Greater Cleveland Area Environmental Water Quality Assessment 1993 - 1995

GREATER CLEVELAND AREA
ENVIRONMENTAL WATER QUALITY ASSESSMENT
1993 - 1995

NORTHEAST OHIO REGIONAL SEWER DISTRICT

Printed on Recycled Paper

July 1997

Northeast Ohio Regional Sewer District
Water Quality & Industrial Surveillance
Environmental & Maintenance Services Center
4747 East 49th Street
Cuyahoga Heights, Ohio 44125-1011

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EXECUTIVE SUMMARY

The 1993-1995 Greater Cleveland Area Environmental Water Quality Assessment is the Northeast Ohio Regional Sewer District's fifth comprehensive report on water quality within its service area. Previous reports were prepared for 1987, 1988, 1989-1990 and 1991-1992. Early responsibilities of the Water Quality and Industrial Surveillance Environmental Assessment program included visual surveys of area streams and follow-up inspections to environmental disruptions; in-field measurements of temperature, dissolved oxygen and stream flow rate; collection of samples for the analysis of chemical and bacteriological parameters; and qualitative sampling of benthic macroinvertebrates.

Since 1987, the Environmental Assessment program has been expanded to include the following:

- Routine monitoring of additional sites on a greater number of streams.
- The collection of samples for chemical and bacteriological analysis at 15 sites in the near shore area of Lake Erie.
- Quantitative and semi-quantitative sampling of benthic macroinvertebrates and the corresponding use of Ohio EPA's Invertebrate Community Index (ICI) and the Hilsenhoff Biotic Index (HBI) to evaluate macroinvertebrate communities.
- Quantitative sampling for fish using long-line and boat electroshocking techniques and the corresponding use of Ohio EPA's Modified Index of Well-Being (MIwb) and Index of Biotic Integrity (IBI) to evaluate fish communities.
- The evaluation of aquatic habitat using Ohio EPA's Qualitative Habitat Evaluation Index (QHEI).

Additional, related monitoring activities are conducted by the NEORSD Analytical Services department. This includes bioassay testing of wastewater treatment plant effluents and environmental waters using *Ceriodaphnia dubia* (water fleas) and *Pimephales promelas* (fathead minnows). During the months of May through September, the department also conducts daily monitoring of fecal coliform and *E. coli* bacteria levels at Edgewater and Euclid beaches.

The charge of the NEORSD Environmental Assessment program, which has remained in effect since the program's inception, is as follows:

1. To document water quality improvements due to NEORSD facilities and programs;

2. To determine sources of environmental disruptions and make recommendations for their elimination;

3. To coordinate monitoring activities with other agencies with interests in water quality;

4. To provide a scientifically sound current information basis for environmental planning and future abatement projects.

While past NEORSD Environmental Water Quality Assessment reports have presented data confirming the dramatic improvement in the area's surface water quality, a significant success of the program has been the discovery and resulting elimination of numerous unaddressed sources of pollution. This report cites 98 specific environmental disruptions identified and/or responded to by NEORSD investigators from 1993 through 1995. These disruptions included sewerage leaks and cross connections, dry weather combined/sanitary sewer overflows, industrial and commercial oil and chemical spills, and landfill leachate. Sixty-seven of the investigations concluded with effective remedial action being taken.

During 1993, 1994 and 1995, investigators collected 270 routine water quality samples from 75 sites on 18 area streams. Each sample was analyzed for up to 37 physical, chemical and bacteriological parameters. Two hundred three of the samples were collected at stream sites which have been designated as surface waters by Ohio EPA.

Because the frequency with which the NEORSD Environmental Assessment Group is able to collect samples at each location is limited, the following qualifications are employed when comparing routine water quality sampling data to Ohio water quality standards.

1. When no maximum criterion exists for a certain chemical parameter (e.g. iron), the failure of a single sample to meet the 30-day average criterion for that parameter is not considered to be an excursion from Ohio water quality standards.

2. The numerical and narrative criteria for Ohio's recreational use designations are shown in Table ES-1. The criteria apply outside of mixing zones, and for each designation, at least one of the two bacteriological standards (fecal coliform or *E. coli*) must be met. The first portion of the standard for each designation, which clearly requires the collection of at least five samples within a 30-day period, can not be applied to routinely collected NEORSD data. Only the second portion, which for the fecal coliform standard of the primary contact recreational use designation states: "...shall not exceed 2,000 per 100 ml in more than ten percent of the samples taken during any thirty-day period," is applied to routine samples collected by NEORSD.

TABLE ES-1

Narrative and numerical criteria for Ohio EPA's Recreational Use Designations (O.A.C. 3745-1-07):

BATHING WATERS

Fecal coliform - geometric mean fecal coliform content (either MPN or MF), based on not less than five samples within a thirty-day period, shall not exceed 200 per 100 ml and [fecal coliform content (either MPN or MF)] shall not exceed 400 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

E. coli - geometric mean *E. coli* content (either MPN or MF), based on not less than five samples within a thirty-day period, shall not exceed 126 per 100 ml and [*E. coli* content (either MPN or MF)] shall not exceed 235 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

PRIMARY CONTACT

Fecal coliform - geometric mean fecal coliform content (either MPN of MF), based on not less than five samples within a thirty-day period, shall not exceed 1,000 per 100 ml and [fecal coliform content (either MPN or MF)] shall not exceed 2,000 per 100 ml in more than ten per cent of the samples taken during any thirty day period.

E. coli - geometric mean *E. coli* content (either MPN or MF), based on not less than five samples within a thirty day period, shall not exceed 126 per 100 ml and [*E. coli* content (either MPN or MF)] shall not exceed 298 per 100 ml in more than ten per cent of the samples taken during any thirty-day period.

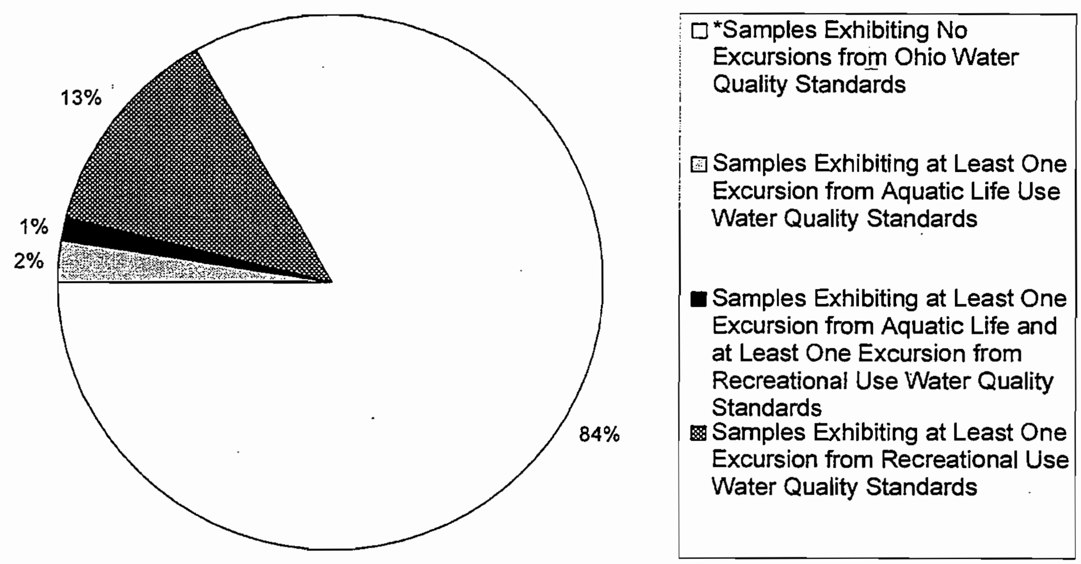
SECONDARY CONTACT

Fecal coliform - shall not exceed 5,000 per 100 ml (either MPN or MF) in more than ten per cent of the samples taken during any thirty day period.

E. coli - shall not exceed 576 per 100 ml in more than ten per cent of the samples taken during any thirty day period.

With the conditions listed above and the exclusion of two concentrations which were measured at or below practical quantification levels[1], a total of 37 excursions from Ohio water quality standards were recorded in 34 of the 270 samples. Thirty-six of the excursions were for parameters typically associated with sanitary sewage - fecal coliform and/or *E. coli* bacteria and dissolved oxygen. The final excursion was for oil and grease, a pollutant typically associated with industrial discharges, at Big Creek Site #27. Figure ES-1 illustrates the proportion of routine stream samples which exhibited excursions from Ohio water quality standards and Figure ES-2 breaks the excursions down by parameter.

Figure ES - 1
Comparison of Routine NEORSD Stream Samples to OEPA Water Quality Standards
1993 - 1995



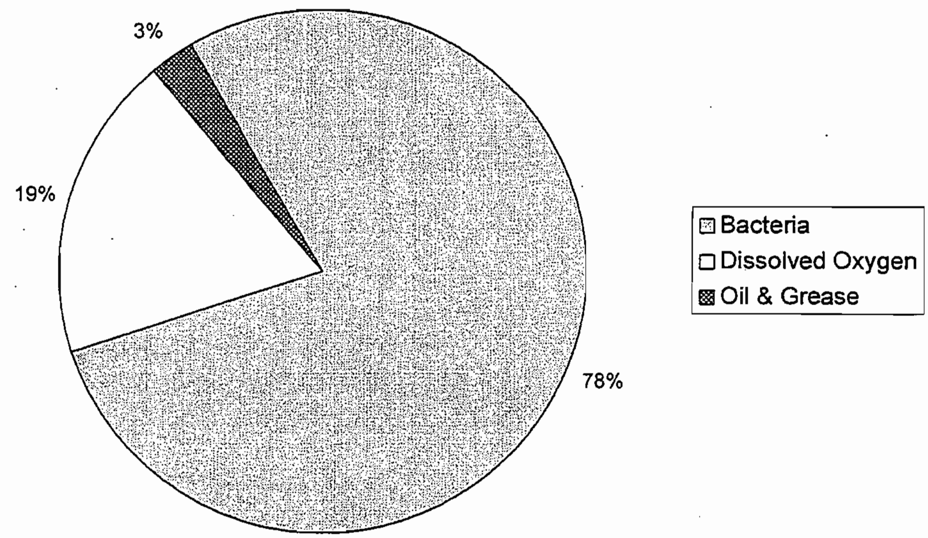
*Includes single samples exhibiting excursions from 30-day average criteria where maximum aquatic life criteria are lacking

Twenty-nine of the 37 excursions were caused by elevated concentrations of fecal coliform and/or *E. coli* bacteria. As noted in previous NEORSD Environmental Assessment reports, elevated fecal coliform levels have been the most valuable indicators in the identification of sources of stream pollution. Fecal coliform bacteria are found in the intestinal tracts of warm-blooded animals including humans. Elevation of their concentration by as much as several orders of magnitude in urban or suburban waterways provides an indication of contamination by sanitary sewage. Fecal coliform bacteria are not necessarily harmful to aquatic life or humans, but the sanitary sewage in which they are carried is likely to also carry heavy loads of decomposing organic

[1]A practical quantification level is defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions and is set at five times the method detection limit.

waste, which is harmful to aquatic ecosystems, and pathogens, which can pose a threat of disease through human contact.

Figure ES - 2
Breakdown of NEORSD Measured Water Quality Standards Excursions by Parameter, Routine Stream Samples
1993-1995



Another valuable indicator of environmental disruptions in streams is the benthic macroinvertebrate community. Benthic macroinvertebrates are aquatic organisms which inhabit the bottom regions of water bodies and include insect larvae, crustaceans, snails, clams, worms, etc. A high diversity of benthic macroinvertebrates is typically indicative of a healthy ecosystem, while a low diversity is usually indicative of an ecosystem under environmental stress, such as from pollution. Furthermore, various taxa of benthic macroinvertebrates exhibit various sensitivities to pollution, and through identification of the taxa and knowledge of their tolerance of pollution, the quality of a water body over time may be characterized. In this respect, benthic macroinvertebrate data can provide more information than chemical or bacteriological data, because the benthic community reflects all recent stream events and is not just a "snapshot" from the time at which sampling occurs.

Numerical indices of the benthic community utilized by the NEORSD include the Hilsenhoff Biotic Index (HBI) and Ohio EPA's Invertebrate Community Index (ICI). The HBI was calculated for 44 sites for the period 1993-1995. Twenty-one of the sites for which the HBI was calculated during 1993-1995 also had HBI scores calculated for 1991-1992. When the recommended HBI seasonal correction factor of -0.6 is included for samples collected during June, July, and August, narrative ratings of water quality based on the index improved at seven locations, remained constant at 12 locations and declined at two locations. Overall, during 1993-1995, the HBI yielded water quality ratings of "good" at 28 sites, "fair" at 12 sites and "fairly poor" at four sites. The ICI was calculated for a total of 14 sites on the Cuyahoga River, Big Creek and Mill Creek for 1994 and 1995. Narrative ratings of water quality based on the ICI were "good" at four sites, "marginally good" at four sites and "fair" at six sites.

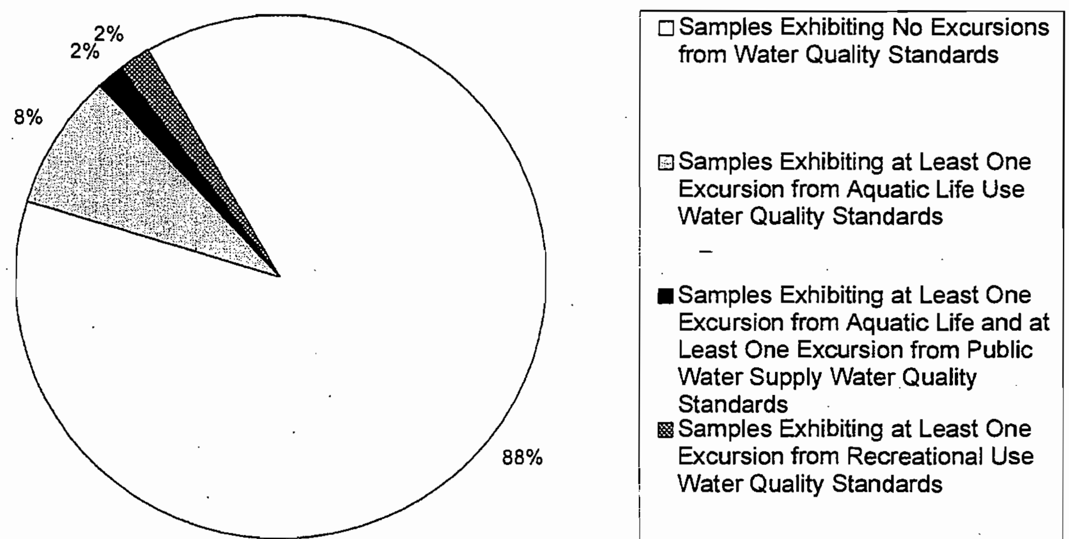
Despite the greater mobility of fish populations than of macroinvertebrate populations, fish community data can also provide useful water quality information. During 1994, as part of its Cuyahoga River Electroshocking/Sediment Study, the NEORSD utilized its electroshocking boat to monitor the fish community upstream and downstream of the Southerly Wastewater Treatment Plant. Although only one sampling pass was completed at each location, results indicated, as they had in the past, that the river was not meeting the biological standards which have been set by Ohio EPA.

Electroshocking using NEORSD's longline electroshocking equipment was also conducted on the Rocky River in 1993 and 1995. The Rocky River sampling was conducted upstream and downstream of the Berea WWTP, before and after its decommissioning. Sample results indicated an improvement in the fish community, both upstream and downstream of the plant, following its decommissioning and the corresponding diversion of flow to the Southwest Interceptor.

Because habitat quality is at least as important to the well-being of aquatic biota as water quality, the NEORSD Environmental Assessment group evaluates aquatic habitat using Ohio EPA's Qualitative Habitat Evaluation Index (QHEI). QHEI scores can provide insight into the extent to which differences in biota can be attributed to water quality versus habitat. This report contains the results of the most recent habitat evaluations conducted by investigators at 65 stream locations. Narrative ratings of habitat quality using the QHEI ranged from "poor" to "excellent."

NEORSD Environmental Assessment efforts for the period 1993 through 1995 also included sampling near the surface of Lake Erie at 12 sites along the greater Cleveland shoreline and near the surface and near the bottom at three sites further offshore near the City of Cleveland's public water supply intakes. One hundred eight lake water samples were collected, each for analysis of up to 33 physical, chemical, and bacteriological parameters. Excluding seven silver concentrations which were at or below practical quantification levels, a total of 17 excursions from Ohio Water Quality Standards were measured in 13 of the 108 samples. Figure ES-3 illustrates the proportion of routine Lake Erie samples which failed to meet Ohio Water Quality Standards. Seven of these excursions - five for dissolved oxygen, one for copper, and one for zinc - were measured just northeast of the Cuyahoga River. Five excursions were measured at Lake Erie Site C. Two of the five excursions measured at Site C (one for dissolved solids and one for copper) were measured near the surface of the lake. The three remaining excursions measured at Site C (one for dissolved solids, one for copper and one for dissolved oxygen) were measured near the lake bottom. One excursion was measured at each of the following locations: Baldwin water intake near the lake bottom (dissolved oxygen), near the Westerly WWTP discharge to Lake Erie (bacteria), near the Easterly WWTP discharge to Lake Erie (bacteria), approximately 300 feet offshore of Euclid Beach (copper), and west of the mouth of the Rocky River (dissolved oxygen).

Figure ES - 3
Comparison of Routine NEORSD Lake Erie Samples to Ohio EPA Water Quality Standards
1993 - 1995



Reports on special projects conducted by the NEORSD Environmental Assessment group, in addition to routine monitoring activities, are contained in the appendices to this report. Two of those projects, Cuyahoga River monitoring upstream and downstream of the Southerly Wastewater Treatment Plant, and Rocky River monitoring upstream and downstream of the former Berea WWTP, have already been mentioned briefly. Two other projects merit discussion.

During 1995, the NEORSD conducted a joint study with the Ohio EPA to monitor dissolved oxygen concentrations in the Cuyahoga River Navigation Channel. Dissolved oxygen concentrations were measured near the surface, near mid-depth, and/or near the river bottom at the lower Harvard Avenue bridge and at five locations within the navigation channel. Samples were collected on 46 days from April through October. No failures to meet Ohio's dissolved oxygen standards were measured upstream of the Carter Road bridge. Failures to meet the dissolved oxygen criteria for the navigation channel, however, were recorded at Carter Road on three occasions, and at Center Street, which was the furthest downstream monitoring location, on six occasions. The NEORSD has supported a Cuyahoga River Remedial Action Plan study to examine the feasibility of reaerating the navigation channel.

NEORSD investigators also participated in the water quality monitoring portion of the District's Mill Creek Watershed Facilities Plan. The Environmental Assessment Group has been evaluating aquatic habitat, fish and macroinvertebrate communities for several years. To date, however, the Mill Creek project has been the group's most comprehensive evaluation of water quality within a single watershed. Results of the study indicate that although habitat, as measured by Ohio EPA's QHEI, appears to be adequate, macroinvertebrate and fish communities, in general, are not meeting Ohio EPA's biocriteria for Mill Creek. These results may be typical of urban watersheds. According to the Mill Creek Watershed Project Executive Summary, "National data indicate that biology and channel stability of streams in heavily urbanized watersheds suffer tremendously from the effects of runoff. Decreased time of travel and increased peak flows and volume erode habitat that would be present and stable in undeveloped conditions." (NEORSD, 1996, p.46) The Mill Creek Project Executive Summary also indicates that within a watershed, an impervious area of 10 to 15 percent is the threshold for aquatic life degradation. The area of imperviousness within the Mill Creek watershed is approximately 30 percent. The results of the Mill Creek biosurveys were therefore not surprising. As a result of work conducted for the Mill Creek project, the project team has recommended the creation of an urban stream designation which would relate biocriteria to the proportion of impervious land within a watershed. (NEORSD, 1996, pp. 46-47)

Like past NEORSD Environmental Assessment reports, over 100 copies of this report will be distributed to researchers, academia, governmental agencies, and the general public. Peer review and comment are invited.

ACKNOWLEDGMENTS

This report was authored by Cathy Zamborsky, Tom Zablotny, Bill Mack, James Justice, Keith Linn and Frank Foley. Technical guidance was provided by Keith Linn. The information contained herein was provided by numerous members of the Northeast Ohio Regional Sewer District's Water Quality & Industrial Surveillance and Sewer Maintenance & Control departments. The chemical and bacteriological analyses were performed by NEORSD Analytical Services. Benthic macroinvertebrate identification was conducted by Bill Mack. Fish identification was conducted by Tom Zablotny. Maps were prepared by Jeffrey Duke and Biljana Turanovic. Computer programming was performed by Scott Horvath. Typing was performed by Sheree Robinson. The report was edited by Keith Linn, Cathy Zamborsky and Frank Foley.

CUYAHOGA RIVER

In 1969, oil and debris at the Cuyahoga River's head of navigation caught fire, and the "river that burns" received international notoriety. The fire drew attention to the heavily polluted condition of the Cuyahoga River, which flowed orange with industrial and municipal waste under slicks of oil, providing part of the impetus for a worldwide environmental movement.

In the two decades that followed, massive efforts to improve environmental water quality were undertaken by industry and government. Among these efforts was the creation in 1972 of the Cleveland Regional Sewer District, eventually to become known as the Northeast Ohio Regional Sewer District (NEORSD).

At the top of the NEORSD agenda was the clean-up of the Cuyahoga River basin's largest municipal discharge, the Southerly Wastewater Treatment Plant (WWTP). Following years of reconstruction and expansion at the plant, accompanied by intercepting sewer construction, industrial pretreatment installation, and initiation of combined sewer overflow control, dramatic improvements in the water quality of the Cuyahoga River became evident. As the loadings of raw, untreated sanitary sewage to the river dropped between the 1970's and 1980's, so did the levels of fecal coliform bacteria in the water. When the NEORSD installed nitrification as an advanced wastewater treatment stage at the Southerly WWTP in the mid-1980's, levels of ammonia, which is oxygen-demanding and toxic to aquatic life, also dropped. (For quantification of the fecal coliform and ammonia decreases, see NEORSD Greater Cleveland Area Environmental Water Quality Assessment 1989-1990 Report.)

Aquatic organisms returned to the now increasingly habitable river, and between 1988 and 1992, 50 species of fish were found living in the river within the boundaries of Cuyahoga County. The public's appreciation of the Cuyahoga River as a resource also returned as recreational boating on the river and commercial development in the Cleveland Flats along the river banks boomed in popularity.

Nevertheless, the Cuyahoga River's recovery was not yet complete and concerns about the river's water quality remained. Dissolved oxygen deficiencies were being measured periodically in the river's navigation channel. The river was failing to achieve Ohio EPA biological criteria for balanced, reproducing fish and invertebrate populations. Tumors were being found in bottom-dwelling catfish. Analyses of dredged river sediments were revealing levels of contaminants unacceptable for open-lake disposal. Following storms, muddy discoloration and floating debris continued to be eyesores, and elevated wet weather bacterial concentrations continued to raise public health concerns.

Because of the continuing water quality concerns, the International Joint Commission's Great Lakes Water Quality Board identified the Cuyahoga River as one of 43 Areas of Concern in the Great Lakes basin. To restore uses which have been impaired, the eight Great Lakes states and the Province of Ontario have committed to developing a Remedial Action Plan (RAP) for each Area of Concern.

The Cuyahoga River RAP is a joint effort involving state and federal agencies, industrial, commercial, and private interests, community interest groups, and local public jurisdictions. The NEORSD has participated heavily in the Cuyahoga River RAP. The involvement of NEORSD Water Quality & Industrial Surveillance has included providing data for the RAP State One efforts to describe the environmental condition of the Cuyahoga River watershed.

The Cuyahoga River and its tributaries drain approximately 813 square miles of land in northeastern Ohio (SAIC, 1986). The headwaters of the river originate in Geauga County and drop from approximately 1,300 feet above sea level at an average rate of three to four feet per mile. Flowing south/southwest, the river moves through Lake Rockwell in Portage County and then continues west/southwest through Kent. Entering Summit County, the river flows through Cuyahoga Falls and Akron. As the river moves through the Cuyahoga gorge above Akron, it falls at a rate of about 25 feet per mile. At Akron, the river moves north/northwest and continues down through Cuyahoga County and Cleveland, descending at a rate of about five feet per mile. Compared to its upstream stretches, the river is influenced less by dam structures and diversions as it moves from Akron to Lake Erie.

As the Cuyahoga River flows through northeastern Ohio and finally empties into Lake Erie through Cleveland Harbor, it passes through and around urban, suburban, and rural land. Each of the residential, commercial, industrial, agricultural, and recreational uses exert their influences on the river, either directly or indirectly.

The hydrologic characteristics of the Cuyahoga River vary widely depending on regional precipitation, predominant soil types and their water-holding capacities, and the proportion of the drainage basin covered by impermeable surfaces. The latter is especially influential as the river moves through the highly developed Cleveland area. Low-flow levels have been altered upward due to this condition. The soils in the basin range from slightly erodible to highly erodible.

Flow data for the Cuyahoga River is measured by a United States Geological Survey (USGS) station at Old Rockside Road in Independence (RM 13.2). The average flow recorded at this station was 1,177 cubic feet per second (CFS) for water year 1993, 938 CFS for water year 1994, and 730 CFS for water year 1995.

The flow in the Cuyahoga River in its navigable section, downstream of River Mile (RM) 5.6, is strongly influenced by Lake Erie. The dynamics of river and lake mixing near the confluence are primarily a function of the prevailing nearshore currents as well as the physical characteristics of the lower channel and the Lake Erie shoreline. The area where the mixing is most predominant can be considered a freshwater estuary. The effect of Lake Erie on the flow of the Cuyahoga River can be observed as far as six to seven miles upstream. Additionally, the slow moving current in the lower channel has led to the deposition of large amounts of sediment. A high rate of solids settling requires that the lower navigation channel be dredged routinely to maintain a depth of 25 to 30 feet. This sediment has been carried downstream from the river's upper and middle reaches and originates primarily from upland areas in the basin (U.S. Army Corps of Engineers, 1981). River transport of 211,000 and 530,000 tons of sediment per year have been estimated by the USGS and the Army Corps of Engineers, respectively (SAIC, 1986).

In 1993, the Ohio EPA adopted modified aquatic life use designations for the Cuyahoga River Navigation Channel, based upon results of biological and water quality analyses and water quality modeling studies. The Ohio EPA has recognized the habitat restrictions in this river segment resulting from physical factors such as continual dredging, steel shoring of banks, and the total lack of riparian buffer and shallow water habitat.

Water quality modeling studies performed by the Ohio EPA have demonstrated that depressed dissolved oxygen levels in the navigation channel are attributable to the channel's modification for navigation maintenance. The studies showed that natural levels of oxygen-demanding materials would result in periodic failure to attain Warmwater Habitat standards as long as the channel remains at its current depth. However, sufficient decrease in the depth of the channel to ensure Warmwater Habitat standards attainment would preclude navigation.

The use attainability study performed by the Ohio EPA indicates that factors such as the physical habitat and dissolved oxygen levels in the ship channel are inadequate to support warmwater aquatic life habitation. A biological survey of the navigation channel showed substantially degraded fish and benthic macroinvertebrate communities. In addition, the modification of the channel for navigation precludes the potential for the recovery of balanced, reproducing populations of warmwater fish and invertebrate organisms. However, fish use the navigational channel as a migratory route to spawning locations upstream during spring months. Therefore, this seasonal and stream flow related use has been recognized and is protected through its use designation (Ohio EPA, 1993).

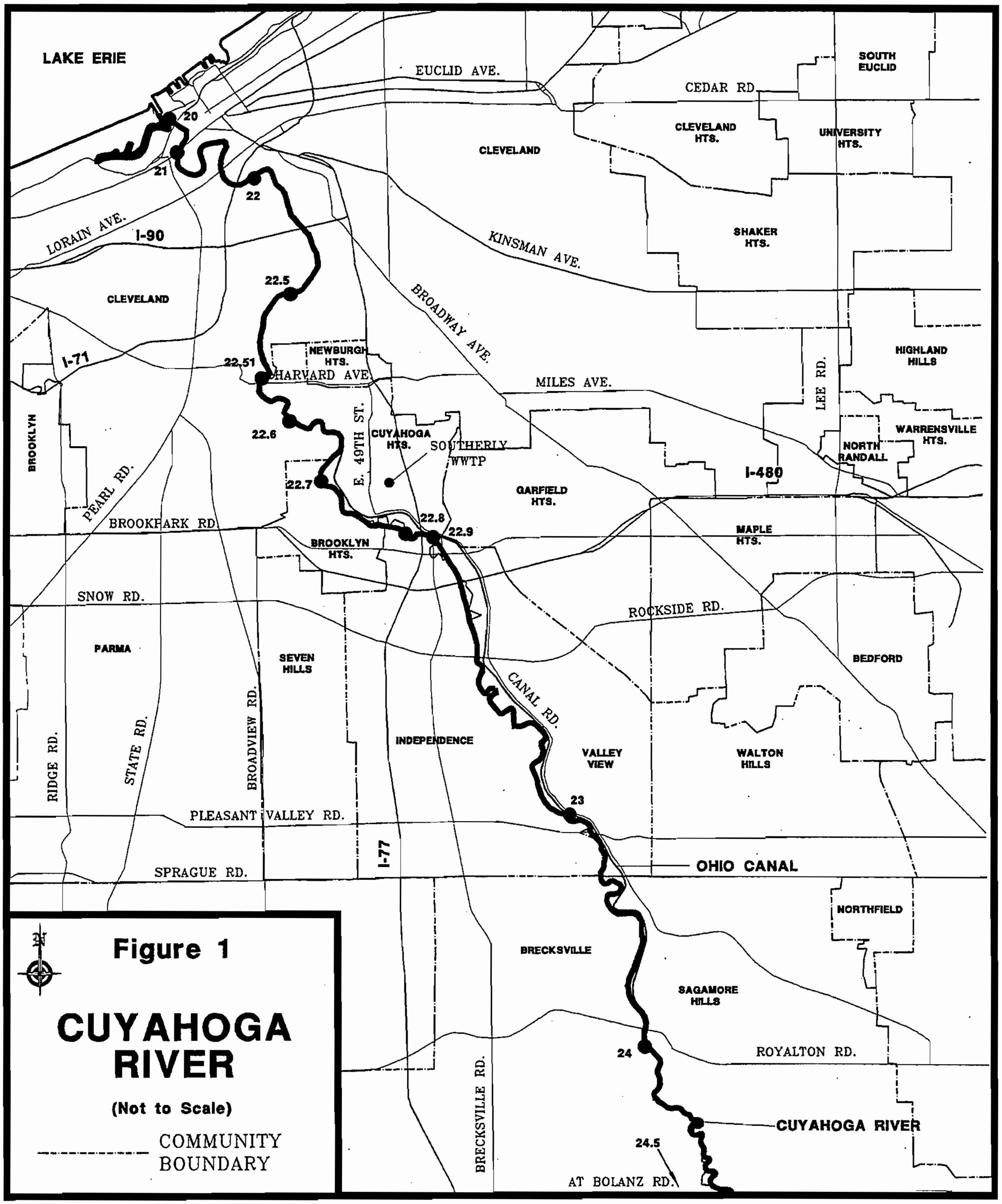
The Ohio EPA has designated the Cuyahoga River Navigation Channel Limited Resource Water - Navigation Maintenance during the months of June through January and during the remaining months of the year whenever the river flow is less than 703 cubic feet per second at the USGS station in Independence. The minimum dissolved oxygen criterion for the Limited Resource Water aquatic life use maintenance is 1.5 mg/L. During the months of February through May whenever the Cuyahoga River flow equals or exceeds 703 cubic feet per second at the USGS station, the aquatic life use is Fish Passage. The Fish Passage use is defined as: those rivers or other water bodies that, "... have been found to be incapable of supporting and maintaining a balanced, integrated, adaptive community of warmwater organisms but are capable of supporting the passage of warmwater fish during migratory periods." (OEPA, 1993) The "minimum at any time" dissolved oxygen criterion for the Fish Passage Aquatic Life Use is 4.0 mg/L (Ohio EPA, 1993). The Cuyahoga River navigation channel has also been designated Industrial Water Supply and Primary Contact Recreational Use by the Ohio EPA.

Upstream of the navigation channel, the Cuyahoga River has been designated State Resource Water, Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreational Use. The Cuyahoga River has also been designated State Resource Water from Rockside Road upstream to its headwaters in Geauga County.

Routine sampling for chemical and bacteriological analysis was performed in 1993, 1994 and 1995 at twelve sites on the Cuyahoga River between the river mouth at RM 0.3 and Bolanz Road in Cuyahoga Valley National Recreation Area at RM 33.2. Chemical and bacteriological data from the Cuyahoga River are presented in Appendix B.

Site #20 (41° 29.93' N, 81° 42.50' W) is off the east bank of the Cuyahoga River at RM 0.3 behind Fagan's Restaurant, located at the intersection of Old River Road and Front Street. The river at this location is approximately 300 feet wide and 30 feet deep. Unidirectional flow in the river is barely evident on most occasions during dry weather conditions. A cessation in flow or backflow, which are occasionally observed, are a result of the interfacing of the river with Lake Erie's waters. At this site and at all of the other sites where the depth is at least three feet, the river generally appears turbid or light brown in color. Small amounts of natural and/or man-made debris have often been observed near the river edge at Site #20. A substrate of fine sediment and muck is typical in the lower navigation channel, and the habitat type can be considered either a very slow run or large pool. It is not a natural, riverine habitat due to the extensive shoreline development, the existence of steel-lined banks with virtually no vegetative cover, and the fact that the channel is routinely dredged to maintain its depth. No QHEI score has been determined at this location.

Site #21 (41° 29.62' N, 81° 42.26' W) is at the north downstream side of the Center Street bridge (RM 1.0). The river at this location is approximately 150 feet wide and 30 feet deep. Like Site #20, this segment of the river is within the navigation channel. Both banks consist of steel seawall with developed shorelines. The water color is light brown and the substrate is silt. Lake-effect backflow has been observed at this site. Samples are collected from the bridge at midstream. No QHEI score has been determined at this site.


LAKE ERIE
EUCLID AVE.
CEDAR RD.
SOUTH EUCLID
CLEVELAND HTS.
UNIVERSITY HTS.
CLEVELAND
20
21
22
LORAIN AVE.
I-90
SHAKER HTS.
KINSMAN AVE.
22.5
CLEVELAND
BROADWAY AVE.
I-71
NEWBURGH HTS.
22.51
HARVARD AVE.
MILES AVE.
LEE RD.
HIGHLAND HILLS
BROOKLYN
22.6
E. 49TH ST.
CUYAHOGA HTS.
SOUTHERLY WWTP
WARRENSVILLE HTS.
NORTH RANDALL
I-480
PEARL RD.
22.7
GARFIELD HTS.
BROOKPARK RD.
22.8
22.9
MAPLE HTS.
BROOKLYN HTS.
SNOW RD.
ROCKSIDE RD.
PARMA
SEVEN HILLS
BEDFORD
CANAL RD.
INDEPENDENCE
VALLEY VIEW
WALTON HILLS
RIDGE RD.
STATE RD.
BROADVIEW RD.
23
PLEASANT VALLEY RD.
I-77
OHIO CANAL
SPRAGUE RD.
NORTHFIELD
BRECKSVILLE
SAGAMORE HILLS
24
ROYALTON RD.
BRECKSVILLE RD.
CUYAHOGA RIVER
24.5
AT BOLANZ RD.
N
Figure 1
CUYAHOGA RIVER
(Not to Scale)
COMMUNITY BOUNDARY

Site #22 (41° 29.43' N, 81° 41.27' W) is at the West 3rd Street bridge in the Cleveland Flats (RM 3.3). The river at this location is approximately 200 feet wide and 28 feet deep. Again, the velocity of flow in the river is very slow and barely evident on most occasions under dry weather conditions. The physical characteristics of the river are very similar to those of Sites #20 and #21, with the exception of a 0.1- to 0.2- mile stretch of exposed earthen bank along the west side of the river at this location. Substrate type and quality are also similar to those of Sites #20 and #21. Samples are collected from the bridge at midstream. No QHEI score has been determined at this site.

Site #22.5 (41° 27.81' N, 81° 40.65' W) is at the Newburg and South Shore Railroad bridge on the property of the LTV Steel Company and can be accessed by following the river onto the steel mill property from either Independence Road or Campbell Road (RM 5.6). There are two parallel railroad bridges located approximately 30 feet apart at the site. The Newburg and South Shore Railroad bridge is located on the upstream side and is the downstream boundary of the Ohio EPA Warmwater Habitat designation. The bridge on the downstream side is at the head of the navigation channel. The river at this location is approximately 150 feet wide and the depth ranges from four feet nearshore to about ten feet midstream. On the upstream side of the twin bridges, the bottom contour is more riverine. On the downstream side, the depth is greater and more uniform due to maintenance dredging. On most occasions while sampling at this site, the accumulation of natural and/or man made debris at the bridge supports, especially near the east bank, has been noted. In this run-type habitat, the substrate is primarily composed of sand and fine gravel midstream and silt and muck along the margins. An industrial setting predominates in the upland area. Separating the river and the industry is a very narrow vegetative buffer upstream of the sampling site. The vegetative buffer begins at Site #22.5 and is more extensive along the east bank than the west bank. As one approaches Site #22.51, which is 1.6 miles upstream at the lower Harvard Avenue bridge, the buffer is intermittent and is interspersed with small sections of open or "raw" land. Also, immediately upstream of Site #22.5, the lower west bank is concrete-lined. Several industrial discharges are evident both upstream and downstream of this site. No QHEI score has been determined at this location.

Site #22.51 (41° 26.77' N, 81° 41.07' W) is at the lower Harvard Avenue bridge (RM 7.1). It is located less than 0.2 miles downstream of the Cuyahoga River/Big Creek confluence. Downstream of the bridge, the river begins to slow as it moves through the "LTV stretch" from RM 7.1 to RM 4.3. Lake Erie has the potential to exert an effect on the river's velocity as far upstream as this site. In 1992, Site #22.51 obtained a QHEI score of 62 (Appendix F).

Site #22.6 (41° 26.43' N, 81° 40.71' W) is at the west bank of the river adjacent to the River Smelting & Refining Company, 4195 Bradley Road (Rm 7.9). The site can be accessed from Bradley Road (RM 7.0), at the southeast end of the company's dirt-and-gravel front lot. Site #22.6 is about one-half mile upstream of the Cuyahoga

River/Big Creek confluence. In 1992, Site #22.6 obtained a QHEI score of 45.5 (Appendix F).

Site #22.7 (41° 25.36' N, 81° 40.01' W) is at the east bank of the river underneath the crossing of the NEORSD Southwest Interceptor (RM 9.7). This site is located one mile downstream of the effluent discharge from the NEORSD Southerly Wastewater Treatment Plant. The site can be accessed from the tow path which runs between the river and the Ohio Canal. Access can be made to the tow path at the Southerly ash lagoons off Canal Road. Located upstream between RM 10.0 and RM 10.5 are three demolition material disposal sites. Two disposal sites are situated on the west bank and one site is located on the east bank. Site #22.7 obtained a QHEI score of 54 in 1992 (Appendix F).

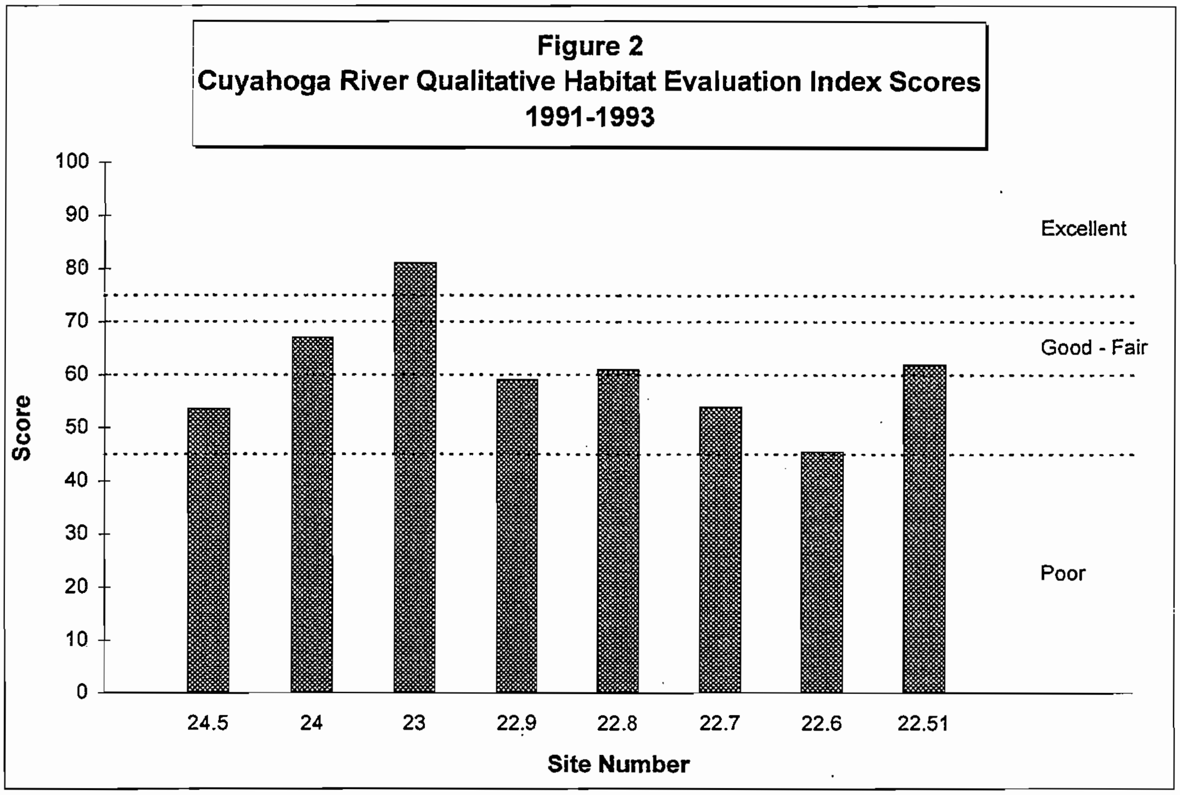
Site #22.8 (41° 26.56' N, 81° 39.61' W) is at the chlorine-access railroad bridge to the Southerly WWTP and is located near the southwest end of the plant's ash lagoons (RM 11.3). This site is about one-half mile upstream of the effluent discharge from the NEORSD Southerly WWTP and 0.1 miles downstream of the West Creek confluence. The site can be accessed from Canal Road across from the NEORSD Southerly Wastewater Treatment Plant's main entrance gate. In 1992, Site #22.8 obtained a QHEI score of 61 (Appendix F).

Site #22.9 (41° 26.51' N, 81° 39.18' W) is at the railroad bridge crossing southeast of the intersection of East 71st Street and Canal Road (RM 11.7). This site is located 0.2 miles downstream of the Mill Creek confluence. Site #22.9 obtained a QHEI score of 59 in 1992 (Appendix F).

Site #23 (41° 21.86' N, 81° 39.69' W) is located at the Old Riverview Road bridge (RM 16.8). This site is in the Cuyahoga Valley National Recreation Area (CVNRA) and is located 0.2 miles downstream of the Cuyahoga River/Tinkers Creek confluence. The site can be accessed from Canal Road at the intersection with Tinkers Creek Road. In 1992, Site #23 obtained a QHEI score of 81 (Appendix F).

Site #24 (41° 19.29' N, 81° 35.21' W) is located downstream of the State Route 82 bridge (RM 20.8). This site is also in the CVNRA and is located downstream of the Cuyahoga River/Chippewa Creek confluence. This site can be accessed from Riverview Road south of its intersection with State Route 82. In 1992, Site #24 obtained a QHEI score of 67 (Appendix F).

Site #24.5 (41° 11.95' N, 81° 34.14' W) is located east of the intersection of Bolanz Road and Riverview Road in Summit County at RM 33.2. This site is approximately four miles downstream of the City of Akron Wastewater Treatment Plant effluent discharge and less than 0.2 miles upstream of the Cuyahoga River/Furnace Run confluence. Site #24.5 was selected to evaluate Cuyahoga River water quality upstream and outside of the NEORSD service area for comparison with downstream water quality. In 1992, Site #24.5 obtained a QHEI score of 53.5 (Appendix F).



Benthic Macroinvertebrate Sampling on the Cuyahoga River

In 1994, benthic macroinvertebrates were collected from Sites #24.5, #24, #23, #22.9, #22.73, the Southerly Wastewater Treatment Plant (SWWTP) effluent channel, #22.72, #22.71, #22.7, #22.69 and #22.61. The samples were used to calculate Hilsenhoff Biotic Index (HBI), Shannon Diversity Index ($\bar{d}$), total taxa, Ephemeroptera + Plecoptera + Trichoptera taxa (EPT), and percent EPT composition (Table D-1, Appendix D). In addition, the Invertebrate Community Index was calculated for Sites #22.73, #22.71, #22.7 and #22.61. The following is a list of site descriptions for non-routine Cuyahoga River sample locations:

Site #22.73 (River Mile 11.0) is located approximately 1,000 feet upstream of NEORSD's Southerly Wastewater Treatment Plant (WWTP) effluent channel.

The Southerly WWTP effluent channel enters the Cuyahoga River from the east bank at River Mile 10.83. The sample is taken from the effluent channel, approximately 100 feet upstream of its confluence with the Cuyahoga River.

Site #22.72 (River Mile 10.82) is located approximately 400 feet downstream of the Southerly WWTP effluent channel. This site, also referred to as the near field site, is located upstream of the Kurtz Brothers demolition material disposal site located on the east bank of the river.

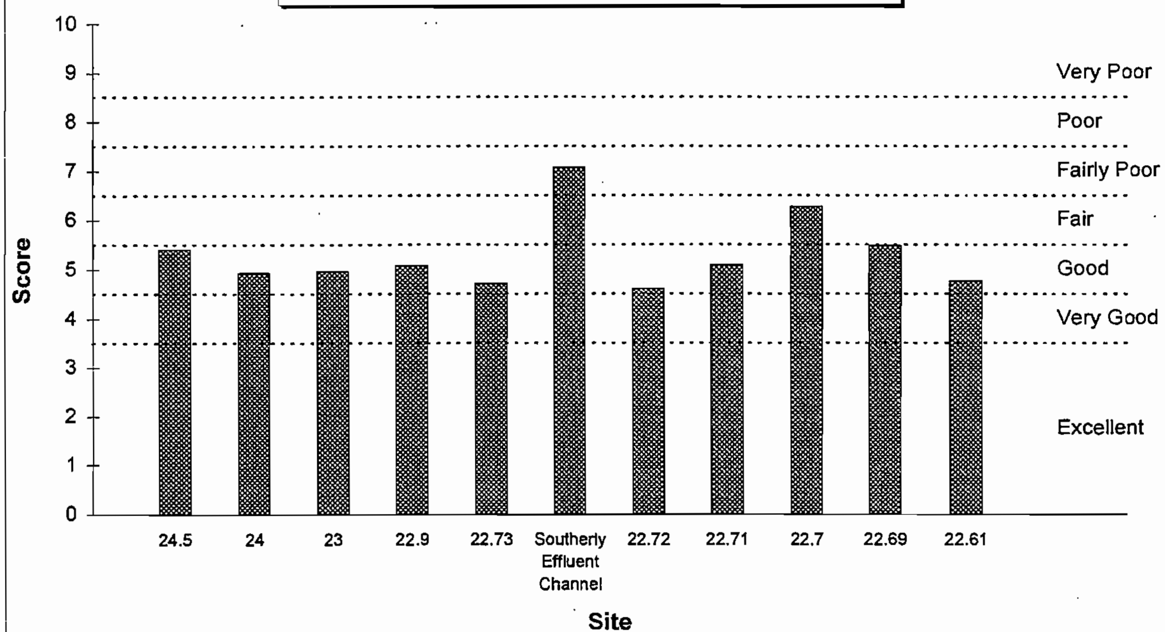
Site #22.71 (River Mile 10.5) is located approximately 1,700 feet downstream of the effluent channel. This site is referred to as the "far field" site.

Site #22.69 (River Mile 9.5) is located approximately 1,000 feet downstream of the Southwest Interceptor crossing.

Site #22.61 (River Mile 8.5) is located approximately 100 feet upstream of the Ohio Canal's confluence with the Cuyahoga River.

Cuyahoga River HBI scores calculated for 1994 are presented in Figure 3. The scores remained fairly constant from Site #24.5 downstream to Site #22.61. All sites received HBI narrative ratings of "Good" except Site #22.7 and the Southerly WWTP effluent channel. These two locations received narrative ratings of "Fair" and "Fairly Poor," respectively.

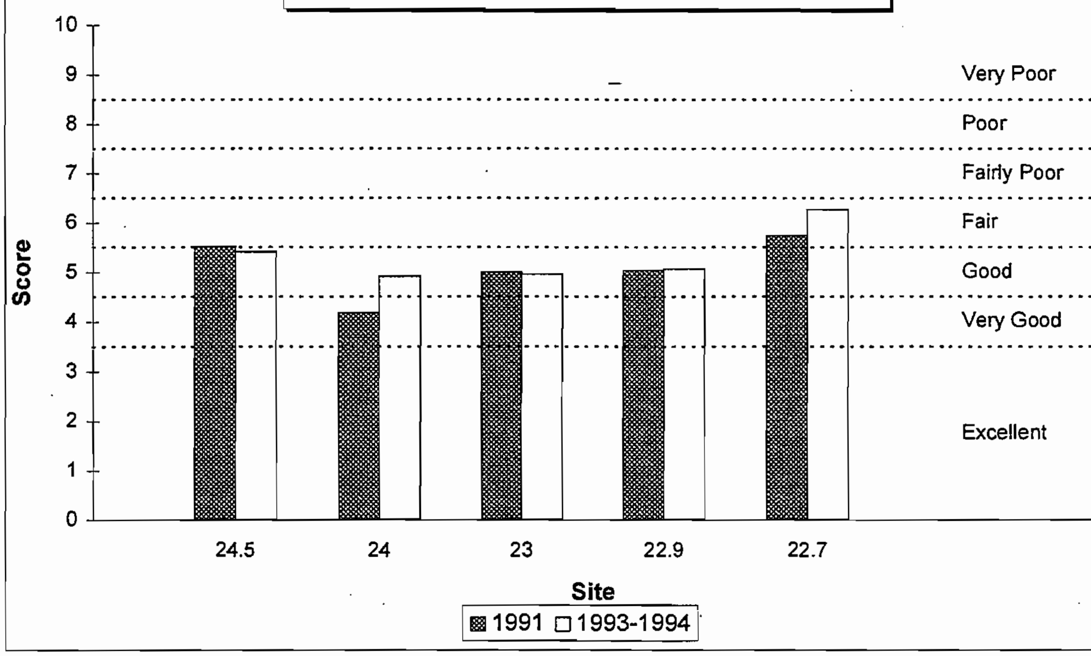
Figure 3
Cuyahoga River Hilsenhoff Biotic Index Scores
1994



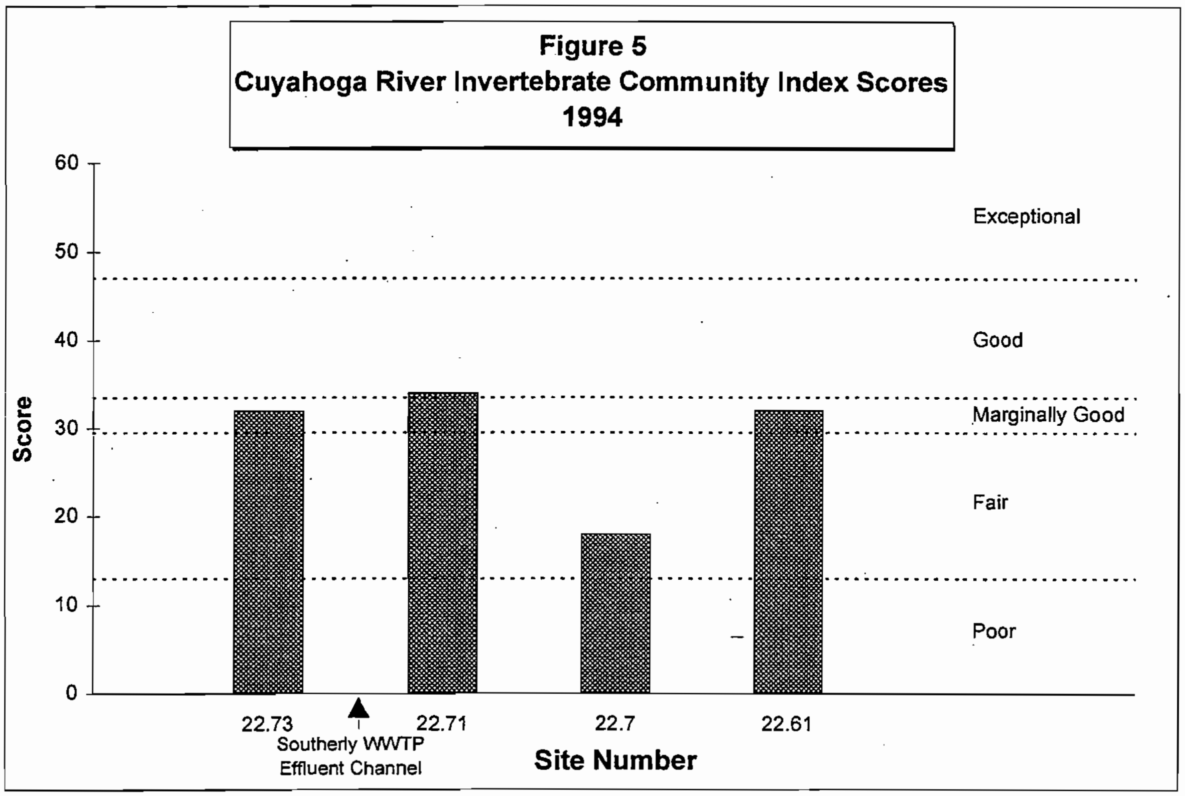
A comparison of HBI scores from 1991 and 1994 for Sites #24.5, #24, #23, #22.9 and #22.7 is presented in Figure 4. One noticeable distinction between the 1991 and 1994 collections was a decrease in the percent EPT composition and a general increase in the Shannon Diversity Index. While there were some fluctuations in the scores for total taxa and EPT taxa, these metrics did not show an appreciable change. Although these differences are an indication of a shift in the macroinvertebrate community's structure, HBI scores in general did not indicate significant changes in water quality.

In addition to kick-net sampling, NEORSD collected macroinvertebrate samples using Hester-Dendy artificial substrate samplers at four sites on the Cuyahoga River in 1994. One sampler was located upstream of the Southerly WWTP (Site #22.73) and three were placed downstream of Southerly (Sites #22.71, #22.7 and #22.61). Macroinvertebrate data collected using the artificial substrates was used to calculate Invertebrate Community Index (ICI) scores, which are presented in Figure 5. Site #22.71 was the only one of the four sample locations to achieve the minimum ICI criterion score of 34 required by the Warmwater Habitat Aquatic Life Use Designation. Sites #22.73 and #22.61 were close to attainment with ICI scores of 32. Site #22.7 received the lowest calculated score of 18.

Figure 4
Cuyahoga River Hilsehoff Biotic Index Scores
1991-1994



Analysis of the data compiled through kick-net and artificial substrate sampling in 1994 indicate that the macroinvertebrate community at Site #22.7 may be impaired. In 1994, concentrations of chemical and bacteriological parameters measured at Site #22.7 were comparable to concentrations measured upstream, at Site #22.8, and downstream, at Site #22.6. Concentrations of chemical and bacteriological parameters measured at Site #22.7 in 1994 were also comparable to concentrations measured at the same site in 1988 and 1991 (data on file at NEORSD-WQIS). However, during the period of 1988 to 1994, the habitat around Site #22.7 underwent extensive modification.



Since 1988, the continued expansion of disposal facilities on both the east and west banks of the river has occurred. This expansion has involved the complete clearing of vegetation near the river's edge. The process of land clearing leaves areas of barren earth more susceptible to erosion during rain events and reduces the protective riparian buffer zone that aids in the protection against erosion. Fine inorganic sediment from cleared areas can be washed into the river during rain events and clouds of dust generated in the daily operation of the disposal facilities can be deposited in the river. These land clearing practices and destruction of riparian buffer zones negatively affect macroinvertebrate communities downstream of such affected areas.

The impaired macroinvertebrate community may be attributable to the changes in habitat and land-use practices upstream of Site #22.7 which result in increased sediment loadings to the Cuyahoga River (see also Appendix K - 1994 Cuyahoga River Electroshocking/Sediment Sampling Study). The habitat at Site #22.7 includes a slow current and no riffles, making it a depositional area. Depositional areas with slow currents and pools are more sensitive and quicker to respond to increased sediment loads than riffle areas (Cline et. al. 1982; Logan and Brooker, 1983). Deposited inorganic material can interfere with the respiratory processes of many macroinvertebrate species and can smother organic food particles, resulting in reduced food supplies. Such processes adversely impact downstream macroinvertebrate communities, primarily mayfly and caddisfly taxa. An analysis of Cuyahoga River macroinvertebrate community data reveals several trends which further indicate that increased sedimentation has impaired the macroinvertebrate community at Site #22.7. A reduction in the percent caddisfly composition in both kick-net and artificial substrate collections at Site #22.7 may be attributed to increased sedimentation, because net spinning caddisflies are especially sensitive to increased turbidity (Roback, 1962).

The differences in 1994 ICI scores from Sites #22.73, #22.71 and #22.7, can be attributed to decreases in caddisfly and mayfly taxa. In 1994, six caddisfly taxa and four mayfly taxa were collected at Site #22.73, six caddisfly taxa and six mayfly taxa were collected at Site #22.71 and only three caddisfly taxa and four mayfly taxa were collected at Site #22.7. The corresponding percent caddisfly and mayfly compositions revealed a similar trend with Site #22.73 having a caddisfly composition of 24.4% and a mayfly composition of 1.23%, Site #22.71 having caddisfly and mayfly compositions of 24.4% and 10.7%, respectively, and Site #22.7 having a caddisfly composition of 0.3% and a mayfly composition of 0.7%.

A similar trend was observed in HBI scores for Sites #22.73, #22.71 and #22.7. The higher score of 6.27 at Site #22.7 can be attributed in part to decreases in percent EPT composition. In 1994, percent EPT composition was 75.4% at Site #22.73, 72.5% at Site #22.71, and 45.8% at Site #22.7.

Analysis of the above data and observations of increased abundances of organisms such as chironomids and oligochaetes (data on file at NEORSD - WQIS) indicate that Site #22.7 is most likely impacted from increased sedimentation, possibly as a result of land practices at upstream disposal facilities. This is a classic response of a macroinvertebrate community to increased sediment loadings (Waters, 1995). The reduction in caddisfly and mayfly taxa at Site #22.7 may also indicate a negative impact from disposal facilities located along the river, because run-off from land clearing and development have a negative effect on benthic macroinvertebrate numbers and species richness (Hogg and Norris, 1991). It should be noted that ICI scores measured by NEORSD for Site #22.7 have steadily declined from 32 in 1988 to 24 in 1991 and to 18 in 1994 while the disposal facilities immediately upstream have expanded.

Problems and Remediation:

- 1 -

Historically, NEORSD has responded to numerous odor complaints in the Bradley and Jennings Roads area. These odors were found to be associated with leachate from the Bradley Road and Northcoast Disposal Landfills, which flows into the Spring Creek culvert, a tributary of the Cuyahoga River. An extensive investigation of this area was performed in 1992 and the results appear in the Greater Cleveland Area Environmental Water Quality Assessment 1991-1992 Report.

On January 25, 1993, NEORSD investigators observed evidence of sanitary sewage in the Spring Creek culvert while monitoring manhole atmospheres. Bacteriological sampling conducted at various locations along the Spring Creek culvert revealed fecal coliform concentrations ranging from 2,100 to 120,000 organisms per 100 mL. The source of this bacterial contamination was not identified.

On April 29, 1993, NEORSD investigated complaints of strong sewage odors at 833 Gino Lane. During the investigation, no sewage odors were detected and no signs of raw sewage were observed in the Spring Creek culvert which runs near the aforementioned property. The complaints were attributed to hydrogen sulfide odors coming from the Spring Creek culvert.

\- 2 -

NEORSD investigators responded to a fuel oil spill on the Cuyahoga River at Drydock Avenue upon the request of the U.S. Coast Guard on April 28, 1993. The oil was entering the river via a storm sewer outfall and was traced to the vicinity of Fleet Supplies, Inc. located at 215 Mahoning Avenue. Although no leaks or spills were detected in Fleet Supplies' underground storage tanks, laboratory analyses conducted by the U.S. Coast Guard indicated that samples taken from the storage tanks and the storm sewer were identical. The U.S. Coast Guard placed an absorbent boom in the river and an absorbent pillow in the storm sewer to collect the spilled fuel oil.

\- 3 -

On July 2, 1993, NEORSD investigated a report of an oil sheen on the Cuyahoga River at the lower Harvard Avenue bridge. The report was communicated to NEORSD staff by a representative of the Cuyahoga County Local Emergency Planning Committee. The sheen was traced to an 8-inch storm sewer outfall from which a black liquid was discharging. This storm sewer receives run-off from Aluminum Waste Recovery which is located at 4181 Bradley Road. The Emergency Spill Response Company, a private firm, erected a boom on the river to contain the spilled material. Although their assistance was not requested, company representatives had heard Cuyahoga County Emergency Communications System (CECOMS) radio transmissions and responded to the incident voluntarily.

\- 4 -

On November 3, 1993 NEORSD investigators responded to a report of chemical dumping at Nanofilm Corporation located at 10111 Sweet Valley Drive. An inspection of Nanofilm Corporation property revealed that employees were washing out 55-gallon barrels that had contained lens cleaner (containing isopropanol, ethanol, and glycol ether) and discharging the rinse water to a catch basin. The catch basin was found to be tributary to a ditch that empties into the Cuyahoga River. Investigators advised

Nanofilm Corporation officials that all future discharges of this material should be to the sanitary sewer.

\- 5 -

An inspection and dye test of Ferry Cap and Set Screw Company at 2151 Scranton Road, on April 25, 1994, found wastewater from their pickling operation discharging to the Cuyahoga River via an improper connection to a storm sewer. Average results of sampling of the pickling wastewater conducted by NEORSD prior to that date were as follows: flow - 26,000 gpd, BOD - 25 mg/L, COD - 32 mg/L, suspended solids - 265 mg/L, oil & grease - 25 mg/L, copper - 0.28 mg/L, iron - 53 mg/L, and lead - 0.19 mg/L. Ferry Cap and Set Screw Company representatives were advised to reroute the discharge to the sanitary sewer. Subsequent dye tests performed on July 12, 1994, confirmed the rerouting of the pickling operation wastewater, but process wastewater from Eagle Furniture Stripping Company, a tenant at Ferry Cap and Set Screw, was still discharging to the storm sewer. Again, Ferry Cap and Set Screw was advised to correct the improper connection. A follow-up inspection conducted on August 4, 1994, confirmed that the process wastewater had been connected to the sanitary sewer.

\- 6 -

On June 14, 1994, The Cuyahoga County Emergency Communications System (CECOMS) advised NEORSD of a No. 6 fuel oil spill on the Cuyahoga River from LTV Steel. A 2-inch fuel supply line had sprung a leak, allowing 720 to 1000 gallons of oil to enter the Cuyahoga River through a storm sewer before it was detected. Samsel Services was contracted to remove the oil from the river.

\- 7 -

On July 19, 1994, NEORSD investigators discovered a soapy dry weather discharge from an 18-inch outfall on the Cuyahoga River near the Station Road bridge. The source of the dry weather flow was ascertained to be septic tanks in the area of Cinnabar Drive and Route 82 in Brecksville.

\- 8 -

On July 26, 1994, NEORSD investigators responded to a report of a green substance in the Cuyahoga River at Jim's Steak House located at 1800 Scranton Road, Cleveland. The green color was a dye being used by a local plumbing company to test window well drains on Jim's Steak House property.

\- 9 -

On August 30, 1994, NEORSD investigated reports of strong odors and a gray-colored discharge from a storm sewer outfall at 4294 Sky Lane Drive. Investigators observed what appeared to be piles of steel mill slag downstream of Skylane Drive, in the Bradley Road landfill. During their inspection, however, they did not observe the gray-colored discharge.

- 10 -

On February 8, 1995, NEORSD Sewer Maintenance and Repair personnel discovered a surcharged Cuyahoga Valley Interceptor manhole near Valley Lane Drive and Andover Boulevard in Garfield Heights. The surcharged manhole caused a dry weather overflow of an estimated 28,000 gallons of sanitary sewage to an unnamed tributary of the Cuyahoga River. The Ohio EPA was notified that day, and Alcon Construction Company was contracted to perform emergency repairs. The 8-inch sanitary sewer line was cleared of a blockage on February 9, 1995, thereby eliminating this source of pollution to the Cuyahoga River.

- 11 -

On March 20, 1995, NEORSD responded to a report of an oil sheen on the Cuyahoga River at the lower Harvard Avenue bridge. The source of the sheen was Wabash Alloys at 4365 Bradley Road. Oil, from lubricated aluminum turnings being stored on the property, was entering a floor drain tributary to a 12-inch outfall pipe that discharged to the Cuyahoga River. Wabash Alloys was advised to erect booms to contain the oil which was discharging from the outfall. A follow-up investigation on March 22, revealed that the floor drain and the 12-inch outfall were both sealed. The oil-contaminated soil and rocks below the outfall had been removed by Industrial Vacuuming Service Corporation.

- 12 -

On April 17, 1995, NEORSD investigators responded to a complaint of a white discharge behind 4851 Van Epps Road in Brooklyn Heights. The white discharge was found to be run-off from steam cleaning of construction vehicles at Cleveland Cement Contractors, Inc. located at 4823 Van Epps Road. The run-off entered a yard drain and discharged into a ravine which is tributary to the Cuyahoga River via a 6-inch outfall pipe. Cleveland Cement Contractors, Inc. was advised to reroute the run-off from the steam cleaning operation to the sanitary sewer. The company currently has plans to construct a wash area to house its steam cleaning operation. Wastewater from the new wash area will be routed to the sanitary sewer.

- 13 -

On April 22, 1995, NEORSD investigators responded to a complaint of a petroleum product in the sewer system at 9685 Whitewood Road in Brecksville. An estimated ½ to 1 gallon of petroleum product was observed in an unnamed tributary of the Cuyahoga River just below a storm sewer outfall north of 9775 Whitewood Road. The

Brecksville Fire Department was notified and assisted NEORSD in remediation efforts. Investigators were unable to identify the source of the petroleum product.

- 14 -

The U.S. Coast Guard investigated a bright green color in Brandywine Creek, which is a tributary of the Cuyahoga River, in Northfield Center Township on August 12, 1995. Unable to determine the cause of the color, the U.S. Coast Guard contacted NEORSD to analyze water samples taken from Brandywine Creek. The green color was determined to be the result of a an algal bloom, which contained the blue-green algae *Anacystis sp.* and *Oscillatoria sp.* The cause of the bloom was undetermined.

- 15 -

On January 26, 1995, NEORSD investigators responded to a reported oil spill at LTV Steel Company's 80-inch hot strip mill roll shop at 3341 Jennings Road. Investigators determined that approximately 20 gallons of Metkool 9300 (water soluble oil), leaked from a 500-gallon tote tank and entered a 72-inch storm sewer that discharges to the Cuyahoga River. Booms were erected and AAA Pipe Cleaning Company was contracted to remove oil from the storm sewer and river. LTV officials informed NEORSD that the floor drain that allowed oil to enter the storm sewer would be sealed. A subsequent inspection by NEORSD investigators revealed that the floor drain was sealed with concrete on January 29, 1995.

- 16 -

In each of its monthly operating reports to Ohio EPA, from March through August 1995, NEORSD reported zinc concentrations in the Cuyahoga River, downstream of the Southerly Wastewater Treatment Plant, which were in excess of Warmwater Habitat chronic outside mixing zone criteria. During the same time period, the Southerly WWTP effluent was within NPDES permit limitations for zinc, and no corresponding high zinc concentrations were found in the Cuyahoga River upstream of the plant.

NEORSD personnel therefore hypothesized that a direct discharger to the Cuyahoga River could be causing the elevated zinc concentrations. In order to prevent environmental degradation to the Cuyahoga River at this location, NEORSD personnel asked Ohio EPA to attempt to identify the source of zinc and take appropriate action to eliminate it. Ohio EPA, however, was unable to identify the source of the zinc.

NEORSD staff observed that the elevated zinc concentrations tended to be preceded by rain events. District investigators therefore instituted a wet weather sampling program at several locations on the Cuyahoga River and its tributaries, between Old Rockside Road and the river's downstream confluence with the Ohio Canal. Analytical results of the wet weather sampling program, however, revealed no elevated zinc concentrations.

Investigators then decided to examine the District's sample collection methods. The Cuyahoga River sample site downstream of the Southerly WWTP consists of a winch and pulley system. This system, which was erected to enable the District to comply with an Ohio EPA request to obtain a midstream sample from the Cuyahoga River, is operated by a two person team. One person cranks a bucket, which travels via steel cable, to the midpoint of the river. A second cable then lowers the bucket. The bucket returns to the riverbank via cable, where the second person fills the sample container.

Standing water collected from the bucket on September 27, 1995, had a zinc concentration of 13.2 mg/L. Investigators believe the samples collected downstream of Southerly were contaminated by the galvanized steel cable used to transport the bucket to midstream. Zinc from the galvanized steel was apparently either flaking off or being dissolved by acidic rainwater.

Southerly WWTP personnel have implemented procedures to eliminate the zinc contamination at this location. The bucket, which previously remained attached to the cable, is now transported to the site each time the sample is collected. More stringent procedures for rinsing the bucket prior to sample collection have also been implemented. No elevated zinc concentrations have been observed at this location since November 11, 1995.

OHIO CANAL

The Ohio Canal, which was opened between Cleveland and Akron in 1827, had replaced the Cuyahoga River as the major transportation artery in this region. The canal system opened Ohio and the Midwest to commerce and industrialization. Fifty-three years later, however, it was replaced as a transportation route by the railroads and subsequently abandoned. What is presently left of the canal system is of not much more than historical significance. The only remaining wetted section stretches for eleven miles northward along the east bank of the Cuyahoga River from the State Route 82 bridge crossing between Brecksville and Sagamore Hills, to the confluence with the Cuyahoga River, approximately 0.7 miles west of the intersection of Grant Avenue and East 49th Street.

The NEORSD incorporated sampling of the Ohio Canal into its Stream Monitoring Program as a result of arguments raised in early 1988 concerning designation of the Cuyahoga River as Warmwater Habitat from River Mile (RM) 10.8 to RM 5.6. Because the lower eleven miles of the canal are fed by the river, the two systems are expected to be quite similar in water quality characteristics. The NEORSD hypothesized that because of this similarity, any major differences in biological condition between the river and the canal must be related to differences in other factors, perhaps the quality of physical habitat and/or erosion and sedimentation. Thus, for experimental and informational purposes, chemical, bacteriological, and benthic sampling has been performed on the canal by the NEORSD.

The exact drainage area tributary to the canal's wetted section is unknown. It is fed by partial flow from the Cuyahoga River, near Site #24, through an inlet structure located just upstream of the low-head dam under the State Route 82 bridge. The canal is receiving flow from the river to provide a source of cooling water for the American Steel and Wire Corporation, located at 4300 East 49th Street in Cuyahoga Heights. The company leases the canal for this purpose from the Ohio Department of Natural Resources, and its intake line is located 0.4 miles upstream of the canal's confluence with the river. Downstream of the diversion of river water into the canal, no other large drainages which would significantly affect its flow are known to enter the canal. The flow in the canal is regulated by the inlet structure and five return structures located along its west bank. The water surface gradient is nearly zero for most of its length, and elevation drops are facilitated by lock structures and weirs.

The Ohio EPA has no current use designation for the Ohio Canal. No QHEI's have been determined for the canal since it is not a natural watercourse. The NEORSD has selected four locations on the Ohio Canal for routine chemical, bacteriological and benthic sampling and analysis (Figure 6). Chemical and bacteriological data from the Ohio Canal are presented in Appendix B.

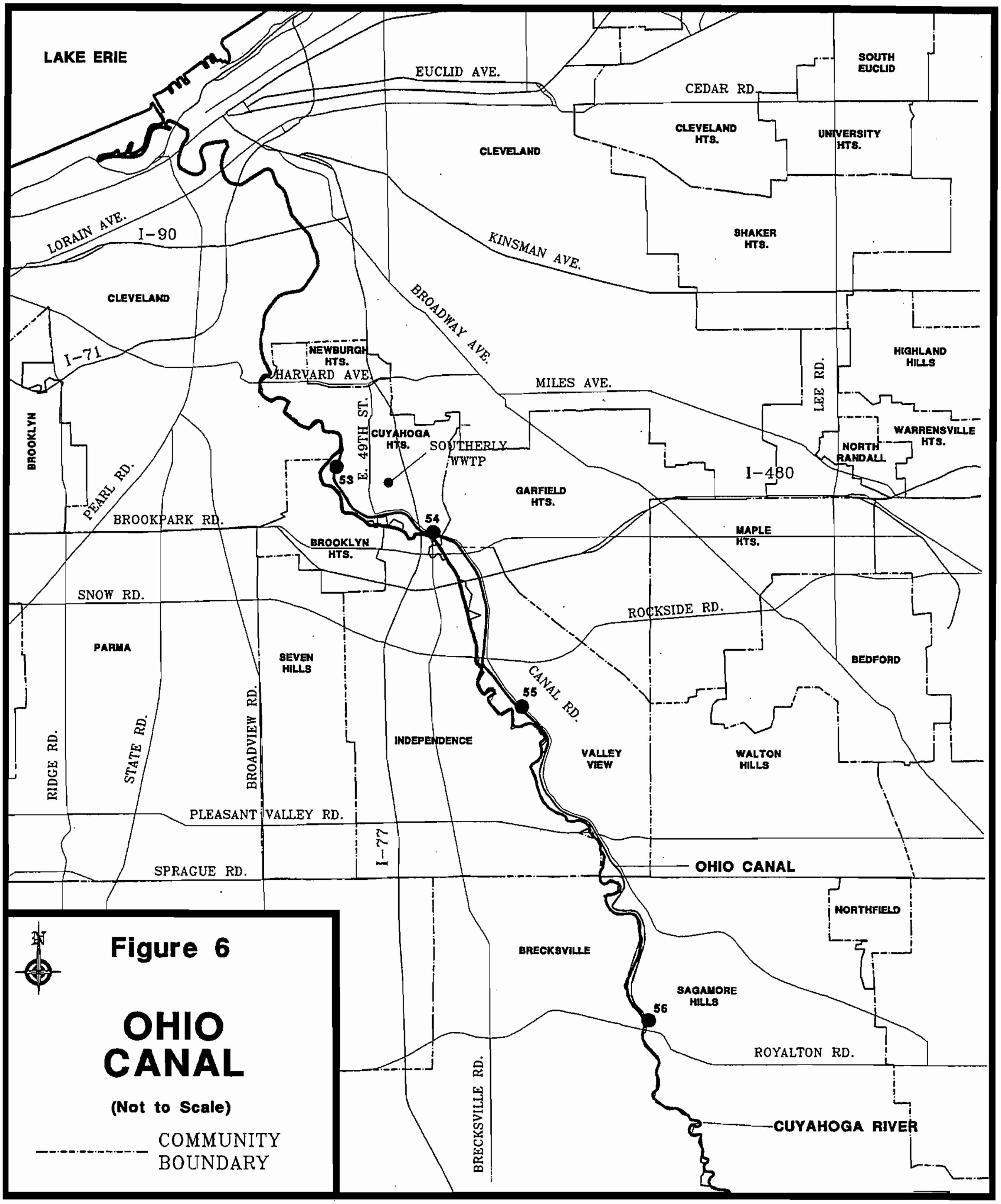


Figure 6

OHIO CANAL

(Not to Scale)

COMMUNITY BOUNDARY

Site #53 (41° 26.27' N, 81° 24.88' W) is approximately 30 feet upstream of the confluence with the Cuyahoga River (RM 8.5). The site can be accessed from a walking trail that travels to the north between the river and the canal for 0.4 miles from the end of the old tow path.

Site #54 (41° 26.58' N, 81° 39.16' W) is located at the railroad bridge crossing near the intersection of East 71st Street and Canal Road. Parallel to this location is Site #22.9 on the Cuyahoga River.

Site #55 (41° 23.04' N, 81° 37.19' W) is located at the Stone Road bridge and can be accessed from Canal Road. This site is located in the Cuyahoga Valley National Recreation Area.

Site #56 (41° 19.17' N, 81° 35.25' W) is located at the inlet structure through which Cuyahoga River flow is diverted into the canal. This site is located in the rural environment of the Cuyahoga Valley National Recreation Area.

Problems and Remediation:

- 1 -

On April 4, 1995, NEORSD investigators responded to a report of oil in the Ohio Canal near the entrance to NEORSD's Southerly Wastewater Treatment Plant, 6000 Canal Road. An inspection of the area revealed a light sheen on the canal from around a 12-inch flap gate on the north bank. The source of the oil was identified as a Kenmore Construction vehicle which ruptured its crankcase. The investigation revealed that approximately one gallon of oil spilled onto the ground. Although some of the oil was cleaned up by company personnel, an undetermined quantity of oil had entered a storm sewer through a parking lot catch basin at the Southerly Wastewater Treatment Plant. The Kenmore Construction Company assumed responsibility for the spill and provided clean-up of the oil.

BIG CREEK

Big Creek drains southwestern Cleveland and the southwest suburbs. It has a total drainage area of 38.6 square miles and a total length of 12.0 miles. Big Creek has two main branches: the East Branch, which originates in North Royalton south of Pleasant Valley Road and flows north through Parma and Parma Heights into Brooklyn; and the West Branch, which originates in Brook Park and flows northeast through the west side of Cleveland into Brooklyn, where it combines with the East Branch. From the confluence of the two main branches, Big Creek flows east through Brooklyn and Cleveland to the Cuyahoga River at River Mile 7.4. Additionally, each branch has a major tributary stream: Stickney Creek, which originates in Parma and flows northwest through a section of Cleveland into Brooklyn, where it combines with the East Branch; and the "Chevrolet" Branch, which originates in Parma south of Brookpark Road and flows northeast into Cleveland, where it combines with the West Branch.

Most of Big Creek is open, with only two major portions culverted: approximately 0.4 miles underneath the Cleveland Metroparks Zoo; and approximately 2.6 miles of the West Branch between West 117th Street and Puritas Avenue.

Along Interstate 71, from downstream of the East and West Branch confluence to Brookside Park, the creek has been relocated and channelized with concrete beds. Other than this 1.6 miles of channelization and the culverted portions, the creek's substrate is predominantly natural.

The creek's drainage area is largely residential and commercial but also includes significant portions of land used for industrial and recreational purposes. The Ohio EPA has designated Big Creek Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreational Use. The Ford Branch of Big Creek has been designated Limited Resource Water and Secondary Contact Recreational Use. Portions of Big Creek within the boundaries of the Cleveland Metroparks have also been designated State Resource Water. Big Creek has six locations that are routinely sampled by NEORSD investigators for chemical, bacteriological, and benthic analysis (Figure 7). Chemical and bacteriological data from Big Creek are presented in Appendix B.

Site #25 (41° 26.72' N, 81° 41.21' W) is located on the main stem downstream of Jennings Road and approximately 900 feet upstream of the confluence with the Cuyahoga River. In 1993, Site #25 obtained a QHEI score of 59.5 (Appendix F).

Site #26 (41° 26.70' N, 81° 45.24' W) is located on the East Branch of Big Creek approximately 100 feet upstream of its confluence with the West Branch. As is the

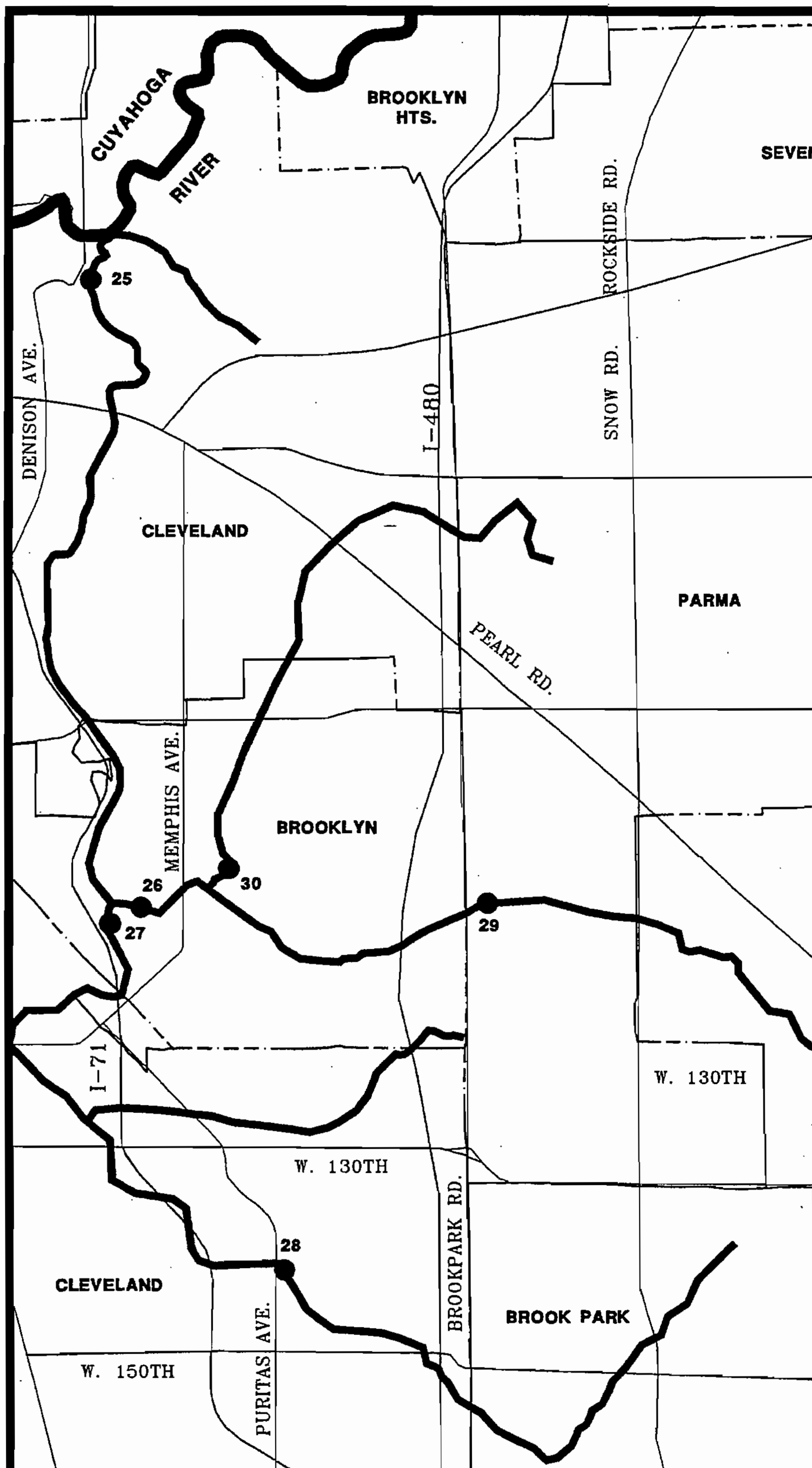


Figure 7

BIG CREEK

(Not to Scale)

COMMUNITY BOUNDARY

case with Site #27, this section of the creek passes through a portion of the Cleveland Metroparks Big Creek Reservation north of Memphis Avenue and Tiedeman Road. Site #26 obtained a QHEI score of 67 in 1991 (Appendix F).

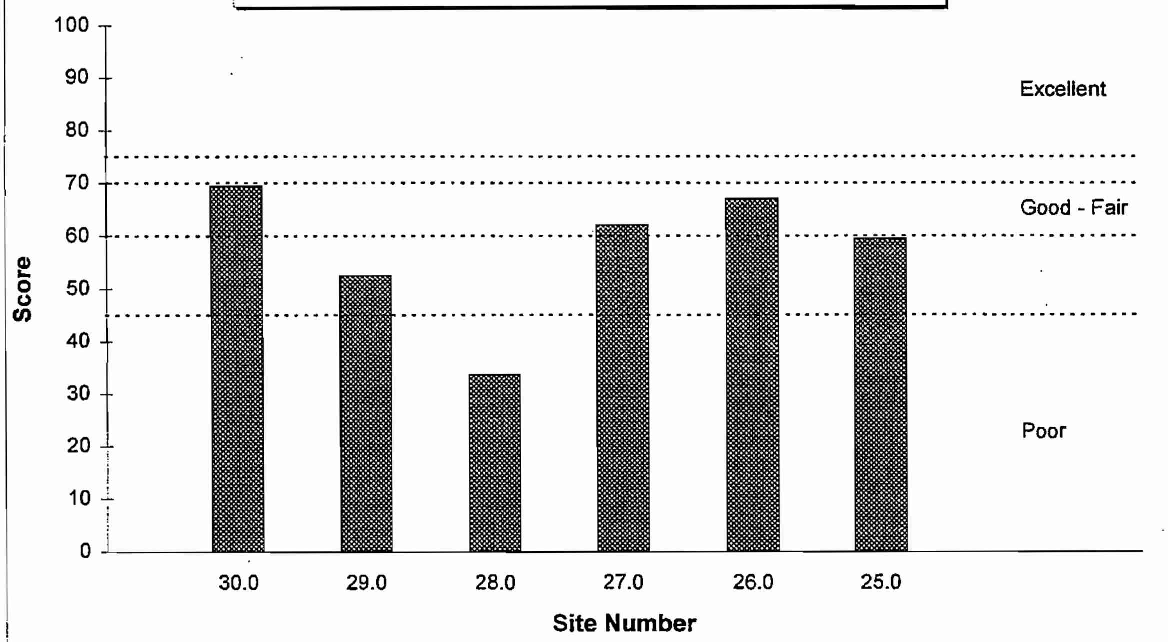
Site #27 (41° 26.73' N, 81° 45.33' W) is located on the West Branch of Big Creek approximately 100 feet upstream of the confluence with the East Branch. It is in a portion of the Cleveland Metroparks Big Creek Reservation north of Memphis Avenue and Tiedeman Road. In 1993, Site #27 obtained a QHEI score of 62 (Appendix F).

Site #28 (41° 25.90' N, 81° 47.57' W) is located on the West Branch of Big Creek immediately upstream of the beginning of the double-barrel culvert south of Puritas Avenue. The stream at this point has passed through a flat marshland with high grass. Near the culvert, it has concrete beds which are covered with sand and a dense growth of green algae. Site #28 obtained a QHEI score of 33.5 in 1993 (Appendix F).

Site #29 (41° 24.76' N, 81° 45.26' W) is located upstream on the East Branch of Big Creek at the Fernhill Picnic area in the Metroparks Big Creek Reservation, south of Brookpark Road. In 1991, Site #29 obtained a QHEI score of 52.5 (Appendix F).

Site #30 (41° 26.33' N, 81° 45.13' W) is located on Stickney Creek about 100 feet upstream of its confluence with the East Branch of Big Creek south of Memphis Avenue. In 1993, Site #30 obtained a QHEI score of 69.5 (Appendix F).

Figure 8
Big Creek Qualitative Habitat Evaluation Index Scores
1991-1993



Problems and Remediation:

\- 1 -

On May 18, 1993, NEORSD investigators responded to a complaint of a green substance in a tributary of Big Creek's West Branch. The substance was traced through the storm sewer system to a cooling tower at Specialty Products Company located at 13525 Hummel Road. The green substance was determined to be GCO-10 with Visigard, a cooling tower treatment compound which contains a dye for leak detection purposes. Due to a malfunctioning feed pump, an excessive amount of the substance entered the cooling tower and then entered Big Creek through a bleed-off on the cooling tower that is tributary to a storm sewer. Following notification of the Ohio EPA, company officials agreed to reroute the cooling water drain to the sanitary sewer system. A subsequent dye test by NEORSD investigators verified that the corrections had been made.

\- 2 -

On March 12, 1993 NEORSD received reports of sanitary sewage entering Big Creek's East Branch at Wesley Drive just south of Pearl Road. Although an inspection of the 36-inch storm sewer outfall revealed no signs of ongoing sanitary contamination, evidence of past sanitary sewage contamination was observed. In addition, a continuous dry weather discharge through the outfall was measured at 58,000 gallons per day with a fecal coliform concentration of 1,100 organisms per 100 mL. Investigations performed on later dates were unable to identify the source of sanitary debris. The source of the dry weather flow, however, was identified as a probable water main leak entering the northbound storm sewer on Ridge Road between Wilber and Hampstead Avenues. The City of Cleveland Water Department was apprised of the situation, but the dry weather flow continues unabated.

\- 3 -

In recent years, NEORSD has received numerous reports of oil sheens and white colors in the "Chevrolet" Branch of Big Creek's West Branch (see 1989-90 and 1991-92 Greater Cleveland Area Environmental Water Quality Assessment Reports). Historically, NEORSD investigators had identified several sources of process waste waters and oils discharged into the "Chevrolet" Branch and remediation has resulted. Despite these remediation efforts, reports of oil sheens and white colors in this branch of Big Creek have continued since 1991. Investigators have thus far only been able to trace the sheens and colors through the 60-inch eastbound storm sewer on the south side of Brookpark Road to West 130th Street. The intermittent nature of these occurrences has impeded the identification of the remaining sources of pollution to the "Chevrolet" Branch and warrants further investigation.

On December 20, 1994 NEORSD investigators discovered a white-colored discharge entering the "Chevrolet" Branch of Big Creek, through a 24-inch eastbound storm sewer outfall, approximately 1000 feet downstream of Brookpark Road. The discharge was traced to Anchor Tool and Die Company located at 11830 Brookpark Road. The company was discharging water soluble lubricants from its deburring operation into the storm sewer through a floor drain. Anchor Tool and Die was instructed to make changes in their manufacturing processes that would eliminate the discharge to the environment. A follow-up inspection on December 29, 1994, verified that the floor drain was sealed with concrete, eliminating this source of pollution to the "Chevrolet" Branch of Big Creek's West Branch.

- 4 -

Historically, Big Creek's West Branch has been one of the most severely polluted streams in the Greater Cleveland area. Although several sources of pollution have been identified in the past, Big Creek's West Branch continues to have problems. One such problem is at Cooley Avenue in Cleveland. A 24-inch sanitary sewer located north of Bellaire Road and Kensington Avenue routinely becomes blocked, restricting the flow of sanitary sewage in the sewer. This results in an overflow of sewage into Big Creek near the Cooley Avenue regulator located at 11820 Cooley Avenue. A more detailed discussion of the history of the Cooley Avenue regulator can be found in the Northeast Ohio Regional Sewer District's 1989-1990 Greater Cleveland Area Environmental Water Quality Assessment.

On March 29, 1995, NEORSD investigators responded to a complaint of sanitary sewage seeping from the base of an elevated manhole east of 3691 Highland Road and entering Big Creek's West Branch. Subsequent inspections revealed that the 24-inch sanitary sewer was blocked and surcharged due to debris and root intrusion. This resulted in sanitary sewage spilling over a weir into Big Creek upstream of the raised manhole, near the Cooley Avenue Regulator. On March 30, 1995, fecal coliform concentrations were measured at 20,000 organisms/100mL near the base of the raised manhole, 3,200 organisms per 100 mL at the culverted section of Big Creek north of 11820 Cooley Avenue and 2,400 organisms per 100 mL in the open section of the creek east of West 117th Street. The City of Cleveland Division of Water Pollution Control was notified and cleared the blockage on April 4, 1995.

Follow-up bacteriological sampling was conducted on April 28 and on May 3, 1995. Although the seepage from the elevated manhole continued, fecal coliform concentrations decreased to 1,600 organisms/100 mL near its base. Fecal coliform concentrations of 840 organisms per 100 mL and 780 organisms per 100 mL were measured in the culverted section of Big Creek north of 11820 Cooley Avenue and in the open section of the creek east of West 117th Street, respectively. The source of the fecal coliform concentrations measured upstream of the elevated manhole is unknown and warrants further investigation.

- 5 -

During the period 1993 through 1995, NEORSD investigated four separate reports of oil sheens on Big Creek in the vicinity of Tiedeman and Memphis Roads. In each case, NEORSD investigators have traced the oil to Ferrous Metal Processing Company located at 11103 Memphis Avenue. The source of the oil contamination to Big Creek has been an oil separator that is tributary to a storm sewer that discharges to Big Creek. Research Oil Company is contracted to service the oil separator on a monthly basis. Despite regular maintenance of the oil separator, oil sheens are an ongoing concern in this section of Big Creek. The recurring nature of this problem warrants continued monitoring of this location.

- 6 -

During the period of February 28, 1994 to March 4, 1994, with Ohio EPA's approval, NEORSD diverted flow from the Big Creek Interceptor to Big Creek in order to perform needed repairs. The diversion was measured at an average volume of approximately 25 million gallons per day. (See Appendix I for details of the 1994 Big Creek Interceptor diversion.)

On March 4, 1994, NEORSD investigators responded to a report of a fish kill in Big Creek in the vicinity of Jennings Road. A total of 31 dead fish, including 14 central stoneroller minnows, 10 bluntnose minnows, four creek chubs, two common white suckers, and one common shiner. Dissolved oxygen measurements were in the range of 13-14 mg/L and the water temperature in Big Creek was measured at 1.5° Celsius. It was determined that the diversion of the interceptor to Big Creek increased the water level, covering existing gravel/sand bar islands. When the flow was diverted back into the interceptor, a sudden decrease in the water level stranded fish on the gravel/sand bars and caused the reported fish kill.

- 7 -

On March 8, 1994, NEORSD investigators responded to a report of a low pH detected in the West Branch of Big Creek. An inspection of the creek near Ferrous Metal Processing Company revealed a bright orange color in the creek emanating from the north bank. The pH of this discharge was measured at 2.0 standard units. An investigation of Ferrous Metal Processing Company's property revealed that the orange discharge was leaking from a cold water rinse tank containing acidic wastewater. The wastewater was seeping through a building wall and into the soil, infiltrating a roof drain which was tributary to a storm sewer which ultimately discharged into the West Branch of Big Creek. Ohio EPA officials ordered Ferrous Metal Processing Company to neutralize the contaminated areas of their property and the creek. In addition, company officials volunteered to modify their operation in order to eliminate this source of contamination to the creek. These modifications were verified by NEORSD investigators on March 11, 1994.

- 8 -

On May 24, 1994, investigators responded to a report by NEORSD Sewer Maintenance and Control crews of sanitary sewage entering Big Creek's East Branch through a 24-inch storm sewer outfall, just south of Snow Road. Bacteriological analysis of the discharge revealed a fecal coliform concentration of 350,000 organisms per 100 mL and flow measurements indicated a discharge rate of 180,000 gallons per day. The discharge was the result of a blocked sanitary sewer at Edgebrook Boulevard and Eureka Drive in Parma Heights. The blockage was removed by the Cuyahoga County Sanitary Engineering Department on May 24, 1994. NEORSD investigators verified the removal of the blockage on May 26, 1994.

- 9 -

On June 20, 1994, NEORSD investigators responded to a complaint of a gray substance in Stickney Creek located west of the Brooklyn Branch of the Cuyahoga County Public Library at 4480 Ridge Road. While inspecting this section of the creek, investigators observed that the creek's flow had turned red in color. The red flow was traced to West 51st Street and Russell Avenue, in Parma. It was determined that a water leak at this location was washing clay into the storm sewer and eventually into the creek, resulting in the red color. At the time of the investigation, the City of Cleveland Water Department was on location to repair the water leak.

- 10 -

On July 18, 1994, NEORSD investigators discovered a dry weather discharge of 160,000 gallons per day with a fluoride concentration of 1.5 mg/L near Site #29 on Big Creek's East Branch. The flow was traced to a catch basin at 10970 Sharon Drive where water was observed entering the basin from surrounding brick work. The City of Cleveland Water Department was contacted and a broken water line was repaired on July 29, 1994. Despite this correction, continued dry weather flow was observed entering Big Creek near Site #29. The source of the remaining flow was determined to be between 10970 Sharon Drive and Queens Highway. The City of Cleveland Water Department was made aware of these new findings. A follow-up investigation on October 5, 1994, verified the elimination of this dry weather discharge.

- 11 -

On July 19, 1994, NEORSD investigators responded to a report from the Cuyahoga County Board of Health of sanitary sewage entering Stickney Creek near the Brooklyn Branch of the Cuyahoga County Public Library at 4480 Ridge Road. An inspection by investigators revealed a rupture in an 8-inch sanitary sewer in Stickney Creek under Ridge Road, just south of West 66th Street. This rupture was responsible for the discharge of approximately 420,000 gallons of sewage per day to Stickney Creek and fecal coliform concentrations in the creek downstream of the Ridge Road culvert of 140,000 organisms per 100 mL.

The Cuyahoga County Sanitary Engineering Department was notified and temporary repairs were performed to eliminate the discharge of sewage to Stickney Creek. A sample collected from the creek at the downstream end of the Ridge Road culvert on September 20, 1994 had a fecal coliform concentration of 1,900 organisms per 100 mL. To date, a permanent correction to the storm sewer has not been completed, but the Cuyahoga County Sanitary Engineering Department has prepared plans for improvements that will eliminate the 8-inch sewer and divert flow to the 24-inch sanitary sewer on Ridge Road.

\- 12 -

On September 13, 1994, NEORSD investigators discovered a 30-inch storm sewer discharging sanitary sewage to Big Creek's East Branch just upstream of Site #29. Investigators traced the source of sewage to a blocked sanitary sewer near 9618 Fernhill Drive. The blockage caused the sanitary sewer to become surcharged resulting in sewage infiltrating into the storm sewer system. The City of Parma Service Department was notified on September 13, 1994, but as of the date of this report, the problem continues unabated.

\- 13 -

On November 15, 1994, NEORSD personnel discovered three dry weather discharges to Big Creek from the south bank near Cleveland Metroparks Zoo property under the Fulton Road bridge. On July 31, 1995 flow measurements and bacteriological samples were obtained from the outfalls. A flow of 3,400 gallons per day with a fecal coliform concentration of 1,000 organisms per 100 mL was being discharged from an 18-inch outfall and a flow of 183,000 gallons per day with a fecal coliform concentration of 21,000 organisms per 100 mL was discharged from a 24-inch outfall. Although no flow measurements could be obtained from a 36-inch outfall, the fecal coliform concentration was measured at 5,900 organisms per 100 mL. Discussions with representatives from the Cleveland Metroparks identified the discharges as spillovers from several of the zoo's exhibits. The Cleveland Metroparks recently conducted a water conservation study and is currently developing plans that would eliminate these discharges by reusing or recycling the water in future exhibits.

\- 14 -

On June 6, 1995, NEORSD personnel investigated a dry weather discharge to Big Creek's East Branch from a 24-inch storm sewer outfall near Big Creek Parkway just south of Oakdale Avenue. The discharge was measured at a flow rate of 1,100 gallons per day and had a fecal coliform concentration of 110,000 organisms per 100 mL. The flow was traced as far as 9611 Elsmere Drive. Because no blockage was found in the sanitary sewer in this vicinity, further investigation to identify this source of contamination to Big Creek is warranted.

- 15 -

On June 27, 1995, NEORSD investigators responded to a report of a chemical entering Big Creek's East Branch at 8901 Evergreen Drive in Parma. An inspection of the sewer system in the area by NEORSD, Ohio EPA, and the Parma Fire Department did not reveal the source or identity of the chemical. While at the above location, however, NEORSD investigators noted a significant amount of dry weather flow exiting a 42-inch storm sewer outfall.

Investigators returned on July 25, 1995 to obtain flow measurements and bacteriological samples. The discharge rate was measured at 150,000 gallons per day and the fecal coliform concentration was found to be 460 organisms per 100 mL. The primary sources of this dry weather flow were identified as probable water main breaks entering the storm sewer at the southeast corner of Ridgefield and Pearl Roads and the southeast corner of Ridge and Snow Roads. The City of Cleveland Water Department was informed of these findings but the dry weather flow continues unabated.

- 16 -

On July 24, 1995, NEORSD investigators responded to a complaint of sanitary sewage entering Big Creek's East Branch through a 42-inch outfall located east of 8901 Evergreen Drive. Bacteriological analysis of the discharge revealed a fecal coliform concentration of 340,000 organisms per 100 mL. The source of sanitary sewage was traced to a surcharged sanitary sewer caused by a blockage downstream of 8423 West Moreland Road. The City of Parma Service Department was notified and the blockage was removed. Correction of this problem was verified on August 31, 1995.

- 17 -

While walking the main branch of Big Creek, NEORSD investigators observed a dry weather discharge with evidence of sanitary sewage entering the creek from the south bank near 4001 Pearl Road. Bacteriological analysis of the discharge, on July 20, 1995, revealed a fecal coliform concentration of 200,000 organisms per 100 mL. The flow was identified as septic tank run-off from a commercial multiple occupancy building at 4001 Pearl Road. Investigators notified the building owner of the discharge. He stated that the building's two 4,000-gallon septic tanks are cleaned every two years. Ohio EPA was also notified of the discharge.

- 18 -

On January 3, 1995, NEORSD personnel discovered a non-permitted discharge of industrial process wastewater to a storm sewer that empties into a tributary of Big Creek. Results of a grab sample obtained from the storm sewer on January 4, 1995 were as follows: COD - 2350 mg/L, suspended solids - 4312 mg/L, copper - 0.45 mg/L, iron - 76.0 mg/L, lead - 0.10 mg/L, and pH - 10.4 S.U. The process wastewater was discovered coming from United Screw and Bolt Corporation, located at 3636 West 58th Street, through overflow pipes in two underground storage tanks. The tanks receive alkaline cleaner used for cleaning machine parts. The company engineer and Ohio EPA were apprised of these findings. Ohio EPA, in a letter dated January 12, 1995, gave United Screw and Bolt Corporation 60 days to plug all catch basins in the plant that were not connected to a sanitary sewer. In addition, they were instructed to discontinue all discharge until the overflows from the storage tanks could be rerouted to the sanitary sewer. Dye tests performed by NEORSD investigators on February 1, 1995 verified that the discharge is tributary to the sanitary sewer system.

MILL CREEK

Mill Creek drains southeastern Cleveland and the suburbs along the southeastern border of Cleveland. It has a total drainage area of 18.1 square miles and a total length of 9.0 miles. Mill Creek originates in the vicinity of Warrensville Township, flows southwest through Warrensville Heights and a small section of Cleveland to near Broadway Avenue in Maple Heights, which it parallels northwest through Garfield Heights into Cleveland, and then flows south along the border of Cuyahoga Heights and Garfield Heights to the Cuyahoga River at River Mile 11.9.

Almost the entire creek is open - the only significant culverted sections being short segments of the creek upstream of Garfield Park, under Interstate 480, and downstream of the detention basin east of Kerruish Park. Except for the concrete beds in the culverts, the creek's substrate is predominantly natural.

Mill Creek's drainage area is primarily residential and industrial. The Ohio EPA has designated Mill Creek Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreational Use.

The water quality of Mill Creek is of particular concern to the NEORSD as it discharges into the Cuyahoga River approximately one mile upstream of the Southerly WWTP discharge to the river. Historically, Mill Creek has been one of the most heavily polluted streams in the Greater Cleveland Area.

Six locations have been chosen on Mill Creek for routine chemical, bacteriological, and benthic sampling and analysis (Figure 9). Chemical and bacteriological data from Mill Creek are presented in Appendix B.

Site #31 (41° 24.99' N, 81° 38.33' W) is located on the main stem of Mill Creek, approximately 600 feet upstream of the confluence with the Cuyahoga River, under Canal Road. In 1995, Site #31 obtained a QHEI score of 72 (Appendix F).

Site #32 (41° 25.27' N, 81° 38.11' W) is located on a small tributary to Mill Creek from the northeast which is culverted beneath Warner Road. The tributary enters the creek less than one half mile upstream of Mill Creek's confluence with the Cuyahoga River. Site #32 obtained a QHEI score of 68 in 1995 (Appendix F).

Site #33 (41° 25.28' N, 81° 34.92' W) is located on the Wolf Creek tributary to Mill Creek in the Cleveland Metroparks Garfield Park Reservation, approximately 100 feet upstream of its confluence with Mill Creek. In 1995, this site obtained a QHEI score of 62.5 (Appendix F).

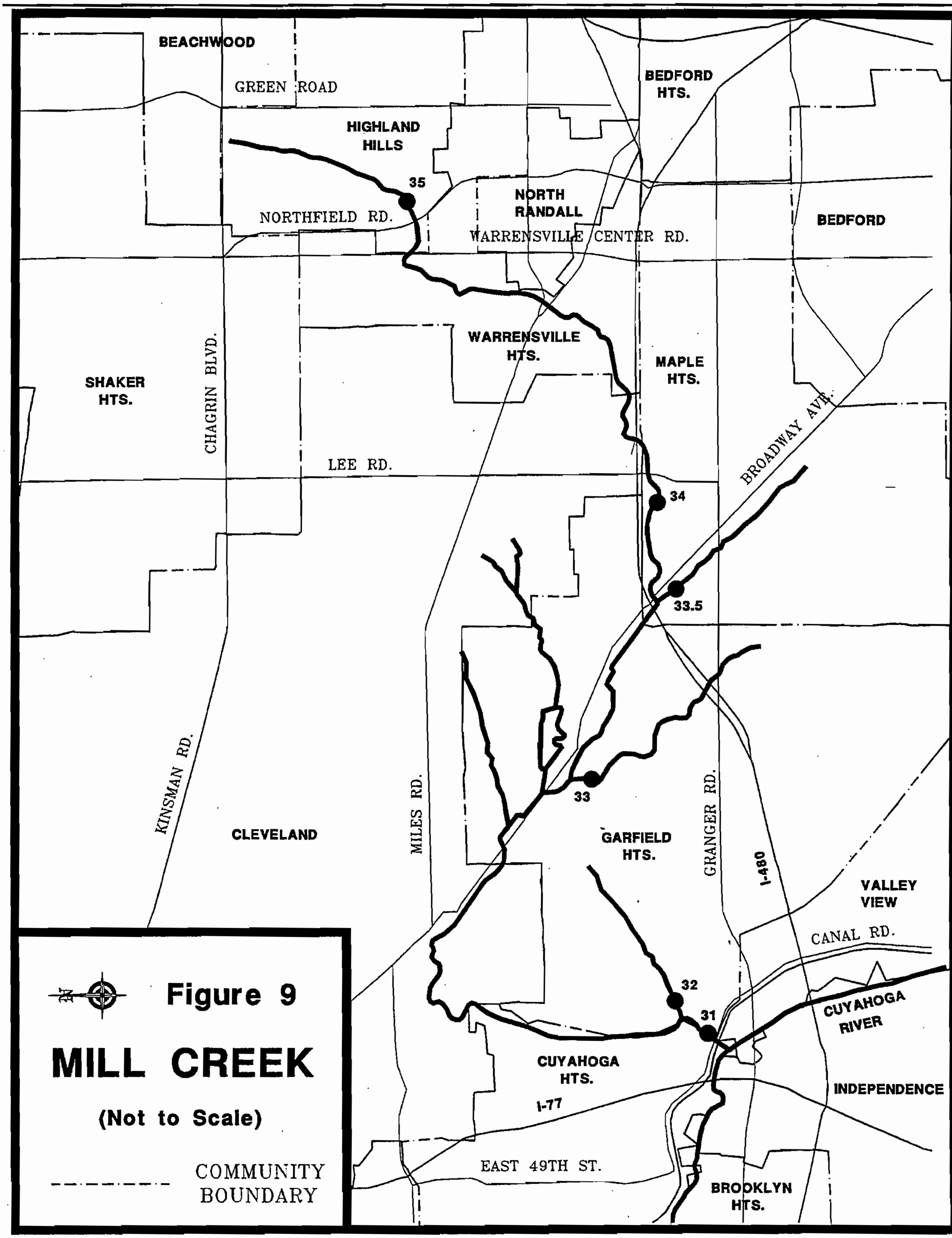


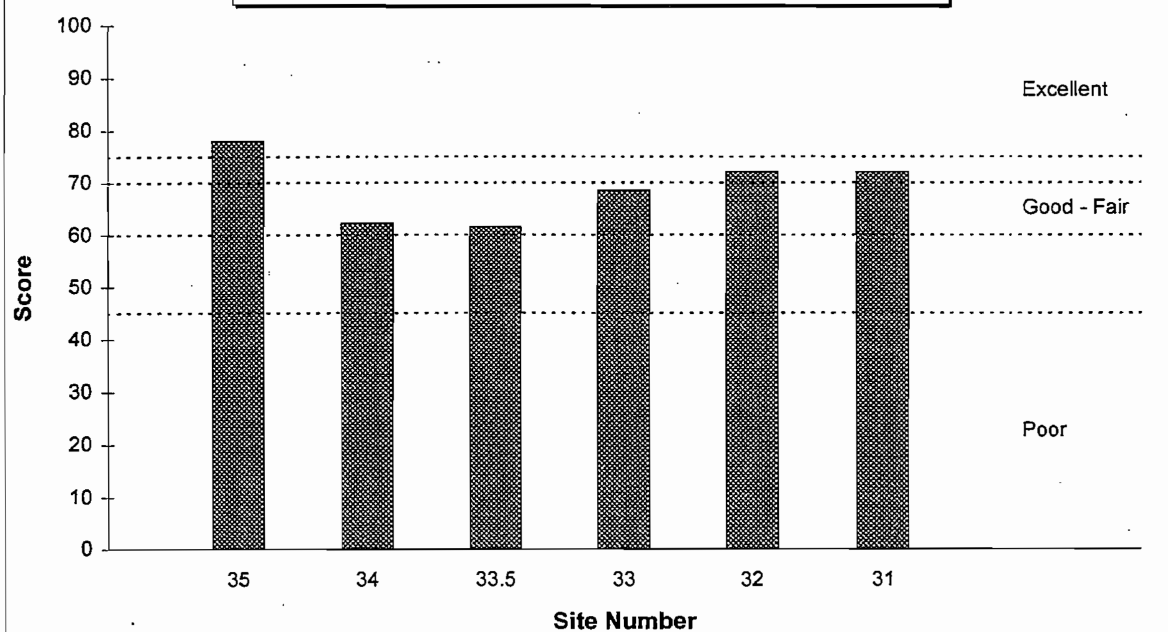
Figure 9
MILL CREEK
(Not to Scale)

Site #33.5(41° 25.85' N, 81° 36.31 W) is located on a tributary to Mill Creek known as the Mapletown Branch, which flows in a northeastern direction parallel to Broadway Avenue in Maple Heights. This site is approximately thirty feet upstream of this tributary's confluence with Mill Creek, south of Interstate 480 at Broadway Avenue. In 1992, this site obtained a QHEI score of 61.5 (Appendix F).

Site #34 (41° 25.34' N, 81° 34.00' W) is located on Mill Creek at Rex Avenue and Glenburn Avenue in Maple Heights. Site #35 obtained a QHEI score of 62.25 in 1995 (Appendix F).

Site #35 (41° 26.70' N, 81° 31.91' W) is located on Mill Creek 100 feet upstream of Northfield Road in the Village of Highland Hills. In 1995, Site #35 obtained a QHEI score of 78 (Appendix F).

Figure 10
Mill Creek Qualitative Habitat Evaluation Index Scores
1992-1995



Problems and Remediation:

- 1 -

On March 24, 1993, NEORSD investigators responded to a report by Ohio EPA of sanitary sewage entering a Mill Creek tributary, south of Donovan Drive in Garfield Heights. Investigators found a rupture in a sanitary sewer in a wooded area south of

Donovan and Cherie Drives. Water contaminated with sanitary sewage was entering the creek at a rate of approximately 400,000 gallons per day. Bacteriological analysis of this flow showed a fecal coliform concentration of 700,000 organisms per 100 mL. The City of Garfield Heights Service Department was notified of this problem on March 24. According to City officials, repairs to the sanitary sewer began on March 31 and were completed on April 2. A follow-up inspection by NEORSD investigators on April 6 revealed that this source of pollution in Mill Creek had been eliminated.

\- 2 -

A complaint of sanitary sewage in Mill Creek at Miles Road was investigated on May 14, 1993. Investigators discovered a dry weather discharge containing sanitary sewage entering the creek from the east, through a storm sewer outfall under Miles Road. The sewage was traced back to the Empire Die Casting Company at 19800 Miles Road. Dye tests showed that the company's sanitary facilities had been improperly connected to the Miles Road storm sewer. Company officials were apprised of this problem and agreed to have this wastewater rerouted to the sanitary sewer system. These modifications were verified by NEORSD investigators on August 3, 1993.

\- 3 -

On May 18, 1993, NEORSD investigators performing an inspection at Seaman Carburetor, 7513 Rosewood Avenue, noted that the company's pump station was inoperative, resulting in an overflow of sanitary sewage and industrial wastewater to a tributary of Mill Creek. Company officials were advised to eliminate this unauthorized environmental discharge. Ohio EPA was informed of this situation on May 18. A subsequent inspection by NEORSD investigators revealed that the overflow from the pump station had been rerouted to the sanitary sewer system.

\- 4 -

On October 13, 1993, NEORSD investigators responded to a report by Ohio EPA of sanitary sewage in Mill Creek at Canal Road. The sewage was traced back to a combined sewer overflow outfall to Mill Creek, west of Warner Road. Investigators found a malfunctioning overflow regulator at Miles Park and Broadway Avenues. It was determined that a gate on the dry weather outlet was closed, causing an overflow condition. Following this discovery, the NEORSD Sewer Maintenance and Control Department was notified and immediately opened the electronically-controlled gate, eliminating the influent to Mill Creek.

\- 5 -

On December 1, 1993, NEORSD investigators discovered sanitary sewage entering Mill Creek from the north through a storm sewer outfall, under Warrensville Center Road in Warrensville Heights. A sample from this outfall was obtained for bacteriological analysis on December 2. The fecal coliform concentration was measured at 12,000 organisms per 100 mL. Due to inclement weather conditions, the investigation was postponed.

On March 15, 1994, NEORSD investigators resumed the inspection and traced the sanitary sewage back to the storm sewer at 2007 Harvard Avenue. On April 15, 1994, the Cuyahoga County Sanitary Engineering Department was notified of the problem. On April 18, a blockage was discovered and removed from the sanitary sewer at 2007 Harvard Avenue, thus eliminating this source of pollution in Mill Creek.

- 6 -

A problem in Cleveland which had been discussed in the NEORSD Greater Cleveland Area Environmental Water Quality Assessment 1991-1992 Report was eliminated in 1994. A collapsed section of the Miles Avenue sanitary sewer between East 174th Street and 17201 Miles Avenue had resulted in the exfiltration of sanitary sewage into the 48-inch storm sewer on Miles Avenue. The 48-inch storm sewer on Miles Avenue is tributary to a 10-foot storm sewer on Lee Road, which then discharges to Mill Creek near Kollin Avenue, east of Lee Road. The dry weather flow of sanitary sewage and industrial wastewater had been measured at a rate greater than 50,000 gallons per day. The City of Cleveland Division of Water Pollution Control was notified of these findings in November 1992. Repairs to the collapsed sewer on Miles Avenue, including the replacement of the 8-inch sanitary sewer, were completed in May 1994. Subsequent inspections by NEORSD investigators revealed that this source of sanitary sewage contamination in Mill Creek had been eliminated.

A dry weather discharge containing sanitary sewage continued, however, to enter Mill Creek from the storm sewer outfall near Kollin Avenue. Subsequent inspections by investigators in 1994 and 1995 revealed that the discharge to Mill Creek was from numerous sources throughout the sewer system.

In September 1994, NEORSD investigators again traced back dry weather flow entering the storm sewer outfall near Kollin Avenue to the storm sewer on Miles Avenue. The source of this flow was identified as process wastewater from Herold's Salad Inc., 17512 Miles Avenue. These findings were reported to the City of Cleveland Division of Water Pollution Control. As a result, Herold's Salad Inc. was required to reconnect this discharge to the sanitary sewer system. In September 1995, Herold's Salad Inc. reportedly rerouted the wastewater to the sanitary sewer. A dye test performed by NEORSD investigators on September 27, 1995, verified these modifications.

Another source of dry weather sanitary sewage contamination which was entering Mill Creek through the Miles Avenue storm sewer, was identified by NEORSD investigators in September 1994. Investigators discovered an improper connection of a residential sanitary discharge to the storm sewer at 4253 East 176th Street. The storm sewer on East 176th Street is tributary to the Wyatt Road storm sewer which flows to the Miles Avenue storm sewer. The City of Cleveland Division of Water Pollution Control was notified of this situation. As of the date of this report, the City of Cleveland had contacted the homeowner to require reconnection of this sanitary discharge to the sanitary sewer system, but corrections had not been made.

In March 1995, NEORSD investigators performed more dye tests, inspections, and bacteriological sampling in an attempt to further identify the source(s) of the sanitary sewage contamination of Mill Creek through the storm sewer outfall east of Kollin Avenue. These efforts revealed several additional sources of sanitary sewage to the Lee Road storm sewer.

Investigators traced flow in the Lee Road storm sewer back to 4115 Lee Road where the sanitary facilities at three retail stores within the Lee/Harvard Shopping Center had been improperly connected to the storm sewer. These findings were reported to the City of Cleveland Division of Water Pollution Control, which in turn contacted the landlord of the shopping center to require reconnection of the sanitary discharges to the sanitary sewer system. Dye tests performed by NEORSD investigators in October 1995 verified that these discharges are now tributary to the sanitary sewer.

Investigators further traced dry weather flow to the Harvard Avenue storm sewer (east of Lee Road), which is tributary to the Lee Road storm sewer and ultimately tributary to Mill Creek. Investigators found a significant flow of apparently clean water entering the Harvard Avenue storm sewer at Lee Heights Boulevard. The source of this flow was identified as a probable water main leak entering the storm sewer between 3895 and 3910 Lee Heights Boulevard. The City of Cleveland Water Department was notified of the situation. A follow-up inspection in October 1995 revealed that the leak had been repaired.

Finally, NEORSD investigators discovered sanitary sewage entering the Harvard Avenue storm sewer at 18810 Harvard Avenue. A dye test of the sanitary facilities at the Willow Park Convalescent Home revealed that the sanitary discharge was improperly connected to the storm sewer. A sample obtained for bacteriological analysis from the storm sewer, at 18810 Harvard Avenue, revealed a fecal coliform concentration of 770,000 organisms per 100mL on March 15, 1995. The City of Cleveland Division of Water Pollution Control was notified and required the reconnection of this facility's sanitary discharge to the sanitary sewer system. On October 16, 1995, NEORSD investigators verified the remediation through a dye test. Future inspections of Mill Creek, downstream of the storm sewer outfall near Kollin Avenue, should reflect improvement in water quality resulting from these modifications.

\- 7 -

Elevated fecal coliform concentrations measured at Site #34 in 1993 and 1994, were attributed to a recurrence of a dry weather discharge of sanitary sewage to Mill Creek under Lee Road. Since 1988, blockages in the sanitary sewer on Raymond Street, between Theodore Street and Anthony Street, have resulted in the leakage of sanitary sewage into the storm sewer, which is tributary to the outfall under Lee Road. Each time a discharge has been discovered, notification of the City of Maple Heights Service Department has resulted in the correction of the problem.

In January 1996, the City of Maple Height's Raymond Street/Lee Road sewer improvement project was initiated. According to city officials, the project includes construction of a new sanitary sewer and storm sewer system in this vicinity. Hopefully, this project will be successful in eliminating the recurring influent to the creek. Future sampling on Mill Creek at Site #34 should reflect the improvement in water quality resulting from this project and any further remediation in this area of Maple Heights.

\- 8 -

Also in the vicinity of Lee Road, on August 30, 1994, NEORSD investigators discovered a dry weather discharge of sanitary sewage to Mill Creek through a storm sewer outfall, upstream of Lee Road and west of McCracken Road in Maple Heights. Measurements on September 13 indicated that the flow was entering Mill Creek at an approximate rate of 19,000 gallons per day, with a fecal coliform concentration of 14,000,000 organisms per 100 mL. Investigators traced the sewage back to the storm sewer on Raymond Street, between Catherine and Clement Streets. Dye tests indicated that a blockage or leak in the Raymond Street sanitary sewer at this location had resulted in sewage entering the storm sewer. The City of Maple Heights Service Department was notified on September 15. A follow-up inspection by NEORSD investigators on October 27 indicated no further discharge to Mill Creek from this source.

On November 14, 1994, however, NEORSD investigators found the discharge recurring and again traced its source to Raymond Street. As of the date of this report, no further sanitary sewage contamination to Mill Creek from this source had been noted. The recurring nature of the problem, however, warrants continued monitoring of this location. Also, the sewer improvement project on Raymond Street and Lee Road may provide permanent remediation of the sanitary sewer blockages on Raymond Street, between Catherine Street and Clement Street.

\- 9 -

During the 1994 survey of Mill Creek, NEORSD investigators discovered a dry weather flow containing sanitary sewage entering the "Mapletown Branch" of Mill Creek through a 90-inch storm sewer outfall behind Mapletown Shopping Center.

Bacteriological analysis of the flow from this outfall showed a fecal coliform concentration of 580,000 organisms per 100 mL on September 8, 1994.

In September 1994 and March 1995 NEORSD investigators attempted to trace back the source of the sanitary sewage entering the creek through the 90-inch storm sewer outfall. Investigations revealed that the dry weather flow contaminated by sanitary sewage was from several sources throughout the sewer system in Maple Heights. In September 1994, investigators found dry weather flow from the northbound Broadway Avenue storm sewer entering the 90-inch westbound storm sewer at Maple Heights Boulevard. The flow was traced back to a storm sewer on Morgan Street, where sewage was leaking into the storm sewer due to a blockage in the Garden Street sanitary sewer. The fecal coliform concentration of the flow was measured at 130,000 organisms per 100 mL. The City of Maple Heights Service Department was notified and the blockage was removed, eliminating the influent to the Broadway Avenue storm sewer.

Also contributing to the dry weather flow in the northbound Broadway Avenue storm sewer, was the sanitary discharge from the Wash-N-Dry Laundromat at 16150 Broadway Avenue, which investigators found to be improperly connected to the storm sewer. Following this discovery, the problem was reported to the City of Maple Heights Service Department. An inspection by NEORSD investigators on March 13, 1995 revealed that the discharge remained improperly connected to the Broadway Avenue storm sewer. According to city officials, an emergency contract, to reroute the discharge from the storm sewer to the sanitary sewer system, was to be issued. However, as of the date of this report, the discharge from the Wash-N-Dry Laundromat to Mill Creek continues unabated.

Another source of bacterial contamination in the 90-inch westbound storm sewer was discovered by NEORSD investigators in September 1994. Water containing sanitary sewage was found entering the 90-inch storm sewer from the northbound Clement Street storm sewer. The rate of this dry weather discharge was measured at approximately 20,000 gallons per day, with a fecal coliform concentration of 280,000 organisms per 100 mL. Investigators traced the sewage back to the storm sewers in the vicinity of Clement Street and Mapleboro Road. Although investigators were unable to determine the exact source of this discharge and contamination, the City of Maple Heights Service Department was notified of this situation. Bacteriological analysis of the discharge as of the date of this report, however, revealed a fecal coliform concentration of 3,900 organisms per 100 mL, indicating that contamination by sanitary sewage remains.

In March 1995, NEORSD investigators discovered a dry weather discharge to the 90-inch westbound storm sewer from the south-bound Lee Road storm sewer at Maple Heights Boulevard. The fecal coliform concentration of this flow was measured at 190,000 organisms per 100 mL. Investigators have, so far, been unable to identify the source of flow in the Lee Road storm sewer.

Also noted during the March 1995 investigation was a significant flow of clean water in the westbound Libby Road storm sewer at Lee Road. This flow is tributary to the 90-inch storm sewer. The source of this flow was identified as a probable water main leak entering the storm sewer between 5133 and 5185 Catherine Street. The City of Cleveland Division of Water was notified of these findings. Future inspections and continued monitoring will be performed to verify the elimination of these sources of pollution in this Mill Creek tributary.

- 10 -

In June 1994, NEORSD Sewer Maintenance and Control crews discovered a dry weather flow containing sanitary sewage entering Mill Creek, southeast of East 173rd Street and Elmer Avenue in Cleveland. Measurements indicated that the flow was entering the creek at an approximate rate of 280,000 gallons per day. Bacteriological analysis of the flow showed a fecal coliform concentration of 3,900,000 organisms per 100 mL on September 13. An inspection by the crews revealed that the dry weather discharge was occurring downstream of a NEORSD-maintained overflow structure at this location. The overflow of sewage to Mill Creek was attributed to a collapsed section of a sanitary sewer at East 173rd Street, south of Elmer Avenue. The City of Cleveland Division of Water Pollution Control was notified of these findings in July 1994. Repairs to the sewer were completed by October 1994, thereby eliminating this source of pollution in Mill Creek.

- 11 -

On June 23, 1994, NEORSD investigators discovered sanitary sewage in Wolf Creek where it exits the culvert under Henry Street, just north of McCracken Road. The sewage was traced back to Wolf Creek near the terminus of East 128th Street, south of McCracken Road, where it was overflowing from an exposed section of an apparently abandoned sewer on the north bank of the creek. An inspection of a manhole near the end of East 128th Street revealed that this sewer pipe joins a westbound sanitary sewer. Further investigation revealed that a blockage in the westbound sanitary sewer had caused the flow to back-up, resulting in an overflow of sewage to Wolf Creek through the abandoned pipe. Bacteriological analysis of this dry weather flow in Wolf Creek showed a fecal coliform concentration of 5,300,000 organisms per 100 mL. The City of Garfield Heights Service Department was notified of this problem on June 23.

A follow-up inspection by NEORSD investigators on July 15 revealed that the sanitary sewer had been unblocked, eliminating the influent to Wolf Creek. During subsequent inspections, NEORSD investigators observed construction work along this section of Wolf Creek between July and August 1995. According to Garfield Heights officials, the Cuyahoga County Sanitary Engineering Department was contracted to perform the necessary repair work to remediate this problem, which included the replacement of sections of the sanitary and storm sewers in this vicinity.

- 12 -

On August 17, 1994, NEORSD investigators discovered a rupture in the Mill Creek Interceptor underneath Mill Creek, behind 4878 Chaincraft Road. At that time, the problem was reported to the Cuyahoga County Sanitary Engineering Department. A sample of the creek was obtained downstream of the break on August 19. The fecal coliform concentration of the sample was measured at 140,000 organisms per 100 mL. According to county officials, repairs to the interceptor were completed during the week of November 14, 1994. Subsequent inspections by NEORSD investigators revealed that this source of sanitary sewage contamination in Mill Creek had been eliminated.

- 13 -

On August 30, 1994, NEORSD investigators found sanitary sewage leaking from the base of a raised manhole on the Mill Creek Interceptor located on the north bank of Mill Creek, upstream of Warner Road and south of Broadway Avenue in Cleveland. Many of the bricks on the manhole structure were either shifted or missing, enabling sewage to enter the creek. A sample of the flow emanating from the base of the manhole was obtained for bacteriological analysis on September 12, 1994. The fecal coliform concentration was measured at 4,200,000 organisms per 100 mL.

In December 1994 a construction firm, which had been contracted by the NEORSD, replaced the manhole structure with precast concrete pipe. In addition, about 25 feet of the Mill Creek Interceptor, which runs along the north bank of the creek, was encased in cement. Although no leaks from the interceptor had been observed at this location, many of the bricks on this pipe had also shifted. These modifications to the interceptor were completed by December 23, 1994, thereby eliminating this source of sanitary sewage contamination in Mill Creek.

- 14 -

On August 30, 1994, NEORSD investigators discovered a dry weather flow containing sanitary sewage entering Mill Creek from the north bank, near Calvary Cemetery. Bacteriological analysis of this flow revealed a fecal coliform concentration of 840,000 organisms per 100 mL. The source of this discharge was identified as septic tank effluent from the Calvary Cemetery Maintenance Garage, 10000 Miles Avenue. According to cemetery officials, the 1,500-gallon septic tank is cleaned once a year. This information was forwarded to the Ohio EPA. Currently, Calvary Cemetery is in the process of obtaining an operational permit for its septic tank from the Cuyahoga County Board of Health who will, in turn, conduct routine inspections of the system.

- 15 -

On August 30, 1994, NEORSD investigators discovered a dry weather flow, which contained sanitary sewage, entering Mill Creek from a storm sewer outfall under the Interstate 480 bridge, south of McCracken Road and west of Broadway Avenue. Bacteriological analysis of this flow showed a fecal coliform concentration of 1,700,000 organisms per 100 mL on September 12, 1994. The sewage was traced back to a vacant lot between 14305 and 14309 Maple Street, where it was leaking into a storm sewer due to a blockage in the sanitary sewer at this location. The City of Maple Heights Service Department was notified of this problem and reportedly removed the blockage, eliminating the influent to Mill Creek.

- 16 -

Another source of pollution in a tributary to Mill Creek was an unpermitted discharge from the Cleveland Industrial Square, 4500 Lee Road, which had been discovered by NEORSD investigators in November 1989. Past investigations revealed that companies in the Cleveland Industrial Square had sanitary facilities tributary to the storm sewer on Seville Road and ultimately tributary to the creek. Additionally, over the past few years, NEORSD has responded to complaints of oil in this Mill Creek tributary near NEO Parkway, north of McCracken Road and at Orchard Road, south of Ohio Avenue. Investigations revealed that industrial wastewater from the Cleveland Industrial Square had been responsible for the discharge of oil to the creek. In November 1989, Ohio EPA was notified of the problem. An Ohio EPA representative then contacted the landlord of this facility to require reconnection of the company's sewers to the sanitary sewer system. All subsequent inspections by NEORSD investigators had indicated that this discharge to the creek was continuing unabated. In August 1994, the NEORSD again notified the Ohio EPA of the status of the discharge from the Cleveland Industrial Square. Finally, a follow-up inspection revealed that this facility's wastewater had been rerouted to the sanitary sewer system. These modifications were verified through a dye test by NEORSD investigators.

- 17 -

In October 1994, NEORSD investigators attempted to trace back the source of dry weather flow entering Mill Creek through a storm sewer outfall located approximately 50 feet downstream of the Miles Road bridge. This discharge was discovered by investigators on August 31, 1994. Bacteriological analysis of this flow revealed a fecal coliform concentration of 30,000 organisms per 100 mL on September 13, 1994. The flow was measured at an approximate rate of 130,000 gallons per day.

Investigations determined that the dry weather flow was coming from several sources throughout the sewer system on Emery Road between Warrensville Center and Northfield Roads in North Randall. One source contributing to this dry weather bacterial contamination in Mill Creek was identified as run-off from the horse stables at

Thistledown Race Track, on Emery Road. Water used to wash the horses drains into a catch basin in the stable area which is tributary to the Emery Road storm sewer. Further investigation is needed to determine the remaining source(s) of this dry weather flow to Mill Creek.

- 18 -

On October 13, 1994, NEORSD investigators found sanitary sewage entering Mill Creek through a storm sewer outfall at the west end of Dorver Avenue in Cleveland. The source of the sewage was identified as an improper connection of a residential sanitary discharge to the storm sewer at 7702 Dorver Avenue. Following this discovery, the problem was reported to the City of Cleveland Division of Water Pollution Control. A follow-up inspection by NEORSD investigators on January 10, 1995 revealed that no corrective action had been taken to remediate this problem.

- 19 -

On October 26, 1994, NEORSD investigators found sanitary sewage entering a Mill Creek tributary, east of Osborne Road and south of Dressler Avenue in Garfield Heights. This discharge of sanitary sewage was attributed to a blockage in a sanitary sewer between Broadway Avenue and Osborn Road. The sewage was found overflowing from a manhole in a wooded area, west of Osborn Road. Following this discovery, the City of Garfield Heights Service Department was notified of the problem. According to city officials, the Cuyahoga County Sanitary Engineering Department was contracted to remove the blockage in the sanitary sewer. A subsequent inspection by NEORSD investigators on January 27, 1995, verified the elimination of this source of pollution in Mill Creek.

- 20 -

In December 1994, NEORSD was notified of a wet weather discharge to Mill Creek from the east bank in the vicinity of the Warner Hill Landfill. According to a construction firm contracted by the Warner Hill Development Company, the discharge rate was estimated to be in excess of 2,000 gallons per minute. Bacteriological analysis of a sample of the flow collected during a rain event on January 20, 1995 showed a fecal coliform concentration of 420,000 organisms per 100 mL.

Following a meeting with several agencies and communities, it was determined that this wet weather discharge of sanitary sewage to Mill Creek was attributed to the rupture of a sanitary sewer bypass pipe. The bypass pipe had been installed to divert flow from a section of the sanitary sewer, which runs through the landfill, during emergency repairs to the sewer. An inspection, however, revealed that the inlet to the bypass pipe was open and capable of receiving flow. During rain events, high flow conditions in the sanitary sewer resulted in the overflow of sewage to the ruptured bypass pipe. On May 17, 1995, the Cuyahoga County Sanitary Engineering

Department plugged the inlet to the bypass with cement, thereby eliminating this source of wet weather sanitary sewage contamination in Mill Creek.

- 21 -

On December 13, 1994, NEORSD investigators responded to a report by the Warrensville Heights Fire Department of a diesel fuel spill on Aurora Road just east of Warrensville Center Road. An estimated 20 gallons of fuel had spilled onto Aurora Road when a tanker truck punctured its fuel tank while turning out of a driveway. Although some of the fuel had been contained with absorbent pads, an undetermined quantity had entered a storm sewer through a catch basin on Aurora Road. This storm sewer is tributary to the Mill Creek storm water detention basin north of Interstate 480 and west of Preston Road. Containment booms were placed at the storm sewer outlet to the creek to prevent further migration of the spill downstream. The Ohio EPA was notified and apprised of the situation on December 14, 1994.

- 22 -

On April 28, 1995, an orange color reported in a Mill Creek tributary, just north of Canal Road, was investigated by NEORSD personnel. Investigators found the substance entering the creek intermittently through a 4-inch hose from a construction site along Warner Road near Canal Road in Garfield Heights. Water having a high solids content was being pumped from well points along Warner Road for construction of a sanitary sewer line. A sample of the creek was obtained downstream of the discharge and the analyses indicated elevated concentrations of iron (250 mg/L), total solids (2007 mg/L), and phosphorus (3.85 mg/L).

- 23 -

On May 8, 1995, NEORSD investigators discovered a heavy growth of algae and a white-colored flow in Wolf Creek where it exits the culvert under Interstate 480 near East 131st Street, south of McCracken Road. A sample of Wolf Creek was obtained for bacteriological analysis on May 9. The fecal coliform concentration was measured at 49,000 organisms per 100 mL. The source of this discoloration and contamination by sanitary sewage in Wolf Creek could not be determined. Further investigation is needed.

- 24 -

On September 6, 1995, NEORSD investigators found a dry weather discharge of sanitary sewage entering the creek through a storm sewer outfall under the Miles Road bridge. The flow was measured at approximately 7,200 gallons per day. Bacteriological analysis of this flow showed a fecal coliform concentration of 1,200,000 organisms per 100 mL. On September 7, the sewage was traced back to a storm sewer southwest of the intersection of Miles and Warrensville Center Roads. A blockage of the sanitary sewer at this location had been resulting in leakage of the sewage into the storm sewer. Following this discovery, the problem was reported to the City of Warrensville Heights Service Department. A subsequent inspection by NEORSD investigators revealed that the Miles Road sanitary sewer at Warrensville Center Road had been unblocked and this source of pollution in Mill Creek had been eliminated.

\- 25 -

On October 2 and 9, 1995, NEORSD investigators noted an unusually high flow in Mill Creek at several upstream locations while obtaining water samples. The flow was traced back to the City of Cleveland Division of Water's Green Road Pump Station, 4100 Green Road, where investigators found the area around two 10-million gallon holding tanks to be flooded with water and draining to a nearby catch basin. Following this discovery, personnel at the pump station were apprised of the situation. A supervisor present at the time, explained that the holding tanks were probably overfilled. The overflows were attributed to the fact that the Division of Water was installing a new computer system and the meters at this station and at the water filtration plant needed to be recalibrated. He advised investigators that the operators at these stations would be notified of the situation. Elevated suspended solids and iron concentrations measured at Site #35 (Northfield Road) on both days may have been attributable to the overflows. On October 2 and October 9, suspended solids were measured at 19 mg/L and 31 mg/L, and iron was measured at 1.1 mg/L and 1.4 mg/L, respectively. (The highest suspended solids concentration measured by NEORSD during routine dry weather sampling conducted at Site #35 during 1993, 1994, and 1995, was 6 mg/L and the highest iron concentration measured was 0.45 mg/L.)

WEST CREEK

West Creek drains the eastern section of Parma and portions of Seven Hills, Brooklyn Heights, and Independence. It has an approximate drainage area of 20 square miles and a total length of approximately 8 miles. West Creek has two branches: the main stem, which originates in Parma just south of the intersection of Broadview Road and Pleasant Valley Road and flows north through the eastern section of Parma, then east through Seven Hills, Brooklyn Heights, and Independence; and a smaller branch, originating in Independence north of the Chestnut Road and Oakwood Drive intersection, joining the main stem through a culvert under Interstate 480, west of the Interstate 77 interchange. From this confluence, West Creek flows north to the Cuyahoga River upstream of the Southerly WWTP chlorine-access railroad bridge (RM 11.3).

Most of West Creek is open and its substrate is predominantly natural. Along Interstate 480, the main stem has a short channelized section with concrete beds and sidewalls. Between Keynote Drive and Lancaster Drive in Brooklyn Heights, the stream has been re-routed to the northwest, with gabions installed on the banks to allow for construction of a commercial/industrial park.

West Creek's drainage area is largely residential. The Ohio EPA has designated West Creek Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreational Use. The NEORSD has selected three locations on West Creek for routine chemical, bacteriological, and benthic sampling and analysis (Figure 11). Chemical and bacteriological data from West Creek are presented in Appendix B.

Site #36 (41° 24.81' N, 81° 38.86' W) is located on the main stem under the Granger Road bridge, between Interstate 77 and Valley Belt Road, approximately 1,000 feet upstream of the confluence with the Cuyahoga River. In 1991, Site #36 obtained a QHEI score of 51 (Appendix F).

Site #37 (41° 24.64' N, 81° 41.68' W) is located on the main stem of West Creek under the Broadview Road bridge, between Brookdale Avenue and Sandpiper Drive in Parma. Approximately 50 feet upstream of the site is a city water leak (discovered during the 1987 NEORSD survey), which continues to discharge to the creek at a measured rate of 73 gallons per minute. In 1991, Site #37 obtained a QHEI score of 56.5 (Appendix F).

Site #38 (41° 23.40' N, 81° 41.97' W) is located on the main stem of West Creek just upstream of the West Ridgewood Drive bridge, west of Post Road, in Parma. In 1991, Site #38 obtained a QHEI score of 59.5 (Appendix F).

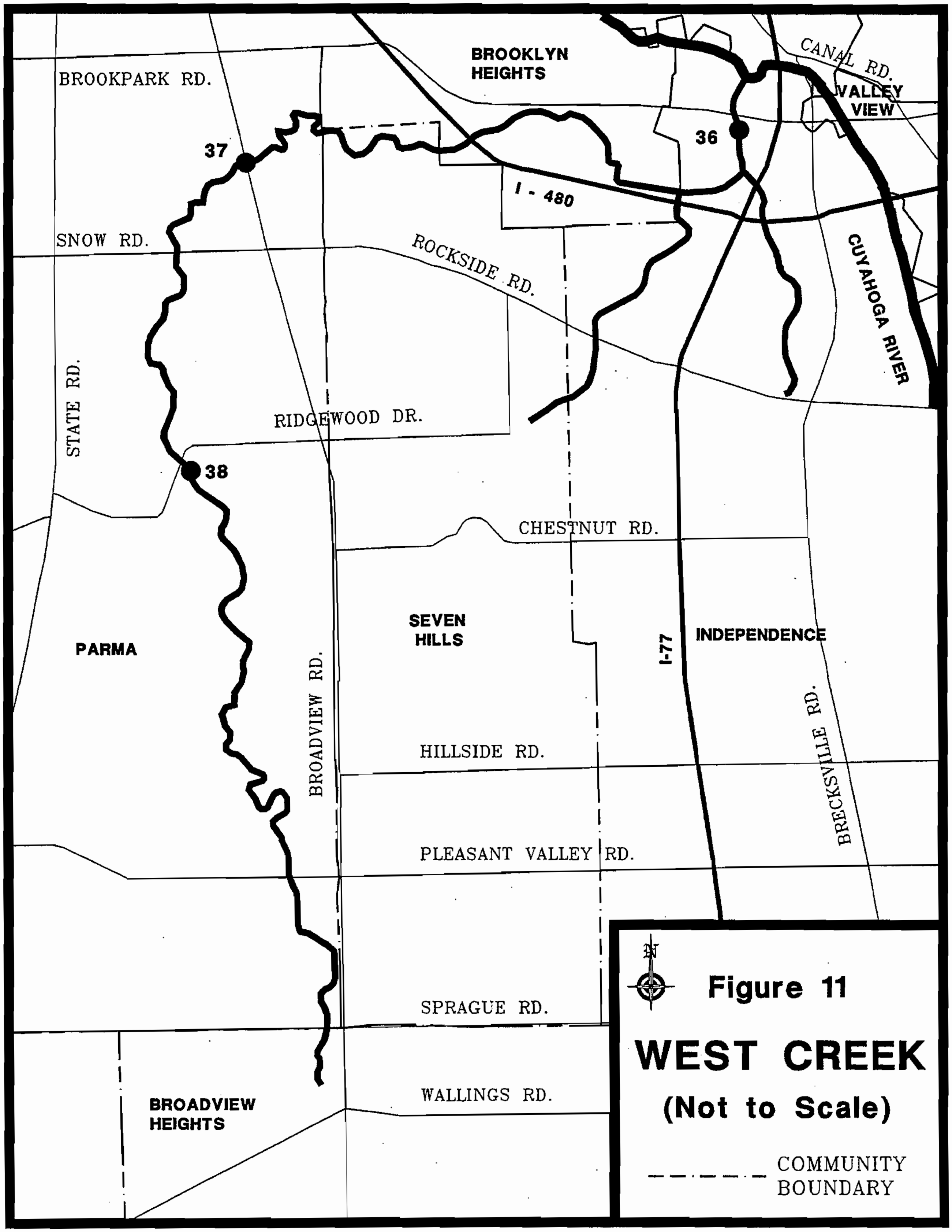
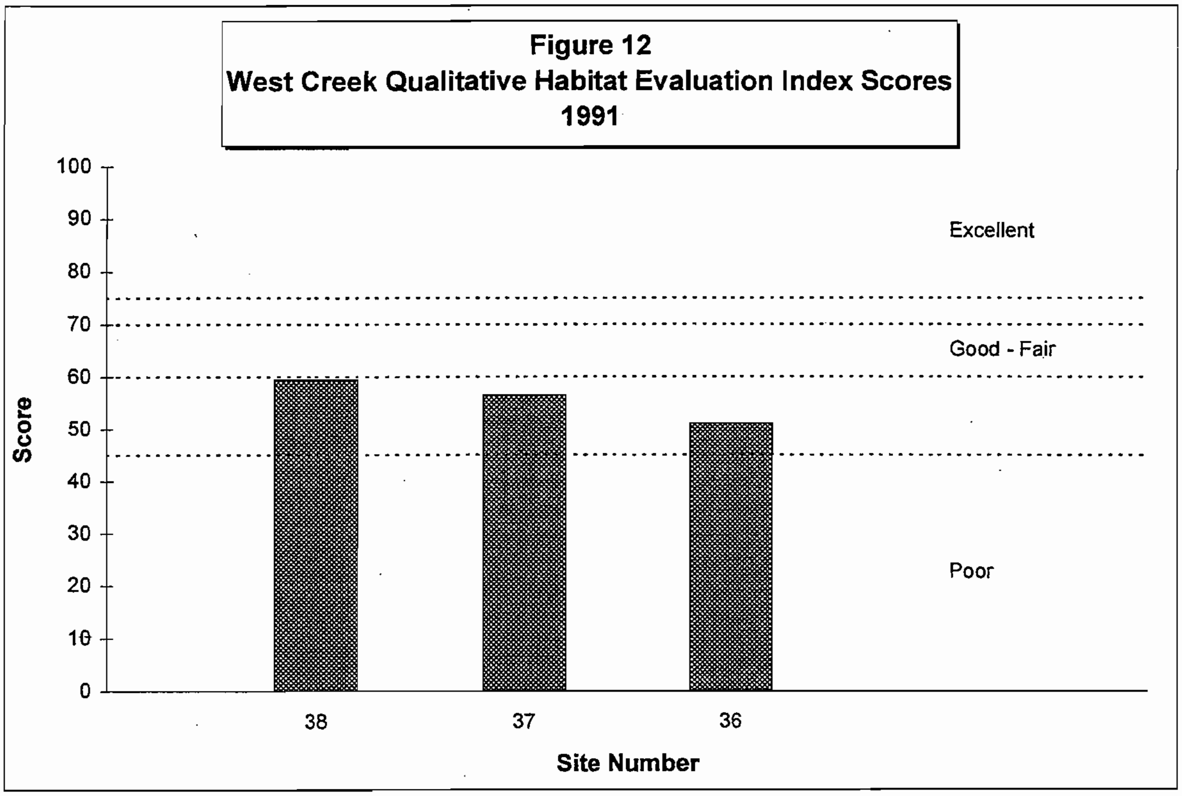


Figure 11

WEST CREEK

(Not to Scale)



Problems and Remediation:

- 1 -

Over the past several years, NEORSD investigators have responded to complaints about sewage in a tributary to West Creek, east of 5245 West 10th Street. The problem was first reported in July 1988 by Ohio EPA. NEORSD investigators found sanitary sewage entering the tributary through a 48-inch eastbound storm sewer outfall at this location. The problem had been reported to the City of Parma in 1988.

Subsequent inspections and sampling by NEORSD investigators throughout the period of 1991 to 1995 revealed that this discharge to the creek was continuing unabated. Bacteriological sampling of the creek, downstream of the discharge, revealed fecal coliform concentrations as high as 64,000 organisms per 100 mL in June 1995. Inspections also revealed that the sanitary flow was originating from several directions throughout the sewer system.

In July 1993, NEORSD investigators discovered a blockage in the sanitary sewer on Broadview Road, between Brookview Boulevard and Brookpark Road, which resulted in the leakage of sewage into the storm sewer. Additionally, investigators found an improper connection of a sanitary discharge to the storm sewer on Broadview Road from a retail store at 5228 Broadview Road. These findings were reported to the

City of Parma in August 1993. Subsequent inspections by investigators verified that this facility's wastewater has been rerouted to the sanitary sewer system.

NEORSD investigators also found sanitary sewage entering the storm sewer on Brookpark Road at West 26th Street. The source of this influent was identified as residential sanitary discharge from the Ideal Mobile Home Park, 2700 Brookpark Road, which had been improperly connected to the storm sewer. These findings were reported to the City of Cleveland Division of Water Pollution Control. The Division of Water Pollution Control required the owner of the mobile home park to reconnect its sanitary discharge to the sanitary sewer system. Dye tests performed by NEORSD investigators in December 1995 verified that this discharge is now tributary to the sanitary sewer.

Despite these modifications to the sewer system, a dry weather discharge containing evidence of sanitary sewage continues to enter the creek through the 48-inch storm sewer outfall. Further investigation is needed to determine the remaining source(s) of the continuing dry weather flow to this West Creek tributary.

TINKERS CREEK

Tinkers Creek enters the Cuyahoga River at River Mile 17.0, south of Tinkers Creek Road in the Cuyahoga Valley National Recreation Area. Tinkers Creek is the largest tributary to the Cuyahoga River with a drainage area of 96 square miles.

A northern run of Tinkers Creek originates in Warrensville Heights and flows south through Orange Village and into the City of Solon. In Solon, the run turns westward south of Solon Road and continues flowing west through Oakwood and into Bedford Heights. A southern run begins in Reminderville in Summit County. This run flows south into Twinsburg and then turns northwest and flows into Glenwillow. The run continues northwest through Oakwood and into Bedford Heights where it merges with the northern run. This confluence is in the Cleveland Metroparks Hawthorne Parkway, south of Solon Road.

The creek then flows northwest out of Bedford Heights and into Bedford. In the Cleveland Metroparks Bedford Reservation, a southern run, originating from tributaries in Oakwood and Walton Hills, merges with Tinkers Creek north of Gorge Parkway. From Bedford the creek turns west and flows through Walton Hills, finally entering the Cuyahoga River in Valley View.

The Tinkers Creek drainage area is primarily residential and recreational, with some industry and agriculture. The Ohio EPA has designated the creek Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreational Use. Additionally, Tinkers Creek has been designated State Resource Water from its mouth to Richmond Road. Tinkers Creek has been assigned four sites for routine chemical, bacteriological and benthic sampling by the NEORSD (Figure 13). Chemical and bacteriological data from Tinkers Creek are presented in Appendix B.

Site #39 (41° 21.79' N, 81° 36.55' W) is located on Tinkers Creek approximately 500 feet upstream from the confluence of Tinkers Creek with the Cuyahoga River. This sample site is south of the intersection of Canal Road and Tinkers Creek Road. Sampling is performed downstream of the west face of the Ohio Canal viaduct over the creek. In 1993, Site #39 obtained a QHEI score of 64 (Appendix F).

Site #40 (41° 23.01' N, 81° 31.46' W) is located within the Cleveland Metroparks Bedford Chagrin Parkway. Specifically, the site is located off Bedford Chagrin Parkway, northeast of Broadway Avenue and underneath the Northfield Road bridge. In 1991, Site #40 obtained a QHEI score of 69.5 (Appendix F).

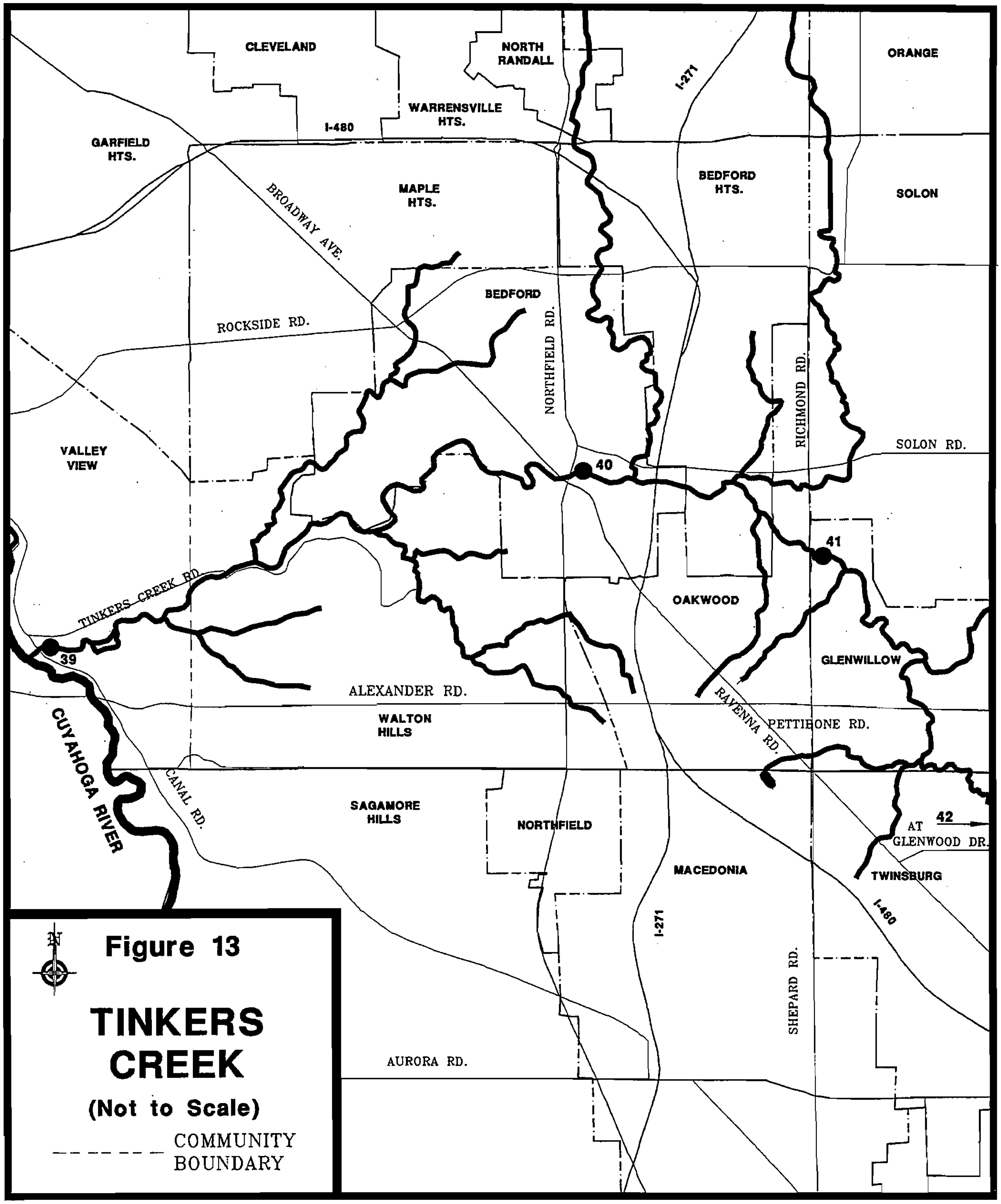


Figure 13

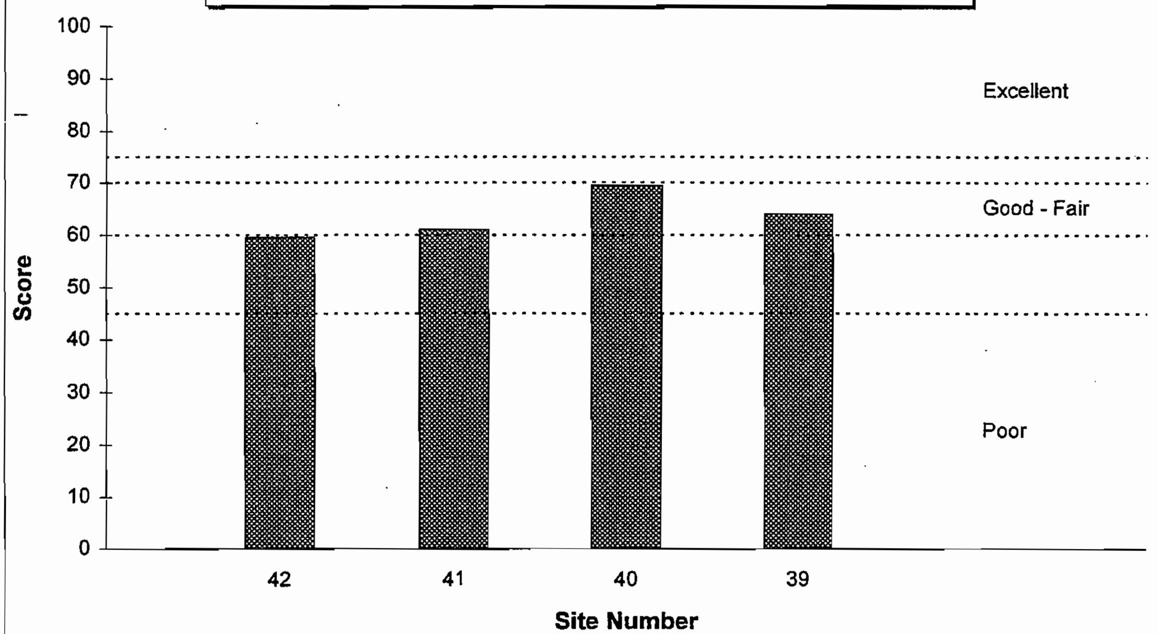
TINKERS CREEK

(Not to Scale)

Site #41 (41° 22.48' N, 81° 29.37' W) is located east of Richmond Road, south of the Cleveland Metroparks Bedford Chagrin Parkway, and is opposite the service garage at Inland Refuse Transfer, Inc., 6705 Richmond Road. In 1992, Site #41 obtained a QHEI score of 61 (Appendix F).

Site #42 (41° 21.79' N, 81° 27.97' W) is located upstream of the southeast face of the Glenwood Drive bridge crossing Tinkers Creek. The bridge lies between Idlewood Drive and Gary Drive in Twinsburg. In 1992, Site #42 obtained a QHEI score of 59.5 (Appendix F).

Figure 14
Tinkers Creek Qualitative Habitat Evaluation Index Scores
1991-1993



Benthic Macroinvertebrate Sampling on Tinkers Creek

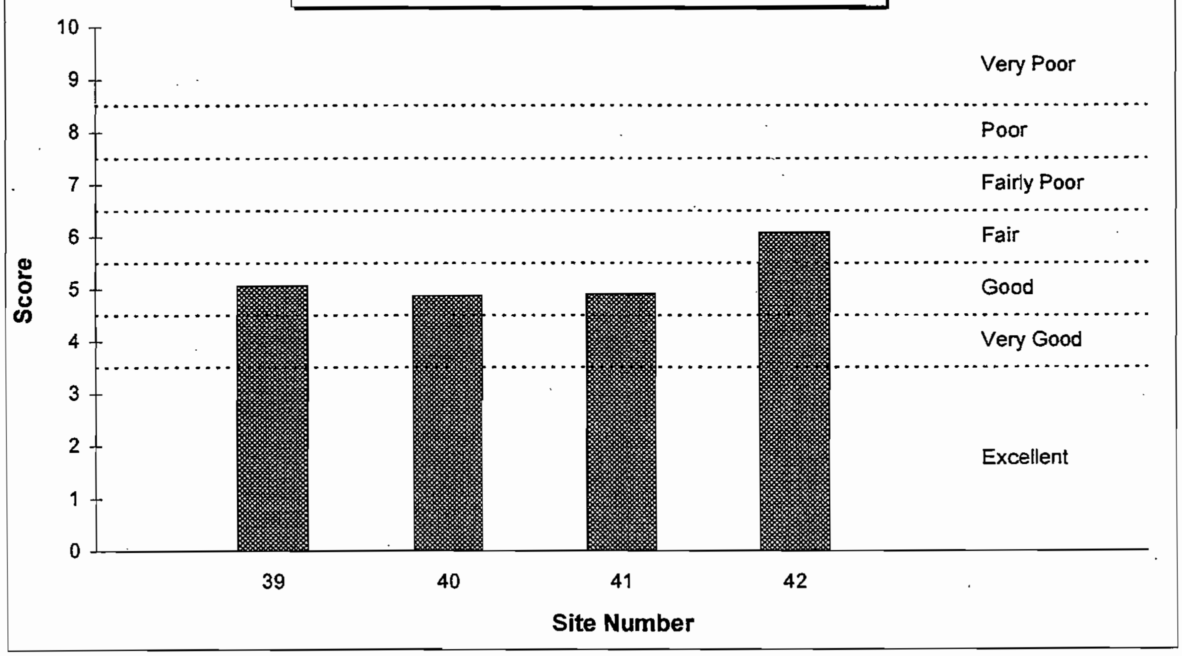
Site #39 - This site received an HBI score of 5.06 (Good) (See Figure 15). The macroinvertebrate community is high in EPT taxa, percent EPT composition and diversity (See Appendix D, Table D-1).

Site #40 - The benthic macroinvertebrate data collected at Site #40 indicates a healthy invertebrate community. The HBI score of 4.88 (Good) and other metric scores, particularly the percent EPT composition (See Appendix D, Table D-1) reveal that the overall water quality at Site #40 is good. This 1994 benthic data is comparable to data collected at this location in 1989 and 1991, indicating that the benthic community structure and composition have remained relatively unchanged.

Site #41 - As with Sites #39 and #40, Site #41 appears to have a healthy macroinvertebrate community which is an indication of good water quality. The low diversity (See Appendix D, Table D-1) is most likely due to the predominance of EPT organisms and is not an indication of an impaired community. This site received an HBI score of 4.90 (Good). These results are similar to those obtained in 1989 and 1991, indicating that the benthic community has remained relatively unchanged.

Site #42 - This site received an HBI score of 6.08 (Fair) which was the highest score of all the Tinkers Creek sites. This location also had the highest proportion of tolerant organisms. These data suggest that organic pollution may be impacting the benthic macroinvertebrate community. Although the HBI score was relatively high, there appears to be a robust benthic macroinvertebrate community present at Site #42 as demonstrated by the high scores for EPT taxa, percent EPT composition and diversity (See Appendix D, Table D-1). Additional sampling will be needed to further evaluate water quality and determine the source of impact at Site #42.

Figure 15
Tinkers Creek Hilsenhoff Biotic Index Scores
1994



Problems and Remediation:

- 1 -

NEORSD investigators observed evidence of sanitary sewage in Wood Creek, which is a tributary of Tinkers Creek, while inspecting it at Cresswell Avenue on June

10, 1994. The sewage was traced back to Maple Heights Boulevard at Hollywood Avenue, where it was found to be leaking into the storm sewer due to a blockage in the sanitary sewer at this point. This storm sewer enters the Wood Creek culvert south of Waterbury Avenue at Hollywood Avenue. The City of Maple Heights Service Department was notified of the blockage on June 14, 1994. A follow-up inspection by NEORSD investigators on June 15 revealed that the sanitary sewer had been unblocked and this source of contamination in Wood Creek had been eliminated.

- 2 -

Another source of contamination by sanitary sewage was found in Wood Creek by NEORSD investigators following a report of sanitary sewage in the creek at Cresswell Avenue on November 30, 1994. The flow of sewage was traced back to a blocked sanitary sewer on Hillgrove Avenue at Warrensville Center Road. The blockage resulted in sewage overflowing into the storm sewer which is tributary to the Wood Creek culvert. Following notification of the City of Maple Heights Service Department, the blockage was cleared. NEORSD investigators, on December 7, verified that this source of pollution in Wood Creek had been eliminated.

- 3 -

On March 1, 1995, NEORSD personnel responded to a report of sanitary sewage entering a tributary of Tinkers Creek, southeast of the intersection of Harvard Road and Green Road in Highland Hills. Sanitary sewage was found overflowing from a manhole in a wooded area at this location. The flow was measured at approximately 29,000 gallons per day. Bacteriological analysis of this flow showed a fecal coliform concentration of 98,000 organisms per 100 mL. A 15-inch westbound sanitary sewer was found to be blocked, causing the sewer to surcharge at the manhole.

Following this discovery, the Cuyahoga County Sanitary Engineering Department, City of Cleveland Division of Water Pollution Control and Ohio EPA were notified of the problem. Several attempts by the Cuyahoga County Sanitary Engineering Department to clear the blockage, which appeared to be the result of severe root intrusion, were unsuccessful. Finally, on March 28, 1995, a construction firm contracted by the City of Cleveland Division of Water Pollution Control replaced a 60-foot section of the sanitary sewer, eliminating the influent to the creek.

On May 9, 1995, the 15-inch sanitary sewer was again found to be blocked. The blockage resulted in an overflow of sewage from a surcharged manhole upstream of the replaced section of sanitary sewer. The City of Cleveland Division of Water Pollution Control was again notified of the problem. A subsequent inspection by NEORSD investigators revealed that the blockage in the 15-inch sanitary sewer had been cleared, eliminating this source of pollution in Tinkers Creek.

- 4 -

Over the past few years, NEORSD has responded to complaints of gray-colored water and sewage in creeks located near Harvard and Emery Roads in the vicinity of Interstate 271. These creeks are tributaries of Tinkers Creek. In each case, NEORSD investigators discovered malodorous discharges to the creeks from storm sewer outfalls under Interstate 271. Also noted were greenish-yellow colored pools around the outfalls which emitted a sulfur-type odor. Samples of the discharges to the creeks were obtained and chemical analyses revealed elevated concentrations of sulfates (1479 - 1831 mg/L), calcium (640 - 2000 mg/L), pH (8.7 -10.5 S.U.), alkalinity (46 - 813 mg/L), hardness (2370 mg/L), and specific conductance (2050 - 11,000 µmhos/cm). These results are indicative of run-off from unweathered blast furnace slag, which is commonly used as fill for construction projects. The timing of these complaints coincides with the Interstate 271 express lane construction project.

CHIPPEWA CREEK

Chippewa Creek's drainage area includes the communities and parks in the southernmost part of Cuyahoga County west of the Cuyahoga River. From the creek's mouth upstream, these include: a portion of the Cuyahoga Valley National Recreation Area; the Cleveland Metroparks Brecksville Reservation; the City of Brecksville; the City of Broadview Heights; the southern tip of the City of Seven Hills; the eastern portion of the City of North Royalton.

Chippewa Creek's drainage area is primarily residential and recreational. The Ohio EPA has designated Chippewa Creek Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreational Use. In addition, portions of Chippewa Creek within the boundaries of the Cleveland Metroparks have been designated State Resource Water. The NEORSD has selected three locations on Chippewa Creek which are routinely sampled for chemical, bacteriological, and benthic analysis (Figure 16). Chemical and bacteriological data from Chippewa Creek are presented in Appendix B.

Site #43 (41° 18.91' N, 81° 35.88' W) is located at a concrete ford on which Chippewa Creek Drive crosses the creek east of Valley Parkway. This location is approximately 3,000 feet upstream of the confluence with the Cuyahoga River at about River Mile 22.0 and represents the total flow of Chippewa Creek. In 1991, Site #43 obtained a QHEI score of 80 (Appendix F).

Site #43.5 (41° 19.32' N, 81° 38.69' W) is located on the Bramblewood Branch tributary to Chippewa Creek, just upstream of its confluence with the main stem of Chippewa Creek, east of Harris Road, north of Old Royalton Road. In 1993, Site #43.5 obtained a QHEI score of 62.5 (Appendix F).

Site #44 (41° 19.41' N, 81° 40.37' W) is located on the main stem of Chippewa Creek at the Avery Road bridge between Harris Road and East Royalton Road. It is downstream of the confluence of the Seneca Branch, the Royalwood Branch, and the Briarwood Branch. In 1991, Site #44 obtained a QHEI score of 77 (Appendix F).

No environmental disruptions on Chippewa Creek were found by or reported to the NEORSD in 1993, 1994 and 1995.

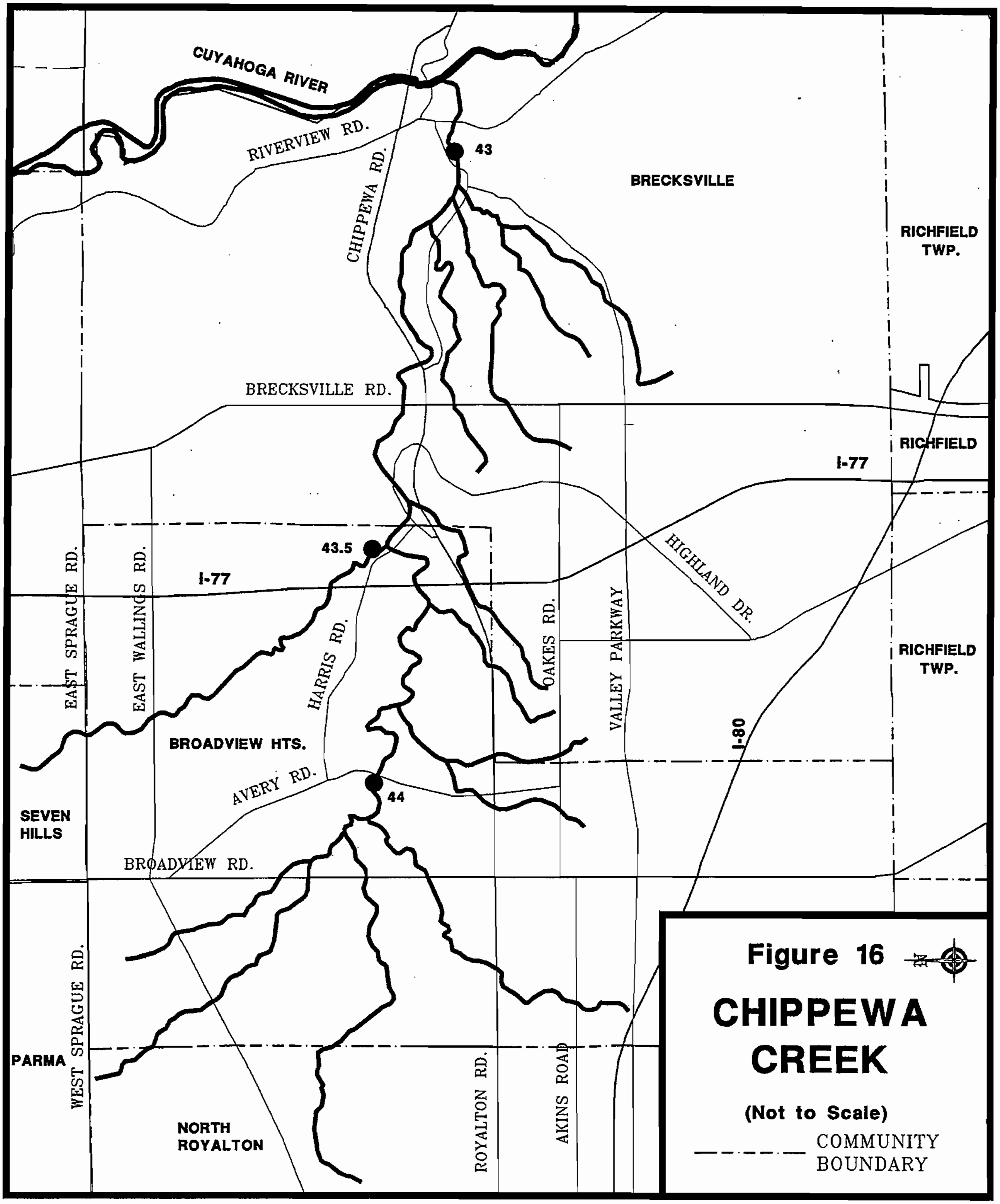
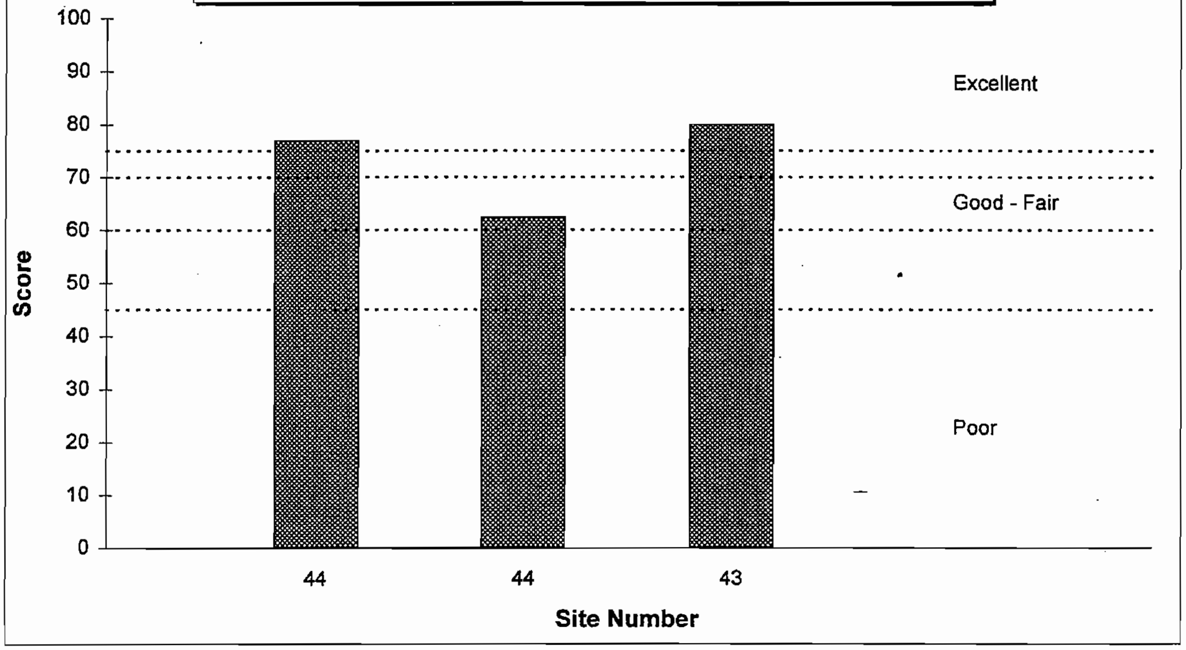


Figure 16

CHIPPEWA CREEK

(Not to Scale)

Figure 17
Chippewa Creek Qualitative Habitat Evaluation Index Scores
1991-1993



SAGAMORE CREEK

Sagamore Creek enters the Cuyahoga River in Summit County, southwest of the intersection of Sagamore Road and Canal Road in the Cuyahoga Valley National Recreation Area (CVNRA). The creek originates in Macedonia and Sagamore Hills in Summit County as two intermittent runs flowing northwest and merging north of West Valley View Road. The combined intermittent run then flows in a mostly northwest direction, entering Cuyahoga County at Sagamore Road. While flowing toward Cuyahoga County, the creek adds five intermittent runs from the east and one intermittent run from the west.

In the area of the Summit County/Cuyahoga County boundary, the creek becomes a constant flow. North of the boundary, a sixth intermittent run enters from the east. Once in Walton Hills, Cuyahoga County, the creek turns and flows in a northwest direction until it reaches the intersection of Alexander Road and Dunham Road. At this intersection the creek turns and flows generally southwest towards Canal Road. As the creek flows southwest it takes on three intermittent runs from the south. At the intersection of Sagamore Road and Canal Road the creek re-enters Summit County before it merges with the Cuyahoga River.

Sagamore Creek's drainage area is primarily low density residential with large undeveloped and recreational use areas. The Ohio EPA has no current use designation for Sagamore Creek.

Sagamore Creek has been assigned one sample location for routine chemical, bacteriological, and benthic sampling (Figure 18). Chemical and bacteriological data from Sagamore Creek are presented in Appendix B.

Site #57 (41° 21.04' N, 81° 35.56' W) is located upstream of Canal Road as it crosses the creek north of Sagamore Road. In 1993, Site #57 obtained a QHEI score of 79.5 (Appendix F).

Benthic Macroinvertebrate Sampling on Sagamore Creek

Site #57 - This location received an HBI score of 4.90 (Good) which was relatively unchanged from the score of 4.59 (Good) this site received in 1991. The primary difference between 1991 and 1994 data was the large increase in total taxa (25 in 1991 to 56 in 1994), diversity (2.7 in 1991 to 3.2 in 1994), and EPT taxa (7 in 1991 to 15 in 1994). This data is indicative of a well balanced and healthy macroinvertebrate community which can be attributed to good water quality.

No environmental disruptions on Sagamore Creek were found by or reported to the NEORSD in 1993, 1994 or 1995.

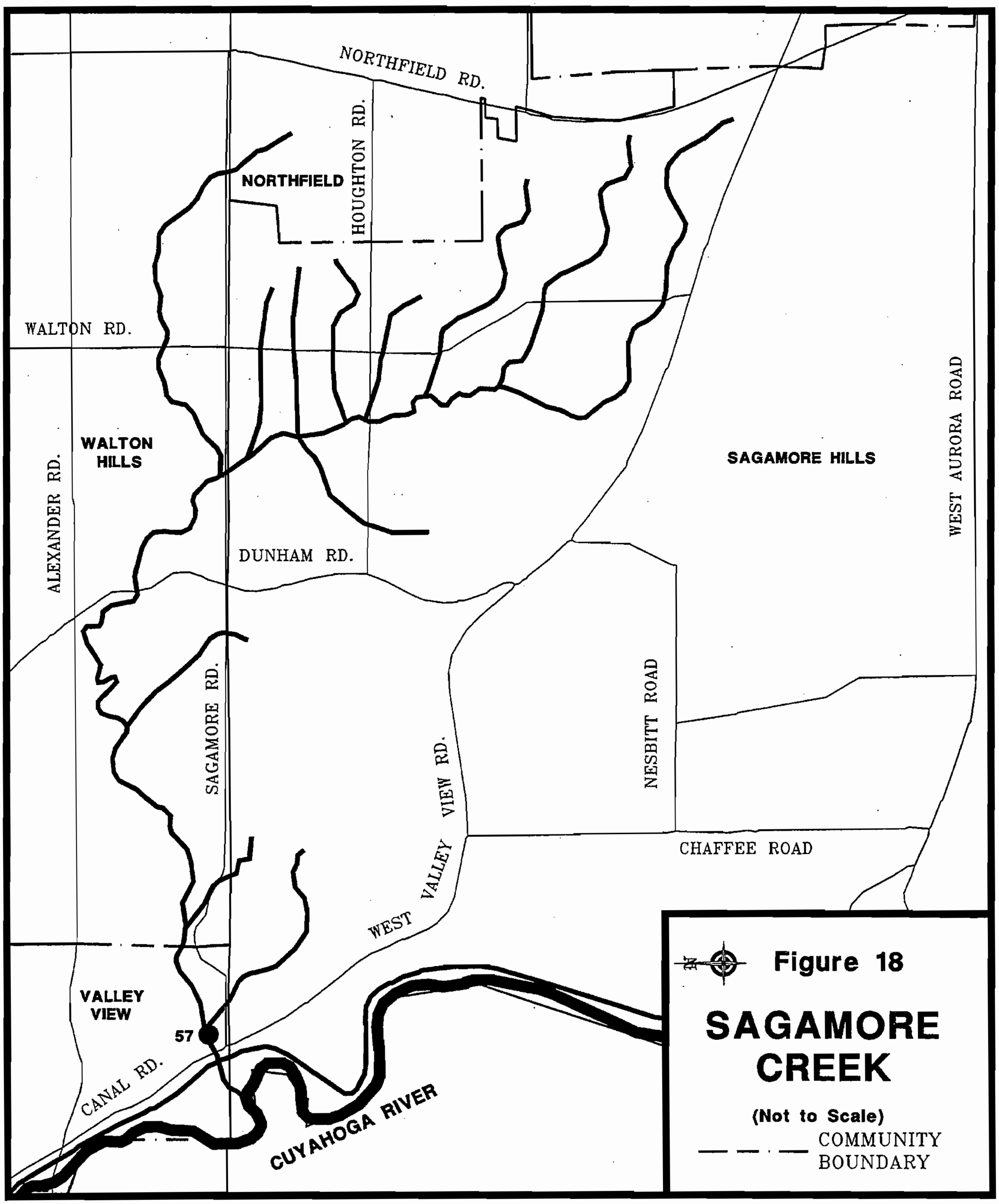


Figure 18
SAGAMORE CREEK
(Not to Scale)

KINGSBURY RUN

Kingsbury Run drains the central portion of Cleveland east of the Cuyahoga River and a portion of the west end of Shaker Heights. It has a total drainage area of 7.8 square miles and a total length of 4.3 miles. Kingsbury Run flows predominantly east-to-west with two branches that merge east of East 37th Street, south of Woodland Avenue. The main stem begins at East 47th Street, south of Woodland Avenue, and eventually enters the Cuyahoga River at approximately River Mile 4.0, just north of the old Jefferson Avenue bridge, 2785 Broadway Avenue.

Kingsbury Run has the following open sections: a 1,000-foot section from the confluence with the Cuyahoga River to the mouth of the culvert; a 1,100-foot section between East 78th Street and Grand Avenue, 250 feet north of Colfax Road; a 900-foot section between East 84th Street and East 87th Street, north of Kinsman Road. The remaining portion of Kingsbury Run is entirely underground and is a combination of culverted stream sections and storm sewers, serving as an overflow-receiving sewer for combined sewers during high flow conditions.

The Ohio EPA has no current use designation for Kingsbury Run. Kingsbury Run has been assigned five sample sites by NEORSD Environmental Assessment for routine chemical and bacteriological sampling (Figure 19). No QHEI's have been performed on Kingsbury Run since the sample sites are culverted. Chemical and bacteriological data from Kingsbury Run are presented in Appendix B.

Site #46 (41° 28.93' N, 81° 40.45' W) is located at the mouth of the culvert, approximately 1,000 feet upstream of the confluence with the Cuyahoga River and north of the old Jefferson Avenue bridge.

Site #46.1 (41° 29.07' N, 81° 40.02' W) is located on the main stem of Kingsbury Run at a manhole on the culvert, in the center of East 37th Street, approximately 2,000 feet south of Woodland Avenue.

Site #46-A (41° 27.38' N, 81° 38.33' W) is located on Kingsbury Run's North Branch, at a rectangular manhole on the culvert adjacent to the RTA Power Control Administrative Offices, 5400 Grand Avenue, approximately 200 feet west of East 55th Street.

Site #46-B (41° 27.07' N, 81° 38.45' W) is located on a tributary to Kingsbury Run's North Branch. The sample site is located at a manhole on the culvert in the center of Sweeney Avenue, approximately 100 feet west of East 55th Street, near 5407 Sweeney Avenue.

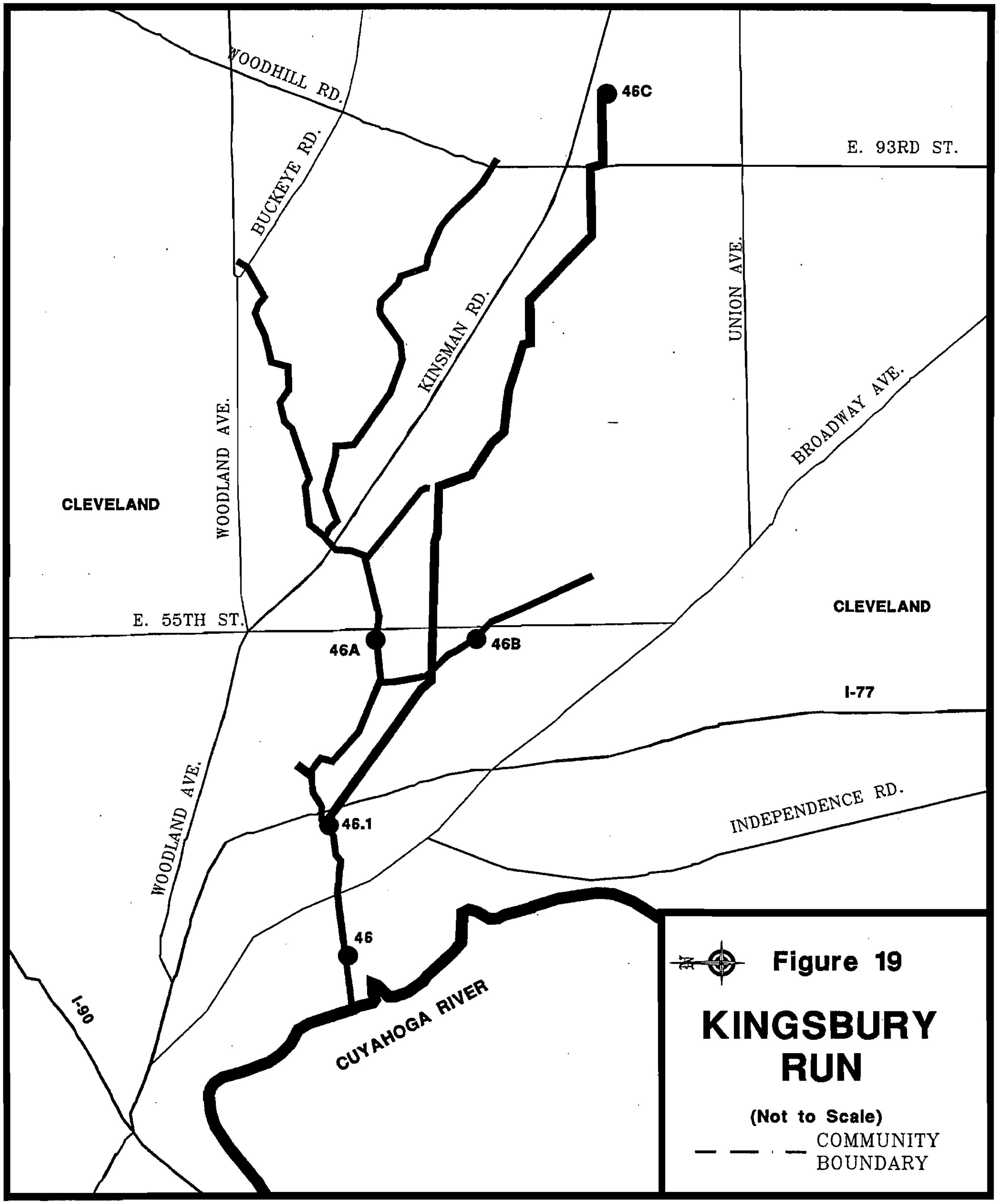


Figure 19

KINGSBURY RUN

(Not to Scale)

Site #46-C (41° 28.17' N, 81° 37.01' W) is located on Kingsbury Run's South Branch, at a manhole at Kingsbury Boulevard and Carton Avenue, approximately 150 feet south of Kinsman Road. This site is approximately 30 feet downstream from the confluence of the 96-inch Kinsman/Union storm relief sewer and the Kingsbury Run culvert.

No environmental disruptions on Kingsbury Run were found by or reported to the NEORSD in 1993, 1994, or 1995.

MORGANA RUN

Morgana Run drains the central portion of the City of Cleveland east of the Cuyahoga River. It has a total drainage area of 2,280 acres and a total length of 4.8 miles. Morgana Run's culvert originates at East 97th Street between Sandusky Avenue and Way Avenue. It runs predominantly east-to-west to East 49th Street, where, in dry weather, its entire flow drops into the Southerly Interceptor and is tributary to the NEORSD Southerly WWTP. The remaining section of Morgana Run enters the Cuyahoga River on the LTV Steel Company's property, south of the former location of the Clark Avenue bridge, at approximately River Mile 4.9.

In about 1910, Morgana Run was culverted, and in some places, relocated to follow Morgana Avenue. In 1960 and 1961, the Morgana Run culvert from Interstate 77 to Independence Road was reinforced, allowing the Republic Steel Corporation to use the land above Morgana Run as a bulk storage facility for coal, coke, and ore.

In 1969, all of the dry weather flow in Morgana Run upstream of East 49th Street was diverted by a weir, through a 42-inch pipe, into the Southerly Interceptor. The weir is overflowed only in wet weather, when many combined sewer overflows are tributary to Morgana Run upstream.

Until December 1991, when the LTV Steel Company's coke plant was removed from service, its treated effluent and cooling waters were discharged to Morgana Run between the river and Independence Road at a rate of approximately 10,000 gallons per minute.

The Ohio EPA has no current use designation for Morgana Run. Morgana Run has been assigned two sampling locations for routine chemical and bacteriological analysis (Figure 20). Chemical and bacteriological data from Morgana Run are presented in Appendix B.

Site #47-A (41° 28.15' N, 81° 40.10' W) is located at the mouth of Morgana Run where it enters the Cuyahoga River. This location was selected to include the LTV Steel Company's treated coke plant effluent into Morgana Run. Since Site #47-A is at the mouth of the culvert, no QHEI has been determined at this site.

Site #47 (41° 28.04' N, 81° 39.93' W) is located at a manhole on Independence Road, approximately 200 yards upstream of its confluence with the Cuyahoga River. This site is upstream of the LTV Steel Company Coke Plant effluent discharge. Since Site #47 is culverted, no QHEI has been determined at this site.

No environmental disruptions on Morgana Run were found by or reported to the NEORSD in 1993, 1994 or 1995.

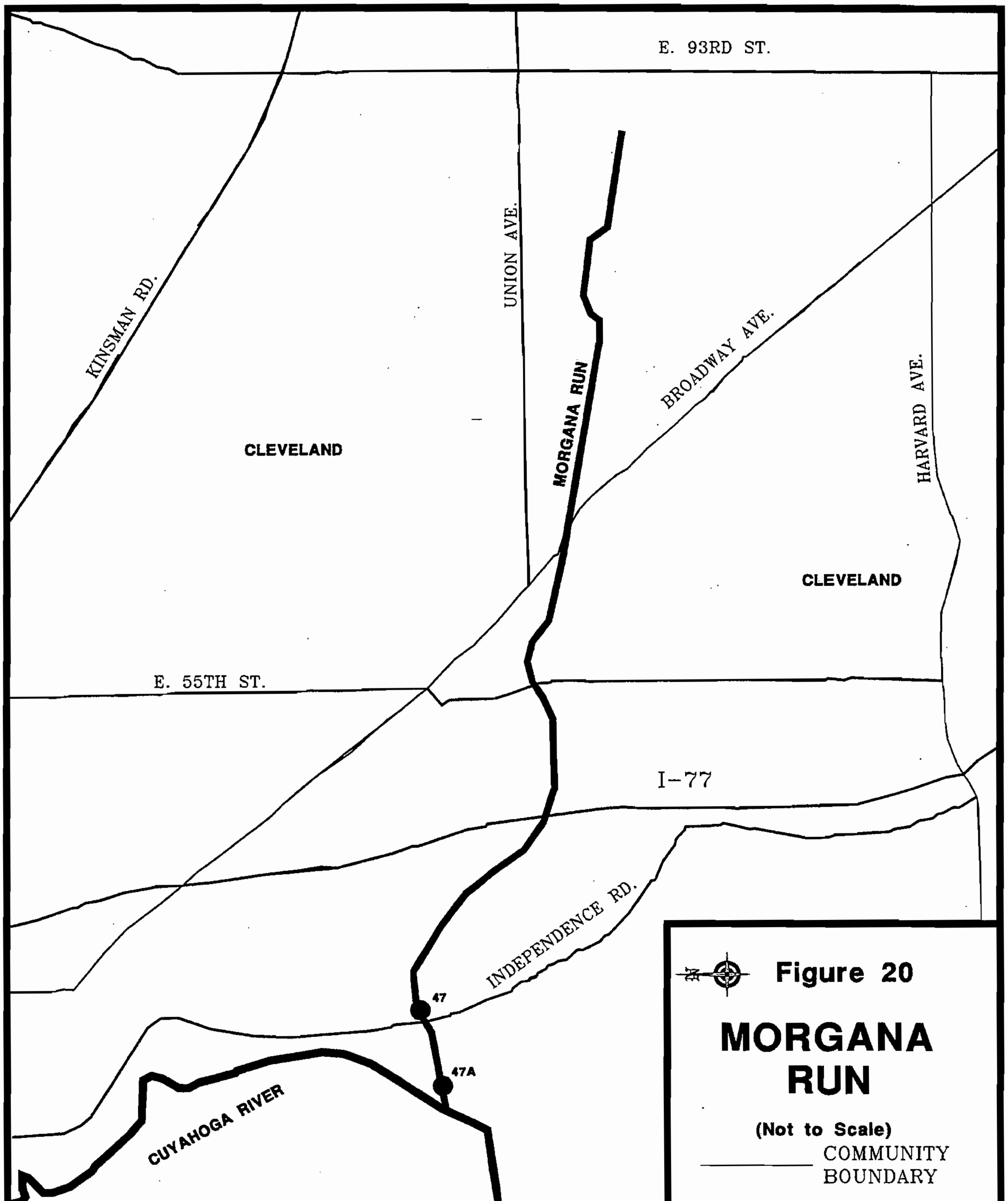


Figure 20

MORGANA RUN

(Not to Scale)

BURKE BROOK

Burke Brook carries surface run-off water and combined sewer overflows from the southern part of Cleveland east of the Cuyahoga River and from sections of Cuyahoga Heights and Newburgh Heights. The total drainage area is 1,400 acres.

Tributary to Burke Brook are 13 combined sewer overflow (CSO) structures. These overflow structures receive flow from a drainage area of approximately 500 acres, which is over one third of the total drainage area of Burke Brook. Ten of these overflow structures are located on Burke Brook's main branch, east of Interstate 77. In July 1982, the NEORSD activated a diversion chamber east of Interstate 77, south of Fleet Avenue. This diversion chamber intercepts the entire dry weather flow of Burke Brook's main branch. From this chamber, the main branch's flow is diverted into the NEORSD Southerly Interceptor.

The south branch of Burke Brook originates as a 48-inch storm sewer on Grant Avenue in Cuyahoga Heights. Then, it flows through Newburgh Heights where it joins the former channel of the main branch downstream of the NEORSD's diversion chamber. From this point, Burke Brook flows under Interstate 77 and LTV Steel Company property northwest to its confluence with the Cuyahoga River at about River Mile 5.3.

Three combined sewer overflow structures are presently not tributary to the NEORSD's diversion chamber: one on Grant Avenue east of Interstate 77 in Cuyahoga Heights, and one on Harvard Avenue west of Interstate 77 in Newburgh Heights, both of which are maintained by the NEORSD; one in the Washington Park Horticultural Center, which the Village of Newburgh Heights is responsible for maintaining.

Except for 0.3 total miles of open section on both sides of Interstate 77 and about 100 yards of an open tributary near Bert Avenue, the entire length of Burke Brook is culverted. The Ohio EPA has no current use designation for the culverted sections of Burke Brook. The open section of the creek adjacent to Interstate 77 has been designated Limited Resource Water, Agricultural Water Supply, Industrial Water Supply and Secondary Contact Recreational Use. Burke Brook has been assigned two sampling locations for routine chemical and bacteriological analysis (Figure 21). Chemical and bacteriological data from Burke Brook are presented in Appendix B.

Site #48 (41° 29.31' N, 81° 41.02' W) is located in an open chamber on the double barrel culvert on LTV Steel Company property, about 200 yards upstream of the brook's confluence with the Cuyahoga River. Since Site #48 is culverted, no QHEI has been obtained.

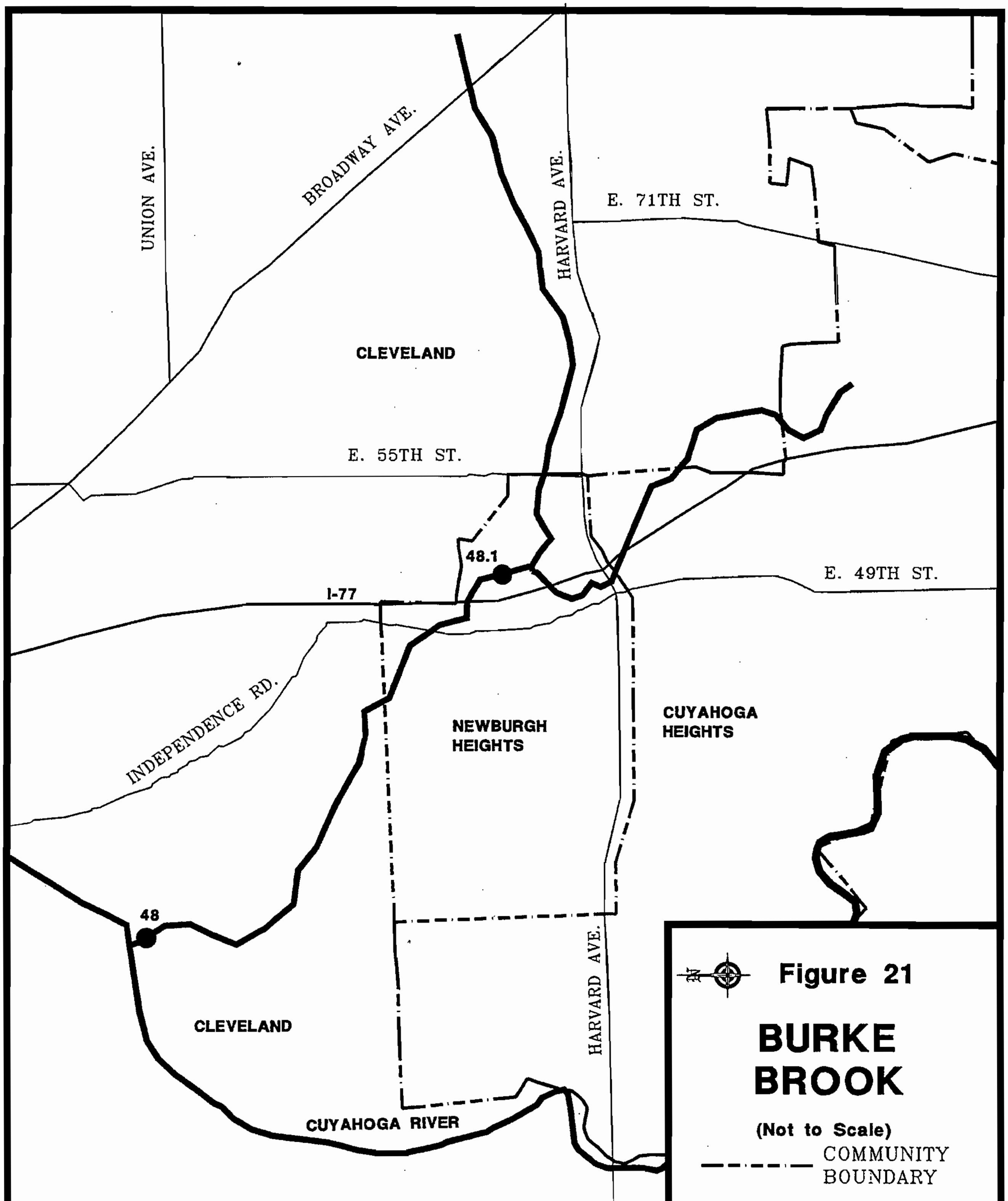


Figure 21

BURKE BROOK

(Not to Scale)

Site #48.1 (41° 27.07' N, 81° 39.40' W) is located off Independence Road, south of Fleet Avenue, on the open section of Burke Brook's main stem, just east of Interstate 77, downstream from the former confluence of the main and south branches. In 1993, Site #48.1 obtained a QHEI score of 44 (Appendix F).

Problems and Remediation:

\- 1 -

On January 10, 1994, NEORSD investigators assisted the Newburg Heights Fire Department in a response to gasoline leaking to the sanitary sewer from a Speedway Station at Harvard Avenue and East 27th Street. An estimated 2,300 gallons of gasoline had leaked to the sewer system when two underground fuel supply lines were broken during construction activity at the station. An undetermined quantity of gasoline had entered Burke Brook through a sanitary sewer overflow at East 42nd Street and Alpha Avenue. Containment booms and absorbent pads, which were positioned at the overflow structure, prevented additional flow from entering the creek. All clean-up measures were conducted by Samsel Services Company and monitored by the Ohio EPA.

\- 2 -

As a result of dye testing conducted between September 22 and October 25, 1994 at the Riser Foods, Inc. facility located at 5800 Grant Avenue in Cuyahoga Heights, investigators discovered four drains which were tributary to the storm sewer and ultimately to Burke Brook. NEORSD, in a letter dated November 8, 1994, requested that the four drains be disconnected from the storm sewer and connected to the sanitary sewer. Company officials, in a letter dated February 15, 1995, notified the NEORSD that the drains had been rerouted to the sanitary sewer or had been sealed with cement. The corrections were subsequently verified by NEORSD investigators.

EUCLID CREEK

Euclid Creek's drainage area includes the communities of Cleveland, Euclid, Highland Heights, Richmond Heights, Willoughby Hills, Lyndhurst and South Euclid. The total drainage area is approximately 15,500 acres, and the creek has a length of 9.5 miles. With the exception of a culverted section under Interstate 90, the creek is predominantly open. The section between Lake Shore Boulevard and Nottingham Road has been channelized by the U.S. Army Corps of Engineers with concrete stream beds for flood control. A dam is located downstream of the St. Clair Avenue Bridge.

The Ohio EPA has designated Euclid Creek Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreational Use. In addition, portions of Euclid Creek within the boundaries of the Cleveland Metroparks have been designated State Resource Water. The NEORSD has selected five locations on Euclid Creek which are routinely sampled for chemical, bacteriological, and benthic analysis (Figure 22). Chemical and bacteriological data from Euclid Creek are presented in Appendix B.

Site #0.5 (41° 34.91' N, 81° 33.58' W) is located about 150 feet downstream of Lake Shore Boulevard. Site #0.5 was selected in 1990 to reflect the environmental impact on Euclid Creek from several upstream storm sewer outfalls, and this location is the furthest downstream sampling site prior to its discharge into Lake Erie. In 1991, Site #0.5 obtained a QHEI score of 45 (Appendix F).

Site #1 (41° 34.31' N, 81° 32.78' W) is located about 10 feet south of the St. Clair Avenue Bridge. In 1993, Site #1 obtained a QHEI score of 76 (Appendix F).

Site #2 (41° 33.61' N, 81° 31.88' W) is located on the South Branch of Euclid Creek in the Highland Picnic Area of the Cleveland Metroparks Euclid Creek Reservation, about 100 feet upstream of its confluence with the North Branch. In 1993, Site #2 obtained a QHEI score of 66.5 (Appendix F).

Site #3 (41° 33.59' N, 81° 31.88' W) is located on the North Branch of Euclid Creek in the Highland Picnic Area of the Cleveland Metroparks Euclid Creek Reservation, about 100 feet upstream of the confluence with the South Branch. In 1993, Site #3 obtained a QHEI score of 65.5 (Appendix F).

Site #4 (41° 31.10' N, 81° 30.68' W) is located on the South Branch, adjacent to the South Euclid-Lyndhurst Public Library, 4645 Mayfield Road. In 1993, Site #4 obtained a QHEI score of 69 (Appendix F).

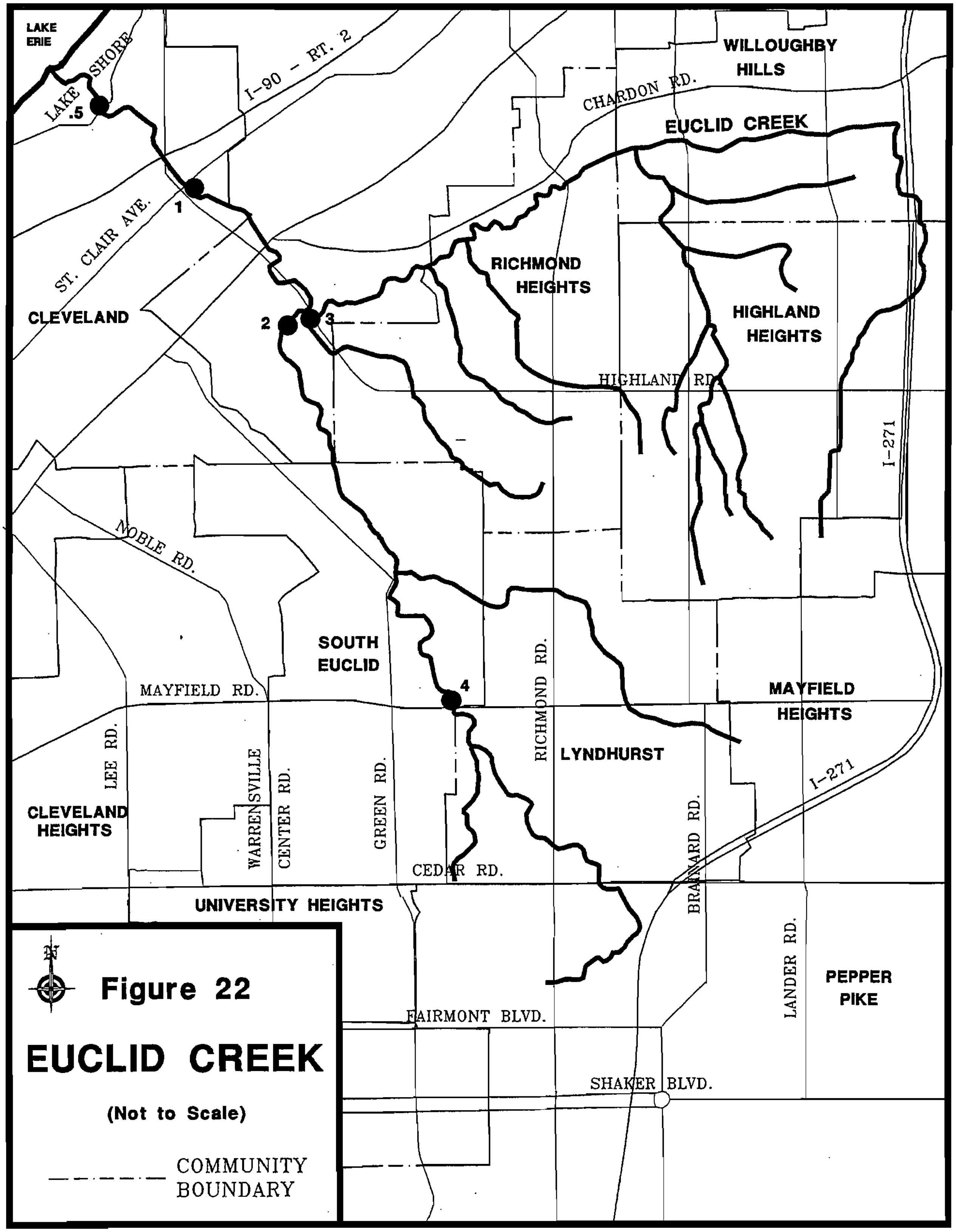
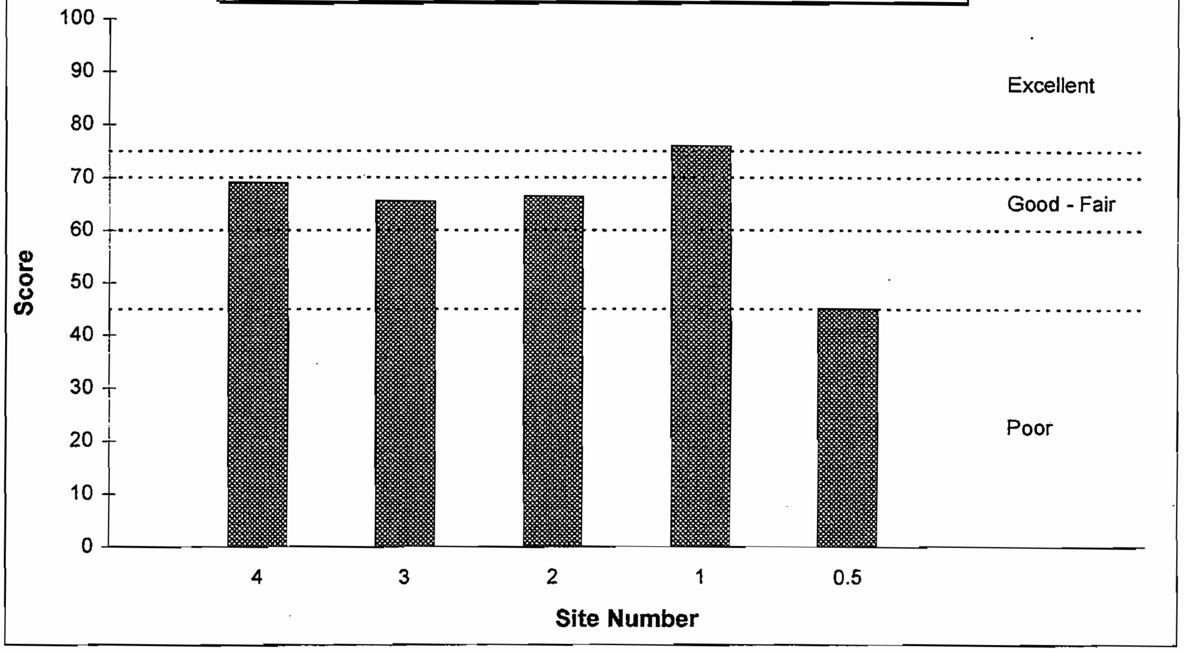


Figure 22
EUCLID CREEK
(Not to Scale)

Figure 23
Euclid Creek Qualitative Habitat Evaluation Index Scores
1991



Problems and Remediation:

- 1 -

In July of 1987, NEORSD investigators inspected a 42-inch storm sewer outfall at Euclid Creek, upstream of Site #1 and behind Cleveland Metal Cleaning Corporation at 1423 Dille Road. Intermittent discharges from this outfall had been responsible for incidents throughout the period from 1987 to 1992, during which time Euclid Creek had periodically turned an orange color downstream of the outfall. This storm sewer, which originates on the property of the Inland Division of the General Motors Corporation on Euclid Avenue, runs east past Dille Road north of Cleveland Metal Cleaning Corporation to Euclid Creek.

Samples taken in 1989 and 1990 from this 42-inch storm sewer outfall had indicated high concentrations of suspended solids (200 to
818 mg/L) and iron (14 to 660 mg/L). Additionally, low pH levels had been noted (2.9 to 6.1 standard units). Iron solids, present in the storm sewer discharge, had accumulated causing a build-up of iron sludge on the creek bed. A 1990 City of Euclid contracted video inspection of this storm sewer revealed badly decomposed joints, several cracks in the top of the pipe and numerous points of infiltration in the vicinity of Cleveland Metal Cleaning Corporation, which has a steel pickling operation.

On April 29, 1993, NEORSD investigators and an Ohio EPA representative responded to a report of an orange color in Euclid Creek at Lake Shore Boulevard. An inspection of the 42-inch storm sewer outfall revealed that it was the source of the orange residue. Investigators visited Cleveland Metal Cleaning Corporation and spoke with the environmental coordinator. He explained that their spent pickle liquor was hauled off the property and that some may have spilled during the transfer from the holding tanks to the tanker trucks. A sample taken from a catch basin in the truck loading area was green in color (typical of pickle liquor) and had a pH of 2.5 standard units, a nickel concentration of 0.93 mg/L, a copper concentration of 0.62 mg/L, a total chromium concentration of 2.6 mg/L, a zinc concentration of 1.9 mg/L, an iron concentration of 15,300 mg/L, and a lead concentration of 0.59 mg/L. This catch basin is tributary to the 42-inch storm sewer. In addition, pooled water having a pH of 2.0 standard units was observed around the base of an 18,000-gallon holding tank. Ohio EPA required that Cleveland Metal Cleaning Corporation neutralize the substance in the catch basin and the water around the holding tank.

- 2 -

On June 13, 1994, NEORSD responded to a report of a pickle liquor spill that had occurred on June 11, 1994 at Cleveland Metal Cleaning Corporation. The environmental coordinator for Cleveland Metal Cleaning Corporation explained that approximately 30 gallons of pickle liquor was accidentally siphoned through a steam hose into a boiler and finally to a storm drain in the boiler room. Investigators recommended that the drain in the boiler room be sealed and the boiler blowdown water be piped to the sanitary sewer. A follow-up investigation on March 22, 1995 confirmed that the drain in the boiler room was sealed. In addition, a new liner had been installed in the pickle liquor tank to eliminate pinhole discharges.

- 3 -

On April 7, 1993 WQIS received a report from Ohio EPA that oil had been discharged to a tributary of Euclid Creek via the storm sewer from the Heights/Hilltop interceptor shaft (#4) on Wilson Mills Road at Richmond Road. NEORSD investigators spoke with the construction manager of shaft #4 on April 8, 1993. Apparently an oil separator was overfilled, and excess water and oil spilled over into the storm sewer. MHC Environmental was contracted to remove the oil from the creek. Remediation efforts to remove oil from the tributary of Euclid Creek were confirmed on April 8, 1993.

- 4 -

On August 16, 1993, NEORSD investigators responded to a report from the Cuyahoga County Board of Health of sanitary sewage entering Euclid Creek from under the Anderson Road bridge. Sanitary sewage was seeping from the base of a 36-inch sanitary sewer, where it joins the west wall of the Anderson Road bridge embankment. The City of South Euclid was notified of the problem and began replacing the sanitary sewer on September 7, 1993. Bacteriological sampling on September 9, 1993 revealed a fecal coliform concentration of 160,000 organisms per 100 mL downstream of the Anderson Road bridge. Subsequent investigations verified the elimination of this environmental disruption to Euclid Creek.

\- 5 -

On December 7, 1993 District personnel responded to a report from the U.S. Coast Guard of oil entering Euclid Creek near St. Clair Avenue and East 185th Street. The oil was flowing into the creek from a 30-inch storm sewer outfall on the east bank. Working in conjunction with the Cleveland Fire Department and the U.S. Coast Guard, NEORSD investigators traced the oil to the vicinity of Neff Road and St. Clair Avenue. However, attempts to find the source of the oil were unsuccessful.

\- 6 -

On June 13, 1994, NEORSD investigators responded to a report by Ohio EPA of oil in Euclid Creek, downstream of Lake Shore Boulevard, at Site #0.5. The oil appeared to be emanating from a 36-inch eastbound storm sewer outfall under the Lake Shore Boulevard bridge. Investigators were unable to identify the source of the oil contamination to the creek.

\- 7 -

While conducting routine sampling at Euclid Creek on October 13, 1994, NEORSD investigators discovered high fecal coliform concentrations (170,000 organisms per 100 mL) downstream of the Mayfield Road bridge (Site #4). An inspection of the area revealed dry weather flow with evidence of sanitary sewage entering Euclid Creek from a 24-inch storm sewer outfall on the north side of the Mayfield Road bridge. The City of South Euclid reported that construction debris had blocked a sanitary sewer line on Mayfield Road. This resulted in sewage spilling over into the storm sewer. The blockage was cleared on October 29, 1994 and its correction was verified by NEORSD investigators on January 6, 1995.

\- 8 -

On November 7, 1994, NEORSD investigators responded to a report by the Beachwood Police Department of black tar in a tributary of Euclid Creek near Interstate-271 (I-271) and Cedar Road. Investigators traced the tar to a five foot storm sewer outfall located 1,000 feet northeast of David Myers Parkway and south of Cedar Road. The tar was traced to construction on the I-271 median strip near Cedar Road. The black tar is used during the construction of roadways and excess tar was making its way into catch basins, which ultimately drain into Euclid Creek. Clean Harbors Environmental Services was contracted by Kenmore Construction Company to clean the catch basins and the five-foot storm sewer outfall. The clean-up was verified by NEORSD investigators on November 8, 1994.

GREEN CREEK

Green Creek drains a small portion of Cleveland and South Euclid. The drainage area, mostly residential and industrial, is approximately 660 acres, and the stream is 6.1 miles in length. Green Creek is culverted for 2.3 miles, from Euclid Avenue to Lake Erie. The Ohio EPA has no current or proposed use designation for Green Creek. Green Creek has been assigned three sample sites by NEORSD Environmental Assessment for routine chemical, bacteriological and biological sampling (Figure 24). Chemical and bacteriological data from Green Creek are presented in Appendix B.

Site #5 (41° 34.32' N, 81° 33.80' W) is located at a manhole on the culvert at Arcade Avenue, west of East 167th Street. The culvert at Site #5 is 8 feet wide by 4 feet high. Since Site #5 is culverted, no QHEI has been determined.

Site #6 (41° 34.01' N, 81° 33.78' W) is located at a small opening on the culvert, northeast of East 170th Street and Saranac Road. This open section of the creek is 10 feet long by 8 feet wide. No QHEI has been determined at Site #6 since this location lacks habitat characteristics required for a QHEI. Specifically, Site #6 lacks the appropriate length (200-500 m) for determining a QHEI.

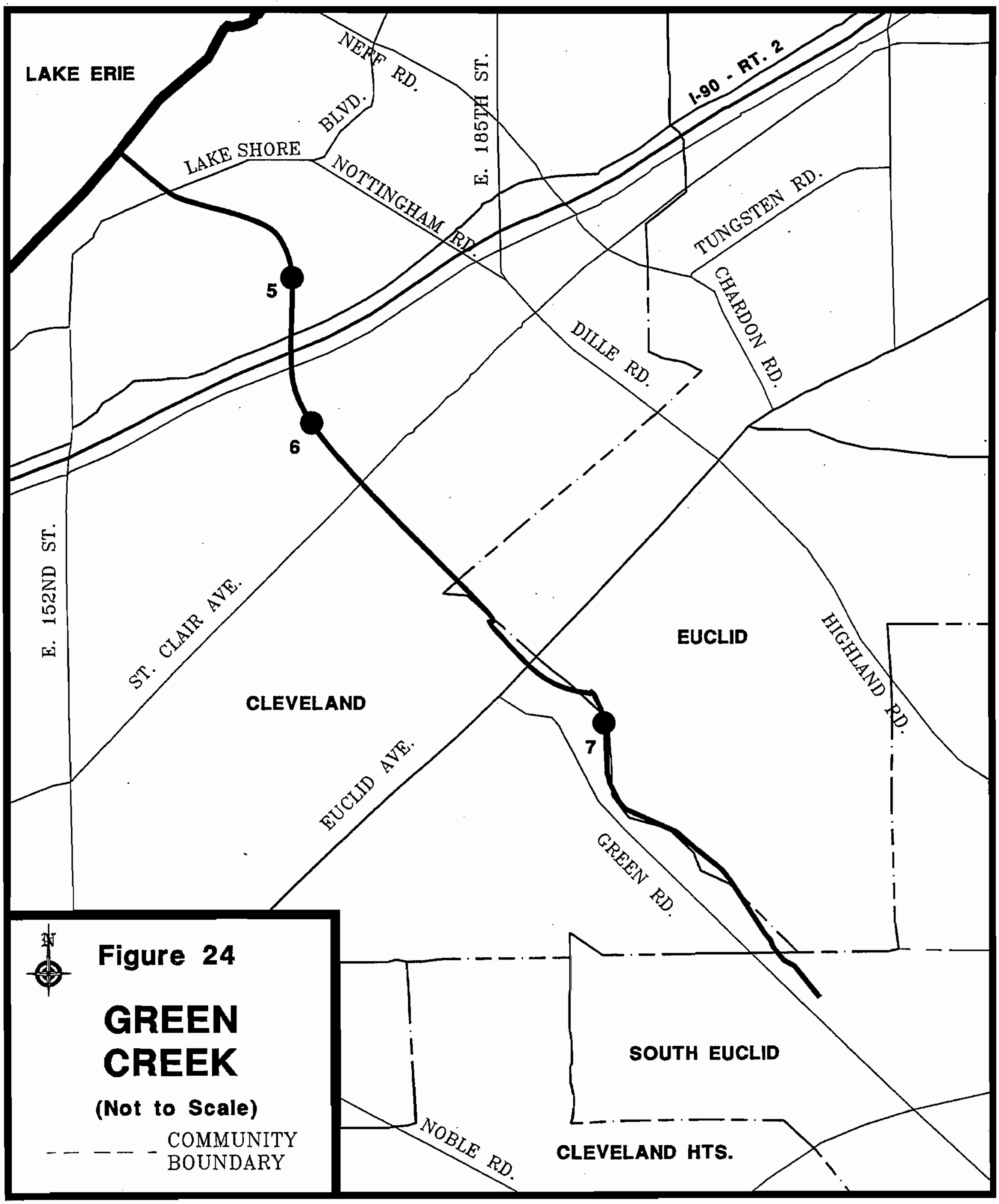
Site #7 (41° 33.39' N, 81° 32.76' W) is located south of Euclid Avenue on Upper Valley Drive. Samples and measurements are obtained at the downstream end of the open creek, before it enters the culvert. A metal grate, which functions as a debris screen, crosses the creek just upstream of the sample site. In 1993, Site #7 obtained a QHEI score of 64.5 (Appendix F).

Problems and Remediation:

- 1 -

While inspecting the Green Creek culvert in July 1995, NEORSD investigators observed evidence of sanitary sewage in the creek's culvert downstream of Site #7, near the Greenlite Shopping Center, north of Euclid Avenue and Green Road. To determine where sanitary sewage was entering the Green Creek culvert, bacteriological samples were taken at various locations in storm sewers tributary to the culvert. Results of the analyses revealed fecal coliform concentrations as high as 340,000 organisms per 100 mL and showed that the contamination by sanitary sewage was from several directions throughout the sewer system.

In September 1995, NEORSD investigators performed numerous dye tests and inspections in an attempt to further identify the sources of the sanitary sewage influent


LAKE ERIE
NEFF RD.
E. 185TH ST.
I-90 - RT. 2
BLVD.
LAKE SHORE
NOTTINGHAM RD.
TUNGSTEN RD.
CHARDON RD.
DILLE RD.
5
6
7
E. 152ND ST.
ST. CLAIR AVE.
CLEVELAND
EUCLID
HIGHLAND RD.
EUCLID AVE.
GREEN RD.
SOUTH EUCLID
NOBLE RD.
CLEVELAND HTS.
N
Figure 24
GREEN CREEK
(Not to Scale)
COMMUNITY BOUNDARY

to Green Creek. These efforts revealed that the sanitary facilities at Popeye's Chicken and Biscuits (18126 Euclid Avenue), Pizza Hut (18324 Euclid Avenue) and two retail stores at the Greenlite Shopping Center had been improperly connected to storm sewers tributary to the creek. In addition, NEORSD investigators discovered that the 24-inch westbound sanitary sewer on Euclid Avenue is improperly connected to the Green Creek culvert at 18324 Euclid Avenue. The NEORSD Engineering department is currently investigating corrective actions to eliminate these sources of sanitary sewage to Green Creek.

NINE-MILE CREEK

Nine-Mile Creek's drainage area includes the communities of South Euclid, University Heights, Cleveland Heights, East Cleveland, Cleveland, and Bratenahl. The total drainage area is approximately 5,000 acres. Nine-Mile Creek is culverted from near its mouth at Lake Shore Boulevard to east of Belvoir Road at the border between the cities of Cleveland and Cleveland Heights. Upstream of this location, the creek is open, and the "Nela Park" Branch, which enters the culverted main stem of Nine-Mile Creek south of Belvoir Boulevard, east of Hillside Avenue in East Cleveland, is also open.

The Ohio EPA has designated Nine-Mile Creek Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary Contact Recreational Use. The NEORSD has selected four locations on Nine-Mile Creek which are routinely sampled for chemical, bacteriological, and benthic analysis (Figure 25). Chemical and bacteriological data from Nine-Mile Creek are presented in Appendix B.

Site #8a (41° 33.04' N, 81° 36.08' W) is located approximately 500 yards upstream of Nine-Mile Creek's confluence with Lake Erie. Samples are obtained about 50 feet north of the Lake Shore Boulevard bridge. In 1993, Site #8a obtained a QHEI score of 55 (Appendix F).

Site #8b (41° 32.87' N, 81° 34.11' W) is located on the culverted section of the main stem of Nine-Mile Creek. This site is located at a manhole west of Ivanhoe Road and approximately 20 feet north of the railroad tracks which run perpendicular to Ivanhoe Road. Since Site #8b is culverted, no QHEI has been obtained.

Site #9 (41° 32.53' N, 81° 33.39' W) on the Nine-Mile Creek "Nela Park" Branch is located one-quarter mile southeast of Euclid Avenue on the southwest side of Belvoir Boulevard. Samples are obtained just upstream of this branch's entry into the Nine-Mile Creek culvert. In 1993, Site #9 obtained a QHEI score of 57 (Appendix F).

Site #10 (41° 32.69' N, 81° 33.23' W) is located on the main stem of Nine-Mile Creek, 10 feet upstream of its entry into the Nine-Mile Creek culvert. It is on the south side of Belvoir Boulevard about one-half mile east of Euclid Avenue. In 1993, Site #10 obtained a QHEI score of 58 (Appendix F).

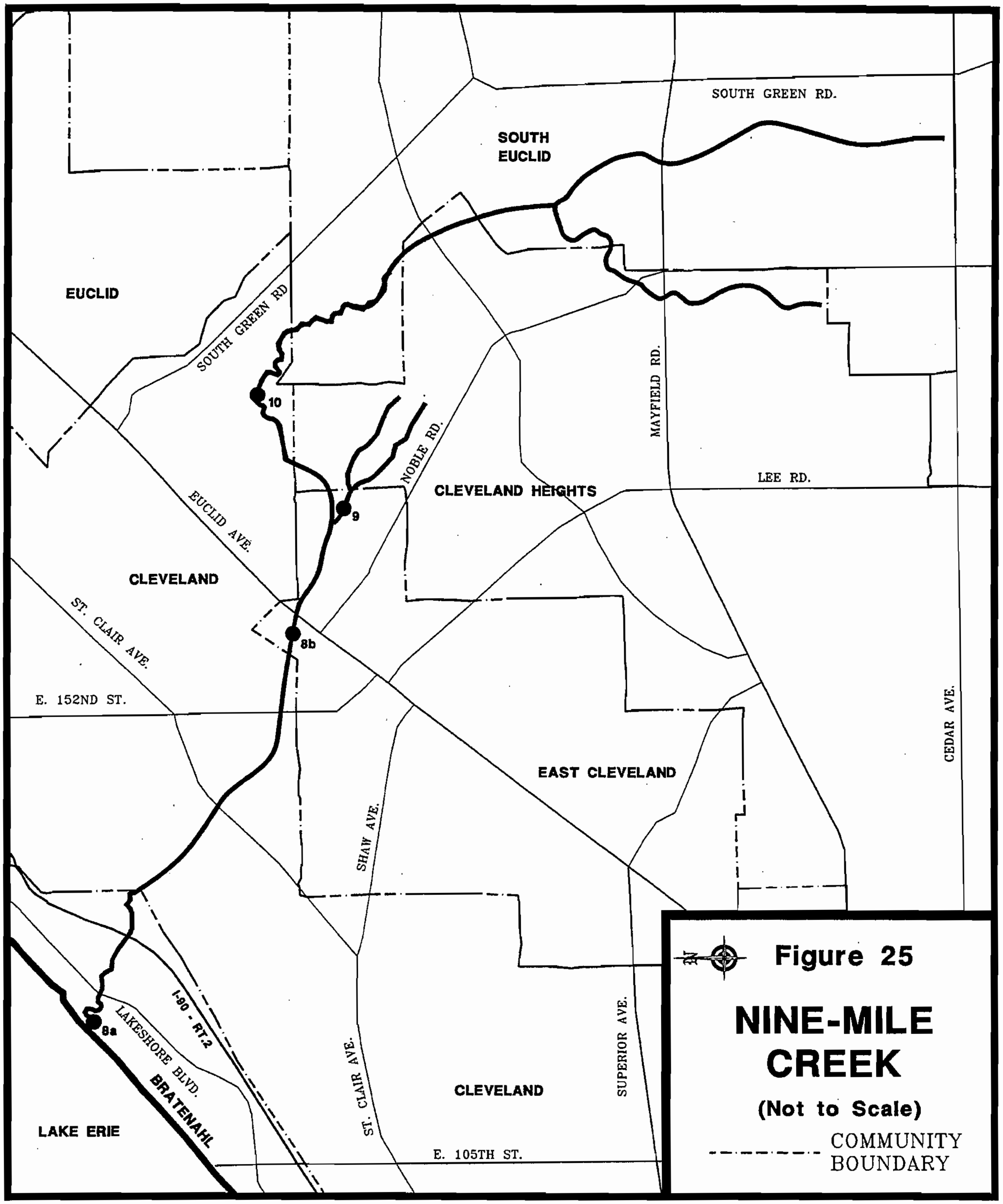
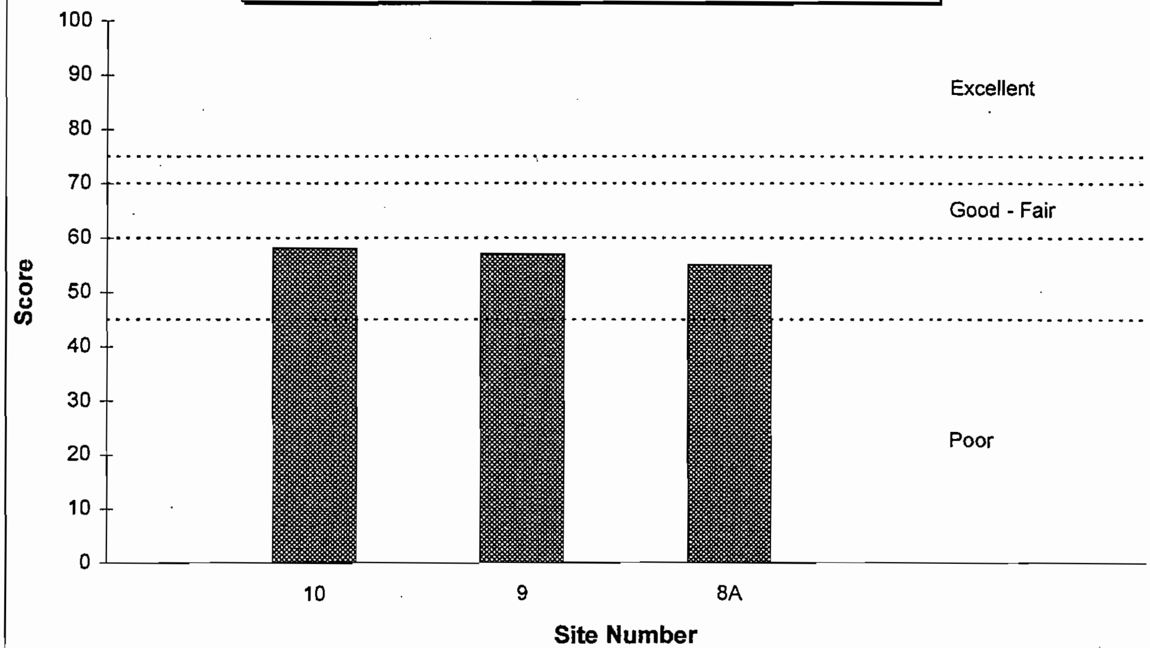


Figure 25

NINE-MILE CREEK

(Not to Scale)

Figure 26
Nine-Mile Creek Qualitative Habitat Evaluation Index Scores
1993



Problems and Remediation:

- 1 -

On January 12, 1993, NEORSD Investigators discovered sanitary sewage entering the "Nela Park" Branch of Nine-Mile Creek, upstream of Site #9, from a storm sewer outfall behind Randolph and Medford Roads in Cleveland Heights. The flow was measured at approximately 390,000 gallons per day. On January 15, the sewage was traced back to Noble Road, between Pennfield and Quilliams Roads. A blockage of the sanitary sewer at this location had resulted in leakage of sewage into the storm sewer. Following this discovery, the City of Cleveland Heights Service Department was notified.

A follow-up inspection by investigators on January 19 revealed that the dry weather flow of sanitary sewage to the "Nela Park" Branch at this location was continuing unabated. Although a blockage in the sanitary sewer on Noble Road, between Pennfield and Quilliams Roads, had been cleared, investigators found another blockage in the sanitary sewer on Noble Road, between Yellowstone and Pennfield Roads. The City of Cleveland Heights Service Department was notified of this problem and reportedly removed the blockage that day. On January 25, 1993, NEORSD investigators verified that the blockage had been cleared, eliminating this source of pollution in Nine-Mile Creek.

- 2 -

On March 22, 1993, NEORSD investigators discovered a surcharged sanitary sewer on Ravine Drive in East Cleveland. The flow in the sanitary sewer had backed up because of an obstruction in a downstream section. As a result, sanitary sewage was entering a storm sewer tributary to Nine-Mile Creek through an overflow relief structure on Ravine Drive. The dry weather flow of sanitary sewage was measured at approximately 20,000 gallons per day. The City of East Cleveland was notified of the problem. On June 7, 1993, NEORSD investigators found that the overflow structure had been sealed with concrete, eliminating the dry weather discharge to Nine-Mile Creek.

- 3 -

On July 26, 1994, NEORSD investigators responded to a report of a blue-colored flow in Nine-Mile Creek at Lake Shore Boulevard. The discolored flow was determined to be entering the creek through an overflow structure at Coit Road and Kirby Avenue. A blockage in the combined sewer on Coit Road had resulted in the dry weather overflow of sanitary sewage to Nine-Mile Creek. Measurements on July 27 indicated that the overflow of sanitary sewage was entering the creek at an approximate rate of 750,000 gallons per day, with a fecal coliform concentration of 17,000 organisms per 100 mL. The City of Cleveland Division of Water Pollution Control was notified of this problem and, on July 27, removed the blockage and eliminated this source of contamination in Nine-Mile Creek.

- 4 -

On August 24, 1994, NEORSD investigators discovered a break in a 12-inch sanitary sewer which crosses the "Nela Park" Branch of Nine-Mile Creek upstream of Site #9. The break was located west of Atherstone and Langton Roads. The flow of sewage entering the creek from this source was measured at approximately 19,000 gallons per day. The fecal coliform concentration on this branch immediately downstream of the break was measured at 100,000 organisms per 100 mL. Following this discovery, the City of Cleveland Heights Service Department was notified of the situation. A subsequent inspection by investigators revealed that the sewer had been patched, eliminating this source of pollution in Nine-Mile Creek.

DUGWAY BROOK

Dugway Brook's drainage area includes the communities of Cleveland, East Cleveland, Cleveland Heights, University Heights, and Bratenahl. The brook has two main branches, East and West, and has a total length of 7.9 miles and total drainage area of 9.4 square miles. Most of Dugway Brook is culverted, with the following exceptions which are open: near the mouth, north of Lake Shore Boulevard; on a tributary to the West Branch, between Derbyshire Road and Washington Boulevard in Cleveland Heights; on the West Branch, through Lakeview Cemetery, between Mayfield Road and Euclid Avenue; on the East Branch through Cumberland Park, between Euclid Heights Boulevard and Hampshire Road, in Cleveland Heights.

The Ohio EPA has no current or proposed use designation for Dugway Brook. The NEORSD has selected four locations on Dugway Brook which are routinely sampled for chemical, bacteriological, and benthic analysis (Figure 27). Chemical and bacteriological data from Dugway Brook are presented in Appendix B.

Site #12 (41° 31.42' N, 81° 35.82' W) is located near the mouth of Dugway Brook, just north of Lake Shore Boulevard. In 1993, Site #12 obtained a QHEI score of 70 (Appendix F).

Site #13 (41° 31.66' N, 81° 36.45' W) is located on Dugway Brook's West Branch at Primrose Avenue. The stream is culverted at this point and must be entered through the storm sewer outlet from the overflow regulator at Primrose Avenue and East 111th Street. Since Site #13 is culverted, no QHEI has been determined.

Site #14 (41° 30.66' N, 81° 35.45' W) is located on Dugway Brook's West Branch downstream of the NEORSD flood control dam at Lakeview Cemetery. In 1993, Site #14 obtained a QHEI score of 63 (Appendix F).

Site #15 (41° 30.66' N, 81° 34.21' W) is located on the East Branch of Dugway Brook at Cumberland Park in Cleveland Heights, south of Mayfield Road. In 1993, Site #15 obtained a QHEI score of 64 (Appendix F).

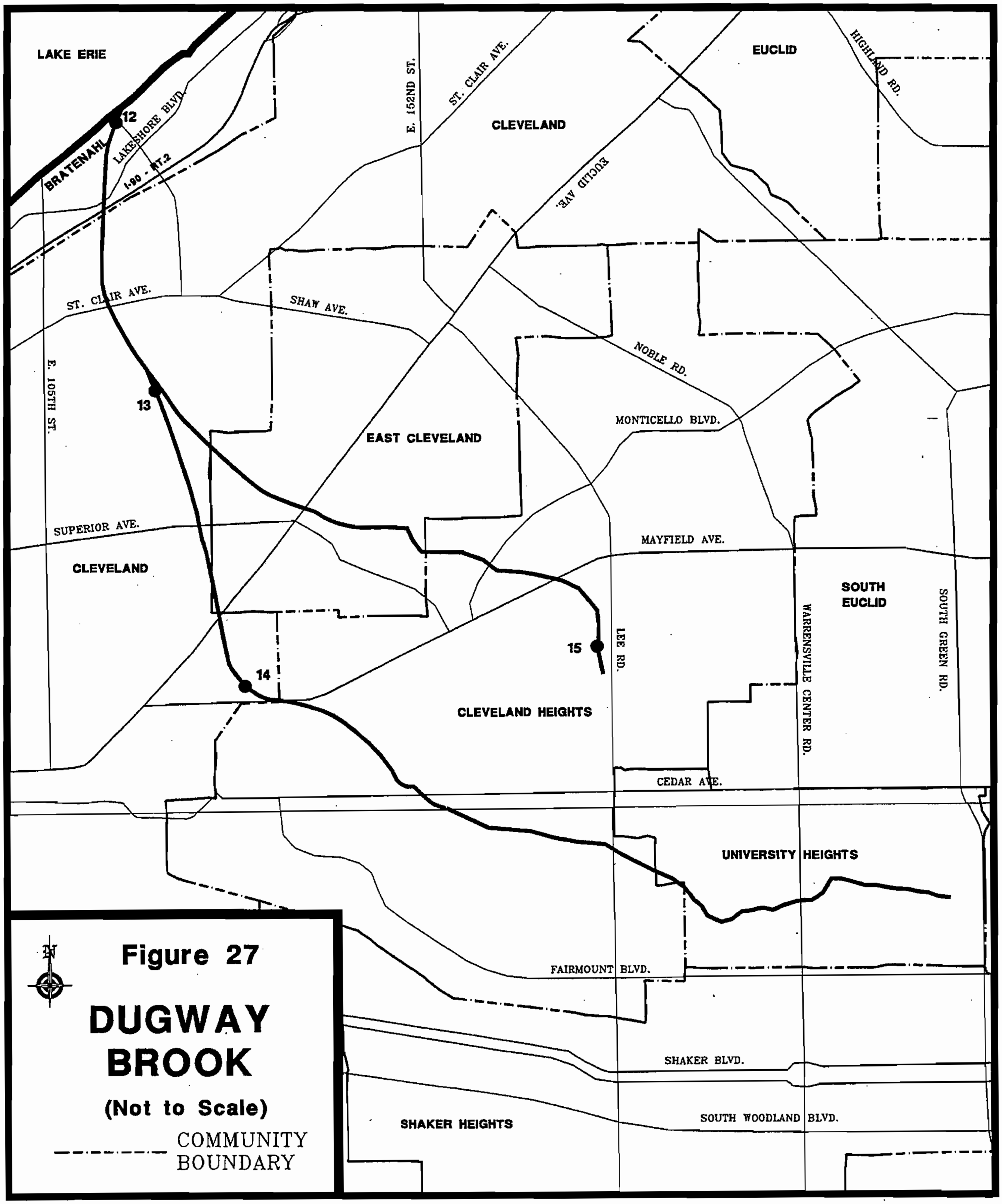
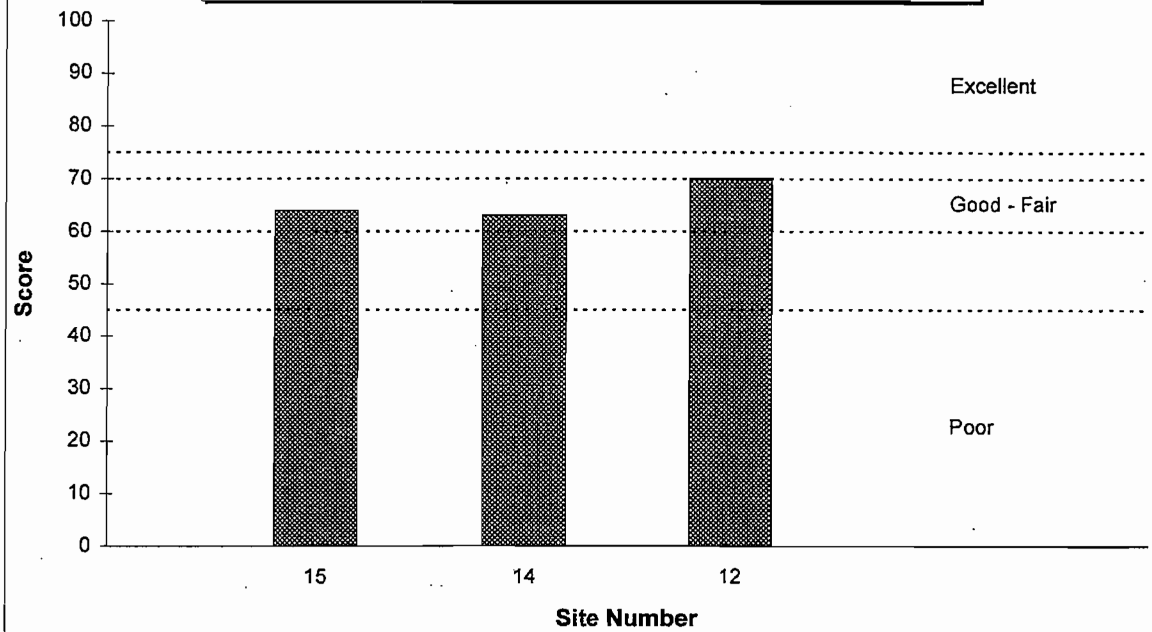

LAKE ERIE
EUCLID
HIGHLAND RD.
ST. CLAIR AVE.
E. 152ND ST.
CLEVELAND
12
BRATENAHL
LAKESHORE BLVD.
I-90 - RT.2
EUCLID AVE.
ST. CLAIR AVE.
SHAW AVE.
NOBLE RD.
E. 105TH ST.
13
MONTICELLO BLVD.
EAST CLEVELAND
SUPERIOR AVE.
MAYFIELD AVE.
CLEVELAND
SOUTH EUCLID
SOUTH GREEN RD.
WARRENSVILLE CENTER RD.
LEE RD.
15
14
CLEVELAND HEIGHTS
CEDAR AVE.
UNIVERSITY HEIGHTS
FAIRMOUNT BLVD.
SHAKER BLVD.
SOUTH WOODLAND BLVD.
SHAKER HEIGHTS
N
Figure 27
DUGWAY BROOK
(Not to Scale)
COMMUNITY BOUNDARY

Figure 28
Dugway Brook Qualitative Habitat Evaluation Index Scores
1993



Problems and Remediation:

- 1 -

On January 19, 1993, NEORSD investigators discovered a dry weather discharge of sanitary sewage from a 36-inch storm sewer outfall to Dugway Brook, upstream of Site #15. The flow was measured at approximately 43,000 gallons per day and bacteriological analysis of this discharge showed a fecal coliform concentration of 990,000 organisms per 100 mL. On January 26, NEORSD investigators traced the sewage to a blocked sanitary sewer on Superior Avenue at Euclid Heights Boulevard. The City of Cleveland Heights Service Department was notified of the problem and reportedly cleared the blockage on January 27.

- 2 -

On August 24, 1993, NEORSD investigators found the influent recurring and again traced its source to Superior Avenue at Euclid Heights Boulevard. Notification of the City of Cleveland Heights Service Department again resulted in correction of the problem by removal of the blockage in the sanitary sewer. On September 2, NEORSD investigators verified that this source of pollution in Dugway Brook had been eliminated.

- 3 -

On March 23, 1994, NEORSD investigators responded to a report of sewage entering the West Branch of Dugway Brook through a storm sewer outfall at Washington Boulevard and Cedar Road in University Heights. At the time of the inspection, investigators discovered dry weather flow entering the creek from three storm sewer outfalls at this location. Samples of the discharges were obtained for bacteriological analysis on March 23. The fecal coliform concentrations were measured at 780 organisms per 100 mL (42-inch westbound storm sewer outfall), 40,000 organisms per 100 mL (24-inch westbound storm sewer outfall) and 400,000 organisms per 100 mL (36-inch eastbound storm sewer outfall). The rate of flow was measured at approximately 20,000 gallons per day from the 42-inch westbound outfall and 100,000 gallons per day from the 36-inch eastbound outfall. Investigators were unable to measure the flow from the 24-inch outfall.

A follow-up inspection by investigators on June 9 revealed that the discharge from the 24-inch storm sewer outfall had ceased . Bacteriological analysis of the discharges from the remaining outfalls showed fecal coliform concentrations of less than 10 organisms per 100 mL (36-inch outfall) and 25,000 organisms per 100 mL (42-inch outfall) on June 10. These sources of contamination may be intermittent, necessitating further investigation.

- 4 -

On August 18, 1994, NEORSD investigators discovered sanitary sewage entering the Dugway Brook culvert upstream of Site #13 while performing routine sampling. The source of this contamination was determined to be a dry weather overflow of sanitary sewage due to a blockage in a dry weather outlet at Primrose Avenue and East 111th Street. NEORSD Sewer Maintenance and Control crews identified this problem on August 18 while performing inspections of the overflow structures tributary to Dugway Brook. The blockage was cleared that day by NEORSD personnel, thus eliminating this source of pollution in Dugway Brook.

DOAN BROOK

Doan Brook's drainage area includes the communities of Cleveland, Cleveland Heights, and Shaker Heights. Doan Brook has a total length of 8.1 miles and a drainage area of 11.7 square miles. Approximately 1.3 miles of the brook is culverted. The brook flows through Shaker Lakes Park, Ambler Park, University Circle, and Rockefeller Park into Lake Erie near Gordon Park.

The Ohio EPA has designated Doan Brook Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply and Primary contact Recreational Use. Sections of Doan Brook within the boundaries of the Shaker Lakes Regional Nature Center have also been designated State Resource Water. The NEORSD has selected four locations on Doan Brook which are routinely sampled for chemical, bacteriological, and benthic analysis (Figure 29). Chemical and bacteriological data from Doan Brook are presented in Appendix B.

Site #16 (41° 31.96' N, 81° 37.78' W) is located on Doan Brook, north of St. Clair Avenue, east of Martin Luther King, Jr. Drive. In 1993, Site #16 obtained a QHEI score of 56.5 (Appendix F).

Site #17 (41° 32.01' N, 81° 37.51' W) is located on Doan Brook, north of the Cleveland Museum of Art, 11150 East Boulevard. In 1993, Site #17 obtained a QHEI score of 70.5 (Appendix F).

Site #18 (41° 29.13' N, 81° 34.45' W) is located on the North Branch of Doan Brook, northeast of the Shaker Lakes Regional Nature Center Office, 2600 South Park Boulevard. In 1993, Site #18 obtained a QHEI score of 61.5 (Appendix F).

Site #19 (41° 28.97' N, 81° 34.44' W) is located on the South Branch of Doan Brook, southeast of the Shaker Lakes Regional Nature Center Office. In 1993, Site #19 obtained a QHEI score of 64 (Appendix F).

<u>Benthic Macroinvertebrate Sampling on Doan Brook</u>

Site #17 - The results of sampling at Site #17 are indicative of a macroinvertebrate community which is impacted by significant organic pollution. This location received an HBI score of 7.16 (Fairly Poor), which was the worst score recorded on Doan Brook (Figure 31). The macroinvertebrate community was predominantly comprised of aquatic worms (95%) and midge fly larvae, which are tolerant to organic pollution (Appendix D-1). No EPT taxa were collected at Site #17. Sanitary sewage, which may be entering the Doan Brook culvert in the University Circle area (See Problems and Remediation #2) could be the source of organic pollution affecting the macroinvertebrate community

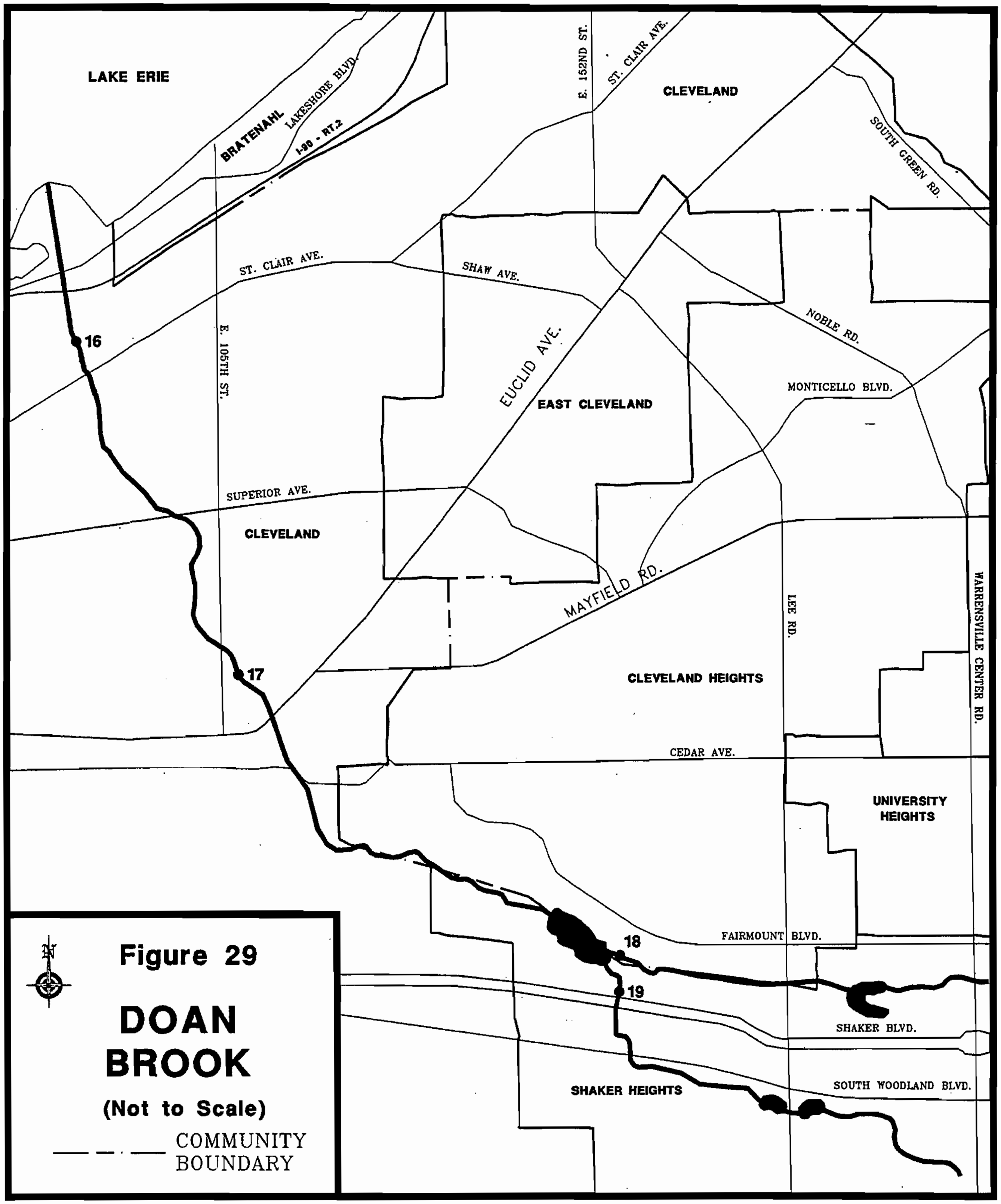
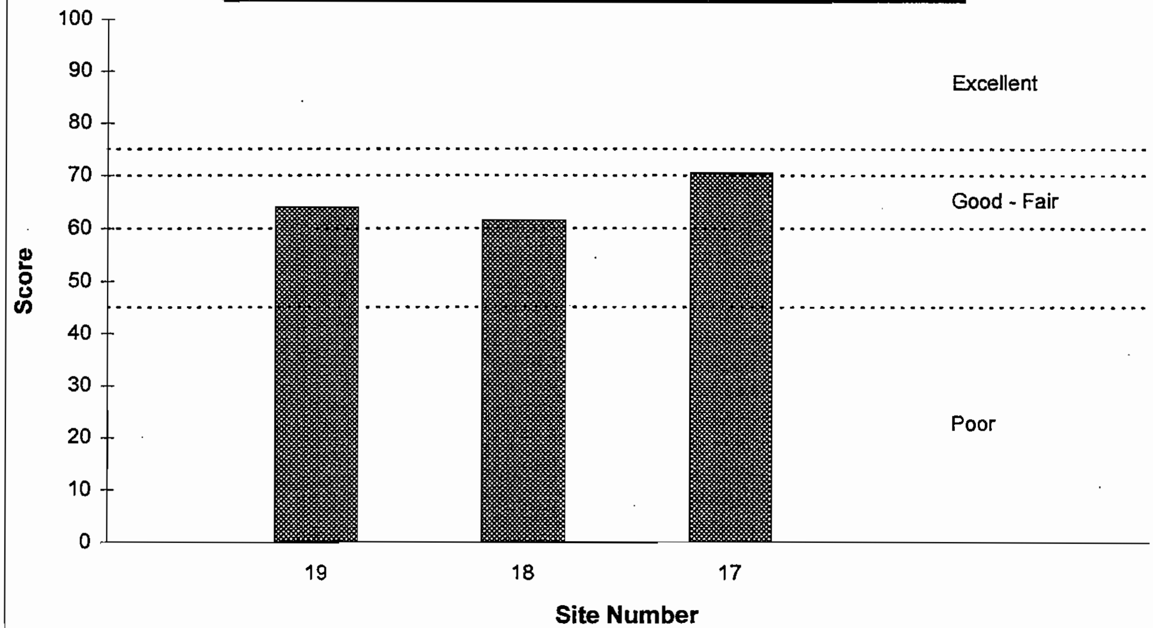


Figure 29

DOAN BROOK

(Not to Scale)

Figure 30
Doan Brook Qualitative Habitat Evaluation Index Scores
1993

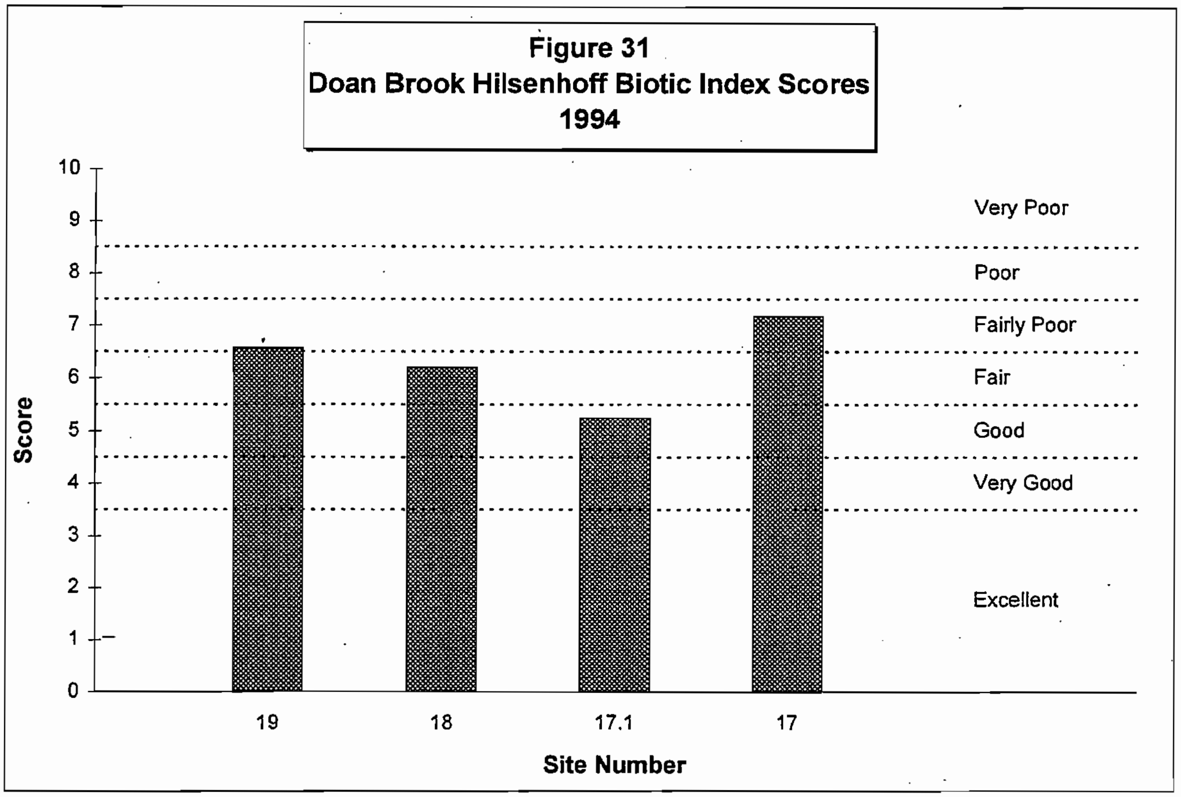


at this site. Further sampling will be conducted to specifically identify the source of impairment at this location.

Site #17.1 - This site is located in Ambler Park just north of the intersection of Martin Luther King Jr. Drive and Fairhill Road. It is located approximately 1.5 miles upstream of Site #17 and was added to isolate any environmental disruptions which could occur in the 1.3 mile Doan Brook culvert under University Circle. Site #17.1 received an HBI score of 5.24 (Good), which was the best score recorded on Doan Brook (Figure 31), and had an EPT composition of 61.8% (Appendix D-1). A comparison of benthic data collected at Sites #17 and #17.1 indicates that the source of organic pollution impacting Site #17 is entering Doan Brook in the University Circle area.

Site #18 - This site received an HBI score of 6.20 (Fair) and had an EPT composition of 14.29% (See Appendix D-1). The high HBI score, low EPT composition, and a relatively high composition of dipterans indicate that the macroinvertebrate community at Site #18 is impacted by organic pollution. The source of organic pollution may be several combined sewer overflows located upstream of Site #18.

Site #19 - Site #19, which received an HBI score of 6.57 (Fairly Poor), had a benthic macroinvertebrate community with an EPT composition of 11.3% and a dipteran composition of 65% (see Appendix D-1). The HBI score indicates that the benthic macroinvertebrate community at Site #19 may be impacted by organic pollution. Further sampling is required to determine the source(s) of impact at this site.



Problems and Remediation:

- 1 -

On May 25, 1993, NEORSD investigators responded to a complaint of sanitary sewage in a tributary of Doan Brook located behind 3157 Belvoir Road. An inspection of the creek at this location revealed obvious signs of sanitary sewage contamination that appeared to have been discharged from a 4-inch storm sewer outfall behind 21800 South Woodland Avenue. Examination of the sanitary sewer on South Woodland showed evidence of recent surcharge events, but the sanitary sewer was flowing normally at that time. After speaking with the resident at 3157 Belvoir Road, investigators learned that the Shaker Heights Service Department had been working on the South Woodland sanitary sewer and had removed a blockage. The removal of the blockage eliminated the discharge of sanitary sewage into Doan Brook via the 4-inch storm sewer outfall.

- 2 -

Historically, elevated fecal coliform concentrations at Site #17 (as high as 180,000 organisms per 100 mL) were attributable to a dry weather overflow of sewage from the overflow regulator Doan Valley Interceptor-15 (DV-15) at Cedar Hill and East

Boulevard. The causes of this dry weather overflow were due to the following: a collapsed sewer near 2330 Euclid Heights Boulevard in Cleveland Heights and an improper sanitary sewer connection at 2373 Euclid Heights Boulevard. The City of Cleveland Heights Sewer Department reportedly corrected the above problems in January of 1994 with the replacement of the sanitary and storm sewers on the south side of Euclid Heights Boulevard between Derbyshire and Cedar Roads.

Despite these improvements to the sewer system in this area, elevated concentrations of fecal coliform continue to be measured at Site #17. Bacteriological samples taken following the City of Cleveland Heights corrections revealed fecal coliform concentrations of 40,000 organisms per 100 mL on August 18, 1994; 97,000 organisms per 100 mL on October 18, 1994; and 89,000 organisms per 100 mL on June 7, 1995. Further investigation is required to determine the source of continued sanitary contamination to Doan Brook at Site #17.

- 3 -

On April 29, 1994, NEORSD received a report of dry weather flow entering Doan Brook via a 24-inch storm sewer located north of Fairhill Road at Kemper Road. Bacteriological samples taken on May 23, 1994 did not reveal any evidence of sanitary sewage in this dry weather discharge. In addition, investigators were unable to isolate the source of the dry weather discharge on this date. Further bacteriological sampling of the 24-inch storm sewer, which was conducted on July 13, 1994, revealed a fecal coliform concentration of 2,200,000 organisms per 100 mL. The elevated fecal coliform concentration was the result of a blockage in a sanitary sewer on North Moreland Boulevard which caused sewage to leak into the storm sewer and ultimately discharge to Doan Brook. After being notified of the problem, the Shaker Heights Service Department removed the blockage on July 14th. NEORSD investigators verified the correction of the sanitary sewer blockage but still observed dry weather flow in the storm sewer. Further investigation is required to isolate the source of this dry weather flow.

- 4 -

On May 13, 1994, NEORSD investigators observed sanitary sewage in Doan Brook near Coventry Road and North Park Boulevard. The source of the sanitary sewage was found to be a collapsed weir in a 10-inch sanitary sewer at 2764 Fairmount Boulevard. As a result, sanitary sewage was flowing directly into the 42-inch storm sewer which is tributary to Doan Brook. Investigators notified the Cleveland Heights Sewer Department which corrected the problem on May 20, 1994. The weir was inspected and the corrections were verified by District personnel on May 23, 1994.

- 5 -

On February 5, 1993, NEORSD investigators walked a portion of the Giddings Brook culvert, a tributary of Doan Brook near Baldwin Road and Mt. Overlook Road, and discovered two dry weather discharges. Just downstream of the entry manhole at Baldwin and Mt. Overlook Roads, a raw water intake line to the Baldwin Water Filtration Plant was found to be leaking approximately 100 gallons per minute. Approximately 475 feet downstream of the entry location a 12-inch inlet pipe to the culvert was gushing water at an estimated rate of 1,500-2,000 gallons per minute. The manager of the Baldwin Water Filtration Plant was notified of the two dry weather discharges.

ROCKY RIVER

The Rocky River has two branches, East and West, the confluence of which is at Cedar Point Road in North Olmsted. The main stem of the Rocky River flows north from the confluence approximately ten miles through the communities of North Olmsted, Brook Park, Fairview Park, Cleveland, Rocky River, and Lakewood, where the river enters Lake Erie.

The East Branch of the Rocky River enters Cuyahoga County from Medina County and flows northwest through the communities of North Royalton, Strongsville, Middleburg heights, Berea, and Olmsted Township to its confluence with the West Branch in North Olmsted. The West Branch of the Rocky River enters Cuyahoga County from Lorain County and flows north through the communities of Olmsted Falls and North Olmsted to the confluence.

Wastewater Treatment Plants which discharge effluents to the Rocky River include: Strongsville "B" and "C" WWTP's; North Royalton "B" WWTP; Columbia Township Subdivision WWTP; Columbia Mobile Home Park WWTP; Olmsted Trailer Park WWTP; Vinewood subdivision WWTP; and others.

Major tributaries to the Rocky River include: Plum Creek, which joins the West Branch in Olmsted Falls; Blodgett Creek, which also joins the West Branch in Olmsted Falls; Baldwin Creek, which joins the East Branch in Berea, and includes the North Royalton "B" WWTP effluent; and Abram Creek, which joins the main stem in Cleveland.

The Ohio EPA has designated the Rocky River State Resource Water, Aquatic Life Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, Primary Contact Recreational Use and Seasonal Salmonid Habitat. The NEORSD has selected five locations on the Rocky River which are routinely sampled for chemical, bacteriological, and benthic analysis (Figure 32). Chemical and bacteriological data from Rocky River are presented in Appendix B.

Site #49 (40° 23.15' N, 81° 51.94' W) is located in Berea on the East Branch of the Rocky River, approximately 300 yards upstream of Valley Parkway, north of Falls Lane. In 1995, Site #49 obtained a QHEI score of 72 (Appendix F).

Site #50 (41° 23.45' N, 81° 51.97' W) is located on the East Branch of the Rocky River at West Bridge Street in Berea. This site is upstream of the former Berea WWTP effluent discharge and about 100 yards downstream of the City of Berea Water Purification Plant. Site #50 obtained a QHEI score of 73 in 1993 (Appendix F).

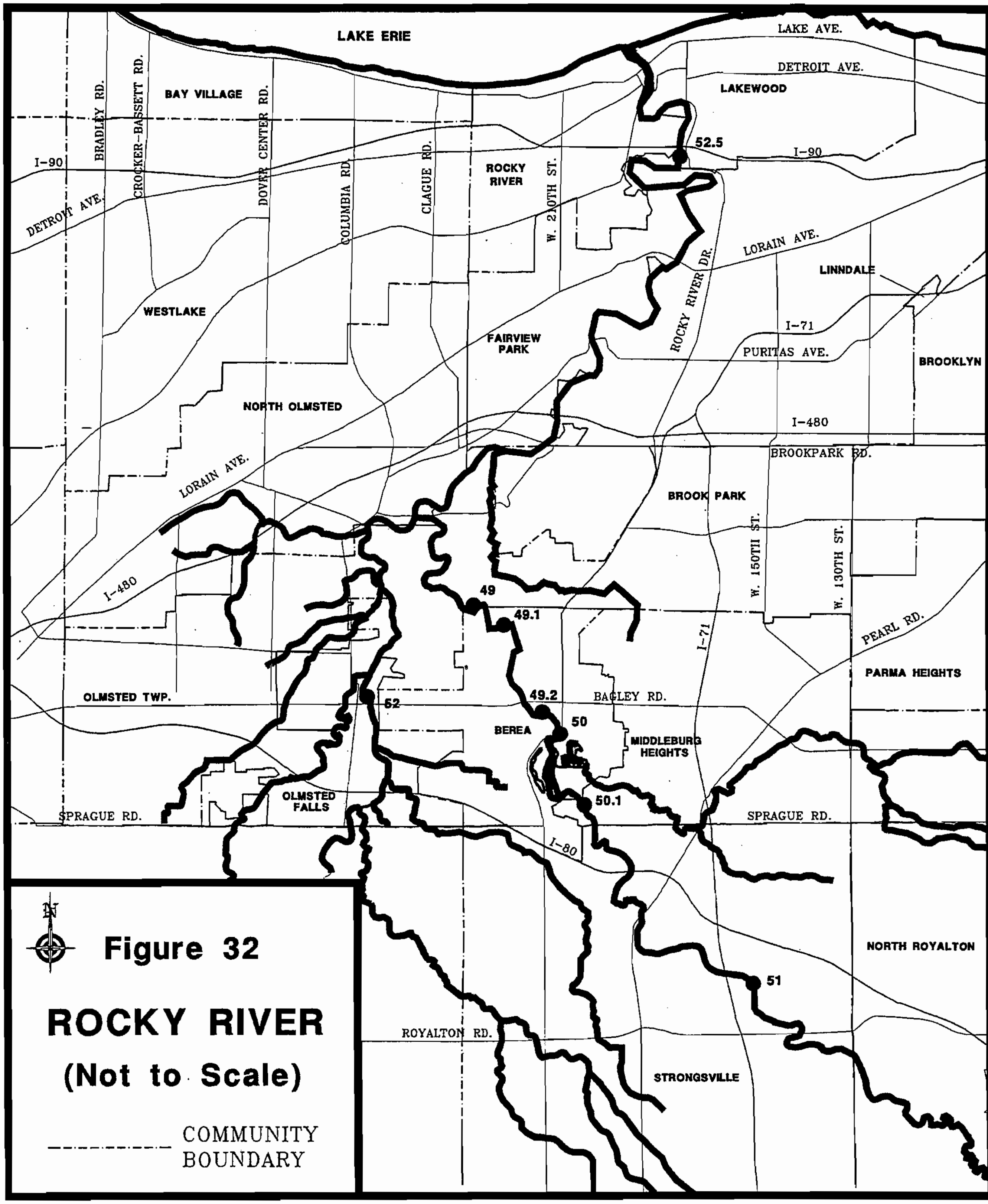


Figure 32

ROCKY RIVER

(Not to Scale)

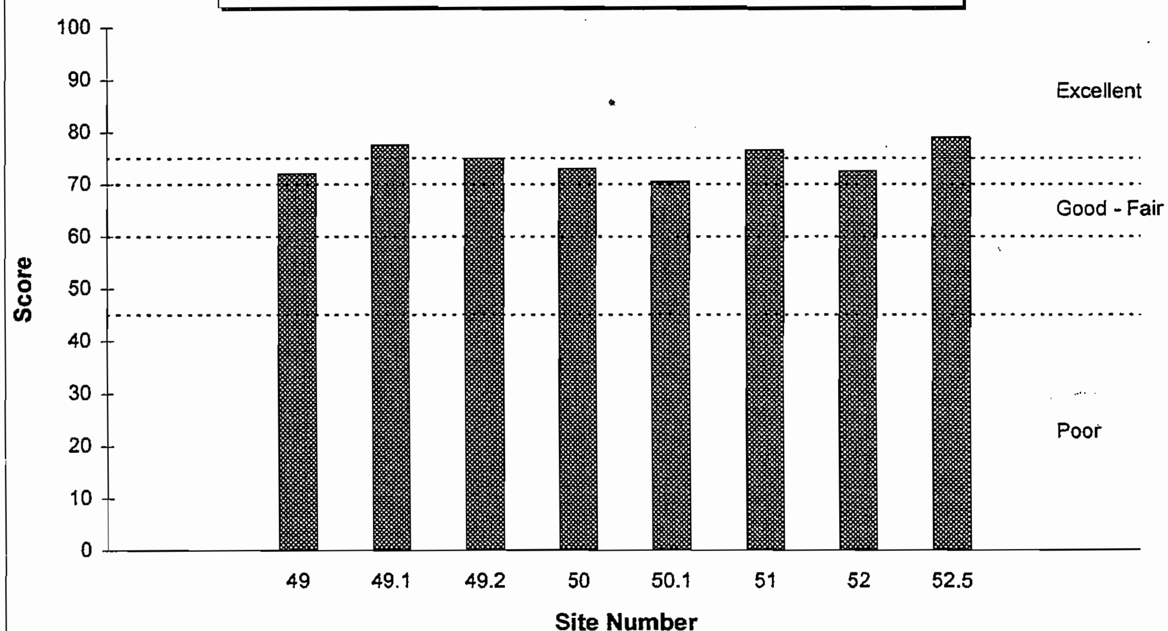
------------ COMMUNITY BOUNDARY

Site #51 (41° 19.07' N, 81° 48.47' W) is located on the East Branch of the Rocky River in Strongsville, approximately 75 feet upstream of East Access Road in the Metroparks Mill Stream Run Reservation. In 1993, Site #51 obtained a QHEI score of 76.25 (Appendix F).

Site #52 (41° 22.68' N, 81° 53.91' W) is located on the West Branch of the Rocky River in Olmsted Falls north of Bagley Road. This site is immediately upstream of the confluence with Plum Creek. Site #52 obtained a QHEI score of 7.25 in 1993 (Appendix F).

Site #52.5 (41° 28.31' N, 81° 49.46' W) is located on the main stem of the Rocky River in the Cleveland Metroparks Rocky River Reservation approximately 30 yards upstream of the Hilliard Road Bridge. This site is approximately 200 yards downstream of the storm sewer outfall at Riverside Drive and Hog's Back Lane, which is the northernmost point of the NEORSD jurisdiction on the Rocky River. Site #52.5 was selected to reflect the environmental impact on the Rocky River from seven upstream storm sewer outfalls, to which numerous combined sewer overflows are known to be tributary. In 1993, Site #52.5 obtained a QHEI score of 79 (Appendix F).

Figure 33
Rocky River Qualitative Habitat Evaluation Index Scores
1993-1995



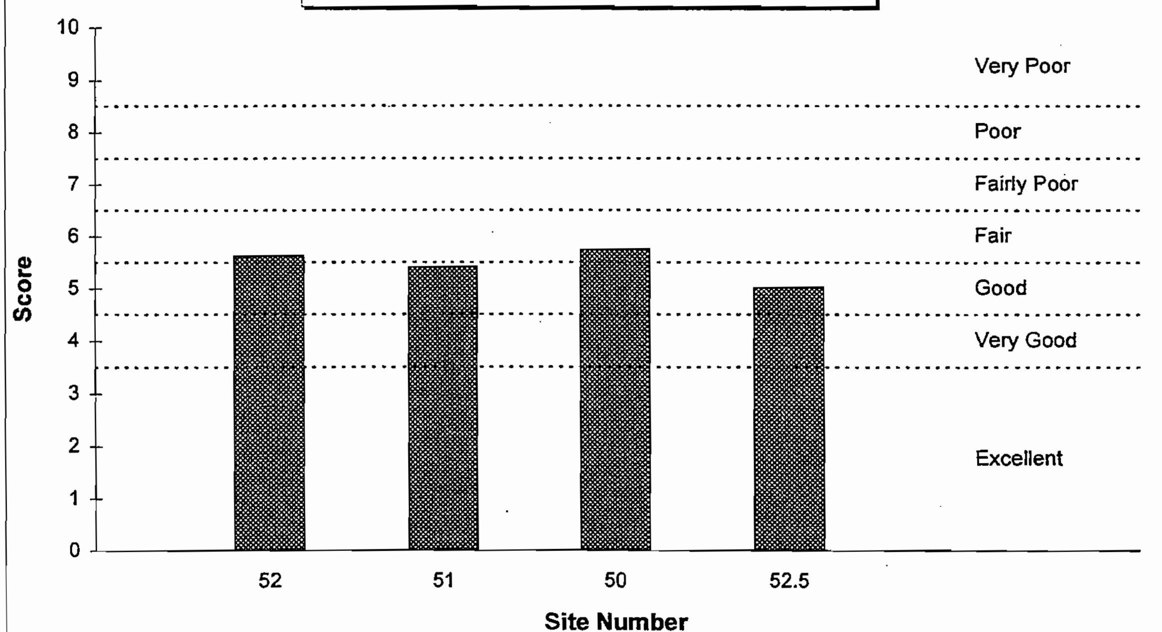
Benthic Macroinvertebrate Sampling on the Rocky River

Site #49 - Benthic macroinvertebrate data from sampling conducted from 1993 to 1995 indicate an improvement in water quality at this location. This improvement in water quality may be attributable to the decommissioning of the former Berea Wastewater Treatment Plant and the corresponding diversion of flow to the Southwest Interceptor. Further information can be found in Appendix H.

Site #50 - Benthic macroinvertebrate data from sampling in 1994 does not indicate any significant change in water quality from sampling conducted in 1992. All five of the measured indices remained nearly the same (See Appendix D). Site #50 received an HBI score of 5.74 (Fair), which is an indication that fairly significant organic pollution is impacting the macroinvertebrate community. Further sampling is required to determine that may be the cause of this impairment.

Site #51 - Site #51 received an HBI score of 5.41 (Good). The macroinvertebrate community has remained relatively unchanged since 1992. A slight decrease in EPT taxa and diversity (See Appendix D) indicate a shift in community structure but is not an indication of any form of water quality impairment.

Figure 34
Rocky River Hilsenhoff Biotic Index Scores
1994



Site #52 - The macroinvertebrate assemblages collected at Site #52 in 1994 are comparable to those collected in 1992. The primary difference in metric scores was the increase in percent EPT composition from 14.2% in 1992 to 51.7% in 1994 (See Appendix D). Although this is a dramatic increase it may not reflect an improvement in water quality because HBI scores were similar in 1992 and 1994. The increase in percent EPT composition may only reflect temporal differences in the macroinvertebrate community.

Site #52.5 - The 1994 benthic macroinvertebrate data suggests an improvement in water quality at Site 52.5 since 1992. Site #52.5 received HBI scores of 5.62 (Fair) in 1992 and 5.01 (Good) in 1994. In addition, notable increases in EPT taxa and percent EPT composition (See Appendix D) further demonstrate an improvement in the water quality at this location.

Rocky River Watershed WWTP Decommissionings:

As a result of the construction of the Northeast Ohio Regional Sewer District's Southwest Interceptor (SWI), several wastewater treatment plants in the Rocky River watershed were decommissioned. Wastewater previously tributary to these plants was diverted to the SWI and now flows to the Southerly Wastewater Treatment Center. Prior to their decommissioning, investigators conducted fish and macroinvertebrate sampling upstream and downstream of the Berea, Brookpark, Middleburg Heights, and Strongsville "A" Wastewater Treatment Plants.

Fish and macroinvertebrate sampling upstream and downstream of the Berea Wastewater Treatment Plant were also conducted in 1995, subsequent to its decommissioning. Results of sampling conducted before and after the plant's shut-down are presented in Appendices G and H of this report. Future reports will discuss the results of fish and macroinvertebrate sampling conducted upstream and downstream of the Brookpark, Middleburg Heights, and Strongsville "A" WWTPs, both before and after their decommissioning. Receiving waters to which these plants formerly discharged and decommissioning dates are listed below:

Wastewater Treatment Plant	Receiving Water	Decommissioning Date
Berea WWTP	Rocky River	October 15, 1993
Brookpark WWTP	Abram Creek	January 6, 1993
Middleburg Heights WWTP	Abram Creek	December 30, 1992
Strongsville "A" WWTP	Blodgett Creek	July 18, 1994

Problems and Remediation:

- 1 -

A discharge to Rocky River, which had been discussed in the NEORSD's Greater Cleveland Area Environmental Water Quality Assessment Report 1991-1992, continued throughout 1994 and 1995. In November 1991, NEORSD investigators discovered sanitary sewage entering Rocky River from a storm sewer outfall located north of the Lorain Avenue bridge. The sewage was traced back to between 17730 and 18200 Lorain Avenue where a blockage of the sanitary sewer at this location had been resulting in sewage leaking into the storm sewer. NEORSD investigators also discovered a water main break between 17303 and 17400 Lorain Avenue which resulted in additional flow to the storm sewer, upstream of the aforementioned location.

These findings were reported to the City of Cleveland Divisions of Water Pollution Control and Water in November 1991. Despite repeated remedial efforts by the Division of Water Pollution Control, blockages continue to occur in the sanitary sewer resulting in sanitary sewage discharging to the Rocky River. According to city officials, these blockages are caused by excessive grease and cloth products entering the sewer system from Fairview General Hospital.

Additional inspections of the area by NEORSD investigators in 1994 and 1995 also revealed that potable water continues to be discharged to the Rocky River from the water main break on Lorain Avenue. On June 10, 1994, the flow from the storm sewer outfall was measured at approximately 173,000 gallons per day. This measurement included flow from the blocked sanitary sewer and water main break. Bacteriological analysis of this flow showed a fecal coliform concentration of 100,000 organisms per 100 mL on June 10, 1994.

- 2 -

On January 6, 1994, NEORSD investigators responded to a complaint by a Berea resident of sewage odors in the vicinity of Pearl Street and Third Avenue. Investigators discovered a dry weather flow containing sanitary sewage in the storm sewer on Third Avenue, but were unable to determine the source of this contamination. The City of Berea was apprised of the situation on January 14, 1994. However, as of the date of this report, the sanitary sewage contamination to the Third Avenue storm sewer continues.

- 3 -

On May 10, 1994, NEORSD investigators responded to a reported chemical spill at GATX Logistics, Inc., 19400 Holland Road. While transferring a 55-gallon drum of an acrylic polymer emulsion solution, a company employee accidentally broke the dispensing nozzle on the drum, spilling the material to a nearby catch basin. According to company estimates, 20-30 gallons of the material had entered a catch basin and the storm sewer system. Following the incident, an earthen dike was constructed in Abram Creek, downstream of the tributary storm sewer outfall, to prevent further migration of the spill. The majority of this substance was contained and transferred via portable pump to a sanitary sewer. Further clean-up measures were conducted by Clean Harbors under contract with GATX Logistics, Inc. and monitored by Ohio EPA.

- 4 -

On June 22, 1994, NEORSD Investigators responded to a complaint of sewage in a tributary of the Rocky River at 19609 Parkmount Avenue. Investigators observed evidence of sanitary sewage in the creek where it exits a 72-inch culvert behind 19701 Parkmount Avenue. The source of the contamination was traced back to the West 197th Street storm sewer, where investigators discovered a dry weather discharge containing sanitary sewage entering the culvert. Bacteriological analysis of the creek, downstream of the culvert opening, showed a fecal coliform concentration of 22,000 organisms per 100 mL. The City of Cleveland Division of Water Pollution Control was notified of this problem on June 27, 1994. However, as of the date of this report, the sanitary sewage contamination to the creek from the West 197th Street storm sewer continues unabated.

- 5 -

NEORSD investigators responded to additional reports by Berea residents of sewage odors on September 7, 1994. The odor complaints were in the vicinity of North Rocky River Drive and Depot Street. NEORSD investigators discovered sanitary sewage entering the East Branch of the Rocky River through a 48-inch storm sewer outfall between Pulaski Street and Depot Street. The dry weather discharge was measured at approximately 5,700 gallons per day. Following this discovery, the City of Berea was notified of the situation.

- 6 -

On September 29, 1994, NEORSD investigators responded to a reported diesel fuel spill at a Sunoco Station at 7606 Pearl Road. An estimated 15-20 gallons of fuel had been spilled onto the station's property. Due to a rain event at the time of the incident, the fuel was quickly dispersed onto Pearl Road in a southbound direction. Additionally, the fuel was further scattered by traffic. Following an automobile accident in the area, Ohio Department of Transportation crews spread sand in an effort to eliminate the slippery road conditions and absorb the fuel. Investigators found trace amounts of the fuel in the southbound storm sewer on Pearl Road. This storm sewer discharges to a swale, adjacent to the Interstate 71 southbound exit ramp and Pearl Road, where investigators observed a light sheen confined to a pool at the storm sewer outfall. Subsequently, the sand saturated with diesel fuel was collected by Southwest Sweeping Incorporated. All clean-up measures were monitored by Ohio EPA.

- 7 -

On June 29, 1995, NEORSD investigators responded to a report by Ohio EPA of oil in Abram Creek near the International Exposition Center. Investigators observed oil and evidence of sanitary sewage in this tributary of the Rocky River. The source of the contamination was identified as a broken force main from the Isaac Corporation pump station located at 18899 Snow Road. The influent was flowing to a drainage ditch which parallels railroad tracks and discharges to Abram Creek. According to company officials, the force main was subsequently repaired, thus eliminating this source of pollution in Abram Creek.

- 8 -

On August 8, 1995, NEORSD investigators responded to a report of a manhole overflowing sewage to a tributary of the Rocky River. The manhole is located in a wooded area west of West 198th Street and north of Midvale Avenue in Cleveland. The surcharge condition was due to a blockage in the sanitary sewer on Midvale Avenue at West 202nd Street. The flow of sewage entering the creek was measured at an approximate rate of 40,000 gallons per day with a fecal coliform concentration of 3,800,000 organisms per 100 mL on August 8. The City of Cleveland Division of Water Pollution Control was notified of this problem on August 10. On August 16, NEORSD investigators verified that the blockage had been removed and that the overflow of sewage had ceased.

CHAGRIN RIVER

The Chagrin River has a total length of 48 miles, with a drainage area of 267 square miles. The land use is primarily rural with a low density of residential housing. Communities located in the Chagrin River drainage area include: Aurora, Chagrin Falls, Chesterland, Eastlake, Mayfield Heights, the Village of Mayfield, Newbury, Solon, Willoughby, Willoughby Hills, and several other eastern suburbs of Cleveland. Development pressures in the drainage area are potential causes of degradation of the habitat. However, the majority of the Chagrin River has good to exceptional water quality with a healthy biological community.

The entire Chagrin River basin is considered a State Resource Water. The main stem of the Chagrin River from the headwaters to River Mile 4.8 has been designated by the Ohio EPA Warmwater Habitat and Primary Contact Recreational Use. From River Mile 4.8 to the mouth, the river has been designated Warmwater and Seasonal Salmonid Habitat, and Primary Contact Recreational Use. The Ohio EPA has designated the following tributaries of the Chagrin River as Exceptional Warmwater Habitat and Primary Contact Recreational Use: Griswald Creek, Willey Creek, McFarland Creek, and Beaver Creek. Coldwater Habitat and Primary Contact Recreational Use designations apply to Silver Creek and the East Branch along with its tributaries.

The Chagrin River has been assigned two sites for routine sampling by the NEORSD. These sites had been chosen to evaluate the potential impact on Chagrin River water quality from the NEORSD-owned and operated Beech Hill Pump Station at 6830 Wilson Mills Road and the Bonnieview Comminutor Station at Beech Hill and Bonnieview Roads. The Bonnieview Station was decommissioned on May 26, 1995 and the Beech Hill Station was decommissioned on June 1, 1995. One site is located upstream of the former sewage pumping stations' bypass effluents (Site #59) and the other is located downstream of the effluents (Site #58). Chemical and bacteriological data from Chagrin River are presented in Appendix B.

Site #58 (41° 32.94' N, 81° 24.88' W) is located on the main stem of the Chagrin River at River Mile 15.1, approximately 3,500 feet downstream of the confluence with Beech Hill/Bonnieview Creek and 1,500 feet east of the Chagrin River Road bridge. Beech Hill/Bonnieview creek formerly received flow from the Beech Hill and Bonnieview Pump Stations during bypass events. In 1992, Site #58 obtained a QHEI score of 76 (Appendix F).

Site #59 (41° 31.62' N, 81° 24.69' W) is located on the main stem of the Chagrin River at River Mile 17.4, which is approximately 1.6 miles upstream of the confluence

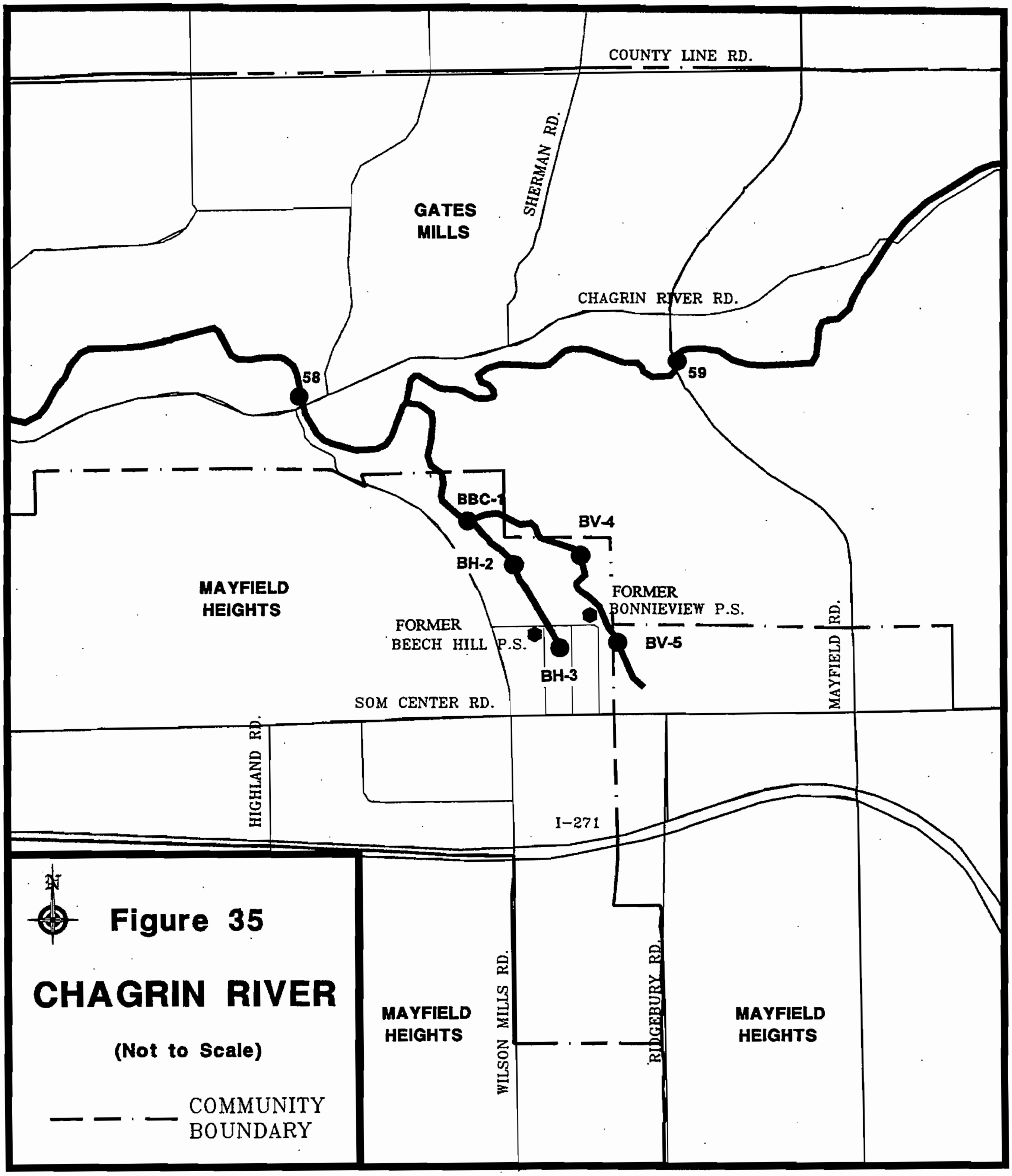


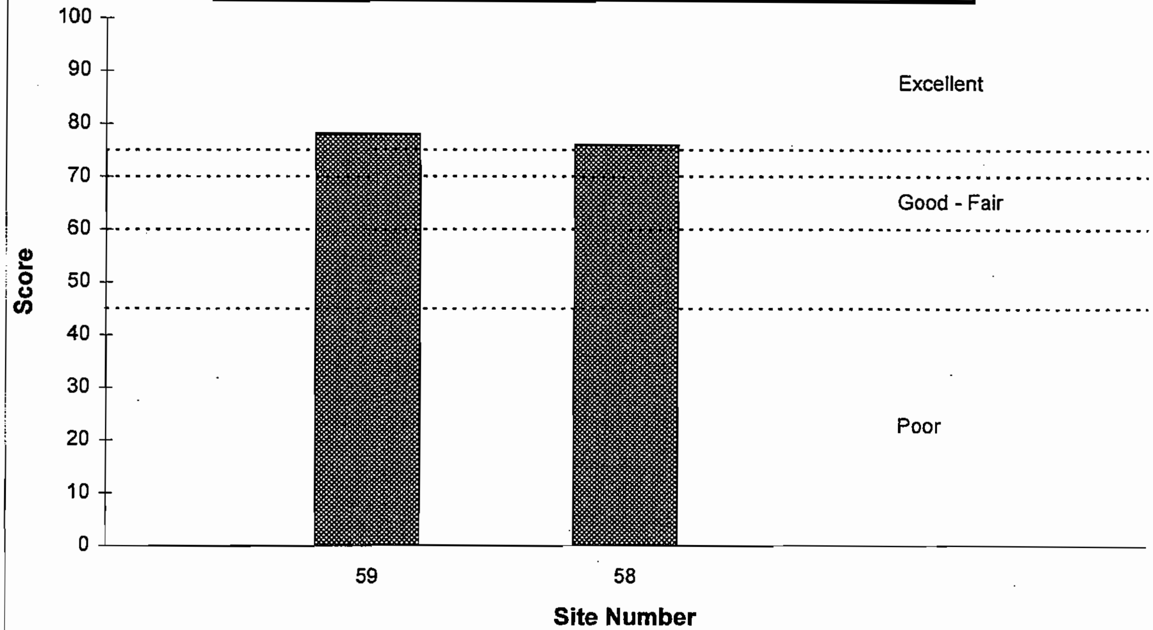
Figure 35

CHAGRIN RIVER

(Not to Scale)

with Beech Hill/Bonnieview Creek. Samples are obtained from the south side of the Mayfield Road bridge. In 1992, Site #59 obtained a QHEI score of 78 (Appendix F).

Figure 36
Chagrin River Qualitative Habitat Evaluation Index Scores
1991-1992



Macroinvertebrate Sampling on "Beech Hill/Bonnieview" Creek

As a result of its construction of the Heights-Hilltop Interceptor, the Northeast Ohio Regional Sewer District decommissioned the Bonnieview Comminutor Station (Beech Hill and Bonnieview Roads) on May 26, 1995, and the Beech Hill Pump Station (6330 Wilson Mills Road) on June 1, 1995. Wastewater previously tributary to the stations, now flows by gravity to the Heights-Hilltop Interceptor and ultimately to the Easterly Wastewater Treatment Plant.

Beech Hill Creek is a small stream which, during occasional bypass events, had received the effluent from the Beech Hill Pump Station. The creek flows east, where it is joined by Bonnieview Creek near Village Trails. During bypass events, Bonnieview Creek had previously received flow from the Bonnieview Comminutor Station. Downstream of the confluence of Beech Hill and Bonnieview Creeks, the stream is referred to by NEORSD investigators as the Beech Hill/Bonnieview Creek (see map). The Beech Hill/Bonnieview Creek flows in an easterly direction until its confluence with the Chagrin River (RM 15.7), upstream of Site #58 (Rm 15.1).

Site BBC-1 is located approximately 150 feet downstream from the confluence of the Beech Hill and Bonnieview Creeks, east of Village Trails. This site was selected in 1992 for an initial water quality assessment of the Beech Hill/Bonnieview Creek. During the initial survey, several septic tank effluents from residential areas tributary to Beech Hill Creek were noted. Benthic macroinvertebrate data collected at this site in 1992 indicated that fairly significant organic pollution existed. A portion of this organic pollution was attributed to the occasional bypass events at the Bonnieview and Beech Hill stations, with the remaining portion being attributed to septic tank effluents.

Four new sampling sites were established in 1994, and additional sampling was conducted prior to the decommissioning of the Beech Hill Pump Station and the Bonnieview Comminutor Station. All four of the new sites were located upstream of Site BBC-1. At the time of sampling in 1994, several housing developments, adjacent to both the Beech Hill and Bonnieview Creeks, were near completion.

Site BH-2 is located on Beech Hill Creek, upstream from the confluence with Bonnieview Creek (BBC-1) and downstream of the former Beech Hill Pump Station. This location is approximately 100 feet east of Hanover Woods.

Site BH-3 is located on Beech Hill Creek approximately 75 feet upstream from the former Beech Hill Pump Station. At this location, the creek has the characteristic of an intermittent stream with very little flow and volume. The habitat at this location was not conducive to kick-net sampling because of a lack of adequate flow velocity. Qualitative macroinvertebrate sampling was performed at this location.

Site BV-4 is located on Bonnieview Creek at Hardwood Court, downstream of the former Bonnieview Comminutor Station and upstream from the confluence of the Beech Hill Creek (BBC-1).

Site BV-5 is located on Bonnieview Creek, approximately 100 yards upstream of the former Bonnieview Comminutor Station.

Macroinvertebrate samples collected in 1994 had not been processed as of the writing of this report. Future sampling will be conducted to determine the effects of the Bonnieview and Beech Hill Station decommissionings on the water quality of Beech Hill and Bonnieview Creeks. Results of the 1994 samples and future samples, will be presented and discussed in a future report.

Problems and Remediation:

- 1 -

On April 24, 1995, NEORSD investigators responded to a report of a gasoline spill from an overturned tanker truck on Chagrin Boulevard, just east of Interstate 271, near the border between the City of Beachwood and Orange Village. Although the location of the incident was determined to be outside of NEORSD's service area, NEORSD investigators remained on-site and provided assistance to the spill response team. An estimated 8,500 gallons of unleaded fuel had been spilled onto Chagrin Boulevard and had flowed in an easterly direction. An undetermined quantity of the fuel had entered the storm sewer system through catch basins on Chagrin Boulevard. This storm sewer discharges to Willey Creek, which is tributary to the C hagrin River. Most of the gasoline that reached the creek was retained by an earthen dike and containment booms which had been positioned in the creek at the storm sewer outfall located behind 27600 Chagrin Boulevard. The spill clean-up was conducted by Samsel Services Company under contract with the Lyden Oil Company.

LAKE ERIE

In 1990, the NEORSD initiated sampling of Lake Erie water quality in the vicinity of Greater Cleveland. The NEORSD's jurisdictional area is located entirely within the Lake Erie basin, and therefore all waters from NEORSD facilities are ultimately tributary to Lake Erie.

The lake is the site of the area's heaviest recreational water use, including bathing, boating, and fishing. Additionally, the City of Cleveland uses Lake Erie as its public water supply, pumping water for domestic, commercial, and industrial uses from intakes located offshore.

The 15 NEORSD Lake Erie routine sampling sites were selected to evaluate the impact of potential sources of pollution on ambient water quality, at sites where it is most critical to the uses to be protected and where the impact is likely to be most severe (Figure 37). Samples are collected using a NEORSD-owned boat from near the lake surface at each site for chemical and bacteriological analysis and also near the lake bottom for chemical analysis at the three sites near the public water intakes.

No attempt has been made by the NEORSD to limit the routine lake sampling to conditions of dry weather pollution impacts. Wet weather sources may affect lake water quality for a much longer period of time than they affect stream water quality, although the impact is diminished by greater dilution in the lake. Water quality is less subject to variability in a large water body's lentic environment than in a stream's lotic environment.

The Ohio EPA has designated Lake Erie Exceptional Warmwater Habitat, State Resource Water, Public Water Supply, Agricultural Water Supply, Industrial Water Supply, and Bathing Waters for Recreational Use. Public Water Supply criteria only apply within 500 yards of surface water intakes. Chemical and bacteriological data from the NEORSD routine sampling of Lake Erie are presented in Appendix C.

Site A is located near the submerged Crown Water Intake, at 41° 31.16' N, 81° 52.80' W. The site is about 2.6 miles offshore on a heading of 310 degrees northwest from the east side of the mouth of the Rocky River. The average water depth at Site A has been measured at 46 feet.

Site B is located within 500 yards west of the visible Baldwin Water Intake Crib at 41° 32.90' N, 81° 45.00' W. Also in this vicinity is the submerged Garret A. Morgan (Division) Water Intake at 41° 32.83' N, 81° 45.83' W. The average water depth at Site B has been measured at 48 feet.

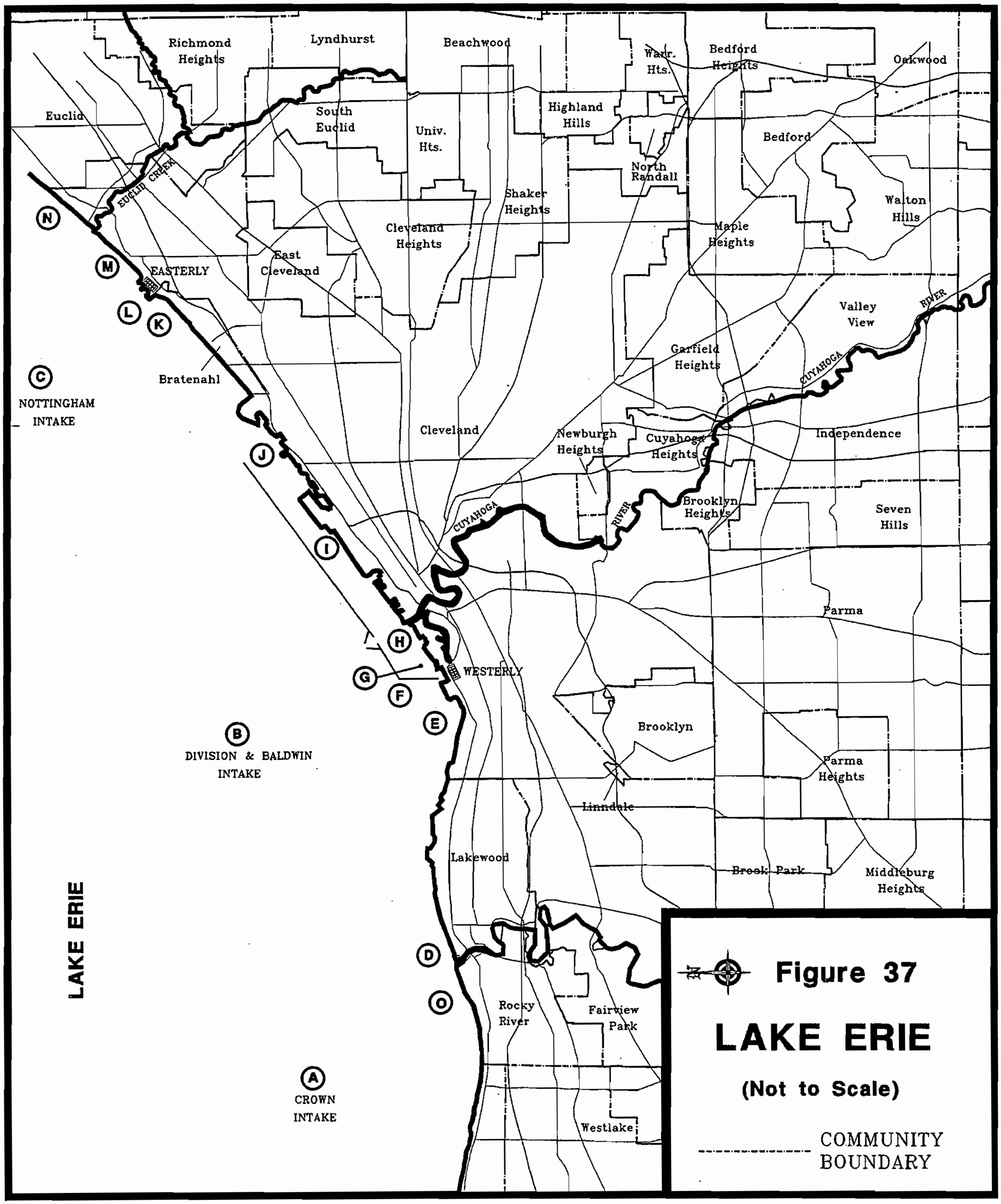

Richmond Heights
Lyndhurst
Beachwood
Warr. Hts.
Bedford Heights
Oakwood
Euclid
South Euclid
Univ. Hts.
Highland Hills
Bedford
North Randall
EUCLID CREEK
Shaker Heights
Walton Hills
Cleveland Heights
Maple Heights
East Cleveland
EASTERLY
Valley View
RIVER
Garfield Heights
CUYAHOGA
Bratenahl
NOTTINGHAM INTAKE
Cleveland
Newburgh Heights
Cuyahoga Heights
Independence
CUYAHOGA
RIVER
Brooklyn Heights
Seven Hills
Parma
WESTERLY
Brooklyn
DIVISION & BALDWIN INTAKE
Parma Heights
Linndale
Lakewood
Brook Park
Middleburg Heights
LAKE ERIE
Rocky River
Fairview Park
CROWN INTAKE
Westlake
A
B
C
D
E
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Figure 37
LAKE ERIE
(Not to Scale)
COMMUNITY BOUNDARY

Site C is located near the submerged Nottingham Water Intake at 41° 37.08' N, 81° 37.05' W. The site is about 3.5 miles offshore on a heading of 315 degrees northwest of the mouth of Euclid Creek. The average water depth at Site C has been measured at 48 feet.

Site D (41° 29.57' N, 81° 50.09' W) is located east of the Rocky River mouth. Site D was selected to evaluate the impact of flow from the Rocky River on water quality in Lake Erie. The average depth at Site D has been measured at 12 feet.

Site E (41° 29.41' N, 81° 44.45' W) is located offshore of Edgewater Beach. This site was selected to evaluate the water quality of Lake Erie in this area of heavy recreational use. The average water depth at Site E has been measured at 10 feet.

Site F (41° 30.05' N, 81° 43.66' W) is located near the NEORSD Westerly WWTP treated effluent discharge to Lake Erie, which is submerged 185 feet north of the northwest corner of the Cleveland Harbor break wall. This site was selected to evaluate the water quality of Lake Erie within the plant's effluent mixing zone. The average water depth measured at this location has been 30 feet.

Site G (41° 29.74' N, 81° 43.58' W) is located inside the Cleveland Harbor, east of the location of the NEORSD Westerly Combined Sewer Overflow Treatment Facility (CSOTF) discharge to the harbor. This site was selected to evaluate the water quality in the west end of Cleveland Harbor, which is potentially impacted by flows from both the Westerly CSOTF discharge and the Cuyahoga River. The average water depth at this location has been measured at 20 feet.

Site H (41° 30.25' N, 81° 42.76' W) is located within the Cleveland Harbor, approximately 50 feet northwest of the mouth of the Cuyahoga River. This site was selected to evaluate the influence of the Cuyahoga River on the water quality of Lake Erie within the Cleveland Harbor. This location is in a high-traffic area during the commercial shipping and recreational boating season. The average water depth at Site H has been measured at 33 feet.

Site I (41° 31.22' N, 81° 40.93' W) is located inside the Cleveland Harbor break wall offshore from Burke Lakefront Airport, just east of Channel Marker #9. This site was selected to evaluate the water quality of Lake Erie within the eastern Cleveland Harbor and potential impacts on it, including five combined sewer overflows along the lakefront between East 20th Street and East 38th Street. The average water depth at Site I has been measured at 25 feet.

Site J (41° 32.33' N, 81° 38.77' W) is located approximately 200 feet offshore from Gordon Park, at the east end of the Cleveland Harbor. This site was selected to evaluate the water quality inside the harbor as it enters the open area of Lake Erie. The average water depth at Site J has been measured at 27 feet.

Site K (41° 34.15' N, 81° 35.54' W) is located between Nine-Mile Creek to the west and the NEORSD Easterly WWTP to the east, approximately 200 feet offshore from White City Beach, west of its break wall. This site was selected to evaluate the potential impact on Lake Erie water quality from several Cleveland East Side streams, including the severely polluted Dugway Brook and Nine-Mile Creek, and a major combined sewer overflow outlet located at the end of a pier between White City Beach and the Easterly WWTP. The average water depth at Site K has been measured at 10 feet.

Site L (41° 34.46' N, 81° 35.33' W) is located approximately 50 feet north of the Easterly WWTP discharge to Lake Erie. This site was selected to evaluate the water quality of Lake Erie within the Easterly WWTP effluent mixing zone. The average water depth at Site L has been measured at 19 feet.

Site M (41° 35.07' N, 81° 34.25' W) is located approximately 300 feet offshore from Euclid Beach and one mile northeast of the Easterly WWTP. This site was selected to evaluate the water quality of Lake Erie in the vicinity of the beach, where recreational use is relatively heavy. The average water depth at Site M has been measured at 13 feet.

Site N (41° 36.01' N, 81° 33.07' W) is located approximately 300 feet offshore from Euclid General Hospital, about one mile northeast of the mouth of Euclid Creek. This site was selected to evaluate the water quality of Lake Erie entirely "down-lake" from the NEORSD service area. The average water depth at Site N has been measured at 13 feet.

Site O (41° 29.34' N, 81° 50.86' W) is located west of the mouth of the Rocky River. This site was selected to evaluate the water quality of Lake Erie entirely "up-lake" and outside of any expected influence from the NEORSD service area. The average water depth at Site O has been measured at 11 feet.

Problems and Remediation:

- 1 -

Throughout 1993 and 1994, NEORSD responded to numerous reports of a fluorescent orange colored material entering Lake Erie from a storm sewer outfall at the Forest City Yacht Club, 5301 North Marginal Road. In each case, investigators determined that the discolored flow had entered Lake Erie via an overflow of a combined sewer most likely due to rain events earlier in the day.

Although at the time of inspections no overflow was occurring, the orange material was always traced back to Day-Glo Color Corporation, 4515 St. Clair Avenue. After each occurrence, Day-Glo contracted Samsel Services Company for clean-up of the material at the Forest City Yacht Club. On July 22, 1994, Day-Glo contacted NEORSD, outlining their plans to modify the manufacturing process to prevent any further contamination of the environment by their discharges to the sewer system.

- 2 -

On April 5, 1994, NEORSD investigators, during an inspection of Freeman Manufacturing and Supply Company, 1246 West 70th Street, discovered that the company's process wastewater was entering a six-inch storm sewer which ultimately discharges to Lake Erie, approximately one-third of a mile north of the intersection of West 70th Street and Father Caruso Drive. Dye tests revealed that the discharge included wastewater from the company's sheet wax process line. Average results of sampling conducted by NEORSD prior to April 5, 1994 were as follows: flow - 8700 gpd, BOD - 1588 mg/L, COD - 2010 mg/L, suspended solids - 571 mg/L, copper - 0.12 mg/L, iron - 2.3 mg/L. Company officials agreed to perform plumbing modifications to reroute the wastewater into the sanitary sewer system. These modifications were verified by NEORSD investigators on June 8, 1994.

- 3 -

On July 22, 1994, NEORSD investigators responded to a report of sanitary sewage leaking from a pipe at the North Coast Harbor pier. At the time of the inspection, no sewage was observed entering Lake Erie from this source. Employees of North Coast Harbor had stopped the leak by wrapping duct tape around the pipe which ran along the sheet piling on the harbor's pier. Further inspection by investigators revealed that the pipe was an abandoned sanitary sewer once used by Captain John's Restaurant. North Coast Harbor officials were notified of this situation and on July 23, reportedly flushed and capped this sewer to prevent future occurrences.

APPENDICES

A. Bibliography

B. Cleveland Area Streams Chemical and Bacteriological Data, 1993-1995

C. Lake Erie Chemical and Bacteriological Data, 1993-1995

D. Results of Benthic Macroinvertebrate Sampling, 1993-1995

E. Results of Electroshock Fish Sampling, 1993-1995

F. Qualitative Habitat Evaluation Index Scores, 1991-1995

G. Rocky River Fish Surveys, Upstream and Downstream of the Berea WWTP, 1993 and 1995

H. Rocky River Macroinvertebrate Surveys, Upstream and Downstream of the Berea WWTP, 1993-1995

I. Big Creek Interceptor Diversion, 1994

J. Big Creek Interceptor Diversion Macroinvertebrate Sampling, 1995

K. Cuyahoga River Electroshocking/Sediment Study, 1994

L. Cuyahoga River Navigation Channel Dissolved Oxygen Study, 1995

M. Mill Creek Biomonitoring Survey, 1995

N. Cleveland Metroparks Stream Sampling, 1993-1995

APPENDIX A
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APPENDIX B
CLEVELAND AREA STREAMS CHEMICAL AND BACTERIOLOGICAL DATA, 1993-1995

DATA TABLE KEY

Individual data are presented by sampling date as month/day/year. The sampled water body, with the NEORSD-assigned sample site number and /or letter in parentheses, also appears in the heading. For streams, data presented are from analyses of surface grab samples obtained under dry weather conditions (following at least three days of no significant rainfall). Routine stream sampling was performed under dry weather conditions to maximize data comparability and to facilitate identification of dry weather pollutant sources. These sources have the greatest potential for environmental impact due to the combination of maximal pollutant concentration with minimal instream dilution.

All chemical and bacteriological parameters analyzed in the sample are listed in the first column, followed by analytical units in parentheses. When a measured value exceeds a State of Ohio water quality criterion, the applicable water use designation, with the exceeded numerical criterion in parentheses, appears in the "Excursion" column. An asterisk appears when no maximum criterion is applicable and the single value only exceeds an average criterion (therefore not necessarily representing an excursion from water quality standards).

Applicable Ohio EPA Water Use Designations

ASW	=	Agricultural Water Supply
BW	=	Bathing Waters Recreational Use
EWH	=	Exceptional Warmwater Habitat Aquatic Life Use
HHSR	=	Human Health (Single-Route Exposure)
LRW	=	Limited Resource Water
PCU	=	Primary Contact Recreational Use
PWS	=	Pubic Water Supply
SCU	=	Secondary Contact Recreational Use
SSH	=	Seasonal Salmonid Habitat Aquatic Life Use
WHAL	=	Warmwater Habitat Aquatic Life Use

Other Acronyms and Abbreviations

BOD-5	=	Biochemical Oxygen Demand (5-day test)
COD	=	Chemical Oxygen Demand
E Coli	=	*Escherichia coli*
N	=	Nitrogen

TKN	=	Total Kjeldahl Nitrogen
mg/L	=	milligrams per liter
mS/cm	=	millisiemens per centimeter
ug/L	=	micrograms per liter
s.u.	=	standard units
NTU	=	Nephelometric Turbidity Units

Samples were collected by direct immersion of the sample bottles below the water surface. At bridge or manhole sites, samples were collected with an acid-cleaned, de-ionized water-rinsed plastic bucket and drop line. The bucket was further rinsed with stream water from the sample site prior to the collection of each sample. All samples obtained at bridge or manhole sites were collected from midstream, while all other stream samples were collected near the bank.

Closed and labeled plastic containers were used to transport samples, on ice for preservation, to NEORSD Analytical Services. All bottles used to transport samples for bacteriological analysis had been sterilized prior to sampling.

At all sites, field measurements for water temperature and dissolved oxygen concentrations were obtained at the time of sampling using a calibrated YSI Model 51B Oxygen Meter or a Horiba U-10 Water Quality Checker. In 1993, specific conductance was measured in-field at all sites using a Beckman Industrial Model RC 16D Conductivity Bridge. In 1994 and 1995, specific conductance, turbidity and pH were measured at the time of sampling at all sites using the Horiba U-10 Water Quality Checker.

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WQIS

EUCLID CREEK (0.5) - 08/26/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	11.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	501	-
Dissolved Solids	(mg/L)	429	-
Specific Conductance	(mS/cm)	0.604	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.34	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	84	-
Alkalinity	(mg/L)	129	-
Hardness	(mg/L)	196	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	<0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	760	-
pH	(s.u.)	8.6	-
Phenolics	(mg/L)	<0.050	-
Oil & Grease	(mg/L)	2	-

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WQIS

EUCLID CREEK (0.5) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	9.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	559	-
Dissolved Solids	(mg/L)	481	-
Specific Conductance	(mS/cm)	0.310	-
Turbidity	(NTU)	3.10	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.30	-
TKN	(mg/L)	0.69	-
Chlorides	(mg/L)	146	-
Sulfates	(mg/L)	118	-
Alkalinity	(mg/L)	100	-
Hardness	(mg/L)	232	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.6000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	500	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	310	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.90	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

EUCLID CREEK (0.5) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.6	-
Dissolved Oxygen	(mg/L)	10.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	450	-
Dissolved Solids	(mg/L)	445	-
Specific Conductance	(mS/cm)	0.770	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.95	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	110	-
Sulfates	(mg/L)	95	-
Alkalinity	(mg/L)	102	-
Hardness	(mg/L)	208	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	500	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	240	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.40	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

EUCLID CREEK (0.5) - 06/08/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	7.7	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	649	-
Dissolved Solids	(mg/L)	585	-
Specific Conductance	(mS/cm)	1.000	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.80	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	160	-
Sulfates	(mg/L)	111	-
Alkalinity	(mg/L)	129	-
Hardness	(mg/L)	242	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.2600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	7.8	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

EUCLID CREEK (1) - 08/26/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	9.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	478	-
Dissolved Solids	(mg/L)	404	-
Specific Conductance	(mS/cm)	0.540	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.56	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	190	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	<0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.5000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	120	-
pH	(s.u.)	8.2	-
Phenolics	(mg/L)	<0.050	-
Oil & Grease	(mg/L)	<1	-

NEORSD

WQIS

EUCLID CREEK (1) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	581	-
Dissolved Solids	(mg/L)	537	-
Specific Conductance	(mS/cm)	0.340	-
Turbidity	(NTU)	3.60	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.22	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	126	-
Sulfates	(mg/L)	124	-
Alkalinity	(mg/L)	108	-
Hardness	(mg/L)	228	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.7500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	460	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	400	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

EUCLID CREEK (1) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.0	-
Dissolved Oxygen	(mg/L)	9.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	447	-
Dissolved Solids	(mg/L)	445	-
Specific Conductance	(mS/cm)	0.770	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	1.02	-
TKN	(mg/L)	0.73	-
Chlorides	(mg/L)	112	-
Sulfates	(mg/L)	115	-
Alkalinity	(mg/L)	100	-
Hardness	(mg/L)	206	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	220	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	100	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

EUCLID CREEK (1) - 06/08/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	609	-
Dissolved Solids	(mg/L)	571	-
Specific Conductance	(mS/cm)	1.000	-
Ammonia-N	(mg/L)	0.05	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.03	-
TKN	(mg/L)	0.30	-
Chlorides	(mg/L)	166	-
Sulfates	(mg/L)	106	-
Alkalinity	(mg/L)	119	-
Hardness	(mg/L)	236	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	540	-
pH	(s.u.)	7.7	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

EUCLID CREEK (2) - 08/26/93

Parameter		Value	Excursion
Temperature	(degrees C)	20.5	-
Dissolved Oxygen	(mg/L)	6.8	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	582	-
Dissolved Solids	(mg/L)	480	-
Specific Conductance	(mS/cm)	0.700	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.51	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	138	-
Sulfates	(mg/L)	81	-
Alkalinity	(mg/L)	117	-
Hardness	(mg/L)	196	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	<0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	230	-
pH	(s.u.)	8.1	-
Phenolics	(mg/L)	<0.050	-
Oil & Grease	(mg/L)	<1	-

NEORSD

WQIS

EUCLID CREEK (2) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	677	-
Dissolved Solids	(mg/L)	609	-
Specific Conductance	(mS/cm)	0.380	-
Turbidity	(NTU)	1.20	-
Ammonia-N	(mg/L)	0.70	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.54	-
Chlorides	(mg/L)	176	-
Sulfates	(mg/L)	144	-
Alkalinity	(mg/L)	108	-
Hardness	(mg/L)	249	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0010	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	190	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.80	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

EUCLID CREEK (2) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	9.6	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	559	-
Dissolved Solids	(mg/L)	491	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	1.07	-
TKN	(mg/L)	0.77	-
Chlorides	(mg/L)	162	-
Sulfates	(mg/L)	115	-
Alkalinity	(mg/L)	96	-
Hardness	(mg/L)	220	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	120	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	85	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.70	-
Cobalt	(mg/L)	<0.0010	-

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EUCLID CREEK (2) - 06/08/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.9	-
Dissolved Oxygen	(mg/L)	5.6	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	856	-
Dissolved Solids	(mg/L)	772	-
Specific Conductance	(mS/cm)	1.400	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.70	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	350	-
Sulfates	(mg/L)	143	-
Alkalinity	(mg/L)	108	-
Hardness	(mg/L)	267	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	90	-
pH	(s.u.)	7.7	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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EUCLID CREEK (3) - 08/26/93

Parameter		Value	Excursion
Temperature	(degrees C)	20.5	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	431	-
Dissolved Solids	(mg/L)	352	-
Specific Conductance	(mS/cm)	0.580	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.16	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	1.14	-
TKN	(mg/L)	0.38	-
Chlorides	(mg/L)	82	-
Sulfates	(mg/L)	55	-
Alkalinity	(mg/L)	123	-
Hardness	(mg/L)	184	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	<0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	8.2	-
Phenolics	(mg/L)	<0.050	-
Oil & Grease	(mg/L)	<1	-

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EUCLID CREEK (3) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	558	-
Dissolved Solids	(mg/L)	542	-
Specific Conductance	(mS/cm)	0.300	-
Turbidity	(NTU)	1.60	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	1.20	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	126	-
Sulfates	(mg/L)	87	-
Alkalinity	(mg/L)	112	-
Hardness	(mg/L)	212	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	440	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	240	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.40	-
Cobalt	(mg/L)	<0.0010	-

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EUCLID CREEK (3) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	9.8	-
Dissolved Oxygen	(mg/L)	10.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	15	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	559	-
Dissolved Solids	(mg/L)	388	-
Specific Conductance	(mS/cm)	0.680	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	1.37	-
TKN	(mg/L)	0.56	-
Chlorides	(mg/L)	96	-
Sulfates	(mg/L)	82	-
Alkalinity	(mg/L)	105	-
Hardness	(mg/L)	197	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	35	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	20	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.10	-
Cobalt	(mg/L)	<0.0010	-

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EUCLID CREEK (3) - 06/08/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.5	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	451	-
Dissolved Solids	(mg/L)	442	-
Specific Conductance	(mS/cm)	0.750	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	1.60	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	114	-
Sulfates	(mg/L)	70	-
Alkalinity	(mg/L)	144	-
Hardness	(mg/L)	202	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	260	-
pH	(s.u.)	7.7	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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EUCLID CREEK (4) - 08/26/93

Parameter		Value	Excursion
Temperature	(degrees C)	20.5	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	657	-
Dissolved Solids	(mg/L)	583	-
Specific Conductance	(mS/cm)	0.800	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.18	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	68	-
Sulfates	(mg/L)	136	-
Alkalinity	(mg/L)	119	-
Hardness	(mg/L)	242	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	300	-
pH	(s.u.)	8.2	-
Phenolics	(mg/L)	<0.050	-
Oil & Grease	(mg/L)	<1	-

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EUCLID CREEK (4) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	644	-
Dissolved Solids	(mg/L)	632	-
Specific Conductance	(mS/cm)	0.415	-
Turbidity	(NTU)	2.10	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.70	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	196	-
Sulfates	(mg/L)	101	-
Alkalinity	(mg/L)	141	-
Hardness	(mg/L)	236	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	280	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	260	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.50	-
Cobalt	(mg/L)	<0.0010	-

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EUCLID CREEK (4) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.6	-
Dissolved Oxygen	(mg/L)	9.1	-
BOD-5	(mg/L)	10	-
COD	(mg/L)	60	-
Suspended Solids	(mg/L)	13	-
Total Solids	(mg/L)	600	-
Dissolved Solids	(mg/L)	584	-
Specific Conductance	(mS/cm)	1.100	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	3.20	-
Phosphorus	(mg/L)	0.81	-
Soluble Phosphorus	(mg/L)	0.69	-
Nitrate-N	(mg/L)	0.16	-
TKN	(mg/L)	5.90	-
Chlorides	(mg/L)	186	-
Sulfates	(mg/L)	105	-
Alkalinity	(mg/L)	112	-
Hardness	(mg/L)	216	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	170000	PCU(2000)
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	54000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.20	-
Cobalt	(mg/L)	<0.0010	-

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EUCLID CREEK (4) - 06/08/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.5	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	944	-
Dissolved Solids	(mg/L)	914	-
Specific Conductance	(mS/cm)	1.600	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.40	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	498	-
Sulfates	(mg/L)	151	-
Alkalinity	(mg/L)	141	-
Hardness	(mg/L)	293	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	330	-
pH	(s.u.)	7.7	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0040	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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GREEN CREEK (5) - 08/31/93

Parameter		Value	Excursion
Temperature	(degrees C)	18.0	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	255	-
Dissolved Solids	(mg/L)	219	-
Specific Conductance	(mS/cm)	0.370	-
Turbidity	(NTU)	1.60	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.09	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.72	-
TKN	(mg/L)	0.45	-
Chlorides	(mg/L)	52	-
Sulfates	(mg/L)	44	-
Alkalinity	(mg/L)	113	-
Hardness	(mg/L)	176	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	220	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	190	-
Phenolics	(mg/L)	<0.050	-

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GREEN CREEK (5) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.8	-
Dissolved Oxygen	(mg/L)	6.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	324	-
Dissolved Solids	(mg/L)	283	-
Specific Conductance	(mS/cm)	0.540	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.16	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	0.49	-
TKN	(mg/L)	0.20	-
Chlorides	(mg/L)	52	-
Sulfates	(mg/L)	59	-
Alkalinity	(mg/L)	128	-
Hardness	(mg/L)	189	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.3100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	14000	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	9600	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.70	-
Cobalt	(mg/L)	<0.0010	-

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GREEN CREEK (5) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	13.9	-
Dissolved Oxygen	(mg/L)	6.5	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	313	-
Dissolved Solids	(mg/L)	291	-
Specific Conductance	(mS/cm)	0.530	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	2.50	-
Phosphorus	(mg/L)	1.31	-
Soluble Phosphorus	(mg/L)	1.27	-
Nitrate-N	(mg/L)	0.57	-
TKN	(mg/L)	4.10	-
Chlorides	(mg/L)	40	-
Sulfates	(mg/L)	63	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	184	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	10000	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	5900	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.60	-
Cobalt	(mg/L)	<0.0010	-

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GREEN CREEK (6) - 08/31/93

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	282	-
Dissolved Solids	(mg/L)	245	-
Specific Conductance	(mS/cm)	0.380	-
Turbidity	(NTU)	1.80	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	0.80	-
TKN	(mg/L)	1.02	-
Chlorides	(mg/L)	50	-
Sulfates	(mg/L)	40	-
Alkalinity	(mg/L)	97	-
Hardness	(mg/L)	144	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	280	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	200	-
Phenolics	(mg/L)	<0.050	-

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WQIS

GREEN CREEK (6) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.4	-
Dissolved Oxygen	(mg/L)	6.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	273	-
Dissolved Solids	(mg/L)	246	-
Specific Conductance	(mS/cm)	0.450	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.15	-
Nitrate-N	(mg/L)	0.47	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	54	-
Sulfates	(mg/L)	47	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	52	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	9800	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	8600	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.60	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

GREEN CREEK (6) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	5.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	267	-
Dissolved Solids	(mg/L)	251	-
Specific Conductance	(mS/cm)	0.480	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	3.30	-
Phosphorus	(mg/L)	1.38	-
Soluble Phosphorus	(mg/L)	1.35	-
Nitrate-N	(mg/L)	0.24	-
TKN	(mg/L)	5.20	-
Chlorides	(mg/L)	48	-
Sulfates	(mg/L)	54	-
Alkalinity	(mg/L)	100	-
Hardness	(mg/L)	158	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	26000	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	14000	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

GREEN CREEK (7) - 08/31/93

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	259	-
Dissolved Solids	(mg/L)	216	-
Specific Conductance	(mS/cm)	0.320	-
Turbidity	(NTU)	2.70	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.22	-
Chlorides	(mg/L)	34	-
Sulfates	(mg/L)	32	-
Alkalinity	(mg/L)	94	-
Hardness	(mg/L)	160	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	320	-
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	220	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

GREEN CREEK (7) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.1	-
Dissolved Oxygen	(mg/L)	6.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	11	-
Total Solids	(mg/L)	210	-
Dissolved Solids	(mg/L)	197	-
Specific Conductance	(mS/cm)	0.320	-
Turbidity	(NTU)	37.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.25	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	30	-
Sulfates	(mg/L)	40	-
Alkalinity	(mg/L)	80	-
Hardness	(mg/L)	126	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	400	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	440	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

GREEN CREEK (7) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.2	-
Dissolved Oxygen	(mg/L)	8.7	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	198	-
Dissolved Solids	(mg/L)	196	-
Specific Conductance	(mS/cm)	0.320	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.12	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	44	-
Alkalinity	(mg/L)	80	-
Hardness	(mg/L)	142	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	55	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	65	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.10	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (8A) - 08/25/93

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	3.4	WHAL(4.0)
BOD-5	(mg/L)	6	-
COD	(mg/L)	25	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	327	-
Dissolved Solids	(mg/L)	287	-
Specific Conductance	(mS/cm)	0.440	-
Turbidity	(NTU)	3.60	-
Ammonia-N	(mg/L)	1.50	-
Phosphorus	(mg/L)	0.32	-
Soluble Phosphorus	(mg/L)	0.32	-
Nitrate-N	(mg/L)	0.18	-
TKN	(mg/L)	2.31	-
Chlorides	(mg/L)	76	-
Sulfates	(mg/L)	49	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	184	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0200	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.5700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	2600	PCU(2000)
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	760	PCU(298)
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

NINE-MILE CREEK (8A) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.4	-
Dissolved Oxygen	(mg/L)	2.5	WHAL(4.0)
BOD-5	(mg/L)	3	-
COD	(mg/L)	23	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	581	-
Dissolved Solids	(mg/L)	565	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	0.45	-
TKN	(mg/L)	2.00	-
Chlorides	(mg/L)	142	-
Sulfates	(mg/L)	114	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	260	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0800	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	0.8400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	2800	PCU(2000)
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	2500	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.40	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (8A) - 10/14/94

Parameter		Value	Excursion
Temperature	(degrees C)	13.8	-
Dissolved Oxygen	(mg/L)	3.4	WHAL(4.0)
BOD-5	(mg/L)	4	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	500	-
Dissolved Solids	(mg/L)	447	-
Specific Conductance	(mS/cm)	0.830	-
Turbidity	(NTU)	19.00	-
Ammonia-N	(mg/L)	1.40	-
Phosphorus	(mg/L)	0.32	-
Soluble Phosphorus	(mg/L)	0.25	-
Nitrate-N	(mg/L)	0.44	-
TKN	(mg/L)	2.50	-
Chlorides	(mg/L)	110	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	151	-
Hardness	(mg/L)	240	-
Nickel	(mg/L)	0.0090	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.1000	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.8900	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1200	-
pH	(s.u.)	7.2	-
E Coli	(organisms/100ml)	960	PCU(298)
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.60	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (8B) - 08/25/93

Parameter		Value	Excursion
BOD-5	(mg/L)	160	-
COD	(mg/L)	103	-
Suspended Solids	(mg/L)	56	-
Total Solids	(mg/L)	430	-
Dissolved Solids	(mg/L)	291	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.39	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	0.93	-
TKN	(mg/L)	2.18	-
Chlorides	(mg/L)	78	-
Sulfates	(mg/L)	55	-
Alkalinity	(mg/L)	119	-
Hardness	(mg/L)	176	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.9000	WHAL(1.0)*
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4600	PCU(2000)
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	3600	PCU(298)
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

NINE-MILE CREEK (8B) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.2	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	557	-
Dissolved Solids	(mg/L)	554	-
Specific Conductance	(mS/cm)	0.910	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.09	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.52	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	154	-
Sulfates	(mg/L)	109	-
Alkalinity	(mg/L)	115	-
Hardness	(mg/L)	218	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.2800	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4400	PCU(2000)
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	3300	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	0.0010	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (8B) - 10/14/94

Parameter		Value	Excursion
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	459	-
Dissolved Solids	(mg/L)	407	-
Specific Conductance	(mS/cm)	0.600	-
Turbidity	(NTU)	3.60	-
Ammonia-N	(mg/L)	0.13	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	0.75	-
TKN	(mg/L)	0.95	-
Chlorides	(mg/L)	110	-
Sulfates	(mg/L)	84	-
Alkalinity	(mg/L)	114	-
Hardness	(mg/L)	212	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.5700	-
Cadmium	(mg/L)	0.0030	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	0.4000	HHSR(0.012)*
Fecal Coliform	(organisms/100ml)	3800	PCU(2000)
E Coli	(organisms/100ml)	1300	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.80	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (9) - 08/25/93

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	31	-
Suspended Solids	(mg/L)	20	-
Total Solids	(mg/L)	671	-
Dissolved Solids	(mg/L)	608	-
Specific Conductance	(mS/cm)	0.760	-
Turbidity	(NTU)	25.00	-
Ammonia-N	(mg/L)	0.70	-
Phosphorus	(mg/L)	0.17	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	1.50	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	193	-
Sulfates	(mg/L)	138	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	231	-
Nickel	(mg/L)	0.0190	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.2000	WHAL(1.0)*
Cadmium	(mg/L)	0.0050	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	2500	PCU(2000)
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	1100	PCU(298)
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

NINE-MILE CREEK (9) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	16.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	852	-
Dissolved Solids	(mg/L)	560	-
Specific Conductance	(mS/cm)	1.500	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	0.74	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	256	-
Sulfates	(mg/L)	204	-
Alkalinity	(mg/L)	183	-
Hardness	(mg/L)	320	-
Nickel	(mg/L)	0.0100	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	820	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	560	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	6.30	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (9) - 10/14/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.2	-
Dissolved Oxygen	(mg/L)	2.0	WHAL(4.0)
BOD-5	(mg/L)	2	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	1759	-
Dissolved Solids	(mg/L)	1630	WHAL(1500)*
Specific Conductance	(mS/cm)	2.700	-
Turbidity	(NTU)	17.00	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	3.00	-
TKN	(mg/L)	0.97	-
Chlorides	(mg/L)	440	-
Sulfates	(mg/L)	364	-
Alkalinity	(mg/L)	271	-
Hardness	(mg/L)	568	-
Nickel	(mg/L)	0.0260	-
Copper	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.0800	-
Cadmium	(mg/L)	0.0030	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	60	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	24	-
Arsenic	(mg/L)	0.0080	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	13.00	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (10) - 08/25/93

Parameter		Value	Excursion
Temperature	(degrees C)	19.5	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	244	-
Dissolved Solids	(mg/L)	241	-
Specific Conductance	(mS/cm)	0.350	-
Turbidity	(NTU)	0.70	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.64	-
TKN	(mg/L)	0.79	-
Chlorides	(mg/L)	61	-
Sulfates	(mg/L)	37	-
Alkalinity	(mg/L)	114	-
Hardness	(mg/L)	126	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0600	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	160	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	80	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

NINE-MILE CREEK (10) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	17.6	-
Dissolved Oxygen	(mg/L)	4.7	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	457	-
Dissolved Solids	(mg/L)	432	-
Specific Conductance	(mS/cm)	0.750	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.42	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	148	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	200	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1200	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	1100	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.70	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

NINE-MILE CREEK (10) - 10/14/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.5	-
Dissolved Oxygen	(mg/L)	4.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	372	-
Dissolved Solids	(mg/L)	345	-
Specific Conductance	(mS/cm)	0.650	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.16	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	0.58	-
TKN	(mg/L)	0.78	-
Chlorides	(mg/L)	100	-
Sulfates	(mg/L)	74	-
Alkalinity	(mg/L)	110	-
Hardness	(mg/L)	204	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	270	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	160	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

DUGWAY BROOK (12) - 08/24/93

Parameter		Value	Excursion
Temperature	(degrees C)	17.0	-
Dissolved Oxygen	(mg/L)	6.8	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	860	-
Dissolved Solids	(mg/L)	807	-
Specific Conductance	(mS/cm)	1.075	-
Turbidity	(NTU)	5.40	-
Ammonia-N	(mg/L)	0.37	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	1.41	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	290	-
Sulfates	(mg/L)	93	-
Alkalinity	(mg/L)	178	-
Hardness	(mg/L)	308	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.7300	-
Cadmium	(mg/L)	0.0060	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	5500	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	4500	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

DUGWAY BROOK (12) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.8	-
Dissolved Oxygen	(mg/L)	5.9	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	1738	-
Dissolved Solids	(mg/L)	1668	-
Specific Conductance	(mS/cm)	3.100	-
Turbidity	(NTU)	8.00	-
Ammonia-N	(mg/L)	1.00	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.16	-
Nitrate-N	(mg/L)	1.09	-
TKN	(mg/L)	2.20	-
Chlorides	(mg/L)	734	-
Sulfates	(mg/L)	128	-
Alkalinity	(mg/L)	213	-
Hardness	(mg/L)	390	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	5.0000	-
Iron	(mg/L)	0.8600	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	8000	-
pH	(s.u.)	7.0	-
E Coli	(organisms/100ml)	5700	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	6.90	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DUGWAY BROOK (12) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.2	-
Dissolved Oxygen	(mg/L)	4.8	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	24	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	1380	-
Dissolved Solids	(mg/L)	1245	-
Specific Conductance	(mS/cm)	2.430	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.60	-
Phosphorus	(mg/L)	0.25	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	1.27	-
TKN	(mg/L)	1.59	-
Chlorides	(mg/L)	594	-
Sulfates	(mg/L)	101	-
Alkalinity	(mg/L)	198	-
Hardness	(mg/L)	349	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.8500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	7800	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	4500	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.60	-
Cobalt	(mg/L)	0.0010	-

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WQIS

DUGWAY BROOK (12) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	15.6	-
Dissolved Oxygen	(mg/L)	5.5	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	23	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	1024	-
Dissolved Solids	(mg/L)	945	-
Specific Conductance	(mS/cm)	1.720	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	1.00	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	0.23	-
TKN	(mg/L)	3.00	-
Chlorides	(mg/L)	348	-
Sulfates	(mg/L)	113	-
Alkalinity	(mg/L)	194	-
Hardness	(mg/L)	324	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0080	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.8400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	21000	-
pH	(s.u.)	7.5	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DUGWAY BROOK (13) - 08/24/93

Parameter		Value	Excursion
BOD-5	(mg/L)	2	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	579	-
Dissolved Solids	(mg/L)	512	-
Specific Conductance	(mS/cm)	0.787	-
Turbidity	(NTU)	1.50	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.17	-
Soluble Phosphorus	(mg/L)	0.15	-
Nitrate-N	(mg/L)	0.84	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	132	-
Sulfates	(mg/L)	78	-
Alkalinity	(mg/L)	152	-
Hardness	(mg/L)	246	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	76	-
Phenolics	(mg/L)	<0.050	-

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WQIS

DUGWAY BROOK (13) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.6	-
Dissolved Oxygen	(mg/L)	9.3	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	107	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	778	-
Dissolved Solids	(mg/L)	705	-
Specific Conductance	(mS/cm)	1.200	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.13	-
Nitrate-N	(mg/L)	0.91	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	220	-
Sulfates	(mg/L)	112	-
Alkalinity	(mg/L)	180	-
Hardness	(mg/L)	307	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.5200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1500	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	1200	-
Arsenic	(mg/L)	0.0080	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.80	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DUGWAY BROOK (13) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	14.1	-
Dissolved Oxygen	(mg/L)	7.5	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	7	-
Total Solids	(mg/L)	630	-
Dissolved Solids	(mg/L)	532	-
Specific Conductance	(mS/cm)	1.030	-
Turbidity	(NTU)	7.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.16	-
Nitrate-N	(mg/L)	1.03	-
TKN	(mg/L)	1.25	-
Chlorides	(mg/L)	162	-
Sulfates	(mg/L)	83	-
Alkalinity	(mg/L)	157	-
Hardness	(mg/L)	252	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.6200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	6100	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	3900	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.70	-
Cobalt	(mg/L)	0.0010	-

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WQIS

DUGWAY BROOK (13) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.0	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	756	-
Dissolved Solids	(mg/L)	726	-
Specific Conductance	(mS/cm)	1.200	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.17	-
Soluble Phosphorus	(mg/L)	0.16	-
Nitrate-N	(mg/L)	1.50	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	224	-
Sulfates	(mg/L)	107	-
Alkalinity	(mg/L)	178	-
Hardness	(mg/L)	306	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	750	-
pH	(s.u.)	7.9	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DUGWAY BROOK (14) - 08/24/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	467	-
Dissolved Solids	(mg/L)	443	-
Specific Conductance	(mS/cm)	0.620	-
Turbidity	(NTU)	1.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.30	-
Soluble Phosphorus	(mg/L)	0.29	-
Nitrate-N	(mg/L)	0.42	-
TKN	(mg/L)	0.91	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	75	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	206	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	620	-
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	190	-
Phenolics	(mg/L)	<0.050	-

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WQIS

DUGWAY BROOK (14) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.8	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	771	-
Dissolved Solids	(mg/L)	739	-
Specific Conductance	(mS/cm)	1.300	-
Turbidity	(NTU)	34.00	-
Ammonia-N	(mg/L)	7.67	-
Phosphorus	(mg/L)	0.27	-
Soluble Phosphorus	(mg/L)	0.25	-
Nitrate-N	(mg/L)	0.46	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	238	-
Sulfates	(mg/L)	111	-
Alkalinity	(mg/L)	173	-
Hardness	(mg/L)	317	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.4400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4000	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	2700	-
Arsenic	(mg/L)	0.0080	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.90	-
Cobalt	(mg/L)	<0.0010	-

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DUGWAY BROOK (14) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	6.3	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	44	-
Total Solids	(mg/L)	677	-
Dissolved Solids	(mg/L)	542	-
Specific Conductance	(mS/cm)	0.990	-
Turbidity	(NTU)	115.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.36	-
Soluble Phosphorus	(mg/L)	0.28	-
Nitrate-N	(mg/L)	0.76	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	164	-
Sulfates	(mg/L)	95	-
Alkalinity	(mg/L)	166	-
Hardness	(mg/L)	258	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	11000	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	7600	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	0.0010	-

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DUGWAY BROOK (14) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.4	-
Dissolved Oxygen	(mg/L)	10.3	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	756	-
Dissolved Solids	(mg/L)	705	-
Specific Conductance	(mS/cm)	1.230	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.24	-
Soluble Phosphorus	(mg/L)	0.22	-
Nitrate-N	(mg/L)	0.40	-
Chlorides	(mg/L)	224	-
Sulfates	(mg/L)	95	-
Alkalinity	(mg/L)	163	-
Hardness	(mg/L)	269	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	0.2800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1000	-
pH	(s.u.)	8.5	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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DUGWAY BROOK (15) - 08/24/93

Parameter		Value	Excursion
Temperature	(degrees C)	17.5	-
Dissolved Oxygen	(mg/L)	3.2	-
BOD-5	(mg/L)	12	-
COD	(mg/L)	31	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	569	-
Dissolved Solids	(mg/L)	527	-
Specific Conductance	(mS/cm)	0.750	-
Turbidity	(NTU)	8.00	-
Ammonia-N	(mg/L)	6.45	-
Phosphorus	(mg/L)	0.86	-
Soluble Phosphorus	(mg/L)	0.78	-
Nitrate-N	(mg/L)	<0.01	-
TKN	(mg/L)	7.48	-
Chlorides	(mg/L)	142	-
Sulfates	(mg/L)	76	-
Alkalinity	(mg/L)	195	-
Hardness	(mg/L)	274	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	1.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4100	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	3500	-
Phenolics	(mg/L)	<0.050	-

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DUGWAY BROOK (15) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.7	-
Dissolved Oxygen	(mg/L)	5.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	889	-
Dissolved Solids	(mg/L)	830	-
Specific Conductance	(mS/cm)	1.500	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	0.75	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	278	-
Sulfates	(mg/L)	109	-
Alkalinity	(mg/L)	205	-
Hardness	(mg/L)	346	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	680	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	300	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.00	-
Cobalt	(mg/L)	<0.0010	-

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DUGWAY BROOK (15) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	4.4	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	858	-
Dissolved Solids	(mg/L)	737	-
Specific Conductance	(mS/cm)	1.380	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.80	-
Phosphorus	(mg/L)	0.24	-
Soluble Phosphorus	(mg/L)	0.15	-
Nitrate-N	(mg/L)	0.65	-
TKN	(mg/L)	1.81	-
Chlorides	(mg/L)	266	-
Sulfates	(mg/L)	94	-
Alkalinity	(mg/L)	188	-
Hardness	(mg/L)	342	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	1.2000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	3100	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	2900	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	0.0010	-

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WQIS

DUGWAY BROOK (15) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	15.8	-
Dissolved Oxygen	(mg/L)	6.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	485	-
Dissolved Solids	(mg/L)	430	-
Specific Conductance	(mS/cm)	0.680	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	55	-
Alkalinity	(mg/L)	119	-
Hardness	(mg/L)	206	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0600	-
Iron	(mg/L)	0.3500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	10000	-
pH	(s.u.)	7.6	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DOAN BROOK (16) - 08/27/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	5.1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	425	-
Dissolved Solids	(mg/L)	390	-
Specific Conductance	(mS/cm)	0.750	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.24	-
Soluble Phosphorus	(mg/L)	0.21	-
Nitrate-N	(mg/L)	0.80	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	314	-
Sulfates	(mg/L)	54	-
Alkalinity	(mg/L)	157	-
Hardness	(mg/L)	178	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0600	-
Iron	(mg/L)	0.2400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	150	-
Phenolics	(mg/L)	<0.050	-

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WQIS

DOAN BROOK (16) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.4	-
Dissolved Oxygen	(mg/L)	6.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	278	-
Dissolved Solids	(mg/L)	257	-
Specific Conductance	(mS/cm)	0.510	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.64	-
TKN	(mg/L)	0.43	-
Chlorides	(mg/L)	78	-
Sulfates	(mg/L)	39	-
Alkalinity	(mg/L)	89	-
Hardness	(mg/L)	145	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.1500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	90	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	60	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.30	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DOAN BROOK (16) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	14.0	-
Dissolved Oxygen	(mg/L)	6.4	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	18	-
Total Solids	(mg/L)	541	-
Dissolved Solids	(mg/L)	453	-
Specific Conductance	(mS/cm)	0.330	-
Turbidity	(NTU)	2.40	-
Ammonia-N	(mg/L)	0.09	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.17	-
Nitrate-N	(mg/L)	1.05	-
TKN	(mg/L)	1.51	-
Chlorides	(mg/L)	140	-
Sulfates	(mg/L)	57	-
Alkalinity	(mg/L)	151	-
Hardness	(mg/L)	230	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	300	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	290	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.30	-
Cobalt	(mg/L)	0.0010	-

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WQIS

DOAN BROOK (16) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.8	-
Dissolved Oxygen	(mg/L)	2.9	WHAL(4.0)
BOD-5	(mg/L)	8	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	741	-
Dissolved Solids	(mg/L)	717	-
Specific Conductance	(mS/cm)	1.300	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.17	-
Nitrate-N	(mg/L)	0.81	-
TKN	(mg/L)	2.30	-
Chlorides	(mg/L)	254	-
Sulfates	(mg/L)	81	-
Alkalinity	(mg/L)	146	-
Hardness	(mg/L)	274	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	0.3000	HHSR(0.012)*
Fecal Coliform	(organisms/100ml)	1400	-
pH	(s.u.)	7.3	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DOAN BROOK (17) - 08/27/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	3.1	WHAL(4.0)
BOD-5	(mg/L)	20	-
COD	(mg/L)	40	-
Suspended Solids	(mg/L)	18	-
Total Solids	(mg/L)	375	-
Dissolved Solids	(mg/L)	331	-
Specific Conductance	(mS/cm)	0.540	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	1.90	-
Phosphorus	(mg/L)	0.81	-
Soluble Phosphorus	(mg/L)	0.59	-
Nitrate-N	(mg/L)	0.12	-
TKN	(mg/L)	4.08	-
Chlorides	(mg/L)	110	-
Sulfates	(mg/L)	49	-
Alkalinity	(mg/L)	121	-
Hardness	(mg/L)	172	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.2700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	32000	PCU(2000)
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	30000	PCU(298)
Phenolics	(mg/L)	<0.050	-

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WQIS

DOAN BROOK (17) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	6.1	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	614	-
Dissolved Solids	(mg/L)	575	-
Specific Conductance	(mS/cm)	1.100	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.24	-
Nitrate-N	(mg/L)	0.77	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	198	-
Sulfates	(mg/L)	81	-
Alkalinity	(mg/L)	109	-
Hardness	(mg/L)	223	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	40000	PCU(2000)
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	24000	PCU(298)
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.60	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

DOAN BROOK (17) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.0	-
Dissolved Oxygen	(mg/L)	5.6	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	7	-
Total Solids	(mg/L)	415	-
Dissolved Solids	(mg/L)	365	-
Specific Conductance	(mS/cm)	0.385	-
Turbidity	(NTU)	1.80	-
Ammonia-N	(mg/L)	1.04	-
Phosphorus	(mg/L)	0.50	-
Soluble Phosphorus	(mg/L)	0.45	-
Nitrate-N	(mg/L)	0.27	-
TKN	(mg/L)	3.09	-
Chlorides	(mg/L)	118	-
Sulfates	(mg/L)	49	-
Alkalinity	(mg/L)	113	-
Hardness	(mg/L)	194	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	97000	PCU(2000)
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	31000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.40	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

DOAN BROOK (17) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.1	-
Dissolved Oxygen	(mg/L)	4.8	-
BOD-5	(mg/L)	10	-
COD	(mg/L)	25	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	536	-
Dissolved Solids	(mg/L)	522	-
Specific Conductance	(mS/cm)	0.870	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	0.80	-
Phosphorus	(mg/L)	0.38	-
Soluble Phosphorus	(mg/L)	0.33	-
Nitrate-N	(mg/L)	0.50	-
TKN	(mg/L)	3.50	-
Chlorides	(mg/L)	174	-
Sulfates	(mg/L)	60	-
Alkalinity	(mg/L)	112	-
Hardness	(mg/L)	202	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	89000	PCU(2000)
pH	(s.u.)	7.5	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

DOAN BROOK (18) - 08/27/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	6.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	314	-
Dissolved Solids	(mg/L)	271	-
Specific Conductance	(mS/cm)	0.440	-
Turbidity	(NTU)	1.40	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	0.33	-
TKN	(mg/L)	1.01	-
Chlorides	(mg/L)	70	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	110	-
Hardness	(mg/L)	163	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.3300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	290	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	250	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

DOAN BROOK (18) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	6.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	405	-
Dissolved Solids	(mg/L)	387	-
Specific Conductance	(mS/cm)	0.710	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.72	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	126	-
Sulfates	(mg/L)	58	-
Alkalinity	(mg/L)	100	-
Hardness	(mg/L)	173	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.1800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	700	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	300	PCU(298)
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0010	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

DOAN BROOK (18) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	260	-
Dissolved Solids	(mg/L)	233	-
Specific Conductance	(mS/cm)	0.185	-
Turbidity	(NTU)	1.70	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	50	-
Sulfates	(mg/L)	36	-
Alkalinity	(mg/L)	102	-
Hardness	(mg/L)	148	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	60	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	75	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.10	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

DOAN BROOK (18) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	20.7	-
Dissolved Oxygen	(mg/L)	5.1	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	322	-
Dissolved Solids	(mg/L)	297	-
Specific Conductance	(mS/cm)	0.530	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	92	-
Sulfates	(mg/L)	31	-
Alkalinity	(mg/L)	95	-
Hardness	(mg/L)	150	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	250	-
pH	(s.u.)	7.7	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

DOAN BROOK (19) - 08/27/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	7.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	293	-
Dissolved Solids	(mg/L)	255	-
Specific Conductance	(mS/cm)	0.420	-
Turbidity	(NTU)	1.20	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	0.18	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	68	-
Sulfates	(mg/L)	24	-
Alkalinity	(mg/L)	111	-
Hardness	(mg/L)	136	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	170	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

DOAN BROOK (19) - 08/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	6.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	347	-
Dissolved Solids	(mg/L)	321	-
Specific Conductance	(mS/cm)	0.590	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.91	-
TKN	(mg/L)	0.73	-
Chlorides	(mg/L)	94	-
Sulfates	(mg/L)	50	-
Alkalinity	(mg/L)	109	-
Hardness	(mg/L)	144	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.2700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	260	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	200	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.80	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

DOAN BROOK (19) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.5	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	247	-
Dissolved Solids	(mg/L)	234	-
Specific Conductance	(mS/cm)	0.185	-
Turbidity	(NTU)	0.90	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	52	-
Sulfates	(mg/L)	31	-
Alkalinity	(mg/L)	104	-
Hardness	(mg/L)	140	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	95	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	35	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.10	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

DOAN BROOK (19) - 06/07/95

Parameter		Value	Excursion
Temperature	(degrees C)	20.1	-
Dissolved Oxygen	(mg/L)	6.0	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	449	-
Dissolved Solids	(mg/L)	423	-
Specific Conductance	(mS/cm)	0.690	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	43	-
Alkalinity	(mg/L)	116	-
Hardness	(mg/L)	180	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.4500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	800	-
pH	(s.u.)	7.5	-
Antimony	(mg/L)	<0.0070	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (20) - 07/22/93

Parameter		Value	Excursion
Temperature	(degrees C)	24.1	-
Dissolved Oxygen	(mg/L)	1.6	-
BOD-5	(mg/L)	10	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	18	-
Total Solids	(mg/L)	658	-
Dissolved Solids	(mg/L)	577	-
Specific Conductance	(mS/cm)	0.750	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	5.30	-
TKN	(mg/L)	2.60	-
Chlorides	(mg/L)	150	-
Sulfates	(mg/L)	92	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	248	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0070	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.9600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	360	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	220	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

CUYAHOGA RIVER (20) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	2.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	82	-
Total Solids	(mg/L)	521	-
Dissolved Solids	(mg/L)	392	-
Specific Conductance	(mS/cm)	0.880	-
Turbidity	(NTU)	66.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.28	-
Soluble Phosphorus	(mg/L)	0.15	-
Nitrate-N	(mg/L)	3.00	-
TKN	(mg/L)	2.30	-
Chlorides	(mg/L)	114	-
Sulfates	(mg/L)	67	-
Alkalinity	(mg/L)	111	-
Hardness	(mg/L)	188	-
Nickel	(mg/L)	0.0150	-
Copper	(mg/L)	0.0400	-
Total Chromium	(mg/L)	0.0070	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0700	-
Iron	(mg/L)	3.2000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0070	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	310	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	210	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	6.90	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

CUYAHOGA RIVER (20) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	5.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	44	-
Suspended Solids	(mg/L)	62	-
Total Solids	(mg/L)	648	-
Dissolved Solids	(mg/L)	529	-
Specific Conductance	(mS/cm)	0.330	-
Turbidity	(NTU)	22.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.31	-
Soluble Phosphorus	(mg/L)	0.21	-
Nitrate-N	(mg/L)	<0.01	-
TKN	(mg/L)	2.40	-
Chlorides	(mg/L)	147	-
Sulfates	(mg/L)	90	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0090	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0700	-
Iron	(mg/L)	2.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	80	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	9.90	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

CUYAHOGA RIVER (20) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	27.0	-
Dissolved Oxygen	(mg/L)	2.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	17	-
Total Solids	(mg/L)	502	-
Dissolved Solids	(mg/L)	442	-
Specific Conductance	(mS/cm)	0.780	-
Turbidity	(NTU)	11.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	3.20	-
TKN	(mg/L)	2.50	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	77	-
Alkalinity	(mg/L)	138	-
Hardness	(mg/L)	196	-
Nickel	(mg/L)	0.0130	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.7000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	950	-
pH	(s.u.)	7.3	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	7.70	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (21) - 07/22/93

Parameter		Value	Excursion
Temperature	(degrees C)	25.0	-
Dissolved Oxygen	(mg/L)	2.2	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	687	-
Dissolved Solids	(mg/L)	615	-
Specific Conductance	(mS/cm)	0.825	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.76	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	5.89	-
TKN	(mg/L)	2.50	-
Chlorides	(mg/L)	150	-
Sulfates	(mg/L)	104	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	261	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.8300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	30	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	20	-
Phenolics	(mg/L)	<0.050	-

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CUYAHOGA RIVER (21) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	2.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	26	-
Suspended Solids	(mg/L)	37	-
Total Solids	(mg/L)	595	-
Dissolved Solids	(mg/L)	504	-
Specific Conductance	(mS/cm)	0.960	-
Turbidity	(NTU)	68.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	4.10	-
TKN	(mg/L)	2.10	-
Chlorides	(mg/L)	152	-
Sulfates	(mg/L)	82	-
Alkalinity	(mg/L)	121	-
Hardness	(mg/L)	221	-
Nickel	(mg/L)	0.0150	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	1.2000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	70	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	35	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	9.90	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (21) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.0	-
Dissolved Oxygen	(mg/L)	5.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	31	-
Suspended Solids	(mg/L)	17	-
Total Solids	(mg/L)	592	-
Dissolved Solids	(mg/L)	533	-
Specific Conductance	(mS/cm)	0.360	-
Turbidity	(NTU)	9.40	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.24	-
Nitrate-N	(mg/L)	7.20	-
TKN	(mg/L)	2.10	-
Chlorides	(mg/L)	146	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	222	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.7200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	40	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	45	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	11.60	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

CUYAHOGA RIVER (21) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	28.0	-
Dissolved Oxygen	(mg/L)	2.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	23	-
Suspended Solids	(mg/L)	17	-
Total Solids	(mg/L)	534	-
Dissolved Solids	(mg/L)	461	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.17	-
Nitrate-N	(mg/L)	3.80	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	124	-
Sulfates	(mg/L)	84	-
Alkalinity	(mg/L)	145	-
Hardness	(mg/L)	203	-
Nickel	(mg/L)	0.0140	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.7100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	7.4	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	8.80	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22) - 07/22/93

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	2.8	-
BOD-5	(mg/L)	10	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	20	-
Total Solids	(mg/L)	659	-
Dissolved Solids	(mg/L)	598	-
Specific Conductance	(mS/cm)	0.850	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.18	-
Soluble Phosphorus	(mg/L)	0.13	-
Nitrate-N	(mg/L)	5.74	-
TKN	(mg/L)	2.60	-
Chlorides	(mg/L)	150	-
Sulfates	(mg/L)	102	-
Alkalinity	(mg/L)	129	-
Hardness	(mg/L)	274	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1300	-
Iron	(mg/L)	1.1000	-
Cadmium	(mg/L)	0.0040	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	40	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	30	-
Phenolics	(mg/L)	<0.050	-

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WQIS

CUYAHOGA RIVER (22) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	27.1	-
Dissolved Oxygen	(mg/L)	5.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	29	-
Suspended Solids	(mg/L)	20	-
Total Solids	(mg/L)	632	-
Dissolved Solids	(mg/L)	545	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	63.00	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.25	-
Soluble Phosphorus	(mg/L)	0.20	-
Nitrate-N	(mg/L)	5.20	-
TKN	(mg/L)	2.20	-
Chlorides	(mg/L)	144	-
Sulfates	(mg/L)	91	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0150	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0600	-
Iron	(mg/L)	0.8200	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	80	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	9.90	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

CUYAHOGA RIVER (22) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.0	-
Dissolved Oxygen	(mg/L)	5.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	25	-
Suspended Solids	(mg/L)	14	-
Total Solids	(mg/L)	544	-
Dissolved Solids	(mg/L)	502	-
Specific Conductance	(mS/cm)	0.310	-
Turbidity	(NTU)	6.50	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.23	-
Nitrate-N	(mg/L)	5.90	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	77	-
Alkalinity	(mg/L)	118	-
Hardness	(mg/L)	228	-
Nickel	(mg/L)	0.0150	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.5300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	50	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	60	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	8.90	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	28.0	-
Dissolved Oxygen	(mg/L)	4.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	25	-
Total Solids	(mg/L)	571	-
Dissolved Solids	(mg/L)	488	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	14.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.23	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	4.50	-
TKN	(mg/L)	2.10	-
Chlorides	(mg/L)	132	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	125	-
Hardness	(mg/L)	211	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0300	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0700	-
Iron	(mg/L)	0.9500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80	-
pH	(s.u.)	7.4	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0050	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	9.80	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22.5) - 07/22/93

Parameter		Value	Excursion
Temperature	(degrees C)	25.2	-
Dissolved Oxygen	(mg/L)	5.6	-
BOD-5	(mg/L)	11	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	17	-
Total Solids	(mg/L)	682	-
Dissolved Solids	(mg/L)	603	-
Specific Conductance	(mS/cm)	0.850	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.20	-
Nitrate-N	(mg/L)	6.90	-
TKN	(mg/L)	2.70	-
Chlorides	(mg/L)	154	-
Sulfates	(mg/L)	106	-
Alkalinity	(mg/L)	134	-
Hardness	(mg/L)	252	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.8900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	55	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	50	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

CUYAHOGA RIVER (22.5) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	25.7	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	26	-
Suspended Solids	(mg/L)	30	-
Total Solids	(mg/L)	625	-
Dissolved Solids	(mg/L)	527	-
Specific Conductance	(mS/cm)	0.970	-
Turbidity	(NTU)	75.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.36	-
Soluble Phosphorus	(mg/L)	0.28	-
Nitrate-N	(mg/L)	5.84	-
TKN	(mg/L)	2.70	-
Chlorides	(mg/L)	146	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0140	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.2000	WHAL(1.0)*
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	550	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	370	PCU(298)
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	9.60	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

CUYAHOGA RIVER (22.5) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	16.0	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	31	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	580	-
Dissolved Solids	(mg/L)	508	-
Specific Conductance	(mS/cm)	0.305	-
Turbidity	(NTU)	8.30	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.38	-
Soluble Phosphorus	(mg/L)	0.32	-
Nitrate-N	(mg/L)	7.20	-
TKN	(mg/L)	2.20	-
Chlorides	(mg/L)	170	-
Sulfates	(mg/L)	76	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.6000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	510	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	350	PCU(298)
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	9.50	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.5) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.0	-
Dissolved Oxygen	(mg/L)	7.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	25	-
Suspended Solids	(mg/L)	29	-
Total Solids	(mg/L)	614	-
Dissolved Solids	(mg/L)	535	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	19.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.35	-
Soluble Phosphorus	(mg/L)	0.27	-
Nitrate-N	(mg/L)	4.50	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	140	-
Sulfates	(mg/L)	100	-
Alkalinity	(mg/L)	138	-
Hardness	(mg/L)	217	-
Nickel	(mg/L)	0.0170	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.4000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	550	-
pH	(s.u.)	7.7	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0040	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	12.60	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.51) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.5	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	27	-
Suspended Solids	(mg/L)	19	-
Total Solids	(mg/L)	600	-
Dissolved Solids	(mg/L)	507	-
Specific Conductance	(mS/cm)	0.940	-
Turbidity	(NTU)	25.00	-
Ammonia-N	(mg/L)	0.05	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.20	-
Nitrate-N	(mg/L)	5.80	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	142	-
Sulfates	(mg/L)	84	-
Alkalinity	(mg/L)	126	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0120	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.6200	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	270	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	220	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	8.30	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.51) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.0	-
Dissolved Oxygen	(mg/L)	8.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	33	-
Suspended Solids	(mg/L)	16	-
Total Solids	(mg/L)	548	-
Dissolved Solids	(mg/L)	498	-
Specific Conductance	(mS/cm)	0.265	-
Turbidity	(NTU)	5.10	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.35	-
Soluble Phosphorus	(mg/L)	0.33	-
Nitrate-N	(mg/L)	7.00	-
TKN	(mg/L)	2.00	-
Chlorides	(mg/L)	144	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	121	-
Hardness	(mg/L)	239	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.4600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	290	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	180	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	8.50	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.51) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	22	-
Suspended Solids	(mg/L)	26	-
Total Solids	(mg/L)	606	-
Dissolved Solids	(mg/L)	511	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	14.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.41	-
Soluble Phosphorus	(mg/L)	0.33	-
Nitrate-N	(mg/L)	5.80	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	138	-
Sulfates	(mg/L)	92	-
Alkalinity	(mg/L)	145	-
Hardness	(mg/L)	213	-
Nickel	(mg/L)	0.0150	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.1000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0070	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	510	-
pH	(s.u.)	7.7	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	11.30	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.6) - 07/22/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.5	-
Dissolved Oxygen	(mg/L)	5.2	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	612	-
Dissolved Solids	(mg/L)	557	-
Specific Conductance	(mS/cm)	0.725	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.17	-
Nitrate-N	(mg/L)	5.90	-
TKN	(mg/L)	2.40	-
Chlorides	(mg/L)	136	-
Sulfates	(mg/L)	101	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	242	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.5900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	60	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	40	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

CUYAHOGA RIVER (22.6) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.5	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	25	-
Suspended Solids	(mg/L)	16	-
Total Solids	(mg/L)	627	-
Dissolved Solids	(mg/L)	514	-
Specific Conductance	(mS/cm)	0.930	-
Turbidity	(NTU)	39.00	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.28	-
Soluble Phosphorus	(mg/L)	0.20	-
Nitrate-N	(mg/L)	5.60	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	87	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	223	-
Nickel	(mg/L)	0.0110	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.4400	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	460	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	350	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	7.90	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22.6) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.0	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	32	-
Suspended Solids	(mg/L)	14	-
Total Solids	(mg/L)	559	-
Dissolved Solids	(mg/L)	483	-
Specific Conductance	(mS/cm)	0.250	-
Turbidity	(NTU)	5.20	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.35	-
Soluble Phosphorus	(mg/L)	0.32	-
Nitrate-N	(mg/L)	7.00	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	77	-
Alkalinity	(mg/L)	119	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.5400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	400	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	140	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	8.50	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.6) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	7.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	26	-
Total Solids	(mg/L)	606	-
Dissolved Solids	(mg/L)	495	-
Specific Conductance	(mS/cm)	0.900	-
Turbidity	(NTU)	13.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.39	-
Soluble Phosphorus	(mg/L)	0.33	-
Nitrate-N	(mg/L)	5.30	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	132	-
Sulfates	(mg/L)	92	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	217	-
Nickel	(mg/L)	0.0140	-
Copper	(mg/L)	0.0300	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.9500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0100	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	470	-
pH	(s.u.)	7.5	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	9.10	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22.7) - 07/21/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	11.0	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	7	-
Total Solids	(mg/L)	643	-
Dissolved Solids	(mg/L)	600	-
Specific Conductance	(mS/cm)	0.700	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	7.60	-
TKN	(mg/L)	2.00	-
Chlorides	(mg/L)	160	-
Sulfates	(mg/L)	89	-
Alkalinity	(mg/L)	125	-
Hardness	(mg/L)	237	-
Nickel	(mg/L)	0.0270	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	0.3200	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	150	-
pH	(s.u.)	7.2	-
E Coli	(organisms/100ml)	125	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

CUYAHOGA RIVER (22.7) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	14	-
Total Solids	(mg/L)	602	-
Dissolved Solids	(mg/L)	517	-
Specific Conductance	(mS/cm)	0.820	-
Turbidity	(NTU)	7.60	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.24	-
Nitrate-N	(mg/L)	6.24	-
TKN	(mg/L)	2.10	-
Chlorides	(mg/L)	142	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	127	-
Hardness	(mg/L)	223	-
Nickel	(mg/L)	0.0120	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	120	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	110	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	9.90	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.7) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	14.0	-
Dissolved Oxygen	(mg/L)	8.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	32	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	554	-
Dissolved Solids	(mg/L)	533	-
Specific Conductance	(mS/cm)	0.920	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.37	-
Soluble Phosphorus	(mg/L)	0.34	-
Nitrate-N	(mg/L)	8.32	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	77	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	220	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	88	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	9.80	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22.7) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	7.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	23	-
Suspended Solids	(mg/L)	19	-
Total Solids	(mg/L)	583	-
Dissolved Solids	(mg/L)	517	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.54	-
Soluble Phosphorus	(mg/L)	0.49	-
Nitrate-N	(mg/L)	6.60	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	142	-
Sulfates	(mg/L)	92	-
Alkalinity	(mg/L)	140	-
Hardness	(mg/L)	213	-
Nickel	(mg/L)	0.0150	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.9000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	370	-
pH	(s.u.)	7.7	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	11.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22.8) - 07/21/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	11.2	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	638	-
Dissolved Solids	(mg/L)	559	-
Specific Conductance	(mS/cm)	0.620	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.13	-
Nitrate-N	(mg/L)	3.40	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	132	-
Sulfates	(mg/L)	87	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	256	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.4900	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	180	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	165	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

CUYAHOGA RIVER (22.8) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	31	-
Suspended Solids	(mg/L)	24	-
Total Solids	(mg/L)	566	-
Dissolved Solids	(mg/L)	492	-
Specific Conductance	(mS/cm)	0.725	-
Turbidity	(NTU)	8.80	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	2.92	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	114	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	133	-
Hardness	(mg/L)	236	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.8300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	180	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	170	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.30	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.8) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.5	-
Dissolved Oxygen	(mg/L)	8.3	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	30	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	492	-
Dissolved Solids	(mg/L)	452	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.25	-
Soluble Phosphorus	(mg/L)	0.22	-
Nitrate-N	(mg/L)	3.91	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	108	-
Sulfates	(mg/L)	73	-
Alkalinity	(mg/L)	130	-
Hardness	(mg/L)	232	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	260	-
pH	(s.u.)	8.6	-
E Coli	(organisms/100ml)	160	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (22.8) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	29	-
Total Solids	(mg/L)	576	-
Dissolved Solids	(mg/L)	461	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.23	-
Nitrate-N	(mg/L)	3.20	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	94	-
Alkalinity	(mg/L)	134	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	1.2000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	480	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	0.0010	-

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CUYAHOGA RIVER (22.9) - 07/21/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	12.0	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	630	-
Dissolved Solids	(mg/L)	597	-
Specific Conductance	(mS/cm)	0.600	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.16	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	3.60	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	174	-
Sulfates	(mg/L)	86	-
Alkalinity	(mg/L)	153	-
Hardness	(mg/L)	266	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.5300	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	100	-
Phenolics	(mg/L)	<0.050	-

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CUYAHOGA RIVER (22.9) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	24	-
Total Solids	(mg/L)	559	-
Dissolved Solids	(mg/L)	470	-
Specific Conductance	(mS/cm)	0.730	-
Turbidity	(NTU)	7.80	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	2.80	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	114	-
Sulfates	(mg/L)	81	-
Alkalinity	(mg/L)	137	-
Hardness	(mg/L)	238	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.7300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	180	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	150	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22.9) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	24	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	496	-
Dissolved Solids	(mg/L)	372	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	0.05	-
Phosphorus	(mg/L)	0.25	-
Soluble Phosphorus	(mg/L)	0.23	-
Nitrate-N	(mg/L)	4.08	-
TKN	(mg/L)	0.92	-
Chlorides	(mg/L)	108	-
Sulfates	(mg/L)	72	-
Alkalinity	(mg/L)	130	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.4600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	230	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	120	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (22.9) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	7.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	38	-
Total Solids	(mg/L)	610	-
Dissolved Solids	(mg/L)	480	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	14.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	3.20	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	132	-
Sulfates	(mg/L)	89	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	232	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	1.3000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	510	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CUYAHOGA RIVER (23) - 07/21/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	607	-
Dissolved Solids	(mg/L)	592	-
Specific Conductance	(mS/cm)	0.580	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.17	-
Soluble Phosphorus	(mg/L)	0.15	-
Nitrate-N	(mg/L)	3.70	-
TKN	(mg/L)	1.64	-
Chlorides	(mg/L)	132	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	154	-
Hardness	(mg/L)	258	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0700	-
Iron	(mg/L)	0.3800	-
Cadmium	(mg/L)	0.0030	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	145	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	137	-
Phenolics	(mg/L)	<0.050	-

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WQIS

CUYAHOGA RIVER (23) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	23	-
Total Solids	(mg/L)	563	-
Dissolved Solids	(mg/L)	474	-
Specific Conductance	(mS/cm)	0.700	-
Turbidity	(NTU)	6.70	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	2.50	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	77	-
Alkalinity	(mg/L)	137	-
Hardness	(mg/L)	234	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.7200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	220	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	130	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

CUYAHOGA RIVER (23) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	30	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	469	-
Dissolved Solids	(mg/L)	451	-
Specific Conductance	(mS/cm)	0.780	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.28	-
Soluble Phosphorus	(mg/L)	0.24	-
Nitrate-N	(mg/L)	3.80	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	102	-
Sulfates	(mg/L)	67	-
Alkalinity	(mg/L)	131	-
Hardness	(mg/L)	240	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.4100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	190	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	130	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.90	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

CUYAHOGA RIVER (23) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	25	-
Total Solids	(mg/L)	551	-
Dissolved Solids	(mg/L)	453	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.22	-
Nitrate-N	(mg/L)	3.20	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	130	-
Sulfates	(mg/L)	90	-
Alkalinity	(mg/L)	137	-
Hardness	(mg/L)	232	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	1.2000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	750	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (24) - 07/21/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	11	-
Total Solids	(mg/L)	625	-
Dissolved Solids	(mg/L)	563	-
Specific Conductance	(mS/cm)	0.580	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.13	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	3.10	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	86	-
Alkalinity	(mg/L)	168	-
Hardness	(mg/L)	272	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.1000	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.6000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	135	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	105	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

CUYAHOGA RIVER (24) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.5	-
Dissolved Oxygen	(mg/L)	8.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	12	-
Total Solids	(mg/L)	536	-
Dissolved Solids	(mg/L)	479	-
Specific Conductance	(mS/cm)	0.730	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	2.80	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	87	-
Alkalinity	(mg/L)	136	-
Hardness	(mg/L)	235	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.5000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	120	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.70	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (24) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	7.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	24	-
Suspended Solids	(mg/L)	11	-
Total Solids	(mg/L)	492	-
Dissolved Solids	(mg/L)	458	-
Specific Conductance	(mS/cm)	0.790	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.32	-
Soluble Phosphorus	(mg/L)	0.29	-
Nitrate-N	(mg/L)	4.00	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	96	-
Sulfates	(mg/L)	74	-
Alkalinity	(mg/L)	131	-
Hardness	(mg/L)	227	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.4700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	2000	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	1000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.00	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (24) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	19	-
Total Solids	(mg/L)	570	-
Dissolved Solids	(mg/L)	478	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	9.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.30	-
Soluble Phosphorus	(mg/L)	0.28	-
Nitrate-N	(mg/L)	3.40	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	124	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	234	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.7700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	7.9	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (24.5) - 07/21/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	8.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	594	-
Dissolved Solids	(mg/L)	558	-
Specific Conductance	(mS/cm)	0.580	-
Ammonia-N	(mg/L)	1.20	-
Phosphorus	(mg/L)	0.74	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	3.60	-
TKN	(mg/L)	2.09	-
Chlorides	(mg/L)	126	-
Sulfates	(mg/L)	86	-
Alkalinity	(mg/L)	160	-
Hardness	(mg/L)	262	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0010	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.4200	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	140	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	120	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

CUYAHOGA RIVER (24.5) - 07/19/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	514	-
Dissolved Solids	(mg/L)	445	-
Specific Conductance	(mS/cm)	0.680	-
Turbidity	(NTU)	4.50	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	2.80	-
TKN	(mg/L)	2.00	-
Chlorides	(mg/L)	110	-
Sulfates	(mg/L)	78	-
Alkalinity	(mg/L)	137	-
Hardness	(mg/L)	227	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	560	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	160	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	3.90	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (24.5) - 10/12/94

Parameter		Value	Excursion
Temperature	(degrees C)	13.1	-
Dissolved Oxygen	(mg/L)	7.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	30	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	460	-
Dissolved Solids	(mg/L)	436	-
Specific Conductance	(mS/cm)	0.730	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.25	-
Soluble Phosphorus	(mg/L)	0.22	-
Nitrate-N	(mg/L)	4.04	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	82	-
Sulfates	(mg/L)	67	-
Alkalinity	(mg/L)	125	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.3900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	9000	PCU(2000)
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	3600	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CUYAHOGA RIVER (24.5) - 08/01/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.0	-
Dissolved Oxygen	(mg/L)	7.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	552	-
Dissolved Solids	(mg/L)	470	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	6.50	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.21	-
Nitrate-N	(mg/L)	3.10	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	83	-
Alkalinity	(mg/L)	146	-
Hardness	(mg/L)	232	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.6200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	230	-
pH	(s.u.)	7.7	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	5.20	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

BIG CREEK (25) - 08/20/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	710	-
Dissolved Solids	(mg/L)	613	-
Specific Conductance	(mS/cm)	0.940	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.24	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	242	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	106	-
Hardness	(mg/L)	196	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2800	-
Cadmium	(mg/L)	0.0040	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	3200	PCU(2000)
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	2800	PCU(298)
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

BIG CREEK (25) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.8	-
Dissolved Oxygen	(mg/L)	7.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	15	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	622	-
Dissolved Solids	(mg/L)	594	-
Specific Conductance	(mS/cm)	1.100	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.40	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	232	-
Sulfates	(mg/L)	81	-
Alkalinity	(mg/L)	114	-
Hardness	(mg/L)	171	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	5000	PCU(2000)
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	2100	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (25) - 10/05/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.4	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	652	-
Dissolved Solids	(mg/L)	594	-
Specific Conductance	(mS/cm)	1.160	-
Turbidity	(NTU)	17.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.80	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	210	-
Sulfates	(mg/L)	87	-
Alkalinity	(mg/L)	113	-
Hardness	(mg/L)	204	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.4600	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	440	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.40	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (25) - 05/03/95

Parameter		Value	Excursion
Temperature	(degrees C)	9.5	-
Dissolved Oxygen	(mg/L)	13.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	884	-
Dissolved Solids	(mg/L)	856	-
Specific Conductance	(mS/cm)	1.510	-
Turbidity	(NTU)	2.10	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.43	-
TKN	(mg/L)	0.55	-
Chlorides	(mg/L)	302	-
Sulfates	(mg/L)	142	-
Alkalinity	(mg/L)	125	-
Hardness	(mg/L)	281	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0120	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	510	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	6.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (26) - 08/20/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	447	-
Dissolved Solids	(mg/L)	356	-
Specific Conductance	(mS/cm)	0.530	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	0.26	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	100	-
Sulfates	(mg/L)	82	-
Alkalinity	(mg/L)	96	-
Hardness	(mg/L)	180	-
Nickel	(mg/L)	0.0090	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	0.0080	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	5100	PCU(2000)
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	1400	PCU(298)
Phenolics	(mg/L)	<0.050	-

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WQIS

BIG CREEK (26) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.3	-
Dissolved Oxygen	(mg/L)	9.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	463	-
Dissolved Solids	(mg/L)	439	-
Specific Conductance	(mS/cm)	0.780	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	0.03	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	148	-
Sulfates	(mg/L)	76	-
Alkalinity	(mg/L)	112	-
Hardness	(mg/L)	166	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1800	-
pH	(s.u.)	8.3	-
E Coli	(organisms/100ml)	1000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	3.20	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

BIG CREEK (26) - 10/05/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.8	-
Dissolved Oxygen	(mg/L)	10.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	16	-
Total Solids	(mg/L)	402	-
Dissolved Solids	(mg/L)	347	-
Specific Conductance	(mS/cm)	0.690	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	0.85	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	86	-
Sulfates	(mg/L)	75	-
Alkalinity	(mg/L)	101	-
Hardness	(mg/L)	182	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5700	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	25000	PCU(2000)
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	9800	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.00	-
Cobalt	(mg/L)	<0.0010	-

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BIG CREEK (26) - 05/03/95

Parameter		Value	Excursion
Temperature	(degrees C)	8.2	-
Dissolved Oxygen	(mg/L)	15.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	515	-
Dissolved Solids	(mg/L)	412	-
Specific Conductance	(mS/cm)	1.080	-
Turbidity	(NTU)	1.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.32	-
TKN	(mg/L)	0.52	-
Chlorides	(mg/L)	182	-
Sulfates	(mg/L)	122	-
Alkalinity	(mg/L)	152	-
Hardness	(mg/L)	263	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0110	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	940	-
pH	(s.u.)	8.3	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	6.50	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (27) - 08/20/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	22	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	586	-
Dissolved Solids	(mg/L)	513	-
Specific Conductance	(mS/cm)	0.730	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	164	-
Sulfates	(mg/L)	92	-
Alkalinity	(mg/L)	135	-
Hardness	(mg/L)	224	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.3400	-
Cadmium	(mg/L)	0.0040	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	340	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	350	PCU(298)
Phenolics	(mg/L)	<0.050	-
Oil & Grease	(mg/L)	86	WHAL(10)

NEORSD

WQIS

BIG CREEK (27) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	0.6	-
Dissolved Oxygen	(mg/L)	6.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	20	-
Total Solids	(mg/L)	765	-
Dissolved Solids	(mg/L)	688	-
Specific Conductance	(mS/cm)	1.270	-
Turbidity	(NTU)	40.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	220	-
Sulfates	(mg/L)	109	-
Alkalinity	(mg/L)	162	-
Hardness	(mg/L)	234	-
Nickel	(mg/L)	0.0090	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.6000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Fecal Coliform	(organisms/100ml)	410	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	200	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.60	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

BIG CREEK (27) - 10/05/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.2	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	634	-
Dissolved Solids	(mg/L)	580	-
Specific Conductance	(mS/cm)	1.130	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.72	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	170	-
Sulfates	(mg/L)	126	-
Alkalinity	(mg/L)	133	-
Hardness	(mg/L)	243	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.4000	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	540	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	430	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.00	-
Cobalt	(mg/L)	<0.0100	-

NEORSD

WQIS

BIG CREEK (27) - 05/03/95

Parameter		Value	Excursion
Temperature	(degrees C)	10.8	-
Dissolved Oxygen	(mg/L)	15.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	879	-
Dissolved Solids	(mg/L)	843	-
Specific Conductance	(mS/cm)	1.450	-
Turbidity	(NTU)	4.50	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.09	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.55	-
TKN	(mg/L)	0.83	-
Chlorides	(mg/L)	264	-
Sulfates	(mg/L)	147	-
Alkalinity	(mg/L)	146	-
Hardness	(mg/L)	314	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.5400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	8.3	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	6.70	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (28) - 08/20/93

Parameter		Value	Excursion
Temperature	(degrees C)	17.5	-
Dissolved Oxygen	(mg/L)	9.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	460	-
Dissolved Solids	(mg/L)	388	-
Specific Conductance	(mS/cm)	0.490	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	0.08	-
TKN	(mg/L)	0.95	-
Chlorides	(mg/L)	94	-
Sulfates	(mg/L)	64	-
Alkalinity	(mg/L)	121	-
Hardness	(mg/L)	200	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.3900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	740	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	420	PCU(298)
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

BIG CREEK (28) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.8	-
Dissolved Oxygen	(mg/L)	8.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	632	-
Dissolved Solids	(mg/L)	594	-
Specific Conductance	(mS/cm)	1.080	-
Turbidity	(NTU)	11.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	212	-
Sulfates	(mg/L)	77	-
Alkalinity	(mg/L)	134	-
Hardness	(mg/L)	202	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.4300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	540	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	540	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (28) - 10/05/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	7	-
Total Solids	(mg/L)	544	-
Dissolved Solids	(mg/L)	498	-
Specific Conductance	(mS/cm)	0.980	-
Turbidity	(NTU)	13.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.95	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	146	-
Sulfates	(mg/L)	86	-
Alkalinity	(mg/L)	136	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0600	-
Iron	(mg/L)	0.5500	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	500	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	260	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

BIG CREEK (28) - 05/03/95

Parameter		Value	Excursion
Temperature	(degrees C)	12.2	-
Dissolved Oxygen	(mg/L)	15.8	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	23	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	782	-
Dissolved Solids	(mg/L)	741	-
Specific Conductance	(mS/cm)	1.290	-
Turbidity	(NTU)	6.80	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.43	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	248	-
Sulfates	(mg/L)	100	-
Alkalinity	(mg/L)	139	-
Hardness	(mg/L)	268	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.5200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	70	-
pH	(s.u.)	8.2	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.40	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (29) - 08/20/93

Parameter		Value	Excursion
Temperature	(degrees C)	17.0	-
Dissolved Oxygen	(mg/L)	9.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	433	-
Dissolved Solids	(mg/L)	381	-
Specific Conductance	(mS/cm)	0.590	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.16	-
TKN	(mg/L)	0.83	-
Chlorides	(mg/L)	100	-
Sulfates	(mg/L)	102	-
Alkalinity	(mg/L)	110	-
Hardness	(mg/L)	216	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0030	-
Cadmium	(mg/L)	0.0030	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1900	-
pH	(s.u.)	8.4	-
E Coli	(organisms/100ml)	1200	PCU(298)
Phenolics	(mg/L)	<0.050	-

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WQIS

BIG CREEK (29) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.3	-
Dissolved Oxygen	(mg/L)	9.3	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	549	-
Dissolved Solids	(mg/L)	516	-
Specific Conductance	(mS/cm)	0.850	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.40	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	154	-
Sulfates	(mg/L)	97	-
Alkalinity	(mg/L)	116	-
Hardness	(mg/L)	216	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0010	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0080	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	740	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0001	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	3.30	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (29) - 10/05/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.1	-
Dissolved Oxygen	(mg/L)	10.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	341	-
Dissolved Solids	(mg/L)	292	-
Specific Conductance	(mS/cm)	0.590	-
Turbidity	(NTU)	20.00	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.67	-
TKN	(mg/L)	0.95	-
Chlorides	(mg/L)	70	-
Sulfates	(mg/L)	68	-
Alkalinity	(mg/L)	96	-
Hardness	(mg/L)	178	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2700	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	96000	PCU(2000)
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	38000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.20	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

BIG CREEK (29) - 05/03/95

Parameter		Value	Excursion
Temperature	(degrees C)	12.2	-
Dissolved Oxygen	(mg/L)	14.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	676	-
Dissolved Solids	(mg/L)	647	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	2.20	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.52	-
Chlorides	(mg/L)	190	-
Sulfates	(mg/L)	131	-
Alkalinity	(mg/L)	104	-
Hardness	(mg/L)	270	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1600	-
pH	(s.u.)	8.5	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	3.80	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

BIG CREEK (30) - 08/20/93

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	328	-
Dissolved Solids	(mg/L)	262	-
Specific Conductance	(mS/cm)	0.420	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.29	-
Soluble Phosphorus	(mg/L)	0.27	-
Nitrate-N	(mg/L)	0.47	-
TKN	(mg/L)	0.75	-
Chlorides	(mg/L)	52	-
Sulfates	(mg/L)	46	-
Alkalinity	(mg/L)	102	-
Hardness	(mg/L)	180	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	5400	PCU(2000)
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	4800	PCU(298)
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

BIG CREEK (30) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.8	-
Dissolved Oxygen	(mg/L)	7.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	314	-
Dissolved Solids	(mg/L)	292	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.24	-
Soluble Phosphorus	(mg/L)	0.19	-
Nitrate-N	(mg/L)	0.80	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	86	-
Sulfates	(mg/L)	41	-
Alkalinity	(mg/L)	101	-
Hardness	(mg/L)	147	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	1.2000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0070	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	7200	PCU(2000)
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	2400	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	2.60	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (30) - 10/05/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.7	-
Dissolved Oxygen	(mg/L)	8.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	291	-
Dissolved Solids	(mg/L)	266	-
Specific Conductance	(mS/cm)	0.530	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	0.75	-
TKN	(mg/L)	0.68	-
Chlorides	(mg/L)	60	-
Sulfates	(mg/L)	51	-
Alkalinity	(mg/L)	97	-
Hardness	(mg/L)	151	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0600	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1200	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	600	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

BIG CREEK (30) - 05/03/95

Parameter		Value	Excursion
Temperature	(degrees C)	9.8	-
Dissolved Oxygen	(mg/L)	16.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	515	-
Dissolved Solids	(mg/L)	507	-
Specific Conductance	(mS/cm)	0.844	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.73	-
TKN	(mg/L)	0.37	-
Chlorides	(mg/L)	140	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	119	-
Hardness	(mg/L)	212	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	8.4	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (31) - 08/23/93

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	9.1	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	28	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	979	-
Dissolved Solids	(mg/L)	911	-
Specific Conductance	(mS/cm)	1.220	-
Ammonia-N	(mg/L)	2.19	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	1.37	-
TKN	(mg/L)	4.08	-
Chlorides	(mg/L)	250	-
Sulfates	(mg/L)	172	-
Alkalinity	(mg/L)	212	-
Hardness	(mg/L)	404	-
Nickel	(mg/L)	0.0090	-
Copper	(mg/L)	0.0010	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.4000	WHAL(1.0)*
Cadmium	(mg/L)	0.0030	-
Lead	(mg/L)	0.0090	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	60	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	50	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

MILL CREEK (31) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	6.2	-
BOD-5	(mg/L)	9	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	955	-
Dissolved Solids	(mg/L)	894	-
Specific Conductance	(mS/cm)	1.200	-
Turbidity	(NTU)	9.50	-
Ammonia-N	(mg/L)	1.10	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.81	-
TKN	(mg/L)	9.70	-
Chlorides	(mg/L)	270	-
Sulfates	(mg/L)	149	-
Alkalinity	(mg/L)	221	-
Hardness	(mg/L)	369	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	1.3000	WHAL(1.0)*
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	540	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	290	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	14.60	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

MILL CREEK (31) - 10/06/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.7	-
Dissolved Oxygen	(mg/L)	7.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	28	-
Suspended Solids	(mg/L)	15	-
Total Solids	(mg/L)	1037	-
Dissolved Solids	(mg/L)	955	-
Specific Conductance	(mS/cm)	1.700	-
Turbidity	(NTU)	21.00	-
Ammonia-N	(mg/L)	4.60	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	1.51	-
TKN	(mg/L)	6.00	-
Chlorides	(mg/L)	232	-
Sulfates	(mg/L)	232	-
Alkalinity	(mg/L)	241	-
Hardness	(mg/L)	458	-
Nickel	(mg/L)	0.0140	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	2.9000	WHAL(1.0)*
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	220	-
pH	(s.u.)	7.1	-
E Coli	(organisms/100ml)	100	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	19.40	-
Cobalt	(mg/L)	0.0020	-

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WQIS

MILL CREEK (31) - 05/02/95

Parameter		Value	Excursion
Temperature	(degrees C)	11.5	-
Dissolved Oxygen	(mg/L)	9.1	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	18	-
Total Solids	(mg/L)	1142	-
Dissolved Solids	(mg/L)	1095	-
Specific Conductance	(mS/cm)	1.950	-
Turbidity	(NTU)	21.00	-
Ammonia-N	(mg/L)	1.20	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.92	-
TKN	(mg/L)	3.90	-
Chlorides	(mg/L)	322	-
Sulfates	(mg/L)	233	-
Alkalinity	(mg/L)	255	-
Hardness	(mg/L)	483	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	44	-
pH	(s.u.)	7.7	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	15.30	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (32) - 08/23/93

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	5.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	564	-
Dissolved Solids	(mg/L)	522	-
Specific Conductance	(mS/cm)	0.700	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.19	-
TKN	(mg/L)	1.36	-
Chlorides	(mg/L)	118	-
Sulfates	(mg/L)	114	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	256	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0020	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	510	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	270	-
Phenolics	(mg/L)	<0.050	-

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WQIS

MILL CREEK (32) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.5	-
Dissolved Oxygen	(mg/L)	3.2	WHAL(4.0)
BOD-5	(mg/L)	6	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	1029	-
Dissolved Solids	(mg/L)	989	-
Specific Conductance	(mS/cm)	1.410	-
Turbidity	(NTU)	3.80	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.02	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	302	-
Sulfates	(mg/L)	188	-
Alkalinity	(mg/L)	219	-
Hardness	(mg/L)	368	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.5100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0070	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	250	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	190	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	11.60	-
Cobalt	(mg/L)	0.0010	-

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WQIS

MILL CREEK (32) - 10/06/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.5	-
Dissolved Oxygen	(mg/L)	4.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	848	-
Dissolved Solids	(mg/L)	768	-
Specific Conductance	(mS/cm)	1.400	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.58	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	192	-
Sulfates	(mg/L)	190	-
Alkalinity	(mg/L)	179	-
Hardness	(mg/L)	386	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1600	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	2000	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	820	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	10.10	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

MILL CREEK (32) - 05/02/95

Parameter		Value	Excursion
Temperature	(degrees C)	10.7	-
Dissolved Oxygen	(mg/L)	11.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	1157	-
Dissolved Solids	(mg/L)	1142	-
Specific Conductance	(mS/cm)	1.840	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.60	-
TKN	(mg/L)	0.85	-
Chlorides	(mg/L)	244	-
Sulfates	(mg/L)	330	-
Alkalinity	(mg/L)	214	-
Hardness	(mg/L)	514	-
Nickel	(mg/L)	0.0130	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1200	-
Iron	(mg/L)	3.4000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	18000	PCU(2000)
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	25.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

MILL CREEK (33) - 08/23/93

Parameter		Value	Excursion
Temperature	(degrees C)	17.5	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	30	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	513	-
Dissolved Solids	(mg/L)	463	-
Specific Conductance	(mS/cm)	0.700	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.09	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	<0.01	-
TKN	(mg/L)	1.98	-
Chlorides	(mg/L)	130	-
Sulfates	(mg/L)	96	-
Alkalinity	(mg/L)	116	-
Hardness	(mg/L)	212	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0020	-
Total Chromium	(mg/L)	0.0080	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3600	-
Cadmium	(mg/L)	0.0080	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	400	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	220	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

MILL CREEK (33) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.5	-
Dissolved Oxygen	(mg/L)	6.2	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	653	-
Dissolved Solids	(mg/L)	605	-
Specific Conductance	(mS/cm)	0.932	-
Turbidity	(NTU)	1.60	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.40	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	180	-
Sulfates	(mg/L)	116	-
Alkalinity	(mg/L)	143	-
Hardness	(mg/L)	252	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	660	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	680	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.30	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (33) - 10/06/94

Parameter		Value	Excursion
Temperature	(degrees C)	9.3	-
Dissolved Oxygen	(mg/L)	7.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	663	-
Dissolved Solids	(mg/L)	603	-
Specific Conductance	(mS/cm)	1.100	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	0.51	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	136	-
Sulfates	(mg/L)	173	-
Alkalinity	(mg/L)	139	-
Hardness	(mg/L)	307	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3200	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	500	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	190	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.30	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

MILL CREEK (33) - 05/02/95

Parameter		Value	Excursion
Temperature	(degrees C)	11.0	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	869	-
Dissolved Solids	(mg/L)	838	-
Specific Conductance	(mS/cm)	1.510	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.56	-
TKN	(mg/L)	0.68	-
Chlorides	(mg/L)	272	-
Sulfates	(mg/L)	160	-
Alkalinity	(mg/L)	151	-
Hardness	(mg/L)	336	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	5.80	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

MILL CREEK (33.5) - 08/23/93

Parameter		Value	Excursion
Temperature	(degrees C)	14.5	-
Dissolved Oxygen	(mg/L)	6.8	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	27	-
Suspended Solids	(mg/L)	17	-
Total Solids	(mg/L)	422	-
Dissolved Solids	(mg/L)	364	-
Specific Conductance	(mS/cm)	0.500	-
Ammonia-N	(mg/L)	1.82	-
Phosphorus	(mg/L)	0.31	-
Soluble Phosphorus	(mg/L)	0.25	-
Nitrate-N	(mg/L)	0.29	-
TKN	(mg/L)	3.43	-
Chlorides	(mg/L)	74	-
Sulfates	(mg/L)	66	-
Alkalinity	(mg/L)	146	-
Hardness	(mg/L)	192	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.8600	-
Cadmium	(mg/L)	0.0100	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	3100	PCU(298)
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

MILL CREEK (33.5) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	4.0	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	26	-
Suspended Solids	(mg/L)	13	-
Total Solids	(mg/L)	599	-
Dissolved Solids	(mg/L)	536	-
Specific Conductance	(mS/cm)	0.848	-
Turbidity	(NTU)	6.60	-
Ammonia-N	(mg/L)	2.20	-
Phosphorus	(mg/L)	0.54	-
Soluble Phosphorus	(mg/L)	0.50	-
Nitrate-N	(mg/L)	0.15	-
TKN	(mg/L)	5.80	-
Chlorides	(mg/L)	152	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	167	-
Hardness	(mg/L)	244	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.9200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	340000	PCU(2000)
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	24000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	7.90	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (33.5) - 10/06/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.1	-
Dissolved Oxygen	(mg/L)	6.4	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	561	-
Dissolved Solids	(mg/L)	522	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	3.70	-
Phosphorus	(mg/L)	0.44	-
Soluble Phosphorus	(mg/L)	0.43	-
Nitrate-N	(mg/L)	0.46	-
TKN	(mg/L)	4.00	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	101	-
Alkalinity	(mg/L)	187	-
Hardness	(mg/L)	278	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	<0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.4	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	8.00	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (33.5) - 05/02/95

Parameter		Value	Excursion
Temperature	(degrees C)	10.3	-
Dissolved Oxygen	(mg/L)	10.8	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	681	-
Dissolved Solids	(mg/L)	649	-
Specific Conductance	(mS/cm)	1.180	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.25	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.32	-
TKN	(mg/L)	0.58	-
Chlorides	(mg/L)	202	-
Sulfates	(mg/L)	108	-
Alkalinity	(mg/L)	160	-
Hardness	(mg/L)	288	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	8.1	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0050	-
Potassium	(mg/L)	6.30	-
Cobalt	(mg/L)	<0.0010	-

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MILL CREEK (34) - 08/23/93

Parameter		Value	Excursion
Temperature	(degrees C)	17.0	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	25	-
COD	(mg/L)	54	-
Suspended Solids	(mg/L)	34	-
Total Solids	(mg/L)	476	-
Dissolved Solids	(mg/L)	396	-
Specific Conductance	(mS/cm)	0.630	-
Ammonia-N	(mg/L)	3.33	-
Phosphorus	(mg/L)	0.74	-
Soluble Phosphorus	(mg/L)	0.53	-
Nitrate-N	(mg/L)	0.35	-
TKN	(mg/L)	4.91	-
Chlorides	(mg/L)	124	-
Sulfates	(mg/L)	64	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	194	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.5200	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	47000	PCU(2000)
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	36000	PCU(298)
Phenolics	(mg/L)	<0.050	-

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MILL CREEK (34) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	9	-
COD	(mg/L)	24	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	755	-
Dissolved Solids	(mg/L)	708	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	3.20	-
Ammonia-N	(mg/L)	1.20	-
Phosphorus	(mg/L)	0.26	-
Soluble Phosphorus	(mg/L)	0.26	-
Nitrate-N	(mg/L)	0.49	-
TKN	(mg/L)	2.60	-
Chlorides	(mg/L)	242	-
Sulfates	(mg/L)	71	-
Alkalinity	(mg/L)	162	-
Hardness	(mg/L)	240	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80000	PCU(2000)
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	56000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (34) - 10/06/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.0	-
Dissolved Oxygen	(mg/L)	6.1	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	677	-
Dissolved Solids	(mg/L)	616	-
Specific Conductance	(mS/cm)	1.300	-
Turbidity	(NTU)	7.00	-
Ammonia-N	(mg/L)	2.90	-
Phosphorus	(mg/L)	0.54	-
Soluble Phosphorus	(mg/L)	0.53	-
Nitrate-N	(mg/L)	0.57	-
TKN	(mg/L)	3.80	-
Chlorides	(mg/L)	186	-
Sulfates	(mg/L)	86	-
Alkalinity	(mg/L)	193	-
Hardness	(mg/L)	272	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	<0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2800	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	66000	PCU(2000)
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	31000	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.20	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (34) - 05/02/95

Parameter		Value	Excursion
Temperature	(degrees C)	10.0	-
Dissolved Oxygen	(mg/L)	14.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	663	-
Dissolved Solids	(mg/L)	644	-
Specific Conductance	(mS/cm)	1.180	-
Turbidity	(NTU)	7.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.28	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	228	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	148	-
Hardness	(mg/L)	272	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	550	-
pH	(s.u.)	8.6	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	3.20	-
Cobalt	(mg/L)	<0.0010	-

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MILL CREEK (35) - 08/23/93

Parameter		Value	Excursion
Temperature	(degrees C)	17.0	-
Dissolved Oxygen	(mg/L)	8.8	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	29	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	831	-
Dissolved Solids	(mg/L)	755	-
Specific Conductance	(mS/cm)	1.100	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	<0.01	-
TKN	(mg/L)	1.49	-
Chlorides	(mg/L)	266	-
Sulfates	(mg/L)	98	-
Alkalinity	(mg/L)	142	-
Hardness	(mg/L)	270	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0070	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2300	-
Cadmium	(mg/L)	0.0050	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	100	-
Phenolics	(mg/L)	<0.050	-

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WQIS

MILL CREEK (35) - 07/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	698	-
Dissolved Solids	(mg/L)	630	-
Specific Conductance	(mS/cm)	0.987	-
Turbidity	(NTU)	2.80	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.15	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	42	-
Sulfates	(mg/L)	72	-
Alkalinity	(mg/L)	149	-
Hardness	(mg/L)	227	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	560	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	480	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	3.80	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (35) - 10/06/94

Parameter		Value	Excursion
Temperature	(degrees C)	9.7	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	702	-
Dissolved Solids	(mg/L)	640	-
Specific Conductance	(mS/cm)	1.300	-
Turbidity	(NTU)	2.10	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.56	-
TKN	(mg/L)	0.94	-
Chlorides	(mg/L)	212	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	173	-
Hardness	(mg/L)	286	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	85	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.60	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MILL CREEK (35) - 05/02/95

Parameter		Value	Excursion
Temperature	(degrees C)	10.1	-
Dissolved Oxygen	(mg/L)	11.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	1011	-
Dissolved Solids	(mg/L)	966	-
Specific Conductance	(mS/cm)	1.750	-
Turbidity	(NTU)	42.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.02	-
TKN	(mg/L)	0.84	-
Chlorides	(mg/L)	358	-
Sulfates	(mg/L)	119	-
Alkalinity	(mg/L)	175	-
Hardness	(mg/L)	344	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.4500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	36	-
pH	(s.u.)	8.1	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	5.60	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

WEST CREEK (36) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	651	-
Dissolved Solids	(mg/L)	602	-
Specific Conductance	(mS/cm)	0.350	-
Turbidity	(NTU)	1.20	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.32	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	186	-
Sulfates	(mg/L)	110	-
Alkalinity	(mg/L)	102	-
Hardness	(mg/L)	228	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	190	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	100	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	6.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

WEST CREEK (36) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	10.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	512	-
Dissolved Solids	(mg/L)	465	-
Specific Conductance	(mS/cm)	0.320	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.94	-
Chlorides	(mg/L)	164	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	103	-
Hardness	(mg/L)	200	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	44	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	12	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.40	-
Cobalt	(mg/L)	0.0010	-

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WQIS

WEST CREEK (36) - 06/19/95

Parameter		Value	Excursion
Temperature	(degrees C)	22.3	-
Dissolved Oxygen	(mg/L)	10.2	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	850	-
Dissolved Solids	(mg/L)	750	-
Specific Conductance	(mS/cm)	1.400	-
Turbidity	(NTU)	1.70	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.50	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	254	-
Sulfates	(mg/L)	137	-
Alkalinity	(mg/L)	198	-
Hardness	(mg/L)	282	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0090	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	370	-
pH	(s.u.)	8.2	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	7.50	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

WEST CREEK (37) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	9.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	682	-
Dissolved Solids	(mg/L)	516	-
Specific Conductance	(mS/cm)	0.295	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.75	-
Chlorides	(mg/L)	140	-
Sulfates	(mg/L)	102	-
Alkalinity	(mg/L)	102	-
Hardness	(mg/L)	212	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	2900	PCU(2000)
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	1900	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.80	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

WEST CREEK (37) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	14.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	521	-
Dissolved Solids	(mg/L)	426	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	0.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.83	-
TKN	(mg/L)	0.82	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	89	-
Alkalinity	(mg/L)	99	-
Hardness	(mg/L)	199	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	16	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	12	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.70	-
Cobalt	(mg/L)	0.0010	-

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WQIS

WEST CREEK (37) - 06/19/95

Parameter		Value	Excursion
Temperature	(degrees C)	20.9	-
Dissolved Oxygen	(mg/L)	10.6	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	712	-
Dissolved Solids	(mg/L)	634	-
Specific Conductance	(mS/cm)	1.200	-
Turbidity	(NTU)	0.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	1.25	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	336	-
Sulfates	(mg/L)	141	-
Alkalinity	(mg/L)	108	-
Hardness	(mg/L)	278	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4600	PCU(2000)
pH	(s.u.)	8.4	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.40	-
Cobalt	(mg/L)	0.0010	-

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WQIS

WEST CREEK (38) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.0	-
Dissolved Oxygen	(mg/L)	9.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	634	-
Dissolved Solids	(mg/L)	574	-
Specific Conductance	(mS/cm)	0.300	-
Turbidity	(NTU)	1.40	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.27	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	158	-
Sulfates	(mg/L)	129	-
Alkalinity	(mg/L)	101	-
Hardness	(mg/L)	262	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	0.2400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	180	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	140	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.10	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

WEST CREEK (38) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	9.5	-
Dissolved Oxygen	(mg/L)	11.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	722	-
Dissolved Solids	(mg/L)	661	-
Specific Conductance	(mS/cm)	0.420	-
Turbidity	(NTU)	1.20	-
Ammonia-N	(mg/L)	0.22	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	2.26	-
TKN	(mg/L)	1.17	-
Chlorides	(mg/L)	178	-
Sulfates	(mg/L)	151	-
Alkalinity	(mg/L)	123	-
Hardness	(mg/L)	304	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	76	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	68	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

WEST CREEK (38) - 06/19/95

Parameter		Value	Excursion
Temperature	(degrees C)	20.4	-
Dissolved Oxygen	(mg/L)	8.9	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	1002	-
Dissolved Solids	(mg/L)	851	-
Specific Conductance	(mS/cm)	1.500	-
Turbidity	(NTU)	0.90	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	2.20	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	274	-
Sulfates	(mg/L)	192	-
Alkalinity	(mg/L)	150	-
Hardness	(mg/L)	363	-
Nickel	(mg/L)	0.0100	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2600	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	330	-
pH	(s.u.)	7.9	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	6.70	-
Cobalt	(mg/L)	0.0010	-

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WQIS

TINKERS CREEK (39) - 08/30/93

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	580	-
Dissolved Solids	(mg/L)	533	-
Specific Conductance	(mS/cm)	0.750	-
Turbidity	(NTU)	2.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	5.16	-
TKN	(mg/L)	1.01	-
Chlorides	(mg/L)	140	-
Sulfates	(mg/L)	90	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	248	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.2100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	8.3	-
E Coli	(organisms/100ml)	80	-
Phenolics	(mg/L)	<0.050	-

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WQIS

TINKERS CREEK (39) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	517	-
Dissolved Solids	(mg/L)	446	-
Specific Conductance	(mS/cm)	0.300	-
Turbidity	(NTU)	3.50	-
Ammonia-N	(mg/L)	0.03	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	3.90	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	124	-
Sulfates	(mg/L)	102	-
Alkalinity	(mg/L)	128	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.2900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	370	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.30	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

TINKERS CREEK (39) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.0	-
Dissolved Oxygen	(mg/L)	14.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	587	-
Dissolved Solids	(mg/L)	541	-
Specific Conductance	(mS/cm)	0.250	-
Turbidity	(NTU)	1.70	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	6.00	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	152	-
Sulfates	(mg/L)	84	-
Alkalinity	(mg/L)	139	-
Hardness	(mg/L)	234	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	95	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	85	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	7.20	-
Cobalt	(mg/L)	0.0010	-

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WQIS

TINKERS CREEK (39) - 06/15/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.3	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	33	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	700	-
Dissolved Solids	(mg/L)	687	-
Specific Conductance	(mS/cm)	1.100	-
Turbidity	(NTU)	3.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.09	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	4.39	-
TKN	(mg/L)	1.24	-
Chlorides	(mg/L)	186	-
Sulfates	(mg/L)	83	-
Alkalinity	(mg/L)	145	-
Hardness	(mg/L)	290	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.3300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	580	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0030	-

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WQIS

TINKERS CREEK (40) - 08/30/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	27	-
Suspended Solids	(mg/L)	11	-
Total Solids	(mg/L)	637	-
Dissolved Solids	(mg/L)	559	-
Specific Conductance	(mS/cm)	0.780	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	7.62	-
TKN	(mg/L)	1.61	-
Chlorides	(mg/L)	152	-
Sulfates	(mg/L)	87	-
Alkalinity	(mg/L)	140	-
Hardness	(mg/L)	246	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	0.3200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	8.4	-
E Coli	(organisms/100ml)	90	-
Phenolics	(mg/L)	<0.050	-

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WQIS

TINKERS CREEK (40) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	25	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	578	-
Dissolved Solids	(mg/L)	479	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	4.60	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	3.80	-
TKN	(mg/L)	2.20	-
Chlorides	(mg/L)	130	-
Sulfates	(mg/L)	107	-
Alkalinity	(mg/L)	131	-
Hardness	(mg/L)	211	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.3600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	29000	PCU(2000)
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	800	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	8.10	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

TINKERS CREEK (40) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	11.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	581	-
Dissolved Solids	(mg/L)	544	-
Specific Conductance	(mS/cm)	0.275	-
Turbidity	(NTU)	2.90	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.19	-
Nitrate-N	(mg/L)	4.41	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	150	-
Sulfates	(mg/L)	81	-
Alkalinity	(mg/L)	152	-
Hardness	(mg/L)	220	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.2500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	220	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	190	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	8.50	-
Cobalt	(mg/L)	0.0010	-

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WQIS

TINKERS CREEK (40) - 06/15/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.5	-
Dissolved Oxygen	(mg/L)	10.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	27	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	733	-
Dissolved Solids	(mg/L)	720	-
Specific Conductance	(mS/cm)	1.200	-
Turbidity	(NTU)	6.50	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	4.25	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	210	-
Sulfates	(mg/L)	79	-
Alkalinity	(mg/L)	146	-
Hardness	(mg/L)	306	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.4900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1900	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

TINKERS CREEK (41) - 08/30/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	6.0	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	28	-
Suspended Solids	(mg/L)	22	-
Total Solids	(mg/L)	716	-
Dissolved Solids	(mg/L)	628	-
Specific Conductance	(mS/cm)	0.880	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.30	-
Soluble Phosphorus	(mg/L)	0.26	-
Nitrate-N	(mg/L)	7.96	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	172	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	140	-
Hardness	(mg/L)	308	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.6700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	250	-
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	200	-
Phenolics	(mg/L)	<0.050	-

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WQIS

TINKERS CREEK (41) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	32	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	564	-
Dissolved Solids	(mg/L)	469	-
Specific Conductance	(mS/cm)	0.320	-
Turbidity	(NTU)	8.20	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.19	-
Nitrate-N	(mg/L)	4.10	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	103	-
Alkalinity	(mg/L)	129	-
Hardness	(mg/L)	210	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0600	-
Iron	(mg/L)	0.6900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	420	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	8.70	-
Cobalt	(mg/L)	<0.0010	-

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TINKERS CREEK (41) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	9.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	576	-
Dissolved Solids	(mg/L)	530	-
Specific Conductance	(mS/cm)	0.250	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.19	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	5.15	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	132	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	151	-
Hardness	(mg/L)	232	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.3300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	260	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	200	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	7.90	-
Cobalt	(mg/L)	0.0010	-

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WQIS

TINKERS CREEK (41) - 06/15/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.7	-
Dissolved Oxygen	(mg/L)	7.3	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	38	-
Suspended Solids	(mg/L)	19	-
Total Solids	(mg/L)	660	-
Dissolved Solids	(mg/L)	631	-
Specific Conductance	(mS/cm)	1.100	-
Turbidity	(NTU)	10.10	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.23	-
Soluble Phosphorus	(mg/L)	0.19	-
Nitrate-N	(mg/L)	4.59	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	180	-
Sulfates	(mg/L)	79	-
Alkalinity	(mg/L)	150	-
Hardness	(mg/L)	296	-
Nickel	(mg/L)	0.0090	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.7500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	300	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0010	-

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WQIS

TINKERS CREEK (42) - 08/30/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	5.6	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	22	-
Suspended Solids	(mg/L)	19	-
Total Solids	(mg/L)	634	-
Dissolved Solids	(mg/L)	574	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.30	-
Soluble Phosphorus	(mg/L)	0.26	-
Nitrate-N	(mg/L)	7.92	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	130	-
Sulfates	(mg/L)	97	-
Alkalinity	(mg/L)	162	-
Hardness	(mg/L)	272	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.7500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	120	-
pH	(s.u.)	8.3	-
E Coli	(organisms/100ml)	110	-
Phenolics	(mg/L)	<0.050	-

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WQIS

TINKERS CREEK (42) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	29	-
Suspended Solids	(mg/L)	17	-
Total Solids	(mg/L)	471	-
Dissolved Solids	(mg/L)	436	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	14.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.23	-
Soluble Phosphorus	(mg/L)	0.16	-
Nitrate-N	(mg/L)	3.40	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	101	-
Sulfates	(mg/L)	198	-
Hardness	(mg/L)	135	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.1000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4400	PCU(2000)
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	540	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.70	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

TINKERS CREEK (42) - 10/13/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.0	-
Dissolved Oxygen	(mg/L)	10.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	582	-
Dissolved Solids	(mg/L)	528	-
Specific Conductance	(mS/cm)	0.240	-
Turbidity	(NTU)	5.20	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.19	-
Soluble Phosphorus	(mg/L)	0.17	-
Nitrate-N	(mg/L)	6.70	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	146	-
Hardness	(mg/L)	246	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.4200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	140	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	100	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	6.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

TINKERS CREEK (42) - 06/15/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	29	-
Suspended Solids	(mg/L)	42	-
Total Solids	(mg/L)	617	-
Dissolved Solids	(mg/L)	545	-
Specific Conductance	(mS/cm)	0.950	-
Turbidity	(NTU)	23.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	5.49	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	128	-
Sulfates	(mg/L)	74	-
Alkalinity	(mg/L)	159	-
Hardness	(mg/L)	278	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.5000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	320	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0030	-

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WQIS

CHIPPEWA CREEK (43) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.0	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	<10	-
Total Solids	(mg/L)	637	-
Dissolved Solids	(mg/L)	632	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	0.80	-
Ammonia-N	(mg/L)	1.00	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.19	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	13	-
Sulfates	(mg/L)	164	-
Alkalinity	(mg/L)	132	-
Hardness	(mg/L)	304	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	110	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.90	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

CHIPPEWA CREEK (43) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.0	-
Dissolved Oxygen	(mg/L)	9.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	808	-
Dissolved Solids	(mg/L)	684	-
Specific Conductance	(mS/cm)	0.370	-
Turbidity	(NTU)	0.50	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.28	-
TKN	(mg/L)	0.78	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	245	-
Alkalinity	(mg/L)	166	-
Hardness	(mg/L)	420	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.5500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	44	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	32	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.70	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CHIPPEWA CREEK (43) - 06/19/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.6	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	794	-
Dissolved Solids	(mg/L)	683	-
Specific Conductance	(mS/cm)	1.100	-
Ammonia-N	(mg/L)	0.03	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.40	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	140	-
Sulfates	(mg/L)	201	-
Alkalinity	(mg/L)	163	-
Hardness	(mg/L)	372	-
Nickel	(mg/L)	0.0120	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	270	-
pH	(s.u.)	7.9	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0050	-
Potassium	(mg/L)	3.80	-
Cobalt	(mg/L)	0.0010	-

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WQIS

CHIPPEWA CREEK (43.5) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.0	-
Dissolved Oxygen	(mg/L)	10.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<10	-
Total Solids	(mg/L)	1165	-
Dissolved Solids	(mg/L)	1159	-
Specific Conductance	(mS/cm)	0.330	-
Turbidity	(NTU)	1.10	-
Ammonia-N	(mg/L)	1.00	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.28	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	118	-
Sulfates	(mg/L)	412	-
Alkalinity	(mg/L)	263	-
Hardness	(mg/L)	674	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	80	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.00	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHIPPEWA CREEK (43.5) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	8.0	-
Dissolved Oxygen	(mg/L)	13.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	1352	-
Dissolved Solids	(mg/L)	1114	-
Specific Conductance	(mS/cm)	0.440	-
Turbidity	(NTU)	0.50	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.17	-
TKN	(mg/L)	0.68	-
Chlorides	(mg/L)	138	-
Sulfates	(mg/L)	428	-
Alkalinity	(mg/L)	280	-
Hardness	(mg/L)	780	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	380	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	240	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.00	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHIPPEWA CREEK (43.5) - 06/19/95

Parameter		Value	Excursion
Temperature	(degrees C)	16.4	-
Dissolved Oxygen	(mg/L)	9.5	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	1317	-
Dissolved Solids	(mg/L)	1114	-
Specific Conductance	(mS/cm)	1.600	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.40	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	452	-
Alkalinity	(mg/L)	269	-
Hardness	(mg/L)	733	-
Nickel	(mg/L)	0.0110	-
Copper	(mg/L)	0.0400	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	64	-
pH	(s.u.)	8.5	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	3.00	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

CHIPPEWA CREEK (44) - 08/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	16.0	-
Dissolved Oxygen	(mg/L)	9.9	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	626	-
Dissolved Solids	(mg/L)	597	-
Specific Conductance	(mS/cm)	0.275	-
Turbidity	(NTU)	3.80	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.15	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	72	-
Sulfates	(mg/L)	159	-
Alkalinity	(mg/L)	188	-
Hardness	(mg/L)	350	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	120	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	120	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.00	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHIPPEWA CREEK (44) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	9.5	-
Dissolved Oxygen	(mg/L)	11.6	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	724	-
Dissolved Solids	(mg/L)	638	-
Specific Conductance	(mS/cm)	0.330	-
Turbidity	(NTU)	1.80	-
Ammonia-N	(mg/L)	0.06	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
TKN	(mg/L)	0.88	-
Chlorides	(mg/L)	70	-
Sulfates	(mg/L)	226	-
Alkalinity	(mg/L)	226	-
Hardness	(mg/L)	468	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.7300	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	64	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.00	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

CHIPPEWA CREEK (44) - 06/19/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.9	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	806	-
Dissolved Solids	(mg/L)	714	-
Specific Conductance	(mS/cm)	1.100	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	92	-
Sulfates	(mg/L)	208	-
Alkalinity	(mg/L)	241	-
Hardness	(mg/L)	444	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	210	-
pH	(s.u.)	7.7	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	2.80	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

KINGSBURY RUN (46) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.6	-
Dissolved Oxygen	(mg/L)	4.4	-
BOD-5	(mg/L)	11	-
COD	(mg/L)	22	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	601	-
Dissolved Solids	(mg/L)	536	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	20.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.16	-
Nitrate-N	(mg/L)	3.10	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	168	-
Sulfates	(mg/L)	100	-
Alkalinity	(mg/L)	156	-
Hardness	(mg/L)	266	-
Nickel	(mg/L)	0.0110	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	<0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0900	-
Iron	(mg/L)	0.7200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	970	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	780	-
Arsenic	(mg/L)	0.0070	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	9.60	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

KINGSBURY RUN (46) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	16.0	-
Dissolved Oxygen	(mg/L)	5.4	-
BOD-5	(mg/L)	21	-
COD	(mg/L)	53	-
Suspended Solids	(mg/L)	62	-
Total Solids	(mg/L)	767	-
Dissolved Solids	(mg/L)	593	-
Specific Conductance	(mS/cm)	0.250	-
Turbidity	(NTU)	8.90	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.57	-
Soluble Phosphorus	(mg/L)	0.31	-
Nitrate-N	(mg/L)	6.90	-
TKN	(mg/L)	9.10	-
Chlorides	(mg/L)	156	-
Sulfates	(mg/L)	111	-
Alkalinity	(mg/L)	164	-
Hardness	(mg/L)	294	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0300	-
Total Chromium	(mg/L)	0.0200	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1500	-
Iron	(mg/L)	2.1000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0090	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	780	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	430	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	12.70	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

KINGSBURY RUN (46) - 06/22/95

Parameter		Value	Excursion
Temperature	(degrees C)	24.6	-
Dissolved Oxygen	(mg/L)	4.0	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	768	-
Dissolved Solids	(mg/L)	649	-
Specific Conductance	(mS/cm)	1.300	-
Turbidity	(NTU)	5.40	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.34	-
Soluble Phosphorus	(mg/L)	0.27	-
Nitrate-N	(mg/L)	5.50	-
TKN	(mg/L)	2.00	-
Chlorides	(mg/L)	222	-
Sulfates	(mg/L)	127	-
Alkalinity	(mg/L)	163	-
Hardness	(mg/L)	294	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1300	-
Iron	(mg/L)	0.4800	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	430	-
pH	(s.u.)	7.5	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

KINGSBURY RUN (46-A) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	16.8	-
Dissolved Oxygen	(mg/L)	6.0	-
BOD-5	(mg/L)	10	-
COD	(mg/L)	22	-
Suspended Solids	(mg/L)	16	-
Total Solids	(mg/L)	1110	-
Dissolved Solids	(mg/L)	1050	-
Specific Conductance	(mS/cm)	1.790	-
Turbidity	(NTU)	30.00	-
Ammonia-N	(mg/L)	1.20	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.68	-
TKN	(mg/L)	2.40	-
Chlorides	(mg/L)	270	-
Sulfates	(mg/L)	181	-
Alkalinity	(mg/L)	358	-
Hardness	(mg/L)	500	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0300	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1100	-
Iron	(mg/L)	7.0000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0100	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	400	-
pH	(s.u.)	7.2	-
E Coli	(organisms/100ml)	160	-
Arsenic	(mg/L)	0.0110	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	9.20	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

KINGSBURY RUN (46-A) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	14.0	-
Dissolved Oxygen	(mg/L)	6.2	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	18	-
Total Solids	(mg/L)	935	-
Dissolved Solids	(mg/L)	870	-
Specific Conductance	(mS/cm)	0.310	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	1.50	-
Phosphorus	(mg/L)	0.25	-
Soluble Phosphorus	(mg/L)	0.20	-
Nitrate-N	(mg/L)	1.12	-
TKN	(mg/L)	2.82	-
Chlorides	(mg/L)	212	-
Sulfates	(mg/L)	131	-
Alkalinity	(mg/L)	345	-
Hardness	(mg/L)	482	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.3500	-
Hexavalent Chromium	(mg/L)	0.1200	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	2.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	560	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	300	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	11.80	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

KINGSBURY RUN (46-A) - 06/22/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.2	-
Dissolved Oxygen	(mg/L)	7.2	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	25	-
Total Solids	(mg/L)	1108	-
Dissolved Solids	(mg/L)	1001	-
Specific Conductance	(mS/cm)	1.700	-
Turbidity	(NTU)	20.10	-
Ammonia-N	(mg/L)	1.30	-
Phosphorus	(mg/L)	0.60	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	0.70	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	266	-
Sulfates	(mg/L)	170	-
Alkalinity	(mg/L)	396	-
Hardness	(mg/L)	544	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.6300	-
Hexavalent Chromium	(mg/L)	0.0300	-
Zinc	(mg/L)	0.1000	-
Iron	(mg/L)	4.3000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	0.2000	-
Fecal Coliform	(organisms/100ml)	2000	-
pH	(s.u.)	7.4	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

KINGSBURY RUN (46-B) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.7	-
Dissolved Oxygen	(mg/L)	5.6	-
BOD-5	(mg/L)	30	-
COD	(mg/L)	76	-
Suspended Solids	(mg/L)	47	-
Total Solids	(mg/L)	1045	-
Dissolved Solids	(mg/L)	962	-
Specific Conductance	(mS/cm)	1.500	-
Turbidity	(NTU)	18.00	-
Ammonia-N	(mg/L)	0.60	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	0.48	-
TKN	(mg/L)	2.60	-
Chlorides	(mg/L)	136	-
Sulfates	(mg/L)	214	-
Alkalinity	(mg/L)	394	-
Hardness	(mg/L)	582	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.3300	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1000	-
Iron	(mg/L)	2.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	390	-
pH	(s.u.)	7.1	-
E Coli	(organisms/100ml)	200	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	11.90	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

KINGSBURY RUN (46-B) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	14.0	-
Dissolved Oxygen	(mg/L)	7.0	-
BOD-5	(mg/L)	15	-
COD	(mg/L)	67	-
Suspended Solids	(mg/L)	40	-
Total Solids	(mg/L)	1015	-
Dissolved Solids	(mg/L)	910	-
Specific Conductance	(mS/cm)	0.250	-
Turbidity	(NTU)	20.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.45	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	0.51	-
TKN	(mg/L)	1.71	-
Chlorides	(mg/L)	150	-
Sulfates	(mg/L)	178	-
Alkalinity	(mg/L)	396	-
Hardness	(mg/L)	568	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	5.0000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	150	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	100	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	9.30	-
Cobalt	(mg/L)	<0.0010	-

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KINGSBURY RUN (46-B) - 06/22/95

Parameter		Value	Excursion
Temperature	(degrees C)	16.1	-
Dissolved Oxygen	(mg/L)	6.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	682	-
Dissolved Solids	(mg/L)	619	-
Specific Conductance	(mS/cm)	0.960	-
Turbidity	(NTU)	9.50	-
Ammonia-N	(mg/L)	0.05	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.70	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	86	-
Sulfates	(mg/L)	110	-
Alkalinity	(mg/L)	275	-
Hardness	(mg/L)	400	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0400	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0600	-
Iron	(mg/L)	1.6000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<10	-
pH	(s.u.)	7.3	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0010	-

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WQIS

KINGSBURY RUN (46-C) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.6	-
Dissolved Oxygen	(mg/L)	3.6	-
BOD-5	(mg/L)	140	-
COD	(mg/L)	311	-
Suspended Solids	(mg/L)	159	-
Total Solids	(mg/L)	530	-
Dissolved Solids	(mg/L)	352	-
Specific Conductance	(mS/cm)	0.770	-
Turbidity	(NTU)	130.00	-
Ammonia-N	(mg/L)	17.00	-
Phosphorus	(mg/L)	2.06	-
Soluble Phosphorus	(mg/L)	1.55	-
Nitrate-N	(mg/L)	0.01	-
TKN	(mg/L)	18.40	-
Chlorides	(mg/L)	100	-
Sulfates	(mg/L)	59	-
Alkalinity	(mg/L)	288	-
Hardness	(mg/L)	184	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0300	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0900	-
Iron	(mg/L)	0.8000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	120000	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	16000	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	6.90	-
Cobalt	(mg/L)	<0.0010	-

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KINGSBURY RUN (46-C) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	1.0	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	34	-
Total Solids	(mg/L)	827	-
Dissolved Solids	(mg/L)	725	-
Specific Conductance	(mS/cm)	0.300	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	0.06	-
Phosphorus	(mg/L)	0.18	-
Soluble Phosphorus	(mg/L)	0.17	-
Nitrate-N	(mg/L)	0.85	-
TKN	(mg/L)	0.79	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	107	-
Alkalinity	(mg/L)	386	-
Hardness	(mg/L)	204	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	14000	-
pH	(s.u.)	8.5	-
E Coli	(organisms/100ml)	8000	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

KINGSBURY RUN (46-C) - 06/22/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.9	-
Dissolved Oxygen	(mg/L)	6.3	-
BOD-5	(mg/L)	146	-
COD	(mg/L)	687	-
Suspended Solids	(mg/L)	463	-
Total Solids	(mg/L)	958	-
Dissolved Solids	(mg/L)	427	-
Specific Conductance	(mS/cm)	0.810	-
Turbidity	(NTU)	35.00	-
Ammonia-N	(mg/L)	10.10	-
Phosphorus	(mg/L)	5.46	-
Soluble Phosphorus	(mg/L)	1.05	-
Nitrate-N	(mg/L)	<0.01	-
TKN	(mg/L)	14.00	-
Chlorides	(mg/L)	94	-
Sulfates	(mg/L)	72	-
Alkalinity	(mg/L)	226	-
Hardness	(mg/L)	186	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.1600	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.3900	-
Iron	(mg/L)	6.9000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0500	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100000	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	0.0050	-

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WQIS

KINGSBURY RUN (46.1) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	16.1	-
Dissolved Oxygen	(mg/L)	7.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	148	-
Total Solids	(mg/L)	1214	-
Dissolved Solids	(mg/L)	917	-
Specific Conductance	(mS/cm)	1.860	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.60	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.90	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	276	-
Sulfates	(mg/L)	215	-
Alkalinity	(mg/L)	357	-
Hardness	(mg/L)	599	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0800	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	1.8000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1300	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	1000	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	11.00	-
Cobalt	(mg/L)	0.0010	-

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WQIS

KINGSBURY RUN (46.1) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	14.0	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	20	-
COD	(mg/L)	487	-
Suspended Solids	(mg/L)	2263	-
Total Solids	(mg/L)	3300	-
Dissolved Solids	(mg/L)	1029	-
Specific Conductance	(mS/cm)	0.360	-
Turbidity	(NTU)	320.00	-
Ammonia-N	(mg/L)	0.70	-
Phosphorus	(mg/L)	1.52	-
Soluble Phosphorus	(mg/L)	0.13	-
Nitrate-N	(mg/L)	1.65	-
TKN	(mg/L)	3.80	-
Chlorides	(mg/L)	238	-
Sulfates	(mg/L)	212	-
Alkalinity	(mg/L)	460	-
Hardness	(mg/L)	377	-
Nickel	(mg/L)	0.0300	-
Copper	(mg/L)	0.0800	-
Total Chromium	(mg/L)	0.1200	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.2100	-
Iron	(mg/L)	28.0000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0500	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	80	-
Arsenic	(mg/L)	0.0190	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	0.0080	-
Potassium	(mg/L)	13.00	-
Cobalt	(mg/L)	0.0040	-

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WQIS

KINGSBURY RUN (46.1) - 06/22/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.3	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	1215	-
Dissolved Solids	(mg/L)	1079	-
Specific Conductance	(mS/cm)	1.900	-
Turbidity	(NTU)	8.60	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	5.50	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	270	-
Sulfates	(mg/L)	218	-
Alkalinity	(mg/L)	392	-
Hardness	(mg/L)	614	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0700	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	1.2000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	7.6	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MORGANA RUN (47) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	23	-
Suspended Solids	(mg/L)	47	-
Total Solids	(mg/L)	1634	-
Dissolved Solids	(mg/L)	1557	-
Specific Conductance	(mS/cm)	0.700	-
Turbidity	(NTU)	3.80	-
Ammonia-N	(mg/L)	0.90	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.20	-
TKN	(mg/L)	2.20	-
Chlorides	(mg/L)	480	-
Sulfates	(mg/L)	151	-
Alkalinity	(mg/L)	65	-
Hardness	(mg/L)	378	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0400	-
Total Chromium	(mg/L)	0.0170	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	15000	-
pH	(s.u.)	9.7	-
E Coli	(organisms/100ml)	12000	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	21.30	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MORGANA RUN (47) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	1486	-
Dissolved Solids	(mg/L)	1324	-
Specific Conductance	(mS/cm)	0.820	-
Turbidity	(NTU)	0.90	-
Ammonia-N	(mg/L)	0.93	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.79	-
TKN	(mg/L)	2.00	-
Chlorides	(mg/L)	496	-
Sulfates	(mg/L)	145	-
Alkalinity	(mg/L)	55	-
Hardness	(mg/L)	384	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	13000	-
pH	(s.u.)	9.2	-
E Coli	(organisms/100ml)	6100	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0050	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	19.70	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MORGANA RUN (47) - 07/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	889	-
Dissolved Solids	(mg/L)	823	-
Specific Conductance	(mS/cm)	1.520	-
Turbidity	(NTU)	1.50	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.60	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	258	-
Sulfates	(mg/L)	168	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	294	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0120	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	25000	-
pH	(s.u.)	8.2	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	9.70	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

MORGANA RUN (47-A) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	28	-
Suspended Solids	(mg/L)	26	-
Total Solids	(mg/L)	536	-
Dissolved Solids	(mg/L)	482	-
Specific Conductance	(mS/cm)	0.792	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.91	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	3.90	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	138	-
Sulfates	(mg/L)	88	-
Alkalinity	(mg/L)	115	-
Hardness	(mg/L)	212	-
Nickel	(mg/L)	0.0110	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0700	-
Iron	(mg/L)	0.9300	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1400	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	1400	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	10.90	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

MORGANA RUN (47-A) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	26	-
Suspended Solids	(mg/L)	31	-
Total Solids	(mg/L)	647	-
Dissolved Solids	(mg/L)	539	-
Specific Conductance	(mS/cm)	0.440	-
Turbidity	(NTU)	9.40	-
Ammonia-N	(mg/L)	0.45	-
Phosphorus	(mg/L)	0.35	-
Soluble Phosphorus	(mg/L)	0.31	-
Nitrate-N	(mg/L)	5.13	-
TKN	(mg/L)	2.54	-
Chlorides	(mg/L)	155	-
Sulfates	(mg/L)	104	-
Alkalinity	(mg/L)	113	-
Hardness	(mg/L)	238	-
Nickel	(mg/L)	0.0200	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	1.1000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1100	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	310	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	10.70	-
Cobalt	(mg/L)	0.0020	-

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WQIS

MORGANA RUN (47-A) - 07/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	27.0	-
Dissolved Oxygen	(mg/L)	5.9	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	23	-
Suspended Solids	(mg/L)	47	-
Total Solids	(mg/L)	622	-
Dissolved Solids	(mg/L)	515	-
Specific Conductance	(mS/cm)	1.020	-
Turbidity	(NTU)	24.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.43	-
Soluble Phosphorus	(mg/L)	0.38	-
Nitrate-N	(mg/L)	3.20	-
TKN	(mg/L)	2.50	-
Chlorides	(mg/L)	154	-
Sulfates	(mg/L)	94	-
Alkalinity	(mg/L)	135	-
Hardness	(mg/L)	224	-
Nickel	(mg/L)	0.0260	-
Copper	(mg/L)	0.0140	-
Total Chromium	(mg/L)	0.0080	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.9000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	580	-
pH	(s.u.)	7.7	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	8.80	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

BURKE BROOK (48) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	35.0	-
Dissolved Oxygen	(mg/L)	6.2	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	37	-
Suspended Solids	(mg/L)	34	-
Total Solids	(mg/L)	610	-
Dissolved Solids	(mg/L)	570	-
Specific Conductance	(mS/cm)	0.410	-
Turbidity	(NTU)	13.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.44	-
Soluble Phosphorus	(mg/L)	0.19	-
Nitrate-N	(mg/L)	4.10	-
TKN	(mg/L)	2.70	-
Chlorides	(mg/L)	152	-
Sulfates	(mg/L)	92	-
Alkalinity	(mg/L)	117	-
Hardness	(mg/L)	218	-
Nickel	(mg/L)	0.0130	-
Copper	(mg/L)	0.0400	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0900	-
Iron	(mg/L)	1.3000	-
Cadmium	(mg/L)	0.0040	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	940	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	800	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	12.50	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

BURKE BROOK (48) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.6	-
Dissolved Oxygen	(mg/L)	4.2	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	881	-
Dissolved Solids	(mg/L)	773	-
Specific Conductance	(mS/cm)	1.560	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	2.62	-
Phosphorus	(mg/L)	0.09	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	3.55	-
TKN	(mg/L)	3.94	-
Chlorides	(mg/L)	248	-
Sulfates	(mg/L)	202	-
Alkalinity	(mg/L)	142	-
Hardness	(mg/L)	327	-
Nickel	(mg/L)	0.0400	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.3900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	11000	-
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	7800	-
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	23.00	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

BURKE BROOK (48) - 07/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.2	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	1164	-
Dissolved Solids	(mg/L)	1118	-
Specific Conductance	(mS/cm)	1.980	-
Turbidity	(NTU)	2.10	-
Ammonia-N	(mg/L)	3.50	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	4.50	-
Chlorides	(mg/L)	340	-
Sulfates	(mg/L)	318	-
Alkalinity	(mg/L)	138	-
Hardness	(mg/L)	404	-
Nickel	(mg/L)	0.0270	-
Copper	(mg/L)	0.0180	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0010	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4600	-
pH	(s.u.)	8.5	-
Arsenic	(mg/L)	0.0090	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	38.20	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

BURKE BROOK (48.1) - 08/26/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	7.2	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	20	-
Suspended Solids	(mg/L)	20	-
Total Solids	(mg/L)	786	-
Dissolved Solids	(mg/L)	652	-
Specific Conductance	(mS/cm)	0.370	-
Turbidity	(NTU)	2.30	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.13	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	0.64	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	210	-
Sulfates	(mg/L)	153	-
Alkalinity	(mg/L)	195	-
Hardness	(mg/L)	370	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0300	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1000	-
Iron	(mg/L)	0.3400	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	930	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	460	-
Arsenic	(mg/L)	0.0350	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	10.00	-
Cobalt	(mg/L)	0.0030	-

NEORSD

WQIS

BURKE BROOK (48.1) - 10/18/94

Parameter		Value	Excursion
Temperature	(degrees C)	15.2	-
Dissolved Oxygen	(mg/L)	10.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	1165	-
Dissolved Solids	(mg/L)	978	-
Specific Conductance	(mS/cm)	1.660	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	0.08	-
TKN	(mg/L)	1.26	-
Chlorides	(mg/L)	284	-
Sulfates	(mg/L)	198	-
Alkalinity	(mg/L)	221	-
Hardness	(mg/L)	509	-
Nickel	(mg/L)	0.0100	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2500	-
Cadmium	(mg/L)	0.0030	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	45	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	30	-
Arsenic	(mg/L)	0.0140	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	6.60	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

BURKE BROOK (48.1) - 07/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.5	-
Dissolved Oxygen	(mg/L)	7.3	-
BOD-5	(mg/L)	16	-
COD	(mg/L)	63	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	1081	-
Dissolved Solids	(mg/L)	1049	-
Specific Conductance	(mS/cm)	1.760	-
Turbidity	(NTU)	2.50	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.60	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	272	-
Sulfates	(mg/L)	196	-
Alkalinity	(mg/L)	298	-
Hardness	(mg/L)	464	-
Nickel	(mg/L)	0.0140	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2700	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	740	-
pH	(s.u.)	8.1	-
Arsenic	(mg/L)	<0.0100	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	7.10	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

ROCKY RIVER (49) - 08/19/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	586	-
Dissolved Solids	(mg/L)	483	-
Specific Conductance	(mS/cm)	0.700	-
Ammonia-N	(mg/L)	3.43	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	3.84	-
TKN	(mg/L)	4.60	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	124	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	197	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0020	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	190	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	44	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

ROCKY RIVER (49) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.9	-
Dissolved Oxygen	(mg/L)	9.3	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	44	-
Suspended Solids	(mg/L)	41	-
Total Solids	(mg/L)	509	-
Dissolved Solids	(mg/L)	417	-
Specific Conductance	(mS/cm)	0.690	-
Turbidity	(NTU)	122.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.24	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	1.80	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	94	-
Sulfates	(mg/L)	66	-
Alkalinity	(mg/L)	131	-
Hardness	(mg/L)	198	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1000	-
Iron	(mg/L)	2.5000	WHAL(1.0)*
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0090	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1600	-
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	400	PCU(298)
Arsenic	(mg/L)	0.0080	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.70	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

ROCKY RIVER (49) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.1	-
Dissolved Oxygen	(mg/L)	10.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	462	-
Dissolved Solids	(mg/L)	422	-
Specific Conductance	(mS/cm)	0.760	-
Turbidity	(NTU)	10.00	-
Ammonia-N	(mg/L)	0.03	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	4.76	-
TKN	(mg/L)	1.14	-
Chlorides	(mg/L)	104	-
Sulfates	(mg/L)	83	-
Alkalinity	(mg/L)	108	-
Hardness	(mg/L)	228	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.7000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	160	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	68	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.60	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

ROCKY RIVER (49) - 05/04/95

Parameter		Value	Excursion
Temperature	(degrees C)	14.0	-
Dissolved Oxygen	(mg/L)	11.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	7	-
Total Solids	(mg/L)	484	-
Dissolved Solids	(mg/L)	473	-
Specific Conductance	(mS/cm)	0.748	-
Turbidity	(NTU)	6.50	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	2.75	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	114	-
Sulfates	(mg/L)	90	-
Alkalinity	(mg/L)	130	-
Hardness	(mg/L)	206	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.7800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	360	-
pH	(s.u.)	8.1	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	5.10	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

ROCKY RIVER (50) - 08/19/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	7.0	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	22	-
Suspended Solids	(mg/L)	28	-
Total Solids	(mg/L)	476	-
Dissolved Solids	(mg/L)	395	-
Specific Conductance	(mS/cm)	0.580	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	3.64	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	94	-
Sulfates	(mg/L)	108	-
Alkalinity	(mg/L)	93	-
Hardness	(mg/L)	194	-
Nickel	(mg/L)	0.0090	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	1.0000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	480	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	104	-
Phenolics	(mg/L)	0.050	PWS(0.001)

NEORSD

WQIS

ROCKY RIVER (50) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.6	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	48	-
Suspended Solids	(mg/L)	66	-
Total Solids	(mg/L)	528	-
Dissolved Solids	(mg/L)	462	-
Specific Conductance	(mS/cm)	0.690	-
Turbidity	(NTU)	170.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.13	-
Nitrate-N	(mg/L)	1.70	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	102	-
Sulfates	(mg/L)	71	-
Alkalinity	(mg/L)	127	-
Hardness	(mg/L)	192	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	3.5000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1200	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	820	PCU(298)
Arsenic	(mg/L)	0.0080	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0050	WHAL(0.0049)
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.30	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

ROCKY RIVER (50) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	7.5	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	510	-
Dissolved Solids	(mg/L)	417	-
Specific Conductance	(mS/cm)	0.740	-
Turbidity	(NTU)	25.00	-
Ammonia-N	(mg/L)	0.14	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	5.05	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	122	-
Sulfates	(mg/L)	78	-
Alkalinity	(mg/L)	108	-
Hardness	(mg/L)	212	-
Nickel	(mg/L)	0.0100	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	1.4000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	84	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	60	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.40	-
Cobalt	(mg/L)	0.0020	-

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WQIS

ROCKY RIVER (50) - 05/04/95

Parameter		Value	Excursion
Temperature	(degrees C)	12.8	-
Dissolved Oxygen	(mg/L)	10.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	24	-
Total Solids	(mg/L)	493	-
Dissolved Solids	(mg/L)	460	-
Specific Conductance	(mS/cm)	0.737	-
Turbidity	(NTU)	17.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	2.61	-
TKN	(mg/L)	2.40	-
Chlorides	(mg/L)	104	-
Sulfates	(mg/L)	10	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	234	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	1.6000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	210	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	0.0020	-

NEORSD

WQIS

ROCKY RIVER (51) - 08/19/93

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	8.9	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	27	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	477	-
Dissolved Solids	(mg/L)	413	-
Specific Conductance	(mS/cm)	0.580	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.17	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	7.19	-
TKN	(mg/L)	0.96	-
Chlorides	(mg/L)	106	-
Sulfates	(mg/L)	91	-
Alkalinity	(mg/L)	103	-
Hardness	(mg/L)	200	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	240	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	180	-
Phenolics	(mg/L)	<0.050	-

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WQIS

ROCKY RIVER (51) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	17.9	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	40	-
Suspended Solids	(mg/L)	27	-
Total Solids	(mg/L)	487	-
Dissolved Solids	(mg/L)	348	-
Specific Conductance	(mS/cm)	0.630	-
Turbidity	(NTU)	110.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	2.29	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	78	-
Sulfates	(mg/L)	53	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	186	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	1.5000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	530	-
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	370	PCU(298)
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.90	-
Cobalt	(mg/L)	0.0010	-

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ROCKY RIVER (51) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.2	-
Dissolved Oxygen	(mg/L)	8.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	475	-
Dissolved Solids	(mg/L)	379	-
Specific Conductance	(mS/cm)	0.700	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.14	-
Soluble Phosphorus	(mg/L)	0.15	-
Nitrate-N	(mg/L)	8.50	-
TKN	(mg/L)	2.06	-
Chlorides	(mg/L)	90	-
Sulfates	(mg/L)	61	-
Alkalinity	(mg/L)	98	-
Hardness	(mg/L)	208	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	320	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	220	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	5.90	-
Cobalt	(mg/L)	0.0010	-

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WQIS

ROCKY RIVER (51) - 05/04/95

Parameter		Value	Excursion
Temperature	(degrees C)	11.7	-
Dissolved Oxygen	(mg/L)	12.6	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	431	-
Dissolved Solids	(mg/L)	392	-
Specific Conductance	(mS/cm)	0.645	-
Turbidity	(NTU)	3.60	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Chlorides	(mg/L)	82	-
Sulfates	(mg/L)	71	-
Alkalinity	(mg/L)	128	-
Hardness	(mg/L)	203	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.3300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	0.3000	HHSR(0.012)*
Fecal Coliform	(organisms/100ml)	760	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	3.50	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

ROCKY RIVER (52) - 08/19/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	7.0	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	16	-
Total Solids	(mg/L)	514	-
Dissolved Solids	(mg/L)	450	-
Specific Conductance	(mS/cm)	0.600	-
Ammonia-N	(mg/L)	0.60	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	2.23	-
TKN	(mg/L)	2.30	-
Chlorides	(mg/L)	78	-
Sulfates	(mg/L)	141	-
Alkalinity	(mg/L)	125	-
Hardness	(mg/L)	240	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	280	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	142	-
Phenolics	(mg/L)	<0.050	-

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WQIS

ROCKY RIVER (52) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	18.6	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	43	-
Suspended Solids	(mg/L)	48	-
Total Solids	(mg/L)	492	-
Dissolved Solids	(mg/L)	416	-
Specific Conductance	(mS/cm)	0.586	-
Turbidity	(NTU)	260.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.28	-
Soluble Phosphorus	(mg/L)	0.19	-
Nitrate-N	(mg/L)	1.40	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	68	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	179	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	4.9000	WHAL(1.0)*
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	630	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	440	PCU(298)
Arsenic	(mg/L)	0.0140	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

ROCKY RIVER (52) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	10.3	-
Dissolved Oxygen	(mg/L)	9.1	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	571	-
Dissolved Solids	(mg/L)	520	-
Specific Conductance	(mS/cm)	0.940	-
Turbidity	(NTU)	26.00	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	7.50	-
TKN	(mg/L)	1.64	-
Chlorides	(mg/L)	124	-
Sulfates	(mg/L)	142	-
Alkalinity	(mg/L)	98	-
Hardness	(mg/L)	236	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.4400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	84	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	9.40	-
Cobalt	(mg/L)	0.0010	-

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WQIS

ROCKY RIVER (52) - 05/04/95

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	10.8	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	520	-
Dissolved Solids	(mg/L)	466	-
Specific Conductance	(mS/cm)	0.750	-
Turbidity	(NTU)	2.90	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.59	-
TKN	(mg/L)	3.20	-
Chlorides	(mg/L)	72	-
Sulfates	(mg/L)	124	-
Alkalinity	(mg/L)	139	-
Hardness	(mg/L)	266	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.3400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	0.3000	PWS(0.012)* HHSR(0.012)*
Fecal Coliform	(organisms/100ml)	160	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0040	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.60	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

ROCKY RIVER (52.5) - 08/19/93

Parameter		Value	Excursion
Temperature	(degrees C)	24.5	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	15	-
Total Solids	(mg/L)	527	-
Dissolved Solids	(mg/L)	438	-
Specific Conductance	(mS/cm)	0.640	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.08	-
Nitrate-N	(mg/L)	4.30	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	90	-
Sulfates	(mg/L)	101	-
Alkalinity	(mg/L)	105	-
Hardness	(mg/L)	200	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.4000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	78	-
pH	(s.u.)	8.6	-
E Coli	(organisms/100ml)	38	-
Phenolics	(mg/L)	<0.050	-

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WQIS

ROCKY RIVER (52.5) - 08/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.5	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	65	-
Total Solids	(mg/L)	530	-
Dissolved Solids	(mg/L)	346	-
Specific Conductance	(mS/cm)	0.690	-
Turbidity	(NTU)	135.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.14	-
Nitrate-N	(mg/L)	2.40	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	100	-
Sulfates	(mg/L)	76	-
Alkalinity	(mg/L)	124	-
Hardness	(mg/L)	190	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	2.8000	WHAL(1.0)* SSH(1.0)
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	390	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	310	PCU(298)
Arsenic	(mg/L)	0.0060	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Potassium	(mg/L)	4.40	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

ROCKY RIVER (52.5) - 10/17/94

Parameter		Value	Excursion
Temperature	(degrees C)	13.2	-
Dissolved Oxygen	(mg/L)	10.5	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	542	-
Dissolved Solids	(mg/L)	482	-
Specific Conductance	(mS/cm)	0.870	-
Turbidity	(NTU)	7.00	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.17	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	7.04	-
TKN	(mg/L)	1.51	-
Chlorides	(mg/L)	126	-
Sulfates	(mg/L)	102	-
Alkalinity	(mg/L)	103	-
Hardness	(mg/L)	222	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.2200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	130	-
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	72	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	7.60	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

ROCKY RIVER (52.5) - 05/04/95

Parameter		Value	Excursion
Temperature	(degrees C)	14.5	-
Dissolved Oxygen	(mg/L)	10.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	521	-
Dissolved Solids	(mg/L)	505	-
Specific Conductance	(mS/cm)	0.750	-
Turbidity	(NTU)	2.90	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	2.71	-
TKN	(mg/L)	1.90	-
Chlorides	(mg/L)	114	-
Sulfates	(mg/L)	113	-
Alkalinity	(mg/L)	113	-
Hardness	(mg/L)	220	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.2800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	20	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	5.00	-
Cobalt	(mg/L)	0.0010	-

NEORSD

WQIS

OHIO CANAL (53) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.7	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	32	-
Suspended Solids	(mg/L)	80	-
Total Solids	(mg/L)	523	-
Dissolved Solids	(mg/L)	411	-
Specific Conductance	(mS/cm)	0.577	-
Turbidity	(NTU)	27.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.27	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	2.30	-
Chlorides	(mg/L)	106	-
Sulfates	(mg/L)	67	-
Alkalinity	(mg/L)	89	-
Hardness	(mg/L)	160	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	2.9000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0100	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	8.3	-
E Coli	(organisms/100ml)	150	-
Arsenic	(mg/L)	0.0090	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	0.0020	-

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OHIO CANAL (53) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	8	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	58	-
Total Solids	(mg/L)	509	-
Dissolved Solids	(mg/L)	405	-
Specific Conductance	(mS/cm)	0.770	-
Turbidity	(NTU)	83.00	-
Ammonia-N	(mg/L)	0.06	-
Phosphorus	(mg/L)	0.29	-
Soluble Phosphorus	(mg/L)	0.16	-
Nitrate-N	(mg/L)	3.10	-
TKN	(mg/L)	1.18	-
Chlorides	(mg/L)	100	-
Sulfates	(mg/L)	89	-
Alkalinity	(mg/L)	135	-
Hardness	(mg/L)	226	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.9000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Fecal Coliform	(organisms/100ml)	110	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	80	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	0.0010	-

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WQIS

OHIO CANAL (53) - 06/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	62	-
Total Solids	(mg/L)	531	-
Dissolved Solids	(mg/L)	442	-
Specific Conductance	(mS/cm)	0.760	-
Turbidity	(NTU)	22.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.20	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	1.90	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	109	-
Sulfates	(mg/L)	98	-
Alkalinity	(mg/L)	115	-
Hardness	(mg/L)	206	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	2.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	130	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	5.40	-
Cobalt	(mg/L)	0.0020	-

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OHIO CANAL (54) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.7	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	25	-
Suspended Solids	(mg/L)	41	-
Total Solids	(mg/L)	375	-
Dissolved Solids	(mg/L)	324	-
Specific Conductance	(mS/cm)	0.517	-
Turbidity	(NTU)	23.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.19	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	1.40	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	82	-
Sulfates	(mg/L)	56	-
Alkalinity	(mg/L)	103	-
Hardness	(mg/L)	167	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.8000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	240	-
pH	(s.u.)	8.5	-
E Coli	(organisms/100ml)	180	-
Arsenic	(mg/L)	0.0070	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.20	-
Cobalt	(mg/L)	0.0010	-

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OHIO CANAL (54) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	11.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	34	-
Total Solids	(mg/L)	518	-
Dissolved Solids	(mg/L)	448	-
Specific Conductance	(mS/cm)	0.840	-
Turbidity	(NTU)	60.00	-
Ammonia-N	(mg/L)	0.09	-
Phosphorus	(mg/L)	0.40	-
Soluble Phosphorus	(mg/L)	0.31	-
Nitrate-N	(mg/L)	4.34	-
TKN	(mg/L)	1.04	-
Chlorides	(mg/L)	110	-
Sulfates	(mg/L)	94	-
Alkalinity	(mg/L)	131	-
Hardness	(mg/L)	230	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.2000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	230	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	160	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.60	-
Cobalt	(mg/L)	0.0010	-

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WQIS

OHIO CANAL (54) - 06/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.7	-
Dissolved Oxygen	(mg/L)	11.2	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	42	-
Total Solids	(mg/L)	589	-
Dissolved Solids	(mg/L)	520	-
Specific Conductance	(mS/cm)	0.930	-
Turbidity	(NTU)	14.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	2.70	-
TKN	(mg/L)	2.10	-
Chlorides	(mg/L)	130	-
Sulfates	(mg/L)	100	-
Alkalinity	(mg/L)	147	-
Hardness	(mg/L)	247	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	1.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	250	-
pH	(s.u.)	8.4	-
Arsenic	(mg/L)	0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.10	-
Cobalt	(mg/L)	0.0020	-

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OHIO CANAL (55) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.8	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	7	-
COD	(mg/L)	31	-
Suspended Solids	(mg/L)	71	-
Total Solids	(mg/L)	436	-
Dissolved Solids	(mg/L)	328	-
Specific Conductance	(mS/cm)	0.557	-
Turbidity	(NTU)	40.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.33	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	1.00	-
TKN	(mg/L)	2.40	-
Chlorides	(mg/L)	70	-
Sulfates	(mg/L)	51	-
Alkalinity	(mg/L)	101	-
Hardness	(mg/L)	156	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	3.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0080	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	280	-
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	200	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.20	-
Cobalt	(mg/L)	0.0010	-

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WQIS

OHIO CANAL (55) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	8.3	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	26	-
Total Solids	(mg/L)	472	-
Dissolved Solids	(mg/L)	422	-
Specific Conductance	(mS/cm)	0.820	-
Turbidity	(NTU)	39.00	-
Ammonia-N	(mg/L)	0.06	-
Phosphorus	(mg/L)	0.39	-
Soluble Phosphorus	(mg/L)	0.35	-
Nitrate-N	(mg/L)	4.11	-
TKN	(mg/L)	1.06	-
Chlorides	(mg/L)	110	-
Sulfates	(mg/L)	89	-
Alkalinity	(mg/L)	126	-
Hardness	(mg/L)	241	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.9600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	60	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.80	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

OHIO CANAL (55) - 06/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.6	-
Dissolved Oxygen	(mg/L)	9.1	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	31	-
Total Solids	(mg/L)	659	-
Dissolved Solids	(mg/L)	575	-
Specific Conductance	(mS/cm)	1.100	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	0.03	-
Phosphorus	(mg/L)	0.22	-
Soluble Phosphorus	(mg/L)	0.13	-
Nitrate-N	(mg/L)	3.10	-
TKN	(mg/L)	2.60	-
Chlorides	(mg/L)	180	-
Sulfates	(mg/L)	100	-
Alkalinity	(mg/L)	150	-
Hardness	(mg/L)	264	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0060	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	1.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	270	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.60	-
Cobalt	(mg/L)	0.0010	-

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WQIS

OHIO CANAL (56) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.4	-
Dissolved Oxygen	(mg/L)	6.4	-
BOD-5	(mg/L)	5	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	30	-
Total Solids	(mg/L)	382	-
Dissolved Solids	(mg/L)	339	-
Specific Conductance	(mS/cm)	0.587	-
Turbidity	(NTU)	11.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	1.70	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	84	-
Sulfates	(mg/L)	62	-
Alkalinity	(mg/L)	109	-
Hardness	(mg/L)	168	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	1.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	760	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	660	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.30	-
Cobalt	(mg/L)	0.0010	-

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WQIS

OHIO CANAL (56) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	19	-
Total Solids	(mg/L)	1550	-
Dissolved Solids	(mg/L)	1354	-
Specific Conductance	(mS/cm)	0.780	-
Turbidity	(NTU)	16.00	-
Ammonia-N	(mg/L)	0.18	-
Phosphorus	(mg/L)	0.50	-
Soluble Phosphorus	(mg/L)	0.46	-
Nitrate-N	(mg/L)	4.44	-
TKN	(mg/L)	1.19	-
Chlorides	(mg/L)	100	-
Sulfates	(mg/L)	81	-
Alkalinity	(mg/L)	127	-
Hardness	(mg/L)	225	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.4500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	140	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	80	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	4.70	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

OHIO CANAL (56) - 06/20/95

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	29	-
Total Solids	(mg/L)	605	-
Dissolved Solids	(mg/L)	511	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	8.20	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.38	-
Soluble Phosphorus	(mg/L)	0.32	-
Nitrate-N	(mg/L)	3.30	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	138	-
Sulfates	(mg/L)	102	-
Alkalinity	(mg/L)	148	-
Hardness	(mg/L)	262	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	1.0000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	760	-
pH	(s.u.)	7.8	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	4.50	-
Cobalt	(mg/L)	0.0010	-

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WQIS

SAGAMORE CREEK (57) - 08/25/94

Parameter		Value	Excursion
Temperature	(degrees C)	19.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	444	-
Dissolved Solids	(mg/L)	413	-
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	92	-
Sulfates	(mg/L)	99	-
Alkalinity	(mg/L)	143	-
Hardness	(mg/L)	233	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	1200	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	70	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.30	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

SAGAMORE CREEK (57) - 10/24/94

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	9.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	465	-
Dissolved Solids	(mg/L)	463	-
Specific Conductance	(mS/cm)	0.800	-
Ammonia-N	(mg/L)	0.05	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	0.02	-
TKN	(mg/L)	0.56	-
Chlorides	(mg/L)	96	-
Sulfates	(mg/L)	83	-
Alkalinity	(mg/L)	154	-
Hardness	(mg/L)	260	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<5	-
pH	(s.u.)	7.3	-
E Coli	(organisms/100ml)	<5	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.30	-
Cobalt	(mg/L)	<0.0010	-

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WQIS

SAGAMORE CREEK (57) - 06/19/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.2	-
Dissolved Oxygen	(mg/L)	9.1	-
BOD-5	(mg/L)	<1	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	562	-
Dissolved Solids	(mg/L)	483	-
Specific Conductance	(mS/cm)	0.800	-
Turbidity	(NTU)	0.50	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	122	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	82.00	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	45	-
Sulfates	(mg/L)	266	-
Hardness	(mg/L)	155	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	180	-
pH	(s.u.)	7.9	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0005	-
Potassium	(mg/L)	2.50	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHAGRIN RIVER (58) - 08/08/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	18	-
Total Solids	(mg/L)	337	-
Dissolved Solids	(mg/L)	308	-
Specific Conductance	(mS/cm)	0.540	-
Turbidity	(NTU)	40.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.50	-
Nitrate-N	(mg/L)	0.51	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	56	-
Sulfates	(mg/L)	30	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	164	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.6400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	310	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	230	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.40	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHAGRIN RIVER (58) - 10/24/94

Parameter		Value	Excursion
BOD-5	(mg/L)	2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	394	-
Dissolved Solids	(mg/L)	380	-
Specific Conductance	(mS/cm)	0.580	-
Turbidity	(NTU)	3.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	0.26	-
TKN	(mg/L)	0.62	-
Chlorides	(mg/L)	64	-
Sulfates	(mg/L)	54	-
Alkalinity	(mg/L)	153	-
Hardness	(mg/L)	230	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.2600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	95	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	85	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.10	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHAGRIN RIVER (58) - 06/08/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.9	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	<1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	16	-
Total Solids	(mg/L)	374	-
Dissolved Solids	(mg/L)	354	-
Specific Conductance	(mS/cm)	0.560	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	0.50	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	68	-
Sulfates	(mg/L)	47	-
Alkalinity	(mg/L)	143	-
Hardness	(mg/L)	184	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.8000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	180	-
pH	(s.u.)	8.0	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0030	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHAGRIN RIVER (59) - 08/08/94

Parameter		Value	Excursion
Temperature	(degrees C)	1.1	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	14	-
Total Solids	(mg/L)	346	-
Dissolved Solids	(mg/L)	316	-
Specific Conductance	(mS/cm)	0.540	-
Turbidity	(NTU)	37.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.59	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	62	-
Sulfates	(mg/L)	29	-
Alkalinity	(mg/L)	125	-
Hardness	(mg/L)	158	-
Nickel	(mg/L)	0.0300	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.6400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	250	-
pH	(s.u.)	8.3	-
E Coli	(organisms/100ml)	220	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	2.30	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHAGRIN RIVER (59) - 10/24/94

Parameter		Value	Excursion
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	361	-
Dissolved Solids	(mg/L)	324	-
Specific Conductance	(mS/cm)	0.550	-
Turbidity	(NTU)	3.40	-
Ammonia-N	(mg/L)	0.01	-
Phosphorus	(mg/L)	0.09	-
Soluble Phosphorus	(mg/L)	0.09	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	68	-
Sulfates	(mg/L)	57	-
Alkalinity	(mg/L)	152	-
Hardness	(mg/L)	222	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	85	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	75	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	<0.0010	-
Beryllium	(mg/L)	<0.0010	-
Potassium	(mg/L)	3.40	-
Cobalt	(mg/L)	<0.0010	-

NEORSD

WQIS

CHAGRIN RIVER (59) - 06/08/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.5	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	387	-
Dissolved Solids	(mg/L)	350	-
Specific Conductance	(mS/cm)	0.560	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	0.61	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	72	-
Sulfates	(mg/L)	47	-
Alkalinity	(mg/L)	185	-
Hardness	(mg/L)	200	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.7100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	500	-
pH	(s.u.)	7.6	-
Arsenic	(mg/L)	<0.0050	-
Thallium	(mg/L)	<0.0070	-
Silver	(mg/L)	0.0020	-
Beryllium	(mg/L)	<0.0005	-
Cobalt	(mg/L)	<0.0010	-

APPENDIX C
LAKE ERIE CHEMICAL AND BACTERIOLOGICAL DATA, 1993-1995

DATA TABLE KEY

Individual data are presented by sampling date as month/day/year. The sampled water body, with the NEORSD-assigned sample site number and /or letter in parentheses, also appears in the heading. For Lake Erie, data presented are from analyses of surface grab samples, except A-1, B-1, and C-1, which were from analyses of grab samples collected from two feet above the lake bottom.

All chemical and bacteriological parameters analyzed in the sample are listed in the first column, followed by analytical units in parentheses. When a measured value exceeds a State of Ohio water quality criterion, the applicable water use designation, with the exceeded numerical criterion in parentheses, appears in the "Excursion" column. An asterisk appears when no maximum criterion is applicable and the single value only exceeds an average criterion (therefore not necessarily representing an excursion from water quality standards).

Applicable Ohio EPA Water Use Designations

ASW	=	Agricultural Water Supply
BW	=	Bathing Waters Recreational Use
EWH	=	Exceptional Warmwater Habitat Aquatic Life Use
HHSR	=	Human Health (Single-Route Exposure)
LRW	=	Limited Resource Water
PCU	=	Primary Contact Recreational Use
PWS	=	Pubic Water Supply
SCU	=	Secondary Contact Recreational Use
SSH	=	Seasonal Salmonid Habitat Aquatic Life Use
WHAL	=	Warmwater Habitat Aquatic Life Use

Other Acronyms and Abbreviations

BOD-5	=	Biochemical Oxygen Demand (5-day test)
COD	=	Chemical Oxygen Demand
E coli	=	Escherichia coli
N	=	Nitrogen
TKN	=	Total Kjeldahl Nitrogen
mg/L	=	milligrams per liter
mS/cm	=	millisiemens per centimeter
ug/L	=	micrograms per liter

s.u.	=	standard units
NTU	=	Nephelometric Turbidity Units

Lake Erie samples were collected from boatside by direct immersion of the sample bottle below the water surface. Samples collected from near the lake bottom were obtained using Kemmerer-type Vertical Sampling Bottle.

Closed and labeled plastic containers were used to transport samples, on ice for preservation, to NEORSD Analytical Services. All bottles used to transport samples for bacteriological analysis had been sterilized prior to sampling.

At all Lake Erie sites, field measurements for water temperature and dissolved oxygen concentrations were obtained at the time of sampling using a calibrated YSI Model 51B Oxygen Meter or a Horiba U-10 Water Quality Checker. In 1993, specific conductance was measured in-field at all sites using a Beckman Industrial Model RC 16D Conductivity Bridge. In 1994 and 1995, specific conductance, turbidity and pH were measured at the time of sampling at all sites using the Horiba U-10 Water Quality Checker. Water transparency was measured at each Lake Erie site using a Secchi disk.

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WQIS

LAKE ERIE (A) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	10.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	192	-
Dissolved Solids	(mg/L)	164	-
Specific Conductance	(mS/cm)	0.250	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.10	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	26	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	119	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.2	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	12.00	-

NEORSD

WQIS

LAKE ERIE (A) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	10.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	160	-
Dissolved Solids	(mg/L)	150	-
Specific Conductance	(mS/cm)	0.195	-
Turbidity	(NTU)	2.50	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	140	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.5	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (A) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.7	-
Dissolved Oxygen	(mg/L)	8.3	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	166	-
Dissolved Solids	(mg/L)	161	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.71	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.2	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	8.00	-

NEORSD

WQIS

LAKE ERIE (A) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.4	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	27	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	151	-
Dissolved Solids	(mg/L)	131	-
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	<0.01	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	15	-
Sulfates	(mg/L)	15	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	106	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0200	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<2	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	<2	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	9.00	-

NEORSD

WQIS

LAKE ERIE (A) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.4	-
Dissolved Oxygen	(mg/L)	9.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	192	-
Dissolved Solids	(mg/L)	184	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.97	-
TKN	(mg/L)	0.49	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	25	-
Alkalinity	(mg/L)	84	-
Hardness	(mg/L)	125	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.2	-
Silver	(mg/L)	0.0020	-
Transparency	(ft.)	>14.00	-

NEORSD

WQIS

LAKE ERIE (A) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	144	-
Dissolved Solids	(mg/L)	138	-
Specific Conductance	(mS/cm)	0.240	-
Turbidity	(NTU)	0.70	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	15	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	112	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0110	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<2	-
pH	(s.u.)	7.3	-
Transparency	(ft.)	14.00	-

NEORSD

WQIS

LAKE ERIE (A-1) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	6.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	236	-
Dissolved Solids	(mg/L)	166	-
Specific Conductance	(mS/cm)	0.240	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.08	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	28	-
Alkalinity	(mg/L)	85	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

LAKE ERIE (A-1) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	26	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	158	-
Dissolved Solids	(mg/L)	151	-
Specific Conductance	(mS/cm)	0.190	-
Turbidity	(NTU)	2.40	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	16	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	136	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.4	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

LAKE ERIE (A-1) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.4	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	173	-
Dissolved Solids	(mg/L)	160	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	6.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	114	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.1	-
Silver	(mg/L)	<0.0010	-

NEORSD

WQIS

LAKE ERIE (A-1) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.4	-
Dissolved Oxygen	(mg/L)	9.7	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	33	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	158	-
Dissolved Solids	(mg/L)	133	-
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.06	-
TKN	(mg/L)	0.65	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	108	-
Nickel	(mg/L)	<0.0020	-
Copper	(mg/L)	0.0110	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.1	-
Silver	(mg/L)	<0.0010	-

NEORSD

WQIS

LAKE ERIE (A-1) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.7	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	15	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	188	-
Dissolved Solids	(mg/L)	172	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	4.40	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.89	-
TKN	(mg/L)	0.54	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	116	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.1	-
Silver	(mg/L)	0.0040	EWH(0.0021)

NEORSD

WQIS

LAKE ERIE (A-1) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.0	-
Dissolved Oxygen	(mg/L)	6.9	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	148	-
Dissolved Solids	(mg/L)	131	-
Specific Conductance	(mS/cm)	0.240	-
Turbidity	(NTU)	0.88	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	52	-
Sulfates	(mg/L)	15	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	119	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.5	-
Transparency	(ft.)	14.00	-

NEORSD

WQIS

LAKE ERIE (B) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	217	-
Dissolved Solids	(mg/L)	146	-
Specific Conductance	(mS/cm)	0.235	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.12	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	23	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	124	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0020	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.4	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	8.00	-

NEORSD

WQIS

LAKE ERIE (B) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	10.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	170	-
Dissolved Solids	(mg/L)	152	-
Specific Conductance	(mS/cm)	0.195	-
Turbidity	(NTU)	2.70	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	142	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.8	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (B) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.7	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	160	-
Dissolved Solids	(mg/L)	152	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.15	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	10	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	115	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.2	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	11.00	-

NEORSD

WQIS

LAKE ERIE (B) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.4	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	30	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	158	-
Dissolved Solids	(mg/L)	126	-
Specific Conductance	(mS/cm)	0.230	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.07	-
TKN	(mg/L)	0.37	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	24	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	108	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<5	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	<5	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	11.00	-

NEORSD

WQIS

LAKE ERIE (B) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.4	-
Dissolved Oxygen	(mg/L)	9.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	15	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	208	-
Dissolved Solids	(mg/L)	179	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	0.60	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	1.01	-
TKN	(mg/L)	0.46	-
Chlorides	(mg/L)	17	-
Sulfates	(mg/L)	23	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.3	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	> 14.00	-

NEORSD

WQIS

LAKE ERIE (B) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.0	-
Dissolved Oxygen	(mg/L)	7.9	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	172	-
Dissolved Solids	(mg/L)	169	-
Specific Conductance	(mS/cm)	0.240	-
Turbidity	(NTU)	0.74	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	16	-
Alkalinity	(mg/L)	89	-
Hardness	(mg/L)	114	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.1000	-
Iron	(mg/L)	0.2400	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<2	-
pH	(s.u.)	7.9	-
Transparency	(ft.)	14.00	-

NEORSD

WQIS

LAKE ERIE (B-1) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	229	-
Dissolved Solids	(mg/L)	209	-
Specific Conductance	(mS/cm)	0.225	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.13	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	25	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	116	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0020	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.9	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

LAKE ERIE (B-1) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	10.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	180	-
Dissolved Solids	(mg/L)	108	-
Specific Conductance	(mS/cm)	0.190	-
Turbidity	(NTU)	3.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	118	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1500	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.4	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

LAKE ERIE (B-1) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.4	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	179	-
Dissolved Solids	(mg/L)	152	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.17	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	19	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	112	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.3	-
Silver	(mg/L)	<0.0010	-

NEORSD

WQIS

LAKE ERIE (B-1) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.4	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	32	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	151	-
Dissolved Solids	(mg/L)	130	-
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.09	-
TKN	(mg/L)	0.69	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	14	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	108	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	<0.0010	-

NEORSD

WQIS

LAKE ERIE (B-1) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.6	-
Dissolved Oxygen	(mg/L)	7.7	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	173	-
Dissolved Solids	(mg/L)	157	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.81	-
TKN	(mg/L)	0.54	-
Chlorides	(mg/L)	12	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	84	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.8	-
Silver	(mg/L)	<0.0010	-

NEORSD

WQIS

LAKE ERIE (B-1) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	5.6	EWH(6.0)
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	157	-
Dissolved Solids	(mg/L)	156	-
Specific Conductance	(mS/cm)	0.246	-
Turbidity	(NTU)	0.68	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	30	-
Sulfates	(mg/L)	15	-
Alkalinity	(mg/L)	95	-
Hardness	(mg/L)	115	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.6	-
Transparency	(ft.)	14.00	-

NEORSD

WQIS

LAKE ERIE (C) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.5	-
Dissolved Oxygen	(mg/L)	9.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	200	-
Dissolved Solids	(mg/L)	145	-
Specific Conductance	(mS/cm)	0.225	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.21	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	28	-
Alkalinity	(mg/L)	83	-
Hardness	(mg/L)	104	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	0.3000	PWS(0.012)* HHSR(0.012)*
pH	(s.u.)	8.3	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	15.00	-

NEORSD

WQIS

LAKE ERIE (C) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	11.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	22	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	201	-
Dissolved Solids	(mg/L)	152	-
Specific Conductance	(mS/cm)	0.195	-
Turbidity	(NTU)	2.80	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.07	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	141	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.1	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	4.50	-

NEORSD

WQIS

LAKE ERIE (C) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	166	-
Dissolved Solids	(mg/L)	155	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.14	-
TKN	(mg/L)	0.76	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	16	-
Alkalinity	(mg/L)	94	-
Hardness	(mg/L)	108	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<4	-
pH	(s.u.)	8.3	-
E Coli	(organisms/100ml)	<4	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	12.00	-

NEORSD

WQIS

LAKE ERIE (C) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.1	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	54	-
Suspended Solids	(mg/L)	25	-
Total Solids	(mg/L)	1282	-
Dissolved Solids	(mg/L)	1065	PWS(750)
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	0.02	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.08	-
TKN	(mg/L)	0.63	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	12	-
Alkalinity	(mg/L)	930	-
Hardness	(mg/L)	29	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0400	EWH(0.0051)
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0100	-
Lead	(mg/L)	0.0080	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	12.00	-

NEORSD

WQIS

LAKE ERIE (C) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	18.5	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	187	-
Dissolved Solids	(mg/L)	159	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	0.30	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.63	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	164	-
Hardness	(mg/L)	152	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<4	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	>14.00	-

NEORSD

WQIS

LAKE ERIE (C) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.0	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	173	-
Dissolved Solids	(mg/L)	144	-
Specific Conductance	(mS/cm)	0.249	-
Turbidity	(NTU)	0.40	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	80	-
Hardness	(mg/L)	116	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.5	-
Transparency	(ft.)	14.00	-

NEORSD

WQIS

LAKE ERIE (C-1) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	8.8	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	210	-
Dissolved Solids	(mg/L)	149	-
Specific Conductance	(mS/cm)	0.220	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.17	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	112	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.3	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

LAKE ERIE (C-1) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	9.8	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	18	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	176	-
Dissolved Solids	(mg/L)	147	-
Specific Conductance	(mS/cm)	0.185	-
Turbidity	(NTU)	2.70	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.06	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	21	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	116	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.6	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

LAKE ERIE (C-1) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	157	-
Dissolved Solids	(mg/L)	150	-
Specific Conductance	(mS/cm)	0.270	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.14	-
TKN	(mg/L)	0.75	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	13	-
Alkalinity	(mg/L)	99	-
Hardness	(mg/L)	100	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.3	-
Silver	(mg/L)	<0.0010	-

NEORSD

WQIS

LAKE ERIE (C-1) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.2	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	21	-
Suspended Solids	(mg/L)	15	-
Total Solids	(mg/L)	1135	-
Dissolved Solids	(mg/L)	1010	PWS(750)
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.11	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	16	-
Alkalinity	(mg/L)	868	-
Hardness	(mg/L)	18	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0100	EWH(0.0031)
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-

NEORSD

WQIS

LAKE ERIE (C-1) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	15.7	-
Dissolved Oxygen	(mg/L)	6.7	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	190	-
Dissolved Solids	(mg/L)	156	-
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	0.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	14	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	170	-
Hardness	(mg/L)	178	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.8	-
Silver	(mg/L)	0.0010	-

NEORSD

WQIS

LAKE ERIE (C-1) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	17.5	-
Dissolved Oxygen	(mg/L)	1.5	EWH(6.0)
BOD-5	(mg/L)	<2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	156	-
Dissolved Solids	(mg/L)	144	-
Specific Conductance	(mS/cm)	0.252	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	118	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.3	-
Silver	(mg/L)	0.0120	EWH(0.0021)
Transparency	(ft.)	14.00	-

NEORSD

WQIS

LAKE ERIE (D) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	23.5	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	15	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	249	-
Dissolved Solids	(mg/L)	190	-
Specific Conductance	(mS/cm)	0.265	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.75	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	28	-
Sulfates	(mg/L)	40	-
Alkalinity	(mg/L)	89	-
Hardness	(mg/L)	118	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0020	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	8.50	-

NEORSD

WQIS

LAKE ERIE (D) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	10.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	184	-
Dissolved Solids	(mg/L)	175	-
Specific Conductance	(mS/cm)	0.200	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.23	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	30	-
Sulfates	(mg/L)	24	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	116	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.5	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	12.00	-

NEORSD

WQIS

LAKE ERIE (D) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.6	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	193	-
Dissolved Solids	(mg/L)	187	-
Specific Conductance	(mS/cm)	0.310	-
Turbidity	(NTU)	11.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.37	-
TKN	(mg/L)	0.76	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	21	-
Alkalinity	(mg/L)	92	-
Hardness	(mg/L)	118	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.0	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	4.00	-

NEORSD

WQIS

LAKE ERIE (D) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.7	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	36	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	169	-
Dissolved Solids	(mg/L)	157	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.61	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	110	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	10	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	4	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	9.00	-

NEORSD

WQIS

LAKE ERIE (D) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	21.3	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	236	-
Dissolved Solids	(mg/L)	224	-
Specific Conductance	(mS/cm)	0.330	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	1.05	-
TKN	(mg/L)	0.68	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	34	-
Alkalinity	(mg/L)	92	-
Hardness	(mg/L)	128	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.1	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	3.50	-

NEORSD

WQIS

LAKE ERIE (D) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	6.3	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	193	-
Dissolved Solids	(mg/L)	170	-
Specific Conductance	(mS/cm)	0.275	-
Turbidity	(NTU)	2.20	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	49	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	135	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	<0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0800	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	8	-
pH	(s.u.)	7.7	-
Silver	(mg/L)	<0.0100	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (E) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	13	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	208	-
Dissolved Solids	(mg/L)	152	-
Specific Conductance	(mS/cm)	0.265	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.52	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	31	-
Alkalinity	(mg/L)	81	-
Hardness	(mg/L)	120	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	6	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	8	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (E) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	10.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	251	-
Dissolved Solids	(mg/L)	165	-
Specific Conductance	(mS/cm)	0.205	-
Turbidity	(NTU)	2.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.24	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	24	-
Alkalinity	(mg/L)	91	-
Hardness	(mg/L)	116	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4	-
pH	(s.u.)	8.3	-
E Coli	(organisms/100ml)	4	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	9.00	-

NEORSD

WQIS

LAKE ERIE (E) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.9	-
Dissolved Oxygen	(mg/L)	7.1	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	199	-
Dissolved Solids	(mg/L)	152	-
Specific Conductance	(mS/cm)	0.330	-
Turbidity	(NTU)	15.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.36	-
TKN	(mg/L)	2.20	-
Chlorides	(mg/L)	32	-
Sulfates	(mg/L)	15	-
Alkalinity	(mg/L)	97	-
Hardness	(mg/L)	118	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0010	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	20	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	16	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	3.00	-

NEORSD

WQIS

LAKE ERIE (E) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.2	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	36	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	186	-
Dissolved Solids	(mg/L)	141	-
Specific Conductance	(mS/cm)	0.030	-
Turbidity	(NTU)	8.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.55	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	19	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	111	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.2900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.6	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	4.50	-

NEORSD

WQIS

LAKE ERIE (E) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	20.6	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	195	-
Dissolved Solids	(mg/L)	186	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	2.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.81	-
TKN	(mg/L)	0.45	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	28	-
Alkalinity	(mg/L)	180	-
Hardness	(mg/L)	144	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	5	-
pH	(s.u.)	8.1	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (E) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	232	-
Dissolved Solids	(mg/L)	190	-
Specific Conductance	(mS/cm)	0.266	-
Turbidity	(NTU)	1.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	18	-
Alkalinity	(mg/L)	75	-
Hardness	(mg/L)	121	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0110	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.0	-
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (F) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	8.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	180	-
Dissolved Solids	(mg/L)	163	-
Specific Conductance	(mS/cm)	0.270	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.54	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	25	-
Alkalinity	(mg/L)	82	-
Hardness	(mg/L)	118	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	2	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	8.50	-

NEORSD

WQIS

LAKE ERIE (F) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	13.0	-
Dissolved Oxygen	(mg/L)	10.2	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	19	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	252	-
Dissolved Solids	(mg/L)	180	-
Specific Conductance	(mS/cm)	0.250	-
Turbidity	(NTU)	2.20	-
Ammonia-N	(mg/L)	0.60	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	0.16	-
TKN	(mg/L)	2.10	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	27	-
Alkalinity	(mg/L)	94	-
Hardness	(mg/L)	132	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Fecal Coliform	(organisms/100ml)	10000	BW(400)
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	6600	BW(235)
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	4.00	-

NEORSD

WQIS

LAKE ERIE (F) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.3	-
Dissolved Oxygen	(mg/L)	7.9	-
BOD-5	(mg/L)	6	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	291	-
Dissolved Solids	(mg/L)	249	-
Specific Conductance	(mS/cm)	0.550	-
Turbidity	(NTU)	24.00	-
Ammonia-N	(mg/L)	1.50	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	2.30	-
Chlorides	(mg/L)	56	-
Sulfates	(mg/L)	23	-
Alkalinity	(mg/L)	99	-
Hardness	(mg/L)	140	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.3000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	200	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	180	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	3.00	-

NEORSD

WQIS

LAKE ERIE (F) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	35	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	177	-
Dissolved Solids	(mg/L)	157	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	9.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.61	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	19	-
Alkalinity	(mg/L)	91	-
Hardness	(mg/L)	114	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0130	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.1400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.7	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	4.50	-

NEORSD

WQIS

LAKE ERIE (F) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.9	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	205	-
Dissolved Solids	(mg/L)	181	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	1.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.12	-
Soluble Phosphorus	(mg/L)	0.11	-
Nitrate-N	(mg/L)	0.83	-
TKN	(mg/L)	0.37	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	25	-
Alkalinity	(mg/L)	162	-
Hardness	(mg/L)	136	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	8	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0040	EWH(0.0027)
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (F) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	197	-
Dissolved Solids	(mg/L)	178	-
Specific Conductance	(mS/cm)	0.257	-
Turbidity	(NTU)	1.30	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	94	-
Hardness	(mg/L)	114	-
Nickel	(mg/L)	0.0070	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0600	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.2	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (G) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	4	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	294	-
Dissolved Solids	(mg/L)	274	-
Specific Conductance	(mS/cm)	0.400	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	2.09	-
TKN	(mg/L)	1.40	-
Chlorides	(mg/L)	48	-
Sulfates	(mg/L)	38	-
Alkalinity	(mg/L)	93	-
Hardness	(mg/L)	142	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	36	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	4	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	3.50	-

NEORSD

WQIS

LAKE ERIE (G) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	12	-
Suspended Solids	(mg/L)	8	-
Total Solids	(mg/L)	275	-
Dissolved Solids	(mg/L)	234	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	5.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	1.02	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	40	-
Sulfates	(mg/L)	37	-
Alkalinity	(mg/L)	92	-
Hardness	(mg/L)	142	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.3700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	80	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	68	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	2.00	-

NEORSD

WQIS

LAKE ERIE (G) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.3	-
Dissolved Oxygen	(mg/L)	6.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	252	-
Dissolved Solids	(mg/L)	177	-
Specific Conductance	(mS/cm)	0.370	-
Turbidity	(NTU)	17.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.57	-
TKN	(mg/L)	1.20	-
Chlorides	(mg/L)	44	-
Sulfates	(mg/L)	21	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	116	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.6	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	3.00	-

NEORSD

WQIS

LAKE ERIE (G) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.5	-
Dissolved Oxygen	(mg/L)	6.3	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	38	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	296	-
Dissolved Solids	(mg/L)	281	-
Specific Conductance	(mS/cm)	0.540	-
Turbidity	(NTU)	17.00	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.06	-
Soluble Phosphorus	(mg/L)	0.05	-
Nitrate-N	(mg/L)	2.60	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	70	-
Sulfates	(mg/L)	30	-
Alkalinity	(mg/L)	95	-
Hardness	(mg/L)	149	-
Nickel	(mg/L)	0.0110	-
Copper	(mg/L)	0.0180	-
Total Chromium	(mg/L)	0.0080	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	34	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	28	-
Silver	(mg/L)	0.0050	EWH(0.0032)
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	3.00	-

NEORSD

WQIS

LAKE ERIE (G) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.9	-
Dissolved Oxygen	(mg/L)	8.7	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	213	-
Dissolved Solids	(mg/L)	204	-
Specific Conductance	(mS/cm)	0.320	-
Turbidity	(NTU)	2.60	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.93	-
TKN	(mg/L)	0.57	-
Chlorides	(mg/L)	28	-
Sulfates	(mg/L)	28	-
Alkalinity	(mg/L)	170	-
Hardness	(mg/L)	132	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0070	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0060	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	40	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0020	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (G) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	7.5	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	6	-
Total Solids	(mg/L)	245	-
Dissolved Solids	(mg/L)	227	-
Specific Conductance	(mS/cm)	0.380	-
Turbidity	(NTU)	3.20	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.70	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	44	-
Sulfates	(mg/L)	33	-
Alkalinity	(mg/L)	100	-
Hardness	(mg/L)	141	-
Nickel	(mg/L)	0.0100	-
Copper	(mg/L)	0.0130	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.1800	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	6	-
pH	(s.u.)	8.1	-
Transparency	(ft.)	3.00	-

NEORSD

WQIS

LAKE ERIE (H) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	25.0	-
Dissolved Oxygen	(mg/L)	2.8	EWH(6.0)
BOD-5	(mg/L)	3	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	553	-
Dissolved Solids	(mg/L)	490	-
Specific Conductance	(mS/cm)	0.800	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.13	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	6.82	-
TKN	(mg/L)	2.30	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	83	-
Alkalinity	(mg/L)	119	-
Hardness	(mg/L)	210	-
Nickel	(mg/L)	0.0160	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0700	-
Iron	(mg/L)	0.5300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	44	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	1.50	-

NEORSD

WQIS

LAKE ERIE (H) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	13.5	-
Dissolved Oxygen	(mg/L)	6.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	36	-
Suspended Solids	(mg/L)	29	-
Total Solids	(mg/L)	527	-
Dissolved Solids	(mg/L)	464	-
Specific Conductance	(mS/cm)	0.550	-
Turbidity	(NTU)	17.00	-
Ammonia-N	(mg/L)	0.40	-
Phosphorus	(mg/L)	0.76	-
Soluble Phosphorus	(mg/L)	0.12	-
Nitrate-N	(mg/L)	3.46	-
TKN	(mg/L)	2.50	-
Chlorides	(mg/L)	120	-
Sulfates	(mg/L)	85	-
Alkalinity	(mg/L)	97	-
Hardness	(mg/L)	186	-
Nickel	(mg/L)	0.0130	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0050	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	1.1000	EWH(1.0)*
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	36	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	32	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (H) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.4	-
Dissolved Oxygen	(mg/L)	5.9	EWH(6.0)
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	10	-
Total Solids	(mg/L)	268	-
Dissolved Solids	(mg/L)	220	-
Specific Conductance	(mS/cm)	0.450	-
Turbidity	(NTU)	28.00	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.07	-
Soluble Phosphorus	(mg/L)	0.06	-
Nitrate-N	(mg/L)	0.79	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	52	-
Sulfates	(mg/L)	30	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	128	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.5700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	100	-
pH	(s.u.)	7.6	-
E Coli	(organisms/100ml)	56	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	2.00	-

NEORSD

WQIS

LAKE ERIE (H) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	23.6	-
Dissolved Oxygen	(mg/L)	4.2	EWH(6.0)
BOD-5	(mg/L)	<2	-
COD	(mg/L)	49	-
Suspended Solids	(mg/L)	13	-
Total Solids	(mg/L)	594	-
Dissolved Solids	(mg/L)	521	-
Specific Conductance	(mS/cm)	1.000	-
Turbidity	(NTU)	33.00	-
Ammonia-N	(mg/L)	0.50	-
Phosphorus	(mg/L)	0.19	-
Soluble Phosphorus	(mg/L)	0.16	-
Nitrate-N	(mg/L)	5.21	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	152	-
Sulfates	(mg/L)	68	-
Alkalinity	(mg/L)	122	-
Hardness	(mg/L)	230	-
Nickel	(mg/L)	0.0120	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.2	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	1.50	-

NEORSD

WQIS

LAKE ERIE (H) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	22.1	-
Dissolved Oxygen	(mg/L)	2.6	EWH(6.0)
BOD-5	(mg/L)	<2	-
COD	(mg/L)	27	-
Suspended Solids	(mg/L)	22	-
Total Solids	(mg/L)	499	-
Dissolved Solids	(mg/L)	472	-
Specific Conductance	(mS/cm)	0.790	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	0.60	-
Phosphorus	(mg/L)	0.21	-
Soluble Phosphorus	(mg/L)	0.18	-
Nitrate-N	(mg/L)	3.63	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	134	-
Sulfates	(mg/L)	80	-
Alkalinity	(mg/L)	244	-
Hardness	(mg/L)	206	-
Nickel	(mg/L)	0.0140	-
Copper	(mg/L)	0.0800	EWH(0.0367)
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0600	-
Iron	(mg/L)	1.0000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	170	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	1.00	-

NEORSD

WQIS

LAKE ERIE (H) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	27.0	-
Dissolved Oxygen	(mg/L)	2.4	EWH(6.0)
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	9	-
Total Solids	(mg/L)	198	-
Dissolved Solids	(mg/L)	184	-
Specific Conductance	(mS/cm)	0.597	-
Turbidity	(NTU)	6.20	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.08	-
Soluble Phosphorus	(mg/L)	0.07	-
Nitrate-N	(mg/L)	2.00	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	84	-
Sulfates	(mg/L)	59	-
Alkalinity	(mg/L)	107	-
Hardness	(mg/L)	174	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0040	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.3000	EWH(0.1865)
Iron	(mg/L)	0.5000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	6	-
pH	(s.u.)	8.5	-
Transparency	(ft.)	1.50	-

NEORSD

WQIS

LAKE ERIE (I) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	8.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	206	-
Dissolved Solids	(mg/L)	169	-
Specific Conductance	(mS/cm)	0.245	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.33	-
TKN	(mg/L)	2.40	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	84	-
Hardness	(mg/L)	128	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0030	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.2	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	6.50	-

NEORSD

WQIS

LAKE ERIE (I) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	9.8	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	26	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	261	-
Dissolved Solids	(mg/L)	180	-
Specific Conductance	(mS/cm)	0.220	-
Turbidity	(NTU)	1.80	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.66	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	30	-
Sulfates	(mg/L)	30	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	120	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	28	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	24	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (I) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.1	-
Dissolved Oxygen	(mg/L)	7.3	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	179	-
Dissolved Solids	(mg/L)	135	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	7.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.23	-
TKN	(mg/L)	0.62	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	14	-
Alkalinity	(mg/L)	92	-
Hardness	(mg/L)	102	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.8	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (I) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.4	-
Dissolved Oxygen	(mg/L)	7.5	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	41	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	226	-
Dissolved Solids	(mg/L)	188	-
Specific Conductance	(mS/cm)	0.380	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	1.40	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	36	-
Sulfates	(mg/L)	25	-
Alkalinity	(mg/L)	83	-
Hardness	(mg/L)	125	-
Nickel	(mg/L)	0.0040	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	18	-
pH	(s.u.)	7.4	-
E Coli	(organisms/100ml)	10	-
Silver	(mg/L)	0.0020	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	8.00	-

NEORSD

WQIS

LAKE ERIE (I) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	20.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	14	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	300	-
Dissolved Solids	(mg/L)	267	-
Specific Conductance	(mS/cm)	0.420	-
Turbidity	(NTU)	2.90	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.87	-
Chlorides	(mg/L)	46	-
Sulfates	(mg/L)	39	-
Alkalinity	(mg/L)	188	-
Hardness	(mg/L)	150	-
Nickel	(mg/L)	0.0190	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.2600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0050	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	4.00	-

NEORSD

WQIS

LAKE ERIE (I) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	7.7	-
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	177	-
Dissolved Solids	(mg/L)	162	-
Specific Conductance	(mS/cm)	0.295	-
Turbidity	(NTU)	1.50	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	32	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	90	-
Hardness	(mg/L)	121	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<2	-
pH	(s.u.)	8.4	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (J) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	7.8	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	213	-
Dissolved Solids	(mg/L)	176	-
Specific Conductance	(mS/cm)	0.250	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.31	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	23	-
Alkalinity	(mg/L)	83	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0030	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.0	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (J) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	9.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	243	-
Dissolved Solids	(mg/L)	167	-
Specific Conductance	(mS/cm)	0.210	-
Turbidity	(NTU)	2.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.44	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	25	-
Alkalinity	(mg/L)	85	-
Hardness	(mg/L)	120	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.0	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (J) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.7	-
Dissolved Oxygen	(mg/L)	7.3	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	165	-
Dissolved Solids	(mg/L)	128	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	9.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.21	-
TKN	(mg/L)	0.57	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	14	-
Alkalinity	(mg/L)	84	-
Hardness	(mg/L)	106	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (J) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.5	-
Dissolved Oxygen	(mg/L)	7.7	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	39	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	196	-
Dissolved Solids	(mg/L)	168	-
Specific Conductance	(mS/cm)	0.340	-
Turbidity	(NTU)	11.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.97	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	30	-
Sulfates	(mg/L)	38	-
Alkalinity	(mg/L)	82	-
Hardness	(mg/L)	117	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	8	-
pH	(s.u.)	7.5	-
E Coli	(organisms/100ml)	4	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	4.50	-

NEORSD

WQIS

LAKE ERIE (J) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.9	-
Dissolved Oxygen	(mg/L)	10.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	196	-
Dissolved Solids	(mg/L)	180	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.84	-
TKN	(mg/L)	0.72	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	23	-
Alkalinity	(mg/L)	172	-
Hardness	(mg/L)	134	-
Nickel	(mg/L)	0.0800	-
Copper	(mg/L)	0.0130	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0400	-
Iron	(mg/L)	0.1800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.8	-
Silver	(mg/L)	0.0020	-
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (J) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	416	-
Dissolved Solids	(mg/L)	399	-
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	1.70	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.10	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	30	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	85	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.0900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4	-
pH	(s.u.)	7.8	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (K) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.5	-
Dissolved Oxygen	(mg/L)	7.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	157	-
Dissolved Solids	(mg/L)	141	-
Specific Conductance	(mS/cm)	0.235	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.26	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	132	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	18	-
pH	(s.u.)	7.7	-
E Coli	(organisms/100ml)	6	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	10.00	-

NEORSD

WQIS

LAKE ERIE (K) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	213	-
Dissolved Solids	(mg/L)	162	-
Specific Conductance	(mS/cm)	0.220	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.05	-
Soluble Phosphorus	(mg/L)	0.04	-
Nitrate-N	(mg/L)	0.51	-
TKN	(mg/L)	1.80	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	27	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	124	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	<4	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (K) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	177	-
Dissolved Solids	(mg/L)	121	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	8.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.24	-
TKN	(mg/L)	0.57	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	14	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	102	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1900	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	20	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	16	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (K) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.3	-
Dissolved Oxygen	(mg/L)	8.3	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	33	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	183	-
Dissolved Solids	(mg/L)	158	-
Specific Conductance	(mS/cm)	0.310	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.60	-
TKN	(mg/L)	0.64	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	19	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	114	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	<0.0100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.6	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (K) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.9	-
Dissolved Oxygen	(mg/L)	10.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	209	-
Dissolved Solids	(mg/L)	169	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	1.40	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.73	-
TKN	(mg/L)	0.56	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	26	-
Alkalinity	(mg/L)	170	-
Hardness	(mg/L)	138	-
Nickel	(mg/L)	0.0500	-
Copper	(mg/L)	0.0110	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	5	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0030	EWH(0.0028)
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (K) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	27.0	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	176	-
Dissolved Solids	(mg/L)	157	-
Specific Conductance	(mS/cm)	0.260	-
Turbidity	(NTU)	1.30	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	24	-
Sulfates	(mg/L)	20	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	115	-
Nickel	(mg/L)	0.0060	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.0	-
Transparency	(ft.)	8.00	-

NEORSD

WQIS

LAKE ERIE (L) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	23.0	-
Dissolved Oxygen	(mg/L)	8.6	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	212	-
Dissolved Solids	(mg/L)	174	-
Specific Conductance	(mS/cm)	0.230	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.28	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	24	-
Alkalinity	(mg/L)	89	-
Hardness	(mg/L)	138	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0030	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	860	BW(400)
pH	(s.u.)	8.2	-
E Coli	(organisms/100ml)	560	BW(235)
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	11.00	-

NEORSD

WQIS

LAKE ERIE (L) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	298	-
Dissolved Solids	(mg/L)	250	-
Specific Conductance	(mS/cm)	0.225	-
Turbidity	(NTU)	2.00	-
Ammonia-N	(mg/L)	1.40	-
Phosphorus	(mg/L)	0.11	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	2.20	-
TKN	(mg/L)	3.50	-
Chlorides	(mg/L)	56	-
Sulfates	(mg/L)	40	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	126	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0070	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.1000	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	48	-
pH	(s.u.)	7.8	-
E Coli	(organisms/100ml)	40	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	6.50	-

NEORSD

WQIS

LAKE ERIE (L) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.0	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	184	-
Dissolved Solids	(mg/L)	160	-
Specific Conductance	(mS/cm)	0.310	-
Turbidity	(NTU)	8.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.29	-
TKN	(mg/L)	0.58	-
Chlorides	(mg/L)	30	-
Sulfates	(mg/L)	16	-
Alkalinity	(mg/L)	88	-
Hardness	(mg/L)	108	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	20	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	12	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	5.00	-

NEORSD

WQIS

LAKE ERIE (L) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.3	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	35	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	172	-
Dissolved Solids	(mg/L)	147	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	4.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.62	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	18	-
Alkalinity	(mg/L)	85	-
Hardness	(mg/L)	114	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0040	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.6	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	6.50	-

NEORSD

WQIS

LAKE ERIE (L) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.4	-
Dissolved Oxygen	(mg/L)	9.4	-
BOD-5	(mg/L)	3	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	291	-
Dissolved Solids	(mg/L)	255	-
Specific Conductance	(mS/cm)	0.410	-
Turbidity	(NTU)	1.40	-
Ammonia-N	(mg/L)	0.70	-
Phosphorus	(mg/L)	0.15	-
Soluble Phosphorus	(mg/L)	0.13	-
Nitrate-N	(mg/L)	1.70	-
TKN	(mg/L)	1.30	-
Chlorides	(mg/L)	52	-
Sulfates	(mg/L)	38	-
Alkalinity	(mg/L)	178	-
Hardness	(mg/L)	148	-
Nickel	(mg/L)	0.0400	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	4	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (L) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	8.3	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	243	-
Dissolved Solids	(mg/L)	196	-
Specific Conductance	(mS/cm)	0.343	-
Turbidity	(NTU)	1.00	-
Ammonia-N	(mg/L)	0.30	-
Phosphorus	(mg/L)	0.10	-
Soluble Phosphorus	(mg/L)	0.10	-
Nitrate-N	(mg/L)	1.20	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	42	-
Sulfates	(mg/L)	29	-
Alkalinity	(mg/L)	82	-
Hardness	(mg/L)	128	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0200	-
Total Chromium	(mg/L)	0.0130	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.4	-
Transparency	(ft.)	9.00	-

NEORSD

WQIS

LAKE ERIE (M) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.5	-
Dissolved Oxygen	(mg/L)	8.4	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	218	-
Dissolved Solids	(mg/L)	194	-
Specific Conductance	(mS/cm)	0.250	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.45	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	24	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	128	-
Nickel	(mg/L)	0.0080	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0100	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0500	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	140	-
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	54	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	14.00	-

NEORSD

WQIS

LAKE ERIE (M) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.0	-
Dissolved Oxygen	(mg/L)	10.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	225	-
Dissolved Solids	(mg/L)	163	-
Specific Conductance	(mS/cm)	0.210	-
Turbidity	(NTU)	2.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.33	-
TKN	(mg/L)	1.70	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	29	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	120	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<4	-
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	<4	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	7.50	-

NEORSD

WQIS

LAKE ERIE (M) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.8	-
Dissolved Oxygen	(mg/L)	7.5	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	169	-
Dissolved Solids	(mg/L)	159	-
Specific Conductance	(mS/cm)	0.300	-
Turbidity	(NTU)	13.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.17	-
TKN	(mg/L)	0.90	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	16	-
Alkalinity	(mg/L)	91	-
Hardness	(mg/L)	108	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	36	-
pH	(s.u.)	7.9	-
E Coli	(organisms/100ml)	8	-
Silver	(mg/L)	0.0010	-
Transparency	(ft.)	4.00	-

NEORSD

WQIS

LAKE ERIE (M) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.3	-
Dissolved Oxygen	(mg/L)	8.5	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	37	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	161	-
Dissolved Solids	(mg/L)	144	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	3.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.41	-
TKN	(mg/L)	0.80	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	84	-
Hardness	(mg/L)	110	-
Nickel	(mg/L)	<0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	<0.0100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.8	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	10.00	-

NEORSD

WQIS

LAKE ERIE (M) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	19.6	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	24	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	207	-
Dissolved Solids	(mg/L)	182	-
Specific Conductance	(mS/cm)	0.310	-
Turbidity	(NTU)	1.10	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.83	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	28	-
Sulfates	(mg/L)	28	-
Alkalinity	(mg/L)	172	-
Hardness	(mg/L)	138	-
Nickel	(mg/L)	0.0400	-
Copper	(mg/L)	0.0190	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	20	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0030	EWH(0.0028)
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (M) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	188	-
Dissolved Solids	(mg/L)	174	-
Specific Conductance	(mS/cm)	0.263	-
Turbidity	(NTU)	0.70	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	21	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	112	-
Nickel	(mg/L)	0.0050	-
Copper	(mg/L)	0.0300	EWH(0.0198)
Total Chromium	(mg/L)	0.0090	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0500	-
Iron	(mg/L)	0.0300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.4	-
Transparency	(ft.)	10.00	-

NEORSD

WQIS

LAKE ERIE (N) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	22.5	-
Dissolved Oxygen	(mg/L)	9.0	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	16	-
Suspended Solids	(mg/L)	2	-
Total Solids	(mg/L)	194	-
Dissolved Solids	(mg/L)	173	-
Specific Conductance	(mS/cm)	0.250	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	<0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.19	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	16	-
Sulfates	(mg/L)	23	-
Alkalinity	(mg/L)	89	-
Hardness	(mg/L)	119	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	0.0020	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.6	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	15.00	-

NEORSD

WQIS

LAKE ERIE (N) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	14.8	-
Dissolved|Oxygen	(mg/L)	10.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	185	-
Dissolved Solids	(mg/L)	147	-
Specific Conductance	(mS/cm)	0.205	-
Turbidity	(NTU)	1.30	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.27	-
TKN	(mg/L)	1.60	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	24	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	120	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0700	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0050	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	<4	-
pH	(s.u.)	8.1	-
E Coli	(organisms/100ml)	<4	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	16.00	-

NEORSD

WQIS

LAKE ERIE (N) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	21.6	-
Dissolved Oxygen	(mg/L)	7.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	5	-
Total Solids	(mg/L)	181	-
Dissolved Solids	(mg/L)	165	-
Specific Conductance	(mS/cm)	0.300	-
Turbidity	(NTU)	11.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.01	-
TKN	(mg/L)	1.10	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	16	-
Alkalinity	(mg/L)	94	-
Hardness	(mg/L)	107	-
Nickel	(mg/L)	0.0010	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	<0.2400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	24	-
pH	(s.u.)	8.0	-
E Coli	(organisms/100ml)	8	-
Silver	(mg/L)	0.0020	EWH(0.0018)
Transparency	(ft.)	3.00	-

NEORSD

WQIS

LAKE ERIE (N) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.2	-
Dissolved Oxygen	(mg/L)	7.3	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	36	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	167	-
Dissolved Solids	(mg/L)	142	-
Specific Conductance	(mS/cm)	0.290	-
Turbidity	(NTU)	5.00	-
Ammonia-N	(mg/L)	0.20	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.47	-
TKN	(mg/L)	0.70	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	19	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	111	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0030	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.5	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	8.00	-

NEORSD

WQIS

LAKE ERIE (N) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	20.8	-
Dissolved Oxygen	(mg/L)	11.5	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	209	-
Dissolved Solids	(mg/L)	181	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	1.10	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.62	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	170	-
Hardness	(mg/L)	126	-
Nickel	(mg/L)	0.0400	-
Copper	(mg/L)	0.0060	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.1100	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Silver	(mg/L)	0.0030	EWH(0.0024)
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (N) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	26.0	-
Dissolved Oxygen	(mg/L)	9.2	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	161	-
Dissolved Solids	(mg/L)	152	-
Specific Conductance	(mS/cm)	0.258	-
Turbidity	(NTU)	0.50	-
Ammonia-N	(mg/L)	0.04	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	32	-
Sulfates	(mg/L)	17	-
Alkalinity	(mg/L)	78	-
Hardness	(mg/L)	120	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0030	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0300	-
Iron	(mg/L)	0.0200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.5	-
Transparency	(ft.)	11.00	-

NEORSD

WQIS

LAKE ERIE (O) - 08/18/93

Parameter		Value	Excursion
Temperature	(degrees C)	24.0	-
Dissolved Oxygen	(mg/L)	8.0	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	17	-
Suspended Solids	(mg/L)	4	-
Total Solids	(mg/L)	162	-
Dissolved Solids	(mg/L)	151	-
Specific Conductance	(mS/cm)	0.290	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.04	-
Soluble Phosphorus	(mg/L)	0.03	-
Nitrate-N	(mg/L)	0.39	-
TKN	(mg/L)	0.40	-
Chlorides	(mg/L)	18	-
Sulfates	(mg/L)	32	-
Alkalinity	(mg/L)	86	-
Hardness	(mg/L)	130	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0040	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0800	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.9	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (O) - 10/06/93

Parameter		Value	Excursion
Temperature	(degrees C)	12.5	-
Dissolved Oxygen	(mg/L)	11.4	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	1	-
Total Solids	(mg/L)	186	-
Dissolved Solids	(mg/L)	150	-
Specific Conductance	(mS/cm)	0.200	-
Turbidity	(NTU)	1.20	-
Ammonia-N	(mg/L)	<0.01	-
Phosphorus	(mg/L)	0.40	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.20	-
TKN	(mg/L)	1.50	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	23	-
Alkalinity	(mg/L)	85	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0090	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.0400	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.7	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	6.00	-

NEORSD

WQIS

LAKE ERIE (O) - 08/10/94

Parameter		Value	Excursion
Temperature	(degrees C)	22.4	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	2	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	7	-
Total Solids	(mg/L)	193	-
Dissolved Solids	(mg/L)	185	-
Specific Conductance	(mS/cm)	0.320	-
Turbidity	(NTU)	12.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.03	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.32	-
TKN	(mg/L)	0.63	-
Chlorides	(mg/L)	26	-
Sulfates	(mg/L)	19	-
Alkalinity	(mg/L)	94	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0100	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.2200	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.0	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	4.00	-

NEORSD

WQIS

LAKE ERIE (O) - 09/20/94

Parameter		Value	Excursion
Temperature	(degrees C)	20.7	-
Dissolved Oxygen	(mg/L)	8.1	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	31	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	156	-
Dissolved Solids	(mg/L)	147	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	9.00	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.01	-
Nitrate-N	(mg/L)	0.44	-
TKN	(mg/L)	0.60	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	21	-
Alkalinity	(mg/L)	87	-
Hardness	(mg/L)	110	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0050	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	<0.0100	-
Iron	(mg/L)	0.0600	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	7.5	-
Silver	(mg/L)	<0.0010	-
Phenolics	(mg/L)	<0.050	-
Transparency	(ft.)	8.00	-

NEORSD

WQIS

LAKE ERIE (O) - 06/14/95

Parameter		Value	Excursion
Temperature	(degrees C)	21.0	-
Dissolved Oxygen	(mg/L)	9.6	-
BOD-5	(mg/L)	<2	-
COD	(mg/L)	11	-
Suspended Solids	(mg/L)	3	-
Total Solids	(mg/L)	214	-
Dissolved Solids	(mg/L)	204	-
Specific Conductance	(mS/cm)	0.280	-
Turbidity	(NTU)	1.90	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.01	-
Soluble Phosphorus	(mg/L)	<0.01	-
Nitrate-N	(mg/L)	0.94	-
TKN	(mg/L)	1.00	-
Chlorides	(mg/L)	20	-
Sulfates	(mg/L)	25	-
Alkalinity	(mg/L)	85	-
Hardness	(mg/L)	122	-
Nickel	(mg/L)	0.0020	-
Copper	(mg/L)	0.0030	-
Total Chromium	(mg/L)	0.0010	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0100	-
Iron	(mg/L)	0.1300	-
Cadmium	(mg/L)	<0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
pH	(s.u.)	8.1	-
Silver	(mg/L)	<0.0010	-
Transparency	(ft.)	7.00	-

NEORSD

WQIS

LAKE ERIE (O) - 08/29/95

Parameter		Value	Excursion
Temperature	(degrees C)	25.5	-
Dissolved Oxygen	(mg/L)	5.8	EWH(6.0)
BOD-5	(mg/L)	1	-
COD	(mg/L)	<10	-
Suspended Solids	(mg/L)	<1	-
Total Solids	(mg/L)	199	-
Dissolved Solids	(mg/L)	176	-
Specific Conductance	(mS/cm)	0.286	-
Turbidity	(NTU)	2.10	-
Ammonia-N	(mg/L)	0.10	-
Phosphorus	(mg/L)	0.02	-
Soluble Phosphorus	(mg/L)	0.02	-
Nitrate-N	(mg/L)	0.30	-
TKN	(mg/L)	0.50	-
Chlorides	(mg/L)	22	-
Sulfates	(mg/L)	22	-
Alkalinity	(mg/L)	91	-
Hardness	(mg/L)	120	-
Nickel	(mg/L)	0.0030	-
Copper	(mg/L)	0.0080	-
Total Chromium	(mg/L)	0.0020	-
Hexavalent Chromium	(mg/L)	<0.0100	-
Zinc	(mg/L)	0.0200	-
Iron	(mg/L)	0.1200	-
Cadmium	(mg/L)	0.0010	-
Lead	(mg/L)	<0.0030	-
Mercury	(ug/L)	<0.2000	-
Fecal Coliform	(organisms/100ml)	60	-
pH	(s.u.)	7.9	-
Transparency	(ft.)	6.00	-

APPENDIX D
RESULTS OF BENTHIC MACROINVERTEBRATE SAMPLING,
1993 - 1995

Benthos Collection Methods

In 1993, 1994, and 1995, the NEORSD performed qualitative, semi-quantitative and quantitative sampling for benthic macroinvertebrates. Organisms were collected using a D-frame kicknet, hand picking, and Hester-Dendy artificial substrate samplers. Only organisms large enough to be retained by a No. 30 mesh screen were collected. Benthic macroinvertebrate samples were retained in labeled vials and preserved with AGW (a mixture of 85% denatured ethanol, 5% glycerol, and 10% water) for laboratory identification. All organisms were identified to the lowest possible taxonomic level.

Qualitative multiple habitat sampling was performed at all accessible micro habitats at a site until no new taxa were being collected. This period of time usually ranged from one-half hour to one hour at each site. The qualitative multiple habitat sampling provided a list of taxa present within a sample site. A master list of all taxa collected, regardless of sampling method, is presented in Table D-4.

Semi-quantitative samples were collected using a D-frame kicknet which was placed in the stream with the open end facing upstream. The substrate upstream of the net was disturbed by kicking for approximately 30 seconds. All large rocks were scraped to dislodge all invertebrates. The large rocks and debris were then visually inspected for any organisms that may have been clinging to the surface. These were removed using forceps and placed in a vial. All large and/or rare taxa were placed in vials because they may interfere with sample splitting and/or be lost when large samples are split using a Folsom sample splitter. Due to the naturally irregular distribution of benthic macroinvertebrates in streams, 3 to 5 kick samples within a sampling reach were collected and composited. The semi-quantitative samples provide data for Hilsenhoff Biotic Index (HBI) calculations.

The Hilsenhoff Biotic Index (HBI) was developed in Wisconsin by Dr. William Hilsenhoff in 1977 and revised by Dr. Hilsenhoff in 1987. The HBI can be used as an indicator of organic and nutrient pollution, which can result in lower dissolved oxygen concentrations. The HBI is an average of tolerance values for all individuals collected from a site. Benthic macroinvertebrates, specifically arthropods, are used in this assessment of stream water quality.

The HBI evaluation of water quality is accomplished using a sample of 100 to 200 arthropods collected from rock or gravel riffles. In deeper streams that have no riffles, samples from rock or gravel runs may be substituted, and in sand-bottomed streams, samples from debris that accumulates on sticks or other objects wedged into the sand in swift current may be used (Hilsenhoff, 1987). It is suggested that the stream sites to be sampled have current velocity of 0.3 m/sec (1.0 ft/sec) or greater (Hilsenhoff, 1987). Sample collection should be performed in the spring before June 1st or between September 1st and October 15th. It has been determined that much higher biotic index values are generally reported for summer months. The use of seasonal correction factors for the summer has been suggested (Hilsenhoff, 1982, 1987).

$$HBI = \sum \frac{n_i a_i}{N}$$

Where:

n_i = Total number of individuals in the ith taxa
a_i = Tolerance value of ith taxa
N = Total number of individuals in a sample

Tolerance values from 0 to 10 have been assigned by Dr. Hilsenhoff for 359 species (Hilsenhoff, 1987). The tolerance values increase with tolerance. For more details about tolerance values and collection methods, refer to Hilsenhoff, 1977, 1982 and 1987.

HBI values are divided into seven narrative water quality ratings: Excellent, Very Good, Good, Fair, Fairly Poor, Poor, Very Poor. The water quality ratings are based on biotic index scores, with higher scores indicating poorer water quality than lower scores (Table D-1), assuming physical habitability of sites to be equal.

Using the HBI to evaluate water quality of streams has some advantages. The use of only arthropods helps to simplify collection, sorting and identification. Sample collection time for HBI evaluations (about 1 hour) is much less than that for artificial substrate samples (six weeks for sampler colonization and many hours of sorting). The relatively small number of arthropods required (100-200) for an evaluation reduces processing time, compared to artificial substrate samples which may contain thousands of organisms, requiring many more hours to process. The requirement to sample only riffles or fast runs for HBI evaluation makes data more comparable between sample locations, because habitat will not be as variable.

The HBI is considered by some to be one of the most reliable indices used for rapid bioassessment today (Szczytko, 1988). HBI values are not strongly affected by stream width, unlike Ephemeropteran, Plecopteran, Trichopteran (EPT) taxa richness values. For this reason, biotic indices are more reliable than taxa richness when ratings are assigned to smaller streams (Lenat, 1993).

The HBI is used by NEORSD along with other methods of interpreting benthic macroinvertebrate data such as: qualitative multiple habitat sampling, EPT taxa richness, Shannon Diversity Index, and Invertebrate Community Index (as per OEPA methods using replicate Hester-Dendy artificial substrate samples). When using invertebrates to assess water quality, a variety of biological indices and methods should be used for the most reliable assessment (Kerans, Karr and Ahlstedt, 1992).

The tolerance values provided by Dr. Hilsenhoff were developed in Wisconsin and may require some modification for Northeast Ohio. This modification may not be very significant because both regions are within the Great Lakes region and have ecologically similar streams and rivers. Site-specific tolerance values, for arthropods collected by the NEORSD, will eventually be determined for future use. Until then, the tolerance values provided by Hilsenhoff will serve as an adequate default.

Approximate tolerance values were assigned to organisms when tolerance values were not available for that species or when the taxonomic level of identification was to the genus only. The approximate tolerance value was determined by averaging the assigned tolerance values for all species within the genus. This approximate tolerance value was then used in the calculation of the HBI score. The range of tolerance values within most genera where approximate values were used was no greater than one. The use of this approximate tolerance value should not have a significant effect on the accuracy of the HBI narrative rating.

Some disadvantages associated with HBI stream evaluations are:

A) Selective sampling techniques. Sampling techniques which examine a specific type of habitat (i.e. riffles, swift runs) and exclude non-arthropods (i.e. snails, worms, leeches, etc.) and other organisms endemic to pools and margins, will not provide sufficient data to characterize the entire benthic community of a stream location.

B) The HBI is only reliable in determining the impact of organic pollution on benthic fauna and was not designated to evaluate non-organic impacts.

The HBI can be modified to include non-arthropods for the bioassessment of streams. This has been accomplished in North Carolina where tolerance values have been determined for non-arthropods. These values for non-arthropods have been included in the HBI calculation for the development of the North Carolina Biotic Index (NCBI, Lenat, 1993).

HBI scores are presented in Table D-2. Numbers of organisms used in the calculations are on file at the NEORSD Water Quality & Industrial Surveillance offices.

Quantitative samples were obtained using five replicate Hester-Dendy artificial substrate samplers per sample site. The five Hester- Dendy samplers were secured to an object (i.e. block, brick etc.) and submerged in the stream for approximately six weeks. The quantitative samples were used for the calculation of the Invertebrate Community Index (ICI). ICI scores are presented in Table D-3.

The Shannon Diversity Index ($\bar{d}$) measures the diversity of organisms in a stream. The index score becomes higher with an increase in diversity of stream organisms. Increased diversity may be correlated to improved water quality and/or habitat quality. The Hilsenhoff Biotic Index may be correlated to the amount of organic pollution in a stream. All other variables remaining the same, the index score becomes higher as the amount of organic pollution increases (range 0-10). The number of EPT taxa and the EPT percent composition generally increase with improving water quality, habitat quality and/or stream size.

Consideration of one index in isolation can lead to misinterpretation of stream conditions. Therefore, characterization of water and/or habitat quality using the benthic data collected here involves the Shannon Diversity Index, EPT Taxa, Percent EPT composition, total taxa and Hilsenhoff Biotic Index.

Table D-1

Evaluation of Water Quality using the Hilsenhoff Biotic Index

Biotic Index	Water Quality	Degree of Organic Pollution
0.00 - 3.50	Excellent	No apparent organic pollution
3.51 - 4.50	Very Good	Possible slight organic pollution
4.51 - 5.50	Good	Some organic pollution
5.51 - 6.50	Fair	Fairly significant organic pollution
6.51 - 7.50	Fairly Poor	Significant organic pollution
7.51 - 8.50	Poor	Very significant organic pollution
8.51 - 10.00	Very Poor	Severe organic pollution

Source: Hilsenhoff, 1987

Table D-2

Kick Net Benthic Macroinvertebrate Data

1993-1995

Sample Location	Date	Total Taxa	Shannon Diversity Index	EPT Taxa	Percent EPT Composition	HBI Score	HBI Narrative Rating
Doan Brook							
17	9/19/94	8	1.3	0	0.00%	7.16	Fairly Poor
17.1	9/19/94	25	1.9	4	61.76%	5.24	Good
18	9/15/94	18	2.2	3	14.29%	6.20	Fair
19	9/15/94	12	1.4	1	11.31%	6.57	Fairly Poor
Cuyahoga River							
22.61	10/3/94	29	2.4	6	4.64%	4.76	Good
22.69	10/13/94	36	2.8	7	47.80%	5.48	Good
22.7	10/3/94	26	2.8	6	45.80%	6.27	Fair
22.71	10/3/94	39	2.1	13	72.50%	5.09	Good
22.72	10/12/94	36	2.5	8	60.20%	4.60	Good
SWWTP effluent channel	10/4/94	21	2.4	1	0.67%	7.07	Fairly Poor
22.73	10/3/94	24	2.1	12	75.04%	4.70	Good
A	8/17/95	24	2.8	10	80.50%	5.52	Fair
22.9	8/26/93	32	2.8	12	71.30%	5.07	Good
B	8/17/95	27	2.5	11	56.40%	4.85	Good
23	8/30/94	37	2.7	10	52.50%	4.96	Good
24	8/30/94	37	2.9	10	50.00%	4.92	Good
24.5	10/4/94	51	2.9	11	49.30%	5.41	Good
Big Creek							
25	8/30/95	27	2.4	6	46.00%	5.33	Good
25.1	8/21/95	32	2.7	8	45.90%	5.75	Fair
25.2	8/21/95	25	2.1	6	71.50%	5.12	Good
25.3	8/21/95	27	2.2	6	70.30%	5.20	Good
Mill Creek							
31	8/12/95	15	2.3	7	54.10%	4.77	Good
32	8/28/95	16	2.1	2	12.30%	6.39	Fair
32.2	8/29/95	37	2.5	8	55.00%	5.06	Good
32.4	8/29/95	27	2.1	6	61.70%	5.50	Good
32.6	8/30/95	21	1.0	4	82.70%	4.56	Good
32.8	9/26/95	29	2.1	3	38.30%	5.63	Fair
33	8/22/95	18	1.8	2	48.80%	5.87	Fair
34	8/25/95	26	2.0	3	21.40%	6.29	Fair
34.5	9/19/95	21	2.1	3	7.00%	6.75	Fairly Poor
35	8/28/95	21	2.2	5	55.00%	5.40	Good

Table D-2 Kick Net Benthic Macroinvertebrate Data 1993-1995

Sample Location	Date	Total Taxa	Shannon Diversity Index	EPT Taxa	Percent EPT Composition	HBI Score	HBI Narrative Rating
Tinkers Creek							
39	9/23/94	36	2.5	9	58.71%	5.06	Good
40	9/23/94	40	2.4	6	65.45%	4.88	Good
41	9/30/94	33	1.9	8	78.30%	4.90	Good
42	9/30/94	41	2.9	7	46.38%	6.08	Fair
Rocky River							
49	7/29/93	25	1.8	6	10.40%	6.63	Fairly Poor
49	9/24/93	24	2.0	4	6.45%	6.43	Fair
49	6/9/94	23	2.7	7	31.20%	5.94	Fair
49	8/4/95	33	2.5	9	75.90%	4.66	Good
49.1	7/29/93	26	2.3	5	68.10%	5.38	Good
49.1	9/24/93	26	2.4	7	72.00%	4.69	Good
49.1	6/15/94	41	3.0	11	38.40%	6.00	Fair
49.1	8/4/95	36	2.6	9	68.60%	4.48	Very Good
49.2	7/29/93	27	2.5	12	81.40%	5.13	Good
49.2	6/9/94	38	2.9	12	43.60%	5.84	Fair
49.2	8/7/95	28	2.3	10	82.70%	5.26	Good
50	6/15/94	42	2.8	11	46.00%	5.74	Fair
50.1	8/7/95	40	2.8	12	75.50%	4.84	Good
51	9/22/94	45	2.7	10	46.40%	5.41	Good
52	9/13/94	37	2.7	9	51.70%	5.62	Fair
52.5	10/27/94	35	2.4	11	78.80%	5.01	Good
Sagamore Creek							
57	6/10/94	56	3.2	15	35.71%	4.90	Good

Key

Shannon Diversity Index:

$d = \Sigma\ [(n_i/n)\ \ln\ (n_i/n)]$ Where: n_i = Total number of individuals in the i-th taxa
n = Total number of individuals in sample

Hilsenhoff Biotic Index (HBI):

$HBI = \Sigma\ (n_i\ a_i\ /n)$ Where: n_i = Total number of individuals in the i-th taxa
a_i = Tolerance value of the i-th taxa
n = Total number of individuals in sample

EPT = Ephemeroptera + Plecoptera + Trichoptera taxa

Table D-3

Hester-Dendy Benthic Macroinvertebrate Data

1993-1995

Sample Location	Date	Total Taxa	Shannon Diversity Index	EPT Taxa	Percent EPT Composition	ICI Score	ICI Narrative Rating
Cuyahoga River							
22.61	10/3/94	52	2.4	9	40.12%	32	Marginally Good
22.7	10/3/94	51	2.7	7	1.01%	18	Fair
22.71	10/3/94	63	2.8	12	25.27%	34	Good
22.73	10/3/94	65	2.7	10	25.60%	32	Marginally Good
A	8/17/95	47	2.3	10	18.20%	30	Marginally Good
B	8/17/95	35	2.9	8	24.60%	30	Marginally Good
Big Creek							
25	9/27/95	37	1.8	3	0.58%	22	Fair
25.2	8/21/95	46	2.4	7	37.30%	34	Good
25.3	8/21/95	50	2.4	6	57.60%	38	Good
Mill Creek							
31	8/12/95	25	2.4	3	6.50%	18	Fair
32.2	8/29/95	31	2.7	1	1.20%	20	Fair
32.4	8/17/95	47	2.3	5	51.70%	38	Good
33	8/30/95	28	1.1	2	1.40%	16	Fair
35	8/28/95	43	2.7	0	0.00%	22	Fair

Key

Shannon Diversity Index:

$d = \Sigma\,[(n_i/n)\ \ln\,(n_i/n)]$ Where: n_i = Total number of individuals in the i th taxa
n = Total number of individuals in sample

Invertebrate Community Index (ICI):

$HBI = \Sigma\,(n_i\,a_i/n)$ Where: n_i = Total number of individuals in the i th taxa
a_i = Tolerance value of the i th taxa
n = Total number of individuals in sample

EPT = Ephemeroptera + Plecoptera + Trichoptera taxa

Table D-4

Benthic Macroinvertebrate Comprehensive Taxa List

1993-1995

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Porifera	—	—	(23, 8/30/94) (25.2, 8/21/95) (35, 8/28/95) (50, 6/15/94) (50.1, 8/7/95)
Haplosclerina			
Spongillidae			
Eunapius fragilis	—	—	(25.3, 8/21/95) (49.1, 7/29/93) (49.1, 8/4/95) (49.2, 6/9/94)
Coelenterata			
Hydrozoa			
Hydroida			
Hydridae			
Hydra americana	—	—	(35, 8/28/95)
Hydra prob. *oligactis*	—	—	(33, 8/30/95)
Platyhelminthes			
Turbellaria			
Tricladida			
Planariidae			
Dugesia tigrina	—	7.5	(17.1, 9/19/94) (18, 9/15/94) (19, 9/15/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (23, 8/30/94) (24, 8/30/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (35, 8/28/95) (49.1, 7/29/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Nematoda			(RR-6, 9/25/92)
Dorylaimida			
Actinolaimus sp.	—	—	(25, 9/27/95)
Dorylaimus sp.	—	—	(35, 8/28/95)
Enoplida			
Tripyla sp.	—	—	(22.61, 10/3/94)
Rhabditida			
Panagrolaimus sp.	—	—	(22.73, 10/3/94) (50, 6/15/94)
Bryzoa			
Phylactolaemata			
Fredericellidae	—	—	
Fredericella sultana	—	—	(22.61, 10/3/94)
Pectinatellidae			
Pectinatella magnifica	—	—	(49.1, 6/15/94) (49.2, 6/9/94)
Plumatellidae			
Plumatella sp.	—	—	(25.3, 8/21/95)
Plumatella repens	—	—	(40, 9/23/94) (41, 9/30/94) (49.1, 7/29/93) (49.1, 8/4/95) (49.2, 8/7/95) (50.1, 8/7/95) (52, 9/13/94) (52.5, 10/27/94)
Annelida			
Oligochaeta	—	—	(17, 9/19/94) (18, 9/15/94) (19, 9/15/94) (CEC, 10/4/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.2, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 6/9/94) (49, 8/4/95)

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Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Oligochaeta (Continued)			(49.1, 7/29/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.1, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94)(52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Hirudinea			
Pharyngodellida			
Erpobdellidae			
Dina (Mooreobdella) bucera	—	7.8	(CR-B, 8/17/95) (24, 8/30/94) (32.4, 8/17/95)
Dina (Mooreobdella) microstoma	—	7.8	(CEC, 10/14/94) (22.69, 10/13/94) (CR-A, 8/17/95) (32.2, 8/29/95) (32.6, 8/30/95) (32.8, 9/27/95) (49, 7/29/93) (49, 6/9/94) (49.1, 7/29/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/22/94)
Erpobdella sp.	—	7.8	(22.9, 8/26/93) (34, 8/25/95)
Erpobdella punctata	—	7.8	(17.1, 9/19/94) (19, 9/15/94) (22.71, 10/3/94) (23, 8/30/94) (25.1, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.8, 9/27/95) (33, 8/30/95) (40, 9/23/94) (52.5, 10/27/94)
Erpobdella triannulata	—	7.8	(CR-B, 8/17/95) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (40, 9/23/94) (49, 7/29/93) (49, 9/24/93) (49.1, 7/29/93) (RR-7, 9/21/94)
Rhynchobdellida			
Glossiphoniidae			
Helobdella stagnalis	—	6.7	(25.2, 8/21/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95)
Placobdella parasitica	—	6.6	(32.8, 9/27/95)
Arthropoda			
Crustacea			
Isopoda			
Asellidae			

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Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Asellus sp.	—	9.4	(CR-A, 8/17/95) (22.61, 10/3/94) (22.73, 10/3/94) (25.2, 8/21/95) (25.3, 8/21/95) (32.4, 8/17/95) (39, 9/23/94) (50, 6/15/94) (50.1, 8/7/95)
Asellus communis	—	9.4	(17.1, 9/19/94) (CEC, 10/14/94) (22.69, 10/13/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-B, 8/17/95) (23, 8/30/94) (25.2, 8/21/95) (49, 7/29/93) (49, 9/24/93) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94)
Asellus racovitzai racovitzai	8	9.4	(57, 6/10/94)
Amphipoda			
Gammaridae			
Crangonyx sp.	—	8	(49.1, 7/29/93)
Crangonyx gracilis complex	8	8	(22.61, 10/3/94) (22.72, 10/12/94) (CR-B, 8/17/95) (25, 8/30/95) (32.8, 9/27/95) (49.1, 6/15/94) (49.2, 6/9/94) (RR-6, 9/25/92) (RR-6, 9/22/94)
Crangonyx pseudogracilis	8	8	(17.1, 9/19/94) (19, 9/15/94) (CEC, 10/14/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (25, 8/30/95) (49.1, 9/24/93)
Gammarus fasciatus	—	6.9	(22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24.5, 10/4/94) (31, 8/12/95) (32.2, 8/29/95)
Decapoda			
Cambaridae			(CR-B, 8/17/95)
Orconectes sp.	—	2.7	(22.72, 10/12/94) (25, 8/30/95) (49.1, 6/15/94) (50.1, 8/7/95)
Orconectes obscurus	—	2.7	(49, 7/29/93) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 8/4/95) (49.2, 7/29/93)
Orconectes virilis	—	2.7	(49, 9/24/93) (49, 8/4/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Arachnoidea			
Acari			
Arreneuridae			
Arrenurus sp.	—	5.7	(RR-6, 9/25/92)
Limnesiidae / Sperchonidae			
Tyrrelia sp. / Sperchon sp.	—	5.7	(17.1, 9/19/94) (22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (24, 8/30/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (34.5, 9/19/95) (42, 9/30/94) (49.2, 6/9/94) (50, 6/15/94) (RR-6, 9/25/92) (RR-9, 9/22/94) (57, 6/10/94)
Hydrachnidae			
Hydrachna sp.	—	5.7	(CR-A, 8/17/95) (25.2, 8/21/95)
Hygrobatidae			
Hygrobates sp.	—	5.7	(22.71, 10/3/94)
Mideopsidae			
Mideopsis sp.	—	5.7	(22.71, 10/3/94)
Insecta			
Collembola			
Isotomidae			
Isotoma sp. (semi-aquatic)	—	—	(32.2, 8/29/95)
Isotomurus palustrus	—	—	(CEC, 10/4/94)
Ephemeroptera			
Siphlonuridae			
Siphlonurus sp.	7	2.6	(50.1, 8/7/95)
Baetidae			
Baetis sp.	—	—	(22.71, 10/3/94) (CR-A, 8/17/95)
Baetis flavistriga	4	7.2	(17.1, 9/19/94) (18, 9/15/94) (19, 9/15/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
B. flavistriga (Continued)			(25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 6/9/94) (49.1, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Baetis intercalaris	6	5.8	(22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (34.5, 9/19/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 6/9/94) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.1, 6/9/94) (49.1, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Baetis vagans	2	—	(39, 9/23/94) (RR-6, 9/25/92) (57, 6/10/94)
Callibaetis sp.	9	9.3	(32.2, 8/29/95) (34, 8/25/95)
Oligoneuriidae			
Isonychia sp.	2	3.8	(24.5, 10/4/94) (49.1, 6/15/94) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94)
Heptageniidae			
Leucrocuta sp.	—	0	(CR-A, 8/17/95)
Leucrocuta hebe	1	0	(22.73, 10/3/94) (CR-B, 8/17/95) (49.2, 6/9/94) (50, 6/15/94) (50.1, 8/7/95)
Nixe lucidipennis	2	—	(57, 6/10/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Stenacron interpunctatum	7	7.1	(22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (42, 9/30/94) (49, 7/29/93) (49, 6/9/94) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.1, 6/9/94) (49.1, 8/7/95) (50.1, 8/7/95) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Stenonema integrum	4	5.5	(22.7, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95)
Stenonema pulchellum	3	—	(22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (23, 8/30/94) (42, 9/30/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.1, 8/7/95) (50.1, 8/7/95) (51, 9/22/94) (52.5, 10/27/94) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Stenonema terminatum	4	4.5	(22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (52.5, 10/27/94)
Stenonema bipunctatum	—	—	(22.71, 10/3/94)
Stenonema tripunctatum	—	—	(22.71, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (25.1, 8/21/95) (49, 7/29/93) (49.2, 7/29/93) (RR-6, 9/25/92) (RR-6, 9/22/94)
Stenonema vicarium	2	1	(49, 8/4/95) (49.1, 9/24/93) (49.2, 7/29/93) (49.2, 8/7/95) (51, 9/22/94) (52.5, 10/27/94) (RR-9, 9/22/94)
Leptophlebiidae			
Paraleptophlebia sp.	1	1.2	(57, 6/10/94)
Ephemerellidae			
Attenella sp.	—	—	(RR-6, 9/25/92)
Tricorythidae			
Tricorythodes sp.	4	5.4	(22.61, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Caenidae			
Caenis sp.	7	7.6	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-B, 8/17/95) (24.5, 10/4/94) (49.1, 6/15/94) (50.1, 8/7/95) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94)
Odonata			
Calopterygidae			
Calopteryx sp.	—	8.3	(22.71, 10/3/94) (32, 8/28/95) (32.2, 8/29/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34.5, 9/19/95) (42, 9/30/94) (49, 9/24/93)
Hetaerina sp.	—	6.2	(25.2, 8/21/95) (25.3, 8/21/95) (32.4, 8/17/95) (35, 8/28/95) (50.1, 8/7/95) (RR-6, 9/25/92)
Coenagrionidae			
Argia sp.	—	8.7	(32.2, 8/29/95)
Argia apicalis	8	8.7	(CEC, 10/4/94) (22.7, 10/3/94) (22.71, 10/3/94) (23, 8/30/94) (24.5, 10/4/94) (40, 9/23/94)
Argia moesta	6	8.7	(CR-A, 8/17/95) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-7, 9/21/94)
Argia tibialis	6	8.7	(22.72, 10/12/94) (23, 8/30/94)
Argia violacea	—	8.7	(22.61, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (41, 9/30/94) (42, 9/30/94)
Enallagma sp.	—	9	(32.6, 8/30/95) (32.8, 9/27/95) (34, 8/25/95) (34.5, 9/19/95)
Ischnura sp.	—	9.4	(32.8, 9/27/95)
Aeshnidae			
Boyeria sp.	—	—	(CR-B, 8/17/95) (23, 8/30/94) (35, 8/28/95)
Plecoptera			
Nemouridae			
Amphinemura sp.	—	3.4	(49.2, 6/9/94) (57, 6/10/94)
Leuctridae			
Leuctra sp.	—	0.7	(CR-A, 8/17/95) (57, 6/10/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Perlidae			
Perlesta placida	5	4.9	(49, 6/9/94) (49.1, 6/15/94) (49.2, 6/9/94) (50, 6/15/94) (57, 6/10/94)
Hemiptera			
Belostomatidae			
Belostoma sp.	—	9.8	(32.6, 8/30/95)
Corixidae			
Palmacorixa sp.	—	9	(CR-B, 8/17/95)
Sigara sp.	—	9	(33, 8/30/95) (52.5, 10/27/94)
Saldidae			
Salda sp.	—	—	(25, 9/27/95)
Gerridae			
Metrobates sp.	—	—	(22.7, 10/3/94)
Rheumatobates sp.	—	—	(22.7, 10/3/94)
Megaloptera			
Sialidae			
Sialis sp.	4	7.5	(22.69, 10/13/94) (22.72, 10/12/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (24.5, 10/4/94) (32.8, 9/27/95) (49.1, 6/15/94) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94)
Corydalidae			
Corydalius prob. *cornutus*	6	5.6	(22.69, 10/13/94) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (32.8, 9/27/95) (39, 9/23/94)
Nigronia serricornis	0	5.5	(22.69, 10/13/94) (24, 8/30/94) (24.5, 10/4/94) (49, 7/29/93) (49, 9/24/93) (49.1, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (50.1, 8/7/95) (51, 9/22/94)
Neuroptera			
Mantispidae	—	—	(25.3, 8/21/95)
Sisyridae	—	—	(25.3, 8/21/95)
Climacia areolaris	—	—	(49.2, 8/7/95)
Sisyra vicaria	—	—	(49.2, 6/9/94) (50, 6/15/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Trichoptera			
Philopotamidae			
Dolophilodes sp.	—	1	(57, 6/10/94)
Polycentropodidae			
Polycentropus sensu lato complex	6	3.5	(49.2, 7/29/93) (57, 6/10/94)
Hydropsychidae			
Cheumatopsyche sp.	5	6.6	(17.1, 9/19/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 6/9/94) (49, 8/4/95) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Diplectrona sp.	—	—	(35, 8/28/95)
Hydropsyche betteni	6	8.1	(22.69, 10/13/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (49.1, 6/15/94) (49.2, 6/9/94) (50, 6/15/94) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Hydropsyche depravata group	—	—	(17.1, 9/19/94) (18, 9/15/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (25, 8/30/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (35, 8/28/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
H. depravata group (Continued)			(39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 8/7/95) (50.1, 8/7/95) (RR-6, 9/25/92) (57, 6/10/94)
Hydropsyche dicantha	—	—	(22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Potamyia sp.	—	—	(CR-A, 8/17/95)
Symphitopsyche bifida group	6	1	(22.61, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (24, 8/30/94) (24.5, 10/4/94) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (39, 9/23/94) (42, 9/30/94) (49, 6/9/94) (49, 8/4/95) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Symphitopsyche morosa group	2	3.2	(52.5, 10/27/94)
Symphitopsyche slossonae	4	0	(31, 8/12/95) (57, 6/10/94)
Symphitopsyche sparna	1	3.2	(22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (31, 8/12/95) (32.2, 8/29/95) (39, 9/23/94) (41, 9/30/94) (57, 6/10/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Hydroptilidae			
Hydroptila sp.	6	6.2	(17.1, 9/19/94) (18, 9/15/94) (CEC, 10/4/94) (22.71, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (42, 9/30/94) (49, 6/9/94) (49, 8/4/95) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94) (57, 6/10/94)
Leptoceridae			
Ceraclea sp.	3	—	(22.9, 8/26/93) (50, 6/15/94)
Ceraclea maculata	3	6.4	(49.2, 6/9/94)
Nectopsyche sp.	3	—	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95)
Lepidoptera			
Nepticulidae			
Neptacula	—	—	(52, 9/13/94)
Noctuidae			(24.5, 10/4/94)
Archanara sp.	—	—	(32.6, 8/30/95)
Pyralidae			(49.1, 9/24/93)
Petrophila sp.	5	1.8	(51, 9/22/94) (57, 6/10/94)
Coleoptera			
Dytisidae			
Agabus sp.	—	—	(57, 6/10/94)
Cybister/Hydaticus/Dytiscus sp. ?	—	—	(22.71, 10/3/94)
Hygrotus sp.	—	—	(57, 6/10/94)
Laccophilus	—	10	(25.2, 8/21/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Hydrophilidae			
Anacaena sp.	—	—	(25.2, 8/21/95)
Berosus sp.	—	8.6	(22.69, 10/13/94) (32.2, 8/29/95) (40, 9/23/94) (42, 9/30/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-7, 9/21/94)
Helophorus sp.	—	7.9	(49.2, 6/9/94)
Tropisternus sp.	—	9.8	(32, 8/28/95) (32.6, 8/30/95)
Dryopidae			
Helichus lithophilus	5	5.4	(51, 9/22/94)
Psephenidae			
Ectopria sp.	5	—	(25.3, 8/21/95)
Ectopria nervosa	5	4.3	(RR-6, 9/25/92)
Psephenus herricki	4	2.5	(23, 8/30/94) (50.1, 8/7/95) (51, 9/22/94) (57, 6/10/94)
Scirtidae			
Cyphon sp.	—	—	(25, 9/27/95)
Elmidae			
Ancyronyx variegata	6	6.9	(22.61, 10/3/94) (22.69, 10/13/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (24, 8/30/94) (49, 8/4/95) (RR-6, 9/25/92)
Dubiraphia sp.	6 (larvae)	6.4	(CR-A, 8/17/95)
Gonielmus dietrichi	—	—	(CR-B, 8/17/95) (50, 6/15/94) (RR-6, 9/25/92) (RR-6, 9/22/94)
Macronychus glabratus	4	4.7	(22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (24, 8/30/94) (RR-6, 9/25/92)
Optioservus trivittatus	4	2.7	(49.2, 8/7/95)
Stenelmis sp.	5	5.4	(CR-A, 8/17/95) (CR-B, 8/17/95) (49, 7/29/93) (49.1, 9/24/93) (50.1, 8/7/95)
Stenelmis crenata	5	5.4	(22.61, 10/3/94) (22.69, 10/13/94) (22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25.3, 8/21/95) (32.2, 8/29/95) (35, 8/28/95) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49,9/24/93)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
S. crenata (Continued)			(49, 8/4/95) (49.1, 7/29/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52.5, 10/27/94) (RR-6, 9/25/92) (57, 6/10/94)
Stenelmis sexlineata	5	5.4	(50.1, 8/7/95) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Heteroceridae			(39, 9/23/94)
Chrysomelidae			
Disonycha sp.	—	—	(25.2, 8/21/95)
Carabidae			
Chlaenius sp. (terrestrial)	—	—	(33, 8/30/95)
Staphylinidae			
Stenus sp.	—	—	(32.4, 8/17/95) (32.6, 8/30/95) (57, 6/10/94)
Diptera			
Tipulidae			
Antocha sp.	3	4.6	(CEC, 10/4/94) (22.71, 10/3/94) (24, 8/30/94) (24.5, 10/4/94) (32.2, 8/29/95) (40, 9/23/94) (49, 8/4/95) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (50.1, 8/7/95) (51, 9/22/94)
Dactylolabis sp.	—	—	(CR-B, 8/17/95)
Dicranota (Raphidolabina) sp.	3	0	(25, 9/27/95) (33, 8/30/95) (57, 6/10/94)
Gonomyia sp.	—	—	(32, 8/28/95)
Hexatoma sp.	2	4.7	(24.5, 10/4/94) (42, 9/30/94) (51, 9/22/94)
Holorusia sp.	—	—	(34, 8/25/95)
Limonia sp.	6	10	(17.1, 9/19/94) (22.7, 10/3/94) (25, 9/27/95) (41, 9/30/94) (42, 9/30/94) (49, 9/24/93) (49.1, 9/24/93) (52, 9/13/94)
Lipsothrix sp.	—	—	(51, 9/22/94)
Ormosia	—	—	(22.61, 10/3/94) (39, 9/23/94) (57, 6/10/94)
Tipula abdominalis	4	7.7	(24.5, 10/4/94) (39, 9/23/94) (49, 9/24/93) (49.2, 6/9/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Tipula prob. *furca*	4	7.7	(18, 9/15/94) (CEC, 10/4/94) (22.69, 10/13/94) (22.72, 10/12/94) (24.5, 10/4/94) (25, 8/30/95) (25.1, 8/21/95) (32, 8/28/95) (32.6, 8/30/95) (33, 8/30/95) (34.5, 9/19/95) (41, 9/30/94) (49, 9/24/93) (49, 6/9/94) (49, 8/4/95) (49.1, 9/24/93) (52, 9/13/94) (57, 6/10/94)
Psychodidae			
Pericoma sp.	4	—	(22.61, 10/3/94) (22.7, 10/3/94) (32.4, 8/17/95) (34, 8/25/95)
Psychoda sp.	10	9.9	(25, 9/27/95)
Culicidae			
Anopheles sp.	—	9.1	(32, 8/28/95)
Culex sp.	—	10	(25.3, 8/21/95) (32, 8/28/95) (33, 8/30/95)
Simuliidae			
Cnephia sp.	—	—	(42, 9/30/94)
Simulium jenningsi	4	4.4	(22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (39, 9/23/94) (49, 6/9/94) (49.1, 6/15/94) (49.2, 7/29/93) (51, 9/22/94)
Simulium rugglesi	5	4.4	(57, 6/10/94)
Simulium vittatum	7	8.7	(17.1, 9/19/94) (18, 9/15/94) (19, 9/15/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 6/9/94) (49, 8/4/95) (49.1, 6/15/94) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Ceratopogonidae			
Atrichopogon sp.	—	6.8	(23, 8/30/94) (33, 8/30/95)
Bezzia sp. / Probezzia sp.	6	—	(22.61, 10/3/94) (22.7, 10/3/94) (42, 9/30/94) (57, 6/10/94)
Ceratopogon sp.	—	—	(22.73, 10/3/94)
Culicoides sp.	10	6.5	(22.73, 10/3/94) (23, 8/30/94) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (33, 8/30/95)
Dasyhelea sp.	—	—	(49.2, 8/7/95)
Monohelea sp. / Stilobezzia sp. comple	—	—	(RR-6, 9/25/92)
Chironomidae			
Psectrotanypus (Psectrotanypus) sp.	10	—	(33, 8/30/95)
Clinotanypus sp.	8	—	(32.4, 8/17/95)
Alotanypus sp.	—	—	(32.2, 8/29/95)
Nilotanypus fimbriatus	6	4	(RR-6, 9/25/92)
Natarsia sp.	8	10	(CR-A, 8/17/95)
Natarsia baltimoreus	8	10	(CR-B, 8/17/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (35, 8/28/95)
Procladius sp.	9	9.3	(25.2, 8/21/95) (32.4, 8/17/95)
Procladius sublettei	9	9.3	(32.2, 8/29/95)
Pentaneura sp.	6	4.6	(22.61, 10/3/94) (25.2, 8/21/95) (35, 8/28/95)
Ablabesmyia sp.	8	—	(50, 6/15/94)
Ablabesmyia mallochi	8	7.6	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (25, 9/27/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (35, 8/28/95) (40, 9/23/94) (49.1, 6/15/94) (50.1, 8/7/95) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94)
Ablabesmyia parajanta	8	7.1	(32.8, 9/27/95) (35, 8/28/95) (RR-6, 9/25/92)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Thienemannimyia sp.	6	8.7	(17.1, 9/19/94) (18, 9/15/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (24.5, 10/4/94) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-9, 9/22/94) (57, 6/10/94)
Meropelopia sp.	6	8.7	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (RR-6, 9/25/92)
Helopelopia sp.	6	8.7	(18, 9/15/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (35, 8/28/95) (40, 9/23/94) (42, 9/30/94) (49.1, 9/24/93) (49.1, 8/4/95) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Conchapelopia sp.	6	8.7	(17.1, 9/19/94) (18, 9/15/94) (19, 9/15/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 6/9/94) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (57, 6/10/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Labrundinia sp.	7	—	(22.7, 10/3/94)
Diamesa sp.	5	7.7	(52.5, 10/27/94)
Thienemanniella sp.	6	6	(RR-6, 9/25/92 & 9/22/94)
Thienemanniella prob. *xena*	6	6	(22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (35, 8/28/95) (39, 9/23/94) (42, 9/30/94) (49.1, 6/15/94) (50, 6/15/94) (50.1, 8/7/95)
Corynoneura celeripes	7	6.2	(22.7, 10/3/94)
Corynoneura taris	7	6.2	(22.7, 10/3/94) (22.73, 10/3/94) (35, 8/28/95) (40, 9/23/94) (RR-6, 9/25/92)
Brilla flavifrons	5	5.2	(22.73, 10/3/94) (CR-B, 8/17/95) (24.5, 10/4/94) (25, 9/27/95) (32.4, 8/17/95) (35, 8/28/95) (40, 9/23/94) (49, 6/9/94) (49.1, 6/15/94) (49.1, 8/4/95) (RR-6, 9/25/92) (57, 6/10/94)
Bryophaenocladius sp.	—	—	(22.7, 10/3/94) (RR-9, 9/25/92)
Nanocladius sp.	3	7.2	(25.1, 8/21/95) (35, 8/28/95)
Nanocladius distinctus	3	7.2	(22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (25, 9/27/95) (32.4, 8/17/95) (34, 8/25/95) (35, 8/28/95) (49.1, 7/29/93) (49.1, 6/15/94) (RR-6, 9/25/92) (RR-7, 9/21/94) (RR-9, 9/22/94)
Nanocladius minimus	3	7.2	(22.7, 10/3/94) (22.71, 10/3/94) (25.3, 8/21/95) (32.4, 8/17/95) (49, 7/29/93) (49, 9/24/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.2, 6/9/94) (50, 6/15/94) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94)
Nanocladius rectinervis	3	7.2	(31, 8/12/95) (32.2, 8/29/95) (RR-6, 9/25/92)
Nanocladius spiniplenus	3	7.2	(22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (25, 9/27/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.4, 8/17/95) (32.8, 9/27/95) (33, 8/30/95) (35, 8/28/95) (49, 7/29/93) (49.1, 7/29/93) (49.1, 8/4/95) (50, 6/15/94)
Cardiocladius sp.	5	6.2	(22.69, 10/13/94) (22.72, 10/12/94) (22.9, 8/26/93) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (49, 6/9/94) (49.1, 6/15/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Cardiocladius obscurus	5	6.2	(17, 9/19/94) (17.1, 9/19/94) (22.71, 10/3/94) (22.73, 10/3/94) (25, 8/30/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (49, 7/29/93) (49, 8/4/95) (49.1, 8/4/95) (49.2, 6/9/94) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Psectrocladius sp.	8	3.8	(32.8, 9/27/95)
Symposiocladius sp.	—	—	(RR-6, 9/25/92)
Parametriocnemus lundbecki	5	3.7	(22.61, 10/3/94) (22.7, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (32.4, 8/17/95) (35, 8/28/95) (49.2, 6/9/94) (RR-6, 9/25/92) (57, 6/10/94)
Rheocricotopus robacki	6	7.7	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (24.5, 10/4/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49.1, 6/15/94) (49.2, 6/9/94) (50, 6/15/94) (RR-6, 9/25/92)
Cricotopus sp.	7	—	(35, 8/28/95)
Cricotopus tremulus	7	—	(22.69, 10/13/94) (22.7, 10/3/94) (23, 8/30/94) (24.5, 10/4/94) (25, 9/27/95) (31, 8/12/95) (32.2, 8/29/95) (34, 8/25/95) (49.1, 7/29/93) (49.1, 6/15/94) (50, 6/15/94) (RR-6, 9/25/92) (RR-7, 9/21/94) (RR-9, 9/22/94)
Cricotopus albiforceps	7	—	(50.1, 8/7/95)
Cricotopus annulator	7	—	(17.1, 9/19/94) (CEC, 10/4/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 6/9/94) (49, 8/4/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
C. annulator (Continued)			(49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94) (57, 6/10/94)
Cricotopus curtus	7	—	(17, 9/19/94) (22.7, 10/3/94) (25.3, 8/21/95) (32, 8/28/95) (32.8, 9/27/95) (34, 8/25/95) (34.5, 9/19/95) (49, 9/24/93) (50, 6/15/94) (51, 9/22/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-9, 9/22/94) (57, 6/10/94)
Cricotopus triannulatus	7	—	(17, 9/19/94) (17.1, 9/19/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.2, 8/21/95) (25.3, 8/21/95) (34, 8/25/95) (34.5, 9/19/95) (39, 9/23/94) (40, 9/23/94) (49, 6/9/94) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 6/9/94) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94) (57, 6/10/94)
Cricotopus trifascia	7	—	(22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.4, 8/17/95) (32.6, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (39, 9/23/94) (40, 9/23/94) (42, 9/30/94) (49, 6/9/94) (49.1, 6/15/94) (49.2, 6/9/94) (50, 6/15/94) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94) (57, 6/10/94)
Cricotopus bicinctus	7	8.7	(17, 9/19/94) (17.1, 9/19/94) (18, 9/15/94) (19, 9/15/94) (CEC, 10/4/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
C. bicinctus (Continued)			(32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 6/9/94) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 6/9/94) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Cricotopus vierriensis	7	4.8	(22.69, 10/13/94) (39, 9/23/94) (52, 9/13/94) (RR-6, 9/25/92) (RR-7, 9/21/94) (RR-9, 9/22/94)
Cricotopus (Isocladius) sp.	7	—	(32.2, 8/29/95)
Cricotopus (Isocladius) intersectus	7	—	(CEC, 10/4/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (34, 8/25/95) (35, 8/28/95) (RR-6, 9/25/92)
Cricotopus (Isocladius) laetus	7	—	(RR-9, 9/22/94)
Cricotopus (Isocladius) ornatus	7	—	(CEC, 10/4/94) (22.7, 10/3/94) (22.71, 10/3/94) (25, 9/27/95) (33, 8/30/95)
Cricotopus (Isocladius) reversus	7	—	(34, 8/25/95)
Cricotopus (Isocladius) sylvestris	7	10	(17, 9/19/94) (CEC, 10/4/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (25, 9/27/95) (32, 8/28/95) (32.8, 9/27/95) (49, 6/9/94) (49.1, 6/15/94) (49.2, 6/9/94) (50, 6/15/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (57, 6/10/94)
Orthocladius carlatus	6	—	(25, 9/27/95) (25.3, 8/21/95) (RR-6, 9/25/92)
Orthocladius obumbratus	6	8.8	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (25.3, 8/21/95) (39, 9/23/94) (51, 9/22/94) (RR-6, 9/25/92) (57, 6/10/94)
Orthocladius oliveri	—	—	(52.5, 10/27/94)
Paraphaenocladius sp.	—	—	(22.71, 10/3/94)
Synorthocladius n.r. *semivinens*	2	4.7	(17.1, 9/19/94) (18, 9/15/94)
Omisus sp.	—	—	(57, 6/10/94)
Smittia sp.	6	—	(57, 6/10/94)
Pseudosmittia sp.	6	—	(22.73, 10/3/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Parakiefferiella sp.	—	5.9	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (32.4, 8/17/95) (RR-6, 9/25/92)
Eukiefferiella brehmi	8	3.7	(22.73, 10/3/94)
Eukiefferiella claripennis	8	5.7	(22.73, 10/3/94) (50, 6/15/94) (RR-6, 9/25/92) (RR-9, 9/22/94)
Eukiefferiella coerulescens	8	—	(22.71, 10/3/94) (49, 6/9/94)
Eukiefferiella devonica	8	2.6	(22.69, 10/13/94)
Eukiefferiella gracei	8	2.7	(50, 6/15/94)
Eukiefferiella pseudomontana	8	—	(22.69, 10/13/94) (51, 9/22/94) (57, 6/10/94)
Tvetenia bavarica	5	4	(22.73, 10/3/94) (49.2, 6/9/94)
Tvetenia discoloripes	5	3.9	(22.71, 10/3/94) (22.73, 10/3/94) (22.9, 8/26/93) (24.5, 10/4/94) (39, 9/23/94) (40, 9/23/94) (49, 8/4/95) (52, 9/13/94)
Cryptochironomus sp.	8	—	(22.72, 10/12/94) (23, 8/30/94) (24, 8/30/94) (49.1, 6/15/94) (51, 9/22/94)
Cryptochironomus fulvus group	8	6.7	(22.61, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (25, 9/27/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (33, 8/30/95) (39, 9/23/94) (49, 7/29/93) (49, 8/4/95) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-9, 9/22/94)
Microtendipes caelum	6	6.2	(22.61, 10/3/94) (49, 8/4/95) (50.1, 8/7/95) (51, 9/22/94) (RR-6, 9/25/92)
Stictochironomus sp.	9	6.7	(50.1, 8/7/95) (51, 9/22/94) (57, 6/10/94)
Stenochironomus sp.	5	6.4	(22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (25.3, 8/21/95) (49.1, 7/29/93) (49.1, 8/4/95)
Tribelos jucundus	5	6.6	(32.2, 8/29/95)
Phaenopsectra prob. *dyari*	7	6.8	(22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (24.5, 10/4/94) (25, 9/27/95) (25.2, 8/21/95) (32.4, 8/17/95) (35, 8/28/95) (51, 9/22/94) (RR-6, 9/25/92) (57, 6/10/94)
Phaenopsectra flavipes	7	8.5	(CR-B, 8/17/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (33, 8/30/95) (35, 8/28/95)
Xenochironomus sp.	0	—	(50, 6/15/94)
Cryptotendipes sp.	6	6.1	(25.3, 8/21/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Dicrotendipes sp.	8	7.9	(34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (49.1, 7/29/93)
Dicrotendipes neomodestus	8	8.3	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (24.5, 10/4/94) (25, 9/27/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (40, 9/23/94) (42, 9/30/94) (49.1, 6/15/94) (RR-7, 9/21/94)
Dicrotendipes nervosus TYPE I	8	10	(32.4, 8/17/95) (RR-6, 9/25/92)
Dicrotendipes nervosus TYPE II	8	10	(25.3, 8/21/95) (35, 8/28/95) (40, 9/23/94) (RR-6, 9/25/92)
Dicrotendipes simpsonii	8	10	(25, 9/27/95) (RR-6, 9/25/92)
Glyptotendipes sp.	10	8.5	(CEC, 10/4/94) (22.71, 10/3/94) (22.72, 10/12/94)
Glyptotendipes lobiferus	10	8.5	(18, 9/15/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (32.2, 8/29/95)
Paratendipes albimanus	8	5.3	(35, 8/28/95)
Polypedilum sp.	6	—	(32.8, 9/27/95)
Polypedilum convictum	6	5.3	(17.1, 9/19/94) (18, 9/15/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (34, 8/25/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 9/24/93) (49, 6/9/94) (49, 8/4/95) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Polypedilum fallax group	6	6.7	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (24, 8/30/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
P. fallax group (Continued)			(32.8, 9/27/95) (33, 8/30/95) (34.5, 9/19/95) (35, 8/28/95) (41, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 8/4/95) (52, 9/13/94) (RR-6, 9/25/92)
Polypedilum illinoense	6	9.2	(17.1, 9/19/94) (18, 9/15/94) (CEC, 10/4/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (CR-A, 8/17/95) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 6/9/94) (50, 6/15/94) (50.1, 8/7/95) (52, 9/13/94) (RR-6, 9/25/92) (RR-9, 9/22/94) (57, 6/10/94)
Polypedilum (Tripodura) scalaenum	6	8.7	(22.61, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (25.2, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (33, 8/30/95) (35, 8/28/95) (50.1, 8/7/95) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (49.2, 8/7/95) (50.1, 8/7/95) (RR-6, 9/22/94) (RR-9, 9/22/94)
Einfeldia sp.	9	—	(CR-A, 8/17/95) (57, 6/10/94)
Endochironomus nigricans	10	7.5	(22.61, 10/3/94) (22.7, 10/3/94) (24.5, 10/4/94) (25.3, 8/21/95) (39, 9/23/94)
Parachironomus sp.	10	9.2	(50.1, 8/7/95)
Parachironomus aborbtivus	10	9.2	(22.73, 10/3/94) (25.3, 8/21/95) (RR-6, 9/25/92)
Parachironomus corinatus	10	9.2	(25.2, 8/21/95)
Parachironomus frequens	10	9.2	(CEC, 10/4/94) (25.2, 8/21/95) (25.3, 8/21/95) (40, 9/23/94) (42, 9/30/94) (49.1, 7/29/93) (49.1, 8/4/95)
Parachironomus hirtalatus	10	9.2	(CEC, 10/4/94)
Pseudochironomus sp.	5	4.2	(24.5, 10/4/94) (49.1, 9/24/93)
Chironomus sp.	10	9.8	(22.7, 10/3/94) (22.72, 10/12/94) (25.2, 8/21/95) (32.6, 8/30/95) (32.2, 8/29/95) (RR-7, 9/21/94) (RR-9, 9/22/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Chironomus anthracinus group	10	9.8	(31, 8/12/95) (33, 8/30/95)
Chironomus decorus group	10	9.8	(22.61, 10/3/94) (22.73, 10/3/94) (24.5, 10/4/94) (25, 9/27/95) (25.2, 8/21/95) (39, 9/23/94) (41, 9/30/94) (49, 7/29/93) (49.1, 6/15/94) (RR-6, 9/25/92) (57, 6/10/94)
Chironomus riparius group	10	9.8	(17, 9/19/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (25, 9/27/95) (32, 8/28/95) (32.4, 8/17/95) (34, 8/25/95) (34.5, 9/19/95) (42, 9/30/94) (RR-6, 9/25/92)
Chironomus tentans	10	9.8	(22.7, 10/3/94) (25, 9/27/95) (32, 8/28/95) (32.8, 9/27/95)
Cladotanytarsus sp.	7	3.7	(35, 8/28/95)
Zavrelia sp.	—	2.7	(RR-6, 9/22/94)
Paratanytarsus sp.	6	7.7	(17.1, 9/19/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (33, 8/30/95) (35, 8/28/95) (40, 9/23/94) (49.1, 8/4/95) (49.2, 8/7/95) (50.1, 8/7/95) (RR-6, 9/22/94) (RR-9, 9/22/94)
Rheotanytarsus distinctissimus group	6	6.4	(22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.4, 8/17/95) (39, 9/23/94) (42, 9/30/94) (49.2, 8/7/95) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)
Rheotanytarsus exiguus group	6	6.4	(17.1, 9/19/94) (18, 9/15/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25.3, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (39, 9/23/94) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49.1, 8/4/95) (50.1, 8/7/95) (51, 9/22/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Tanytarsus sp.	6	6.7	(51, 9/22/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Tanytarsus glabrascens group	6	6.7	(17.1, 9/19/94) (18, 9/15/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.8, 9/27/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 8/4/95) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50, 6/15/94) (50.1, 8/7/95) (51, 9/22/94) (52, 9/13/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Tanytarsus guerlus group	6	6.7	(17.1, 9/19/94) (19, 9/15/94) (22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.73, 10/3/94) (CR-A, 8/17/95) (25, 9/27/95) (25.3, 8/21/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.8, 9/27/95) (35, 8/28/95) (39, 9/23/94) (40, 9/23/94) (42, 9/30/94) (49, 8/4/95) (49.1, 9/24/93) (50.1, 8/7/95) (51, 9/22/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94) (57, 6/10/94)
Micropsectra polita ?	7	1.4	(22.73, 10/3/94)
Athericidae			
Atherix sp.	—	—	(49, 8/4/95) (50.1, 8/7/95)
Atherix variegata / lantha	2	2.1	(22.69, 10/13/94) (22.72, 10/12/94) (22.9, 8/26/93) (23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (41, 9/30/94) (42, 9/30/94) (49.1, 9/24/93) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 8/7/95) (50.1, 8/7/95) (51, 9/22/94) (RR-6, 9/22/94)
Stratiomyidae			
Nemotelus sp.	—	—	(25.2, 8/21/95)
Odotomyia sp.	—	—	(19, 9/15/94) (25.2, 8/21/95) (33, 8/30/95)
Empididae			
Hemerodromia sp.	6	8.1	(17.1, 9/19/94) (18, 9/15/94) (CEC, 10/4/94) (22.61, 10/3/94) (22.69, 10/13/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (22.9, 8/26/93) (CR-A, 8/17/95) (CR-B, 8/17/95)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Hemerodromia sp. (Continued)			(23, 8/30/94) (24, 8/30/94) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 8/4/95) (49.1, 9/24/93) (49.1, 8/4/95) (49.2, 7/29/93) (49.2, 6/9/94) (49.2, 8/7/95) (50.1, 8/7/95) (51, 9/22/94) (52.5, 10/27/94) (57, 6/10/94)
Dolichopodidae			(42, 9/30/94)
Syrphidae			
Myolepta sp.	—	—	(22.7, 10/3/94)
Ephydridae			(32.4, 8/17/95) (32.6, 8/30/95) (49, 8/4/95)
Ephydra sp.	6	—	(32, 8/28/95)
Muscidae			(34, 8/25/95)
Limnophora sp.	6	7	(25, 9/27/95) (33, 8/30/95)
Mollusca			
Gastropoda			
Mesogastropoda			
Hydrobiidae			
Amnicola limosa	—	4.8	(18, 9/15/94) (19, 9/15/94)
Basommatophora			
Ancylidae			
Ferrissia paralella	—	6.9	(22.61, 10/3/94) (22.7, 10/3/94) (22.71, 10/3/94) (22.72, 10/12/94) (22.73, 10/3/94) (CR-A, 8/17/95) (CR-B, 8/17/95) (24.5, 10/4/94) (25, 9/27/95) (25.1, 8/21/95) (25.2, 8/21/95) (25.3, 8/21/95) (35, 8/28/95) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49, 7/29/93) (49, 9/24/93) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.1, 6/15/94) (49.1, 8/4/95) (49.2, 6/9/94) (50, 6/15/94) (51, 9/22/94) (52.5, 10/27/94) (RR-6, 9/25/92) (RR-6, 9/22/94) (RR-7, 9/21/94) (RR-9, 9/22/94)

Taxon	HBI Tolerance Values	NCBI Tolerance Values	Site and Date Collected
Planorbidae			
Gyraulus parvus	—	—	(19, 9/15/94) (22.69, 10/13/94) (CR-B, 8/17/95) (25.2, 8/21/95) (31, 8/12/95) (49.1, 8/4/95) (32.4, 8/17/95)
Physidae			
Physella sp.	—	9.1	(22.72, 10/12/94) (32.4, 8/17/95)
Physella gyrina sayi	—	9.1	(24, 8/30/94) (25.2, 8/21/95) (25.3, 8/21/95)
Physella vinosa	—	9.1	(17, 9/19/94) (CEC, 10/4/94) (22.71, 10/3/94) (CR-A, 8/17/95) (24.5, 10/4/94) (25, 8/30/95) (25, 9/27/95) (25.2, 8/21/95) (25.3, 8/21/95) (31, 8/12/95) (32, 8/28/95) (32.2, 8/29/95) (32.4, 8/17/95) (32.6, 8/30/95) (32.8, 9/27/95) (33, 8/30/95) (34, 8/25/95) (34.5, 9/19/95) (35, 8/28/95) (40, 9/23/94) (41, 9/30/94) (42, 9/30/94) (49.1, 9/24/93) (52, 9/13/94)
Lymnaeidae			
Fossaria humilis	—	—	(33, 8/30/95)
Stagnicola catascopium	—	8	(CEC, 10/4/94) (35, 8/28/95)
Pelecypoda			
Eulamellibranchia			
Sphaeriidae	—	—	(CR-A, 8/17/95)
Musculium sp.	—	—	(23, 8/30/94) (49.1, 6/15/94)
Musculium transversum	—	—	(50, 6/15/94)
Pisidium sp.	—	6.8	(41, 9/30/94)
Pisidium amnicum	—	6.8	(52.5, 10/27/94) (RR-6, 9/22/94) (RR-7, 9/21/94)
Pisidium walkeri mainense	—	6.8	(51, 9/22/94)
Sphaerium sp.	—	7.7	(49.1, 8/4/95)
Sphaerium occidentale	—	7.7	(42, 9/30/94)
Sphaerium rhomboideum	—	7.7	(40, 9/23/94) (41, 9/30/94) (52, 9/13/94)
Sphaerium striatinum	—	7.7	(25.1, 8/21/95) (25.2, 8/21/95) (49, 8/4/95) (49.1, 7/29/93) (49.1, 9/24/93) (49.2, 7/29/93) (49.2, 8/7/95) (50.1, 8/7/95)

APPENDIX E
RESULTS OF ELECTROSHOCK FISH SAMPLING,
1993 - 1995

Fish Collection Methods

NEORSD performed quantitative sampling for fish during 1993-1995 utilizing its 17' Coffelt aluminum electrofishing boat and generator-powered longline electroshocking equipment (Sampler Type E). Specimens were identified to species level, weighed, counted and examined for the presence of DELT anomalies and returned to the stream from which they were collected. DELT anomalies include deformities, eroded fins, lesions and tumors. Fish which were not identified in the field were placed in formalin and sent to the Ohio State University's Museum of Biological Diversity, where they were identified by the Curator of Fishes. Electroshock fish sampling was performed at the following areas:

1 Cuyahoga River (upstream and downstream of Southerly WWTP effluent)
2 Rocky River (upstream and downstream of Berea WWTP and upstream of Baldwin Lake)
3 Mill Creek (Eleven biomonitoring sites throughout the Mill Creek Watershed)

Longline generator electrofishing consists of wading in a sample zone in an upstream direction for a distance of 150-200 meters and electroshocking all habitat types including undercut banks, brush piles, log jams, boulders and other submerged structures. Fish are then netted and placed in a nylon floating live well where they are later processed. Ohio EPA protocols require two or three individual sampling passes to assess fish community health.

Boat electrofishing consists of shocking all habitat types within a sampling zone which is 0.5 kilometers in length, while moving from upstream to downstream. In zones with extensive woody debris and abundant cover, a slower boat speed is necessary to maneuver the boat in and out of areas. The stunned fish are collected and put in an on-board live well for later processing. According to Ohio EPA protocols, each boat sampling zone should be electrofished two or three times during the sampling season.

The electroshocking data collected by NEORSD was compiled and used to evaluate fish community health through the use of two Ohio EPA indices, the Index of Biotic Integrity (IBI) and the Modified Index of Well Being (MIwb). The IBI incorporates 12 community metrics representing structural and functional attributes. The structural attributes are based upon fish community aspects such as fish numbers and diversity. Functional attributes are based upon fish community aspects such as feeding strategies, environmental tolerances and disease symptoms. These metrics are individually scored by comparing the data collected at a survey site with values expected at reference sites located in a similar geographic region. The maximum IBI score is 60 and the minimum is 12. The summation of the 12 individual metric scores provides a single value IBI score which determines the narrative rating ("exceptional," "good," "fair," or "poor") of a fish community.

The modified Index of Well Being (MIwb) incorporates four fish community measures: numbers of individuals, biomass, and the Shannon Diversity Index (H) based on numbers and weight of fish. Unlike the IBI score, the MIwb score is the result of a mathematical calculation based upon the formula:

Modified Index of Well-Being

$$MIwb = 0.5 \ln N + 0.5 \ln B + \bar{H}(No.) + \bar{H}(Wt.)$$

where:

N = Relative numbers of all species excluding species designated "highly tolerant"

B = Relative weights of all species excluding species designated "highly tolerant"

$\bar{H}(No.)$ = Shannon Diversity Index based on numbers

$\bar{H}(Wt.)$ = Shannon Diversity Index based on weight

Shannon Diversity Index

$$\bar{H} = -\sum \left[\left(\frac{n_i}{N} \right) \log_e \left(\frac{n_i}{N} \right) \right]$$

where:

n_i = Relative numbers or weight of species

N = Total number or weight of the sample

A detailed description of the sampling and analysis methods utilized in fish surveys including calculations of IBI's and MIwb's can be found in OEPA's Biological Criteria for the Protection of Aquatic Life Volumes II and III (1987). The following is a list of all fishes collected by NEORSD during 1993-1995, which includes species, numbers, weights, pollution tolerances, and incidence of DELT anomalies.

Cuyahoga River Upstream of Southerly WWTP
Sample Date: 10/14/94
Collection Distance: 0.50 km
Collection Method: Boat Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Campostoma anomalum Central stoneroller minnow	4	0.086	--	--
Hypentelium nigricans Northern hog sucker	7	1.580	Moderately Intolerant	--
Catostomus commersoni Common white sucker	50	2.918	Highly Tolerant	--
Percina caprodes Northern log perch	1	0.020	--	--
Dorosoma cepedianum Eastern gizzard shad	32	--	--	--
Cyprinus carpio Common carp	1	0.030	Highly Tolerant	--
Lepomis cyanellus Green sunfish	1	0.008	Highly Tolerant	--
Lepomis macrochirus Bluegill sunfish	1	0.002	Moderately Tolerant	--
Ictalurus natalis Yellow bullhead	1	0.270	Highly Tolerant	--
Totals	98	4.914		

Index of Biotic Integrity (IBI) =18 (Poor)

Cuyahoga River Downstream of Southerly WWTP
Sample Date: 10/14/94
Collection Distance: 0.50 km
Collection Method: Boat Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Pimephales notatus Bluntnose minnow	2	0.008	Highly Tolerant	--
Cyprinus carpio Common carp	10	23.973	Highly Tolerant	--
Catostomus commersoni Common white sucker	17	2.754	Highly Tolerant	Dorsal Lesion (1)
Dorosoma cepedianum Eastern gizzard shad	19	3.143	--	--
Hypentelium nigricans Northern hog sucker	2	0.370	Moderately Intolerant	--
Moxostoma erythrurum Golden redhorse	1	0.350	Moderately Intolerant	--
Notropis atherinoides Emerald shiner	1	0.004	--	--
Pimephales promelas Northern fathead minnow	1	0.010	Highly Tolerant	--
Ictalurus natalis Yellow bullhead	1	0.270	Highly Tolerant	Lip Lesion (1)
Totals	54	30.882		

*DELT anomalies were observed on 3.7% (2) of the fish collected.
Index of Biotic Integrity (IBI) =16 (Poor)

Mill Creek Site 35.2 - North of Halburton Road
Sample Date: 7/11/95
Collection Distance: 0.15 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies

NO FISH COLLECTED

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 35.2 - North of Halburton Road
Sample Date: 9/12/95
Collection Distance: 0.15 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies

NO FISH COLLECTED

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 35.0 - Northfield Road
Sample Date: 7/10/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Semotilus atromaculatus Creek chub	180	1.682	Highly Tolerant	Deformed Dorsal (1) Mouth Lesion (4)
Rhinicthys atratulus Blacknose dace	63	0.158	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	2	0.008	Highly Tolerant	--
Pomoxis nigromaculatus Black crappie	27	0.062	--	--
Totals	272	1.91		

*DELT anomalies were observed on 1.8% (5) of the fish collected.
Index of Biotic Integrity (IBI) = 16 (Very Poor)

Mill Creek Site 35.0 - Northfield Road
Sample Date: 9/12/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Semotilus atromaculatus Creek chub	225	1.639	Highly Tolerant	Lip Lesion (2)
Rhinicthys atratulus Blacknose dace	185	0.456	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	11	0.040	Highly Tolerant	--
Pomoxis nigromaculatus Black crappie	5	0.018	--	--
Totals	426	2.153		

*DELT anomalies were observed on 0.46% (2) of the fish collected.
Index of Biotic Integrity (IBI) = 18 (Poor)

Mill Creek Site 34.5 - Downstream of Miles Avenue
Sample Date: 7/28/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
NO FISH COLLECTED				

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 34.5 - Downstream of Miles Avenue
Sample Date: 9/6/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Rhinicthys atratulus Blacknose dace	30	0.114	Highly Tolerant	--
Semotilus atromaculatus Creek chub	21	0.182	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	1	0.002	Highly Tolerant	--
Totals	52	0.298		

Index of Biotic Integrity (IBI) =14 (Very Poor)

Mill Creek Site 34.0 - Rex Road
Sample Date: 7/10/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	4	0.174	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	2	0.010	Highly Tolerant	--
Totals	6	0.184		

Index of Biotic Integrity (IBI) =12 (Very Poor)

Mill Creek Site 34.0 - Rex Road
Sample Date: 9/6/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Rhinicthys atratulus Blacknose dace	211	0.281	Highly Tolerant	--
Semotilus atromaculatus Creek chub	332	0.969	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	7	0.018	Highly Tolerant	--
Totals	550	1.268		

Index of Biotic Integrity (IBI) =20 (Poor)

Mill Creek Site 33.0 - Wolf Creek
Sample Date: 7/10/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
NO FISH COLLECTED				

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 33.0 - Wolf Creek
Sample Date: 9/6/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies

NO FISH COLLECTED

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 32.8 - Downstream of Wolf Creek
Sample Date: 7/26/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	176	0.354	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	4	0.016	Highly Tolerant	--
Rhinicthys atratulus Blacknose dace	22	0.096	Highly Tolerant	--
Carassius auratus Goldfish	1	0.002	Highly Tolerant	--
Pomoxis nigromaculatus Black crappie	3	0.012	--	--
Totals	206	0.48		

Index of Biotic Integrity (IBI) =20 (Poor)

Mill Creek Site 32.8 - Downstream of Wolf Creek
Sample Date: 9/12/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Rhinicthys atratulus Blacknose dace	89	0.166	Highly Tolerant	--
Semotilus atromaculatus Creek chub	460	1.230	Highly Tolerant	Deformed Mouth (2)
Pimephales promelas Northern fathead minnow	5	0.010	Highly Tolerant	--
Totals	554	1.406		

*DELT anomalies were observed on 0.36% (2) of the fish collected.
Index of Biotic Integrity (IBI) = 18 (Poor)

Mill Creek Site 32.6 - Broadway Avenue
Sample Date: 6/21/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	3	0.122	Highly Tolerant	--
Totals	3	0.122		

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 32.6 - Broadway Avenue
Sample Date: 8/8/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	98	0.644	Highly Tolerant	--
Rhinicthys atratulus Blacknose dace	8	0.042	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	2	0.006	Highly Tolerant	--
Pomoxis nigromaculatus Black crappie	2	0.012	--	--
Totals	110	0.704		

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 32.4 - Downstream of Falls
Sample Date: 7/12/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	2	0.094	Highly Tolerant	--
Totals	2	0.094		

Index of Biotic Integrity (IBI) = 12 (Very Poor)

Mill Creek Site 32.4 - Downstream of Falls
Sample Date: 9/25/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	332	2.022	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	56	0.614	--	--
Pimephales promelas Northern fathead minnow	15	0.072	Highly Tolerant	--
Rhinicthys atratulus Blacknose dace	35	0.138	Highly Tolerant	--
Lepomis cyanellus Green sunfish	2	0.112	Highly Tolerant	--
Catostomus commersoni Common white sucker	2	0.418	Highly Tolerant	--
Totals	442	3.376		

Index of Biotic Integrity (IBI) = 22 (Poor)

Mill Creek Site 32.2 - Upstream of Warner Road Tributary
Sample Date: 6/16/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Campostoma anomalum Central stoneroller minnow	8	0.100	--	--
Lepomis cyanellus Green sunfish	1	0.020	Highly Tolerant	--
Rhinicthys atratulus Blacknose dace	1	0.006	Highly Tolerant	--
Semotilus atromaculatus Creek chub	9	0.188	Highly Tolerant	--
Totals	19	0.314		

Index of Biotic Integrity (IBI) = 12 (Very Poor)
Modified Index of Well-Being (MIwb) = 2.2 (Very Poor)

Mill Creek Site 32.2 - Upstream of Warner Road Tributary
Sample Date: 8/7/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Campostoma anomalum Central stoneroller minnow	190	1.670	--	Dorsal Fin Lesion (1)
Catostomus commersoni Common white sucker	78	1.276	Highly Tolerant	--
Semotilus atromaculatus Creek chub	88	1.422	Highly Tolerant	--
Rhinicthys atratulus Blacknose dace	12	0.096	Highly Tolerant	--
Notropis spilopterus Spotfin shiner	2	0.030	--	--
Ictalurus natalis Yellow bullhead	1	0.032	Highly Tolerant	--
Lepomis macrochirus Bluegill sunfish	1	0.024	Moderately Tolerant	Dorsal Lesion (1)
Pomoxis nigromaculatus Black crappie	2	0.022	--	--
Pimephales notatus Bluntnose minnow	4	0.042	Highly Tolerant	--
Lepomis cyanellus Green sunfish	3	0.098	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	2	0.012	Highly Tolerant	--
Totals	383	4.724		

*DELT anomalies were observed on 0.52% (2) of the fish collected.
Index of Biotic Integrity (IBI) = 26 (Poor)
Modified Index of Well Being (MIwb) = 5.4 (Poor)

Mill Creek Site 32.0 - Warner Road Tributary
Sample Date: 6/16/95
Collection Distance: 0.15 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	1	0.050	Highly Tolerant	--
Catostomus commersoni Common white sucker	1	0.018	Highly Tolerant	--
Totals	2	0.068		

Index of Biotic Integrity (IBI) =12 (Very Poor)

Mill Creek Site 32.0 - Warner Road Tributary
Sample Date: 8/8/95
Collection Distance: 0.15 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Catostomus commersoni Common white sucker	22	0.190	Highly Tolerant	--
Semotilus atromaculatus Creek chub	12	0.238	Highly Tolerant	Dorsal Fin Lesion (1)
Pimephales promelas Northern fathead minnow	1	0.004	Highly Tolerant	--
Totals	35	0.432		

*DELT anomalies were observed on 2.8% (1) of the fish collected.
Index of Biotic Integrity (IBI) = 18 (Poor)

Mill Creek Site 31.0 - Canal Road
Sample Date: 6/16/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Semotilus atromaculatus Creek chub	3	0.072	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	12	0.1	--	--
Catostomus commersoni Common white sucker	2	0.014	Highly Tolerant	--
Pimephales promelas Northern fathead minnow	2	0.018	Highly Tolerant	--
Cyprinus carpio Common carp	1	0.640	Highly Tolerant	--
Lepomis cyanellus Green sunfish	1	0.050	Highly Tolerant	--
Totals	21	0.894		

Index of Biotic Integrity (IBI) = 14 (Very Poor)
Modified Index of Well-Being (MIwb) = 2.8 (Very Poor)

Mill Creek Site 31.0 - Canal Road
Sample Date: 8/3/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Catostomus commersoni Common white sucker	72	1.668	Highly Tolerant	Head (1), Body (1), Pectoral (1), and Mouth Lesions (1)
Semotilus atromaculatus Creek chub	19	0.238	Highly Tolerant	--
Pimephales notatus Bluntnose minnow	4	0.016	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	14	0.096	--	--
Notropis spilopterus Spotfin shiner	2	0.010	--	--
Lepomis macrochirus Bluegill sunfish	16	0.222	Moderately Tolerant	--
Lepomis cyannellus Green sunfish	6	0.180	Highly Tolerant	--
Pomoxis nigromaculatus Black crappie	5	0.021	--	--
Ictalurus nebulosus Brown bullhead	3	0.062	Highly Tolerant	Body Lesion (1)
Ambloplites rupestris Northern rockbass	1	0.032	--	--
Micropterus salmoides Largemouth bass	4	0.146	--	--
Cyprinus carpio Common carp	3	0.310	Highly Tolerant	--
Carassius auratus Goldfish	1	0.002	Highly Tolerant	--

Mill Creek Site 31.0 - Canal Road
Sample Date: 8/3/95
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Dorosoma cepedianum Eastern gizzard shad	6	0.104	--	--
Lepomis gibbosus Pumpkinseed sunfish	1	0.012	Moderately Tolerant	--
Totals	157	3.119		

*DELT anomalies were observed on 3.2% (5) of the fish collected.
Index of Biotic Integrity (IBI) = 24 (Poor)
Modified Index of Well Being (MIwb) = 5.7 (Poor)

Rocky River Upstream of Baldwin Lake
Sample Date: 10/15/93
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Pimephales notatus Bluntnose minnow	147	0.374	Highly Tolerant	--
Cyprinus carpio Common carp	1	0.004	Highly Tolerant	--
Semotilus atromaculatus Creek chub	14	0.322	Highly Tolerant	--
Micropterus dolomieui Smallmouth bass	1	0.020	Moderately Intolerant	--
Notropis cornutus Common shiner	17	0.220	--	--
Etheostoma nigrum Johnny darter	2	0.004	--	--
Lepomis cyanellus Green sunfish	1	0.002	Highly Tolerant	--
Ambloplites rupestris Northern rock bass	3	0.028	--	--
Lepomis gibbosus Pumpkinseed sunfish	3	0.066	Moderately Tolerant	--
Hypentelium nigricans Northern hog sucker	55	1.212	Moderately Intolerant	--
Catostomus commersoni Common white sucker	19	0.822	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	168	1.249	--	--
Notropis dorsalis Bigmouth shiner	1	0.004	--	--

Rocky River Upstream of Baldwin Lake
Sample Date: 10/15/93
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	DELT Anomalies
Notropis spilopterus Spotfin shiner	2	0.008	--	--
Etheostoma blennoides Greenside darter	17	0.060	Moderately Intolerant	--
Moxostoma erythrurum Golden redhorse	5	0.020	Moderately Intolerant	--
Totals	456	4.415		

Index of Biotic Integrity (IBI) = 30 (Fair)
Modified Index of Well Being (MIwb) = 7.2 (Fair)

Rocky River Upstream of Baldwin Lake
Sample Date: 8/24/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Ambloplites rupestris Northern rock bass	16	0.510	--	--
Pimephales notatus Bluntnose minnow	1122	2.830	Highly Tolerant	Mouth Lesions (4)
Notropis spilopterus Spotfin shiner	17	0.050	--	--
Notropis cornutus Common shiner	26	0.173	--	--
Rhinicthys atratulus Blacknose dace	4	0.012	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	615	3.543	--	Deformed Eye (1), Deformed Spine (1)
Ictalurus natalis Yellow bullhead	2	0.052	Highly Tolerant	--
Hypentelium nigricans Northern hog sucker	73	1.549	Moderately Intolerant	--
Etheostoma Rainbow darter	37	0.108	Moderately Intolerant	--
Etheostoma blennoides Greenside darter	74	0.322	Moderately Intolerant	--
Micropterus salmoides Largemouth bass	12	1.242	--	Tail and Mouth Lesions (2)
Lepomis macrochirus Bluegill sunfish	5	0.040	Moderately Tolerant	--
Notropis stramineus Sand shiner	84	0.029	Moderately Intolerant	--

Rocky River Upstream of Baldwin Lake
Sample Date: 8/24/95
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Semotilus atromaculatus Creek chub	6	0.022	Highly Tolerant	--
Etheostoma nigrum Johnny darter	5	0.010	--	--
Catostomus Commersoni Common white sucker	21	0.918	Highly Tolerant	Mouth, Dorsal, and Body Lesions (3)
Percina maculata Blackside darter	1	0.002	--	--
Cyprinus carpio Common carp	3	3.702	Highly Tolerant	--
Moxostoma erythrurum Golden redhorse	2	0.046	Moderately Intolerant	--
Lepomis cyannellus Green sunfish	4	0.046	Highly Tolerant	--
Notropis dorsalis Bigmouth shiner	2	0.008	--	--
Totals	2131	15.214		

*DELT anomalies were observed on 0.5% (11) of the fish collected.
Index of Biotic Integrity (IBI) = 27 (Poor)
Modified Index of Well Being (MIwb) = 8.3 (Good)

Rocky River Upstream of Baldwin Lake
Sample Date: 10/12/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Hypentelium nigricans Northern hog sucker	45	1.874	Moderately Intolerant	Deformed Fin (1)
Catostomus commersoni Common white sucker	43	2.820	Highly Tolerant	Deformed Eye, Tail Lesion (2)
Cyprinus carpio Common carp	4	0.314	Highly Tolerant	--
Ambloplites rupestris Northern rock bass	6	0.124	--	--
Etheostoma blennoides Greenside darter	8	0.040	Moderately Intolerant	--
Notropis cornutus Common shiner	5	0.072	--	--
Notropis stramineus Sand shiner	8	0.022	Moderately Intolerant	--
Pimephales notatus Bluntnose minnow	171	0.200	Highly Tolerant	--
Notropis spilopterus Spotfin shiner	3	0.010	--	--
Campostoma anomalum Central stoneroller minnow	114	0.608	--	--
Lepomis cyanellus Green sunfish	2	0.012	Highly Tolerant	--
Semotilus atromaculatus Creek chub	5	0.032	Highly Tolerant	--
Lepomis macrochirus Bluegill sunfish	1	0.002	Moderately Tolerant	--

Rocky River Upstream of Baldwin Lake
Sample Date: 10/12/95
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Etheostoma nigrum Johnny darter	8	0.016	--	--
Etheostoma caeruleum Rainbow darter	2	0.006	Moderately Intolerant	--
Totals	425	6.152		

*DELT anomalies were observed on 0.7% (3) of the fish collected.
Index of Biotic Integrity (IBI) = 28 (Fair)
Modified Index of Well Being (MIwb) = 6.8 (Fair)

Rocky River Upstream of Berea WWTP
Sample Date: 8/10/93
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Hypentelium nigricans Northern hog sucker	52	2.358	Moderately Intolerant	--
Catostomus commersoni Common white sucker	13	0.712	Highly Tolerant	Dorsal Lesion (1)
Etheostoma blennoides Greenside darter	31	0.262	Moderately Intolerant	--
Cyprinus carpio Common carp	5	8.075	Highly Tolerant	--
Pimephales notatus Bluntnose minnow	13	0.091	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	119	0.538	--	--
Semotilus atromaculatus Creek chub	24	0.163	Highly Tolerant	--
Notropis stramineus Sand shiner	1	0.008	Moderately Intolerant	--
Etheostoma caeruleum Rainbow darter	1	0.002	Moderately Intolerant	--
Rhinicthys atratulus Blacknose dace	1	0.002	Highly Tolerant	--
Ictalurus natalis Yellow bullhead	1	0.110	Highly Tolerant	--
Lepomis cyanellus Green sunfish	1	0.020	Highly Tolerant	Mouth Lesion (1)
Notropis cornutus Common shiner	7	0.206	--	--

Rocky River Upstream of Berea WWTP
Sample Date: 8/10/93
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Totals	269	12.547		

*DELT anomalies were observed on 0.7% (2) of the fish collected.
Index of Biotic Integrity (IBI) = 34 (Marginally Good)
Modified Index of Well Being (MIwb) = 6.6 (Fair)

Rocky River Downstream of Berea WWTP
Sample Date: 9/23/93
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Catostomus commersoni Common white sucker	57	1.506	Highly Tolerant	--
Semotilus atromaculatus Creek chub	24	0.468	Highly Tolerant	--
Hypentelium nigricans Northern hog sucker	17	0.468	Moderately Intolerant	Tail Lesion (1)
Ictalurus natalis Yellow bullhead	2	0.008	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	62	0.316	--	--
Rhinicthys atratulus Blacknose dace	4	0.012	Highly Tolerant	--
Lepomis macrochirus Bluegill sunfish	1	0.002	Moderately Intolerant	--
Etheostoma caeruleum Rainbow darter	2	0.004	Moderately Intolerant	--
Lepomis cyanellus Green sunfish	2	0.013	Highly Tolerant	--
Etheostoma blennoides Greenside darter	15	0.108	Moderately Intolerant	--
Pimephales notatus Bluntnose minnow	8	0.030	Highly Tolerant	--
Notropis cornutus Common shiner	1	0.002	--	--
Totals	195	2.937		

Rocky River Downstream of Berea WWTP
Sample Date: 9/23/93
(Continued)

*DELT anomalies were observed on 0.5% (1) of the fish collected.
Index of Biotic Integrity (IBI) = 26 (Fair)
Modified Index of Well Being (MIwb) = 6.2 (Fair)

Rocky River Upstream of Berea WWTP
Sample Date: 10/13/93
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Cyprinus carpio Common carp	2	3.140	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	87	0.542	--	Dorsal Lesion (1)
Notropis spilopterus Spotfin shiner	5	0.012	--	--
Ictalurus natalis Yellow bullhead	3	0.210	Highly Tolerant	--
Notropis cornutus Common shiner	50	0.520	--	Body Lesion (1)
Micropterus salmoides Largemouth bass	9	0.120	--	--
Etheostoma blennoides Greenside darter	11	0.084	Moderately Intolerant	--
Hypentelium nigricans Northern hog sucker	16	0.380	Moderately Intolerant	--
Notropis stramineus Sand shiner	2	0.006	Moderately Intolerant	--
Catostomus commersoni Common white sucker	67	1.749	Highly Tolerant	Body Lesions, Dorsal, Ventral Lesions (7)
Etheostoma caeruleum Rainbow darter	1	0.002	Moderately Intolerant	--
Lepomis cyanellus Green sunfish	4	0.062	Highly Tolerant	--
Ictalurus punctatus Channel catfish	1	0.009	--	--

Rocky River Upstream of Berea WWTP
Sample Date: 10/13/93
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Carassius auratus Goldfish	1	0.180	Highly Tolerant	--
Semotilus atromaculatus Creek chub	42	0.372	Highly Tolerant	--
Moxostoma erythrurum Golden redhorse	1	0.004	Moderately Intolerant	--
Pimephales notatus Bluntnose minnow	75	0.210	Highly Tolerant	Mouth Lesions (2)
Totals	377	7.602		

*DELT anomalies were observed on 2.9% (11) of the fish collected.
Index of Biotic Integrity (IBI) = 28 (Fair)
Modified Index of Well Being (MIwb) = 6.2 (Fair)

Rocky River Upstream of Berea WWTP
Sample Date: 8/23/95
Collection Distance: 0.175 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Campostoma anomalum Central stoneroller minnow	217	2.154	--	--
Semotilus atromaculatus Creek chub	31	0.356	Highly Tolerant	Fin, Mouth, and Body Lesions (2)
Notropis spilopterus Spotfin shiner	2	0.016	--	--
Notropis cornutus Common shiner	6	0.088	--	--
Pimephales notatus Bluntnose minnow	23	0.143	Highly Tolerant	--
Etheostoma blennoides Greenside darter	41	0.304	Moderately Intolerant	--
Etheostoma caeruleum Rainbow darter	1	0.004	Moderately Intolerant	--
Lepomis cyanellus Green sunfish	11	0.136	Highly Tolerant	--
Micropterus salmoides Largemouth bass	3	0.180	--	--
Catostomus commersoni Common white sucker	5	0.248	Highly Tolerant	Body Lesion (1)
Hypentelium nigricans Northern hog sucker	57	1.098	Moderately Intolerant	--
Lepomis gibbosus Pumpkinseed sunfish	4	0.058	Moderately Tolerant	--
Ambloplites rupestris Rock bass	1	0.194	--	--

Rocky River Upstream of Berea WWTP
Sample Date: 8/23/95
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Cyprinus carpio Common carp	8	6.775	Highly Tolerant	--
Totals	410	11.754		

*DELT anomalies were observed on 0.7% (3) of the fish collected.
Index of Biotic Integrity (IBI) = 34 (Marginally Good)
Modified Index of Well Being (MIwb) = 7.2 (Fair)

Rocky River Upstream of Berea WWTP
Sample Date: 10/10/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Cyprinus carpio Common carp	5	4.80	Highly Tolerant	--
Hypentelium nigricans Northern hog sucker	39	0.99	Moderately Intolerant	--
Notropis cornutus Common shiner	12	0.244	--	Deformed Tail (1)
Campostoma anomalum Central stoneroller minnow	91	0.928	--	--
Lepomis macrochirus Bluegill sunfish	13	0.094	Moderately Tolerant	--
Pimephales notatus Bluntnose minnow	25	0.122	Highly Tolerant	--
Etheostoma blennoides Greenside darter	18	0.114	Moderately Intolerant	--
Catostomus commersoni Common white sucker	17	0.592	Highly Tolerant	Dorsal Fin Lesion (1)
Semotilus atromaculatus Creek chub	12	0.206	Highly Tolerant	Pectoral Fin Lesion (1)
Notropis stramineus Sand shiner	1	0.006	Moderately Intolerant	--
Lepomis cyanellus Green sunfish	15	0.142	Highly Tolerant	--
Micropterus salmoides Largemouth bass	3	0.020	--	--
Notropis spilopterus Spotfin shiner	20	0.104	--	--

Rocky River Upstream of Berea WWTP
Sample Date: 10/10/95
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Lepomis gibbosus Pumpkinseed sunfish	1	0.018	Moderately Tolerant	--
Pumpkinseed sunfish hybrid	1	0.010	--	--
Totals	273	8.39		

*DELT anomalies were observed on 1.1% (3) of the fish collected.
Index of Biotic Integrity (IBI) = 34 (Marginally Good)
Modified Index of Well Being (MIwb) = 7.2 (Fair)

Rocky River Downstream of Berea WWTP
Sample Date: 8/9/93
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Cyprinus carpio Common carp	5	9.325	Highly Tolerant	--
Semotilus atromaculatus Creek chub	67	1.905	Highly Tolerant	Fin and Lip Lesions (3)
Micropterus salmoides Largemouth bass	1	0.002	--	--
Catostomus commersoni Common white sucker	133	6.205	Highly Tolerant	Dorsal, Eye, and Pelvic Lesions (3)
Pimephales notatus Bluntnose minnow	51	0.268	Highly Tolerant	--
Lepomis macrochirus Bluegill sunfish	1	0.030	Moderately Tolerant	--
Campostoma anomalum Central stoneroller minnow	214	1.706	--	--
Notropis cornutus Common shiner	3	0.010	--	--
Hypentelium nigricans Northern hog sucker	31	1.468	Moderately Intolerant	--
Etheostoma blennoides Greenside darter	16	0.110	Moderately Intolerant	--
Rhinicthys atratulus Blacknose dace	2	0.010	Highly Tolerant	--
Notropis stramineus Sand shiner	1	0.004	Moderately Intolerant	--
Lepomis cyanellus Green sunfish	5	0.130	Highly Tolerant	--

Rocky River Downstream of Berea WWTP
Sample Date: 8/9/93
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Micropterus dolomieui Smallmouth bass	1	0.002	Moderately Intolerant	--
Ictalurus natalis Yellow bullhead	2	0.002	Highly Tolerant	--
Ictalurus punctatus Channel catfish	1	0.001	--	--
Totals	534	21.178		

*DELT anomalies were observed on 1.1% (6) of the fish collected.
Index of Biotic Integrity (IBI) = 22 (Poor)
Modified Index of Well Being (MIwb) = 7.0 (Fair)

Rocky River Downstream of Berea WWTP
Sample Date: 9/23/93
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Catostomus commersoni Common white sucker	57	1.506	Highly Tolerant	--
Semotilus atromaculatus Creek chub	24	0.468	Highly Tolerant	--
Hypentelium nigricans Northern hog sucker	17	0.468	Moderately Intolerant	Tail Lesion (1)
Ictalurus natalis Yellow bullhead	2	0.008	Highly Tolerant	--
Campostoma anomalum Central stoneroller minnow	62	0.316	--	--
Rhinicthys atratulus Blacknose dace	4	0.012	Highly Tolerant	--
Lepomis macrochirus Bluegill sunfish	1	0.002	Moderately Tolerant	--
Etheostoma caeruleum Rainbow darter	2	0.004	Moderately Intolerant	--
Lepomis cyanellus Green sunfish	2	0.013	Highly Tolerant	--
Etheostoma blennoides Greenside darter	15	0.108	Moderately Intolerant	--
Pimephales notatus Bluntnose minnow	8	0.030	Highly Tolerant	--
Notropis cornutus Common shiner	1	0.002	--	--
Totals	195	2.937		

Rocky River Downstream of Berea WWTP
Sample Date: 9/23/93
(Continued)

*DELT anomalies were observed on 0.5% (1) of the fish collected.
Index of Biotic Integrity (IBI) = 26 (Poor)
Modified Index of Well Being (MIwb) = 5.9 (Fair)

Rocky River Downstream of Berea WWTP
Sample Date: 10/13/93
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Catostomus commersoni Common white sucker	167	3.774	Highly Tolerant	Dorsal, Pectoral, and Mouth Lesions (3)
Etheostoma blennoides Greenside darter	11	0.078	Moderately Intolerant	--
Semotilus atromaculatus Creek chub	68	0.990	Highly Tolerant	Body Lesions (3)
Campostoma anomalum Central stoneroller minnow	125	0.702	--	--
Notropis dorsalis Bigmouth shiner	1	0.002	--	--
Hypentelium nigricans Northern hog sucker	28	0.729	Moderately Intolerant	--
Pimephales notatus Bluntnose minnow	87	0.188	Highly Tolerant	--
Notropis cornutus Common shiner	3	0.022	--	--
Moxostoma erythrurum Golden Redhorse	1	0.002	Moderately Intolerant	--
Totals	491	6.487		

*DELT anomalies were observed on 1.2% (6) of the fish collected.
Index of Biotic Integrity (IBI) = 22 (Poor)
Modified Index of Well Being (MIwb) = 6.0 (Fair)

Rocky River Downstream of Berea WWTP
Sample Date: 8/23/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Campostoma anomalum Central stoneroller minnow	267	2.598	--	Dorsal Fin Lesion (2)
Semotilus atromaculatus Creek chub	57	0.712	Highly Tolerant	--
Notropis spilopterus Spotfin shiner	2	0.018	--	--
Notropis cornutus Common shiner	13	0.176	--	Lip Lesion (1)
Pimephales notatus Bluntnose minnow	64	0.392	Highly Tolerant	--
Etheostoma blennoides Greenside darter	42	0.286	Moderately Intolerant	--
Etheostoma caeruleum Rainbow darter	2	0.010	Moderately Intolerant	--
Lepomis cyanellus Green Sunfish	19	0.234	Highly Tolerant	--
Micropterus salmoides Largemouth bass	3	0.014	--	--
Catastomus commersoni Common white sucker	5	0.144	Highly Tolerant	Lip Lesion (1)
Hypentelium nigricans Northern hog sucker	39	0.844	Moderately Intolerant	--
Notropis stramineus Sand shiner	13	0.074	Moderately Intolerant	--
Rhinicthys atratulus Blacknose dace	7	0.008	Highly Tolerant	--
Cyprinus carpio Common carp	7	7.140	Highly Tolerant	--

Rocky River Downstream of Berea WWTP
Sample Date: 8/23/95
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Totals	535	12.65		

*DELT anomalies were observed on 0.7% (5) of the fish collected.
Index of Biotic Integrity (IBI) = 28 (Fair)
Modified Index of Well Being (Miwb) = 7.2 (Fair)

Rocky River Downstream of Berea WWTP
Sample Date: 10/10/95
Collection Distance: 0.2 km
Collection Method: Longline Electroshocking

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Hypentelium nigricans Northern hog sucker	53	1.526	Moderately Intolerant	--
Semotilus atromaculatus Creek chub	25	0.424	Highly Tolerant	Dorsal Fin Lesion (1)
Lepomis cyanellus Green Sunfish	3	0.056	Highly Tolerant	--
Notropis stramineus Sand shiner	7	0.028	Moderately Intolerant	--
Campostoma anomalum Central stoneroller minnow	96	0.882	--	Tail Lesion (1)
Pimephales notatus Bluntnose minnow	25	0.130	Highly Tolerant	--
Catastomus commersoni Common white sucker	21	0.960	Highly Tolerant	Dorsal Fin Lesion (1)
Notropis spilopterus Spotfin shiner	6	0.026	--	--
Micropterus salmoides Largemouth bass	2.	0.018	--	--
Etheostoma blennoides Greenside darter	31	0.192	Moderately Intolerant	--
Etheostoma caeruleum Rainbow darter	1	0.004	Moderately Intolerant	--
Notropus cornutus Common shiner	4	0.054	--	--
Rhinicthys atratulus Blacknose dace	2	0.010	Highly Tolerant	--

Rocky River Downstream of Berea WWTP
Sample Date: 8/23/95
(Continued)

Species	Number	Weight (kg)	Pollution Tolerance	*DELT Anomalies
Totals	276	4.31		

*DELT anomalies were observed on 1.0% (3) of the fish collected.
Index of Biotic Integrity (IBI) = 32(Fair)
Modified Index of Well Being (Miwb) = 7.2 (Fair)

APPENDIX F
QUALITATIVE HABITAT EVALUATION INDEX SCORES, 1991-1995

Ohio EPA Site Description Sheet **QHEI SCORE: 45**

Stream EUCLID CREEK RM ____ Date 08/13/91 River Code ____

Location SITE - #0.5 DOWNSTREAM OF LAKE SHORE BLVD. Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*): *SUBSTRATE SCORE:* 6.5

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ____ ☐☐-GRAVEL [7] ____ ____ Substrate Origin (Check all) — Silt Cover (Check One)
☐☐-BOULDER [9] ____ ■■-SAND [6] ____ ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-SILT HEAVY [-2] ■-SILT MODERATE [-1]
☐☐-COBBLE [8] ____ ☐☐-BEDROCK[5] ____ ____ ■-TILLS [1] ☐-HARDPAN [0] ☐- SILT NORMAL [0] ☐- SILT FREE [1]
☐☐-HARDPAN [4] ____ ☐☐-DETRITUS[3] ✓ ____ ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)
■■-MUCK [2] ____ ☐☐-ARTIFIC.[0] ✓ ____ ☐-SHALE [-1] — ■—EXTENSIVE [-2] ☐—MODERATE[-1]
TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] — ☐—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

COVER SCORE: 9

2] INSTREAM COVER

TYPE (Check *All* That Apply) — AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐- EXTENSIVE > 75% [11]
■-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐- MODERATE 25-75% [7]
■-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ■- SPARSE 5-25% [3]
☐- NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) *CHANNEL:* 5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐- HIGH [4]	☐- EXCELLENT [7]	☐- NONE [6]	☐- HIGH [3]	☐- SNAGGING	☐- IMPOUND.
☐- MODERATE [3]	☐- GOOD [5]	☐- RECOVERED [4]	☐- MODERATE [2]	☐- RELOCATION	☐- ISLANDS
■- LOW [2]	☐- FAIR [3]	☐- RECOVERING [3]	■- LOW [1]	☐- CANOPY REMOVAL	■- LEVEED
☐- NONE [1]	■- POOR [1]	■- RECENT OR NO RECOVERY [1]		■- DREDGING	☐- BANK SHAPING
				☐- ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) *RIPARIAN:* 5

River Right Looking Downstream

RIPARIAN WIDTH	EROSION/RUNOFF - FLOOD PLAIN QUALITY		BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)	
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	■■-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE[2]
☐☐-NARROW 5-10m [2]	■■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
■■-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY *POOL:* 9

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
■- >1m [6]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐- 0.7-1m [4]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐- 0.4-0.7m [2]	☐-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]
☐- < 0.4m [1]		■-SLOW [1]	
☐—<0.2m [Pool = 0]			

☐-NO POOL[0]

COMMENTS:____

RIFFLE: 0.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐- GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	■-EXTENSIVE [-1] ■-MODERATE[0]
☐- GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1] ☐-NONE[2]
■- GENERALLY 5-10 cm [1]	■-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐- GENERALLY < 5 cm [Riffle = 0]		

COMMENTS____ *GRADIENT:* 10

6] Gradient (feet/mile): 13 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet **QHEI SCORE:** 76

Stream Euclid Creek RM____ Date 1/08/93 River Code____

Location Site - #1 at St. Clair Avenue Bridge Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); **SUBSTRATE SCORE:** 20

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ______ ☐☐-GRAVEL [7] ✓ ✓ / Substrate Origin (Check all) / Silt Cover (Check One)
- ■■-BOULDER [9] ___ ✓ ☐☐-SAND [6] ✓ ✓ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
- ■■-COBBLE [8] ✓ ✓ ☐☐-BEDROCK[5] ___ ■-TILLS [1] ☐-HARDPAN [0] ☐ - SILT NORMAL [0] ■ - SILT FREE [1]
- ☐☐-HARDPAN [4] ______ ☐☐-DETRITUS[3] ___ ☐-SANDSTONE [0] / Extent Of Embeddness (Check One)
- ☐☐-MUCK [2] ______ ☐☐-ARTIFIC.[0] ✓ ☐-SHALE [-1] / ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] / ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS________

COVER SCORE: 14

2] INSTREAM COVER

TYPE (Check All That Apply)

- ■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ■-OXBOWS [1]
- ■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
- ☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ☐-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☐ - EXTENSIVE > 75% [11]
- ■ - MODERATE 25-75% [7]
- ☐ - SPARSE 5-25% [3]
- ☐ - NEARLY ABSENT < 5% [1]

COMMENTS:________

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 16

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
■ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:________

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 7

"River Right Looking Downstream"

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	■☐-FOREST, SWAMP [3]	☐■-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
☐■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE [2]
■☐-NARROW 5-10m [2]	☐☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:________

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 7

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐- >1m [6]			
■- 0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐- 0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐- < 0.4m [1]	■-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS:________

RIFFLE: 6

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ - GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ☐-MODERATE[0]
■ - GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW: [1] ☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐ - GENERALLY < 5 cm [Riffle = 0]		

COMMENTS________ **GRADIENT:** 6

6] Gradient (feet/mile): 31.8 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet

QHEI SCORE: 66.5

Stream: EUCLID CREEK RM ____ Date: 01/08/93 River Code ____

Location: SITE - #2 SOUTH BRANCH, HIGHLAND PICNIC AREA Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Check *all types present*); **SUBSTRATE SCORE:** 17

TYPE POOL RIFFLE		POOL RIFFLE		SUBSTRATE QUALITY	
☐☐-BLDER/SLABS[10]	■■-GRAVEL [7]	✓	Substrate Origin (Check all)		Silt Cover (Check One)
☐☐-BOULDER [9] ✓	☐☐-SAND [6] ✓		☐-LIMESTONE [1]	☐-RIP/RAP [0]	☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
■■-COBBLE [8] ✓	☐☐-BEDROCK[5]		■-TILLS [1]	☐-HARDPAN [0]	■-SILT NORMAL [0] ☐-SILT FREE [1]
☐☐-HARDPAN [4] ✓	☐☐-DETRITUS[3]		☐-SANDSTONE [0]		Extent Of Embeddness (Check One)
☐☐-MUCK [2]	☐☐-ARTIFIC.[0]		☐-SHALE [-1]		☐—EXTENSIVE [-2] ☐—MODERATE[-1]
			☐-COAL FINES [-2]		■—LOW[0] ☐—NONE[1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER **COVER SCORE:** 10

TYPE (Check *All* That Apply)

☐-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1]

☐-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]

☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ☐-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

☐-EXTENSIVE > 75% [11]
■-MODERATE 25-75% [7]
☐-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) **CHANNEL:** 14.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
■-HIGH [4]	☐-EXCELLENT [7]	☐-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	■-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				■-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 8.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐■-WIDE>50m [4]	☐■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	■■-NONE OR LITTLE [3]
■☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	■☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 7

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
☐->1m [6]			
■-0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐-< 0.4m [1]	■-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 5.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐-GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ☐-MODERATE[0]
■-GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1] ☐-NONE[2]
☐-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ____ **GRADIENT:** 4

6] Gradient (feet/mile): 51.3 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet **QHEI SCORE:** 65.5

Stream EUCLID CREEK RM ____ Date 01/08/93 River Code ____

Location SITE-#3 NORTH BRANCH, HIGHLAND PICNIC AREA Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 13

TYPE	POOL	RIFFLE		POOL	RIFFLE	SUBSTRATE QUALITY	
☐☐-BLDER/SLABS[10]			■■-GRAVEL [7]	✓	✓	Substrate Origin (Check all)	Silt Cover (Check One)
☐☐-BOULDER [9]		✓	☐☐-SAND [6]	✓	✓	☐-LIMESTONE [1] ☐-RIP/RAP [0]	☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
☐☐-COBBLE [8]	✓	✓	■■-BEDROCK[5]	✓	✓	■-TILLS [1] ☐-HARDPAN [0]	■-SILT NORMAL [0] ☐-SILT FREE [1]
☐☐-HARDPAN [4]			☐☐-DETRITUS[3]			☐-SANDSTONE [0]	Extent Of Embeddness (Check One)
☐☐-MUCK [2]			☐☐-ARTIFIC.[0]			☐-SHALE [-1]	☐-EXTENSIVE [-2] ■-MODERATE[-1]
TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0]						☐-COAL FINES [-2]	☐-LOW[0] ☐-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 13

2] INSTREAM COVER

TYPE (Check All That Apply)

- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ☐-DEEP POOLS [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ■-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT(Check ONLY One or check 2 and AVERAGE)

- ☐-EXTENSIVE > 75% [11]
- ■-MODERATE 25-75% [7]
- ☐-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 15

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	☐-MODERATE [2]	☐-RELOCATION	■-ISLANDS
☐-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	■-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION -(check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 9.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
■■-WIDE>50m [4]	■■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 8

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐->1m [6]			
■-0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	■-INTERSTITIAL[-1]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐-<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 3

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐-GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ☐-MODERATE[0]
☐-GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1] ☐-NONE[2]
■-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ____ **GRADIENT:** 4

6] Gradient (feet/mile): 83.4 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet

QHEI SCORE: 69

Stream: EUCLID CREEK RM ______ Date: 01/08/93 River Code ______

Location: SITE - #4 SOUTH BRANCH AT MAYFIELD ROAD Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 14

TYPE / POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- ☐☐-BLDER/SLABS[10] ____ ■■-GRAVEL[7] ___ ✓ Substrate Origin (Check all) — Silt Cover (Check One)
- ☐☐-BOULDER[9] ____ ☐☐-SAND[6] ___ ✓ ☐-LIMESTONE[1] ☐-RIP/RAP[0] ☐-SILT HEAVY[-2] ☐-SILT MODERATE[-1]
- ☐☐-COBBLE[8] ___ ✓ ■■-BEDROCK[5] ✓ ✓ ■-TILLS[1] ☐-HARDPAN[0] ■-SILT NORMAL[0] ☐-SILT FREE[1]
- ☐☐-HARDPAN[4] ____ ☐☐-DETRITUS[3] ___ ☐-SANDSTONE[0] — Extent Of Embeddness (Check One)
- ☐☐-MUCK[2] ____ ☐☐-ARTIFIC.[0] ___ ☐-SHALE[-1] — ☐—EXTENSIVE[-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0] ☐-COAL FINES[-2] — ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

COVER SCORE: 12

2] INSTREAM COVER

TYPE (Check *All* That Apply) — AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

- ☐-UNDERCUT BANKS[1] ■-DEEP POOLS[2] ☐-OXBOWS[1] ☐-EXTENSIVE >75%[11]
- ■-OVERHANGING VEGETATION[1] ☐-ROOTWADS[1] ☐-AQUATIC MACROPHYTES[1] ■-MODERATE 25-75%[7]
- ☐-SHALLOWS (IN SLOW WATER)[1] ■-BOULDERS[1] ■-LOGS OR WOODY DEBRIS[1] ☐-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT <5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 16

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH[4]	☐-EXCELLENT[7]	■-NONE[6]	☐-HIGH[3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE[3]	■-GOOD[5]	☐-RECOVERED[4]	■-MODERATE[2]	☐-RELOCATION	■-ISLANDS
☐-LOW[2]	☐-FAIR[3]	☐-RECOVERING[3]	☐-LOW[1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE[1]	☐-POOR[1]	☐-RECENT OR NO RECOVERY[1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 6.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m[4]	☐☐-FOREST, SWAMP[3]	☐☐-URBAN OR INDUSTRIAL[0]	■ ☐-NONE OR LITTLE [3]
■■-MODERATE 10-50[3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ■-MODERATE[2]
☐☐-NARROW 5-10m[2]	■■-RESID.,PARK,NEW FIELD[1]	☐☐-CONSERV. TILLAGE[1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m[1]	☐☐-FENCED PASTURE[1]	☐☐-MINING/CONSTRUCTION[0]	
☐☐-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 10

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)		
■->1m[6]	■-POOL WIDTH > RIFFLE WIDTH[2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]	
☐-0.7-1m[4]	☐-POOL WIDTH = RIFFLE WIDTH[1]	☐-FAST[1]	☐-INTERSTITIAL[-1]	☐-NO POOL[0]
☐-0.4-0.7m[2]	☐-POOL WIDTH < RIFFLE W.[0]	■-MODERATE[1]	☐-INTERMITTENT[-2]	
☐-<0.4m[1]		■-SLOW[1]		
☐-<0.2m [Pool = 0]				

COMMENTS: ______

RIFFLE: 2.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐-GENERALLY >10 cm,MAX>50[4]	■-STABLE (e.g.,Cobble, Boulder)[2]	☐-EXTENSIVE[-1]	■-MODERATE[0]
☐-GENERALLY >10 cm,MAX<50[3]	☐-MOD. STABLE (e.g.,Pea Gravel)[1]	■-LOW.[1]	☐-NONE[2]
■-GENERALLY 5-10 cm[1]	■-UNSTABLE (Gravel,Sand)[0]		☐-NO RIFFLE[0]
☐-GENERALLY <5 cm [Riffle = 0]			

COMMENTS ______

GRADIENT: 8

6] Gradient (feet/mile): 33.4 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet — **QHEI SCORE: 64.5**

Stream GREEN CREEK RM ______ Date 01/11/93 River Code ______

Location SITE-#7 SOUTH OF EUCLID AVE. AND UPPER VALLEY DR. Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); **SUBSTRATE SCORE: 17**

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ______ ■■-GRAVEL [7] ____ ____ Substrate Origin (Check all) — Silt Cover (Check One)

☐☐-BOULDER [9] ______ ☐☐-SAND [6] ✓ ✓ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

■■-COBBLE [8] ______ ☐☐-BEDROCK[5] ✓ ✓ ■-TILLS [1] ☐-HARDPAN [0] ■ - SILT NORMAL [0] ☐ - SILT FREE [1]

☐☐-HARDPAN [4] ______ ☐☐-DETRITUS[3] ____ ____ ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)

☐☐-MUCK [2] ______ ☐☐-ARTIFIC.[0] ____ ____ ☐-SHALE [-1] — ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] — ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS______

2] INSTREAM COVER — **COVER SCORE: 13**

TYPE (Check *All* That Apply) — AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1] ☐ - EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]

☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ☐ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5%[1]

COMMENTS:______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) — **CHANNEL: 12.5**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
■ - LOW [2]	■ - FAIR [3]	☐ - RECOVERING [3]	■ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — **RIPARIAN: 7**

River Right Looking Downstream

RIPARIAN WIDTH — EROSION/RUNOFF - FLOOD PLAIN QUALITY — BANK EROSION

L R (Per Bank) — L R (Most Predominant Per Bank) L R (Per Bank)

☐☐-WIDE>50m [4] ☐☐-FOREST, SWAMP [3] ☐☐-URBAN OR INDUSTRIAL[0] ■■-NONE OR LITTLE [3]

■■-MODERATE 10-50 [3] ☐☐-OPEN PASTURE/ ROWCROP[0] ☐☐-SHRUB OR OLD FIELD[2] ☐☐-MODERATE [2]

☐☐-NARROW 5-10m [2] ■■- RESID.,PARK,NEW FIELD [1] ☐☐-CONSERV. TILLAGE [1] ☐☐-HEAVY OR SEVERE[1]

☐☐-VERY NARROW 1-5m [1] ☐☐-FENCED PASTURE [1] ☐☐-MINING/CONSTRUCTION [0]

☐☐-NONE[0]

COMMENTS:______

POOL/GLIDE AND RIFFLE/RUN QUALITY — **POOL: 6**

MAX. DEPTH (Check 1) — MORPHOLOGY (Check 1) — POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)

☐- >1m [6]

■- 0.7-1m [4] ☐-POOL WIDTH > RIFFLE WIDTH [2] ☐-TORRENTIAL[-1] ☐-EDDIES[1]

☐- 0.4-0.7m [2] ☐-POOL WIDTH = RIFFLE WIDTH [1] ☐-FAST[1] ☐-INTERSTITIAL[-1] ☐-NO POOL[0]

☐- < 0.4m [1] ■-POOL WIDTH < RIFFLE W. [0] ■-MODERATE [1] ☐-INTERMITTENT[-2]

☐—<0.2m [Pool = 0] ■-SLOW [1]

COMMENTS:______

RIFFLE: 5

RIFFLE/RUN DEPTH — RIFFLE/RUN SUBSTRATE — RIFFLE/RUN EMBEDDEDNESS

☐ - GENERALLY >10 cm,MAX>50 [4] ☐-STABLE (e.g.,Cobble, Boulder) [2] ☐-EXTENSIVE [-1] ☐-MODERATE[0]

■ - GENERALLY >10 cm,MAX<50 [3] ■-MOD. STABLE (e.g.,Pea Gravel) [1] ■-LOW. [1] ☐-NONE[2]

☐ - GENERALLY 5-10 cm [1] ☐-UNSTABLE (Gravel,Sand) [0] ☐-NO RIFFLE[0]

☐ - GENERALLY < 5 cm [Riffle = 0]

COMMENTS______ **GRADIENT: 4**

6] Gradient (feet/mile): 102.7 %POOL:______ %RIFFLE:______ %RUN:______

Ohio EPA Site Description Sheet **QHEI SCORE: 55**

Stream NINE MILE CREEK RM ______ Date 01/11/93 River Code ______

Location SITE - #8A NORTH OF LAKE SHORE BOULEVARD Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); **SUBSTRATE SCORE: 9**

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ______ ☐☐-GRAVEL [7] ______ Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ______ ■■-SAND [6] ______ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

☐☐-COBBLE [8] ______ ☐☐-BEDROCK[5] ______ ■-TILLS [1] ☐-HARDPAN [0] ■ - SILT NORMAL [0] ☐ - SILT FREE [1]

☐☐-HARDPAN [4] ______ ☐☐-DETRITUS[3] ______ ☐-SANDSTONE [0] Extent Of Embeddness (Check One)

■■-MUCK [2] ______ ☐☐-ARTIFIC.[0] ______ ☐-SHALE [-1] ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐> 4 [1] ■— <= 4 [0] ☐-COAL FINES [-2] ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

COVER SCORE: 13

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐ - EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]

☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ☐ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL: 8**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	☐ - NONE [6]	■ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
■ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	☐ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	■ - POOR [1]	■ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	■ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 6**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	■■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐☐-MODERATE [2]
■■-NARROW 5-10m [2]	■■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 9**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
■- >1m [6]			
☐- 0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐- 0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐- < 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ______

RIFFLE: 0

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	☐-MODERATE[0]
☐ - GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		
☐ - GENERALLY < 5 cm [Riffle = 0]			

■-NO RIFFLE[0]

COMMENTS ______ **GRADIENT: 10**

6] Gradient (feet/mile): 18 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet

QHEI SCORE: 57

Stream NINE MILE CREEK RM______ Date 01/12/93 River Code______

Location SITE - #9 "NELA PARK" BRANCH Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES*; Check all types present):

SUBSTRATE SCORE: 17

TYPE POOL RIFFLE

- ☐☐-BLDER /SLABS[10] ____ ____
- ☐☐-BOULDER [9] ____ ____
- ■■-COBBLE [8] ____ ____
- ☐☐-HARDPAN [4] ____ ____
- ☐☐-MUCK [2] ____ ____

POOL RIFFLE

- ☐☐-GRAVEL [7] ____ ____
- ☐☐-SAND [6] ____ ____
- ■■-BEDROCK[5] ____ ____
- ☐☐-DETRITUS[3] ____ ____
- ☐☐-ARTIFIC.[0] ____ ____

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0]

SUBSTRATE QUALITY

✓ Substrate Origin (Check all)

- ✓ ☐-LIMESTONE [1]
- ■-TILLS [1]
- ☐-SANDSTONE [0]
- ☐-SHALE [-1]
- ☐-COAL FINES [-2]
- ☐-RIP/RAP [0]
- ☐-HARDPAN [0]

Silt Cover (Check One)

- ☐-SILT HEAVY [-2]
- ☐-SILT MODERATE [-1]
- ☐-SILT NORMAL [0]
- ■-SILT FREE [1]

Extent Of Embeddness (Check One)

- ☐-EXTENSIVE [-2]
- ☐-MODERATE[-1]
- ☐-LOW[0]
- ■-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS________________

2] INSTREAM COVER

COVER SCORE: 5

TYPE (Check *All* That Apply)

- ☐-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ☐-DEEP POOLS [2]
- ☐-ROOTWADS [1]
- ☐-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

- ☐-EXTENSIVE > 75% [11]
- ☐-MODERATE 25-75% [7]
- ■-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5% [1]

COMMENTS:________________

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 14

SINUOSITY

- ☐-HIGH [4]
- ■-MODERATE [3]
- ☐-LOW [2]
- ☐-NONE [1]

DEVELOPMENT

- ☐-EXCELLENT [7]
- ☐-GOOD [5]
- ■-FAIR [3]
- ☐-POOR [1]

CHANNELIZATION

- ■-NONE [6]
- ☐-RECOVERED [4]
- ☐-RECOVERING [3]
- ☐-RECENT OR NO RECOVERY [1]

STABILITY

- ☐-HIGH [3]
- ■-MODERATE [2]
- ☐-LOW [1]

MODIFICATIONS/OTHER

- ☐-SNAGGING
- ☐-RELOCATION
- ☐-CANOPY REMOVAL
- ☐-DREDGING
- ☐-IMPOUND.
- ■-ISLANDS
- ☐-LEVEED
- ☐-BANK SHAPING
- ☐-ONE SIDE CHANNEL MODIFICATIONS

COMMENTS:________________

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 8

River Right Looking Downstream

RIPARIAN WIDTH

L R (Per Bank)

- ☐☐-WIDE>50m [4]
- ■■-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ☐☐-VERY NARROW 1-5m [1]
- ☐☐-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY

L R (Most Predominant Per Bank)

- ☐■-FOREST, SWAMP [3]
- ☐☐-OPEN PASTURE/ ROWCROP[0]
- ■☐-RESID.,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]

L R (Per Bank)

- ☐☐-URBAN OR INDUSTRIAL[0]
- ☐☐-SHRUB OR OLD FIELD[2]
- ☐☐-CONSERV. TILLAGE [1]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION

- ■■-NONE OR LITTLE [3]
- ☐☐-MODERATE [2]
- ☐☐-HEAVY OR SEVERE[1]

COMMENTS:________________

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 6

MAX. DEPTH (Check 1)

- ☐->1m [6]
- ☐-0.7-1m [4]
- ■-0.4-0.7m [2]
- ☐-< 0.4m [1]
- ☐-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)

- ☐-POOL WIDTH > RIFFLE WIDTH [2]
- ■-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)

- ☐-TORRENTIAL[-1]
- ■-FAST[1]
- ■-MODERATE [1]
- ■-SLOW [1]
- ☐-EDDIES[1]
- ☐-INTERSTITIAL[-1]
- ☐-INTERMITTENT[-2]

☐-NO POOL[0]

COMMENTS:________________

RIFFLE: 3

RIFFLE/RUN DEPTH

- ☐-GENERALLY >10 cm,MAX>50 [4]
- ☐-GENERALLY >10 cm,MAX<50 [3]
- ■-GENERALLY 5-10 cm [1]
- ☐-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- ☐-STABLE (e.g.,Cobble, Boulder) [2]
- ■-MOD. STABLE (e.g.,Pea Gravel) [1]
- ☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- ☐-EXTENSIVE [-1]
- ☐-MODERATE[0]
- ■-LOW. [1]
- ☐-NONE[2]

☐-NO RIFFLE[0]

COMMENTS________________

GRADIENT: 4

6] Gradient (feet/mile): 201.8 %POOL:______ %RIFFLE:______ %RUN:______

Ohio EPA Site Description Sheet — **QHEI SCORE: 58**

Stream NINE MILE CREEK RM ______ Date 01/12/93 River Code ______

Location SITE-#10 UPSTREAM OF CULVERT, SOUTH OF BELVOIR Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); **SUBSTRATE SCORE: 19**

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER/SLABS[10] ____ ■■-GRAVEL [7] ____ ____ Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ____ ☐☐-SAND [6] ✓ ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

■■-COBBLE [8] ____ ☐☐-BEDROCK[5] ✓ ✓ ■-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ■-SILT FREE [1]

☐☐-HARDPAN [4] ____ ☐☐-DETRITUS[3] ____ ☐-SANDSTONE [0] Extent Of Embeddness (Check One)

☐☐-MUCK [2] ____ ☐☐-ARTIFIC.[0] ____ ☐-SHALE [-1] ☐-EXTENSIVE [-2] ☐-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0] ☐-COAL FINES [-2] ☐-LOW[0] ■-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

COVER SCORE: 6

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐-MODERATE 25-75% [7]

☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ■-SPARSE 5-25% [3]

☐-NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL: 14**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	☐-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	■-ISLANDS
☐-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 8**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE> 50m [4]	■■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
■■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 4**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐->1m [6]		☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐-0.4-0.7m [2]	■-POOL WIDTH = RIFFLE WIDTH [1]	■-MODERATE [1]	☐-INTERMITTENT[-2]
■-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-SLOW [1]	
☐-<0.2m [Pool = 0]			

☐-NO POOL[0]

COMMENTS: ______

RIFFLE: 3

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐-GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	☐-MODERATE[0]
☐-GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1]	☐-NONE[2]
■-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		
☐-GENERALLY < 5 cm [Riffle = 0]			

☐-NO RIFFLE[0]

COMMENTS ______ **GRADIENT: 4**

6] Gradient (feet/mile): 76.3 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet QHEI SCORE: 70

Stream DUGWAY BROOK RM ____ Date 01 | 19 | 93 River Code ____

Location SITE - #12 AT LAKE SHORE BOULEVARD Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); SUBSTRATE SCORE: 17

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ____ ■■-GRAVEL [7] ____ ____ Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ____ ☐☐-SAND [6] ✓ ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

■■-COBBLE [8] ____ ☐☐-BEDROCK[5] ____ ____ ■-TILLS [1] ☐-HARDPAN [0] ■ - SILT NORMAL [0] ☐ - SILT FREE [1]

☐☐-HARDPAN [4] ____ ☐☐-DETRITUS[3] ____ ____ ☐-SANDSTONE [0] Extent Of Embeddness (Check One)

☐☐-MUCK [2] ✓ ☐☐-ARTIFIC.[0] ____ ____ ☐-SHALE [-1] ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■- > 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 14

2] INSTREAM COVER

TYPE (Check *All* That Apply) AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

■-UNDERCUT BANKS [1] ■ -DEEP POOLS [2] ☐ -OXBOWS [1] ☐ - EXTENSIVE > 75% [11]

■ -OVERHANGING VEGETATION [1] ■ -ROOTWADS [1] ■ -AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]

☐ -SHALLOWS (IN SLOW WATER) [1] ☐ -BOULDERS [1] ■ -LOGS OR WOODY DEBRIS [1] ☐ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) CHANNEL: 12

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	■ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	☐ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
■ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	■ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 10

River Right Looking Downstream

RIPARIAN WIDTH	EROSION/RUNOFF - FLOOD PLAIN QUALITY		BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)	
■■-WIDE>50m [4]	■■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE.[2]
☐☐-NARROW 5-10m [2]	☐☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 9

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
■- >1m [6]			
☐- 0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐- 0.4-0.7m [2]	☐ -POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐- < 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 0

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	☐-MODERATE[0]
☐ - GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		
☐ - GENERALLY < 5 cm [Riffle = 0]			

■-NO RIFFLE[0]

COMMENTS ____ GRADIENT: 8

6] Gradient (feet/mile): 23.8 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet QHEI SCORE: 63

Stream DUGWAY BROOK RM______ Date 01/15/93 River Code______

Location SITE-#14 WEST BRANCH, AT LAKEVIEW CEMETERY Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); SUBSTRATE SCORE: 18

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ______ ■■-GRAVEL [7] ___ ✓ Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ✓ ✓ ☐☐-SAND [6] ✓ ✓ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

■■-COBBLE [8] ______ ☐☐-BEDROCK[5] ______ ■-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ■-SILT FREE [1]

☐☐-HARDPAN [4] ______ ☐☐-DETRITUS[3] ______ ☐-SANDSTONE [0] Extent Of Embeddness (Check One)

☐☐-MUCK [2] ______ ☐☐-ARTIFIC.[0] ______ ☐-SHALE [-1] ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0] ☐-COAL FINES [-2] ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS______

2] INSTREAM COVER COVER SCORE: 13

TYPE (Check *All* That Apply) AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1] ■-MODERATE 25-75% [7]

☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ☐-SPARSE 5-25% [3]

☐-NEARLY ABSENT < 5%[1]

COMMENTS:______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) CHANNEL: 11.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	☐-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
■-NONE [1]	■-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:______

4] RIPARIAN ZONE AND BANK EROSION -(check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 10

River Right Looking Downstream

RIPARIAN WIDTH	EROSION/RUNOFF - FLOOD PLAIN QUALITY		BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)	
■■-WIDE>50m [4]	■■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:______

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 3

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)		
☐->1m [6]				
☐-0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]	
☐-0.4-0.7m [2]	■-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]	☐-NO POOL[0]
■-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]	
☐—<0.2m [Pool = 0]		■-SLOW [1]		

COMMENTS:______

RIFFLE: 3.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐-GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	☐-MODERATE[0]
☐-GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1]	☐-NONE[2]
■-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		☐-NO RIFFLE[0]
☐-GENERALLY < 5 cm [Riffle = 0]			

COMMENTS______ GRADIENT: 4

6] Gradient (feet/mile): 111.2 %POOL:______ %RIFFLE:______ %RUN:______

Ohio EPA Site Description Sheet **QHEI SCORE: 64**

Stream DUGWAY BROOK RM ____ Date 01/15/93 River Code ____
Location SITE - #15 EAST BRANCH AT CUMBERLAND PARK Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); **SUBSTRATE SCORE: 17**

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ✓ ✓ ■■-GRAVEL [7] ____ ✓
- ☐☐-BOULDER [9] ____ ____ ☐☐-SAND [6] ____ ____
- ■■-COBBLE [8] ____ ✓ ☐☐-BEDROCK[5] ✓ ____
- ☐☐-HARDPAN [4] ____ ____ ☐☐-DETRITUS[3] ____ ____
- ☐☐-MUCK [2] ____ ____ ☐☐-ARTIFIC.[0] ____ ____

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0]

Substrate Origin (Check all)
- ✓ ☐-LIMESTONE [1] ☐-RIP/RAP [0]
- ✓ ■-TILLS [1] ☐-HARDPAN [0]
- ☐-SANDSTONE [0]
- ☐-SHALE [-1]
- ☐-COAL FINES [-2]

Silt Cover (Check One)
- ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
- ■-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One)
- ☐—EXTENSIVE [-2] ☐—MODERATE[-1]
- ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

2] INSTREAM COVER **COVER SCORE: 13**

TYPE (Check *All* That Apply)
- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ☐-DEEP POOLS [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ■-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)
- ☐ - EXTENSIVE > 75% [11]
- ■ - MODERATE 25-75% [7]
- ☐ - SPARSE 5-25% [3]
- ☐ - NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) **CHANNEL: 13.5**

SINUOSITY
- ☐ - HIGH [4]
- ■ - MODERATE [3]
- ■ - LOW [2]
- ☐ - NONE [1]

DEVELOPMENT
- ☐ - EXCELLENT [7]
- ☐ - GOOD [5]
- ■ - FAIR [3]
- ☐ - POOR [1]

CHANNELIZATION
- ■ - NONE [6]
- ☐ - RECOVERED [4]
- ☐ - RECOVERING [3]
- ☐ - RECENT OR NO RECOVERY [1]

STABILITY
- ☐ - HIGH [3]
- ■ - MODERATE [2]
- ☐ - LOW [1]

MODIFICATIONS/OTHER
- ☐ - SNAGGING ☐ - IMPOUND.
- ☐ - RELOCATION ☐ - ISLANDS
- ☐ - CANOPY REMOVAL ☐ - LEVEED
- ☐ - DREDGING ☐ - BANK SHAPING
- ☐ - ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 6.5**
River Right Looking Downstream

RIPARIAN WIDTH — L R (Per Bank)
- ☐■-WIDE>50m [4]
- ■■-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ☐☐-VERY NARROW 1-5m [1]
- ☐☐-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank) — L R (Per Bank)
- ☐☐-FOREST, SWAMP [3] — ☐☐-URBAN OR INDUSTRIAL[0]
- ☐☐-OPEN PASTURE/ ROWCROP[0] — ☐☐-SHRUB OR OLD FIELD[2]
- ■■- RESID.,PARK,NEW FIELD [1] — ☐☐-CONSERV. TILLAGE [1]
- ☐☐-FENCED PASTURE [1] — ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
- ☐ ☐-NONE OR LITTLE [3]
- ■ ■-MODERATE [2]
- ☐ ☐-HEAVY OR SEVERE[1]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 6**

MAX. DEPTH (Check 1)
- ☐->1m [6]
- ☐-0.7-1m [4]
- ■-0.4-0.7m [2]
- ☐-< 0.4m [1]
- ☐—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- ■-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
- ☐-TORRENTIAL[-1] ☐-EDDIES[1]
- ☐-FAST[1] ☐-INTERSTITIAL[-1]
- ■-MODERATE [1] ☐-INTERMITTENT[-2]
- ■-SLOW [1]

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 4

RIFFLE/RUN DEPTH
- ☐ - GENERALLY >10 cm,MAX>50 [4]
- ☐ - GENERALLY >10 cm,MAX<50 [3]
- ■ - GENERALLY 5-10 cm [1]
- ☐ - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ■-STABLE (e.g.,Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g.,Pea Gravel) [1]
- ☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-EXTENSIVE [-1] ☐-MODERATE[0]
- ■-LOW. [1] ☐-NONE[2]

☐-NO RIFFLE[0]

COMMENTS ____ **GRADIENT: 4**

6] Gradient (feet/mile): 166.9 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet

QHEI SCORE: 56.5

Stream DOAN BROOK RM ______ Date 02/02/93 River Code ______

Location SITE-#16 NORTH OF ST. CLAIR AVENUE Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); **SUBSTRATE SCORE:** 15.5

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ______ ■■-GRAVEL [7] ______ Substrate Origin (Check all) — Silt Cover (Check One)

☐☐-BOULDER [9] ✓ ✓ ☐☐-SAND [6] ✓ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ■-SILT MODERATE [-1]

■■-COBBLE [8] ______ ☐☐-BEDROCK[5] ______ ■-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]

☐☐-HARDPAN [4] ______ ☐☐-DETRITUS[3] ______ ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)

☐☐-MUCK [2] ______ ☐☐-ARTIFIC.[0] ✓ ☐-SHALE [-1] — ☐—EXTENSIVE [-2] ■—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] — ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2] INSTREAM COVER — **COVER SCORE:** 5

TYPE (Check *All* That Apply) — AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

☐-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]

☐-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1] ☐-MODERATE 25-75% [7]

☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ☐-LOGS OR WOODY DEBRIS [1] ■-SPARSE 5-25% [3]

■-NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) — **CHANNEL:** 10

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	☐-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	☐-GOOD [5]	■-RECOVERED [4]	☐-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
■-NONE [1]	■-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	■-BANK SHAPING
				■-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — **RIPARIAN:** 7

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
■■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	■■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY — **POOL:** 7

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
☐->1m [6]			
■-0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ______

RIFFLE: 2

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐-GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ■-MODERATE[0]
☐-GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1] ☐-NONE[2]
■-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ______ **GRADIENT:** 10

6] Gradient (feet/mile): 15.8 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet

QHEI SCORE: 70.5

Stream: Doan Brook RM: ____ Date: 02/02/93 River Code: ____

Location: Site-#17 North of Cleveland Art Museum Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*): **SUBSTRATE SCORE:** 19

TYPE	POOL RIFFLE		POOL	RIFFLE	SUBSTRATE QUALITY	
☐☐-BLDER/SLABS[10]	______	☐☐-GRAVEL [7]	✓	✓	Substrate Origin (Check all)	Silt Cover (Check One)
■■-BOULDER [9]	______	☐☐-SAND [6]	✓	____	☐-LIMESTONE [1] ☐-RIP/RAP [0]	☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
■■-COBBLE [8]	______	☐☐-BEDROCK [5]	____	✓	■-TILLS [1] ☐-HARDPAN [0]	■-SILT NORMAL [0] ☐-SILT FREE [1]
☐☐-HARDPAN [4]	______	☐☐-DETRITUS [3]	____	____	☐-SANDSTONE [0]	Extent Of Embeddness (Check One)
☐☐-MUCK [2]	______	☐☐-ARTIFIC. [0]	____	____	☐-SHALE [-1]	☐—EXTENSIVE [-2] ☐—MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0] ☐-COAL FINES [-2] ■—LOW [0] ☐—NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2] INSTREAM COVER **COVER SCORE:** 14

TYPE (Check *All* That Apply) — AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

■-UNDERCUT BANKS [1]	■-DEEP POOLS [2]	☐-OXBOWS [1]	☐-EXTENSIVE > 75% [11]
■-OVERHANGING VEGETATION [1]	■-ROOTWADS [1]	☐-AQUATIC MACROPHYTES [1]	■-MODERATE 25-75% [7]
☐-SHALLOWS (IN SLOW WATER) [1]	■-BOULDERS [1]	■-LOGS OR WOODY DEBRIS [1]	☐-SPARSE 5-25% [3]
			☐-NEARLY ABSENT < 5% [1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) **CHANNEL:** 14

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	☐-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	■-GOOD [5]	■-RECOVERED [4]	☐-MODERATE [2]	☐-RELOCATION	■-ISLANDS
■-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				■-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 5.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	■■-URBAN OR INDUSTRIAL [0]	■■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP [0]	☐☐-SHRUB OR OLD FIELD [2]	☐☐-MODERATE [2]
■■-NARROW 5-10m [2]	■☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐☐-HEAVY OR SEVERE [1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE [0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 9

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
■->1m [6]			
☐-0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL [-1]	☐-EDDIES [1]
☐-0.4-0.7m [2]	■-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST [1]	☐-INTERSTITIAL [-1]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT [-2]
☐—<0.2m [Pool = 0]		☐-SLOW [1]	

☐-NO POOL [0]

COMMENTS: ______

RIFFLE: 5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐-GENERALLY >10 cm, MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ■-MODERATE [0]
■-GENERALLY >10 cm, MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1] ☐-NONE [2]
☐-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE [0]
☐-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ______ **GRADIENT:** 4

6] Gradient (feet/mile): 55.6 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet

QHEI SCORE: 61.5

Stream DOAN BROOK RM ______ Date 02/02/93 River Code ______

Location SITE-#18 N. BRANCH AT SHAKER LAKES NATURE CENTER Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 15

TYPE	POOL RIFFLE		POOL RIFFLE	SUBSTRATE QUALITY	
☐☐-BLDER /SLABS[10]	______	■■-GRAVEL [7]	___ ___	Substrate Origin (Check all)	Silt Cover (Check One)
☐☐-BOULDER [9]	______	☐☐-SAND [6]	___ ___	☐-LIMESTONE [1] ☐-RIP/RAP [0]	☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
☐☐-COBBLE [8]	✓ ___	☐☐-BEDROCK[5]	___ ___	■-TILLS [1] ☐-HARDPAN [0]	■-SILT NORMAL [0] ☐-SILT FREE [1]
☐☐-HARDPAN [4]	______	☐☐-DETRITUS[3]	___ ___	☐-SANDSTONE [0]	Extent Of Embeddedness (Check One)
☐☐-MUCK [2]	______	☐☐-ARTIFIC.[0]	___ ___	☐-SHALE [-1]	☐—EXTENSIVE [-2] ☐—MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐> 4 [1] ■— <= 4 [0] ☐-COAL FINES [-2] ☐—LOW[0] ■—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2] INSTREAM COVER

COVER SCORE: 11

TYPE (Check *All* That Apply)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ☐-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

☐-EXTENSIVE > 75% [11]
■-MODERATE 25-75% [7]
☐-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5% [1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 14

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	☐-GOOD [5]	☐-RECOVERED [4]	☐-MODERATE [2]	☐-RELOCATION	■-ISLANDS
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)
River Right Looking Downstream

RIPARIAN: 10

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
■■-WIDE > 50m [4]	■■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	■■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 5

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐->1m [6]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.7-1m [4]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐-0.4-0.7m [2]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
■-< 0.4m [1]		■-SLOW [1]	
☐—<0.2m [Pool = 0]			

☐-NO POOL[0]

COMMENTS: ______

RIFFLE: 2.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐-GENERALLY >10 cm, MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ☐-MODERATE[0]
☐-GENERALLY >10 cm, MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1] ■-NONE[2]
☐-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
■-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ______

GRADIENT: 4

6] Gradient (feet/mile): 58 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet

QHEI SCORE: 64

Stream: Doan Brook RM______ Date: 02/02/93 River Code______

Location: Site - #19 S. Branch at Shaker Lakes Nature Center Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 16

TYPE — POOL RIFFLE — POOL RIFFLE

□□-BLDER /SLABS[10] ____ ■■-GRAVEL [7] ____
□□-BOULDER [9] ____ □□-SAND [6] ✓ ____
■■-COBBLE [8] ____ □□-BEDROCK[5] ____
□□-HARDPAN [4] ____ □□-DETRITUS[3] ____
□□-MUCK [2] ____ □□-ARTIFIC.[0] ____

TOTAL NUMBER OF SUBSTRATE TYPES: □> 4 [1] ■—<= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

SUBSTRATE QUALITY
Substrate Origin (Check all)
□-LIMESTONE [1] □-RIP/RAP [0]
■-TILLS [1] □-HARDPAN [0]
□-SANDSTONE [0]
□-SHALE [-1]
□-COAL FINES [-2]

Silt Cover (Check One)
□-SILT HEAVY [-2] □-SILT MODERATE [-1]
■ - SILT NORMAL [0] □ - SILT FREE [1]

Extent Of Embeddness (Check One)
□—EXTENSIVE [-2] □—MODERATE[-1]
■—LOW[0] □—NONE[1]

COMMENTS______

2] INSTREAM COVER

COVER SCORE: 12

TYPE (Check *All* That Apply)

■-UNDERCUT BANKS [1] □-DEEP POOLS [2] □-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
□-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)
□ - EXTENSIVE > 75% [11]
■ - MODERATE 25-75% [7]
□ - SPARSE 5-25% [3]
□ - NEARLY ABSENT < 5%[1]

COMMENTS:______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 13

SINUOSITY
□ - HIGH [4]
■ - MODERATE [3]
■ - LOW [2]
□ - NONE [1]

DEVELOPMENT
□ - EXCELLENT [7]
□ - GOOD [5]
■ - FAIR [3]
■ - POOR [1]

CHANNELIZATION
■ - NONE [6]
□ - RECOVERED [4]
□ - RECOVERING [3]
□ - RECENT OR NO RECOVERY [1]

STABILITY
■ - HIGH [3]
■ - MODERATE [2]
□ - LOW [1]

MODIFICATIONS/OTHER
□ - SNAGGING □ - IMPOUND.
□ - RELOCATION ■ - ISLANDS
□ - CANOPY REMOVAL □ - LEVEED
□ - DREDGING □ - BANK SHAPING
□ - ONE SIDE CHANNEL MODIFICATIONS

COMMENTS:______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 10

River Right Looking Downstream

RIPARIAN WIDTH
L R (Per Bank)
■■-WIDE>50m [4]
□□-MODERATE 10-50 [3]
□□-NARROW 5-10m [2]
□□-VERY NARROW 1-5m [1]
□□-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
■■-FOREST, SWAMP [3]
□□-OPEN PASTURE/ ROWCROP[0]
□□- RESID.,PARK,NEW FIELD [1]
□□-FENCED PASTURE [1]

L R (Per Bank)
□□-URBAN OR INDUSTRIAL[0]
□□-SHRUB OR OLD FIELD[2]
□□-CONSERV. TILLAGE [1]
□□-MINING/CONSTRUCTION [0]

BANK EROSION
■ ■-NONE OR LITTLE [3]
□ □-MODERATE [2]
□ □-HEAVY OR SEVERE[1]

COMMENTS:______

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 6

MAX. DEPTH (Check 1)
□->1m [6]
□-0.7-1m [4]
■-0.4-0.7m [2]
□-< 0.4m [1]
□—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
■-POOL WIDTH > RIFFLE WIDTH [2]
□-POOL WIDTH = RIFFLE WIDTH [1]
□-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
□-TORRENTIAL[-1] □-EDDIES[1]
□-FAST[1] □-INTERSTITIAL[-1]
■-MODERATE [1] □-INTERMITTENT[-2]
■-SLOW [1]

□-NO POOL[0]

COMMENTS:______

RIFFLE: 3

RIFFLE/RUN DEPTH
□ - GENERALLY >10 cm,MAX>50 [4]
□ - GENERALLY >10 cm,MAX<50 [3]
□ - GENERALLY 5-10 cm [1]
■ - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
□-STABLE (e.g.,Cobble, Boulder) [2]
■-MOD. STABLE (e.g.,Pea Gravel) [1]
□-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
□-EXTENSIVE [-1] □-MODERATE[0]
□-LOW. [1] ■-NONE[2]

□-NO RIFFLE[0]

COMMENTS______

GRADIENT: 4

6] Gradient (feet/mile): 47.6 %POOL:______ %RIFFLE:______ %RUN:______

Ohio EPA Site Description Sheet

QHEI SCORE: 62

Stream CUYAHOGA RIVER RM 7.1 Date 07/03/91 River Code

Location SITE - #22.51 DOWNSTREAM OF LOWER HARVARD BRIDGE Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 14

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ____ ____ ☐■-GRAVEL [7] ✓ ✓ Substrate Origin (Check all) — Silt Cover (Check One)

☐☐-BOULDER [9] ✓ ✓ ☐☐-SAND [6] ____ ____ ☐-LIMESTONE [1] ■-RIP/RAP [0] ☐-SILT HEAVY [-2] ■-SILT MODERATE [-1]

☐■-COBBLE [8] ____ ____ ☐☐-BEDROCK[5] ____ ____ ■-TILLS [1] ☐-HARDPAN [0] ■-SILT NORMAL [0] ☐-SILT FREE [1]

☐☐-HARDPAN [4] ____ ____ ☐☐-DETRITUS[3] ____ ____ ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)

☐☐-MUCK [2] ____ ____ ☐☐-ARTIFIC.[0] ✓ ✓ ☐-SHALE [-1] ■-EXTENSIVE [-2] ■-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [1] ■-<= 4 [0] ☐-COAL FINES [-2] ☐-LOW[0] ☐-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

2] INSTREAM COVER

COVER SCORE: 10

TYPE (Check *All* That Apply) — AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]

☐-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐-MODERATE 25-75% [7]

■-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ■-SPARSE 5-25% [3]

☐-NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 13

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	☐-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 4.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	■■-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE [2]
☐■-NARROW 5-10m [2]	☐☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
■☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 9

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
■->1m [6]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.7-1m [4]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐-0.4-0.7m [2]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐-< 0.4m [1]		☐-SLOW [1]	
☐-<0.2m [Pool = 0]			

☐-NO POOL[0]

COMMENTS:____

RIFFLE: 3.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐-GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	■-EXTENSIVE [-1]	■-MODERATE[0]
■-GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		
☐-GENERALLY < 5 cm [Riffle = 0]			

☐-NO RIFFLE[0]

COMMENTS____

GRADIENT: 8

6] Gradient (feet/mile): .9 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet **QHEI SCORE:** 45.5

Stream CUYAHOGA RIVER RM 7.9 Date 02/05/93 River Code ______

Location SITE - #22.6 RIVER SMELTING Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); **SUBSTRATE SCORE:** 6

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ______ ☐☐-GRAVEL [7] ___ ___ Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ______ ☐■-SAND [6] ___ ___☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

☐☐-COBBLE [8] ______ ☐☐-BEDROCK[5] ___ ___■-TILLS [1] ☐-HARDPAN [0] ☐ - SILT NORMAL [0] ☐ - SILT FREE [1]

☐☐-HARDPAN [4] ______ ☐☐-DETRITUS[3] ___ ___☐-SANDSTONE [0] Extent Of Embeddness (Check One)

☐■-MUCK [2] ______ ☐☐-ARTIFIC.[0] ✓ ___☐-SHALE [-1] ☐—EXTENSIVE [-2] ■—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐> 4 [1] ■— <= 4 [0] ☐-COAL FINES [-2] ☐—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS______

2] INSTREAM COVER **COVER SCORE:** 9

TYPE (Check *All* That Apply) AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

☐ -UNDERCUT BANKS [1] ■ -DEEP POOLS [2] ☐ -OXBOWS [1] ☐ - EXTENSIVE > 75% [11]

■ -OVERHANGING VEGETATION [1] ☐ -ROOTWADS [1] ■ -AQUATIC MACROPHYTES [1] ☐ - MODERATE 25-75% [7]

☐ -SHALLOWS (IN SLOW WATER) [1] ■ -BOULDERS [1] ■ -LOGS OR WOODY DEBRIS [1] ■ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5%[1]

COMMENTS:______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) **CHANNEL:** 13

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	■ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	☐ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
■ - LOW [2]	■ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	■ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 5.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐■-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	■☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐■-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
■☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:______

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 8

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
■- >1m [6]			
☐- 0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐- 0.4-0.7m [2]	☐ -POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐- < 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		☐-SLOW [1]	

☐-NO POOL[0]

COMMENTS:______

RIFFLE: 0

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	☐-MODERATE[0]
☐ - GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		
☐ - GENERALLY < 5 cm [Riffle = 0]			

■-NO RIFFLE[0]

COMMENTS______ **GRADIENT:** 4

6] Gradient (feet/mile): .9 %POOL:______ %RIFFLE:______ %RUN:______

Ohio EPA Site Description Sheet QHEI SCORE: 54

Stream CUYAHOGA RIVER RM 9.7 Date 02/08/93 River Code ______
Location SITE - # 22.7 SOUTHWEST INTERCEPTOR Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); SUBSTRATE SCORE: 8.5

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY
- ☐☐-BLDER /SLABS[10] ____ ____ ☐☐-GRAVEL [7] ____ ____
- ☐☐-BOULDER [9] ____ ____ ☐■-SAND [6] ____ ✓
- ☐☐-COBBLE [8] ____ ____ ☐☐-BEDROCK[5] ____ ____
- ☐☐-HARDPAN [4] ____ ____ ☐■-DETRITUS[3] ____ ✓
- ☐☐-MUCK [2] ____ ✓ ☐☐-ARTIFIC.[0] ____ ✓

Substrate Origin (Check all): ☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-TILLS [1] ☐-HARDPAN [0] ☐-SANDSTONE [0] ☐-SHALE [-1] ☐-COAL FINES [-2]

Silt Cover (Check One): ■-SILT HEAVY [-2] ■-SILT MODERATE [-1] ☐-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One): ☐—EXTENSIVE [-2] ■—MODERATE[-1] ☐—LOW[0] ☐—NONE[1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐— <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2] INSTREAM COVER COVER SCORE: 13

TYPE (Check *All* That Apply)
- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ■-DEEP POOLS [2]
- ■-ROOTWADS [1]
- ☐-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)
- ☐- EXTENSIVE > 75% [11]
- ■- MODERATE 25-75% [7]
- ☐- SPARSE 5-25% [3]
- ☐- NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) CHANNEL: 13.5

SINUOSITY
- ☐- HIGH [4]
- ☐- MODERATE [3]
- ■- LOW [2]
- ☐- NONE [1]

DEVELOPMENT
- ☐- EXCELLENT [7]
- ☐- GOOD [5]
- ■- FAIR [3]
- ☐- POOR [1]

CHANNELIZATION
- ■- NONE [6]
- ☐- RECOVERED [4]
- ☐- RECOVERING [3]
- ☐- RECENT OR NO RECOVERY [1]

STABILITY
- ■- HIGH [3] –
- ■- MODERATE [2]
- ☐- LOW [1]

MODIFICATIONS/OTHER
- ☐- SNAGGING
- ☐- RELOCATION
- ☐- CANOPY REMOVAL
- ☐- DREDGING
- ☐- IMPOUND.
- ☐- ISLANDS
- ☐- LEVEED
- ☐- BANK SHAPING
- ☐- ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 7

River Right Looking Downstream

RIPARIAN WIDTH
L R (Per Bank)
- ■☐-WIDE>50m [4]
- ☐☐-MODERATE 10-50 [3]
- ☐■-NARROW 5-10m [2]
- ☐☐-VERY NARROW 1-5m [1]
- ☐☐-NONE[0]

EROSION/RUNOFF : FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
- ■■-FOREST, SWAMP [3]
- ☐☐-OPEN PASTURE/ ROWCROP[0]
- ☐☐- RESID.,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]

L R (Per Bank)
- ☐☐-URBAN OR INDUSTRIAL[0]
- ☐☐-SHRUB OR OLD FIELD[2]
- ☐☐-CONSERV. TILLAGE [1]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
- ☐ ☐-NONE OR LITTLE [3]
- ☐ ☐-MODERATE [2]
- ■ ■-HEAVY OR SEVERE[1]

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 8

MAX. DEPTH (Check 1)
- ■- >1m [6]
- ☐- 0.7-1m [4]
- ☐- 0.4-0.7m [2]
- ☐- < 0.4m [1]
- ☐—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- ☐-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
- ☐-TORRENTIAL[-1]
- ■-FAST[1]
- ■-MODERATE [1]
- ☐-SLOW [1]
- ☐-EDDIES[1]
- ☐-INTERSTITIAL[-1]
- ☐-INTERMITTENT[-2]

☐-NO POOL[0]

COMMENTS: ______

RIFFLE: 0

RIFFLE/RUN DEPTH
- ☐- GENERALLY >10 cm,MAX>50 [4]
- ☐- GENERALLY >10 cm,MAX<50 [3]
- ☐- GENERALLY 5-10 cm [1]
- ☐- GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g.,Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g.,Pea Gravel) [1]
- ☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-EXTENSIVE [-1]
- ☐-MODERATE[0]
- ☐-LOW. [1]
- ☐-NONE[2]

■-NO RIFFLE[0]

COMMENTS ______ GRADIENT: 4

6] Gradient (feet/mile): .9 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet QHEI SCORE: 61

Stream CUYAHOGA RIVER RM 11.3 Date 02/08/93 River Code ____

Location SITE - #22.8 SOUTHERLY CHLORINE ACCESS R.R. BRIDGE Crew: ____

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 14

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

□□-BLDER /SLABS[10] ____ □■-GRAVEL [7] ____ Substrate Origin (Check all) Silt Cover (Check One)

□□-BOULDER [9] ✓ □■-SAND [6] ____ □-LIMESTONE [1] □-RIP/RAP [0] ■-SILT HEAVY [-2] ■-SILT MODERATE [-1]

□□-COBBLE [8] ____ □□-BEDROCK[5] ____ ■-TILLS [1] □-HARDPAN [0] □-SILT NORMAL [0] □-SILT FREE [1]

□□-HARDPAN [4] ____ □□-DETRITUS[3] ✓ □-SANDSTONE [0] Extent Of Embeddness (Check One)

□□-MUCK [2] ____ □□-ARTIFIC.[0] ✓ □-SHALE [-1] □—EXTENSIVE [-2] □—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] □— <= 4 [0] □-COAL FINES [-2] ■—LOW[0] □—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

2] INSTREAM COVER COVER SCORE: 15

TYPE (Check All That Apply) AMOUNT(Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] □-OXBOWS [1] □-EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1] ■-MODERATE 25-75% [7]

□-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] □-SPARSE 5-25% [3]

□-NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 14

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□-HIGH [4]	□-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	□-SNAGGING	□-IMPOUND.
□-MODERATE [3]	□-GOOD [5]	□-RECOVERED [4]	□-MODERATE [2]	□-RELOCATION	□-ISLANDS
■-LOW [2]	■-FAIR [3]	□-RECOVERING [3]	□-LOW [1]	□-CANOPY REMOVAL	□-LEVEED
□-NONE [1]	□-POOR [1]	□-RECENT OR NO RECOVERY [1]		□-DREDGING	□-BANK SHAPING
				□-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
□■-WIDE>50m [4]	□□-FOREST, SWAMP [3]	■□-URBAN OR INDUSTRIAL[0]	□ □-NONE OR LITTLE [3]
■□-MODERATE 10-50 [3]	□□-OPEN PASTURE/ ROWCROP[0]	□■-SHRUB OR OLD FIELD[2]	■ □-MODERATE [2]
□□-NARROW 5-10m [2]	□□- RESID.,PARK,NEW FIELD [1]	□□-CONSERV. TILLAGE [1]	□ ■-HEAVY OR SEVERE[1]
□□-VERY NARROW 1-5m [1]	□□-FENCED PASTURE [1]	□□-MINING/CONSTRUCTION [0]	
□□-NONE[0]			

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 8

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
■->1m [6]			
□-0.7-1m [4]	□-POOL WIDTH > RIFFLE WIDTH [2]	□-TORRENTIAL[-1]	□-EDDIES[1]
□-0.4-0.7m [2]	□-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	□-INTERSTITIAL[-1]
□-< 0.4m [1]	□-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	□-INTERMITTENT[-2]
□—<0.2m [Pool = 0]		□-SLOW [1]	

□-NO POOL[0]

COMMENTS:____

RIFFLE: 0

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
□-GENERALLY >10 cm,MAX>50 [4]	□-STABLE (e.g.,Cobble, Boulder) [2]	□-EXTENSIVE [-1]	□-MODERATE[0]
□-GENERALLY >10 cm,MAX<50 [3]	□-MOD. STABLE (e.g.,Pea Gravel) [1]	□-LOW. [1]	□-NONE[2]
□-GENERALLY 5-10 cm [1]	□-UNSTABLE (Gravel,Sand) [0]		
□-GENERALLY < 5 cm [Riffle = 0]			

■-NO RIFFLE[0]

COMMENTS____ GRADIENT: 4

6] Gradient (feet/mile): ~9 %POOL:____ %RIFFLE:____ %RUN:____

OhioEPA **Qualitative Habitat Evaluation Index Field Sheet** QHEI Score: 54.5

Stream Cuyahoga River Site B RM ____ Date 8/22/95 River Code ____
Location Downstream of Mill Creek Confluence Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE	SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE))	SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE))
☐☐-BLDR /SLABS[10]			☐☐-GRAVEL [7]	✓	✓	☐-LIMESTONE [1]	SILT: ☐-SILT HEAVY [-2]
☐☐-BOULDER [9]			■■-SAND [6]	✓	✓	■-TILLS [1]	■-SILT MODERATE [-1]
☐☐-COBBLE [8]	✓		☐☐-BEDROCK[5]			☐-WETLANDS[0]	■-SILT NORMAL [0]
☐☐-HARDPAN [4]			☐☐-DETRITUS[3]	✓		☐-HARDPAN [0]	☐-SILT FREE [1]
☐☐-MUCK [2]			☐☐-ARTIFICIAL[0]	✓	✓	☐-SANDSTONE [0]	EMBEDDEDNESS: ☐-EXTENSIVE [-2]
☐☐-SILT [2]						☐-RIP/RAP [0]	■-MODERATE [-1]
						☐-LACUSTRINE [0]	☐-NORMAL [0]
						☐-SHALE [-1]	☐-NONE [1]
						☐-COAL FINES [-2]	

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS ____

Substrate: 7.5 Max 20

2] INSTREAM COVER

TYPE: (Check All That Apply)
■ -UNDERCUT BANKS [1] ■ -DEEP POOLS> 70 cm [2] ☐ -OXBOWS [1]
■ -OVERHANGING VEGETATION [1] ■ -ROOTWADS [1] ■ -AQUATIC MACROPHYTES [1]
☐ -SHALLOWS (IN SLOW WATER) [1] ☐ -BOULDERS [1] ■ -LOGS OR WOODY DEBRIS [1]
☐ -ROOTMATS [1] COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
■ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

Cover: 10 Max 20

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
■ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	■ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	■ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

Channel: 11 Max 20

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) L R (Most Predominant Per Bank)	L R	BANK EROSION L R (Per Bank)
■☐-WIDE > 50m [4]	■■-FOREST, SWAMP [3]	☐☐-CONSERVATION TILLAGE [1]	☐■-NONE/LITTLE [3]
☐■-MODERATE 10-50m [3]	☐☐-SHRUB OR OLD FIELD [2]	☐☐-URBAN OR INDUSTRIAL [0]	■☐-MODERATE [2]
☐☐-NARROW 5-10 m [2]	☐☐-RESIDENTIAL,PARK,NEW FIELD [1]	☐☐-OPEN PASTURE,ROWCROP [0]	☐☐-HEAVY/SEVERE[1]
☐☐-VERY NARROW <5 m[1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE [0]			

COMMENTS: ____

Riparian: 9 Max 10

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)	MORPHOLOGY (Check 1 or 2 & AVERAGE)	CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply)	
■ - >1m [6]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-EDDIES[1]	☐-TORRENTIAL[-1]
☐ - 0.7-1m [4]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐ - 0.4-0.7m [2]	■-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐ - 0.2-0.4m [1]		☐-SLOW [1]	
☐ - < 0.2m [POOL=0]	COMMENTS: ____		

Pool/Glide: 7 Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ - GENERALLY >10 cm MAX > 50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐ - NONE [2]
☐ - GENERALLY >10 cm; MAX < 50[3]	☐-MOD. STABLE (e.g.,Large Gravel) [1]	☐ - LOW [1]
☐ - GENERALLY 5-10 cm[1]	■-UNSTABLE (Fine Gravel,Sand) [0]	☐ - MODERATE [0]
■ - GENERALLY < 5 cm [RIFFLE=0]		☐ - EXTENSIVE [-1]
		■ - NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 0 Max 8

6] GRADIENT (ft/mi): 3.25 DRAINAGE AREA (sq.mi.): 709 %POOL: — %GLIDE: — %RIFFLE: — %RUN: 100

Gradient: 10 Max 10

Ohio EPA Site Description Sheet — **QHEI SCORE: 59**

Stream CUYAHOGA RIVER RM 11.7 Date 07/03/91 River Code ______
Location SITE - #22.9 EAST 71st STREET AND CANAL ROAD Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); **SUBSTRATE SCORE: 11.5**

TYPE — POOL RIFFLE

- □□-BLDER /SLABS[10]
- □□-BOULDER [9]
- □□-COBBLE [8]
- □□-HARDPAN [4] ✓ ✓
- □□-MUCK [2]
- □■-GRAVEL [7]
- □■-SAND [6]
- □□-BEDROCK[5]
- □□-DETRITUS[3]
- □□-ARTIFIC.[0]

TOTAL NUMBER OF SUBSTRATE TYPES: □-> 4 [1] ■-<= 4 [0]

SUBSTRATE QUALITY — Substrate Origin (Check all)

- □-LIMESTONE [1]
- □-RIP/RAP [0]
- ■-TILLS [1]
- □-HARDPAN [0]
- □-SANDSTONE [0]
- □-SHALE [-1]
- □-COAL FINES [-2]

Silt Cover (Check One)

- □-SILT HEAVY [-2]
- ■-SILT MODERATE [-1]
- □-SILT NORMAL [0]
- □-SILT FREE [1]

Extent Of Embeddness (Check One)

- ■-EXTENSIVE [-2]
- ■-MODERATE[-1]
- □-LOW[0]
- □-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ______

2] INSTREAM COVER — **COVER SCORE: 10**

TYPE (Check All That Apply)

- □-UNDERCUT BANKS [1]
- □-OVERHANGING VEGETATION [1]
- ■-SHALLOWS (IN SLOW WATER) [1]
- ■-DEEP POOLS [2]
- ■-ROOTWADS [1]
- □-BOULDERS [1]
- □-OXBOWS [1]
- □-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- □-EXTENSIVE > 75% [11]
- ■-MODERATE 25-75% [7]
- ■-SPARSE 5-25% [3]
- □-NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — **CHANNEL: 14.5**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□-HIGH [4]	□-EXCELLENT [7]	■-NONE [6]	□-HIGH [3]	□-SNAGGING	□-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	□-RECOVERED [4]	■-MODERATE [2]	□-RELOCATION	□-ISLANDS
□-LOW [2]	■-FAIR [3]	□-RECOVERING [3]	■-LOW [1]	□-CANOPY REMOVAL	□-LEVEED
□-NONE [1]	□-POOR [1]	□-RECENT OR NO RECOVERY [1]		□-DREDGING	□-BANK SHAPING
				□-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — **RIPARIAN: 4.5**
River Right Looking Downstream

RIPARIAN WIDTH — L R (Per Bank)

- □□-WIDE>50m [4]
- □□-MODERATE 10-50 [3]
- ■□-NARROW 5-10m [2]
- □■-VERY NARROW 1-5m [1]
- □□-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank)

- □□-FOREST, SWAMP [3]
- □□-OPEN PASTURE/ ROWCROP[0]
- □□-RESID.,PARK,NEW FIELD [1]
- □□-FENCED PASTURE [1]

L R (Per Bank)

- ■■-URBAN OR INDUSTRIAL[0]
- □□-SHRUB OR OLD FIELD[2]
- □□-CONSERV. TILLAGE [1]
- □□-MINING/CONSTRUCTION [0]

BANK EROSION

- ■■-NONE OR LITTLE [3]
- □□-MODERATE [2]
- □□-HEAVY OR SEVERE[1]

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY — **POOL: 6**

MAX. DEPTH (Check 1)

- □->1m [6]
- ■-0.7-1m [4]
- □-0.4-0.7m [2]
- □-< 0.4m [1]
- □-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)

- □-POOL WIDTH > RIFFLE WIDTH [2]
- □-POOL WIDTH = RIFFLE WIDTH [1]
- ■-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- □-TORRENTIAL[-1]
- ■-FAST[1]
- ■-MODERATE [1]
- □-SLOW [1]
- □-EDDIES[1]
- □-INTERSTITIAL[-1]
- □-INTERMITTENT[-2]

□-NO POOL[0]

COMMENTS: ______

RIFFLE: 4.5

RIFFLE/RUN DEPTH

- ■-GENERALLY >10 cm,MAX>50 [4]
- □-GENERALLY >10 cm,MAX<50 [3]
- □-GENERALLY 5-10 cm [1]
- □-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- □-STABLE (e.g.,Cobble, Boulder) [2]
- ■-MOD. STABLE (e.g.,Pea Gravel) [1]
- □-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- ■-EXTENSIVE [-1]
- ■-MODERATE[0]
- □-LOW. [1]
- □-NONE[2]

□-NO RIFFLE[0]

COMMENTS ______ **GRADIENT: 8**

6] Gradient (feet/mile): .9 %POOL: ______ %RIFFLE: ______ %RUN: ______

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 64

Stream: Cuyahoga River Site A RM: ____ Date: 8/22/95 River Code: ____
Location: Upstream of Mill Creek Confluence Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE	SUBSTRATE ORIGIN		SUBSTRATE QUALITY
☐☐-BLDR /SLABS[10]			■■-GRAVEL [7]	✓	✓	Check ONE (OR 2 & AVERAGE)		Check ONE (OR 2 & AVERAGE)
☐☐-BOULDER [9]	✓		■■-SAND [6]	✓	✓	☐-LIMESTONE [1]	SILT:	☐-SILT HEAVY [-2]
☐☐-COBBLE [8]	✓	✓	☐☐-BEDROCK[5]			■-TILLS [1]		■-SILT MODERATE [-1]
☐☐-HARDPAN [4]			☐☐-DETRITUS[3]	✓		☐-WETLANDS[0]		■-SILT NORMAL [0]
☐☐-MUCK [2]			☐☐-ARTIFICIAL[0]	✓	✓	☐-HARDPAN [0]		☐-SILT FREE [1]
☐☐-SILT [2]						☐-SANDSTONE [0]	EMBEDDEDNESS:	☐-EXTENSIVE [-2]
						☐-RIP/RAP [0]		☐-MODERATE [-1]
						☐-LACUSTRINE [0]		■-NORMAL [0]
						☐-SHALE [-1]		☐-NONE [1]
						☐-COAL FINES [-2]		

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS ____

Substrate: 15.5 (Max 20)

2] INSTREAM COVER

TYPE: (Check All That Apply)
- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ☐-ROOTMATS [1]
- ■-DEEP POOLS> 70 cm [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
- ☐ - EXTENSIVE >75% [11]
- ☐ - MODERATE 25-75% [7]
- ■ - SPARSE 5-25% [3]
- ☐ - NEARLY ABSENT <5%[1]

Cover: 10 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	■ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
■ - NONE [1]	■ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

Channel: 11 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) L R (Most Predominant Per Bank)	L R	BANK EROSION L R (Per Bank)
■☐-WIDE > 50m [4]	■☐-FOREST, SWAMP [3]	☐☐-CONSERVATION TILLAGE [1]	☐☐-NONE/LITTLE [3]
☐☐ - MODERATE 10-50m [3]	☐☐-SHRUB OR OLD FIELD [2]	☐■-URBAN OR INDUSTRIAL [0]	■■-MODERATE [2]
☐■-NARROW 5-10 m [2]	☐☐-RESIDENTIAL,PARK,NEW FIELD [1]	☐☐-OPEN PASTURE,ROWCROP [0]	☐☐-HEAVY/SEVERE[1]
☐☐- VERY NARROW <5 m[1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐- NONE [0]			

COMMENTS: ____

Riparian: 6.5 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)	MORPHOLOGY (Check 1 or 2 & AVERAGE)	CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply)	
■ - >1m [6]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-EDDIES[1]	☐-TORRENTIAL[-1]
☐ - 0.7-1m [4]	☐-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐ - 0.4-0.7m [2]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐ - 0.2- 0.4m [1]		☐-SLOW [1]	
☐ - < 0.2m [POOL=0]			

COMMENTS: ____

Pool/Glide: 10 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ - GENERALLY >10 cm MAX > 50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐ - NONE [2]
☐ - GENERALLY >10 cm; MAX < 50[3]	☐-MOD. STABLE (e.g.,Large Gravel) [1]	☐ - LOW [1]
■ - GENERALLY 5-10 cm[1]	■-UNSTABLE (Fine Gravel,Sand) [0]	■ - MODERATE [0]
☐ - GENERALLY < 5 cm [RIFFLE=0]		☐ - EXTENSIVE [-1]
		☐ - NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 1 (Max 8)

6] GRADIENT (ft/mi): 3.25 DRAINAGE AREA (sq.mi.): 709

%POOL: 5 %GLIDE: 5
%RIFFLE: 10 %RUN: 80

Gradient: 10 (Max 10)

EPA 4520 4/7/92

Ohio EPA Site Description Sheet QHEI SCORE: 81

Stream: CUYAHOGA RIVER RM: 16.8 Date: 08/15/91 River Code: ______
Location: SITE-#23 RIVERVIEW ROAD BRIDGE Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 17

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ✓ ☐■-GRAVEL [7]
- ☐☐-BOULDER [9] ✓ ☐☐-SAND [6]
- ☐■-COBBLE [8] ☐☐-BEDROCK[5]
- ☐☐-HARDPAN [4] ☐☐-DETRITUS[3]
- ☐☐-MUCK [2] ☐☐-ARTIFIC.[0]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2]

Substrate Origin (Check all): ☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-TILLS [1] ☐-HARDPAN [0] ☐-SANDSTONE [0] ☐-SHALE [-1]

Silt Cover (Check One): ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ■-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One): ☐—EXTENSIVE [-2] ☐—MODERATE [-1] ■—LOW [0] ☐—NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS______

2] INSTREAM COVER COVER SCORE: 13

TYPE (Check All That Apply)

- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ■-SHALLOWS (IN SLOW WATER) [1]
- ■-DEEP POOLS [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☐-EXTENSIVE > 75% [11]
- ■-MODERATE 25-75% [7]
- ■-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5% [1]

COMMENTS:______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 14.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
■-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 9

River Right Looking Downstream

RIPARIAN WIDTH — L R (Per Bank)

- ■■-WIDE>50m [4]
- ☐☐-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ☐☐-VERY NARROW 1-5m [1]
- ☐☐-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank)

- ■☐-FOREST, SWAMP [3]
- ☐■-OPEN PASTURE/ ROWCROP [0]
- ☐☐- RESID.,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]

L R (Per Bank)

- ☐☐-URBAN OR INDUSTRIAL [0]
- ☐■-SHRUB OR OLD FIELD [2]
- ☐☐-CONSERV. TILLAGE [1]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION

- ■ ■-NONE OR LITTLE [3]
- ☐ ☐-MODERATE [2]
- ☐ ☐-HEAVY OR SEVERE [1]

COMMENTS:______

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 12

MAX. DEPTH (Check 1)

- ■->1m [6]
- ☐-0.7-1m [4]
- ☐-0.4-0.7m [2]
- ☐-< 0.4m [1]
- ☐—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)

- ■-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- ☐-TORRENTIAL [-1]
- ■-FAST [1]
- ■-MODERATE [1]
- ■-SLOW [1]
- ■-EDDIES [1]
- ☐-INTERSTITIAL [-1]
- ☐-INTERMITTENT [-2]

☐-NO POOL [0]

COMMENTS:______

RIFFLE: 5.5

RIFFLE/RUN DEPTH

- ☐-GENERALLY >10 cm,MAX>50 [4]
- ■-GENERALLY >10 cm,MAX<50 [3]
- ☐-GENERALLY 5-10 cm [1]
- ☐-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- ■-STABLE (e.g.,Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g.,Pea Gravel) [1]
- ☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- ☐-EXTENSIVE [-1] ■-MODERATE [0]
- ■-LOW. [1] ☐-NONE [2]

☐-NO RIFFLE [0]

COMMENTS______ GRADIENT: 10

6] Gradient (feet/mile): 5.9 %POOL:______ %RIFFLE:______ %RUN:______

Ohio EPA Site Description Sheet **QHEI SCORE: 67**

Stream CUYAHOGA RIVER RM 20.8 Date 01 |20| 93 River Code

Location SITE - #24 STATION ROAD BRIDGE Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); **SUBSTRATE SCORE: 15**

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ____ ____ ■■-GRAVEL [7] ____ ✓ Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ✓ ✓ ☐☐-SAND [6] ✓ ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ■-SILT MODERATE [-1]

■■-COBBLE [8] ____ ✓ ☐☐-BEDROCK[5] ____ ____ ■-TILLS [1] ☐-HARDPAN [0] ☐ - SILT NORMAL [0] ☐ - SILT FREE [1]

☐☐-HARDPAN [4] ____ ____ ☐☐-DETRITUS[3] ____ ____ ☐-SANDSTONE [0] Extent Of Embeddness (Check One)

☐☐-MUCK [2] ____ ____ ☐☐-ARTIFIC.[0] ____ ____ ☐-SHALE [-1] ☐—EXTENSIVE [-2] ■—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] ☐—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

COVER SCORE: 11

2] INSTREAM COVER

AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

TYPE (Check *All* That Apply)

☐ -UNDERCUT BANKS [1] ■ -DEEP POOLS [2] ☐ -OXBOWS [1] ☐ - EXTENSIVE > 75% [11]

■ -OVERHANGING VEGETATION [1] ■ -ROOTWADS [1] ■ -AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]

☐ -SHALLOWS (IN SLOW WATER) [1] ■ -BOULDERS [1] ☐ -LOGS OR WOODY DEBRIS [1] ■ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) **CHANNEL: 14**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
■ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 6**

River Right Looking Downstream

RIPARIAN WIDTH	EROSION/RUNOFF - FLOOD PLAIN QUALITY		BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)	
■☐-WIDE>50m [4]	■☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ■-HEAVY OR SEVERE[1]
☐■-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 7**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)		
■- >1m [6]				
☐- 0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]	
☐- 0.4-0.7m [2]	☐ -POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]	☐-NO POOL[0]
☐- < 0.4m [1]	■-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]	
☐—<0.2m [Pool = 0]		☐-SLOW [1]		

COMMENTS:____

RIFFLE: 4

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	■-MODERATE[0]
■ - GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		☐-NO RIFFLE[0]
☐ - GENERALLY < 5 cm [Riffle = 0]			

COMMENTS____ **GRADIENT: 10**

6] Gradient (feet/mile): 5.9 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet — **QHEI SCORE:** 53.5

Stream CUYAHOGA RIVER RM 33.2 Date 01/20/93 River Code ______

Location SITE - # 24.5 BOLANZ ROAD Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); **SUBSTRATE SCORE:** 5

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ______ ☐☐-GRAVEL [7] ______ Substrate Origin (Check all) Silt Cover (Check One)
- ☐☐-BOULDER [9] ______ ■■-SAND [6] ______ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
- ☐☐-COBBLE [8] ✓ ☐☐-BEDROCK[5] ______ ■-TILLS [1] ☐-HARDPAN [0] ☐ - SILT NORMAL [0] ☐ - SILT FREE [1]
- ☐☐-HARDPAN [4] ______ ☐☐-DETRITUS[3] ______ ☐-SANDSTONE [0] Extent Of Embeddness (Check One)
- ☐☐-MUCK [2] ______ ☐☐-ARTIFIC.[0] ______ ☐-SHALE [-1] ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐> 4 [1] ■— <= 4 [0] ☐-COAL FINES [-2] ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS______

COVER SCORE: 14

2] INSTREAM COVER

TYPE (Check *All* That Apply) AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

- ■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐ - EXTENSIVE > 75% [11]
- ■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]
- ☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ☐ - SPARSE 5-25% [3]
- ☐ - NEARLY ABSENT < 5%[1]

COMMENTS:______

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) **CHANNEL:** 12

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
■ - LOW [2]	■ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	■ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 5.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
■■-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	■■-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	■ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:______

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 7

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)		
■- >1m [6]				
☐- 0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]	
☐- 0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]	☐-NO POOL[0]
☐- < 0.4m [1]	■-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]	
☐—<0.2m [Pool = 0]		☐-SLOW [1]		

COMMENTS:______

RIFFLE: 0

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	☐-MODERATE[0]
☐ - GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	■-UNSTABLE (Gravel,Sand) [0]		☐-NO RIFFLE[0]
■ - GENERALLY < 5 cm [Riffle = 0]			

COMMENTS______ **GRADIENT:** 10

6] Gradient (feet/mile): 4.7 %POOL:______ %RIFFLE:______ %RUN:______

Ohio EPA Site Description Sheet QHEI SCORE: 59.5

Stream BIG CREEK RM ____ Date 09/19/93 River Code ____

Location SITE - #2.5 AT JENNINGS ROAD Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 18

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER/SLABS[10] ✓ / GRAVEL [7]
- BOULDER [9] / SAND [6]
- COBBLE [8] / BEDROCK[5]
- HARDPAN [4] / DETRITUS[3]
- MUCK [2] ✓ / ARTIFIC.[0]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [1] <= 4 [0]

Substrate Origin (Check all): LIMESTONE [1] RIP/RAP [0] TILLS [1] HARDPAN [0] SANDSTONE [0] SHALE [-1] COAL FINES [-2]

Silt Cover (Check One): SILT HEAVY [-2] SILT MODERATE [-1] SILT NORMAL [0] SILT FREE [1]

Extent Of Embeddness (Check One): EXTENSIVE [-2] MODERATE[-1] LOW[0] NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

COVER SCORE: 7

2] INSTREAM COVER

TYPE (Check All That Apply)

- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- SHALLOWS (IN SLOW WATER) [1]
- DEEP POOLS [2]
- ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- AQUATIC MACROPHYTES [1]
- LOGS OR WOODY DEBRIS [1]

AMOUNT(Check ONLY One or check 2 and AVERAGE)

- EXTENSIVE > 75% [11]
- MODERATE 25-75% [7]
- SPARSE 5-25% [3]
- NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 6.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
HIGH [4]	EXCELLENT [7]	NONE [6]	HIGH [3]	SNAGGING	IMPOUND.
MODERATE [3]	GOOD [5]	RECOVERED [4]	MODERATE [2]	RELOCATION	ISLANDS
LOW [2]	FAIR [3]	RECOVERING [3]	LOW [1]	CANOPY REMOVAL	LEVEED
NONE [1]	POOR [1]	RECENT OR NO RECOVERY [1]		DREDGING	BANK SHAPING
				ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 4

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
WIDE>50m [4]	FOREST, SWAMP [3]	URBAN OR INDUSTRIAL[0]	NONE OR LITTLE [3]
MODERATE 10-50 [3]	OPEN PASTURE/ ROWCROP[0]	SHRUB OR OLD FIELD[2]	MODERATE [2]
NARROW 5-10m [2]	RESID.,PARK,NEW FIELD [1]	CONSERV. TILLAGE [1]	HEAVY OR SEVERE[1]
VERY NARROW 1-5m [1]	FENCED PASTURE [1]	MINING/CONSTRUCTION [0]	
NONE[0]			

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 11

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
>1m [6]	POOL WIDTH > RIFFLE WIDTH [2]	TORRENTIAL[-1]	EDDIES[1]
0.7-1m [4]	POOL WIDTH = RIFFLE WIDTH [1]	FAST[1]	INTERSTITIAL[-1]
0.4-0.7m [2]	POOL WIDTH < RIFFLE W. [0]	MODERATE [1]	INTERMITTENT[-2]
< 0.4m [1]		SLOW [1]	
<0.2m [Pool = 0]			

NO POOL[0]

COMMENTS:____

RIFFLE: 5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
GENERALLY >10 cm,MAX>50 [4]	STABLE (e.g.,Cobble, Boulder) [2]	EXTENSIVE [-1] MODERATE[0]
GENERALLY >10 cm,MAX<50 [3]	MOD. STABLE (e.g.,Pea Gravel) [1]	LOW. [1] NONE[2]
GENERALLY 5-10 cm [1]	UNSTABLE (Gravel,Sand) [0]	NO RIFFLE[0]
GENERALLY < 5 cm [Riffle = 0]		

COMMENTS____ GRADIENT: 8

6] Gradient (feet/mile): 24.4 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet

QHEI SCORE: 67

Stream BIG CREEK RM_____ Date 09/23/91 River Code_____

Location SITE - # 26 E. BRANCH UPSTREAM OF CONFLUENCE Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 17

TYPE	POOL	RIFFLE		POOL	RIFFLE	SUBSTRATE QUALITY	
☐■-BLDER/SLABS[10]	✓	✓	☐☐-GRAVEL [7]	___	___	Substrate Origin (Check all)	Silt Cover (Check One)
☐☐-BOULDER [9]	✓	✓	☐☐-SAND [6]	___	___	☐-LIMESTONE [1] ☐-RIP/RAP [0]	☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
☐☐-COBBLE [8]	✓	___	☐■-BEDROCK[5]	✓	✓	■-TILLS [1] ☐-HARDPAN [0]	■-SILT NORMAL [0] ■-SILT FREE [1]
☐☐-HARDPAN [4]	___	___	☐☐-DETRITUS[3]	___	___	☐-SANDSTONE [0]	Extent Of Embeddedness (Check One)
☐☐-MUCK [2]	___	✓	☐☐-ARTIFIC.[0]	___	___	☐-SHALE [-1]	☐—EXTENSIVE [-2] ■—MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0] ☐-COAL FINES [-2] ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS_____

COVER SCORE: 8

2] INSTREAM COVER

TYPE (Check All That Apply)

- ☐-UNDERCUT BANKS [1]
- ☐-OVERHANGING VEGETATION [1]
- ■-SHALLOWS (IN SLOW WATER) [1]
- ☐-DEEP POOLS [2]
- ☐-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☐- EXTENSIVE > 75% [11]
- ■- MODERATE 25-75% [7]
- ■- SPARSE 5-25% [3]
- ☐- NEARLY ABSENT < 5% [1]

COMMENTS:_____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL: 12**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐- HIGH [4]	☐- EXCELLENT [7]	☐- NONE [6]	☐- HIGH [3]	☐- SNAGGING	☐- IMPOUND.
☐- MODERATE [3]	■- GOOD [5]	■- RECOVERED [4]	■- MODERATE [2]	☐- RELOCATION	☐- ISLANDS
■- LOW [2]	■- FAIR [3]	☐- RECOVERING [3]	☐- LOW [1]	☐- CANOPY REMOVAL	☐- LEVEED
☐- NONE [1]	☐- POOR [1]	☐- RECENT OR NO RECOVERY [1]		☐- DREDGING	■- BANK SHAPING
				■- ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:_____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 7.5**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
☐■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE [2]
■☐-NARROW 5-10m [2]	■☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:_____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 7**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐- >1m [6]			
☐- 0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	■-EDDIES[1]
■- 0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐- < 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS:_____

RIFFLE: 5.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐- GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ■-MODERATE[0]
■- GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1] ☐-NONE[2]
☐- GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐- GENERALLY < 5 cm [Riffle = 0]		

COMMENTS_____ **GRADIENT: 10**

6] Gradient (feet/mile): 16.0 %POOL:_____ %RIFFLE:_____ %RUN:_____

Ohio EPA Site Description Sheet

QHEI SCORE: 62

Stream BIG CREEK RM ____ Date 01/26/93 River Code ____

Location SITE #27 WEST BRANCH UPSTREAM OF CONFLUENCE Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); **SUBSTRATE SCORE: 16.5**

TYPE POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

□□-BLDER /SLABS[10] ____ □□-GRAVEL [7] ✓ ✓ — Substrate Origin (Check all)
■■-BOULDER [9] ____ □□-SAND [6] ____ □-LIMESTONE [1] □-RIP/RAP [0]
■■-COBBLE [8] ____ □□-BEDROCK[5] ✓ ____ ■-TILLS [1] □-HARDPAN [0]
□□-HARDPAN [4] ____ □□-DETRITUS[3] ____ □-SANDSTONE [0]
□□-MUCK [2] ____ □□-ARTIFIC.[0] ____ ✓ □-SHALE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] □— <= 4 [0] □-COAL FINES [-2]

Silt Cover (Check One): □-SILT HEAVY [-2] ■-SILT MODERATE [-1] □-SILT NORMAL [0] □-SILT FREE [1]

Extent Of Embeddness (Check One): ■—EXTENSIVE [-2] ■—MODERATE[-1] □—LOW[0] □—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER — **COVER SCORE: 13**

TYPE (Check All That Apply)

■-UNDERCUT BANKS [1] □-DEEP POOLS [2] □-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
□-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)
□-EXTENSIVE > 75% [11]
■-MODERATE 25-75% [7]
□-SPARSE 5-25% [3]
□-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — **CHANNEL: 12**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□-HIGH [4]	□-EXCELLENT [7]	■-NONE [6]	□-HIGH [3]	□-SNAGGING	□-IMPOUND.
□-MODERATE [3]	□-GOOD [5]	□-RECOVERED [4]	■-MODERATE [2]	□-RELOCATION	□-ISLANDS
■-LOW [2]	■-FAIR [3]	□-RECOVERING [3]	□-LOW [1]	□-CANOPY REMOVAL	□-LEVEED
□-NONE [1]	■-POOR [1]	□-RECENT OR NO RECOVERY [1]		□-DREDGING	□-BANK SHAPING
				□-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — **RIPARIAN: 7**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
□■-WIDE>50m [4]	□■-FOREST, SWAMP [3]	■□-URBAN OR INDUSTRIAL[0]	□ □-NONE OR LITTLE [3]
■□-MODERATE 10-50 [3]	□□-OPEN PASTURE/ ROWCROP[0]	□□-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
□□-NARROW 5-10m [2]	□□-RESID.,PARK,NEW FIELD [1]	□□-CONSERV. TILLAGE [1]	□ □-HEAVY OR SEVERE[1]
□□-VERY NARROW 1-5m [1]	□□-FENCED PASTURE [1]	□□-MINING/CONSTRUCTION [0]	
□□-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY — **POOL: 3**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
□->1m [6]	□-POOL WIDTH > RIFFLE WIDTH [2]	□-TORRENTIAL[-1]	□-EDDIES[1]
□-0.7-1m [4]	□-POOL WIDTH = RIFFLE WIDTH [1]	□-FAST[1]	□-INTERSTITIAL[-1]
■-0.4-0.7m [2]	■-POOL WIDTH < RIFFLE W. [0]	□-MODERATE [1]	□-INTERMITTENT[-2]
□-< 0.4m [1]		■-SLOW [1]	
□—<0.2m [Pool = 0]			

□-NO POOL[0]

COMMENTS: ____

RIFFLE: 2.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
□-GENERALLY >10 cm,MAX>50 [4]	□-STABLE (e.g.,Cobble, Boulder) [2]	■-EXTENSIVE [-1] ■-MODERATE[0]
□-GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	□-LOW. [1] □-NONE[2]
■-GENERALLY 5-10 cm [1]	□-UNSTABLE (Gravel,Sand) [0]	□-NO RIFFLE[0]
□-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ____ **GRADIENT: 8**

6] Gradient (feet/mile): 10.6 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet QHEI SCORE: 33.5

Stream BIG CREEK RM ___ Date 01/23/93 River Code ___

Location SITE-#28 WEST BRANCH UPSTREAM OF PURITAS AVE Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); SUBSTRATE SCORE: 1

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ___ ☐☐-GRAVEL [7] ___ ___
- ☐☐-BOULDER [9] ___ ☐☐-SAND [6] ___ ___
- ☐☐-COBBLE [8] ___ ☐☐-BEDROCK[5] ___ ___
- ☐☐-HARDPAN [4] ___ ☐☐-DETRITUS[3] ___ ___
- ☐☐-MUCK [2] ___ ■■-ARTIFIC.[0] ___ ___

Substrate Origin (Check all): ☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-TILLS [1] ☐-HARDPAN [0] ☐-SANDSTONE [0] ☐-SHALE [-1] ☐-COAL FINES [-2]

Silt Cover (Check One): ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ■-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One): ☐—EXTENSIVE [-2] ☐—MODERATE[-1] ■—LOW[0] ☐—NONE[1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [1] ■— <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS___

2] INSTREAM COVER COVER SCORE: 7

TYPE (Check *All* That Apply)

- ☐-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ☐-DEEP POOLS [2]
- ☐-ROOTWADS [1]
- ☐-BOULDERS [1]
- ☐-OXBOWS [1]
- ■-AQUATIC MACROPHYTES [1]
- ☐-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

- ☐- EXTENSIVE > 75% [11]
- ■- MODERATE 25-75% [7]
- ■- SPARSE 5-25% [3]
- ☐- NEARLY ABSENT < 5%[1]

COMMENTS:___

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) CHANNEL: 9

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐- HIGH [4]	☐- EXCELLENT [7]	☐- NONE [6]	■- HIGH [3]	☐- SNAGGING	☐- IMPOUND.
☐- MODERATE [3]	☐- GOOD [5]	■- RECOVERED [4]	☐- MODERATE [2]	☐- RELOCATION	☐- ISLANDS
☐- LOW [2]	☐- FAIR [3]	☐- RECOVERING [3]	☐- LOW [1]	☐- CANOPY REMOVAL	☐- LEVEED
■- NONE [1]	■- POOR [1]	☐- RECENT OR NO RECOVERY [1]		☐- DREDGING	☐- BANK SHAPING
				☐- ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:___

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 7.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)

- ■☐-WIDE>50m [4]
- ☐■-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ☐☐-VERY NARROW 1-5m [1]
- ☐☐-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)

- ☐☐-FOREST, SWAMP [3]
- ☐☐-OPEN PASTURE/ ROWCROP[0]
- ☐☐- RESID.,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]
- ☐■-URBAN OR INDUSTRIAL[0]
- ■☐-SHRUB OR OLD FIELD[2]
- ☐☐-CONSERV. TILLAGE [1]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION

- ■ ■-NONE OR LITTLE [3]
- ☐ ☐-MODERATE [2]
- ☐ ☐-HEAVY OR SEVERE[1]

COMMENTS:___

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 1

MAX. DEPTH (Check 1)

- ☐- >1m [6]
- ☐- 0.7-1m [4]
- ☐- 0.4-0.7m [2]
- ☐- < 0.4m [1]
- ■—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)

- ☐-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)

- ☐-TORRENTIAL[-1]
- ☐-FAST[1]
- ☐-MODERATE [1]
- ■-SLOW [1]
- ☐-EDDIES[1]
- ☐-INTERSTITIAL[-1]
- ☐-INTERMITTENT[-2]

☐-NO POOL[0]

COMMENTS:___

RIFFLE: 0

RIFFLE/RUN DEPTH

- ☐- GENERALLY >10 cm,MAX>50 [4]
- ☐- GENERALLY >10 cm,MAX<50 [3]
- ☐- GENERALLY 5-10 cm [1]
- ☐- GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- ☐-STABLE (e.g.,Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g.,Pea Gravel) [1]
- ☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- ☐-EXTENSIVE [-1]
- ☐-MODERATE[0]
- ☐-LOW. [1]
- ☐-NONE[2]

■-NO RIFFLE[0]

COMMENTS___ GRADIENT: 8

6] Gradient (feet/mile): 14.6 %POOL:___ %RIFFLE:___ %RUN:___

Ohio EPA Site Description Sheet

QHEI SCORE: 52.5

Stream BIG CREEK RM ____ Date 10/17/91 River Code ____

Location SITE-#29 EAST BRANCH, AT FERNHILL PICNIC AREA Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*); **SUBSTRATE SCORE: 12.5**

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ✓ ☐☐-GRAVEL [7]
☐☐-BOULDER [9] ☐■-SAND [6]
☐■-COBBLE [8] ✓ ✓ ☐☐-BEDROCK[5] ✓
☐☐-HARDPAN [4] ☐☐-DETRITUS[3]
☐☐-MUCK [2] ☐☐-ARTIFIC.[0]

Substrate Origin (Check all): ☐-LIMESTONE [1] ☐-RIP/RAP [0] ✓ ■-TILLS [1] ☐-HARDPAN [0] ✓ ☐-SANDSTONE [0] ☐-SHALE [-1] ☐-COAL FINES [-2]

Silt Cover (Check One): ■-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ☐-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One): ■—EXTENSIVE [-2] ■—MODERATE [-1] ☐—LOW [0] ☐—NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

COVER SCORE: 8

2] INSTREAM COVER

TYPE (Check *All* That Apply)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
■-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

☐-EXTENSIVE > 75% [11]
☐-MODERATE 25-75% [7]
■-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5% [1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*) **CHANNEL: 11.5**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	☐-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	☐-GOOD [5]	■-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 6**

River Right Looking Downstream

RIPARIAN WIDTH — L R (Per Bank)
☐☐-WIDE>50m [4]
■■-MODERATE 10-50 [3]
☐☐-NARROW 5-10m [2]
☐☐-VERY NARROW 1-5m [1]
☐☐-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank)
☐☐-FOREST, SWAMP [3]
☐☐-OPEN PASTURE/ ROWCROP [0]
■■-RESID.,PARK,NEW FIELD [1]
☐☐-FENCED PASTURE [1]

L R (Per Bank)
☐☐-URBAN OR INDUSTRIAL [0]
☐☐-SHRUB OR OLD FIELD [2]
☐☐-CONSERV. TILLAGE [1]
☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
☐ ☐-NONE OR LITTLE [3]
■ ■-MODERATE [2]
☐ ☐-HEAVY OR SEVERE [1]

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 5.5**

MAX. DEPTH (Check 1)
☐->1m [6]
☐-0.7-1m [4]
■-0.4-0.7m [2]
☐-< 0.4m [1]
☐—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
■-POOL WIDTH > RIFFLE WIDTH [2]
■-POOL WIDTH = RIFFLE WIDTH [1]
☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
☐-TORRENTIAL [-1] ☐-EDDIES [1]
☐-FAST [1] ☐-INTERSTITIAL [-1]
■-MODERATE [1] ☐-INTERMITTENT [-2]
■-SLOW [1]

☐-NO POOL [0]

COMMENTS:____

RIFFLE: 1

RIFFLE/RUN DEPTH
☐-GENERALLY >10 cm, MAX>50 [4]
☐-GENERALLY >10 cm, MAX<50 [3]
■-GENERALLY 5-10 cm [1]
☐-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
☐-STABLE (e.g., Cobble, Boulder) [2]
■-MOD. STABLE (e.g., Pea Gravel) [1]
■-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
■-EXTENSIVE [-1] ■-MODERATE [0]
☐-LOW. [1] ☐-NONE [2]

☐-NO RIFFLE [0]

COMMENTS____ **GRADIENT: 8**

6] Gradient (feet/mile): 22.3 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet

QHEI SCORE: 69.5

Stream BIG CREEK RM ____ Date 01/27/93 River Code ____

Location SITE-#3D STICKNEY CREEK Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 14.5

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ___ ___ ■■-GRAVEL [7] ___ ___
- ☐☐-BOULDER [9] ___ ✓ ☐☐-SAND [6] ✓ ___
- ☐☐-COBBLE [8] ___ ✓ ■■-BEDROCK[5] ___ ___
- ☐☐-HARDPAN [4] ___ ___ ☐☐-DETRITUS[3] ___ ___
- ☐☐-MUCK [2] ___ ___ ☐☐-ARTIFIC.[0] ___ ___

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

Substrate Origin (Check all)
- ☐-LIMESTONE [1]
- ☐-RIP/RAP [0]
- ■-TILLS [1]
- ☐-HARDPAN [0]
- ☐-SANDSTONE [0]
- ✓ ☐-SHALE [-1]
- ☐-COAL FINES [-2]

Silt Cover (Check One)
- ☐-SILT HEAVY [-2]
- ☐-SILT MODERATE [-1]
- ■-SILT NORMAL [0]
- ■-SILT FREE [1]

Extent Of Embeddedness (Check One)
- ☐—EXTENSIVE [-2]
- ☐—MODERATE[-1]
- ■—LOW[0]
- ☐—NONE[1]

COMMENTS ____

2] INSTREAM COVER

COVER SCORE: 12

TYPE (Check *All* That Apply)
- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ☐-DEEP POOLS [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ■-AQUATIC MACROPHYTES [1]
- ☐-LOGS OR WOODY DEBRIS [1]

AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)
- ☐-EXTENSIVE > 75% [11]
- ■-MODERATE 25-75% [7]
- ☐-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 17

SINUOSITY
- ☐-HIGH [4]
- ■-MODERATE [3]
- ☐-LOW [2]
- ☐-NONE [1]

DEVELOPMENT
- ☐-EXCELLENT [7]
- ■-GOOD [5]
- ☐-FAIR [3]
- ☐-POOR [1]

CHANNELIZATION
- ■-NONE [6]
- ☐-RECOVERED [4]
- ☐-RECOVERING [3]
- ☐-RECENT OR NO RECOVERY [1]

STABILITY
- ■-HIGH [3]
- ☐-MODERATE [2]
- ☐-LOW [1]

MODIFICATIONS/OTHER
- ☐-SNAGGING
- ☐-RELOCATION
- ☐-CANOPY REMOVAL
- ☐-DREDGING
- ☐-IMPOUND.
- ☐-ISLANDS
- ☐-LEVEED
- ☐-BANK SHAPING
- ☐-ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 10

River Right Looking Downstream

RIPARIAN WIDTH — L R (Per Bank)
- ■■-WIDE>50m [4]
- ☐☐-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ☐☐-VERY NARROW 1-5m [1]
- ☐☐-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank)
- ■■-FOREST, SWAMP [3]
- ☐☐-OPEN PASTURE/ ROWCROP[0]
- ☐☐-RESID.,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]

L R (Per Bank)
- ☐☐-URBAN OR INDUSTRIAL[0]
- ☐☐-SHRUB OR OLD FIELD[2]
- ☐☐-CONSERV. TILLAGE [1]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
- ■ ■-NONE OR LITTLE [3]
- ☐ ☐-MODERATE [2]
- ☐ ☐-HEAVY OR SEVERE[1]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 5

MAX. DEPTH (Check 1)
- ☐->1m [6]
- ☐-0.7-1m [4]
- ■-0.4-0.7m [2]
- ☐-< 0.4m [1]
- ☐—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- ☐-POOL WIDTH > RIFFLE WIDTH [2]
- ■-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
- ☐-TORRENTIAL[-1]
- ☐-FAST[1]
- ■-MODERATE [1]
- ■-SLOW [1]
- ☐-EDDIES[1]
- ☐-INTERSTITIAL[-1]
- ☐-INTERMITTENT[-2]

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 1

RIFFLE/RUN DEPTH
- ☐-GENERALLY >10 cm,MAX>50 [4]
- ☐-GENERALLY >10 cm,MAX<50 [3]
- ☐-GENERALLY 5-10 cm [1]
- ■-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g.,Cobble, Boulder) [2]
- ■-MOD. STABLE (e.g.,Pea Gravel) [1]
- ☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-EXTENSIVE [-1]
- ■-MODERATE[0]
- ☐-LOW. [1]
- ☐-NONE[2]

☐-NO RIFFLE[0]

COMMENTS ____

GRADIENT: 10

6] Gradient (feet/mile): 28 %POOL: ____ %RIFFLE: ____ %RUN: ____

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 72

Stream: Mill Creek Site #31.0 RM ___ Date: 8/16/95 River Code ___
Location: Canal Road Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLABS[10]	✓	✓	☐ ☐-GRAVEL [7]	✓	✓
☐ ☐-BOULDER [9]			■ ■-SAND [6]	✓	
■ ■-COBBLE [8]	✓	✓	☐ ☐-BEDROCK[5]		
☐ ☐-HARDPAN [4]			☐ ☐-DETRITUS[3]		
☐ ☐-MUCK [2]			☐ ☐-ARTIFICIAL[0]		✓
☐ ☐-SILT [2]	✓	✓			

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS

SUBSTRATE ORIGIN
Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
■ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐-COAL FINES [-2]

SUBSTRATE QUALITY
Check ONE (OR 2 & AVERAGE)
SILT: ■ -SILT HEAVY [-2]
■ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]
EMBEDDEDNESS: ☐ -EXTENSIVE [-2]
■ -MODERATE [-1]
☐ -NORMAL [0]
☐ -NONE [1]

Substrate 14.5 Max 20

2] INSTREAM COVER
TYPE: (Check All That Apply)
■ -UNDERCUT BANKS [1] ■ -DEEP POOLS> 70 cm [2] ☐ -OXBOWS [1]
■ -OVERHANGING VEGETATION [1] ■ -ROOTWADS [1] ☐ -AQUATIC MACROPHYTES [1]
☐ -SHALLOWS (IN SLOW WATER) [1] ■ -BOULDERS [1] ■ -LOGS OR WOODY DEBRIS [1]
☐ -ROOTMATS [1] COMMENTS:

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
☐ - EXTENSIVE > 75% [11]
■ - MODERATE 25-75% [7]
■ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover 12 Max 20

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
■ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	■ - FAIR [3]	☐ - RECOVERING [3]	■ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	■ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:

Channel 14.5 Max 20

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH
L R (Per Bank)
■ ■ -WIDE > 50m [4]
☐ ☐ - MODERATE 10-50m [3]
☐ ☐ -NARROW 5-10 m [2]
☐ ☐ - VERY NARROW <5 m[1]
☐ ☐ - NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN)
L R (Most Predominant Per Bank)
■ ■-FOREST, SWAMP [3]
☐ ☐-SHRUB OR OLD FIELD [2]
☐ ☐-RESIDENTIAL,PARK,NEW FIELD [1]
☐ ☐ -FENCED PASTURE [1]
L R
☐ ☐-CONSERVATION TILLAGE [1]
☐ ☐ -URBAN OR INDUSTRIAL [0]
☐ ☐ -OPEN PASTURE,ROWCROP [0]
☐ ☐ -MINING/CONSTRUCTION [0]

BANK EROSION
L R (Per Bank)
☐ ■ -NONE/LITTLE [3]
☐ ☐ -MODERATE [2]
■ ☐ -HEAVY/SEVERE[1]

COMMENTS:

Riparian 9 Max 10

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH
(Check 1 ONLY!)
■ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY
(Check 1 or 2 & AVERAGE)
☐ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
■ -POOL WIDTH < RIFFLE W. [0]
COMMENTS:

CURRENT VELOCITY [POOL & RIFFLES!]
(Check All That Apply)
☐ -EDDIES[1] ☐ -TORRENTIAL[-1]
■ -FAST[1] ☐ -INTERSTITIAL[-1]
■ -MODERATE [1] ☐ -INTERMITTENT[-2]
■ -SLOW [1]

Pool/ Glide 9 Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH
☐ - GENERALLY >10 cm;MAX > 50 [4]
☐ - GENERALLY >10 cm; MAX < 50[3]
■ - GENERALLY 5-10 cm[1]
☐ - GENERALLY < 5 cm [RIFFLE=0]
COMMENTS:

RIFFLE/RUN SUBSTRATE
☐-STABLE (e.g.,Cobble, Boulder) [2]
■-MOD. STABLE (e.g.,Large Gravel) [1]
☐-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
■ - LOW [1]
☐ - MODERATE [0]
☐ - EXTENSIVE [-1]
☐ - NO RIFFLE [Metric=0]

Riffle/Run 3 Max 8

Gradient 10 Max 10

6] GRADIENT (ft/mi): 9.6 DRAINAGE AREA (sq.mi.): 9.3 %POOL: 25 %GLIDE: 25 %RIFFLE: 20 %RUN: 30

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 68

Stream: Mill Creek Site #32.0 RM ____ Date 8/16/95 River Code ____
Location: Warner Road Branch Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
☐☐-BLDR/SLABS[10]			☐☐-GRAVEL [7]		✓
■■-BOULDER [9]	✓	✓	■■-SAND [6]	✓	
☐☐-COBBLE [8]	✓	✓	☐☐-BEDROCK[5]		
☐☐-HARDPAN [4]			☐☐-DETRITUS[3]		
☐☐-MUCK [2]			☐☐-ARTIFICIAL[0]		✓
☐☐-SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS ____

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE): ☐-LIMESTONE [1] ■-TILLS [1] ☐-WETLANDS[0] ☐-HARDPAN [0] ☐-SANDSTONE [0] ☐-RIP/RAP [0] ☐-LACUSTRINE [0] ☐-SHALE [-1] ☐-COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
SILT: ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ■-SILT NORMAL [0] ☐-SILT FREE [1]
EMBEDDEDNESS: ☐-EXTENSIVE [-2] ☐-MODERATE [-1] ■-NORMAL [0] ☐-NONE [1]

Substrate: 18 (Max 20)

2] INSTREAM COVER

TYPE: (Check All That Apply)
■-UNDERCUT BANKS [1] ■-DEEP POOLS> 70 cm [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]
☐-ROOTMATS [1] COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
☐-EXTENSIVE > 75% [11] ☐-MODERATE 25-75% [7] ■-SPARSE 5-25% [3] ☐-NEARLY ABSENT < 5%[1]

Cover: 10 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]
☐-MODERATE [3]	☐-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]	

MODIFICATIONS/OTHER: ☐-SNAGGING ☐-IMPOUND. ☐-RELOCATION ☐-ISLANDS ☐-CANOPY REMOVAL ☐-LEVEED ☐-DREDGING ☐-BANK SHAPING ☐-ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ____

Channel: 13 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
■■-WIDE > 50m [4]
☐☐-MODERATE 10-50m [3]
☐☐-NARROW 5-10 m [2]
☐☐-VERY NARROW <5 m[1]
☐☐-NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank)
■■-FOREST, SWAMP [3] ☐☐-CONSERVATION TILLAGE [1]
☐☐-SHRUB OR OLD FIELD [2] ☐☐-URBAN OR INDUSTRIAL [0]
☐☐-RESIDENTIAL,PARK,NEW FIELD [1] ☐☐-OPEN PASTURE,ROWCROP [0]
☐☐-FENCED PASTURE [1] ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
■■-NONE/LITTLE [3]
☐☐-MODERATE [2]
☐☐-HEAVY/SEVERE[1]

COMMENTS: ____

Riparian: 10 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!): ■- >1m [6] ☐- 0.7-1m [4] ☐- 0.4-0.7m [2] ☐- 0.2-0.4m [1] ☐- < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE): ■-POOL WIDTH > RIFFLE WIDTH [2] ☐-POOL WIDTH = RIFFLE WIDTH [1] ☐-POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply): ☐-EDDIES[1] ☐-TORRENTIAL[-1] ☐-FAST[1] ☐-INTERSTITIAL[-1] ■-MODERATE [1] ☐-INTERMITTENT[-2] ■-SLOW [1]

COMMENTS: ____

Pool/Glide: 10 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE/RUN DEPTH: ☐-GENERALLY >10 cm,MAX > 50 [4] ☐-GENERALLY >10 cm; MAX < 50[3] ■-GENERALLY 5-10 cm[1] ☐-GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE: ☐-STABLE (e.g.,Cobble, Boulder) [2] ■-MOD. STABLE (e.g.,Large Gravel) [1] ☐-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS: ☐-NONE [2] ■-LOW [1] ☐-MODERATE [0] ☐-EXTENSIVE [-1]

COMMENTS: ____ ☐- NO RIFFLE [Metric=0]

Riffle/Run: 3 (Max 8)

6] GRADIENT (ft/mi): 53 **DRAINAGE AREA (sq.mi.):** 2.4 %POOL: 25 %GLIDE: 25 %RIFFLE: 25 %RUN: 25

Gradient: 4 (Max 10)

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 70.5

Stream: Mill Creek Site # 32.2 RM ____ Date 8/17/95 River Code ____
Location: General Chemical Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
BLDR /SLABS[10]			GRAVEL [7]	✓	✓
■ BOULDER [9]		✓	SAND [6]	✓	✓
■ COBBLE [8]	✓	✓	BEDROCK[5]		
HARDPAN [4]			DETRITUS[3]		
MUCK [2]			ARTIFICIAL[0]	✓	✓
SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ■ 5 or More [2] / 4 or Less [0]

COMMENTS ____

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE): LIMESTONE [1]; ■ TILLS [1]; WETLANDS[0]; HARDPAN [0]; SANDSTONE [0]; RIP/RAP [0]; LACUSTRINE [0]; SHALE [-1]; COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE):
SILT: SILT HEAVY [-2]; ■ SILT MODERATE [-1]; SILT NORMAL [0]; SILT FREE [1]
EMBEDDEDNESS: EXTENSIVE [-2]; ■ MODERATE [-1]; NORMAL [0]; NONE [1]

Substrate: 18 (Max 20)

2] INSTREAM COVER

TYPE: (Check All That Apply)
UNDERCUT BANKS [1]; ■ OVERHANGING VEGETATION [1]; SHALLOWS (IN SLOW WATER) [1]; ROOTMATS [1]; ■ DEEP POOLS > 70 cm [2]; ROOTWADS [1]; ■ BOULDERS [1]; OXBOWS [1]; ■ AQUATIC MACROPHYTES [1]; ■ LOGS OR WOODY DEBRIS [1]

COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
EXTENSIVE > 75% [11]; MODERATE 25-75% [7]; ■ SPARSE 5-25% [3]; NEARLY ABSENT < 5%[1]

Cover: 9 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
HIGH [4]	EXCELLENT [7]	■ NONE [6]	■ HIGH [3]
MODERATE [3]	■ GOOD [5]	RECOVERED [4]	■ MODERATE [2]
■ LOW [2]	FAIR [3]	RECOVERING [3]	LOW [1]
NONE [1]	POOR [1]	RECENT OR NO RECOVERY [1]	

MODIFICATIONS/OTHER: SNAGGING; RELOCATION; CANOPY REMOVAL; DREDGING; ONE SIDE CHANNEL MODIFICATIONS; IMPOUND.; ISLANDS; LEVEED; BANK SHAPING

COMMENTS: ____

Channel: 15.5 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank): ■■ WIDE > 50m [4]; MODERATE 10-50m [3]; NARROW 5-10 m [2]; VERY NARROW <5 m[1]; NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank): FOREST, SWAMP [3] (R ■); SHRUB OR OLD FIELD [2] (L ■); RESIDENTIAL,PARK,NEW FIELD [1]; FENCED PASTURE [1]; CONSERVATION TILLAGE [1]; URBAN OR INDUSTRIAL [0]; OPEN PASTURE,ROWCROP [0]; MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank): ■■ NONE/LITTLE [3]; MODERATE [2]; HEAVY/SEVERE[1]

COMMENTS: ____

Riparian: 9.5 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!): ■ >1m [6]; 0.7-1m [4]; 0.4-0.7m [2]; 0.2-0.4m [1]; < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE): POOL WIDTH > RIFFLE WIDTH [2]; ■ POOL WIDTH = RIFFLE WIDTH [1]; POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply): EDDIES[1]; FAST[1]; ■ MODERATE [1]; ■ SLOW [1]; TORRENTIAL[-1]; INTERSTITIAL[-1]; INTERMITTENT[-2]

COMMENTS: ____

Pool/Glide: 9 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH: GENERALLY >10 cm,MAX > 50 [4]; GENERALLY >10 cm; MAX < 50[3]; ■ GENERALLY 5-10 cm[1]; GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE: ■ STABLE (e.g.,Cobble, Boulder) [2]; MOD. STABLE (e.g.,Large Gravel) [1]; UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS: NONE [2]; ■ LOW [1]; ■ MODERATE [0]; EXTENSIVE [-1]; NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 3.5 (Max 8)

6] GRADIENT (ft/mi): 38 DRAINAGE AREA (sq.mi.): 20

%POOL: 35 %GLIDE: 15
%RIFFLE: 35 %RUN: 15

Gradient: 6 (Max 10)

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 69.5

Stream: Mill Creek Site #32.4 RM___ Date 8/17/95 River Code___
Location: Mill Creek Falls Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
□ □-BLDR /SLABS[10]			□ □-GRAVEL [7]		✓
■ ■-BOULDER [9]	✓	✓	□ □-SAND [6]	✓	✓
□ □-COBBLE [8]		✓	■ ■-BEDROCK[5]	✓	✓
□ □-HARDPAN [4]			□ □-DETRITUS[3]		
□ □-MUCK [2]			□ □-ARTIFICIAL[0]	✓	✓
□ □-SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] □-4 or Less [0]
COMMENTS___

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)): □-LIMESTONE [1] ■-TILLS [1] □-WETLANDS[0] □-HARDPAN [0] □-SANDSTONE [0] □-RIP/RAP [0] □-LACUSTRINE [0] □-SHALE [-1] □-COAL FINES [-2]

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE)):
SILT: □-SILT HEAVY [-2] □-SILT MODERATE [-1] ■-SILT NORMAL [0] □-SILT FREE [1]
EMBEDDEDNESS: □-EXTENSIVE [-2] □-MODERATE [-1] □-NORMAL [0] ■-NONE [1]

Substrate: 18 — Max 20

2] INSTREAM COVER

TYPE: (Check All That Apply)
□-UNDERCUT BANKS [1] ■-DEEP POOLS> 70 cm [2] □-OXBOWS [1]
■-OVERHANGING VEGETATION [1] □-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
□-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]
□-ROOTMATS [1] COMMENTS:___

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
□-EXTENSIVE > 75% [11] □-MODERATE 25-75% [7] ■-SPARSE 5-25% [3] □-NEARLY ABSENT < 5% [1]

Cover: 9 — Max 20

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□-HIGH [4]	□-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	□-SNAGGING	□-IMPOUND.
□-MODERATE [3]	■-GOOD [5]	□-RECOVERED [4]	□-MODERATE [2]	□-RELOCATION	□-ISLANDS
□-LOW [2]	■-FAIR [3]	□-RECOVERING [3]	□-LOW [1]	□-CANOPY REMOVAL	□-LEVEED
■-NONE [1]	□-POOR [1]	□-RECENT OR NO RECOVERY [1]		□-DREDGING	□-BANK SHAPING
				□-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:___

Channel: 14 — Max 20

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
□ ■-WIDE > 50m [4]
□ □-MODERATE 10-50m [3]
■ □-NARROW 5-10 m [2]
□ □-VERY NARROW <5 m[1]
□ □-NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank)
□ ■-FOREST, SWAMP [3]
□ □-SHRUB OR OLD FIELD [2]
□ □-RESIDENTIAL,PARK,NEW FIELD [1]
□ □-FENCED PASTURE [1]
□ □-CONSERVATION TILLAGE [1]
■ □-URBAN OR INDUSTRIAL [0]
□ □-OPEN PASTURE,ROWCROP [0]
□ □-MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
■ ■-NONE/LITTLE [3]
□ □-MODERATE [2]
□ □-HEAVY/SEVERE[1]

COMMENTS:___

Riparian: 7.5 — Max 10

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
■- >1m [6]
□- 0.7-1m [4]
□- 0.4-0.7m [2]
□- 0.2-0.4m [1]
□- < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
□-POOL WIDTH > RIFFLE WIDTH [2]
■-POOL WIDTH = RIFFLE WIDTH [1]
□-POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply)
□-EDDIES[1] □-TORRENTIAL[-1]
■-FAST[1] □-INTERSTITIAL[-1]
■-MODERATE [1] □-INTERMITTENT[-2]
■-SLOW [1]

COMMENTS:___

Pool/Glide: 10 — Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH
□-GENERALLY >10 cm,MAX > 50 [4]
■-GENERALLY >10 cm; MAX < 50[3]
□-GENERALLY 5-10 cm[1]
□-GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
■-STABLE (e.g.,Cobble, Boulder) [2]
□-MOD. STABLE (e.g.,Large Gravel) [1]
□-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
■-NONE [2]
□-LOW [1]
□-MODERATE [0]
□-EXTENSIVE [-1]
□- NO RIFFLE [Metric=0]

COMMENTS:___

Riffle/Run: 7 — Max 8

6] GRADIENT (ft/mi): 52.8 DRAINAGE AREA (sq.mi.): 19.58 %POOL: 5 %GLIDE: 5 %RIFFLE: 60 %RUN: 30

Gradient: 4 — Max 10

Ohio EPA Qualitative Habitat Evaluation Index Field Sheet

QHEI Score: 70.25

Stream: Mill Creek Site # 32.6 RM ____ Date 8/17/95 River Code ____

Location: ODOT Property / Broadway Ave Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE		POOL	RIFFLE
□ □-BLDR /SLABS[10]			□ □-GRAVEL [7]		✓
■ ■-BOULDER [9]	✓	✓	□ □-SAND [6]	✓	✓
■ ■-COBBLE [8]	✓	✓	□ □-BEDROCK[5]		
□ □-HARDPAN [4]			□ □-DETRITUS[3]		✓
□ □-MUCK [2]			□ □-ARTIFICIAL[0]	✓	✓
□ □-SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] □-4 or Less [0]

COMMENTS ____

SUBSTRATE ORIGIN Check ONE (OR 2 & AVERAGE)
- □ -LIMESTONE [1]
- ■ -TILLS [1]
- □ -WETLANDS[0]
- □ -HARDPAN [0]
- □ -SANDSTONE [0]
- □ -RIP/RAP [0]
- □ -LACUSTRINE [0]
- □ -SHALE [-1]
- □ -COAL FINES [-2]

SUBSTRATE QUALITY Check ONE (OR 2 & AVERAGE)

SILT:
- □ -SILT HEAVY [-2]
- □ -SILT MODERATE [-1]
- ■ -SILT NORMAL [0]
- □ -SILT FREE [1]

EMBEDDEDNESS:
- □ -EXTENSIVE [-2]
- □ -MODERATE [-1]
- ■ -NORMAL [0]
- □ -NONE [1]

Substrate: 20 Max 20

2] INSTREAM COVER

TYPE: (Check All That Apply)
- ■ -UNDERCUT BANKS [1]
- ■ -OVERHANGING VEGETATION [1]
- □ -SHALLOWS (IN SLOW WATER) [1]
- □ -ROOTMATS [1]
- ■ -DEEP POOLS> 70 cm [2]
- ■ -ROOTWADS [1]
- ■ -BOULDERS [1]
- □ -OXBOWS [1]
- ■ -AQUATIC MACROPHYTES [1]
- ■ -LOGS OR WOODY DEBRIS [1]

COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
- □ - EXTENSIVE > 75% [11]
- □ - MODERATE 25-75% [7]
- ■ - SPARSE 5-25% [3]
- □ - NEARLY ABSENT < 5%[1]

Cover: 11 Max 20

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
□ - HIGH [4]	□ - EXCELLENT [7]	■ - NONE [6]	□ - HIGH [3]
□ - MODERATE [3]	□ - GOOD [5]	□ - RECOVERED [4]	■ - MODERATE [2]
■ - LOW [2]	■ - FAIR [3]	□ - RECOVERING [3]	□ - LOW [1]
■ - NONE [1]	□ - POOR [1]	□ - RECENT OR NO RECOVERY [1]	

MODIFICATIONS/OTHER
- □ - SNAGGING
- □ - RELOCATION
- ■ - CANOPY REMOVAL
- □ - DREDGING
- ■ - ONE SIDE CHANNEL MODIFICATIONS
- □ - IMPOUND.
- □ - ISLANDS
- □ - LEVEED
- □ - BANK SHAPING

COMMENTS: ____

Channel: 12.5 Max 20

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
- ■ □ -WIDE > 50m [4]
- □ ■ - MODERATE 10-50m [3]
- □ □ -NARROW 5-10 m [2]
- □ □ - VERY NARROW <5 m[1]
- □ □ - NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank)
- ■ □ -FOREST, SWAMP [3]
- ■ ■ -SHRUB OR OLD FIELD [2]
- □ □ -RESIDENTIAL,PARK,NEW FIELD [1]
- □ □ -FENCED PASTURE [1]
- □ □ -CONSERVATION TILLAGE [1]
- □ ■ -URBAN OR INDUSTRIAL [0]
- □ □ -OPEN PASTURE,ROWCROP [0]
- □ □ -MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
- ■ ■ -NONE/LITTLE [3]
- □ □ -MODERATE [2]
- □ □ -HEAVY/SEVERE[1]

COMMENTS: ____

Riparian: 8.25 Max 10

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
- ■ - >1m [6]
- □ - 0.7-1m [4]
- □ - 0.4-0.7m [2]
- □ - 0.2-0.4m [1]
- □ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
- □ -POOL WIDTH > RIFFLE WIDTH [2]
- ■ -POOL WIDTH = RIFFLE WIDTH [1]
- □ -POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply)
- □ -EDDIES[1]
- □ -FAST[1]
- ■ -MODERATE [1]
- ■ -SLOW [1]
- □ -TORRENTIAL[-1]
- □ -INTERSTITIAL[-1]
- □ -INTERMITTENT[-2]

COMMENTS: ____

Pool/Glide: 9 Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH
- □ - GENERALLY >10 cm,MAX > 50 [4]
- □ - GENERALLY >10 cm; MAX < 50[3]
- ■ - GENERALLY 5-10 cm[1]
- □ - GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
- ■ -STABLE (e.g.,Cobble, Boulder) [2]
- □ -MOD. STABLE (e.g.,Large Gravel) [1]
- □ -UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- □ - NONE [2]
- ■ - LOW [1]
- ■ - MODERATE [0]
- □ - EXTENSIVE [-1]
- □ - NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 3.5 Max 8

Gradient: 6 Max 10

6] GRADIENT (ft/mi): 5.8 DRAINAGE AREA (sq.mi.): 18.91

%POOL: 20 %GLIDE: 20

%RIFFLE: 10 %RUN: 50

EPA 4520 4/7/92

OhioEPA Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 62

Stream Mill Creek Site # 32.8 RM ______ Date 8/17/95 River Code ______
Location Downstream of Wolf Creek Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE / POOL RIFFLE
- ☐☐-BLDR /SLABS[10]
- ☐☐-BOULDER [9] ✓ ✓
- ☐☐-COBBLE [8] ✓ ✓
- ☐☐-HARDPAN [4]
- ☐☐-MUCK [2]
- ☐☐-SILT [2]
- ■■-GRAVEL [7] ✓ ✓
- ■■-SAND [6] ✓ ✓
- ☐☐-BEDROCK[5]
- ☐☐-DETRITUS[3]
- ☐☐-ARTIFICIAL[0] ✓ ✓

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
- ☐-LIMESTONE [1]
- ■-TILLS [1]
- ☐-WETLANDS[0]
- ☐-HARDPAN [0]
- ☐-SANDSTONE [0]
- ☐-RIP/RAP [0]
- ☐-LACUSTRINE [0]
- ☐-SHALE [-1]
- ☐-COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
- SILT: ☐-SILT HEAVY [-2]; ☐-SILT MODERATE [-1]; ■-SILT NORMAL [0]; ☐-SILT FREE [1]
- EMBEDDEDNESS: ■-EXTENSIVE [-2]; ☐-MODERATE [-1]; ■-NORMAL [0]; ☐-NONE [1]

Substrate: 15 (Max 20)

2] INSTREAM COVER

TYPE: (Check All That Apply)
- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ☐-SHALLOWS (IN SLOW WATER) [1]
- ■-ROOTMATS [1]
- ■-DEEP POOLS> 70 cm [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ■-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

COMMENTS:

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
- ☐-EXTENSIVE >75% [11]
- ☐-MODERATE 25-75% [7]
- ■-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT <5%[1]

Cover: 12 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	☐-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
■-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:

Channel: 12.5 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
- ☐☐-WIDE >50m [4]
- ☐☐-MODERATE 10-50m [3]
- ■☐-NARROW 5-10 m [2]
- ☐■-VERY NARROW <5 m[1]
- ☐☐-NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank)
- ☐☐-FOREST, SWAMP [3]
- ☐■-SHRUB OR OLD FIELD [2]
- ☐☐-RESIDENTIAL,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]
- ☐☐-CONSERVATION TILLAGE [1]
- ■☐-URBAN OR INDUSTRIAL [0]
- ☐☐-OPEN PASTURE,ROWCROP [0]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
- ■■-NONE/LITTLE [3]
- ☐☐-MODERATE [2]
- ☐☐-HEAVY/SEVERE[1]

COMMENTS:

Riparian: 5.5 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
- ■- >1m [6]
- ☐- 0.7-1m [4]
- ☐- 0.4-0.7m [2]
- ☐- 0.2-0.4m [1]
- ☐- <0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
- ☐-POOL WIDTH > RIFFLE WIDTH [2]
- ■-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply)
- ☐-EDDIES[1]
- ☐-FAST[1]
- ☐-MODERATE [1]
- ■-SLOW [1]
- ☐-TORRENTIAL[-1]
- ☐-INTERSTITIAL[-1]
- ☐-INTERMITTENT[-2]

COMMENTS:

Pool/Glide: 8 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH
- ☐-GENERALLY >10 cm,MAX > 50 [4]
- ■-GENERALLY >10 cm; MAX < 50[3]
- ☐-GENERALLY 5-10 cm[1]
- ☐-GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g.,Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g.,Large Gravel) [1]
- ■-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-NONE [2]
- ☐-LOW [1]
- ■-MODERATE [0]
- ☐-EXTENSIVE [-1]
- ☐- NO RIFFLE [Metric=0]

COMMENTS:

Riffle/Run: 3 (Max 8)

6] GRADIENT (ft/mi): 5.8 DRAINAGE AREA (sq.mi.): 17.23 %POOL: 10 %GLIDE: 10 %RIFFLE: 10 %RUN: 70

Gradient: 6 (Max 10)

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 62.5

Stream: Wolf Creek Site #33 — RM: ____ — Date: 8/21/95 — River Code: ____
Location: Garfield Park Reservation — Scorers Name: CZTZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
☐☐-BLDR /SLABS[10]			☐☐-GRAVEL [7]	✓	✓
■■-BOULDER [9]	✓	✓	☐☐-SAND [6]	✓	✓
☐☐-COBBLE [8]	✓	✓	☐☐-BEDROCK[5]		
■■-HARDPAN [4]	✓	✓	☐☐-DETRITUS[3]		
☐☐-MUCK [2]			☐☐-ARTIFICIAL[0]	✓	✓
☐☐-SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS ____

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐-LIMESTONE [1]
■-TILLS [1]
☐-WETLANDS[0]
☐-HARDPAN [0]
☐-SANDSTONE [0]
☐-RIP/RAP [0]
☐-LACUSTRINE [0]
☐-SHALE [-1]
☐-COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
SILT: ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ■-SILT NORMAL [0] ☐-SILT FREE [1]
EMBEDDEDNESS: ☐-EXTENSIVE [-2] ☐-MODERATE [-1] ■-NORMAL [0] ☐-NONE [1]

Substrate: 16 (Max 20)

2] INSTREAM COVER

TYPE: (Check All That Apply)
☐-UNDERCUT BANKS [1] — ■-DEEP POOLS> 70 cm [2] — ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] — ☐-ROOTWADS [1] — ■-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] — ■-BOULDERS [1] — ■-LOGS OR WOODY DEBRIS [1]
☐-ROOTMATS [1] — COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
☐-EXTENSIVE >75% [11]
☐-MODERATE 25-75% [7]
■-SPARSE 5-25% [3]
☐-NEARLY ABSENT <5%[1]

Cover: 9 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐-HIGH [4]	☐-EXCELLENT [7]	☐-NONE [6]	■-HIGH [3]
☐-MODERATE [3]	☐-GOOD [5]	■-RECOVERED [4]	■-MODERATE [2]
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]
■-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]	

MODIFICATIONS/OTHER
☐-SNAGGING ☐-IMPOUND.
☐-RELOCATION ☐-ISLANDS
☐-CANOPY REMOVAL ☐-LEVEED
☐-DREDGING ☐-BANK SHAPING
☐-ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ____

Channel: 11 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
■■-WIDE > 50m [4]
☐☐-MODERATE 10-50m [3]
☐☐-NARROW 5-10 m [2]
☐☐-VERY NARROW <5 m[1]
☐☐-NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank)
■■-FOREST, SWAMP [3]
☐☐-SHRUB OR OLD FIELD [2]
☐☐-RESIDENTIAL,PARK,NEW FIELD [1]
☐☐-FENCED PASTURE [1]
☐☐-CONSERVATION TILLAGE [1]
☐☐-URBAN OR INDUSTRIAL [0]
☐☐-OPEN PASTURE,ROWCROP [0]
☐☐-MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
■☐-NONE/LITTLE [3]
☐■-MODERATE [2]
☐☐-HEAVY/SEVERE[1]

COMMENTS: ____

Riparian: 9.5 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
■- >1m [6]
☐- 0.7-1m [4]
☐- 0.4-0.7m [2]
☐- 0.2-0.4m [1]
☐- < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
■-POOL WIDTH > RIFFLE WIDTH [2]
☐-POOL WIDTH = RIFFLE WIDTH [1]
☐-POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply)
☐-EDDIES[1] ☐-TORRENTIAL[-1]
☐-FAST[1] ☐-INTERSTITIAL[-1]
☐-MODERATE [1] ☐-INTERMITTENT[-2]
■-SLOW [1]

COMMENTS: ____

Pool/Glide: 9 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH
☐-GENERALLY >10 cm,MAX > 50 [4]
☐-GENERALLY >10 cm; MAX < 50[3]
■-GENERALLY 5-10 cm[1]
☐-GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
■-STABLE (e.g.,Cobble, Boulder) [2]
☐-MOD. STABLE (e.g.,Large Gravel) [1]
☐-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐-NONE [2]
■-LOW [1]
☐-MODERATE [0]
☐-EXTENSIVE [-1]
☐- NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 4 (Max 8)

6] GRADIENT (ft/mi): 66 **DRAINAGE AREA (sq.mi.):** 1.53
%POOL: 15 %GLIDE: 50
%RIFFLE: 15 %RUN: 20

Gradient: 4 (Max 10)

Ohio EPA Site Description Sheet

QHEI SCORE: 61.5

Stream: MILL CREEK RM ____ Date 07/05/91 River Code ____

Location: SITE-# 33.5 MAPLETOWN BRANCH Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 14.5

TYPE — POOL RIFFLE — POOL RIFFLE

- ☐☐-BLDER /SLABS[10] ____ ____ ☐■-GRAVEL [7] ____ ____
- ☐☐-BOULDER [9] ✓ ✓ ☐☐-SAND [6] ✓ ✓
- ☐■-COBBLE [8] ____ ✓ ☐☐-BEDROCK[5] ____ ____
- ☐☐-HARDPAN [4] ____ ____ ☐☐-DETRITUS[3] ____ ✓
- ☐☐-MUCK [2] ____ ____ ☐☐-ARTIFIC.[0] ✓ ✓

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0]

SUBSTRATE QUALITY

Substrate Origin (Check all)
- ☐-LIMESTONE [1]
- ■-RIP/RAP [0]
- ■-TILLS [1]
- ☐-HARDPAN [0]
- ☐-SANDSTONE [0]
- ☐-SHALE [-1]
- ☐-COAL FINES [-2]

Silt Cover (Check One)
- ☐-SILT HEAVY [-2]
- ■-SILT MODERATE [-1]
- ☐-SILT NORMAL [0]
- ☐-SILT FREE [1]

Extent Of Embeddness (Check One)
- ■—EXTENSIVE [-2]
- ■—MODERATE[-1]
- ☐—LOW[0]
- ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ________

COVER SCORE: 13

2] INSTREAM COVER

TYPE (Check *All* That Apply)
- ■-UNDERCUT BANKS [1]
- ■-OVERHANGING VEGETATION [1]
- ■-SHALLOWS (IN SLOW WATER) [1]
- ■-DEEP POOLS [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)
- ☐-EXTENSIVE > 75% [11]
- ■-MODERATE 25-75% [7]
- ■-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5%[1]

COMMENTS: ________

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 14

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	■-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ________

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 4

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	■■-URBAN OR INDUSTRIAL[0]	☐ ■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ☐-MODERATE [2]
■☐-NARROW 5-10m [2]	☐☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐■-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ________

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 6

MAX. DEPTH (Check 1)
- ☐->1m [6]
- ☐-0.7-1m [4]
- ■-0.4-0.7m [2]
- ☐-< 0.4m [1]
- ☐—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- ■-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
- ☐-TORRENTIAL[-1]
- ☐-FAST[1]
- ■-MODERATE [1]
- ■-SLOW [1]
- ☐-EDDIES[1]
- ☐-INTERSTITIAL[-1]
- ☐-INTERMITTENT[-2]

☐-NO POOL[0]

COMMENTS: ________

RIFFLE: 2

RIFFLE/RUN DEPTH
- ☐-GENERALLY >10 cm,MAX>50 [4]
- ☐-GENERALLY >10 cm,MAX<50 [3]
- ■-GENERALLY 5-10 cm [1]
- ☐-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g.,Cobble, Boulder) [2]
- ■-MOD. STABLE (e.g.,Pea Gravel) [1]
- ☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-EXTENSIVE [-1]
- ■-MODERATE[0]
- ☐-LOW. [1]
- ☐-NONE[2]

☐-NO RIFFLE[0]

COMMENTS ________

GRADIENT: 8

6] Gradient (feet/mile): 39.4 %POOL: ____ %RIFFLE: ____ %RUN: ____

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI Score: 62.25

Stream: Mill Creek Site # 34.0 RM ____ Date: 8/21/95 River Code ____
Location: Rex Rd / Glenborn Rd Scorers Name: CZ TZ

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % or note every type present*);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE	SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE))		SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE))
☐☐-BLDR /SLABS[10]			■■-GRAVEL [7]	✓	✓			
☐☐-BOULDER [9]	✓	✓	■■-SAND [6]	✓	✓	☐-LIMESTONE [1]	SILT:	☐-SILT HEAVY [-2]
☐☐-COBBLE [8]	✓	✓	☐☐-BEDROCK[5]			■-TILLS [1]		☐-SILT MODERATE [-1]
☐☐-HARDPAN [4]			☐☐-DETRITUS[3]			☐-WETLANDS[0]		■-SILT NORMAL [0]
☐☐-MUCK [2]			☐☐-ARTIFICIAL[0]	✓	✓	☐-HARDPAN [0]		☐-SILT FREE [1]
☐☐-SILT [2]						☐-SANDSTONE [0]	EMBEDDEDNESS:	☐-EXTENSIVE [-2]
						☐-RIP/RAP [0]		■-MODERATE [-1]
						☐-LACUSTRINE [0]		■-NORMAL [0]
						☐-SHALE [-1]		☐-NONE [1]
						☐-COAL FINES [-2]		

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS ____

Substrate: 15.5 (Max 20)

2] INSTREAM COVER

TYPE: (Check *All* That Apply)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS> 70 cm [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]
☐-ROOTMATS [1] COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐-EXTENSIVE > 75% [11]
☐-MODERATE 25-75% [7]
■-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5%[1]

Cover: 9 (Max 20)

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	☐-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
■-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

Channel: 13 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) L R (Most Predominant Per Bank)	L R	BANK EROSION L R (Per Bank)
■☐-WIDE > 50m [4]	■☐-FOREST, SWAMP [3]	☐☐-CONSERVATION TILLAGE [1]	■■-NONE/LITTLE [3]
☐■-MODERATE 10-50m [3]	☐■-SHRUB OR OLD FIELD [2]	☐☐-URBAN OR INDUSTRIAL [0]	☐☐-MODERATE [2]
☐☐-NARROW 5-10 m [2]	☐■-RESIDENTIAL,PARK,NEW FIELD [1]	☐☐-OPEN PASTURE,ROWCROP [0]	☐☐-HEAVY/SEVERE[1]
☐☐-VERY NARROW <5 m[1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE [0]			

COMMENTS: ____

Riparian: 8.75 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☐- >1m [6]
■- 0.7-1m [4]
☐- 0.4-0.7m [2]
☐- 0.2-0.4m [1]
☐- < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☐-POOL WIDTH > RIFFLE WIDTH [2]
■-POOL WIDTH = RIFFLE WIDTH [1]
☐-POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check *All* That Apply)
☐-EDDIES[1] ☐-TORRENTIAL[-1]
☐-FAST[1] ☐-INTERSTITIAL[-1]
☐-MODERATE [1] ☐-INTERMITTENT[-2]
■-SLOW [1]

COMMENTS: ____

Pool/Glide: 6 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH
☐- GENERALLY >10 cm MAX > 50 [4]
☐- GENERALLY >10 cm; MAX < 50[3]
☐- GENERALLY 5-10 cm[1]
■- GENERALLY < 5 cm [RIFFLE=0]
COMMENTS: ____

RIFFLE/RUN SUBSTRATE
☐-STABLE (e.g.,Cobble, Boulder) [2]
■-MOD. STABLE (e.g.,Large Gravel) [1]
☐-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐- NONE [2]
■- LOW [1]
☐- MODERATE [0]
☐- EXTENSIVE [-1]
☐- NO RIFFLE [Metric=0]

Riffle/Run: 2 (Max 8)

6] GRADIENT (ft/mi): 25.1 DRAINAGE AREA (sq.mi.): 16
%POOL: 30 %GLIDE: 20
%RIFFLE: 30 %RUN: 20

Gradient: 8 (Max 10)

Ohio EPA Qualitative Habitat Evaluation Index Field Sheet

QHEI Score: 74

Stream: Mill Creek Site # 34.5 RM ___ Date 8/22/95 River Code ___
Location: Downstream of Miles Rd Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
☐ ☐-BLDR /SLABS[10]			☐ ☐-GRAVEL [7]	✓	✓
■ ■-BOULDER [9]	✓	✓	☐ ☐-SAND [6]	✓	✓
■ ■-COBBLE [8]	✓	✓	☐ ☐-BEDROCK[5]		
☐ ☐-HARDPAN [4]			☐ ☐-DETRITUS[3]		
☐ ☐-MUCK [2]			☐ ☐-ARTIFICIAL[0]	✓	✓
☐ ☐-SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]
COMMENTS ___

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)):
☐ -LIMESTONE [1]
■ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐-COAL FINES [-2]

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE)):
SILT: ☐ -SILT HEAVY [-2] ☐ -SILT MODERATE [-1] ■ -SILT NORMAL [0] ☐ -SILT FREE [1]
EMBEDDEDNESS: ☐ -EXTENSIVE [-2] ■ -MODERATE [-1] ■ -NORMAL [0] ☐ -NONE [1]

Substrate: 19.5 (Max 20)

2] INSTREAM COVER

TYPE: (Check *All* That Apply)
■ -UNDERCUT BANKS [1] ■ -DEEP POOLS> 70 cm [2] ☐ -OXBOWS [1]
■ -OVERHANGING VEGETATION [1] ■ -ROOTWADS [1] ■ -AQUATIC MACROPHYTES [1]
☐ -SHALLOWS (IN SLOW WATER) [1] ■ -BOULDERS [1] ■ -LOGS OR WOODY DEBRIS [1]
■ -ROOTMATS [1] COMMENTS: ___

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
■ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover: 12 (Max 20)

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
■ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ___

Channel: 14 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH (L R, Per Bank):
■ ☐ -WIDE > 50m [4]
☐ ☐ - MODERATE 10-50m [3]
☐ ☐ -NARROW 5-10 m [2]
☐ ■ - VERY NARROW <5 m[1]
☐ ☐ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 FOOT RIPARIAN*) (L R, Most Predominant Per Bank):
■ ☐-FOREST, SWAMP [3]
☐ ☐-SHRUB OR OLD FIELD [2]
☐ ☐-RESIDENTIAL,PARK,NEW FIELD [1]
☐ ☐-FENCED PASTURE [1]
☐ ☐-CONSERVATION TILLAGE [1]
☐ ■ -URBAN OR INDUSTRIAL [0]
☐ ☐ -OPEN PASTURE,ROWCROP [0]
☐ ☐ -MINING/CONSTRUCTION [0]

BANK EROSION (L R, Per Bank):
■ ■ -NONE/LITTLE [3]
☐ ☐ -MODERATE [2]
☐ ☐ -HEAVY/SEVERE[1]

COMMENTS: ___

Riparian: 7 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!):
■ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2- 0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE):
■ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check *All* That Apply):
☐ -EDDIES[1] ☐ -TORRENTIAL[-1]
■ -FAST[1] ☐ -INTERSTITIAL[-1]
■ -MODERATE [1] ☐ -INTERMITTENT[-2]
☐ -SLOW [1]

COMMENTS: ___

Pool/Glide: 10 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH:
☐ - GENERALLY >10 cm,MAX > 50 [4]
■ - GENERALLY >10 cm; MAX < 50[3]
☐ - GENERALLY 5-10 cm[1]
☐ - GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE:
■-STABLE (e.g.,Cobble, Boulder) [2]
☐-MOD. STABLE (e.g.,Large Gravel) [1]
☐-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS:
☐ - NONE [2]
■ - LOW [1]
■ - MODERATE [0]
☐ - EXTENSIVE [-1]
☐ - NO RIFFLE [Metric=0]

COMMENTS: ___

Riffle/Run: 5.5 (Max 8)

6] GRADIENT (ft/mi): 31 DRAINAGE AREA (sq.mi.): 13.12 %POOL: 10 %GLIDE: — %RIFFLE: 70 %RUN: 20

Gradient: 6 (Max 10)

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 78

Stream Mill Creek Site #350 RM ____ Date 8/22/95 River Code ____
Location Northfield Rd Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
☐ ☐ -BLDR /SLABS[10]			■ ■ -GRAVEL [7]	✓	✓
☐ ☐ -BOULDER [9]	✓	✓	☐ ☐ -SAND [6]	✓	✓
■ ■ -COBBLE [8]	✓	✓	☐ ☐ -BEDROCK[5]		
☐ ☐ -HARDPAN [4]	✓	✓	☐ ☐ -DETRITUS[3]		
☐ ☐ -MUCK [2]			☐ ☐ -ARTIFICIAL[0]	✓	✓
☐ ☐ -SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)
NUMBER OF SUBSTRATE TYPES: ■ -5 or More [2] ☐ -4 or Less [0]
COMMENTS ____

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1]
■ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)
SILT: ☐ -SILT HEAVY [-2] ☐ -SILT MODERATE [-1] ■ -SILT NORMAL [0] ☐ -SILT FREE [1]
EMBEDDEDNESS: ☐ -EXTENSIVE [-2] ☐ -MODERATE [-1] ■ -NORMAL [0] ☐ -NONE [1]

Substrate: 18 (Max 20)

2] INSTREAM COVER
TYPE: (Check All That Apply)
■ -UNDERCUT BANKS [1]
■ -OVERHANGING VEGETATION [1]
☐ -SHALLOWS (IN SLOW WATER) [1]
■ -ROOTMATS [1]
■ -DEEP POOLS> 70 cm [2]
■ -ROOTWADS [1]
■ -BOULDERS [1]
☐ -OXBOWS [1]
■ -AQUATIC MACROPHYTES [1]
■ -LOGS OR WOODY DEBRIS [1]
COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
☐ - EXTENSIVE >75% [11]
■ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT <5%[1]

Cover: 16 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
■ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]
■ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]
☐ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]	

MODIFICATIONS/OTHER
☐ - SNAGGING ☐ - IMPOUND.
☐ - RELOCATION ■ - ISLANDS
☐ - CANOPY REMOVAL ☐ - LEVEED
☐ - DREDGING ☐ - BANK SHAPING
☐ - ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ____

Channel: 16.5 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
■ ■ -WIDE >50m [4]
☐ ☐ - MODERATE 10-50m [3]
☐ ☐ -NARROW 5-10 m [2]
☐ ☐ - VERY NARROW <5 m[1]
☐ ☐ - NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank)
■ ☐ -FOREST, SWAMP [3]
☐ ■ -SHRUB OR OLD FIELD [2]
☐ ☐ -RESIDENTIAL,PARK,NEW FIELD [1]
☐ ☐ -FENCED PASTURE [1]
☐ ☐ -CONSERVATION TILLAGE [1]
☐ ☐ -URBAN OR INDUSTRIAL [0]
☐ ☐ -OPEN PASTURE,ROWCROP [0]
☐ ☐ -MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
☐ ☐ -NONE/LITTLE [3]
■ ☐ -MODERATE [2]
☐ ■ -HEAVY/SEVERE[1]

COMMENTS: ____

Riparian: 8 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
■ - >1m [6]
☐ - 0.7-1m [4]
☐ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - <0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
■ -POOL WIDTH > RIFFLE WIDTH [2]
☐ -POOL WIDTH = RIFFLE WIDTH [1]
☐ -POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply)
☐ -EDDIES[1] ☐ -TORRENTIAL[-1]
☐ -FAST[1] ☐ -INTERSTITIAL[-1]
☐ -MODERATE [1] ☐ -INTERMITTENT[-2]
■ -SLOW [1]

COMMENTS: ____

Pool/Glide: 9 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH
☐ - GENERALLY >10 cm,MAX > 50 [4]
☐ - GENERALLY >10 cm; MAX < 50[3]
■ - GENERALLY 5-10 cm[1]
☐ - GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
■ -STABLE (e.g.,Cobble, Boulder) [2]
■ -MOD. STABLE (e.g.,Large Gravel) [1]
☐ -UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ - NONE [2]
☐ - LOW [1]
■ - MODERATE [0]
☐ - EXTENSIVE [-1]
☐ - NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 2.5 (Max 8)

6] GRADIENT (ft/mi): 22.9 **DRAINAGE AREA (sq.mi.):** 9.31

%POOL: 50 %GLIDE: 10
%RIFFLE: 20 %RUN: 20

Gradient: 8 (Max 10)

EPA 4520 4/7/92

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 56.5

Stream: Mill Creek Site # 35.2 RM: ____ Date: 8/22/95 River Code: ____

Location: North of Halburton Rd Scorers Name: CZ TZ

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Estimate % or note every type present);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
☐☐-BLDR /SLABS[10]			■■-GRAVEL [7]	✓	✓
☐☐-BOULDER [9]	✓	✓	■■-SAND [6]	✓	✓
☐☐-COBBLE [8]	✓	✓	☐☐-BEDROCK[5]		
☐☐-HARDPAN [4]			☐☐-DETRITUS[3]		
☐☐-MUCK [2]			☐☐-ARTIFICIAL[0]	✓	✓
☐☐-SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]

COMMENTS ____

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE): ☐-LIMESTONE [1] ■-TILLS [1] ☐-WETLANDS[0] ☐-HARDPAN [0] ☐-SANDSTONE [0] ☐-RIP/RAP [0] ☐-LACUSTRINE [0] ☐-SHALE [-1] ☐-COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)

SILT: ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ■-SILT NORMAL [0] ☐-SILT FREE [1]

EMBEDDEDNESS: ☐-EXTENSIVE [-2] ☐-MODERATE [-1] ■-NORMAL [0] ☐-NONE [1]

Substrate: 16 (Max 20)

2] INSTREAM COVER

TYPE: (Check All That Apply)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS> 70 cm [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]
■-ROOTMATS [1] COMMENTS: ____

AMOUNT: (Check ONLY One or check 2 and AVERAGE): ☐-EXTENSIVE >75% [11] ☐-MODERATE 25-75% [7] ■-SPARSE 5-25% [3] ☐-NEARLY ABSENT <5%[1]

Cover: 10 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY: ☐-HIGH [4] ☐-MODERATE [3] ☐-LOW [2] ■-NONE [1]

DEVELOPMENT: ☐-EXCELLENT [7] ☐-GOOD [5] ☐-FAIR [3] ■-POOR [1]

CHANNELIZATION: ■-NONE [6] ☐-RECOVERED [4] ☐-RECOVERING [3] ☐-RECENT OR NO RECOVERY [1]

STABILITY: ■-HIGH [3] ■-MODERATE [2] ☐-LOW [1]

MODIFICATIONS/OTHER: ☐-SNAGGING ☐-RELOCATION ■-CANOPY REMOVAL ☐-DREDGING ☐-ONE SIDE CHANNEL MODIFICATIONS ☐-IMPOUND. ☐-ISLANDS ☐-LEVEED ☐-BANK SHAPING

COMMENTS: Channelization ?

Channel: 10.5 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank): ■■-WIDE > 50m [4] ☐☐-MODERATE 10-50m [3] ☐☐-NARROW 5-10 m [2] ☐☐-VERY NARROW <5 m[1] ☐☐-NONE [0]

FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) — L R (Most Predominant Per Bank): ☐☐-FOREST, SWAMP [3] ☐☐-SHRUB OR OLD FIELD [2] ■■-RESIDENTIAL,PARK,NEW FIELD [1] ☐☐-FENCED PASTURE [1] ☐☐-CONSERVATION TILLAGE [1] ☐☐-URBAN OR INDUSTRIAL [0] ☐☐-OPEN PASTURE,ROWCROP [0] ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank): ■■-NONE/LITTLE [3] ☐☐-MODERATE [2] ☐☐-HEAVY/SEVERE[1]

COMMENTS: ____

Riparian: 8 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!): ☐- >1m [6] ☐- 0.7-1m [4] ■- 0.4-0.7m [2] ☐- 0.2-0.4m [1] ☐- <0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE): ☐-POOL WIDTH > RIFFLE WIDTH [2] ■-POOL WIDTH = RIFFLE WIDTH [1] ☐-POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check All That Apply): ☐-EDDIES[1] ☐-FAST[1] ☐-MODERATE [1] ■-SLOW [1] ☐-TORRENTIAL[-1] ☐-INTERSTITIAL[-1] ☐-INTERMITTENT[-2]

COMMENTS: ____

Pool/Glide: 4 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH: ☐-GENERALLY >10 cm,MAX > 50 [4] ☐-GENERALLY >10 cm; MAX < 50[3] ☐-GENERALLY 5-10 cm[1] ■-GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE: ☐-STABLE (e.g.,Cobble, Boulder) [2] ☐-MOD. STABLE (e.g.,Large Gravel) [1] ■-UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS: ☐-NONE [2] ☐-LOW [1] ■-MODERATE [0] ☐-EXTENSIVE [-1] ☐- NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 0 (Max 8)

6] GRADIENT (ft/mi): 12 DRAINAGE AREA (sq.mi.): 0-9.2 %POOL: 10 %GLIDE: 80 %RIFFLE: 5 %RUN: 5

Gradient: 8 (Max 10)

Ohio EPA Site Description Sheet

QHEI SCORE: 51

Stream WEST CREEK RM____ Date 07/11/91 River Code____
Location SITE - #36 AT GRANGER ROAD Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 11.5

TYPE — POOL RIFFLE — POOL RIFFLE

- ☐☐-BLDER /SLABS[10] ____ ✓ ☐☐-GRAVEL [7] ✓ ✓
- ☐☐-BOULDER [9] ____ ☐■-SAND [6] ____
- ☐■-COBBLE [8] ____ ✓ ☐☐-BEDROCK[5] ____
- ☐☐-HARDPAN [4] ____ ☐☐-DETRITUS[3] ____
- ☐☐-MUCK [2] ____ ☐☐-ARTIFIC.[0] ✓ ✓

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [1] ■-<= 4 [0]

SUBSTRATE QUALITY

Substrate Origin (Check all)
- ☐-LIMESTONE [1] ■-RIP/RAP [0]
- ■-TILLS [1] ☐-HARDPAN [0]
- ☐-SANDSTONE [0]
- ☐-SHALE [-1]
- ☐-COAL FINES [-2]

Silt Cover (Check One)
- ■-SILT HEAVY [-2] ■-SILT MODERATE [-1]
- ☐-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One)
- ■-EXTENSIVE [-2] ☐-MODERATE[-1]
- ☐-LOW[0] ☐-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

2] INSTREAM COVER

COVER SCORE: 10

TYPE (Check All That Apply)
- ■-UNDERCUT BANKS [1]
- ☐-OVERHANGING VEGETATION [1]
- ■-SHALLOWS (IN SLOW WATER) [1]
- ■-DEEP POOLS [2]
- ■-ROOTWADS [1]
- ■-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ■-LOGS OR WOODY DEBRIS [1]

AMOUNT(Check ONLY One or check 2 and AVERAGE)
- ☐ - EXTENSIVE > 75% [11]
- ☐ - MODERATE 25-75% [7]
- ■ - SPARSE 5-25% [3]
- ☐ - NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

CHANNEL: 8

SINUOSITY
- ☐ - HIGH [4]
- ☐ - MODERATE [3]
- ■ - LOW [2]
- ☐ - NONE [1]

DEVELOPMENT
- ☐ - EXCELLENT [7]
- ☐ - GOOD [5]
- ■ - FAIR [3]
- ■ - POOR [1]

CHANNELIZATION
- ☐ - NONE [6]
- ☐ - RECOVERED [4]
- ■ - RECOVERING [3]
- ☐ - RECENT OR NO RECOVERY [1]

STABILITY
- ☐ - HIGH [3]
- ☐ - MODERATE [2]
- ■ - LOW [1]

MODIFICATIONS/OTHER
- ☐ - SNAGGING
- ☐ - RELOCATION
- ☐ - CANOPY REMOVAL
- ☐ - DREDGING
- ☐ - IMPOUND.
- ☐ - ISLANDS
- ☐ - LEVEED
- ☐ - BANK SHAPING
- ■ - ONE SIDE CHANNEL MODIFICATIONS

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 3

River Right Looking Downstream

RIPARIAN WIDTH
L R (Per Bank)
- ☐☐-WIDE>50m [4]
- ☐☐-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ■■-VERY NARROW 1-5m [1]
- ☐☐-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
- ☐☐-FOREST, SWAMP [3]
- ☐☐-OPEN PASTURE/ ROWCROP[0]
- ☐☐- RESID.,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]

L R (Per Bank)
- ■■-URBAN OR INDUSTRIAL[0]
- ☐☐-SHRUB OR OLD FIELD[2]
- ☐☐-CONSERV. TILLAGE [1]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
- ☐ ☐-NONE OR LITTLE [3]
- ■ ■-MODERATE [2]
- ☐ ☐-HEAVY OR SEVERE[1]

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 9

MAX. DEPTH (Check 1)
- ■->1m [6]
- ☐-0.7-1m [4]
- ☐-0.4-0.7m [2]
- ☐-<0.4m [1]
- ☐-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- ■-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ■-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- ☐-TORRENTIAL[-1]
- ■-FAST[1]
- ■-MODERATE [1]
- ☐-SLOW [1]
- ☐-EDDIES[1]
- ☐-INTERSTITIAL[-1]
- ☐-INTERMITTENT[-2]

☐-NO POOL[0]

COMMENTS:____

RIFFLE: 1.5

RIFFLE/RUN DEPTH
- ☐ - GENERALLY >10 cm,MAX>50 [4]
- ■ - GENERALLY >10 cm,MAX<50 [3]
- ■ - GENERALLY 5-10 cm [1]
- ☐ - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g.,Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g.,Pea Gravel) [1]
- ■-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ■-EXTENSIVE [-1] ■-MODERATE[0]
- ☐-LOW. [1] ☐-NONE[2]

☐-NO RIFFLE[0]

COMMENTS____

GRADIENT: 8

6] Gradient (feet/mile): 25.8 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet

QHEI SCORE: 56.5

Stream WEST CREEK RM ____ Date 07 | 09 | 91 River Code ____

Location SITE - #37 AT BROADVIEW ROAD BRIDGE Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 15

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

□□-BLDER /SLABS[10] ✓ ✓ □□-GRAVEL [7] ✓ ✓ — Substrate Origin (Check all) — Silt Cover (Check One)

□■-BOULDER [9] ✓ ✓ □□-SAND [6] ✓ ✓ □-LIMESTONE [1] □-RIP/RAP [0] □-SILT HEAVY [-2] □-SILT MODERATE [-1]

□□-COBBLE [8] ✓ ✓ □■-BEDROCK[5] ____ ■-TILLS [1] □-HARDPAN [0] ■ - SILT NORMAL [0] □ - SILT FREE [1]

□□-HARDPAN [4] ____ □□-DETRITUS[3] ____ □-SANDSTONE [0] — Extent Of Embeddness (Check One)

□□-MUCK [2] ____ □□-ARTIFIC.[0] ✓ ✓ □-SHALE [-1] — □—EXTENSIVE [-2] ■—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] □— <= 4 [0] □-COAL FINES [-2] — □—LOW[0] □—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER

COVER SCORE: 11

TYPE (Check *All* That Apply) — AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)

□ -UNDERCUT BANKS [1] ■-DEEP POOLS [2] □ -OXBOWS [1] □ - EXTENSIVE > 75% [11]

□ -OVERHANGING VEGETATION [1] ■-ROOTWADS [1] □ -AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]

■ -SHALLOWS (IN SLOW WATER) [1] ■ -BOULDERS [1] ■ -LOGS OR WOODY DEBRIS [1] ■ - SPARSE 5-25% [3]

□ - NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 12.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□ - HIGH [4]	□ - EXCELLENT [7]	□ - NONE [6]	□ - HIGH [3]	□ - SNAGGING	■ - IMPOUND.
■ - MODERATE [3]	■ - GOOD [5]	■ - RECOVERED [4]	■ - MODERATE [2]	□ - RELOCATION	□ - ISLANDS
■ - LOW [2]	■ - FAIR [3]	□ - RECOVERING [3]	□ - LOW [1]	□ - CANOPY REMOVAL	□ - LEVEED
□ - NONE [1]	□ - POOR [1]	□ - RECENT OR NO RECOVERY [1]		□ - DREDGING	□ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 3

River Right Looking Downstream

RIPARIAN WIDTH	EROSION/RUNOFF - FLOOD PLAIN QUALITY		BANK EROSION
L R (Per Bank)	L R (Most Predominant Per Bank)	L R (Per Bank)	
□□-WIDE>50m [4]	□□-FOREST, SWAMP [3]	■■-URBAN OR INDUSTRIAL[0]	□ □-NONE OR LITTLE [3]
□□-MODERATE 10-50 [3]	□□-OPEN PASTURE/ ROWCROP[0]	□□-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
□□-NARROW 5-10m [2]	□□- RESID.,PARK,NEW FIELD [1]	□□-CONSERV. TILLAGE [1]	□ □-HEAVY OR SEVERE[1]
■■-VERY NARROW 1-5m [1]	□□-FENCED PASTURE [1]	□□-MINING/CONSTRUCTION [0]	
□□-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 8

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)	
□- >1m [6]			
■- 0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	□-TORRENTIAL[-1]	□-EDDIES[1]
□- 0.4-0.7m [2]	□-POOL WIDTH = RIFFLE WIDTH [1]	□-FAST[1]	□-INTERSTITIAL[-1]
□- < 0.4m [1]	□-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	□-INTERMITTENT[-2]
□—<0.2m [Pool = 0]		■-SLOW [1]	

□-NO POOL[0]

COMMENTS: ____

RIFFLE: 3

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
□ - GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	□-EXTENSIVE [-1]	■-MODERATE[0]
□ - GENERALLY >10 cm,MAX<50 [3]	□-MOD. STABLE (e.g.,Pea Gravel) [1]	□-LOW. [1]	□-NONE[2]
■ - GENERALLY 5-10 cm [1]	□-UNSTABLE (Gravel,Sand) [0]		
□ - GENERALLY < 5 cm [Riffle = 0]			

□-NO RIFFLE[0]

COMMENTS ____

GRADIENT: 4

6] Gradient (feet/mile): 72.4 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet QHEI SCORE: 59.5

Stream WEST CREEK RM ____ Date 07/09/91 River Code ____

Location SITE - #38 U.S. OF W. RIDGEWOOD DRIVE BRIDGE Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 13

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ☐☐-GRAVEL [7] Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ☐■-SAND [6] ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

☐☐-COBBLE [8] ☐■-BEDROCK[5] ■-TILLS [1] ☐-HARDPAN [0] ■-SILT NORMAL [0] ☐-SILT FREE [1]

☐☐-HARDPAN [4] ☐☐-DETRITUS[3] ☐-SANDSTONE [0] Extent Of Embeddness (Check One)

☐☐-MUCK [2] ☐☐-ARTIFIC.[0] ☐-SHALE [-1] ☐-EXTENSIVE [-2] ☐-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [1] ■-<= 4 [0] ☐-COAL FINES [-2] ■-LOW[0] ■-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER COVER SCORE: 9

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐-MODERATE 25-75% [7]

■-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ■-SPARSE 5-25% [3]

☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 13.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	☐-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	■-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	■-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				■-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
■■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ■-MODERATE[2]
☐☐-NARROW 5-10m [2]	■■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐->1m [6]			
☐-0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
■-0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐-<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 2

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐-GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	☐-MODERATE[0]
☐-GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1]	☐-NONE[2]
■-GENERALLY 5-10 cm [1]	■-UNSTABLE (Gravel,Sand) [0]		
☐-GENERALLY < 5 cm [Riffle = 0]			

☐-NO RIFFLE[0]

COMMENTS ____ GRADIENT: 10

6] Gradient (feet/mile): 24 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet QHEI SCORE: 64

Stream TINKERS CREEK RM ______ Date 02 | 03 | 93 River Code ______

Location SITE - #39 OHIO CANAL VIADUCT Crew: NEOPSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 14

TYPE	POOL RIFFLE		POOL RIFFLE	SUBSTRATE QUALITY	
□□-BLDER /SLABS[10]	______	■■-GRAVEL [7]	______	Substrate Origin (Check all)	Silt Cover (Check One)
□□-BOULDER [9]	______	■■-SAND [6]	______	□-LIMESTONE [1] □-RIP/RAP [0]	□-SILT HEAVY [-2] □-SILT MODERATE [-1]
□□-COBBLE [8]	✓ ✓	□□-BEDROCK[5]	______	■-TILLS [1] □-HARDPAN [0]	■- SILT NORMAL [0] □- SILT FREE [1]
□□-HARDPAN [4]	______	□□-DETRITUS[3]	______	□-SANDSTONE [0]	Extent Of Embeddness (Check One)
□□-MUCK [2]	______	□□-ARTIFIC.[0]	______	□-SHALE [-1]	□—EXTENSIVE [-2] □—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: □> 4 [1] ■— <= 4 [0] □-COAL FINES [-2] ■—LOW[0] □—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

COVER SCORE: 10

2] INSTREAM COVER

TYPE (Check All That Apply)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] □-OXBOWS [1]
■-OVERHANGING VEGETATION [1] □-ROOTWADS [1] □-AQUATIC MACROPHYTES [1]
□-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)
□- EXTENSIVE > 75% [11]
■- MODERATE 25-75% [7]
■- SPARSE 5-25% [3]
□- NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 13

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□- HIGH [4]	□- EXCELLENT [7]	■- NONE [6]	■- HIGH [3]	□- SNAGGING	□- IMPOUND.
□- MODERATE [3]	□- GOOD [5]	□- RECOVERED [4]	□- MODERATE [2]	□- RELOCATION	■- ISLANDS
□- LOW [2]	■- FAIR [3]	□- RECOVERING [3]	□- LOW [1]	□- CANOPY REMOVAL	□- LEVEED
■- NONE [1]	□- POOR [1]	□- RECENT OR NO RECOVERY [1]		□- DREDGING	□- BANK SHAPING
				■- ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 7

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
■■-WIDE>50m [4]	□■-FOREST, SWAMP [3]	□□-URBAN OR INDUSTRIAL[0]	□ □-NONE OR LITTLE [3]
□□-MODERATE 10-50 [3]	■□-OPEN PASTURE/ ROWCROP[0]	□□-SHRUB OR OLD FIELD[2]	□ ■-MODERATE [2]
□□-NARROW 5-10m [2]	□□- RESID.,PARK,NEW FIELD [1]	□□-CONSERV. TILLAGE [1]	■ □-HEAVY OR SEVERE[1]
□□-VERY NARROW 1-5m [1]	□□-FENCED PASTURE [1]	□□-MINING/CONSTRUCTION [0]	
□□-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 10

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
■- >1m [6]			
□- 0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	□-TORRENTIAL[-1]	□-EDDIES[1]
□- 0.4-0.7m [2]	□-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	□-INTERSTITIAL[-1]
□- < 0.4m [1]	□-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	□-INTERMITTENT[-2]
□—<0.2m [Pool = 0]		□-SLOW [1]	

□-NO POOL[0]

COMMENTS: ______

RIFFLE: 4

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
□- GENERALLY >10 cm,MAX>50 [4]	□-STABLE (e.g.,Cobble, Boulder) [2]	□-EXTENSIVE [-1]	■-MODERATE[0]
■- GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	□-LOW. [1]	□-NONE[2]
□- GENERALLY 5-10 cm [1]	□-UNSTABLE (Gravel,Sand) [0]		
□- GENERALLY < 5 cm [Riffle = 0]			

□-NO RIFFLE[0]

COMMENTS ______ GRADIENT: 6

6] Gradient (feet/mile): 24.7 %POOL: ______ %RIFFLE: ______ %RUN: ______

Ohio EPA Site Description Sheet **QHEI SCORE: 69.5**

Stream TINKERS CREEK RM____ Date 07/11/91 River Code____
Location SITE-#40 UNDER NORTHFIELD ROAD BRIDGE Crew: NEORSA

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE		POOL RIFFLE		SUBSTRATE QUALITY	SUBSTRATE SCORE: 11
■■-BLDER /SLABS[10]	✓ ✓	□□-GRAVEL [7]	✓ ✓	Substrate Origin (Check all)	Silt Cover (Check One)
□□-BOULDER [9]	✓	□□-SAND [6]	✓ ✓	□-LIMESTONE [1] □-RIP/RAP [0]	□-SILT HEAVY [-2] ■-SILT MODERATE [-1]
□□-COBBLE [8]	✓	□□-BEDROCK[5]		■-TILLS [1] □-HARDPAN [0]	■-SILT NORMAL [0] □-SILT FREE [1]
□□-HARDPAN [4]		□□-DETRITUS[3]	✓	□-SANDSTONE [0]	Extent Of Embeddness (Check One)
□□-MUCK [2]		□□-ARTIFIC.[0]		□-SHALE [-1]	□—EXTENSIVE [-2] ■—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] □—<= 4 [0] □-COAL FINES [-2] ■—LOW[0] □—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

COVER SCORE: 13

2] INSTREAM COVER

TYPE (Check All That Apply) — AMOUNT(Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1]	■-DEEP POOLS [2]	□-OXBOWS [1]	□-EXTENSIVE > 75% [11]
■-OVERHANGING VEGETATION [1]	■-ROOTWADS [1]	□-AQUATIC MACROPHYTES [1]	■-MODERATE 25-75% [7]
■-SHALLOWS (IN SLOW WATER) [1]	■-BOULDERS [1]	■-LOGS OR WOODY DEBRIS [1]	■-SPARSE 5-25% [3]
			□-NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL: 17**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□-HIGH [4]	■-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	□-SNAGGING	□-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	■-RECOVERED [4]	□-MODERATE [2]	□-RELOCATION	□-ISLANDS
□-LOW [2]	□-FAIR [3]	□-RECOVERING [3]	□-LOW [1]	□-CANOPY REMOVAL	■-LEVEED
□-NONE [1]	□-POOR [1]	□-RECENT OR NO RECOVERY [1]		□-DREDGING	□-BANK SHAPING
				■-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 6.5**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
□□-WIDE>50m [4]	□□-FOREST, SWAMP [3]	□□-URBAN OR INDUSTRIAL[0]	■■-NONE OR LITTLE [3]
□■-MODERATE 10-50 [3]	□□-OPEN PASTURE/ ROWCROP[0]	□□-SHRUB OR OLD FIELD[2]	□□-MODERATE.[2]
■□-NARROW 5-10m [2]	■■-RESID.,PARK,NEW FIELD [1]	□□-CONSERV. TILLAGE [1]	□□-HEAVY OR SEVERE[1]
□□-VERY NARROW 1-5m [1]	□□-FENCED PASTURE [1]	□□-MINING/CONSTRUCTION [0]	
□□-NONE[0]			

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 10**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)		
□->1m [6]				
■-0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	□-TORRENTIAL[-1]	■-EDDIES[1]	
□-0.4-0.7m [2]	□-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	□-INTERSTITIAL[-1]	□-NO POOL[0]
□-< 0.4m [1]	□-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	□-INTERMITTENT[-2]	
□—<0.2m [Pool = 0]		■-SLOW [1]		

COMMENTS:____

RIFFLE: 6

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
■-GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	□-EXTENSIVE [-1] ■-MODERATE[0]
■-GENERALLY >10 cm,MAX<50 [3]	□-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1] □-NONE[2]
□-GENERALLY 5-10 cm [1]	□-UNSTABLE (Gravel,Sand) [0]	□-NO RIFFLE[0]
□-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS____ **GRADIENT: 6**

6] Gradient (feet/mile): 39.3 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet

QHEI SCORE: 61

Stream TINKERS CREEK RM ____ Date 07/11/91 River Code ____

Location SITE - #41 EAST OF RICHMOND ROAD Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 9.5

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ____ ____ ☐☐-GRAVEL [7] ✓ ✓ Substrate Origin (Check all) — Silt Cover (Check One)
- ☐☐-BOULDER [9] ✓ ____ ☐☐-SAND [6] ____ ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-SILT HEAVY [-2] ■-SILT MODERATE [-1]
- ☐■-COBBLE [8] ____ ____ ☐☐-BEDROCK[5] ____ ____ ■-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
- ☐☐-HARDPAN [4] ____ ____ ☐☐-DETRITUS[3] ____ ____ ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)
- ☐■-MUCK [2] ____ ____ ☐☐-ARTIFIC.[0] ✓ ✓ ☐-SHALE [-1] — ☐-EXTENSIVE [-2] ■-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0] ☐-COAL FINES [-2] — ☐-LOW[0] ☐-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 13

2] INSTREAM COVER

TYPE (Check All That Apply) — AMOUNT(Check ONLY One or check 2 and AVERAGE)

- ■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]
- ■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ■-MODERATE 25-75% [7]
- ■-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ■-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — **CHANNEL: 14.5**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	■-FAIR [3]	☐-RECOVERING [3]	■-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				■-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — **RIPARIAN: 3.5**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	☐■-URBAN OR INDUSTRIAL[0]	☐■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	■☐-RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐☐-HEAVY OR SEVERE[1]
■☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐■-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY — **POOL: 10**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
■->1m [6]			
☐-0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	☐-MODERATE [1]	☐-INTERMITTENT[-2]
☐-<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 2.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐-GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	■-EXTENSIVE [-1]	■-MODERATE[0]
■-GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐-GENERALLY 5-10 cm [1]	■-UNSTABLE (Gravel,Sand) [0]		☐-NO RIFFLE[0]
☐-GENERALLY < 5 cm [Riffle = 0]			

COMMENTS ____

GRADIENT: 8

6] Gradient (feet/mile): 10.7 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet

QHEI SCORE: 59.5

Stream TINKERS CREEK RM ____ Date 02/03/93 River Code ____

Location SITE - #42 GLENWOOD DRIVE BRIDGE Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 13

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ____ ■■-GRAVEL [7] ✓ ✓ — Substrate Origin (Check all) — Silt Cover (Check One)
- ☐☐-BOULDER [9] ____ ■■-SAND [6] ✓ ✓ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ■-SILT MODERATE [-1]
- ☐☐-COBBLE [8] ✓ ✓ ☐☐-BEDROCK[5] ____ ■-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
- ☐☐-HARDPAN [4] ____ ☐☐-DETRITUS[3] ____ ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)
- ☐☐-MUCK [2] ____ ☐☐-ARTIFIC.[0] ____ ☐-SHALE [-1] — ☐—EXTENSIVE [-2] ☐—MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐> 4 [1] ■— <= 4 [0] ☐-COAL FINES [-2] — ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER

COVER SCORE: 11

TYPE (Check *All* That Apply) — AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

- ■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]
- ■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ■-MODERATE 25-75% [7]
- ☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ☐-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 15

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	■ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
■ - MODERATE [3]	☐ - GOOD [5]	☐ - RECOVERED [4]	☐ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	■ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 6.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
■■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	■☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ■-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 8

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)		
■->1m [6]				
☐-0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]	
☐-0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]	☐-NO POOL[0]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]	
☐—<0.2m [Pool = 0]		☐-SLOW [1]		

COMMENTS: ____

RIFFLE: 0

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ☐-MODERATE[0]
☐ - GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1] ☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	■-NO RIFFLE[0]
☐ - GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ____

GRADIENT: 6

6] Gradient (feet/mile): 3.8 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet

QHEI SCORE: 80

Stream: CHIPPEWA CREEK RM ____ Date 06/27/91 River Code ____

Location: SITE - #43 CHIPPEWA CREEK DRIVE FORD Crew: AIEDRSA

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*);

SUBSTRATE SCORE: 17

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
☐☐-BLDER /SLABS[10]			■■-GRAVEL [7]		
☐☐-BOULDER [9]	✓		☐☐-SAND [6]	✓	
■■-COBBLE [8]			☐☐-BEDROCK[5]		
☐☐-HARDPAN [4]			☐☐-DETRITUS[3]		
☐☐-MUCK [2]			☐☐-ARTIFIC.[0]		

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-- <= 4 [0]

SUBSTRATE QUALITY

Substrate Origin (Check all)
☐-LIMESTONE [1] ☐-RIP/RAP [0]
■-TILLS [1] ☐-HARDPAN [0]
☐-SANDSTONE [0]
☐-SHALE [-1]
☐-COAL FINES [-2]

Silt Cover (Check One)
☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
■-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One)
☐—EXTENSIVE [-2] ☐—MODERATE [-1]
■—LOW [0] ☐—NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER

COVER SCORE: 14

TYPE (Check *All* That Apply)

☐-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
■-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)
☐-EXTENSIVE > 75% [11]
■-MODERATE 25-75% [7]
☐-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 16

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	☐-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 10

River Right Looking Downstream

RIPARIAN WIDTH
L R (Per Bank)
■■-WIDE>50m [4]
☐☐-MODERATE 10-50 [3]
☐☐-NARROW 5-10m [2]
☐☐-VERY NARROW 1-5m [1]
☐☐-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
■■-FOREST, SWAMP [3]
☐☐-OPEN PASTURE/ ROWCROP [0]
☐☐-RESID.,PARK,NEW FIELD [1]
☐☐-FENCED PASTURE [1]

L R (Per Bank)
☐☐-URBAN OR INDUSTRIAL [0]
☐☐-SHRUB OR OLD FIELD [2]
☐☐-CONSERV. TILLAGE [1]
☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
■■-NONE OR LITTLE [3]
☐☐-MODERATE [2]
☐☐-HEAVY OR SEVERE [1]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 9

MAX. DEPTH (Check 1)
■- >1m [6]
☐- 0.7-1m [4]
☐- 0.4-0.7m [2]
☐- < 0.4m [1]
☐—<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
■-POOL WIDTH > RIFFLE WIDTH [2]
☐-POOL WIDTH = RIFFLE WIDTH [1]
■-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
☐-TORRENTIAL [-1] ☐-EDDIES [1]
☐-FAST [1] ☐-INTERSTITIAL [-1]
■-MODERATE [1] ☐-INTERMITTENT [-2]
■-SLOW [1]

☐-NO POOL [0]

COMMENTS: ____

RIFFLE: 4

RIFFLE/RUN DEPTH
☐-GENERALLY >10 cm,MAX>50 [4]
☐-GENERALLY >10 cm,MAX<50 [3]
■-GENERALLY 5-10 cm [1]
☐-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
■-STABLE (e.g.,Cobble, Boulder) [2]
☐-MOD. STABLE (e.g.,Pea Gravel) [1]
☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐-EXTENSIVE [-1] ☐-MODERATE [0]
■-LOW. [1] ☐-NONE [2]

☐-NO RIFFLE [0]

COMMENTS ____

GRADIENT: 10

6] Gradient (feet/mile): 29.4 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet QHEI SCORE: 62.5

Stream CHIPPEWA CREEK RM ____ Date 01/20/93 River Code ____

Location SITE - #43.5 BRAMBLEWOOD BRANCH, US. OF CONFLUENCE Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

TYPE / POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY — SUBSTRATE SCORE: 16

- O O-BLDER /SLABS[10] ___ ___ O O-GRAVEL [7] ___ ✓
- O O-BOULDER [9] ___ ✓ O O-SAND [6] ___ ___
- ■ ■-COBBLE [8] ___ ✓ ■ ■-BEDROCK[5] ✓ ___
- O O-HARDPAN [4] ___ ___ O O-DETRITUS[3] ___ ___
- O O-MUCK [2] ___ ___ O O-ARTIFIC.[0] ___ ___

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] O-<= 4 [0]

Substrate Origin (Check all)
- ✓ O-LIMESTONE [1] O-RIP/RAP [0]
- ✓ ■-TILLS [1] O-HARDPAN [0]
- O-SANDSTONE [0]
- O-SHALE [-1]
- O-COAL FINES [-2]

Silt Cover (Check One)
- O-SILT HEAVY [-2] O-SILT MODERATE [-1]
- O - SILT NORMAL [0] ■ - SILT FREE [1]

Extent Of Embeddness (Check One)
- O-EXTENSIVE [-2] O-MODERATE[-1]
- ■-LOW[0] O-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 11

2] INSTREAM COVER

TYPE (Check All That Apply)
- O -UNDERCUT BANKS [1]
- ■ -OVERHANGING VEGETATION [1]
- O -SHALLOWS (IN SLOW WATER) [1]
- O -DEEP POOLS [2]
- O -ROOTWADS [1]
- ■ -BOULDERS [1]
- O -OXBOWS [1]
- ■ -AQUATIC MACROPHYTES [1]
- ■ -LOGS OR WOODY DEBRIS [1]

AMOUNT(Check ONLY One or check 2 and AVERAGE)
- O - EXTENSIVE > 75% [11]
- ■ - MODERATE 25-75% [7]
- O - SPARSE 5-25% [3]
- O - NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 17

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
O - HIGH [4]	O - EXCELLENT [7]	■ - NONE [6]	■ - HIGH [3]	O - SNAGGING	O - IMPOUND.
■ - MODERATE [3]	■ - GOOD [5]	O - RECOVERED [4]	O - MODERATE [2]	O - RELOCATION	O - ISLANDS
O - LOW [2]	O - FAIR [3]	O - RECOVERING [3]	O - LOW [1]	O - CANOPY REMOVAL	O - LEVEED
O - NONE [1]	O - POOR [1]	O - RECENT OR NO RECOVERY [1]		O - DREDGING	O - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 7.5

River Right Looking Downstream

RIPARIAN WIDTH — L R (Per Bank)
- ■ O-WIDE>50m [4]
- O O-MODERATE 10-50 [3]
- O ■-NARROW 5-10m [2]
- O O-VERY NARROW 1-5m [1]
- O O-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank) / L R (Per Bank)
- ■ O-FOREST, SWAMP [3]
- O O-OPEN PASTURE/ ROWCROP[0]
- O ■- RESID.,PARK,NEW FIELD [1]
- O O-FENCED PASTURE [1]
- O O-URBAN OR INDUSTRIAL[0]
- O O-SHRUB OR OLD FIELD[2]
- O O-CONSERV. TILLAGE [1]
- O O-MINING/CONSTRUCTION [0]

BANK EROSION
- ■ O-NONE OR LITTLE [3]
- O ■-MODERATE [2]
- O O-HEAVY OR SEVERE[1]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: 3

MAX. DEPTH (Check 1)
- O- >1m [6]
- O- 0.7-1m [4]
- ■- 0.4-0.7m [2]
- O- < 0.4m [1]
- O-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- O-POOL WIDTH > RIFFLE WIDTH [2]
- O-POOL WIDTH = RIFFLE WIDTH [1]
- ■-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- O-TORRENTIAL[-1]
- ■-FAST[1]
- O-MODERATE [1]
- O-SLOW [1]
- O-EDDIES[1]
- O-INTERSTITIAL[-1]
- O-INTERMITTENT[-2]

O-NO POOL[0]

COMMENTS: ____

RIFFLE: 4

RIFFLE/RUN DEPTH
- O - GENERALLY >10 cm,MAX>50 [4]
- O - GENERALLY >10 cm,MAX<50 [3]
- ■ - GENERALLY 5-10 cm [1]
- O - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ■-STABLE (e.g.,Cobble, Boulder) [2]
- O-MOD. STABLE (e.g.,Pea Gravel) [1]
- O-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- O-EXTENSIVE [-1] O-MODERATE[0]
- ■-LOW. [1] O-NONE[2]

O-NO RIFFLE[0]

COMMENTS ____ GRADIENT: 4

6] Gradient (feet/mile): 74 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet — **QHEI SCORE: 77**

Stream CHIPPEWA CREEK RM ____ Date 07/26/91 River Code ____

Location SITE-#44 AVERY ROAD BRIDGE Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); **SUBSTRATE SCORE: 20**

TYPE / POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- ☐■-BLDER /SLABS[10] ✓ ✓ ☐☐-GRAVEL [7] ✓ ✓ — Substrate Origin (Check all) — Silt Cover (Check One)
- ☐☐-BOULDER [9] ✓ ✓ ☐☐-SAND [6] ✓ — ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ■-SILT MODERATE [-1]
- ☐■-COBBLE [8] ☐☐-BEDROCK[5] — ■-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
- ☐☐-HARDPAN [4] ☐☐-DETRITUS[3] — ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)
- ☐☐-MUCK [2] ☐☐-ARTIFIC.[0] — ☐-SHALE [-1] — ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] — ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER — **COVER SCORE: 15**

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]
- ■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ■-MODERATE 25-75% [7]
- ■-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ☐-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — **CHANNEL: 17**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	☐-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — **RIPARIAN: 6**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
■■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	■■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY — **POOL: 10**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
■->1m [6]			
☐-0.7-1m [4]	■-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐-0.4-0.7m [2]	☐-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐-GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ■-MODERATE[0]
■-GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1] ☐-NONE[2]
☐-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐-GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ____ **GRADIENT: 4**

6] Gradient (feet/mile): 42.6 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet

QHEI SCORE: 44

Stream BURKE BROOK RM____ Date 01/27/93 River Code____

Location SITE - #48.1 E. OF I-77, SOUTH OF FLEET AVE. Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 6

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ____ ____ ■■-GRAVEL [7] ____ ____ Substrate Origin (Check all) — Silt Cover (Check One)

☐☐-BOULDER [9] ____ ____ ☐☐-SAND [6] ____ ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ■-SILT HEAVY [-2] ☐-SILT MODERATE [-1]

☐☐-COBBLE [8] ____ ✓ ☐☐-BEDROCK[5] ____ ____ ■-TILLS [1] ☐-HARDPAN [0] ☐ - SILT NORMAL [0] ☐ - SILT FREE [1]

☐☐-HARDPAN [4] ____ ____ ☐☐-DETRITUS[3] ____ ____ ☐-SANDSTONE [0] — Extent Of Embeddness (Check One)

☐☐-MUCK [2] ____ ____ ■■-ARTIFIC.[0] ____ ____ ☐-SHALE [-1] — ☐—EXTENSIVE [-2] ☐—MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐> 4 [1] ■— <= 4 [0] ☐-COAL FINES [-2] — ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

COVER SCORE: 8

2] INSTREAM COVER

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1] ☐ - EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]

☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ■ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5%[1]

COMMENTS:____

CHANNEL: 12

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	☐ - NONE [6]	■ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
■ - MODERATE [3]	☐ - GOOD [5]	■ - RECOVERED [4]	☐ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
☐ - LOW [2]	■ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	■ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

RIPARIAN: 8

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐■-FOREST, SWAMP [3]	■☐-URBAN OR INDUSTRIAL[0]	■ ■-NONE OR LITTLE [3]
■■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	☐ ☐-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS:____

POOL: 4

POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐- >1m [6]			
☐- 0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐- 0.4-0.7m [2]	■-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
■- < 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS:____

RIFFLE: 2

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1]	■-MODERATE[0]
☐ - GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1]	☐-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		
■ - GENERALLY < 5 cm [Riffle = 0]			

☐-NO RIFFLE[0]

COMMENTS____

GRADIENT: 4

6] Gradient (feet/mile): 74.1 %POOL:____ %RIFFLE:____ %RUN:____

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 72

Stream: Rocky River — RM: 3.0 — Date: 8/25/95 — River Code: ____

Location: Site #49 Downstream of Berea WWTP — Scorers Name: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % or note every type present*);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE	SUBSTRATE ORIGIN		SUBSTRATE QUALITY
						Check ONE (OR 2 & AVERAGE)		Check ONE (OR 2 & AVERAGE)
☐ ☐-BLDR /SLABS[10]			☐ ☐-GRAVEL [7]	✓	✓	☐ -LIMESTONE [1]	SILT:	■ -SILT HEAVY [-2]
■ ☐-BOULDER [9]			☐ ☐-SAND [6]			■ -TILLS [1]		■ -SILT MODERATE [-1]
☐ ☐-COBBLE [8]	✓	✓	☐ ■-BEDROCK[5]			☐ -WETLANDS[0]		☐ -SILT NORMAL [0]
☐ ☐-HARDPAN [4]			☐ ☐-DETRITUS[3]			☐ -HARDPAN [0]		☐ -SILT FREE [1]
☐ ☐-MUCK [2]			☐ ☐-ARTIFICIAL[0]			☐ -SANDSTONE [0]	EMBEDDEDNESS:	☐ -EXTENSIVE [-2]
☐ ☐-SILT [2]	✓	✓				☐ -RIP/RAP [0]		☐ -MODERATE [-1]
						☐ -LACUSTRINE [0]		■ -NORMAL [0]
						☐ -SHALE [-1]		☐ -NONE [1]
						☐-COAL FINES [-2]		

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] ☐-4 or Less [0]

COMMENTS ____

Substrate: 15.5 (Max 20)

2] INSTREAM COVER

TYPE: (Check *All* That Apply)

■ -UNDERCUT BANKS [1] ☐ -DEEP POOLS> 70 cm [2] ☐ -OXBOWS [1]
■ -OVERHANGING VEGETATION [1] ■ -ROOTWADS [1] ■ -AQUATIC MACROPHYTES [1]
☐ -SHALLOWS (IN SLOW WATER) [1] ■ -BOULDERS [1] ■ -LOGS OR WOODY DEBRIS [1]
☐ -ROOTMATS [1] COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)

☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
■ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover: 9 (Max 20)

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	■ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	■ - ISLANDS
■ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

Channel: 15.5 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (*PAST 100 FOOT RIPARIAN*) L R (Most Predominant Per Bank)	L R	BANK EROSION L R (Per Bank)
■ ■-WIDE > 50m [4]	■ ■-FOREST, SWAMP [3]	☐ ☐-CONSERVATION TILLAGE [1]	☐ ☐ -NONE/LITTLE [3]
☐ ☐ - MODERATE 10-50m [3]	☐ ☐-SHRUB OR OLD FIELD [2]	☐ ☐ -URBAN OR INDUSTRIAL [0]	■ ■ -MODERATE [2]
☐ ☐ -NARROW 5-10 m [2]	☐ ☐-RESIDENTIAL,PARK,NEW FIELD [1]	☐ ☐ -OPEN PASTURE,ROWCROP [0]	☐ ☐ -HEAVY/SEVERE[1]
☐ ☐ - VERY NARROW <5 m[1]	☐ ☐ -FENCED PASTURE [1]	☐ ☐ -MINING/CONSTRUCTION [0]	
☐ ☐ - NONE [0]			

COMMENTS: ____

Riparian: 9 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)	MORPHOLOGY (Check 1 or 2 & AVERAGE)	CURRENT VELOCITY [POOL & RIFFLES!] (Check *All* That Apply)	
☐ - >1m [6]	■ -POOL WIDTH > RIFFLE WIDTH [2]	☐ -EDDIES[1]	☐ -TORRENTIAL[-1]
☐ - 0.7-1m [4]	☐ -POOL WIDTH = RIFFLE WIDTH [1]	■ -FAST[1]	☐ -INTERSTITIAL[-1]
■ - 0.4-0.7m [2]	☐ -POOL WIDTH < RIFFLE W. [0]	■ -MODERATE [1]	☐ -INTERMITTENT[-2]
☐ - 0.2- 0.4m [1]		■ -SLOW [1]	
☐ - < 0.2m [POOL=0]	COMMENTS: ____		

Pool/Glide: 7 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ - GENERALLY >10 cm;MAX > 50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐ - NONE [2]
■ - GENERALLY >10 cm; MAX < 50[3]	☐-MOD. STABLE (e.g.,Large Gravel) [1]	■ - LOW [1]
☐ - GENERALLY 5-10 cm[1]	☐-UNSTABLE (Fine Gravel,Sand) [0]	☐ - MODERATE [0]
☐ - GENERALLY < 5 cm [RIFFLE=0]		☐ - EXTENSIVE [-1]
COMMENTS: ____		☐ - NO RIFFLE [Metric=0]

Riffle/Run: 6 (Max 8)

Gradient: 10 (Max 10)

6] GRADIENT (ft/mi): 10.5 **DRAINAGE AREA (sq.mi.):** 75

%POOL: 30 %GLIDE: 40
%RIFFLE: 20 %RUN: 10

EPA 4520 — 4/7/92

OhioEPA Qualitative Habitat Evaluation Index Field Sheet — QHEI Score: 77.5

Stream: Rocky River — RM 3.6 — Date 8/25/95 — River Code ______
Location: Site #49.1 Upstream of Berea WWTP — Scorers Name: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % or note every type present*);

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE ORIGIN — SUBSTRATE QUALITY

☐ ☐-BLDR /SLABS[10] ___ ___ ☐ ☐-GRAVEL [7] ✓ ✓ — Check ONE (OR 2 & AVERAGE) — Check ONE (OR 2 & AVERAGE)
■ ☐-BOULDER [9] ___ ___ ☐ ☐-SAND [6] ✓ ___ — ☐-LIMESTONE [1] — SILT: ■-SILT HEAVY [-2]
☐ ☐-COBBLE [8] ✓ ✓ ☐ ■-BEDROCK[5] ___ ___ — ■-TILLS [1] — ■-SILT MODERATE [-1]
☐ ☐-HARDPAN [4] ___ ___ ☐ ☐-DETRITUS[3] ___ ___ — ☐-WETLANDS[0] — ☐-SILT NORMAL [0]
☐ ☐-MUCK [2] ___ ___ ☐ ☐-ARTIFICIAL[0] ___ ___ — ☐-HARDPAN [0] — ☐-SILT FREE [1]
☐ ☐-SILT [2] ✓ ✓ — ☐-SANDSTONE [0] — EMBEDDEDNESS: ☐-EXTENSIVE [-2]
NOTE: (Ignore sludge that originates from point-sources; — ☐-RIP/RAP [0] — ☐-MODERATE [-1]
score on natural substrates) ■-5 or More [2] — ☐-LACUSTRINE [0] — ■-NORMAL [0]
NUMBER OF SUBSTRATE TYPES: ☐-4 or Less [0] — ☐-SHALE [-1] — ☐-NONE [1]
COMMENTS ______ ☐-COAL FINES [-2]

Substrate: 15.5 (Max 20)

2] INSTREAM COVER

TYPE: (Check *All* That Apply)
■-UNDERCUT BANKS [1] ■-DEEP POOLS> 70 cm [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]
■-ROOTMATS [1] COMMENTS: ______

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
☐-EXTENSIVE > 75% [11]
■-MODERATE 25-75% [7]
■-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5%[1]

Cover: 13 (Max 20)

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
■-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

Channel: 15.5 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH L R (Per Bank)	FLOOD PLAIN QUALITY (PAST 100 FOOT RIPARIAN) L R (Most Predominant Per Bank)	L R	BANK EROSION L R (Per Bank)
■ ■-WIDE > 50m [4]	■ ■-FOREST, SWAMP [3]	☐ ☐-CONSERVATION TILLAGE [1]	☐ ☐-NONE/LITTLE [3]
☐ ☐-MODERATE 10-50m [3]	☐ ☐-SHRUB OR OLD FIELD [2]	☐ ☐-URBAN OR INDUSTRIAL [0]	■ ■-MODERATE [2]
☐ ☐-NARROW 5-10 m [2]	☐ ☐-RESIDENTIAL,PARK,NEW FIELD [1]	☐ ☐-OPEN PASTURE,ROWCROP [0]	☐ ☐-HEAVY/SEVERE[1]
☐ ☐-VERY NARROW <5 m[1]	☐ ☐-FENCED PASTURE [1]	☐ ☐-MINING/CONSTRUCTION [0]	
☐ ☐-NONE [0]			

COMMENTS: ______

Riparian: 9 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)	MORPHOLOGY (Check 1 or 2 & AVERAGE)	CURRENT VELOCITY [POOL & RIFFLES!] (Check *All* That Apply)	
☐- >1m [6]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-EDDIES[1]	☐-TORRENTIAL[-1]
■- 0.7-1m [4]	■-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐- 0.4-0.7m [2]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐- 0.2- 0.4m [1]		■-SLOW [1]	
☐- < 0.2m [POOL=0]	COMMENTS: ______		

Pool/Glide: 8 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE /RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐-GENERALLY >10 cm;MAX > 50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	■-NONE [2]
■-GENERALLY >10 cm; MAX < 50[3]	☐-MOD. STABLE (e.g.,Large Gravel) [1]	■-LOW [1]
☐-GENERALLY 5-10 cm[1]	☐-UNSTABLE (Fine Gravel,Sand) [0]	☐-MODERATE [0]
☐-GENERALLY < 5 cm [RIFFLE=0]		☐-EXTENSIVE [-1]
COMMENTS: ______		☐-NO RIFFLE [Metric=0]

Riffle/Run: 6.5 (Max 8)

Gradient: 10 (Max 10)

6] GRADIENT (ft/mi): 10.5 **DRAINAGE AREA (sq.mi.):** 75 %POOL: 20 %GLIDE: 5
%RIFFLE: 15 %RUN: 60

Ohio EPA Site Description Sheet — QHEI SCORE: 73

Stream ROCKY RIVER — RM ____ Date 02/04/93 River Code ____

Location SITE - #50 E. BRANCH, AT WEST BRIDGE STREET — Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); — SUBSTRATE SCORE: 17

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

□□-BLDER /SLABS[10] ______ □□-GRAVEL [7] ______ ✓ Substrate Origin (Check all) — Silt Cover (Check One)

■■-BOULDER [9] ______ □□-SAND [6] ______ □-LIMESTONE [1] □-RIP/RAP [0] □-SILT HEAVY [-2] ■-SILT MODERATE [-1]

■■-COBBLE [8] ______ □□-BEDROCK[5] ______ ■-TILLS [1] □-HARDPAN [0] □ - SILT NORMAL [0] □ - SILT FREE [1]

□□-HARDPAN [4] ______ □□-DETRITUS[3] ______ □-SANDSTONE [0] — Extent Of Embeddness (Check One)

□□-MUCK [2] ______ □□-ARTIFIC.[0] ______ □-SHALE [-1] — □—EXTENSIVE [-2] □—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: □-> 4 [1] ■— <= 4 [0] □-COAL FINES [-2] — ■—LOW[0] □—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2] INSTREAM COVER — COVER SCORE: 15

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] □-OXBOWS [1] □ - EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1] ■ - MODERATE 25-75% [7]

□-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] □ - SPARSE 5-25% [3]

□ - NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — CHANNEL: 15

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
□ - HIGH [4]	□ - EXCELLENT [7]	■ - NONE [6]	■ - HIGH [3]	□ - SNAGGING	□ - IMPOUND.
□ - MODERATE [3]	■ - GOOD [5]	□ - RECOVERED [4]	□ - MODERATE [2]	□ - RELOCATION	□ - ISLANDS
■ - LOW [2]	■ - FAIR [3]	□ - RECOVERING [3]	□ - LOW [1]	□ - CANOPY REMOVAL	□ - LEVEED
□ - NONE [1]	□ - POOR [1]	□ - RECENT OR NO RECOVERY [1]		□ - DREDGING	□ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — RIPARIAN: 4

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
□□-WIDE>50m [4]	□□-FOREST, SWAMP [3]	■■-URBAN OR INDUSTRIAL[0]	□ □-NONE OR LITTLE [3]
□□-MODERATE 10-50 [3]	□□-OPEN PASTURE/ ROWCROP[0]	□□-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
■■-NARROW 5-10m [2]	□□- RESID.,PARK,NEW FIELD [1]	□□-CONSERV. TILLAGE [1]	□ □-HEAVY OR SEVERE[1]
□□-VERY NARROW 1-5m [1]	□□-FENCED PASTURE [1]	□□-MINING/CONSTRUCTION [0]	
□□-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: 8

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
■- >1m [6]			
□- 0.7-1m [4]	□-POOL WIDTH > RIFFLE WIDTH [2]	□-TORRENTIAL[-1]	□-EDDIES[1]
□- 0.4-0.7m [2]	□-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	□-INTERSTITIAL[-1]
□- < 0.4m [1]	■-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	□-INTERMITTENT[-2]
□—<0.2m [Pool = 0]		□-SLOW [1]	

□-NO POOL[0]

COMMENTS: ______

RIFFLE: 6

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
□ - GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	□-EXTENSIVE [-1]	□-MODERATE[0]
■ - GENERALLY >10 cm,MAX<50 [3]	□-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1]	□-NONE[2]
□ - GENERALLY 5-10 cm [1]	□-UNSTABLE (Gravel,Sand) [0]		□-NO RIFFLE[0]
□ - GENERALLY < 5 cm [Riffle = 0]			

COMMENTS ______ — GRADIENT: 8

6] Gradient (feet/mile): 18 — %POOL: ______ %RIFFLE: ______ %RUN: ______

OhioEPA Qualitative Habitat Evaluation Index Field Sheet

QHEI Score: 70.5

Stream: Rocky River RM ____ Date: 8/24/95 River Code ____

Location: Upstream of Baldwin Lake Scorers Name: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Estimate % or note every type present*);

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE
□ □-BLDR /SLABS[10]			□ □-GRAVEL [7]		
□ ■-BOULDER [9]			□ □-SAND [6]	✓	✓
□ □-COBBLE [8]	✓	✓	■ ■-BEDROCK[5]		
□ □-HARDPAN [4]			□ □-DETRITUS[3]		
□ □-MUCK [2]			□ □-ARTIFICIAL[0]	✓	✓
□ □-SILT [2]					

NOTE: (Ignore sludge that originates from point-sources; score on natural substrates)

NUMBER OF SUBSTRATE TYPES: ■-5 or More [2] □-4 or Less [0]

COMMENTS ____

SUBSTRATE ORIGIN — Check ONE (OR 2 & AVERAGE)
- □ -LIMESTONE [1]
- ■ -TILLS [1]
- □ -WETLANDS[0]
- □ -HARDPAN [0]
- □ -SANDSTONE [0]
- □ -RIP/RAP [0]
- □ -LACUSTRINE [0]
- □ -SHALE [-1]
- □ -COAL FINES [-2]

SUBSTRATE QUALITY — Check ONE (OR 2 & AVERAGE)

SILT:
- □ -SILT HEAVY [-2]
- ■ -SILT MODERATE [-1]
- □ -SILT NORMAL [0]
- □ -SILT FREE [1]

EMBEDDEDNESS:
- □ -EXTENSIVE [-2]
- □ -MODERATE [-1]
- ■ -NORMAL [0]
- □ -NONE [1]

Substrate: 16 (Max 20)

2] INSTREAM COVER

TYPE: (Check *All* That Apply)
- ■ -UNDERCUT BANKS [1]
- ■ -OVERHANGING VEGETATION [1]
- □ -SHALLOWS (IN SLOW WATER) [1]
- □ -ROOTMATS [1]
- □ -DEEP POOLS> 70 cm [2]
- ■ -ROOTWADS [1]
- ■ -BOULDERS [1]
- □ -OXBOWS [1]
- ■ -AQUATIC MACROPHYTES [1]
- ■ -LOGS OR WOODY DEBRIS [1]

COMMENTS: ____

AMOUNT: (Check *ONLY* One or check 2 and *AVERAGE*)
- □ - EXTENSIVE > 75% [11]
- □ - MODERATE 25-75% [7]
- ■ - SPARSE 5-25% [3]
- □ - NEARLY ABSENT < 5%[1]

Cover: 8 (Max 20)

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY
- □ - HIGH [4]
- □ - MODERATE [3]
- ■ - LOW [2]
- □ - NONE [1]

DEVELOPMENT
- □ - EXCELLENT [7]
- ■ - GOOD [5]
- □ - FAIR [3]
- □ - POOR [1]

CHANNELIZATION
- ■ - NONE [6]
- □ - RECOVERED [4]
- □ - RECOVERING [3]
- □ - RECENT OR NO RECOVERY [1]

STABILITY
- ■ - HIGH [3]
- ■ - MODERATE [2]
- □ - LOW [1]

MODIFICATIONS/OTHER
- □ - SNAGGING
- □ - RELOCATION
- □ - CANOPY REMOVAL
- □ - DREDGING
- □ - ONE SIDE CHANNEL MODIFICATIONS
- □ - IMPOUND.
- ■ - ISLANDS
- □ - LEVEED
- □ - BANK SHAPING

COMMENTS: ____

Channel: 15.5 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) ★River Right Looking Downstream★

RIPARIAN WIDTH — L R (Per Bank)
- ■ ■ -WIDE > 50m [4]
- □ □ - MODERATE 10-50m [3]
- □ □ -NARROW 5-10 m [2]
- □ □ - VERY NARROW <5 m[1]
- □ □ - NONE [0]

FLOOD PLAIN QUALITY (*PAST 100 FOOT RIPARIAN*) — L R (Most Predominant Per Bank)
- ■ ■ -FOREST, SWAMP [3]
- □ □ -SHRUB OR OLD FIELD [2]
- □ □ -RESIDENTIAL,PARK,NEW FIELD [1]
- □ □ -FENCED PASTURE [1]
- □ □ -CONSERVATION TILLAGE [1]
- □ □ -URBAN OR INDUSTRIAL [0]
- □ □ -OPEN PASTURE,ROWCROP [0]
- □ □ -MINING/CONSTRUCTION [0]

BANK EROSION — L R (Per Bank)
- ■ ■ -NONE/LITTLE [3]
- □ □ -MODERATE [2]
- □ □ -HEAVY/SEVERE[1]

Riparian: 10 (Max 10)

COMMENTS: ____

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
- □ - >1m [6]
- ■ - 0.7-1m [4]
- □ - 0.4-0.7m [2]
- □ - 0.2- 0.4m [1]
- □ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
- ■ -POOL WIDTH > RIFFLE WIDTH [2]
- □ -POOL WIDTH = RIFFLE WIDTH [1]
- □ -POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOL & RIFFLES!] (Check *All* That Apply)
- □ -EDDIES[1]
- ■ -FAST[1]
- ■ -MODERATE [1]
- ■ -SLOW [1]
- □ -TORRENTIAL[-1]
- □ -INTERSTITIAL[-1]
- □ -INTERMITTENT[-2]

COMMENTS: ____

Pool/Glide: 9 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE/RUN DEPTH
- ■ - GENERALLY >10 cm;MAX > 50 [4]
- □ - GENERALLY >10 cm; MAX < 50[3]
- □ - GENERALLY 5-10 cm[1]
- □ - GENERALLY < 5 cm [RIFFLE=0]

RIFFLE/RUN SUBSTRATE
- ■ -STABLE (e.g.,Cobble, Boulder) [2]
- □ -MOD. STABLE (e.g.,Large Gravel) [1]
- □ -UNSTABLE (Fine Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- □ - NONE [2]
- □ - LOW [1]
- ■ - MODERATE [0]
- □ - EXTENSIVE [-1]
- □ - NO RIFFLE [Metric=0]

COMMENTS: ____

Riffle/Run: 6 (Max 8)

6] GRADIENT (ft/mi): 4.1 **DRAINAGE AREA (sq.mi.):** 63

%POOL: 25 %GLIDE: 10

%RIFFLE: 30 %RUN: 25

Gradient: 6 (Max 10)

Ohio EPA Site Description Sheet

QHEI SCORE: 76.25

Stream Rocky River RM ____ Date 02/04/93 River Code ____

Location Site-#51 E. Branch, U.S. of East Access Road Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*):

SUBSTRATE SCORE: 16

TYPE POOL RIFFLE POOL RIFFLE

☐☐-BLDER /SLABS[10] ____ ____ ☐☐-GRAVEL [7] ✓ ____

■■-BOULDER [9] ____ ____ ☐☐-SAND [6] ✓ ____

☐☐-COBBLE [8] ____ ✓ ■■-BEDROCK[5] ____ ____

☐☐-HARDPAN [4] ____ ____ ☐☐-DETRITUS[3] ____ ____

☐☐-MUCK [2] ____ ____ ☐☐-ARTIFIC.[0] ____ ____

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-<= 4 [0]

SUBSTRATE QUALITY

Substrate Origin (Check all)

☐-LIMESTONE [1] ☐-RIP/RAP [0]

■-TILLS [1] ☐-HARDPAN [0]

☐-SANDSTONE [0]

☐-SHALE [-1]

☐-COAL FINES [-2]

Silt Cover (Check One)

☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ■-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One)

☐-EXTENSIVE [-2] ☐-MODERATE [-1] ■-LOW [0] ☐-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 13

2] INSTREAM COVER

TYPE (Check *All* That Apply)

■-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]

☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check *ONLY* One or check 2 and *AVERAGE*)

☐-EXTENSIVE > 75% [11] ■-MODERATE 25-75% [7] ☐-SPARSE 5-25% [3] ☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

CHANNEL: 15.5

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
☐-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	☐-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
■-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	☐-LEVEED
■-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	☐-BANK SHAPING
				☐-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

RIPARIAN: 8.75

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)
River Right Looking Downstream

RIPARIAN WIDTH — L R (Per Bank)

■☐-WIDE>50m [4]

☐■-MODERATE 10-50 [3]

☐☐-NARROW 5-10m [2]

☐☐-VERY NARROW 1-5m [1]

☐☐-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank) / L R (Per Bank)

■■-FOREST, SWAMP [3] ☐☐-URBAN OR INDUSTRIAL [0]

☐☐-OPEN PASTURE/ ROWCROP [0] ☐☐-SHRUB OR OLD FIELD [2]

☐☐-RESID.,PARK,NEW FIELD [1] ☐☐-CONSERV. TILLAGE [1]

☐☐-FENCED PASTURE [1] ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION

☐■-NONE OR LITTLE [3]

■☐-MODERATE [2]

■☐-HEAVY OR SEVERE [1]

COMMENTS: ____

POOL: 7

POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1)

☐->1m [6]

■-0.7-1m [4]

☐-0.4-0.7m [2]

☐-< 0.4m [1]

☐-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)

☐-POOL WIDTH > RIFFLE WIDTH [2]

■-POOL WIDTH = RIFFLE WIDTH [1]

☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)

☐-TORRENTIAL [-1] ☐-EDDIES [1]

■-FAST [1] ☐-INTERSTITIAL [-1]

■-MODERATE [1] ☐-INTERMITTENT [-2]

☐-SLOW [1]

☐-NO POOL [0]

COMMENTS: ____

RIFFLE: 6

RIFFLE/RUN DEPTH

☐-GENERALLY >10 cm,MAX>50 [4]

■-GENERALLY >10 cm,MAX<50 [3]

☐-GENERALLY 5-10 cm [1]

☐-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

■-STABLE (e.g.,Cobble, Boulder) [2]

☐-MOD. STABLE (e.g.,Pea Gravel) [1]

☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

☐-EXTENSIVE [-1] ☐-MODERATE [0]

■-LOW. [1] ☐-NONE [2]

☐-NO RIFFLE [0]

COMMENTS ____

GRADIENT: 10

6] Gradient (feet/mile): 6.26 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet

QHEI SCORE: 72.5

Stream ROCKY RIVER RM____ Date 02/05/93 River Code____

Location SITE-#52 W. BRANCH, NORTH OF BAGELY ROAD Crew: NEORSD

1] SUBSTRATE (Check *ONLY* Two Substrate *TYPE BOXES; Check all types present*):

SUBSTRATE SCORE: 16

TYPE	POOL RIFFLE	TYPE	POOL RIFFLE
☐☐-BLDER /SLABS[10]		☐☐-GRAVEL [7]	✓
■■-BOULDER [9]		☐☐-SAND [6]	✓
☐☐-COBBLE [8]	✓ ✓	■■-BEDROCK[5]	
☐☐-HARDPAN [4]		☐☐-DETRITUS[3]	
☐☐-MUCK [2]		☐☐-ARTIFIC.[0]	

TOTAL NUMBER OF SUBSTRATE TYPES: ■-> 4 [1] ☐-- <= 4 [0]

SUBSTRATE QUALITY

Substrate Origin (Check all)
☐-LIMESTONE [1] ☐-RIP/RAP [0]
■-TILLS [1] ☐-HARDPAN [0]
☐-SANDSTONE [0]
☐-SHALE [-1]
☐-COAL FINES [-2]

Silt Cover (Check One)
☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
■-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddness (Check One)
☐--EXTENSIVE [-2] ☐--MODERATE[-1]
■--LOW[0] ☐--NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS____

2] INSTREAM COVER

COVER SCORE: 13

TYPE (Check *All* That Apply)

☐-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1]
■-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT(Check *ONLY* One or check 2 and *AVERAGE*)
☐ - EXTENSIVE > 75% [11]
■ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

COMMENTS:____

3] CHANNEL MORPHOLOGY: (Check *ONLY* One PER Category OR check 2 and *AVERAGE*)

CHANNEL: 16.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	■ - EXCELLENT [7]	■ - NONE [6]	■ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
☐ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	☐ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
■ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	☐ - LEVEED
■ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				☐ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS:____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)

RIPARIAN: 8

River Right Looking Downstream

RIPARIAN WIDTH
L R (Per Bank)
☐☐-WIDE> 50m [4]
■■-MODERATE 10-50 [3]
☐☐-NARROW 5-10m [2]
☐☐-VERY NARROW 1-5m [1]
☐☐-NONE[0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank) L R (Per Bank)
■■-FOREST, SWAMP [3] ☐☐-URBAN OR INDUSTRIAL[0]
☐☐-OPEN PASTURE/ ROWCROP[0] ☐☐-SHRUB OR OLD FIELD[2]
■■- RESID.,PARK,NEW FIELD [1] ☐☐-CONSERV. TILLAGE [1]
☐☐-FENCED PASTURE [1] ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
■ ■-NONE OR LITTLE [3]
☐ ☐-MODERATE [2]
☐ ☐-HEAVY OR SEVERE[1]

COMMENTS:____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 8

MAX. DEPTH (Check 1)
■->1m [6]
☐-0.7-1m [4]
☐-0.4-0.7m [2]
☐-< 0.4m [1]
☐--<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
☐-POOL WIDTH > RIFFLE WIDTH [2]
☐-POOL WIDTH = RIFFLE WIDTH [1]
■-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check *All* That Apply)
☐-TORRENTIAL[-1] ☐-EDDIES[1]
■-FAST[1] ☐-INTERSTITIAL[-1]
■-MODERATE [1] ☐-INTERMITTENT[-2]
☐-SLOW [1]

☐-NO POOL[0]

COMMENTS:____

RIFFLE: 5

RIFFLE/RUN DEPTH
☐ - GENERALLY >10 cm,MAX>50 [4]
■ - GENERALLY >10 cm,MAX<50 [3]
☐ - GENERALLY 5-10 cm [1]
☐ - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
■-STABLE (e.g.,Cobble, Boulder) [2]
☐-MOD. STABLE (e.g.,Pea Gravel) [1]
☐-UNSTABLE (Gravel,Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐-EXTENSIVE [-1] ■-MODERATE[0]
☐-LOW. [1] ☐-NONE[2]

☐-NO RIFFLE[0]

COMMENTS____

GRADIENT: 6

6] Gradient (feet/mile): 15.4 %POOL:____ %RIFFLE:____ %RUN:____

Ohio EPA Site Description Sheet **QHEI SCORE: 79**

Stream Rocky River RM ____ Date 02/05/93 River Code ____

Location Site - #52.5 Upstream of Hilliard Road Bridge Crew: NEORSA

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); **SUBSTRATE SCORE: 20**

TYPE	POOL	RIFFLE	TYPE	POOL	RIFFLE	SUBSTRATE QUALITY	
BLDER /SLABS[10]		✓	GRAVEL [7]	✓		Substrate Origin (Check all)	Silt Cover (Check One)
BOULDER [9]			SAND [6]	✓		LIMESTONE [1] RIP/RAP [0]	SILT HEAVY [-2] SILT MODERATE [-1]
COBBLE [8]	✓		BEDROCK[5]			TILLS [1] HARDPAN [0]	SILT NORMAL [0] SILT FREE [1]
HARDPAN [4]			DETRITUS[3]			SANDSTONE [0]	Extent Of Embeddness (Check One)
MUCK [2]			ARTIFIC.[0]			✓ SHALE [-1]	EXTENSIVE [-2] MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [1] <= 4 [0] COAL FINES [-2] LOW[0] NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 14

2] INSTREAM COVER

TYPE (Check All That Apply)

- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- SHALLOWS (IN SLOW WATER) [1]
- DEEP POOLS [2]
- ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- AQUATIC MACROPHYTES [1]
- LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- EXTENSIVE > 75% [11]
- MODERATE 25-75% [7]
- SPARSE 5-25% [3]
- NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL: 15**

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
HIGH [4]	EXCELLENT [7]	NONE [6]	HIGH [3]	SNAGGING	IMPOUND.
MODERATE [3]	GOOD [5]	RECOVERED [4]	MODERATE [2]	RELOCATION	ISLANDS
LOW [2]	FAIR [3]	RECOVERING [3]	LOW [1]	CANOPY REMOVAL	LEVEED
NONE [1]	POOR [1]	RECENT OR NO RECOVERY [1]		DREDGING	BANK SHAPING
				ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 7**

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
WIDE>50m [4]	FOREST, SWAMP [3]	URBAN OR INDUSTRIAL[0]	NONE OR LITTLE [3]
MODERATE 10-50 [3]	OPEN PASTURE/ ROWCROP[0]	SHRUB OR OLD FIELD[2]	MODERATE [2]
NARROW 5-10m [2]	RESID.,PARK,NEW FIELD [1]	CONSERV. TILLAGE [1]	HEAVY OR SEVERE[1]
VERY NARROW 1-5m [1]	FENCED PASTURE [1]	MINING/CONSTRUCTION [0]	
NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 8**

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
>1m [6]	POOL WIDTH > RIFFLE WIDTH [2]	TORRENTIAL[-1]	EDDIES[1]
0.7-1m [4]	POOL WIDTH = RIFFLE WIDTH [1]	FAST[1]	INTERSTITIAL[-1]
0.4-0.7m [2]	POOL WIDTH < RIFFLE W. [0]	MODERATE [1]	INTERMITTENT[-2]
< 0.4m [1]		SLOW [1]	
<0.2m [Pool = 0]			

NO POOL[0]

COMMENTS: ____

RIFFLE: 5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
GENERALLY >10 cm,MAX>50 [4]	STABLE (e.g.,Cobble, Boulder) [2]	EXTENSIVE [-1]	MODERATE[0]
GENERALLY >10 cm,MAX<50 [3]	MOD. STABLE (e.g.,Pea Gravel) [1]	LOW. [1]	NONE[2]
GENERALLY 5-10 cm [1]	UNSTABLE (Gravel,Sand) [0]		
GENERALLY < 5 cm [Riffle = 0]			

NO RIFFLE[0]

COMMENTS ____ **GRADIENT: 10**

6] Gradient (feet/mile): 8.5 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet

QHEI SCORE: 79.5

Stream SAGAMORE CREEK RM ____ Date 02/03/93 River Code ____
Location SITE - #57 CANAL ROAD Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present): **SUBSTRATE SCORE:** 20

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

- ☐☐-BLDER /SLABS[10] ____ ☐☐-GRAVEL [7] ✓ ✓ — Substrate Origin (Check all) — Silt Cover (Check One)
- ■■-BOULDER [9] ____ ☐☐-SAND [6] ✓ ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
- ■■-COBBLE [8] ____ ☐☐-BEDROCK[5] ____ ■-TILLS [1] ☐-HARDPAN [0] ☐- SILT NORMAL [0] ■- SILT FREE [1]
- ☐☐-HARDPAN [4] ____ ☐☐-DETRITUS[3] ____ ✓☐-SANDSTONE [0] — Extent Of Embeddness (Check One)
- ☐☐-MUCK [2] ____ ☐☐-ARTIFIC.[0] ____ ☐-SHALE [-1] — ☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] — ■—LOW[0] ☐—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER **COVER SCORE:** 17

TYPE (Check All That Apply)

- ■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1]
- ■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ■-AQUATIC MACROPHYTES [1]
- ☐-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ■- EXTENSIVE > 75% [11]
- ■- MODERATE 25-75% [7]
- ☐- SPARSE 5-25% [3]
- ☐- NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 16

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐- HIGH [4]	■- EXCELLENT [7]	■- NONE [6]	☐- HIGH [3]	☐- SNAGGING	☐- IMPOUND.
☐- MODERATE [3]	■- GOOD [5]	☐- RECOVERED [4]	■- MODERATE [2]	☐- RELOCATION	■- ISLANDS
■- LOW [2]	☐- FAIR [3]	☐- RECOVERING [3]	☐- LOW [1]	☐- CANOPY REMOVAL	☐- LEVEED
☐- NONE [1]	☐- POOR [1]	☐- RECENT OR NO RECOVERY [1]		☐- DREDGING	☐- BANK SHAPING
				☐- ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 9.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
■■-WIDE>50m [4]	■■-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ■-NONE OR LITTLE [3]
☐☐-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐☐- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 9

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
■- >1m [6]			
☐- 0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	☐-EDDIES[1]
☐- 0.4-0.7m [2]	■-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐- < 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		☐-SLOW [1]	

☐- NO POOL[0]

COMMENTS: ____

RIFFLE: 4

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐- GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ☐-MODERATE[0]
☐- GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	■-LOW. [1] ☐-NONE[2]
■- GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐- GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ____ **GRADIENT:** 4

6] Gradient (feet/mile): 74.1 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet QHEI SCORE: 76

Stream CHAGRIN RIVER RM 15.1 Date 07/07/92 River Code ____

Location SITE-#5B D.S. OF BEECH HILL/BONNIEVIEW CREEK Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 15

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

☐☐-BLDER /SLABS[10] ____ ☐■-GRAVEL [7] ✓ ✓ Substrate Origin (Check all) Silt Cover (Check One)

☐☐-BOULDER [9] ✓ ✓ ☐☐-SAND [6] ✓ ✓ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ■-SILT MODERATE [-1]

☐■-COBBLE [8] ☐☐-BEDROCK[5] ■-TILLS [1] ☐-HARDPAN [0] ■-SILT NORMAL [0] ☐-SILT FREE [1]

☐☐-HARDPAN [4] ☐☐-DETRITUS[3] ☐-SANDSTONE [0] Extent Of Embeddness (Check One)

☐☐-MUCK [2] ☐☐-ARTIFIC.[0] ☐-SHALE [-1] ☐-EXTENSIVE [-2] ■-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐-<= 4 [0] ☐-COAL FINES [-2] ☐-LOW[0] ☐-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 15

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT(Check ONLY One or check 2 and AVERAGE)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ■-MODERATE 25-75% [7]

■-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ☐-SPARSE 5-25% [3]

☐-NEARLY ABSENT < 5%[1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 16.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐-HIGH [4]	☐-EXCELLENT [7]	■-NONE [6]	■-HIGH [3]	☐-SNAGGING	☐-IMPOUND.
■-MODERATE [3]	■-GOOD [5]	☐-RECOVERED [4]	■-MODERATE [2]	☐-RELOCATION	☐-ISLANDS
☐-LOW [2]	☐-FAIR [3]	☐-RECOVERING [3]	☐-LOW [1]	☐-CANOPY REMOVAL	■-LEVEED
☐-NONE [1]	☐-POOR [1]	☐-RECENT OR NO RECOVERY [1]		☐-DREDGING	■-BANK SHAPING
				■-ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
☐☐-WIDE>50m [4]	☐☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
■■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	■■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 9

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐->1m [6]			
■-0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	■-EDDIES[1]
☐-0.4-0.7m [2]	■-POOL WIDTH = RIFFLE WIDTH [1]	■-FAST[1]	☐-INTERSTITIAL[-1]
☐-< 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐-<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ____

RIFFLE: 4.5

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	
☐-GENERALLY >10 cm,MAX>50 [4]	■-STABLE (e.g.,Cobble, Boulder) [2]	■-EXTENSIVE [-1]	■-MODERATE[0]
■-GENERALLY >10 cm,MAX<50 [3]	☐-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1]	☐-NONE[2]
☐-GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]		☐-NO RIFFLE[0]
☐-GENERALLY < 5 cm [Riffle = 0]			

COMMENTS ____ GRADIENT: 10

6] Gradient (feet/mile): 5.8 %POOL: ____ %RIFFLE: ____ %RUN: ____

Ohio EPA Site Description Sheet QHEI SCORE: 78

Stream CHAGRIN RIVER RM 17.4 Date 07/07/92 River Code ______

Location SITE - #59 MAYFIELD ROAD BRIDGE Crew: NEORSD

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 18

TYPE	POOL RIFFLE		POOL RIFFLE	SUBSTRATE QUALITY	
☐☐-BLDER /SLABS[10]	___	☐■-GRAVEL [7]	✓ ✓	Substrate Origin (Check all)	Silt Cover (Check One)
☐☐-BOULDER [9]	✓ ___	☐☐-SAND [6]	✓ ✓	☐-LIMESTONE [1] ☐-RIP/RAP [0]	☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
☐■-COBBLE [8]	___	☐☐-BEDROCK[5]	___	■-TILLS [1] ☐-HARDPAN [0]	■ - SILT NORMAL [0] ☐ - SILT FREE [1]
☐☐-HARDPAN [4]	___	☐☐-DETRITUS[3]	___	☐-SANDSTONE [0]	Extent Of Embeddness (Check One)
☐☐-MUCK [2]	___	☐☐-ARTIFIC.[0]	___	☐-SHALE [-1]	☐—EXTENSIVE [-2] ☐—MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ■> 4 [1] ☐— <= 4 [0] ☐-COAL FINES [-2] ■—LOW[0] ■—NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2] INSTREAM COVER COVER SCORE: 13

TYPE (Check All That Apply)

■-UNDERCUT BANKS [1] ■-DEEP POOLS [2] ☐-OXBOWS [1]

■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]

■-SHALLOWS (IN SLOW WATER) [1] ■-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

☐ - EXTENSIVE > 75% [11]

■ - MODERATE 25-75% [7]

■ - SPARSE 5-25% [3]

☐ - NEARLY ABSENT < 5%[1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 15.5

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	MODIFICATIONS/OTHER	
☐ - HIGH [4]	☐ - EXCELLENT [7]	■ - NONE [6]	☐ - HIGH [3]	☐ - SNAGGING	☐ - IMPOUND.
■ - MODERATE [3]	■ - GOOD [5]	☐ - RECOVERED [4]	■ - MODERATE [2]	☐ - RELOCATION	☐ - ISLANDS
■ - LOW [2]	☐ - FAIR [3]	☐ - RECOVERING [3]	☐ - LOW [1]	☐ - CANOPY REMOVAL	■ - LEVEED
☐ - NONE [1]	☐ - POOR [1]	☐ - RECENT OR NO RECOVERY [1]		☐ - DREDGING	☐ - BANK SHAPING
				■ - ONE SIDE CHANNEL MODIFICATIONS	

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 7.5

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)	EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank)	L R (Per Bank)	BANK EROSION
■☐-WIDE>50m [4]	■☐-FOREST, SWAMP [3]	☐☐-URBAN OR INDUSTRIAL[0]	☐ ☐-NONE OR LITTLE [3]
☐■-MODERATE 10-50 [3]	☐☐-OPEN PASTURE/ ROWCROP[0]	☐☐-SHRUB OR OLD FIELD[2]	■ ■-MODERATE [2]
☐☐-NARROW 5-10m [2]	☐■- RESID.,PARK,NEW FIELD [1]	☐☐-CONSERV. TILLAGE [1]	☐ ☐-HEAVY OR SEVERE[1]
☐☐-VERY NARROW 1-5m [1]	☐☐-FENCED PASTURE [1]	☐☐-MINING/CONSTRUCTION [0]	
☐☐-NONE[0]			

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 8

MAX. DEPTH (Check 1)	MORPHOLOGY (Check 1)	POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)	
☐- >1m [6]			
■- 0.7-1m [4]	☐-POOL WIDTH > RIFFLE WIDTH [2]	☐-TORRENTIAL[-1]	■-EDDIES[1]
☐- 0.4-0.7m [2]	■-POOL WIDTH = RIFFLE WIDTH [1]	☐-FAST[1]	☐-INTERSTITIAL[-1]
☐- < 0.4m [1]	☐-POOL WIDTH < RIFFLE W. [0]	■-MODERATE [1]	☐-INTERMITTENT[-2]
☐—<0.2m [Pool = 0]		■-SLOW [1]	

☐-NO POOL[0]

COMMENTS: ______

RIFFLE: 6

RIFFLE/RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
☐ - GENERALLY >10 cm,MAX>50 [4]	☐-STABLE (e.g.,Cobble, Boulder) [2]	☐-EXTENSIVE [-1] ☐-MODERATE[0]
■ - GENERALLY >10 cm,MAX<50 [3]	■-MOD. STABLE (e.g.,Pea Gravel) [1]	☐-LOW. [1] ■-NONE[2]
☐ - GENERALLY 5-10 cm [1]	☐-UNSTABLE (Gravel,Sand) [0]	☐-NO RIFFLE[0]
☐ - GENERALLY < 5 cm [Riffle = 0]		

COMMENTS ______ GRADIENT: 10

6] Gradient (feet/mile): 7.7 %POOL:______ %RIFFLE:______ %RUN:______

APPENDIX G
ROCKY RIVER FISH SURVEYS,
UPSTREAM AND DOWNSTREAM OF
THE BEREA WASTEWATER TREATMENT PLANT,
1993 and 1995

Introduction

As a result of the construction of the Northeast Ohio Regional Sewer District's (NEORSD) Southwest Interceptor (SWI), the Berea Wastewater Treatment Plant was decommissioned on October 15, 1993. Wastewater flows previously tributary to the Berea plant now flow to the SWI and ultimately to the NEORSD's Southerly Wastewater Treatment Center. NEORSD Water Quality and Industrial Surveillance Department (WQIS) personnel conducted quantitative electroshocking fish surveys at three sites on the Rocky River in 1993 and 1995. The electroshocking was performed to characterize the health of the fish communities upstream and downstream of the Berea Wastewater Treatment Plant (WWTP), before and after the plant's decommissioning. Electroshocking was conducted on the Rocky River in 1993 and 1995 at the following locations:

Site #	Location	1993 Sampling Dates	1995 Sampling Dates
--	Upstream Baldwin Lake	10/15	8/24 and 10/12
49.1	Upstream Berea WWTP (River Mile 3.6)	8/10, 9/23, and 10/13	8/23 and 10/10
49	Downstream Berea WWTP (River Mile 3.0)	8/9, 9/23, and 10/13	8/23 and 10/10

Fish were collected by utilizing NEORSD's generator powered longline electroshocking equipment (Sampler Type E). Electroshocking was performed in zones which were 0.2 kilometers in length except on August 23, 1995, upstream of the Berea WWTP, where the distance fished was 0.175 kilometers. Fish collected at each site were identified to the species level, weighed, counted and examined for the presence of external anomalies including DELTs (deformities, eroded fins, lesions and tumors). Tables which, for each sample event, list the species collected, number of individuals, weights, pollution tolerances and the incidence of DELT anomalies, can be found in Appendix E.

Data collected were used to calculate Index of Biotic Integrity (IBI) and Modified Index of Well Being (MIwb) scores for each sampling location. IBI[1] and MIwb scores were calculated for the site upstream of Baldwin Lake for 1993. A narrative rating of "Exceptional," "Good," "Fair" or "Poor", which was based upon the index scores, was assigned to the fish community at each site as discussed in Ohio EPA's *Compendium of Biological Results from Ohio Rivers, Streams, and Lakes, 1989.*

Sampling Results and Discussion

Habitat quality was evaluated upstream and downstream of the Berea WWTP in 1993 and 1995. Habitat upstream of the plant was rated "Excellent" and habitat downstream of the plant was rated "Good-Excellent" in 1993 and 1995 according to Ohio EPA's Qualitative Habitat Evaluation Index (QHEI). The physical characteristics of aquatic habitat at both sites remained relatively constant from 1993 to 1995.

The QHEI scores obtained upstream and downstream of Berea WWTP and upstream of Baldwin Lake in 1993 and 1995 are displayed graphically in Figure G-1 and are listed below:

Site #	Location	1993 Score (Narrative Rating)	1995 Score (Narrative Rating)
--	Upstream Baldwin Lake	--	70.5 (Good - Excellent)
49.1	Upstream Berea WWTP	75.0 (Excellent)	77.5 (Excellent)
49	Downstream Berea WWTP	74.5 (Good - Excellent)	72.0 (Good - Excellent)

The minimum Index of Biotic Integrity (IBI) and Modified Index of Well Being (MIwb) scores needed to meet Warmwater Habitat Criteria are 38 (Good) and 7.9 (Good), respectively. All the sites electroshocked on the Rocky River during 1993 and 1995 obtained index scores in the "Poor," "Fair" and "Marginally Good" ranges. Selected fish sampling results are shown in Tables G-1 and G-2. IBI and MIwb scores are shown graphically in Figures G-2 and G-3.

According to Kurt D. Fausch's "Fish Communities as Indicators of Environmental Degradation," in *Biological Indicators of Stress in Fish*, there are nine primary

[1]Ohio EPA protocols require two or three electroshock fish samples. Only one sample was collected upstream of Baldwin Lake in 1993.

underlying assumptions for the Index of Biotic Integrity concerning how stream fish communities change with environmental degradation.

1) *The number of all native species and those in specific taxa or habitat guilds decline.*
2) *The number of intolerant species decline.*
3) *The proportion of individuals that are members of tolerant species increase.*
4) *The proportion of insectivores and carnivores decline.*
5) *The proportion of trophic generalists and omnivores increase.*
6) *Fish abundance declines.*
7) *The proportion of lithophilic spawning fish (fish requiring silt free substrates to spawn) declines and the number of hybrid fish increase.*
8) *The incidence of DELT and external anomalies increases.*
9) *Introduced species increase.*

The following is a brief examination of the above assumptions as they relate to this survey of the Rocky River fish community. (See Table G-3.)

Assumptions 1 and 2: The 1995 data reflect a decrease in numbers of native and intolerant species collected in the Rocky River, upstream and downstream of the Berea WWTP. One explanation for the decrease is that one additional electrofishing pass was conducted and was included in the averaging of the 1993 data. This additional sampling day increased the numbers of native and intolerant species which were collected in 1993. Although the number of intolerant species decreased from 1993 to 1995, the proportion of intolerant individuals increased from approximately 10% in 1993 to approximately 23% in 1995.

Assumption 3: The data show a decrease in the proportion of tolerant species, upstream and downstream of the Berea Wastewater Treatment Plant, from 1993 to 1995 (56% in 1993 versus 28% in 1995). According to Ohio EPA's *Biological Criteria for the Protection of Aquatic Life: Volume II*, tolerant fish species tend toward community predominance with decreasing water or habitat quality. Therefore, assuming that habitat quality remains constant, a decrease in the proportion of tolerant fish should indicate an improvement in water quality.

Assumption 4: The upstream and downstream data show an increase in the proportion of fish from the specialized insectivore and carnivore feeding guilds, from 1993 to 1995 (11.8% in 1993 versus 27.9% in 1995). As stream quality improves, an improved insect population serves as a food base for these fishes.

Assumption 5: The data show a decrease in the proportion of omnivores and generalist feeding fish, both upstream and downstream from 1993 to 1995. The omnivore generalist metric of the IBI is a measure of the level of environmental degradation due to the disruption of the food base. The decrease in the proportion of omnivores (54.7% in 1993 versus 24.7% in 1995), indicates an environmental improvement.

Assumption 6: The data show that average fish numbers increased at the upstream location (307 in 1993 versus 342 in 1995), but remained relatively constant at the downstream location (406 fish in 1993 versus 405 fish in 1995). The increase in fish numbers at the upstream location is indicative of an improvement in water quality.

Assumption 7: The data reflect a slight increase in the proportion of lithophilic spawning fish at the upstream location (27.3% in 1993 versus 28.6% in 1995) and a decrease in the proportion of lithophilic spawning fish at the downstream location (40% in 1993 versus 26.5% in 1995). Although a smaller proportion of lithophilic fish were present in the Rocky River in 1995 downstream of the treatment plant effluent, a greater proportion of lithophils were pollution intolerant fish (9.8% in 1993 versus 20.7% in 1995) such as darters and northern hog suckers. The lithophilic fish collected in 1993 comprised a larger number of the less sensitive, highly pollution tolerant common white sucker species.

Assumption 8: A decline in the incidence of external anomalies from 1993 to 1995 was apparent at the upstream (29.7% in 1993 versus 6.4% in 1995) and downstream (11.7% in 1993 versus 6.6% in 1995) sample locations. The decline in the incidence of anomalies could indicate the start of a recovery in the fish population after the elimination of the Berea WWTP's discharge to the Rocky River.

Assumption 9: No change in the proportion of introduced species was observed from 1993 to 1995, upstream at the Berea Wastewater Treatment Plant. One introduced species (common carp) comprised 0.4% of the total fish collected downstream of the treatment plant effluent in 1993. The same species was collected downstream in 1995 and comprised 0.9% of the total fish collected.

The application of two of Fausch's assumptions (#1 and #2) to the 1993 and 1995 Rocky River electroshocking data may not be entirely appropriate because one more sample was collected in 1993 than in 1995. Four of the remaining seven assumptions (#3, #4, #5, and #8) indicate an improvement in Rocky River water quality downstream of the Berea Wastewater Treatment Plant from 1993 to 1995. Five of the seven remaining assumptions (#3, #4, #5, #6 and #8) indicate an improvement in water quality upstream of the Berea Wastewater Treatment Plant. Two of the assumptions (#6 and #9) indicate little, if any, change in water quality at the downstream location during the study period. Two of the assumptions (#7 and #9) also indicate little if any change in water quality at the upstream location during the study period. Although the decrease in the proportion of lithophilic spawning fish (assumption #7) observed at the downstream location in 1995 may be indicative of a decline in water quality, a higher proportion of the lithophils collected in 1995 were more sensitive pollution intolerant lithophilic fish.

In summary, average IBI and MIwb scores, both upstream and downstream of the Berea WWTP, were slightly higher in 1995 than in 1993. The results of quantitative fish sampling indicate that the Rocky River did not attain the numerical criteria of the Warmwater Habitat Use. The fish index scores, however, which appear to be approaching the criteria (Figures G-2 and G-3) of 38 for IBI and 7.9 for MIwb, and Fausch's assumptions concerning the way in which fish communities change with environmental degradation, indicate that water quality upstream and downstream of the former Berea WWTP may be improving.

Table G-1

1993 Rocky River Electroshocking Summary

*Upstream of Baldwin Lake

Pass #	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomalies (%)	Modified IBI Numerical Score	Modified IBI Narrative Rating	Modified MIwb Numerical Score	Modified MIwb Narrative Rating
1	15-Oct-93	456	39.9	0.0	30	Fair	7.2	Fair

Upstream of Berea WWTP

Pass #	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomalies (%)	IBI Numerical Score	IBI Narrative Rating	MIwb Numerical Score	MIwb Narrative Rating
1	10-Aug-93	269	21.2	0.7	34	Marginally Good	6.6	Fair
2	23-Sep-93	277	31.7	1.4	28	Fair	6.2	Fair
3	13-Oct-93	377	51.5	2.9	24	Poor	7.2	Marginally Good
Average		308	36.7	1.8	29	Fair	6.7	Fair

Downstream of Berea WWTP

Pass #	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomalies (%)	IBI Numerical Score	IBI Narrative Rating	MIwb Numerical Score	MIwb Narrative Rating
1	9-Aug-93	534	49.6	1.1	22	Poor	7.0	Fair
2	23-Sep-93	195	49.7	0.5	26	Poor	5.9	Fair
3	13-Oct-93	491	65.5	1.2	22	Poor	6.0	Fair
Average		407	56.0	1.0	23.33	Poor	6.3	Fair

*Because only one sample was collected, Ohio EPA electroshocking protocols were not followed upstream of Baldwin Lake in 1993.

Table G-2

1995 Rocky River Electroshocking Summary

Upstream of Baldwin Lake

Pass #	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomalies (%)	IBI Numerical Score	IBI Narrative Rating	MIwb Numerical Score	MIwb Narrative Rating
1	24-Aug-95	2131	54.5	0.5	27	Poor	8.3	Good
2	12-Oct-95	425	52.9	0.7	28	Fair	6.8	Fair
Average		1278	54.2	0.5	27.5	Fair/Poor	7.6	Marginally Good

Upstream of Berea WWTP

Pass #	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomalies (%)	IBI Numerical Score	IBI Narrative Rating	MIwb Numerical Score	MIwb Narrative Rating
1	23-Aug-95	410	19.0	0.7	34	Marginally Good	7.2	Fair
2	10-Oct-95	273	27.0	1.1	34	Marginally Good	7.2	Fair
Average		342	22.2	0.9	34.0	Marginally Good	7.2	Fair

Downstream of Berea WWTP

Pass #	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomalies (%)	IBI Numerical Score	IBI Narrative Rating	MIwb Numerical Score	MIwb Narrative Rating
1	23-Aug-95	535	28.7	0.7	28	Fair	7.2	Fair
2	10-Oct-95	276	27.5	1.1	32	Fair	7.2	Fair
Average		406	28.3	0.9	30.0	Fair	7.2	Fair

Table G-3

Application of Fausch's Nine Assumptions to Average Rocky River Electroshocking Data

1993 and 1995

Upstream of Berea WWTP

Year	Native Species (#)	Intolerant Species (#)	Tolerant Species (%)	Insectivores and Carnivores (%)	Generalists and Omnivores (%)	Fish Numbers (#)	Lithophilic Spawners (%)	External Anomalies (%)	Introduced Species (%)
1993	18	7	36.8	10.1	33.2	307	27.3	29.7	1.9
1995	15	4	22.2	18.4	16.5	342	28.6	6.4	1.9
Difference	-3	-3	-14.6	8.3	-16.7	35	1.3	-23.3	0

Downstream of Berea WWTP

Year	Native Species (#)	Intolerant Species (#)	Tolerant Species (%)	Insectivores and Carnivores (%)	Generalists and Omnivores (%)	Fish Numbers (#)	Lithophilic Spawners (%)	External Anomalies (%)	Introduced Species (%)
1993	18	6	56	11.8	54.7	406	40	11.7	0.4
1995	13	4	28.3	27.9	24.7	405	26.5	6.6	0.9
Difference	-5	-2	-27.7	16.1	-30	-1	-13.5	-5.1	0.5

Figure G-1
Rocky River Qualitative Habitat Evaluation Index Scores
1993 and 1995

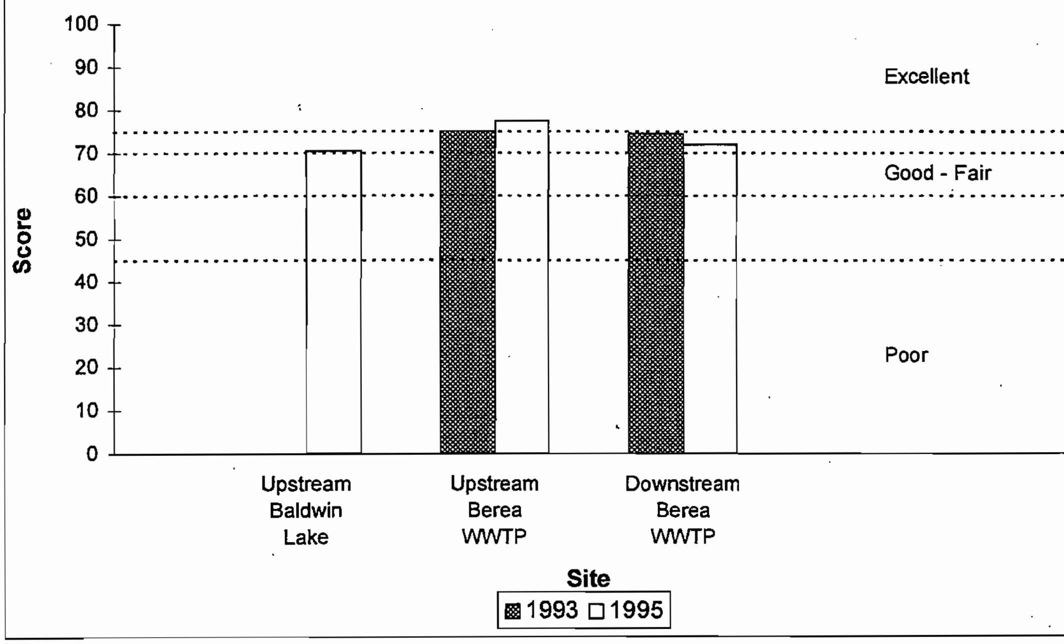
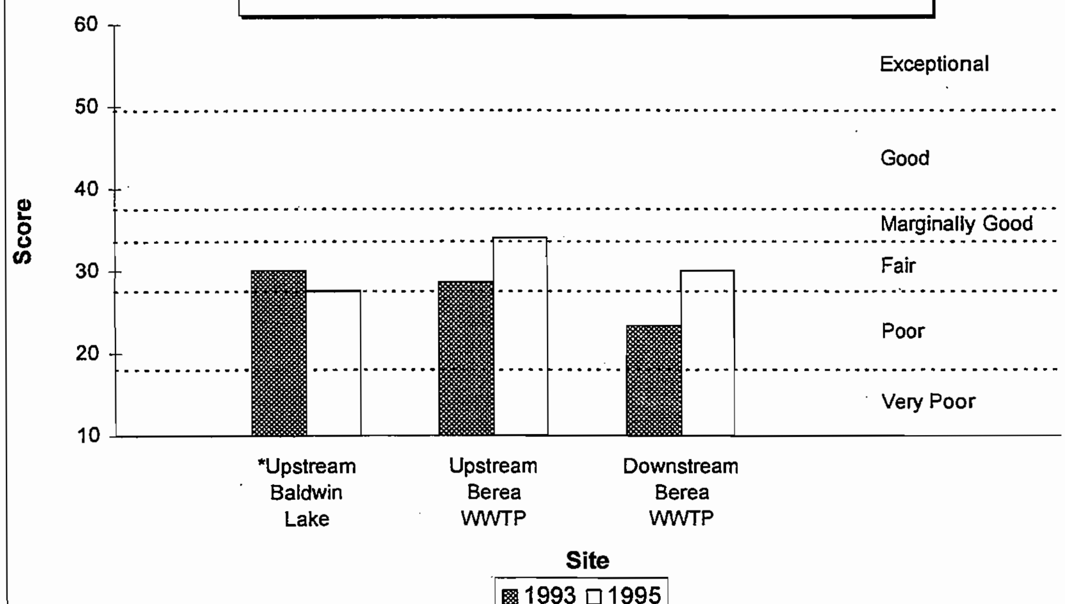
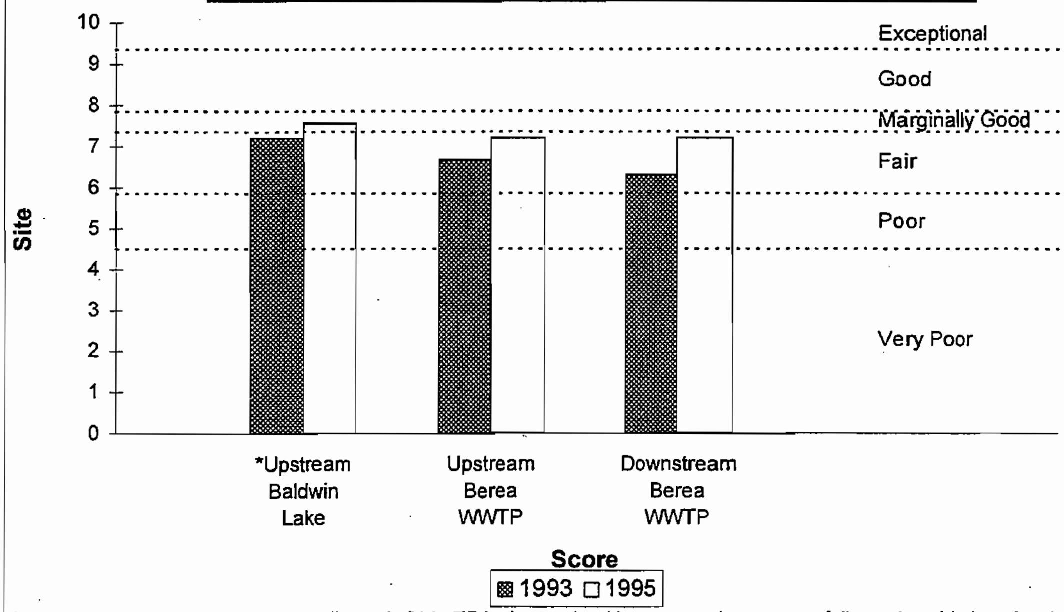


Figure G-2
Average Rocky River Index of Biotic Integrity Scores
1993 and 1995



*Because only one sample was collected, Ohio EPA electroshocking protocols were not met at this location in 1993.

Figure G-3
Average Rocky River Modified Index of Well-Being Scores
1993 and 1995



*Because only one sample was collected, Ohio EPA electroshocking protocols were not followed at this location in 1993.

APPENDIX H
ROCKY RIVER MACROINVERTEBRATE SURVEYS, UPSTREAM AND DOWNSTREAM OF THE BEREA WWTP, 1993-1995

As a result of the construction of the Northeast Ohio Regional Sewer District's (NEORSD) Southwest Interceptor (SWI), the Berea Wastewater Treatment Plant was decommissioned on October 15, 1993 and its discharge to the Rocky River was eliminated. Wastewater flows previously tributary to the Berea plant now flow to the SWI and ultimately to the NEORSD's Southerly Wastewater Treatment Center. NEORSD Water Quality and Industrial Surveillance Department (WQIS) personnel therefore conducted a survey to assess the condition of the macroinvertebrate community in Rocky River before and after the Berea WWTP shutdown.

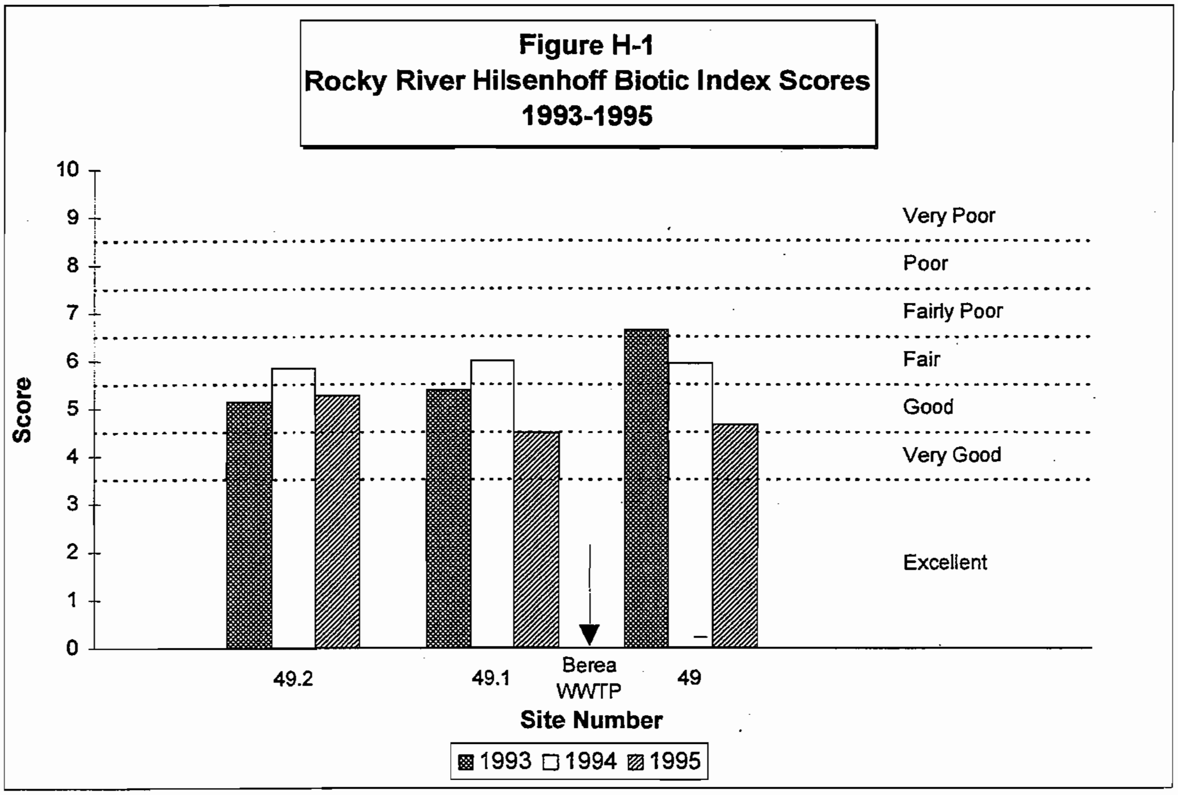
Macroinvertebrate samples were collected using an aquatic D-frame kicknet at Rocky River Sites 49, 49.1 and 49.2 in 1993, 1994 and 1995. Site #49 (40° 23.15' N, 81° 51.94' W) is located in Berea on the East Branch of the Rocky River, approximately 300 yards upstream of Valley Parkway, north of Falls Lane.

Site #49.1 (40° 23.01' N, 81° 51.90' W) is located 50 feet upstream of the Berea WWTP effluent. This location was established in 1992 when routine sampling for benthic macroinvertebrates at Site #49 indicated that an environmental disruption was occurring. Site #49.1 was established to determine if the Berea WWTP was the source of the disruption.

Site #49.2 is located 150 feet upstream of Bagley Road. This location was selected to assess the impact that several storm and sanitary sewer overflow (SSO) outfalls may have on the Rocky River upstream of the Berea WWTP.

Samples from these sites were used to determine an HBI score, total taxa, EPT taxa, percent EPT composition and Shannon Diversity Index for each site. HBI scores are presented in Figure H-1. Scores for the remaining metrics can be found in Appendix D, Table D-1.

The results of sampling conducted downstream of the Berea WWTP at Site #49 appear to indicate an improvement in the macroinvertebrate community and in water quality as a result of the decommissioning of the plant and the corresponding diversion of flow to the NEORSD's Southwest Interceptor. Although all macroinvertebrate metrics which were examined showed an improvement from 1993 to 1995, most notable were the Hilsenhoff Biotic Index (HBI), the percent Ephemeropteran, Plecopteran, and Trichopteran (EPT) composition, and the Shannon Diversity Index.



The HBI narrative rating improved during the study period from Fairly Poor, which indicates the presence of significant organic pollution, to Good, which indicates the presence of some organic pollution. (Only an HBI narrative rating of Excellent indicates no apparent organic pollution.) During the same period, the percent EPT composition increased from 10.4% to 75.9% and the Shannon Diversity Index Score improved from 1.8 to 2.5.

Site #49.1 showed similar improvements in water quality between 1993 and 1995. The HBI narrative rating improved from Good (some organic pollution) in 1993 to Very Good (possible slight organic pollution) in 1995. The most notable improvement in the macroinvertebrate community was an increase in total taxa from 26 in 1993 to 36 in 1995.

The improvement in water quality may be attributable to the completion of the NEORSD's Southwest Interceptor and the resulting remediation of upstream environmental disruptions. Prior to the interceptor's completion, hydraulic overloading of the sanitary sewers in the vicinity of Bagley Road during peak flows would result in overflows of sanitary sewage to the Rocky River from two sanitary sewer overflow structures. The structures, one on the west bank and one on the east bank, were located between Bagley Road and the Berea Falls. Discharges from the overflow structures would produce pools of sewage below each overflow outfall (see the 1991-1992 Greater Cleveland Area Environmental Water Quality Assessment). Observations made by investigators in this area following the completion of NEORSD's Southwest

Interceptor indicated that discharges from the overflow structures had ceased. Further sampling will be conducted to verify these observations.

Site #49.2 did not show any appreciable change in HBI scores during the course of the survey. Variations observed in a few of the metric scores are most likely attributable to temporal differences and not to differences in water quality.

APPENDIX I
BIG CREEK INTERCEPTOR DIVERSION, 1994

The Northeast Ohio Regional Sewer District (District), with the approval of the Ohio Environmental Protection Agency (Ohio EPA), diverted flow from the Big Creek Interceptor (BCI) to Big Creek from February 28, 1994 through March 3, 1994. Water Quality and Industrial Surveillance (WQIS) investigators obtained flow measurements at diversion locations and obtained water quality samples at several locations on Big Creek and the Cuyahoga River during the diversion. Figure I-1 identifies bypass and water quality monitoring locations.

The District diverted flow from the interceptor in order to pour concrete for the construction of the BCI diversion chamber and to repair leaks in the interceptor at Trestle Number 2, near Van Epps and Spring Roads. Facilities which were bypassed included the Jennings Road pump station, several automated regulators, and 24 fixed weir regulators.

The volume of flow diverted to the creek was estimated at approximately three million gallons (MG) on February 28, 1994, 36 MG on March 1, 1994, 36 MG on March 2, 1994, 39 MG on March 3, 1994, and nine MG on March 4, 1994, or a total of approximately 124 MG for the duration of the temporary bypass event.

Tables I-1 through I-3 display the results of samples which were collected for chemical and bacteriological analysis during the temporary bypass to Big Creek. An excursion from Ohio EPA's Warmwater Habitat aquatic life use designation daily maximum criterion for copper was measured at Site #27 (West Branch of Big Creek, approximately 100 yards upstream of the confluence with the East Branch) on March 1, 1994. Excursions from the Warmwater Habitat aquatic life use designation 30-day average criteria during the sampling period were measured at Sites #29, #28, #27, #25, and downstream of Treadway Creek for total dissolved solids; at Site #27 for copper; and at Cuyahoga River Sites #22.7, #22.6, #22.5, and Big Creek Site #27 for iron. Table I-4 summarizes the fecal coliform data collected during the bypass event. The data indicate, as would be expected, that fecal coliform concentrations in the creek were elevated during the bypass. Geometric mean fecal coliform concentrations measured during the temporary bypass ranged from 400/100 mL, at Site #29, which is located on the east branch of the creek upstream of all bypass locations, to 300,000/100 mL downstream of Treadway Creek, which was the furthest downstream monitoring location on Big Creek. Geometric mean fecal coliform concentrations on the Cuyahoga River during the temporary bypass ranged from 3600/100 mL at Site #22.7, which is under the Southwest Interceptor and upstream of the Big Creek confluence, to 8600/100 mL at Site #22.51, which is at the lower Harvard Avenue bridge and downstream of the Big Creek confluence.

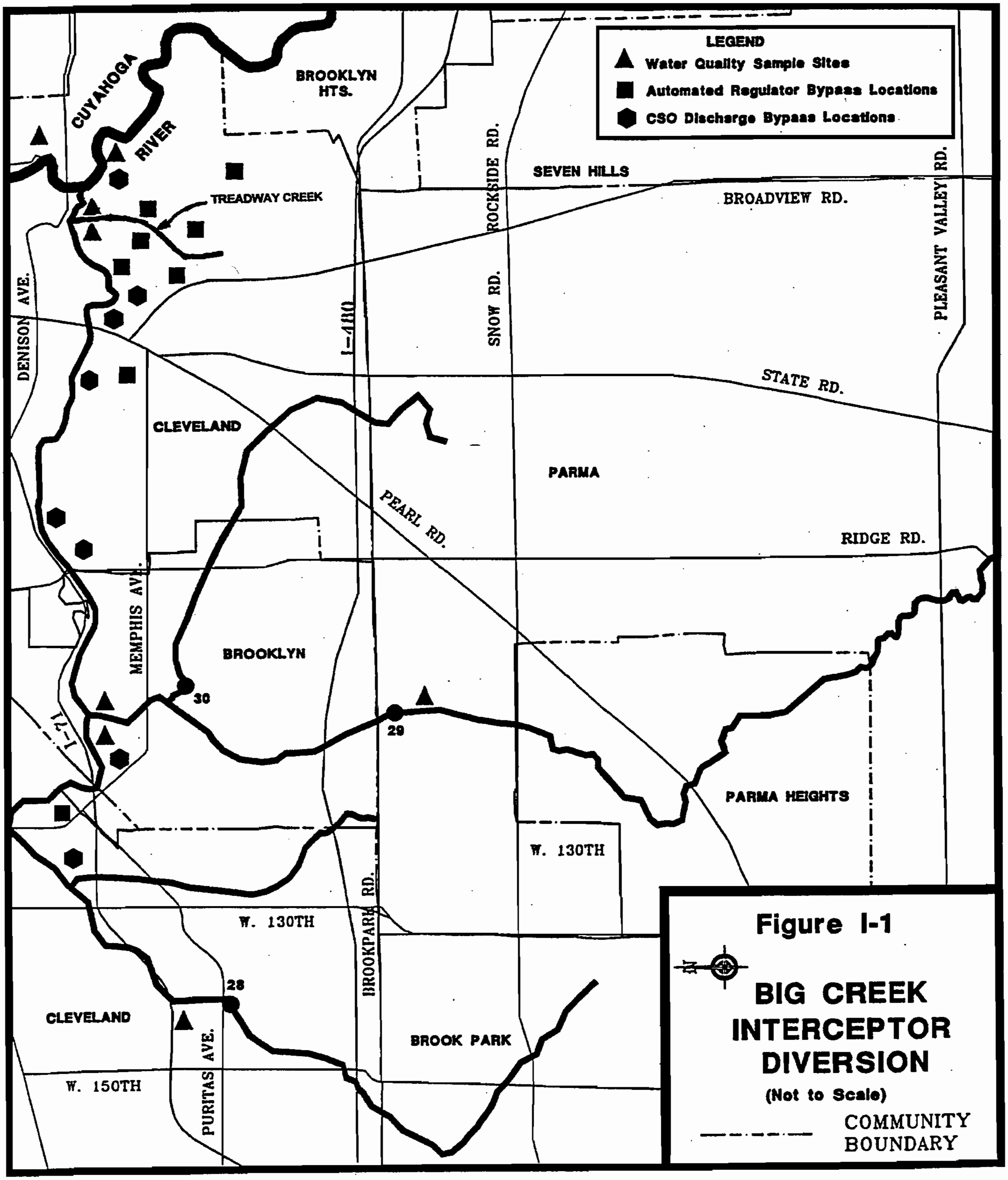


Figure I-1

BIG CREEK INTERCEPTOR DIVERSION

(Not to Scale)

Table I-1

Chemical and Bacteriological Data Collected During the 1994 Big Creek Interceptor Diversion

March 1, 1994

(in mg/L except as noted)

	Cuyahoga River Site 22.7	Cuyahoga River Site 22.6	Big Creek Site 29	Big Creek Site 28	Big Creek Site 27	Big Creek Site 26	Big Creek Site 25	Big Creek D.S. Treadway	Cuyahoga River Site 22.51
BOD	3	4	-	4	300	2	8	6	4
COD	24	24	-	20	1060	23	33	35	13
Suspended Solids	26	32	-	10	709	1	7	9	31
Ammonia-N	0.4	0.5	-	0.5	1	0.3	1.2	0.3	0.6
Phosphorous	0.14	0.15	-	0.09	0.24	0.08	0.26	0.26	0.18
Chlorides	226	232	-	938	1010	986	1002	972	221
Nitrates-N	3.4	2.6	-	0.85	0.83	0.99	0.88	0.9	2.6
Sulfates	72	68	-	116	156	133	151	144	70
Hardness	202	190	-	320	396	252	342	330	200
Alkalinity	97	95	-	131	142	121	137	141	102
Phenolics	< 0.05	< 0.05	-	< 0.05	< 0.05	< 0.05	< 0.05	<0.05	< 0.05
Fecal Coliform (# / 100ml)	1100	4400	-	120	42000	3700	65000	650000	6600
Total Dissolved Solids	565	536	-	1768	3491	1886	1938	1882	552
Total Solids	599	591	-	1810	4160	1968	2030	1987	624
Nickel	0.012	0.011	-	0.007	0.02	0.009	0.009	0.01	0.012
Copper	0.02	0.02	-	0.02	0.23	0.01	0.02	0.02	0.02
Total Chrome	0.003	0.002	-	0.003	0.01	0.002	0.003	0.002	0.004
Hexavalent Chrome	< 0.01	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	0.04	0.05	-	0.11	0.28	0.01	0.03	0.05	0.05
Iron	1.1	1.2	-	0.49	6.3	0.26	0.65	0.6	1.2
Cadmium	< 0.001	< 0.001	-	0.001	0.001	0.001	<0.001	0.001	< 0.001
Lead	< 0.003	< 0.003	-	0.003	0.05	< 0.003	< 0.003	< 0.003	< 0.003
Mercury (ug/L)	< 0.2	< 0.2	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Total Kjeldahl Nitrogen	1.5	2.6	-	1.8	-	1.8	3.8	3.2	2.4
Soluble Phosphorus	0.09	0.1	-	0.07	0.18	0.07	0.22	0.24	0.14
Turbidity (NTU)	13	15	-	6.8	38	3.2	7	6.8	13
Water Temperature (°C)		1.5	-	1	1.5	0	1	1	-
Specific Conductance (us/cm)	560	550	-	1650	1750	1650	1500	1500	540
Dissolved Oxygen	11.2	13.5	-	15	11	15	13	13	11
pH (s.u.)	7.6	7.6	-	7.6	7.7	8.1	7.9	7.9	7.4

Table I-2

Chemical and Bacteriological Data Collected During the 1994 Big Creek Interceptor Diversion

March 2, 1994

(in mg/L except as noted)

	Cuyahoga River Site 22.7	Cuyahoga River Site 22.6	Big Creek Site 29	Big Creek Site 28	Big Creek Site 27	Big Creek Site 26	Big Creek Site 25	Big Creek D.S. Treadway	Cuyahoga River Site 22.51
BOD	5	4	4	48	4	4	24	25	4
COD	25	83	49	126	22	19	54	86	< 10
Suspended Solids	21	21	5	30	5	21	13	15	22
Ammonia-N	0.4	0.4	0.5	4.5	0.5	0.4	2.2	3.3	0.4
Phosphorous	0.14	0.14	0.14	1.26	0.08	0.13	0.65	0.76	0.15
Chlorides	210	204	822	582	1014	1010	700	1066	224
Nitrates-N	2.5	2.5	1	0.52	0.92	1.01	0.68	0.06	2.6
Sulfates	80	71	144	204	124	137	123	127	0.15
Hardness	198	196	325	348	290	306	312	372	202
Alkalinity	99	100	124	204	140	142	148	150	114
Phenolics	< 0.05	< 0.05	< 0.5	< 0.05	< 0.05	< 0.05	<0.05	<0.05	< 0.05
Fecal Coliform (# / 100ml)	5700	7800	14300	160	410000	6000	180000	280000	9800
Total Dissolved Solids	580	560	1818	1458	1984	1936	1556	2223	595
Total Solids	631	620	1846	1502	2085	1972	1578	2272	637
Nickel	0.01	0.011	0.008	0.007	0.006	0.009	0.009	0.06	0.011
Copper	0.01	0.01	0.02	0.05	0.02	0.02	0.04	0.05	0.01
Total Chrome	0.002	0.003	0.003	0.01	0.004	0.004	0.006	0.01	0.003
Hexavalent Chrome	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	0.03	0.04	0.03	0.07	0.08	0.03	0.05	0.06	0.03
Iron	1	1.2	0.37	0.84	0.53	1	0.59	0.66	1.1
Cadmium	0.001	< 0.001	< 0.001	0.001	0.001	< 0.001	0.001	0.001	< 0.001
Lead	< 0.003	< 0.003	< 0.003	0.003	0.003	< 0.003	0.003	0.004	< 0.003
Mercury (ug/L)	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Total Kjeldahl Nitrogen	1.7	1.8	1.6	12.7	1.7	3.1	6.2	8.2	1.9
Soluble Phosphorus	0.1	0.1	0.2	1.22	0.07	0.11	0.55	0.66	0.14
Turbidity (NTU)	12	12	4.6	22	6.5	16	12	15	12
Water Temperature (°C)	3	1.5	1	1	2	1.5	1	1	1.5
Specific Conductance (us/cm)	580	640	-	1850	1550	1700	1460	2000	600
Dissolved Oxygen	11.4	14	12.4	10.2	9	10	9.6	9.5	14
pH (s.u.)	7.8	7.9	7	6.5	7.9	8	8	8	7.8

Table I-3

Chemical and Bacteriological Data Collected During the 1994 Big Creek Interceptor Diversion

March 4, 1994

(in mg/L except as noted)

	Cuyahoga River Site 22.7	Cuyahoga River Site 22.6	Big Creek Site 29	Big Creek Site 28	Big Creek Site 27	Big Creek Site 26	Big Creek Site 25	Big Creek D.S. Treadway	Cuyahoga River Site 22.51
BOD	4	7	-	4	16	4	22	22	7
COD	21	22	-	24	28	23	58	48	20
Suspended Solids	20	28	-	12	10	2	15	16	26
Ammonia-N	-	0.4	-	0.5	2	0.3	1.8	1.9	0.4
Phosphorous	0.15	0.19	-	0.07	0.45	0.8	0.54	0.53	0.11
Chlorides	214	188	-	852	658	752	652	630	203
Nitrates-N	-	2.6	-	1.03	0.7	1.04	0.69	0.6	2.8
Sulfates	85	80	-	131	140	136	130	128	77
Hardness	210	214	-	340	337	306	318	316	206
Alkalinity	103	115	-	141	151	128	145	148	102
Phenolics	< 0.05	< 0.05	-	<0.05	< 0.05	< 0.05	<0.05	< 0.05	< 0.05
Fecal Coliform (# / 100ml)	7400	9400	-	3300	340000	17000	144000	150000	10000
Total Dissolved Solids	699	638	-	1756	1499	580	1415	1423	613
Total Solids	750	-	-	1843	1562	624	1480	1510	675
Nickel	0.011	0.01	-	0.007	0.008	0.008	0.01	0.011	0.01
Copper	0.007	0.011	-	0.014	0.016	0.013	0.02	0.024	0.007
Total Chrome	0.003	0.003	-	0.002	0.004	0.001	0.009	0.009	0.003
Hexavalent Chrome	0.003	< 0.01	-	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Zinc	0.02	0.02	-	0.06	0.04	0.01	0.04	0.04	0.03
Iron	0.93	1.2	-	0.56	0.8	0.23	0.7	0.73	1
Cadmium	< 0.001	< 0.001	-	0.001	0.001	< 0.001	0.001	0.001	< 0.001
Lead	< 0.003	< 0.003	-	0.003	< 0.003	< 0.003	0.003	0.003	< 0.003
Mercury (ug/L)	< 0.2	< 0.2	-	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Total Kjeldahl Nitrogen	-	1.8	-	1.8	4.3	2.1	5.1	5.1	1.8
Soluble Phosphorus	0.1	0.09	-	0.04	0.34	0.07	0.44	0.48	-
Turbidity (NTU)	10	12	-	8.5	10	3.3	13	13	12
Water Temperature (°C)		1	-	1	2.5	1	2	1.5	4
Specific Conductance (us/cm)		540	-	1650	1500	1480	1380	1380	540
Dissolved Oxygen		13.8	-	11.4	12.2	14	14.2	12	12
pH (s.u.)		7.6	-	7.8	7.8	7.9	7.9	7.8	7.4

Table I-4

Summary of Fecal Coliform Data Collected During the 1994 Big Creek Interceptor Diversion

March 1, 2, and 4, 1994

(Fecal Coliforms/100 mL)

Date	Cuyahoga River Site 22.7	Cuyahoga River Site 22.6	Big Creek Site 29	Big Creek Site 28	Big Creek Site 27	Big Creek Site 26	Big Creek Site 25	Big Creek D.S. Treadway	Cuyahoga River Site 22.51
3/1/94	1,100	4,400	-	120	42,000	3,700	65,000	650,000	6,600
3/2/94	5,700	7,800	14,300	160	410,000	6,000	180,000	280,000	9,800
3/4/94	7,400	9,400	-	3,300	340,000	17,000	144,000	150,000	10,000
Geometric Mean	3,600	6,900	14,300	400	180,000	7,200	119,000	300,000	8,600

APPENDIX J
BIG CREEK INTERCEPTOR DIVERSION
MACROINVERTEBRATE SAMPLING,1995

On February 7, 1995, and again on February 23, 1995, NEORSD diverted flow from the Big Creek Interceptor into Big Creek as part of a Big Creek Interceptor Rehabilitation Project. The flow was diverted to Big Creek via CSO #054's outfall located immediately east of Ridge Road. In conjunction with this diversion, the Ohio EPA requested that NEORSD "...conduct macroinvertebrate sampling of Big Creek downstream of the rehabilitation project during the summer months to measure impacts, if any, that the sewage bypass events may have on the health of the stream (Kwolek, 1995)." Ohio EPA recommended that this sampling be conducted in 1995, 1996 and possibly 1997 according to Ohio EPA protocols for biological monitoring.

NEORSD selected four sample locations (Sites #25.3, #25.2, #25.1 and #25) on Big Creek to monitor the macroinvertebrate community's response to the diversion. The following is a brief description of each site.

Site #25.3 was located approximately 500 feet upstream of CSO 054's outfall. This section of the creek was channelized with steep concrete banks and a substrate that was predominantly concrete beds.

Site #25.2 was located approximately 500 feet downstream of CSO 054's outfall. This site was also channelized and had bank and substrate characteristics identical to Site 25.3.

Site #25.1 was located approximately 4,500 feet downstream of CSO 054 near Rose Field in Brookside Park. This site was chosen due to substrate features that were more natural than other locations downstream of the diversion. The substrate consisted of cobble, gravel, concrete rubble and sand. Concrete walls for erosion control were located on both banks. This site had been sampled for benthic macroinvertebrates in 1991.

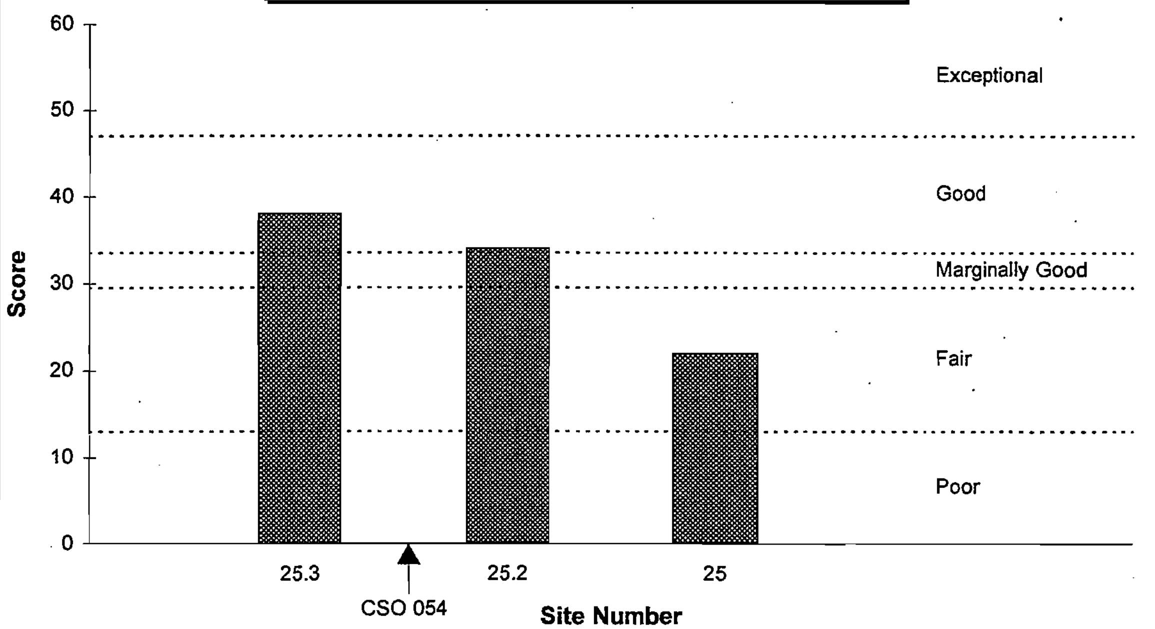
Site #25, which is downstream of Jennings Road and approximately 900 feet upstream of the confluence with the Cuyahoga River, is a routine sampling site and was used to compare results with historical data that had been collected at this location.

The macroinvertebrate sampling consisted of placing a Hester-Dendy artificial substrate sampler at Sites #25.3, #25.2 and #25. Because of high flows and vandalism, however, several of the Hester-Dendy samplers were lost and had to be reset. In addition, kick net samples were collected at all four locations to supplement the Hester-Dendy data and for comparison with historical data on file for Sites #25.1

and #25. ICI and HBI scores are presented in Figures J-1 and J-2. Remaining metrics scores are presented in Tables D-1 and D-2 in Appendix D.

An ICI score of at least 34 (Good) is required to meet Ohio EPA's biological criteria for Warmwater Habitat aquatic life use designation for Big Creek. Sites #25.3 and #25.2 both met the Ohio EPA criteria with scores of 38 (Good) and 34 (Good) respectively.

Figure J-1
Big Creek Invertebrate Community Index Scores
1995

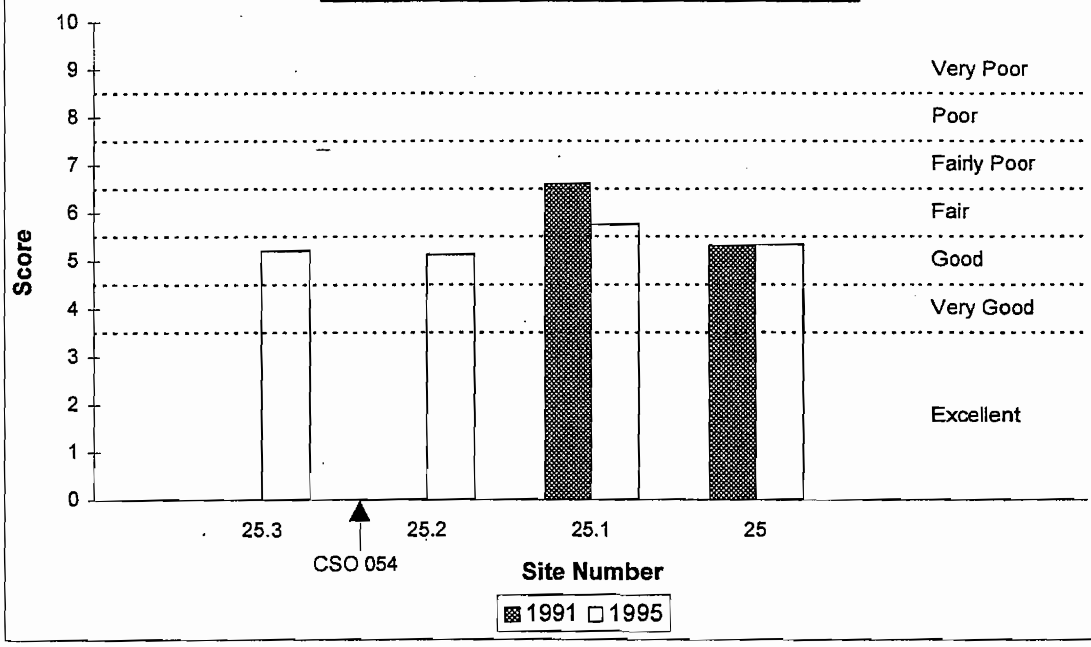


HBI scores for Sites #25.3 and #25.2 both received narrative ratings of Good indicating that some organic pollution exists. However, when the ICI and HBI scores are examined in conjunction with the scores for total taxa, EPT taxa, percent EPT composition and the Shannon Diversity Index, there is little difference between the macroinvertebrate communities sampled upstream and downstream of the Big Creek Interceptor diversion.

Site #25.1 received an HBI score of 5.75 (Fair) which is an improvement from the score of 6.61 (Fairly Poor) this site received in 1991. There were also improvements in the other metric scores with the most notable being the increase in total taxa from 14 in 1991 to 32 in 1995. These metric scores were comparable to those from the upstream sites.

Site #25 received an ICI score of 22 (Fair). However, this low score may have been due to the late collection of the Hester-Dendy sampler at this site. All Hester-Dendy and kick net samples were collected between August 21 and August 30 with the exception of the Hester-Dendy at Site #25 which was collected on September 19. This Hester-Dendy was lost due to vandalism and had to be reset. Therefore, to allow for the six week colonization period, the recovery of this Hester-Dendy was delayed. The resulting metric scores for the Hester-Dendy sample were low with the exception of total taxa, but this was due primarily to tolerant midge taxa. In contrast, the HBI scores for Site #25 received a narrative rating of "Good" and the other metric scores for the kick net sample were considerably higher than those for the Hester-Dendy sample.

Figure J-2
Big Creek Hilsenhoff Biotic Index Scores
1991 and 1995



The data collected at all four sites in 1995, indicates that the macroinvertebrate community remains fairly consistent in structure and function, and does not appear to have been affected by the Big Creek Interceptor Diversion.

APPENDIX K
CUYAHOGA RIVER ELECTROSHOCKING/SEDIMENT SAMPLING STUDY, 1994

INTRODUCTION

During August and October 1994, the Northeast Ohio Regional Sewer District's Water Quality and Industrial Surveillance Department (WQIS) conducted electroshock fish sampling and collected sediment samples on the Cuyahoga River in the vicinity of the District's Southerly Wastewater Treatment Plant. The objectives of the project were as follows:

1. To evaluate the fish communities in the Cuyahoga River study area and characterize overall fish community health through the use of the Index of Biotic Integrity (IBI);

2. To examine the river bottom substrate types present in the study area;

3. To assess whether the load of finer sediment particles into the river may be impacting the health of the fish communities in this area of the Cuyahoga River.

Fish species that do not require clean substrates for spawning and in which egg development is fast and eggs are buoyant, are termed simple miscellaneous spawners. On the other hand, lithophilic spawning fish (lithophils) are a breeding guild of fish that exhibit simple spawning behavior and require clean gravel for successful reproduction. These fish are particularly sensitive to environmental disturbances caused by siltation. The proportion of lithophils collected in each sampling zone within the study area was therefore compared to the proportion of finer sediment particles (fine sand, silt, and clay) which was measured in the same area.

A direct relationship exists between the physical characteristics of a stream and the presence and abundance of fish. (Rankin, The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods and Application, Ohio Environmental Protection Agency, Division of Water Quality Planning and Assessment, Ecological Assessment Section, Columbus, Ohio, 1989). Downstream of the Southerly WWTP, on the east and west banks of the river, land use practices and habitat modifications (consisting of construction/demolition material disposal sites) strip the land of its vegetation and remove the topsoil (Figures K-3, K-4). Without the vegetative strip along the banks of the river, erosion of soil increases sediment loadings to the river. These sediments may then cover the river bottom, which can decrease the habitability of the stream for fish that require bottom substrates composed of larger particles. The upstream portion of the study area is less impacted by nearshore habitat modifications than the downstream portion. On the east bank of the river, north of the chlorine access railroad bridge, the most predominant flood plain quality consists of forest swamp with moderate bank erosion. The west bank of the river has a narrow riparian width (15 - 30 feet) with an urban or industrial flood plain quality with little bank erosion (Figures K-5, K-6).

STUDY AREA

The study area was divided into eleven 300-foot zones, five which were upstream of Southerly, five which were downstream of Southerly, and one which was located in the plant's effluent channel (RM 10.83). A sediment sample was collected near the center of each zone and each zone was electroshocked once for fish. Figure K-1 illustrates the sampling zones on the Cuyahoga River.

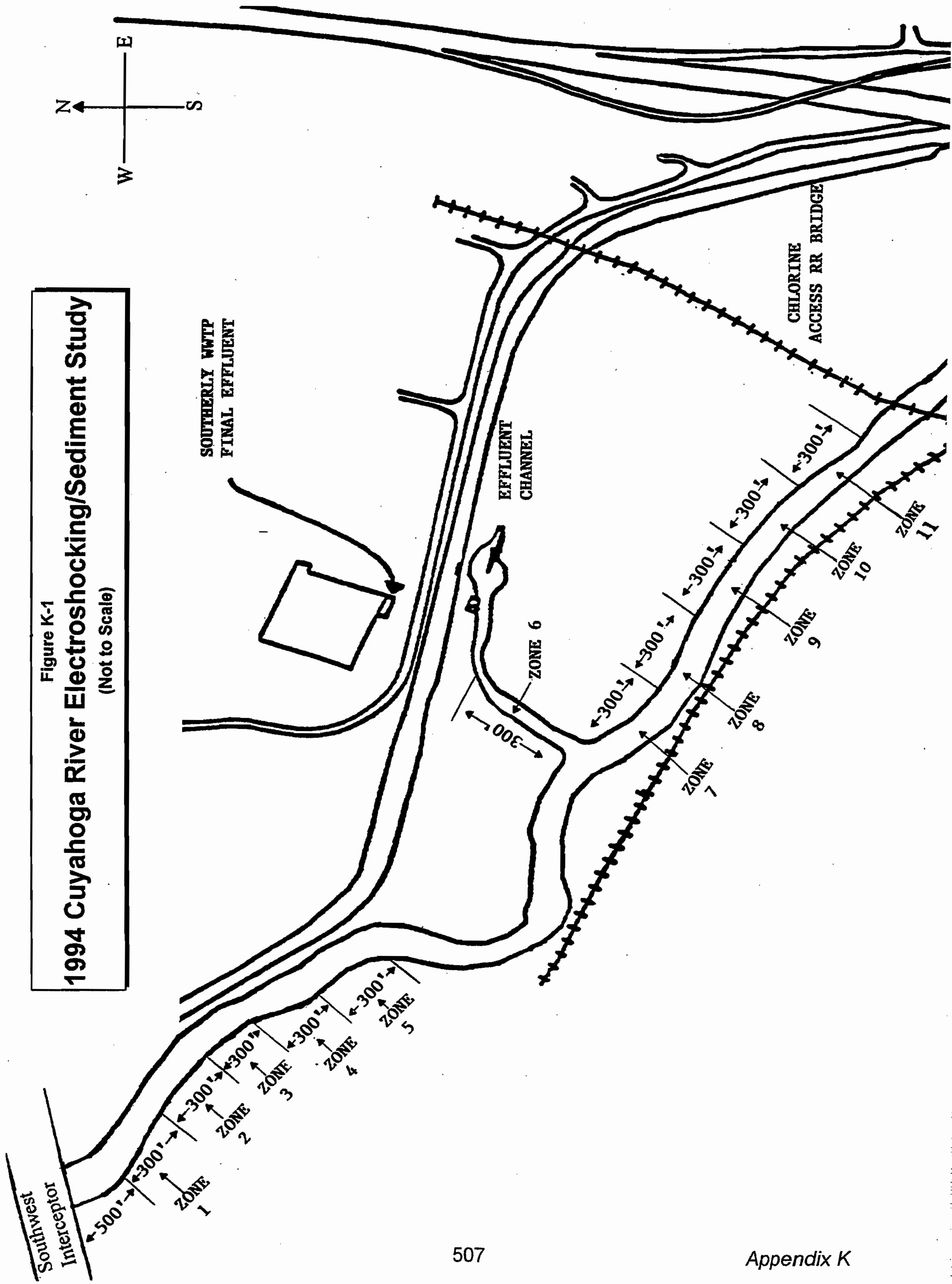
The first of five sampling zones upstream of the Southerly WWTP on the Cuyahoga River began immediately upstream of the confluence of the Southerly WWTP effluent channel (RM 10.83). The subsequent sampling zones continued upstream for 1,500 feet, with each successive 300-foot sampling zone ending at the starting point of the next upstream 300-foot sampling zone. The upstream sampling sites were identified as zones 7 through 11. The first of five sampling zones downstream of the Southerly WWTP started on the Cuyahoga River approximately 500 feet upstream of the Southwest Interceptor (RM 9.7). The sampling zones continued upstream at 300-foot intervals, with each successive 300-foot sampling zone ending at the starting point of the next upstream 300-foot sampling zone. The downstream sites were identified as zones 1 through 5. Zone 6 was located in the Southerly WWTP effluent channel.

METHODS

On August 2, 1994, a substrate sample was collected at midstream in the center of each 300-foot electroshocking zone on the Cuyahoga River and in the Southerly effluent channel. The procedure used a split-spoon core sampler, lowered through the water column to penetrate the substrate to a depth of approximately eight to twelve inches. The extracted sediment sample was then placed in a glass jar, stored, and later sent to Resource International Laboratories, where a sieve analysis was performed.

On October 14, 1994, the eleven 300-foot sampling zones were sampled for fish utilizing NEORSD's 17-foot electroshocking boat. The first zones electroshocked were upstream of the Southerly WWTP effluent channel. Electroshocking began at zone 7 and continued upstream through zone 11. Fish from each zone were collected, identified, counted and classified according to breeding guild. Fish were placed in a holding net while electroshocking continued upstream. When the furthest upstream sampling zone was completed, the fish were released. The five downstream zones on the Cuyahoga River were then electroshocked. Electroshocking began at zone 1 and continued upstream through zone 5. The Southerly WWTP effluent channel was the last zone to be electroshocked for fish.

Figure K-1
1994 Cuyahoga River Electroshocking/Sediment Study
(Not to Scale)



RESULTS AND DISCUSSION

Electroshocking was performed once at each site for this project. One Index of Biotic Integrity[2] (IBI) score was calculated for the upstream zones and one IBI score was calculated for the zones downstream of the treatment plant's effluent. An IBI score of 18 (poor) was assigned to the upstream electroshocking area (zones 7 through 11) and an IBI score of 16 (poor) was assigned to the downstream electroshocking area (zones 1 through 5). Soil classification results for sediments collected in each zone are displayed in Table K-1. Tables K-2 through K-4 list fish species, breeding guilds, and the percentage of lithophilic spawning fishes collected in each sampling zone. Figure K-2 compares the proportion of lithophilic spawning fish collected in each zone with the proportion of finer sediment particles (fine sand, silt, and clay) measured in each zone. Appendix E lists fish species, numbers, weights, pollution tolerances and incidence of DELT anomalies of fishes which were collected.

Although it appears from Figure K-2 that there may be an inverse relationship between the amount of finer sediment particles in a stream's substrate and the proportion of lithophilic spawning fish, one should use caution when examining the data in this study. The following confounding factors should be considered when interpreting it:

1) Sediment loads in the Cuyahoga River also come from other sources upstream of the immediate study area. Robert Appmann, in Erosion and Sedimentation in the Cuyahoga River Basin, U.S. Army Corp of Engineers, 1973, states that the river receives 200,000 tons/year of sediment from channel erosion and 160,000 tons/year from other sources.

2) Although fishes are generally territorial in nature, it is probable that fishes move from zone to zone.

3) Only one electroshock fish sample was collected within each zone, and very limited numbers of fish were collected.

4) Although one IBI score was calculated for the upstream sampling zones and another was calculated for the downstream zones, IBI scores could not be calculated for the individual zones. Individual zones were 300 feet long, however, Ohio EPA protocols require a sampling zone length of 0.5 km (approximately 1600 ft).

5) Although lithophilic fish were present in this area of the Cuyahoga River, whether they are able to spawn there is beyond the scope of this investigation, and is not known.

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[2]Although Ohio EPA protocols require two or three electroshock fish samples, electroshocking was performed once at each site for the purposes of this project.

6) Sediment sampling was limited to one sample per zone and may not have adequately characterized sediment particle size variability within the zone.

In conclusion, although this study was inadequate to demonstrate a relationship between sediment particle size and biological index scores for fish, a more effective management of the sediment inputs into the Cuyahoga River downstream of the Southerly WWTP may nevertheless help to improve the biological integrity and productivity of the river. Some control measures that can be taken to alleviate sediment loadings into streams from shoreline development are temporary vegetation plantings during construction, with a follow-up of final vegetation installations (Waters, 1995 <u>Sediment in Streams: Sources, Biological Effects and Control</u>, American Fisheries Society, 1995).

TABLE K-1
Cuyahoga River Soil Classification
Upstream and Downstream of Southerly WWTP
And in the Effluent Channel

Cuyahoga River Zone	% Coarse Gravel	%Fine Gravel	% Coarse Sand	% Fine Sand	% Silt	% Clay
1	0	9	20	26	8	37
2	2	71	21	6	0	0
3	12	60	17	10	1	0
4	0	0	5	84	11	0
5	0	43	30	25	2	0
6	0	51	32	14	3	0
7	12	64	16	8	0	0
8	38	33	17	12	0	0
9	14	45	24	17	1	0
10	0	18	49	32	1	0
11	12	56	19	13	0	0

Sediment Type	Particle Size (mm)
Coarse Gravel	19.05 - 76.2
Fine Gravel	2.0 - 19.05
Coarse Sand	0.425 - 2.0
Fine Sand	0.075 - 0.425
Silt	0.005 - 0.075
Clay	0.001 - 0.005

TABLE K-2
Fishes Collected on the Cuyahoga River Upstream of Southerly WWTP
Sample Date: 10/14/94
Collection Method: Boat Electroshocking

Zone	Species	Number	*Breeding Guild	Lithophils in Zone	Fine Sand, Silt, and Clay in Zone
7	*Campostoma anomalum* Central stoneroller minnow	4	Complex, no parental care	50%	8%
	Hypentelium nigricans Northern hog sucker	2	Simple Lithophils		
	Catostomus commersoni Common white sucker	1	Simple Lithophils		
	Percina caprodes Log perch	1	Simple Lithophils		
8	*Hypentelium nigricans* Northern hog sucker	5	Simple Lithophils	46%	12%
	Dorosoma cepedianum Eastern gizzard shad	20	Simple Miscellaneous		
	Catostomus commersoni Common white sucker	15	Simple Lithophils		
	Cyprinus carpio Common carp	1	Simple Miscellaneous		
	Lepomis Cyanellus Green sunfish	1	Complex with Parental Care		
	Lepomis macrochirus Bluegill sunfish	1	Complex with Parental Care		
9	*Dorosoma cepedianum* Eastern gizzard shad	8	Simple Miscellaneous	18%	18%
	Catostomus commersoni Common white sucker	2	Simple Lithophils		
	Ictalurus natalis Yellow bullhead	1	Complex with Parental Care		

TABLE K-2
(Continued)

Zone	Species	Number	*Breeding Guild	Lithophils in Zone	Fine Sand, Silt, and Clay in Zone
10	*Catostomus commersoni* Common white sucker	13	Simple Lithophils	100%	33%
11	*Dorosoma cepedianum* Eastern gizzard shad	4	Simple Miscellaneous	72%	13%
	Catostomus commersoni Common white sucker	19	Simple Lithophils		
	Lepomis gibbosus Pumpkinseed sunfish	3	Complex with Parental Care		
	Lepomis macrochirus Bluegill sunfish	1	Complex with Parental Care		
	Notropis cornutus Common shiner	1	Simple Lithophils		
	Hypentelium nigricans Northem hog sucker	1	Simple Lithophils		

*Breeding Guilds From: Ohio Environmental Protection Agency. 1989. Biological Protection of Aquatic Life. Volume III. Columbus, Ohio.

TABLE K-3
Fishes Collected in the Southerly WWTP Effluent Channel
Sample Date: 10/14/94
Collection Method: Boat Electroshocking

Zone	Species	Number	*Breeding Guild	Lithophils in Zone	Fine Sand, Silt, and Clay in Zone
6	*Ictiobus bubalus* Smallmouth buffalofish	2	Simple Miscellaneous	27%	17%
	Cyprinus carpio Common carp	1	Simple Miscellaneous		
	Dorosoma cepedianum Eastern gizzard shad	8	Simple Miscellaneous		
	Notropis cornutus Striped shiner	4	Simple Lithophils		

*Breeding Guilds From: Ohio Environmental Protection Agency. 1989. Biological Protection of Aquatic Life. Volume III. Columbus, Ohio.

TABLE K-4
Fishes Collected on Cuyahoga River Downstream of Southerly WWTP
Sample Date: 10/14/94
Collection Method: Boat Electroshocking

Zone	Species	Number	*Breeding Guild	Lithophils in Zone	Fine Sand, Silt, and Clay in Zone
1	*Pimephales notatus* Bluntnose minnow	2	Complex with Parental Care	25%	71%
	Cyprinus carpio Common carp	1	Simple Miscellaneous		
	Catostomus commersoni Common white sucker	1	Simple Lithophils		
2	*Cyprinus carpio* Common carp	5	Simple Miscellaneous	58%	6%
	Catostomus commersoni Common white sucker	7	Simple Lithophils		
3	*Cyprinus carpio* Common carp	1	Simple Miscellaneous	50%	11%
	Catostomus commersoni Common white sucker	7	Simple Lithophils		
4	*Cyprinus carpio* Common carp	1	Simple Miscellaneous	20%	95%
	Dorosoma cepedianum Eastern gizzard shad	19	Simple Miscellaneous		
	Catostomus commersoni Common white sucker	4	Simple Lithophils		
	Hypentelium nigricans Northern hog sucker	1	Simple Lithophils		

TABLE K-4
(Continued)

Zone	Species	Number	*Breeding Guild	Lithophils in Zone	Fine Sand, Silt, and Clay in Zone
5	*Hypentelium nigricans* Northern hog sucker	1	Simple Lithophils	90%	27%
	Moxostoma erythrurum Golden redhorse	1	Simple Lithophils		
	Pimephales promelas Fathead minnow	1	Complex with Parental Care		
	Catostomus commersoni Common white sucker	6	Simple Lithophils		
	Notropis atherinoides Emerald shiner	1	Simple Lithophils		
	Ictalurus natalis Yellow bullhead	1	Complex with Parental Care		

*Breeding Guilds From: Ohio Environmental Protection Agency. 1989. Biological Protection of Aquatic Life. Volume III, Columbus, Ohio.

Figure K-2
Percent Lithophilic Spawning Fish vs. Percent of Sediment Particles Smaller than 0.425 mm
Cuyahoga River Electroshocking/Sediment Sampling Study

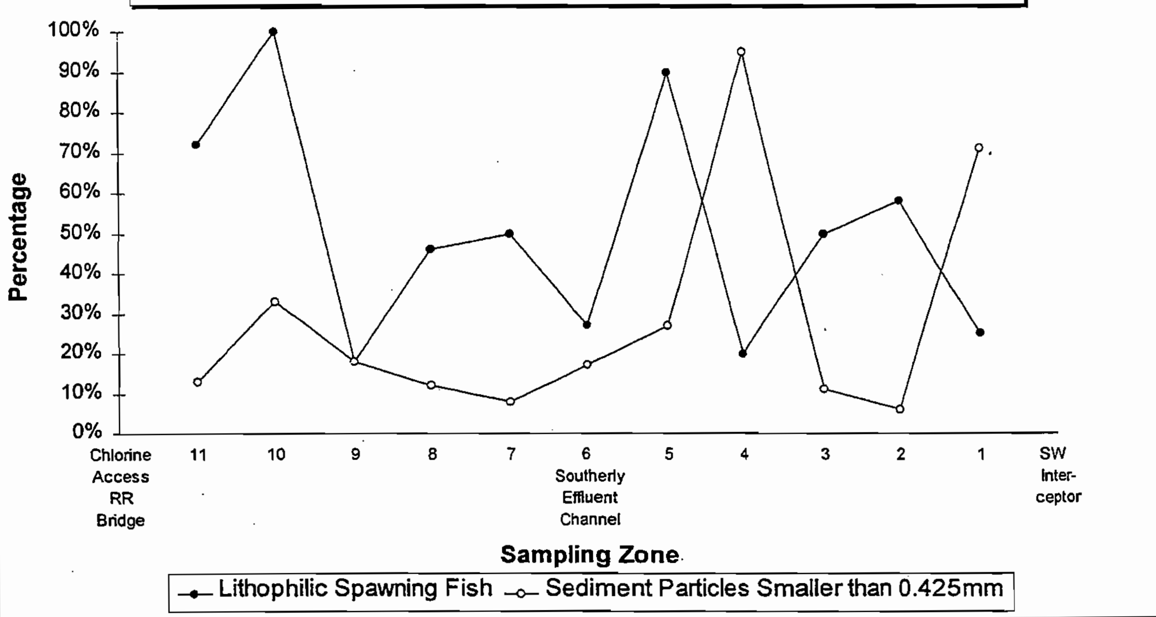


Figure K-3 Cuyahoga River Mile 10.1 (Zone #4) - Concrete material on the west bank of the river downstream of the Southerly WWTP.

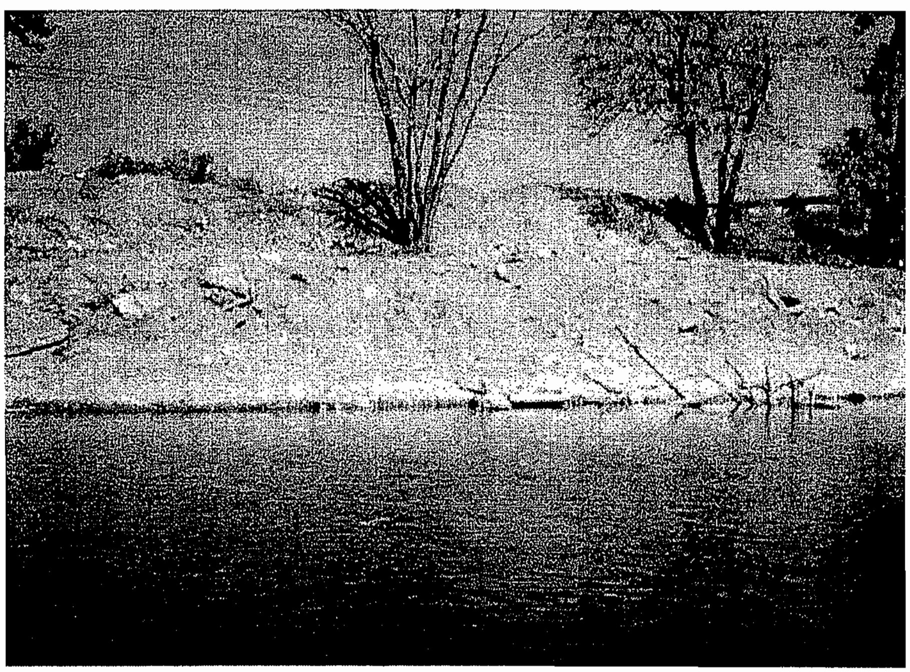


Figure K-4 Cuyahoga River Mile 10.2 (Zone #5) - Downstream of the Southerly WWTP on the west bank of the river. Severely eroding stream bank absent of vegetative strip.

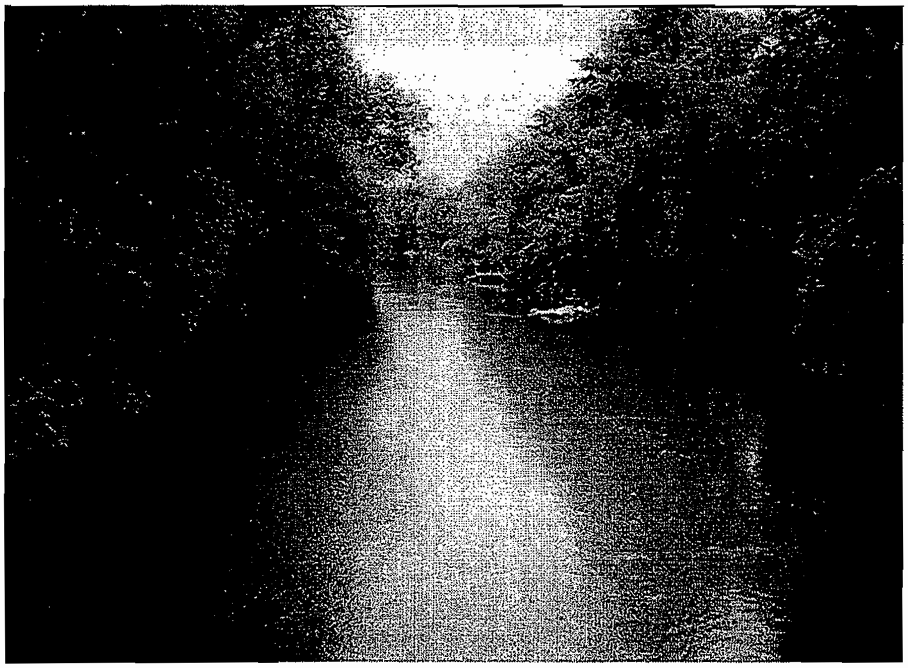


Figure K-5 Cuyahoga River Mile 11.1 (Zone #11) - Upstream of the Southerly WWTP, downstream of the chlorine access RR bridge. Forest, swamp type riparian zone with minimal bank erosion.

Figure K-6 Cuyahoga River Mile 11.0 (Zone #10) - Looking upstream toward the chlorine access RR bridge.

APPENDIX L
CUYAHOGA RIVER NAVIGATION CHANNEL DISSOLVED OXYGEN STUDY, 1995

INTRODUCTION

Northeast Ohio Regional Sewer District (NEORSD) investigators and Ohio Environmental Protection Agency (OEPA) personnel, monitored dissolved oxygen levels in the Cuyahoga River at lower Harvard Avenue and at several locations in the shipping channel from April through October 1995. Parameters measured in the field, in addition to dissolved oxygen, included water temperature, pH, specific conductance and turbidity.

An attempt was made to conduct monitoring at least once per week when the river flow was measured at less than 1000 cubic feet per second (CFS) at the USGS' Independence Gage (#04208000). When the river flow was less than 700 CFS, investigators attempted to monitor dissolved oxygen levels more frequently.

Monitoring was conducted at the lower Harvard Avenue bridge, the Newburgh & South Shore Railroad bridge, the CSX Railroad bridge (upstream of Kingsbury Run), the West Third Street bridge, the Carter Road bridge and the Center Street bridge. Field measurements were obtained at the surface at lower Harvard Avenue; at the surface and near the bottom at the Newburgh & South Shore Railroad; and at the surface, near mid-depth and near the bottom at West Third Street, Carter Road and Center Street. When the CSX Railroad bridge was in the up position, field measurements at this location were obtained only at the surface. The Center Street bridge was closed after September 18 because of overhead repairs being conducted on the Veteran's Memorial bridge. After this date, only surface measurements, which were taken from the west bank of the river approximately 50 feet downstream of Center Street near the Flats Oxbow Association, were obtained.

Dissolved oxygen and water temperature were measured with a YSI Model 57 dissolved oxygen meter. Specific conductance, turbidity and pH were measured by NEORSD investigators with a Horiba Model U-10 water quality monitor. Specific conductance was measured by the NEORSD Analytical Services Department at lower Harvard Avenue and at the Newburgh and Southshore Railroad on August 2, 1995, and at all six monitoring locations on August 11 and 14, 1995. Additionally, pH, specific conductance and turbidity were measured by the NEORSD Analytical Services Department on August 25 and 31, while the Horiba water quality monitor was being serviced. Surface samples collected at each site were analyzed for ammonia by the NEORSD Analytical Services Department.

OEPA has assigned the Cuyahoga River navigation channel the Limited Resource Water-Navigation Maintenance and Fish Passage aquatic life use designations. The Limited Resource Water-Navigation Maintenance designation is in effect during the months of June through January and also during the remaining months of the year whenever the river flow is measured at less than 703 CFS at the USGS' Independence gage. The Fish Passage use designation is in effect during the months of February through May whenever the river flow is measured at 703 CFS or greater at the USGS' Independence gage. The minimum dissolved oxygen criteria is 1.5 mg/L for the Limited Resource Water-Navigation Maintenance designation and 4.0 mg/L for the Fish Passage designation.

RESULTS & DISCUSSION

Monitoring results for each location are shown in Tables L-1 through L-6. Figures L-1 through L-6 display, on a daily basis, the minimum dissolved oxygen concentration measured at each site. Finally, Figures L-7 through L-12 display the minimum dissolved oxygen concentration measured at each site within the navigation channel on each day a failure to meet the minimum dissolved oxygen criteria was recorded.

Figures L-7 through L-12 show a general downstream decrease in dissolved oxygen concentrations within the ship channel. These figures also indicate that no failures to meet the minimum dissolved oxygen criteria were recorded at the three upstream monitoring locations within the navigation channel.

Failures to meet the minimum dissolved oxygen criterion were recorded on one of seven (14%) days on which monitoring was performed in May, two of 10 (20%) days on which monitoring was performed in June, and 3 of 13 (23%) days on which monitoring was performed in July. Failures to meet the minimum dissolved oxygen criterion were recorded at Carter Road on three occasions, and at Center Street, which was the furthest downstream monitoring location, on six occasions. No failures to meet ammonia or pH criteria were recorded at any of the monitoring sites during the study period. A failure to meet the daily maximum temperature criterion for Lake Erie Tributary Estuaries was recorded at West Third Street on May 15, 1995. Several failures to meet the temperature criteria for the General Lake Erie Basin were recorded at the CSX Railroad Bridge upstream of Kingsbury Run. Failures to meet the daily maximum temperature criterion at this location were recorded on May 8, May 15, May 23, June 23, July 31, August 11, and October 20, 1995. Failures to meet the average temperature criterion at this location were recorded for the following periods: May 16-30, June 1-15, June 16-30, September 16-30, October 1-15, and October 16-31, 1995.

Table L-1
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Lower Harvard

Sample Date	Flow (CFS)	Minimum D.O. Criterion (mg/L)	Surface D.O. (mg/L)	Surface Water Temp (°C)	Surface pH (s.u.)	Surface Specific Conductance (mS/cm)	Surface Turbidity (NTU)	Surface NH3-N (mg/L)	Mid - Depth D.O. (mg/L)	Mid - Depth Water Temp (°C)	Mid - Depth pH (s.u.)	Mid - Depth Specific Conductance (mS/cm)	Mid - Depth Turbidity (NTU)	Near - Bottom D.O. (mg/L)	Near - Bottom Water Temp (°C)	Near - Bottom pH (s.u.)	Near - Bottom Specific Conductance (mS/cm)	Near - Bottom Turbidity (NTU)
6-Apr	507	1.5	12.4	7.6	8.2	.1.12	9	0.19	-	-	-	-	-	-	-	-	-	-
* 6-Apr	512	1.5	12.4	8.0	7.5	0.72	-	-	-	-	-	-	-	-	-	-	-	-
25-Apr	924	4.0	10.2	10.7	7.8	0.82	17	0.10	-	-	-	-	-	-	-	-	-	-
* 27-Apr	794	4.0	8.7	13.2	7.9	0.52	-	-	-	-	-	-	-	-	-	-	-	-
1-May	534	1.5	10.2	13.0	7.8	0.92	19	0.50	-	-	-	-	-	-	-	-	-	-
5-May	489	1.5	11.2	15.0	7.9	1.00	27	0.20	-	-	-	-	-	-	-	-	-	-
8-May	403	1.5	9.5	16.0	8.1	0.98	28	0.03	-	-	-	-	-	-	-	-	-	-
10-May	741	4.0	9.2	16.0	7.8	0.85	6	0.10	-	-	-	-	-	-	-	-	-	-
* 10-May	741	4.0	-	-	7.7	0.80	-	0.06	-	-	-	-	-	-	-	-	-	-
12-May	493	1.5	8.8	15.0	7.8	0.96	38	0.13	-	-	-	-	-	-	-	-	-	-
15-May	520	1.5	8.3	19.0	7.8	0.97	33	0.29	-	-	-	-	-	-	-	-	-	-
23-May	643	1.5	8.9	20.8	7.8	0.94	22	0.30	-	-	-	-	-	-	-	-	-	-
2-Jun	607	1.5	8.0	19.0	7.7	0.81	14	0.20	-	-	-	-	-	-	-	-	-	-
5-Jun	755	1.5	7.7	20.0	7.6	0.74	12	0.40	-	-	-	-	-	-	-	-	-	-
9-Jun	471	1.5	7.6	19.0	7.8	0.86	5	0.30	-	-	-	-	-	-	-	-	-	-
12-Jun	630	1.5	7.5	20.5	7.7	0.73	10	0.20	-	-	-	-	-	-	-	-	-	-
13-Jun	581	1.5	8.1	20.0	7.8	0.77	6	0.10	-	-	-	-	-	-	-	-	-	-
* 15-Jun	324	1.5	7.0	20.6	7.7	0.80	-	<.05	-	-	-	-	-	-	-	-	-	-
19-Jun	217	1.5	9.1	25.0	7.9	1.20	3	0.10	-	-	-	-	-	-	-	-	-	-
22-Jun	362	1.5	11.4	25.0	8.3	1.10	14	0.03	-	-	-	-	-	-	-	-	-	-
23-Jun	234	1.5	9.2	25.0	8	1.13	-	0.05	-	-	-	-	-	-	-	-	-	-
27-Jun	811	1.5	6.9	23.0	7.6	0.73	63	0.30	-	-	-	-	-	-	-	-	-	-
3-Jul	717	1.5	7.8	20.5	7.9	0.67	35	1.00	-	-	-	-	-	-	-	-	-	-
* 5-Jul	462	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Jul	577	1.5	7.6	23.0	7.7	0.71	21	0.80	-	-	-	-	-	-	-	-	-	-
11-Jul	285	1.5	8.2	24.0	7.9	1.08	10	0.20	-	-	-	-	-	-	-	-	-	-
14-Jul	657	1.5	6.6	25.0	7.6	0.88	64	0.10	-	-	-	-	-	-	-	-	-	-
18-Jul	666	1.5	6.9	25.0	7.8	0.77	33	0.20	-	-	-	-	-	-	-	-	-	-
19-Jul	458	1.5	7.2	25.0	7.8	0.84	25	0.20	-	-	-	-	-	-	-	-	-	-
* 20-Jul	534	1.5	6.1	24.5	7.8	0.90	-	0.16	-	-	-	-	-	-	-	-	-	-
21-Jul	436	1.5	6.0	25.0	7.8	0.90	15	0.20	-	-	-	-	-	-	-	-	-	-
24-Jul	534	1.5	5.7	25.0	7.7	0.70	28-	0.20	-	-	-	-	-	-	-	-	-	-
25-Jul	342	1.5	6.7	25.5	7.7	0.94	15	0.20	-	-	-	-	-	-	-	-	-	-
28-Jul	512	1.5	6.9	26.0	7.8	0.73	17	0.10	-	-	-	-	-	-	-	-	-	-
31-Jul	304	1.5	6.9	26.0	7.7	0.83	10	0.10	-	-	-	-	-	-	-	-	-	-
2-Aug	652	1.5	5.4	26.0	-	0.93	180	0.40	-	-	-	-	-	-	-	-	-	-
11-Aug	616	1.5	6.9	24.0	-	0.87	42	0.20	-	-	-	-	-	-	-	-	-	-
14-Aug	572	1.5	6.5	26.0	7.7	-	80	0.20	-	-	-	-	-	-	-	-	-	-
25-Aug	233	1.5	7.4	23.0	7.1	0.89	6	0.20	-	-	-	-	-	-	-	-	-	-
31-Aug	210	1.5	7.5	25.0	8	1.01	14	0.40	-	-	-	-	-	-	-	-	-	-
5-Sep	163	1.5	7.7	23.0	8.6	1.10	5	0.20	-	-	-	-	-	-	-	-	-	-
15-Sep	285	1.5	7.0	21.0	7.3	0.90	20	0.40	-	-	-	-	-	-	-	-	-	-
18-Sep	241	1.5	7.3	19.0	7.4	1.10	10	0.30	-	-	-	-	-	-	-	-	-	-
* 29-Sep	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Oct	467	1.5	8.6	17.0	8.3	0.58	34	0.20	-	-	-	-	-	-	-	-	-	-
11-Oct	223	1.5	8.5	18.0	7.6	1.10	8	0.40	-	-	-	-	-	-	-	-	-	-
20-Oct	223	1.5	8.2	16.0	7.6	1.10	7	0.20	-	-	-	-	-	-	-	-	-	-
26-Oct	197	1.5	7.9	13.0	7.6	1.20	6	0.80	-	-	-	-	-	-	-	-	-	-

* Indicates data collected by OEPA

Table L-2
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Newburgh & South Shore Railroad Bridge

			Surface						Mid - Depth					Near - Bottom				
Sample Date	Flow (CFS)	Minimum D.O. Criterion (mg/L)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)	NH3-N (mg/L)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)
6-Apr	507	1.5	11.9	7.5	8.2	1.13	9	0.22	-	-	-	-	-	12.0	7.5	8.1	1.13	10
* 6-Apr	512	1.5	11.9	9.1	7.6	0.74	-	0.23	-	-	-	-	-	12.0	8.0	7.7	0.80	-
25-Apr	924	4.0	9.7	11.0	7.9	0.82	16	0.10	9.6	11.0	7.8	0.82	19	9.8	10.6	7.9	0.82	21
* 27-Apr	794	4.0	8.8	13.5	7.8	0.65	-	0.25	-	-	-	-	-	8.8	13.4	7.8	0.65	-
1-May	534	1.5	10.4	13.0	7.8	0.95	21	1.00	10.4	13.0	7.7	0.95	17	10.4	13.0	7.7	0.95	26
5-May	489	1.5	10.0	15.0	7.9	1.00	40	0.20	10.0	14.5	7.9	1.00	36	10.0	15.0	7.9	1.00	40
8-May	403	1.5	8.6	17.2	7.9	1.04	44	0.10	8.7	15.3	7.9	1.02	30	8.7	15.2	7.9	1.03	35
10-May	741	4.0	9.0	15.5	7.8	0.87	6	0.20	-	-	-	-	-	9.0	15.2	7.9	0.91	-
* 10-May	741	4.0	9.2	15.5	7.7	0.71	-	0.13	-	-	-	-	-	9.2	15.1	7.9	0.78	-
12-May	493	1.5	8.2	15.5	7.8	0.97	20	0.20	-	-	-	-	-	8.2	15.5	7.7	0.97	21
15-May	520	1.5	7.8	18.0	7.8	1.00	29	0.16	-	-	-	-	-	7.2	18.5	7.8	1.00	34
23-May	643	1.5	8.2	19.1	7.8	0.87	21	0.10	-	-	-	-	-	8.3	18.9	7.8	0.87	27
2-Jun	607	1.5	7.7	18.5	7.7	0.82	8	0.30	-	-	-	-	-	-	-	-	-	-
5-Jun	755	1.5	7.5	20.5	7.7	0.76	10	0.20	-	-	-	-	-	7.4	20.0	7.8	0.75	10
9-Jun	471	1.5	7.2	19.5	7.7	0.95	6	0.30	-	-	-	-	-	7.2	19.5	7.7	0.95	6
12-Jun	630	1.5	6.9	21.0	7.6	0.74	10	0.20	-	-	-	-	-	7.0	20.5	7.7	0.73	10
13-Jun	581	1.5	7.7	20.0	7.8	0.80	4	0.10	-	-	-	-	-	7.7	20.0	7.8	0.80	4
* 15-Jun	324	1.5	6.8	21.2	7.8	0.89	-	0.09	-	-	-	-	-	6.9	21.5	7.8	0.89	-
19-Jun	217	1.5	9.0	25.0	7.9	1.20	7	0.10	-	-	-	-	-	9.0	25.0	7.9	1.10	8
22-Jun	362	1.5	14.2	25.0	8.6	1.10	10	0.04	-	-	-	-	-	10.6	25.0	8.2	1.10	12
23-Jun	234	1.5	9.1	25.0	8.1	1.14	-	0.04	-	-	-	-	-	8.9	25.5	8.0	1.13	-
27-Jun	811	1.5	6.5	24.0	7.6	0.72	75	0.20	-	-	-	-	-	6.6	23.0	7.6	0.73	-
3-Jul	717	1.5	7.6	21.0	7.9	0.67	28	0.10	-	-	-	-	-	7.6	21.0	7.9	0.67	-
* 5-Jul	462	1.5	6.6	22.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Jul	577	1.5	6.9	23.0	7.7	0.70	16	1.10	-	-	-	-	-	6.9	23.0	7.6	0.70	21
11-Jul	285	1.5	8.2	24.5	8.0	1.08	10	0.30	-	-	-	-	-	8.0	23.0	7.9	0.97	-
14-Jul	657	1.5	6.4	24.5	7.6	0.93	38	0.20	-	-	-	-	-	6.4	25.0	-	-	-
18-Jul	666	1.5	6.5	26.0	7.8	0.78	31	0.20	-	-	-	-	-	6.4	25.0	7.7	0.78	48
19-Jul	458	1.5	6.9	26.0	7.9	0.86	16	0.10	-	-	-	-	-	6.9	25.5	7.9	0.86	16
* 20-Jul	534	1.5	5.7	24.5	7.9	0.90	-	0.20	-	-	-	-	-	6.6	25.5	7.9	0.90	-
21-Jul	436	1.5	6.7	24.5	7.8	1.01	16	0.20	-	-	-	-	-	6.6	24.0	7.8	0.99	25
24-Jul	534	1.5	4.3	26.0	7.6	0.70	33	0.30	-	-	-	-	-	4.2	25.0	7.6	0.70	-
25-Jul	342	1.5	6.5	25.0	7.7	0.95	15	0.20	-	-	-	-	-	6.4	25.0	7.7	0.94	20
28-Jul	512	1.5	6.4	26.0	7.8	0.74	27	0.20	-	-	-	-	-	6.5	26.0	7.8	0.74	22
31-Jul	304	1.5	6.5	26.0	7.7	1.00	10	0.20	-	-	-	-	-	6.5	25.5	7.7	0.88	20
2-Aug	652	1.5	6.3	27.0	7.7	0.80	30	0.20	-	-	-	-	-	6.3	26.0	-	-	-
11-Aug	616	1.5	6.9	24.0	-	0.85	38	0.20	-	-	-	-	-	6.9	24.0	-	-	-
14-Aug	572	1.5	6.3	26.0	7.7	-	42	0.30	-	-	-	-	-	6.1	26.0	-	-	-
25-Aug	233	1.5	6.6	26.0	6.5	0.81	21	0.40	-	-	-	-	-	6.1	24.0	-	-	-
31-Aug	210	1.5	7.5	25.0	8.0	0.98	4	0.20	-	-	-	-	-	7.4	25.0	-	-	-
5-Sep	163	1.5	7.0	23.0	8.5	1.20	14	0.50	-	-	-	-	-	6.8	23.0	8.4	1.20	-
15-Sep	285	1.5	6.2	24.0	7.3	1.00	23	0.40	-	-	-	-	-	6.2	21.0	7.2	0.90	-
18-Sep	241	1.5	6.2	23.0	7.3	1.20	22	0.50	-	-	-	-	-	6.6	20.0	7.3	1.20	-
* 29-Sep	-	1.5	7.0	22.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Oct	467	1.5	7.7	17.0	7.2	0.76	32	0.30	-	-	-	-	-	7.6	17.0	7.2	0.76	-
11-Oct	223	1.5	8.0	17.5	7.5	1.10	12	0.40	-	-	-	-	-	8.0	17.5	7.6	1.10	-
20-Oct	223	1.5	7.8	17.0	7.5	1.20	8	0.30	-	-	-	-	-	7.8	17.0	7.5	1.20	-
26-Oct	197	1.5	7.5	14.0	7.4	1.20	15	1.20	-	-	-	-	-	7.5	14.0	7.4	1.20	-

* Indicates data collected by OEPA

Table L-3
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
CSX RR Bridge, U.S. of Kingsbury Run

		Minimum	Surface						Mid - Depth					Near - Bottom				
Sample Date	Flow (CFS)	D.O. Criterion (mg/L)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)	NH3-N (mg/L)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductance (mS/cm)	Turbidity (NTU)
6-Apr	507	1.5	10.8	9.2	8.1	1.13	41	0.45	10.5	9.2	8.0	1.13	-					
* 6-Apr	512	1.5	10.8	10.1	7.5	0.78	-	0.37	10.5	9.9	7.7	0.79	-	10.5	9.9	7.6	0.78	-
25-Apr	924	4.0	8.2	13.2	7.7	0.83	39	0.20	8.2	13.2	7.7	0.84	-	-	-	-	-	-
* 27-Apr	794	4.0	8.0	14.9	7.7	0.70	-	0.39	8.0	15.0	7.7	0.70	-	8.0	15.5	7.7	0.71	-
1-May	534	1.5	7.6	16.0	7.3	1.00	110	0.60	7.6	16.0	7.5	1.00	121	7.4	16.0	7.5	1.00	153
5-May	489	1.5	6.2	16.5	7.5	1.10	186	0.80	6.4	16.5	7.6	1.10	-	-	-	-	-	-
8-May	403	1.5	6.3	20.7	7.7	1.04	81	0.50	6.3	20.7	7.7	1.05	-	-	-	-	-	-
10-May	741	4.0	7.0	17.0	7.6	1.01	20	0.60	-	-	-	-	-	-	-	-	-	-
* 10-May	741	4.0	5.6	17.0	7.2	0.90	-	0.44	-	-	-	-	-	-	-	-	-	-
12-May	493	1.5	6.4	18.0	7.6	1.00	46	0.30	-	-	-	-	-	-	-	-	-	-
15-May	520	1.5	6.4	21.5	7.7	1.10	188	0.50	-	-	-	-	-	-	-	-	-	-
23-May	643	1.5	6.2	21.0	7.6	0.96	94	0.60	-	-	-	-	-	-	-	-	-	-
2-Jun	607	1.5	6.6	21.0	7.4	0.84	18	0.40	-	-	-	-	-	-	-	-	-	-
5-Jun	755	1.5	5.9	22.3	7.5	0.71	39	0.30	-	-	-	-	-	-	-	-	-	-
9-Jun	471	1.5	5.6	23.0	7.6	0.95	9	0.40	-	-	-	-	-	-	-	-	-	-
12-Jun	630	1.5	6.6	23.0	7.6	0.82	10	0.80	-	-	-	-	-	-	-	-	-	-
13-Jun	581	1.5	6.8	23.0	7.8	0.79	8	0.30	-	-	-	-	-	-	-	-	-	-
* 15-Jun	324	1.5	5.9	24.9	7.7	0.90	-	0.30	5.7	24.5	7.8	0.90	-	5.4	24.3	8.0	0.90	-
19-Jun	217	1.5	5.4	28.0	7.6	1.20	7	0.40	-	-	-	-	-	-	-	-	-	-
22-Jun	362	1.5	8.8	28.0	8.1	1.20	10	0.10	-	-	-	-	-	-	-	-	-	-
23-Jun	234	1.5	8.5	30.0	8.2	1.14	-	0.10	-	-	-	-	-	-	-	-	-	-
27-Jun	811	1.5	5.8	25.5	7.5	0.74	30	0.30	-	-	-	-	-	-	-	-	-	-
3-Jul	717	1.5	6.8	24.5	7.7	0.67	27	0.30	-	-	-	-	-	-	-	-	-	-
* 5-Jul	462	1.5	5.9	25.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Jul	577	1.5	5.6	25.5	7.5	0.65	30	0.30	-	-	-	-	-	-	-	-	-	-
11-Jul	285	1.5	6.0	26.0	7.7	1.12	23	0.50	-	-	-	-	-	-	-	-	-	-
14-Jul	657	1.5	5.8	27.5	7.5	1.05	18	0.30	-	-	-	-	-	-	-	-	-	-
18-Jul	666	1.5	5.5	29.5	7.7	0.71	79	0.40	-	-	-	-	-	-	-	-	-	-
19-Jul	458	1.5	5.5	27.5	7.7	0.92	30	0.30	-	-	-	-	-	-	-	-	-	-
* 20-Jul	534	1.5	4.5	28.0	7.8	0.90	-	0.30	-	-	-	-	-	-	-	-	-	-
21-Jul	436	1.5	4.8	28.0	7.7	1.03	15	0.40	-	-	-	-	-	-	-	-	-	-
24-Jul	534	1.5	6.1	27.0	7.7	0.95	33	0.40	-	-	-	-	-	-	-	-	-	-
25-Jul	342	1.5	5.6	28.0	7.6	0.80	11	0.30	-	-	-	-	-	-	-	-	-	-
28-Jul	512	1.5	5.4	27.5	7.6	0.72	24	0.30	-	-	-	-	-	-	-	-	-	-
31-Jul	304	1.5	5.7	30.0	7.6	1.00	10	0.30	-	-	-	-	-	-	-	-	-	-
2-Aug	652	1.5	6.3	29.0	7.7	1.10	15	0.30	-	-	-	-	-	-	-	-	-	-
11-Aug	616	1.5	4.3	21.5	7.2	0.75	33	0.30	-	-	-	-	-	-	-	-	-	-
14-Aug	572	1.5	5.2	28.0	7.5	-	31	0.40	-	-	-	-	-	-	-	-	-	-
25-Aug	233	1.5	5.1	28.0	6.7	0.80	25	0.40	-	-	-	-	-	-	-	-	-	-
31-Aug	210	1.5	6.4	28.0	7.9	1.00	7	0.20	-	-	-	-	-	-	-	-	-	-
5-Sep	163	1.5	6.1	28.0	8.3	1.20	11	0.50	-	-	-	-	-	-	-	-	-	-
15-Sep	285	1.5	5.8	24.0	7.3	1.10	23	0.30	-	-	-	-	-	-	-	-	-	-
18-Sep	241	1.5	5.4	24.0	7.2	1.10	19	0.50	-	-	-	-	-	-	-	-	-	-
* 29-Sep	-	1.5	6.6	23.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Oct	467	1.5	6.9	19.5	7.0	0.71	27	0.40	-	-	-	-	-	-	-	-	-	-
11-Oct	223	1.5	7.4	21.0	7.2	1.00	22	0.50	-	-	-	-	-	-	-	-	-	-
20-Oct	223	1.5	7.5	19.0	7.3	1.10	15	0.50	-	-	-	-	-	-	-	-	-	-
26-Oct	197	1.5	6.7	15.5	7.5	1.20	22	0.60	-	-	-	-	-	-	-	-	-	-

* Indicates data collected by OEPA

Table L-4
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
West Third Street

Sample Date	Flow (CFS)	Minimum D.O. Criterion (mg/L)	Surface D.O. (mg/L)	Surface Water Temp (°C)	Surface pH (s.u.)	Surface Specific Conductanc (mS/cm)	Surface Turbidity (NTU)	Surface NH3-N (mg/L)	Mid - Depth D.O. (mg/L)	Mid - Depth Water Temp (°C)	Mid - Depth pH (s.u.)	Mid - Depth Specific Conductanc (mS/cm)	Mid - Depth Turbidity (NTU)	Near - Bottom D.O. (mg/L)	Near - Bottom Water Temp (°C)	Near - Bottom pH (s.u.)	Near - Bottom Specific Conductanc (mS/cm)	Near - Bottom Turbidity (NTU)
6-Apr	507	1.5	6.1	9.0	7.8	1.16	60	0.50	5.9	8.9	7.8	1.16	74	6.0	8.7	7.9	1.15	73
* 6-Apr	512	1.5	6.1	10.0	7.3	0.80	-	0.59	5.9	10.0	7.4	0.80	-	6.0	9.5	7.4	0.79	-
25-Apr	924	4.0	8.3	13.0	7.6	0.84	49	0.30	8.2	12.9	7.7	0.85	60	8.0	12.6	7.6	0.84	79
* 27-Apr	794	4.0	8.4	14.0	7.7	0.69	-	-	8.4	14.0	7.7	0.69	-	8.4	14.0	7.6	0.69	-
1-May	534	1.5	6.8	16.0	7.5	1.00	90	1.00	6.8	16.0	7.5	1.00	93	6.6	16.0	7.4	1.00	113
5-May	489	1.5	2.7	17.0	7.6	1.10	109	0.10	2.5	17.0	7.5	1.10	145	2.7	17.0	7.5	1.10	209
8-May	403	1.5	5.4	19.0	7.6	1.00	53	0.50	4.8	18.5	7.6	1.00	58	4.5	18.0	7.5	1.00	85
10-May	741	4.0	5.6	17.8	7.5	0.94	17	0.50	5.4	17.0	7.6	0.98	-	5.4	17.0	7.6	0.99	-
* 10-May	741	4.0	3.7	17.8	7.5	0.88	-	0.33	5.6	17.0	7.6	0.82	-	5.6	17.0	7.6	0.80	-
12-May	493	1.5	4.8	17.5	7.5	1.00	72	0.50	4.8	17.5	7.5	1.00	76	4.2	17.5	7.4	1.00	133
15-May	520	1.5	5.3	20.0	7.6	1.10	130	0.50	5.3	20.0	7.6	1.10	137	5.3	20.0	7.6	1.10	171
23-May	643	1.5	5.3	20.8	7.7	0.97	105	0.50	5.4	20.3	7.6	0.96	108	5.4	20.2	7.6	0.93	104
2-Jun	607	1.5	5.6	21.0	7.6	0.82	21	0.70	5.3	21.0	7.5	0.82	25	5.0	21.0	7.5	0.83	32
5-Jun	755	1.5	5.4	22.0	7.5	0.73	26	0.40	5.2	21.5	7.5	0.73	38	5.2	21.5	7.5	0.73	31
9-Jun	471	1.5	4.5	23.0	7.5	0.96	10	0.50	4.4	23.0	7.5	0.96	10	4.3	23.0	7.5	0.95	14
12-Jun	630	1.5	6.2	22.5	7.6	0.92	10	0.50	6.0	22.5	7.6	0.92	10	6.0	22.5	7.6	0.92	20
□ 13-Jun	581	1.5	4.8	23.0	7.6	0.76	7	0.50	4.7	23.0	7.6	0.76	7	3.9	23.0	7.5	0.76	18
* 15-Jun	324	1.5	5.4	25.1	7.6	-	-	0.31	5.3	25.0	7.6	0.88	-	5.1	25.1	7.7	0.89	-
19-Jun	217	1.5	4.5	28.0	7.5	1.20	5	0.40	2.8	26.0	7.5	1.10	6	1.8	26.0	7.4	1.10	8
■ 22-Jun	362	1.5	6.5	28.0	7.8	1.20	9	0.10	4.5	27.5	7.6	1.20	17	4.2	27.5	7.5	1.20	36
□ 23-Jun	234	1.5	5.0	28.5	7.8	1.17	-	0.20	2.6	28.0	7.6	1.16	-	2.5	28.0	7.6	1.16	-
27-Jun	811	1.5	4.7	25.5	7.4	0.70	40	0.50	4.0	25.0	7.4	0.70	-	4.0	25.0	7.4	0.70	-
3-Jul	717	1.5	6.6	24.3	7.7	0.65	28	0.90	6.4	24.0	7.7	0.65	-	5.8	23.8	7.7	0.64	-
* 5-Jul	462	1.5	5.5	24.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
□ 7-Jul	577	1.5	4.6	24.0	7.5	0.66	57	1.10	4.7	24.0	7.4	0.66	64	4.7	24.0	7.4	0.66	74
11-Jul	285	1.5	4.3	25.5	7.7	1.10	25	0.50	4.2	25.0	7.6	1.10	-	4.4	24.5	7.6	1.10	-
14-Jul	657	1.5	1.5	27.5	7.4	1.00	17	0.30	1.5	27.5	-	-	-	1.5	27.5	-	-	-
18-Jul	666	1.5	3.6	27.0	7.5	0.71	44	0.30	-	-	-	-	-	3.2	27.0	7.4	0.71	-
□ 19-Jul	458	1.5	3.6	27.0	7.6	0.79	66	0.40	3.8	27.5	7.6	0.80	70	3.6	27.5	7.5	0.79	-
* 20-Jul	534	1.5	3.6	27.0	7.7	0.90	-	0.33	-	-	-	-	-	-	-	-	-	-
21-Jul	436	1.5	3.5	28.0	7.5	1.01	13	0.40	3.1	27.0	7.5	1.02	19	3.0	27.0	7.5	0.92	20
24-Jul	534	1.5	4.7	26.0	7.6	0.93	30	0.40	3.9	26.0	7.6	0.93	-	3.9	26.0	7.5	0.93	-
25-Jul	342	1.5	4.7	26.5	7.6	0.80	13	0.40	4.0	26.5	7.6	0.91	14	3.9	26.5	7.6	0.91	14
28-Jul	512	1.5	5.1	27.0	7.6	0.72	17	0.30	4.9	27.0	7.6	0.72	19	4.6	27.0	7.2	0.72	25
31-Jul	304	1.5	4.2	29.0	7.6	1.00	20	0.40	4.0	28.5	7.5	1.00	20	3.8	28.5	7.5	1.00	20
2-Aug	652	1.5	4.6	28.0	7.6	1.00	12	0.40	4.4	28.0	7.5	1.00	-	4.0	28.0	7.5	1.00	-
11-Aug	616	1.5	6.2	25.0	7.3	0.69	42	0.30	5.1	23.0	7.2	-	-	3.9	22.0	7.2	-	-
14-Aug	572	1.5	3.7	28.0	7.5	-	24	0.60	3.4	28.0	-	-	-	3.2	28.0	-	-	-
25-Aug	233	1.5	4.3	27.0	6.8	0.78	25	0.40	4.0	27.0	-	-	-	3.9	27.0	-	-	-
31-Aug	210	1.5	4.6	28.0	7.9	0.98	15	0.50	4.7	28.0	-	-	-	4.5	28.0	-	-	-
5-Sep	163	1.5	4.6	27.5	8.1	1.20	17	0.50	4.4	27.0	8.1	1.20	-	4.3	27.0	8.1	1.20	-
15-Sep	285	1.5	3.8	24.0	7.1	1.10	24	0.50	3.6	24.0	7.1	1.10	-	3.7	24.0	7.1	1.10	-
18-Sep	241	1.5	4.0	24.0	7.1	1.10	20	0.60	3.9	24.0	7.1	1.00	-	3.7	24.0	7.1	1.00	-
* 29-Sep	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5-Oct	467	1.5	6.3	19.0	7.0	0.72	40	0.60	6.3	19.0	6.9	0.72	-	6.3	18.5	6.9	0.79	-
□ 11-Oct	223	1.5	6.8	19.0	7.3	0.99	33	0.50	6.6	19.0	7.2	0.99	-	6.3	19.0	7.2	0.99	-
20-Oct	223	1.5	7.0	18.0	7.3	1.10	17	0.50	7.0	18.0	7.3	1.10	-	7.0	18.0	7.3	1.10	-
26-Oct	197	1.5	6.1	16.5	7.3	1.10	18	0.90	6.1	16.5	7.3	1.10	-	6.1	16.5	7.3	1.20	-

* Indicates data collected by OEPA
□ Tug or ore boat passed through
■ River dredging occurring

Table L-5
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Carter Road

			Minimum	Surface						Mid - Depth					Near - Bottom				
	Sample Date	Flow (CFS)	D.O. Criterion (mg/L)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductanc (mS/cm)	Turbidity (NTU)	NH3-N (mg/L)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductanc (mS/cm)	Turbidity (NTU)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductanc (mS/cm)	Turbidity (NTU)
	6-Apr	507	1.5	5.0	9.7	7.8	1.16	85	0.68	4.7	9.6	7.8	1.17	92	4.6	9.5	7.8	1.17	90
•	6-Apr	512	1.5	5.1	10.0	7.3	0.81	-	0.78	4.7	10.0	7.4	0.80	-	4.6	10.1	7.3	0.80	-
	25-Apr	924	4.0	7.6	12.1	7.5	0.82	77	0.40	7.5	12.0	7.6	0.82	89	7.2	12.0	7.6	0.83	91
•	27-Apr	794	4.0	7.3	13.0	7.6	0.65	-	0.63	7.3	13.0	7.6	0.65	-	7.4	12.8	7.6	0.65	-
	1-May	534	1.5	6.2	15.0	7.4	1.00	103	0.60	6.2	15.0	7.3	1.00	103	6.6	14.5	7.3	0.99	110
□	5-May	489	1.5	4.2	16.0	7.4	1.00	140	0.60	4.2	16.0	7.5	1.00	176	4.6	15.5	7.5	1.00	177
	8-May	403	1.5	3.6	17.9	7.4	1.06	50	0.38	3.2	17.6	7.4	1.05	62	1.6	17.2	7.3	1.07	52
	10-May	741	4.0	3.3	18.5	7.5	1.04	15	0.60	3.0	• 18.3	7.5	1.08	-	3.1	18.5	7.5	1.03	-
•	10-May	741	4.0	3.3	18.5	7.5	0.90	-	0.52	3.2	18.5	7.6	0.90	-	3.2	18.5	7.6	0.90	-
□	12-May	493	1.5	3.9	16.5	7.4	0.95	117	0.59	3.8	16.5	7.4	0.95	121	3.8	16.3	7.5	0.95	122
	15-May	520	1.5	3.2	20.0	7.5	1.10	88	0.67	3.0	20.0	7.4	1.10	115	3.0	20.0	7.4	1.10	115
	23-May	643	1.5	4.5	21.3	7.6	0.96	68	0.60	4.1	20.3	7.5	0.97	81	4.2	20.3	7.6	0.93	111
	2-Jun	607	1.5	4.5	21.0	7.5	0.79	16	0.50	4.3	21.0	7.5	0.78	17	4.3	21.0	7.5	0.78	20
	5-Jun	755	1.5	5.2	21.0	7.5	0.75	29	0.30	5.0	20.5	7.5	0.74	33	4.9	20.5	7.5	0.74	33
	9-Jun	471	1.5	3.0	23.0	7.4	0.93	8	0.60	2.7	23.0	7.4	0.93	8	2.7	23.0	7.3	0.92	7
	12-Jun	630	1.5	4.5	23.0	7.5	1.03	10	0.50	4.2	23.0	7.5	1.02	10	4.2	23.0	7.4	1.02	10
□	13-Jun	581	1.5	3.1	23.0	7.5	0.84	11	0.60	3.1	23.0	7.5	0.84	9	3.0	23.0	7.5	0.84	9
•	15-Jun	324	1.5	3.1	22.4	7.5	-	-	0.46	3.6	22.8	7.5	0.80	-	3.5	23.4	7.6	0.81	-
	19-Jun	217	1.5	3.1	27.0	7.4	1.10	5	0.50	1.6	25.0	7.4	0.99	6	1.6	25.0	7.4	0.98	9
	22-Jun	362	1.5	0.7	27.5	7.3	1.20	9	0.10	0.2	27.0	7.3	1.20	9	0.2	27.0	7.3	1.20	9
	23-Jun	234	1.5	1.4	28.0	7.5	1.20	-	0.30	0.8	28.0	7.5	1.20	-	0.6	27.5	7.5	1.20	-
	27-Jun	811	1.5	3.4	25.0	7.5	0.94	30	0.40	3.0	25.0	7.5	0.94	-	3.0	25.0	7.4	0.93	-
■	3-Jul	717	1.5	5.0	23.5	7.6	0.65	38	0.30	4.9	23.5	7.6	0.65	-	4.9	23.5	7.6	0.65	-
•	5-Jul	462	1.5	3.8	23.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
■	7-Jul	577	1.5	4.4	23.5	7.5	0.60	103	0.05	4.4	23.2	7.5	0.59	116	4.2	23.5	7.5	0.60	132
	11-Jul	285	1.5	2.2	25.0	7.6	1.02	42	0.50	2.2	24.8	7.5	1.01	-	2.4	24.5	7.4	0.92	-
□	14-Jul	657	1.5	1.6	26.5	7.2	0.97	12	0.50	1.6	25.5	-	-	-	1.6	25.5	-	-	-
	18-Jul	666	1.5	2.8	27.0	7.4	0.70	20	0.40	2.6	27.0	7.4	0.70	23	2.6	27.0	7.4	0.70	23
	19-Jul	458	1.5	2.4	27.0	7.5	0.71	46	0.40	2.3	27.0	7.5	0.71	44	2.3	27.0	7.4	0.71	67
•	20-Jul	534	1.5	2.0	27.0	7.5	0.70	-	0.36	-	-	-	-	-	-	-	-	-	-
	21-Jul	436	1.5	2.1	27.5	7.5	0.96	19	0.40	2.0	27.5	7.5	0.87	22	2.1	28.0	7.5	0.96	21
	24-Jul	534	1.5	2.6	26.0	7.5	1.06	26	0.50	2.6	26.0	7.5	1.06	-	2.8	26.0	7.5	1.06	-
□	25-Jul	342	1.5	3.1	26.0	7.5	0.94	30	0.40	2.9	26.0	7.3	0.86	36	2.8	26.0	7.4	0.94	38
	28-Jul	512	1.5	3.6	26.0	7.5	0.71	16	0.40	-	-	-	-	-	3.6	26.0	7.4	0.71	27
	31-Jul	304	1.5	3.0	28.0	7.5	0.90	10	0.40	2.8	28.0	7.4	0.90	10	2.6	28.0	7.4	0.90	20
	2-Aug	652	1.5	2.6	28.0	7.4	1.00	10	0.40	2.6	28.0	7.5	1.00	-	2.5	28.0	7.4	0.89	-
	11-Aug	616	1.5	5.1	22.0	7.4	0.59	104	0.30	4.7	22.0	7.4	-	-	4.2	22.0	7.4	-	-
	14-Aug	572	1.5	3.3	27.0	7.2	-	23	0.40	3.0	27.0	-	-	-	3.0	26.5	-	-	-
	25-Aug	233	1.5	2.9	27.0	6.7	0.75	29	0.50	2.7	27.5	-	-	-	2.6	27.5	-	-	-
	31-Aug	210	1.5	3.6	28.0	7.8	0.98	12	0.50	3.6	28.0	-	-	-	3.8	28.0	-	-	-
	5-Sep	163	1.5	2.6	27.0	7.9	1.20	14	0.50	2.5	27.0	8.0	1.20	-	2.5	27.0	8.0	1.20	-
	15-Sep	285	1.5	3.0	24.0	7.2	1.20	15	0.50	2.8	24.0	7.1	1.20	-	2.8	24.0	7.1	1.20	-
	18-Sep	241	1.5	2.8	24.0	7.1	1.00	15	0.50	2.7	24.0	7.0	1.00	-	2.7	24.0	7.0	1.00	-
•	29-Sep	-	1.5	4.9	21.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5-Oct	467	1.5	6.0	18.5	7.1	0.84	23	0.50	6.0	18.5	7.0	0.84	-	6.0	18.5	7.0	0.84	-
□	11-Oct	223	1.5	6.2	19.0	7.2	0.93	30	0.50	6.1	18.5	7.3	0.93	-	6.1	18.5	7.3	0.93	-
	20-Oct	223	1.5	6.6	17.0	7.3	1.00	16	0.50	6.6	17.0	7.3	1.00	-	6.5	17.0	7.3	1.00	-
	26-Oct	197	1.5	6.4	16.0	7.3	1.00	22	0.80	5.7	15.0	7.2	1.00	-	5.7	16.0	7.3	1.00	-

• Indicates data collected by OEPA
□ Tug or ore boat passsed through
■ River dredging occurring

Table L-6
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Center Street

	Sample Date	Flow (CFS)	Minimum D.O. Criterion (mg/L)	Surface						Mid - Depth					Near - Bottom				
				D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductanc (mS/cm)	Turbidity (NTU)	NH3-N (mg/L)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductanc (mS/cm)	Turbidity (NTU)	D.O. (mg/L)	Water Temp (°C)	pH (s.u.)	Specific Conductanc (mS/cm)	Turbidity (NTU)
	6-Apr	507	1.5	4.6	10.3	7.8	1.16	95	0.67	4.4	11.0	7.2	1.10	105	4.3	10.4	7.7	1.16	106
•	6-Apr	512	1.5	4.3	11.0	7.4	0.82	-	0.76	4.3	11.0	7.4	0.82	-	4.3	11.0	7.4	0.82	-
	25-Apr	924	4.0	7.4	12.0	7.5	0.82	62	0.29	7.3	12.0	7.5	0.82	74	7.3	12.1	7.6	0.82	98
•	27-Apr	794	4.0	7.6	14.0	7.6	0.65	-	0.39	7.6	13.5	7.6	0.65	-	6.8	13.5	7.6	0.65	-
	1-May	534	1.5	5.8	15.0	7.4	0.96	74	0.60	5.8	15.0	7.4	0.98	79	5.8	14.5	7.3	0.98	77
□	5-May	489	1.5	3.1	15.5	7.5	0.99	165	0.80	2.8	16.0	7.5	0.99	200	2.6	16.0	7.5	0.97	228
	8-May	403	1.5	3.6	18.0	7.3	1.05	47	0.60	5.3	13.9	7.4	0.68	38	7.5	12.2	7.6	0.47	36
	10-May	741	4.0	2.4	18.0	7.5	0.98	11	0.60	1.7	18.0	7.5	0.99	-	1.7	18.0	7.6	0.98	-
•	10-May	741	4.0	1.9	18.0	7.4	-	-	0.56	1.7	18.0	7.5	0.85	-	1.7	18.0	7.2	0.85	-
	12-May	493	1.5	3.8	16.0	7.5	0.96	110	0.56	3.8	16.0	7.5	0.97	118	3.6	16.0	7.5	0.97	137
□	15-May	520	1.5	2.8	18.5	7.5	0.97	97	0.70	2.8	18.5	7.4	1.00	97	2.8	18.5	7.5	0.98	97
	23-May	643	1.5	4.1	21.0	7.5	0.93	49	0.50	3.9	20.3	7.5	0.93	68	3.9	20.0	7.5	0.93	59
	2-Jun	607	1.5	4.5	20.0	7.4	0.76	22	0.40	4.4	20.0	7.4	0.76	25	4.4	20.0	7.4	0.75	25
	5-Jun	755	1.5	4.5	20.9	7.4	0.74	29	0.40	4.4	20.6	7.4	0.74	35	4.4	20.6	7.4	0.75	33
□	9-Jun	471	1.5	1.9	22.5	7.4	0.85	6	0.70	1.9	22.5	7.4	0.83	5	2.4	21.0	7.4	0.72	5
	12-Jun	630	1.5	2.8	22.5	7.4	0.98	10	0.80	2.6	22.5	7.4	0.98	10	2.6	22.0	7.4	0.93	10
	13-Jun	581	1.5	3.5	22.5	7.5	0.97	7	0.50	3.0	22.5	7.5	0.97	8	2.9	22.0	7.5	0.98	9
•	15-Jun	324	1.5	2.8	23.0	7.5	0.79	-	0.44	3.6	23.1	7.5	0.79	-	3.7	23.1	7.5	0.79	-
	19-Jun	217	1.5	2.5	26.0	7.4	0.92	5	0.60	2.2	24.0	7.4	0.87	7	2.2	24.0	7.5	0.89	26
	22-Jun	362	1.5	1.8	26.5	7.4	1.10	7	0.50	1.0	26.0	7.3	1.10	11	1.2	25.0	7.3	1.00	8
□	23-Jun	234	1.5	1.1	26.5	7.5	1.08	-	0.30	0.8	25.5	7.5	1.00	-	2.2	21.5	7.5	0.59	11
	27-Jun	811	1.5	2.2	26.0	7.4	1.10	220	0.40	2.2	26.0	7.4	1.10	-	2.2	23.5	7.4	0.78	-
■	3-Jul	717	1.5	4.4	23.8	7.5	0.65	52	0.20	4.4	23.8	7.5	0.64	-	4.3	23.3	7.5	0.59	-
•	5-Jul	462	1.5	3.5	24.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	7-Jul	577	1.5	2.9	23.5	7.5	0.62	63	0.90	2.8	23.5	7.4	0.62	66	2.9	23.5	7.5	0.62	69
	11-Jul	285	1.5	2.5	25.5	7.5	0.92	46	0.60	2.6	24.2	7.4	0.92	-	2.5	24.9	7.4	0.92	-
	14-Jul	657	1.5	1.5	26.0	7.2	0.96	14	0.50	1.4	26.0	-	-	-	1.4	26.0	-	-	-
	18-Jul	666	1.5	2.8	27.0	7.5	0.74	13	0.40	2.5	27.0	7.5	0.73	14	2.3	27.0	7.5	0.71	14
	19-Jul	458	1.5	1.3	27.0	7.4	0.72	74	0.30	1.2	27.5	7.5	0.72	81	1.2	27.5	7.5	0.71	135
•	20-Jul	534	1.5	1.5	26.5	7.7	0.72	-	0.33	-	-	-	-	-	-	-	-	-	-
	21-Jul	436	1.5	1.4	27.0	7.4	0.83	25	0.40	1.6	27.0	7.4	0.82	31	1.7	27.0	7.5	0.83	24
	24-Jul	534	1.5	3.8	26.0	7.6	1.06	18	0.50	2.4	26.0	7.5	1.05	-	2.0	26.0	7.5	1.04	-
	25-Jul	342	1.5	2.4	26.0	7.5	1.04	13	0.50	2.4	26.0	7.5	1.04	17	2.4	26.0	7.6	1.05	20
□	28-Jul	512	1.5	2.8	26.0	7.5	0.69	23	0.40	2.9	26.0	7.5	0.69	24	2.7	26.0	7.5	0.69	28
	31-Jul	304	1.5	2.7	28.0	7.5	0.79	10	0.30	2.8	• 28.0	7.4	0.79	10	3.0	28.0	7.5	0.79	10
	2-Aug	652	1.5	2.0	28.5	7.5	1.00	10	0.40	1.9	28.5	7.5	1.00	11	1.9	28.5	7.5	1.00	10
	11-Aug	616	1.5	4.4	22.0	7.7	-	180	0.50	4.4	21.5	7.8	-	-	4.4	21.5	7.5	-	-
	14-Aug	572	1.5	3.1	27.0	7.4	-	23	0.60	3.1	26.0	-	-	-	3.2	26.5	-	-	-
	25-Aug	233	1.5	2.1	27.5	6.8	0.76	22	0.50	1.9	28.0	-	-	-	2.0	27.5		-	-
	31-Aug	210	1.5	2.7	27.0	7.9	1.03	12	0.50	2.7	27.5	-	-		2.6	27.5		-	-
	5-Sep	163	1.5	2.8	27.0	7.8	1.20	12	0.60	2.7	27.0	7.8	1.20	-	2.6	26.5	7.9	1.20	-
	15-Sep	285	1.5	3.1	24.0	7.2	1.20	25	0.50	-	-	-	-	-	-	-	-	-	-
	18-Sep	241	1.5	2.8	23.0	7.1	1.10	15	0.50	-	-	-	-	-	-	-	-	-	-
•	29-Sep	-	1.5	4.4	21.0	-	-	-	-	4.2	20.9	-	-	-	-	-	-	-	-
	5-Oct	467	1.5	4.7	15.0	7.4	0.98	12	0.50	-	-	-	-	-	-	-	-	-	-
	11-Oct	223	1.5	6.0	19.0	6.9	0.83	33	0.40	-	-	-	-	-	-	-	-	-	-
	20-Oct	223	1.5	6.0	17.0	7.0	1.00	16	0.50	-	-	-	-	-	-	-	-	-	-
	26-Oct	197	1.5	5.9	15.0	7.4	1.00	7	0.50	-	-	-	-	-	-	-	-	-	-

• Indicates data collected by OEPA
□ Tug or ore boat passed through
■ River dredging occurring

Figure L-1
Minimum Dissolved Oxygen Measured at Lower Harvard Avenue
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study

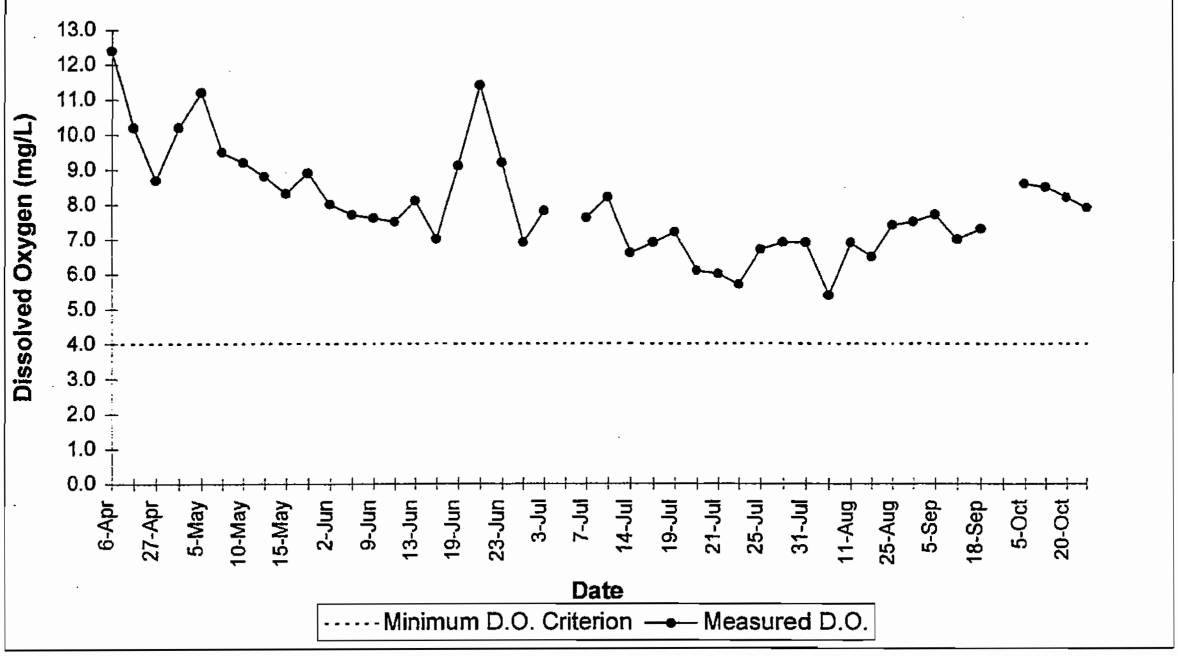
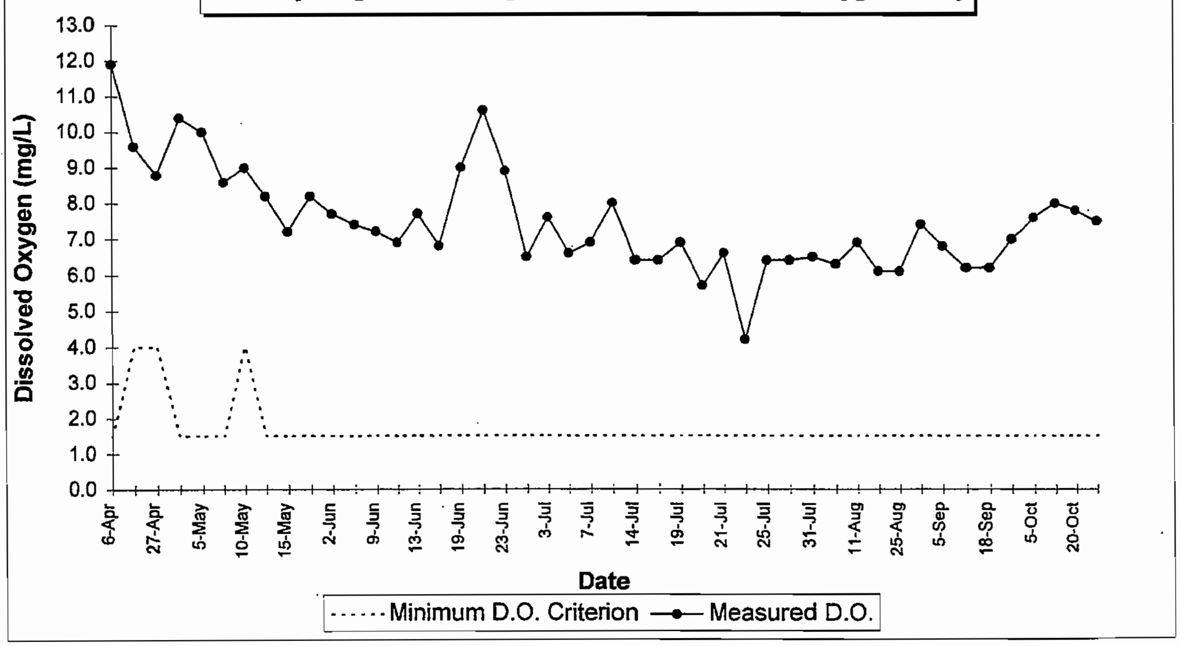


Figure L-2
Minimum Dissolved Oxygen Measured at the
Newburgh & Southshore Railroad
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study



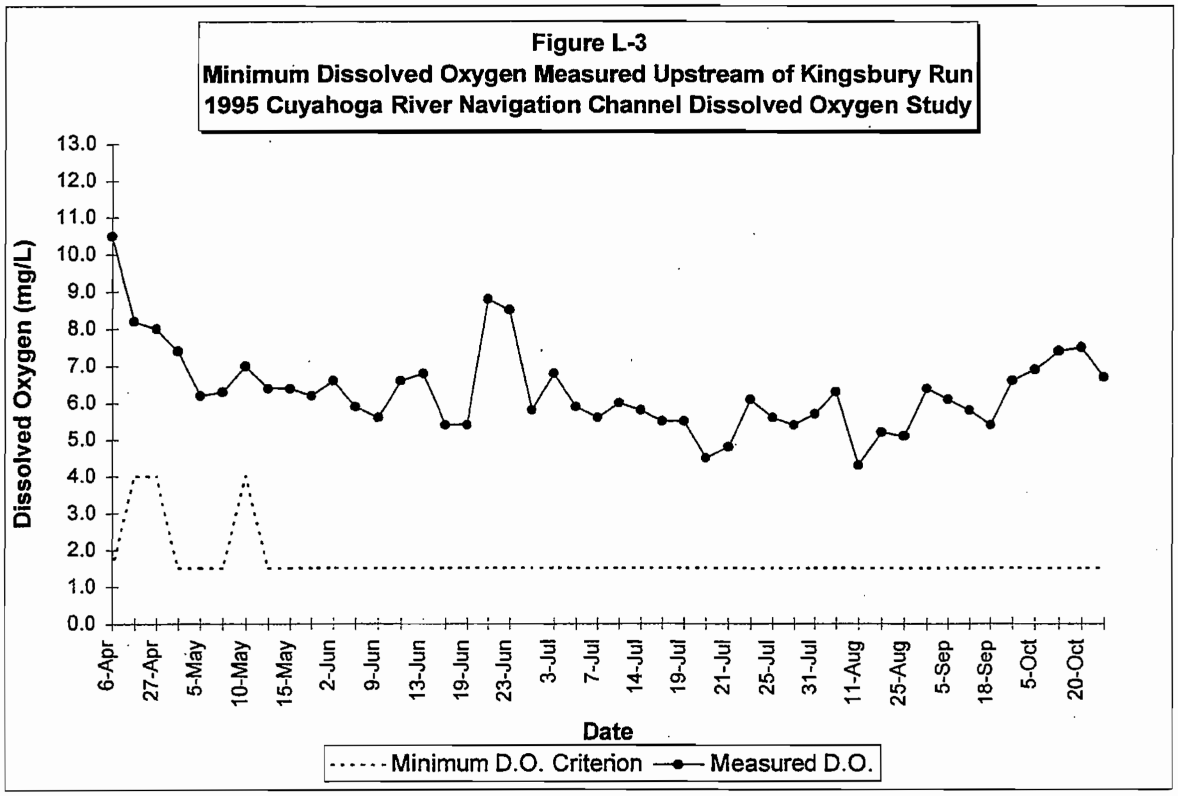


Figure L-3
Minimum Dissolved Oxygen Measured Upstream of Kingsbury Run
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Dissolved Oxygen (mg/L)
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
6-Apr
27-Apr
5-May
10-May
15-May
2-Jun
9-Jun
13-Jun
19-Jun
23-Jun
3-Jul
7-Jul
14-Jul
19-Jul
21-Jul
25-Jul
31-Jul
11-Aug
25-Aug
5-Sep
18-Sep
5-Oct
20-Oct
Date
Minimum D.O. Criterion
Measured D.O.

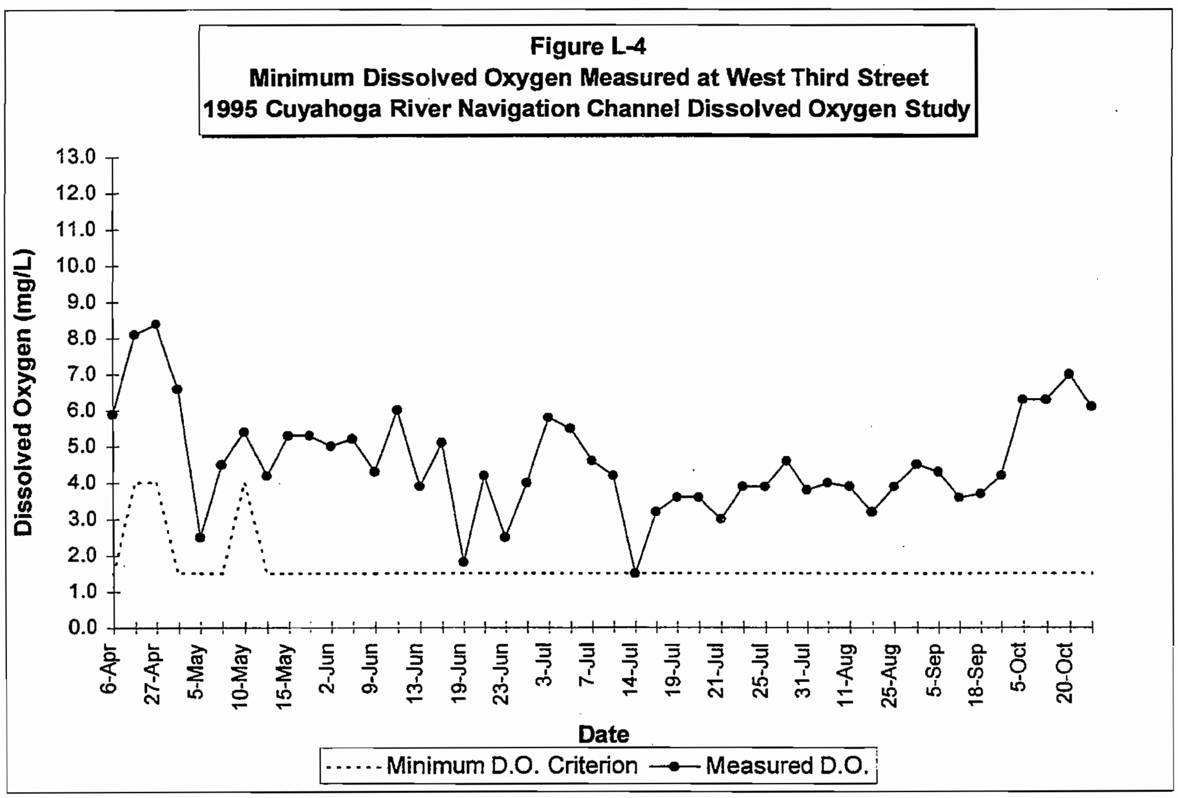


Figure L-4
Minimum Dissolved Oxygen Measured at West Third Street
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Dissolved Oxygen (mg/L)
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
6-Apr
27-Apr
5-May
10-May
15-May
2-Jun
9-Jun
13-Jun
19-Jun
23-Jun
3-Jul
7-Jul
14-Jul
19-Jul
21-Jul
25-Jul
31-Jul
11-Aug
25-Aug
5-Sep
18-Sep
5-Oct
20-Oct
Date
Minimum D.O. Criterion
Measured D.O.

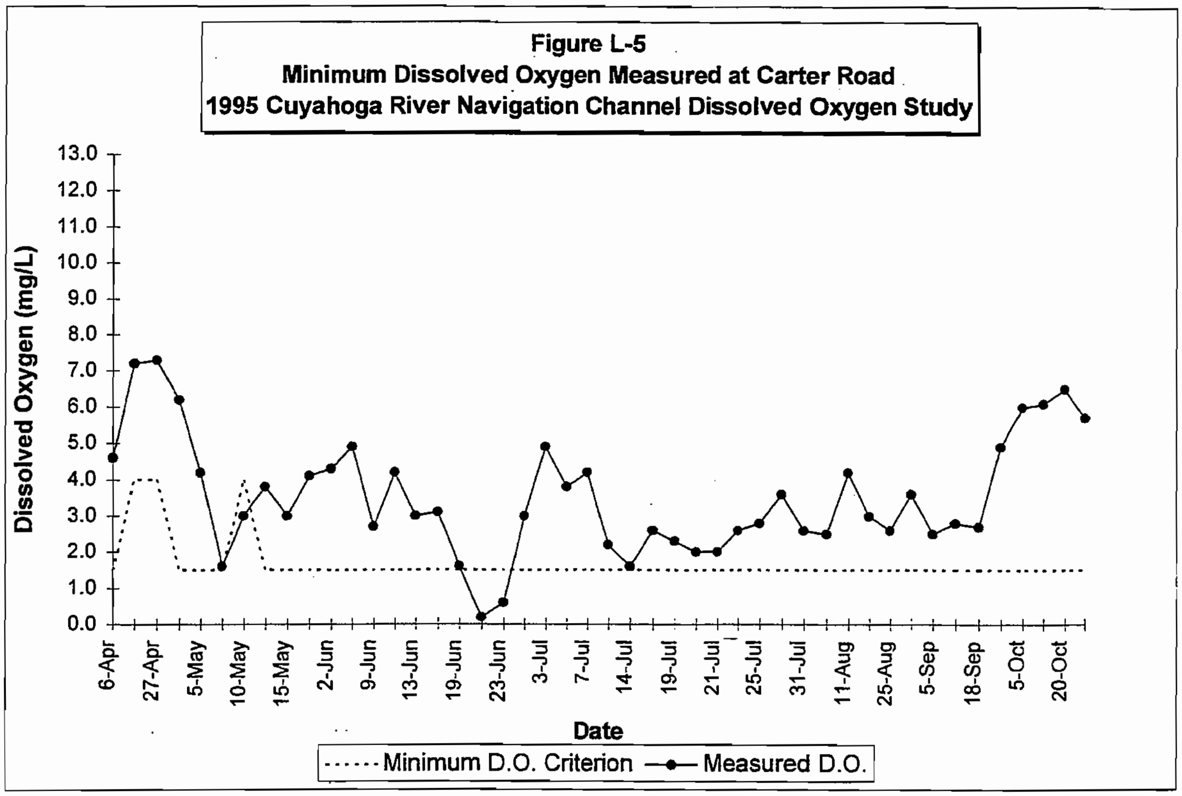


Figure L-5
Minimum Dissolved Oxygen Measured at Carter Road
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Dissolved Oxygen (mg/L)
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
6-Apr
27-Apr
5-May
10-May
15-May
2-Jun
9-Jun
13-Jun
19-Jun
23-Jun
3-Jul
7-Jul
14-Jul
19-Jul
21-Jul
25-Jul
31-Jul
11-Aug
25-Aug
5-Sep
18-Sep
5-Oct
20-Oct
Date
Minimum D.O. Criterion
Measured D.O.

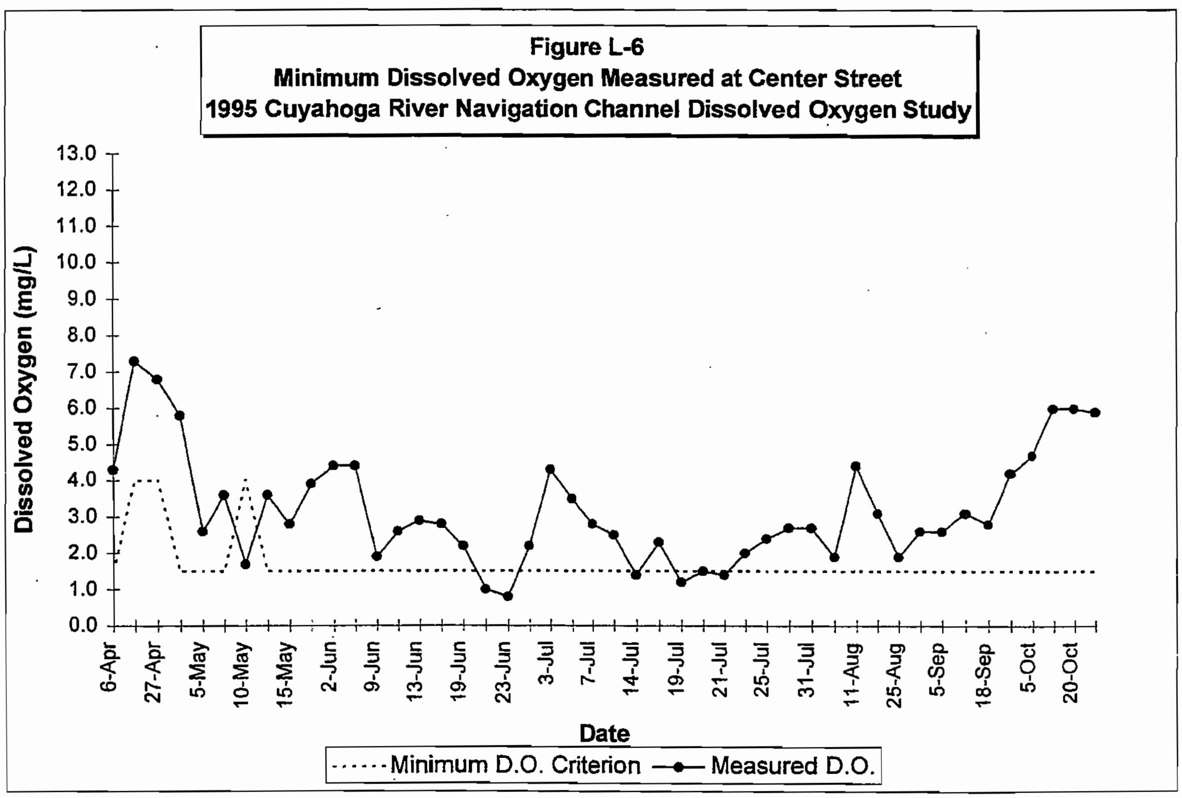


Figure L-6
Minimum Dissolved Oxygen Measured at Center Street
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Dissolved Oxygen (mg/L)
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
6-Apr
27-Apr
5-May
10-May
15-May
2-Jun
9-Jun
13-Jun
19-Jun
23-Jun
3-Jul
7-Jul
14-Jul
19-Jul
21-Jul
25-Jul
31-Jul
11-Aug
25-Aug
5-Sep
18-Sep
5-Oct
20-Oct
Date
Minimum D.O. Criterion
Measured D.O.

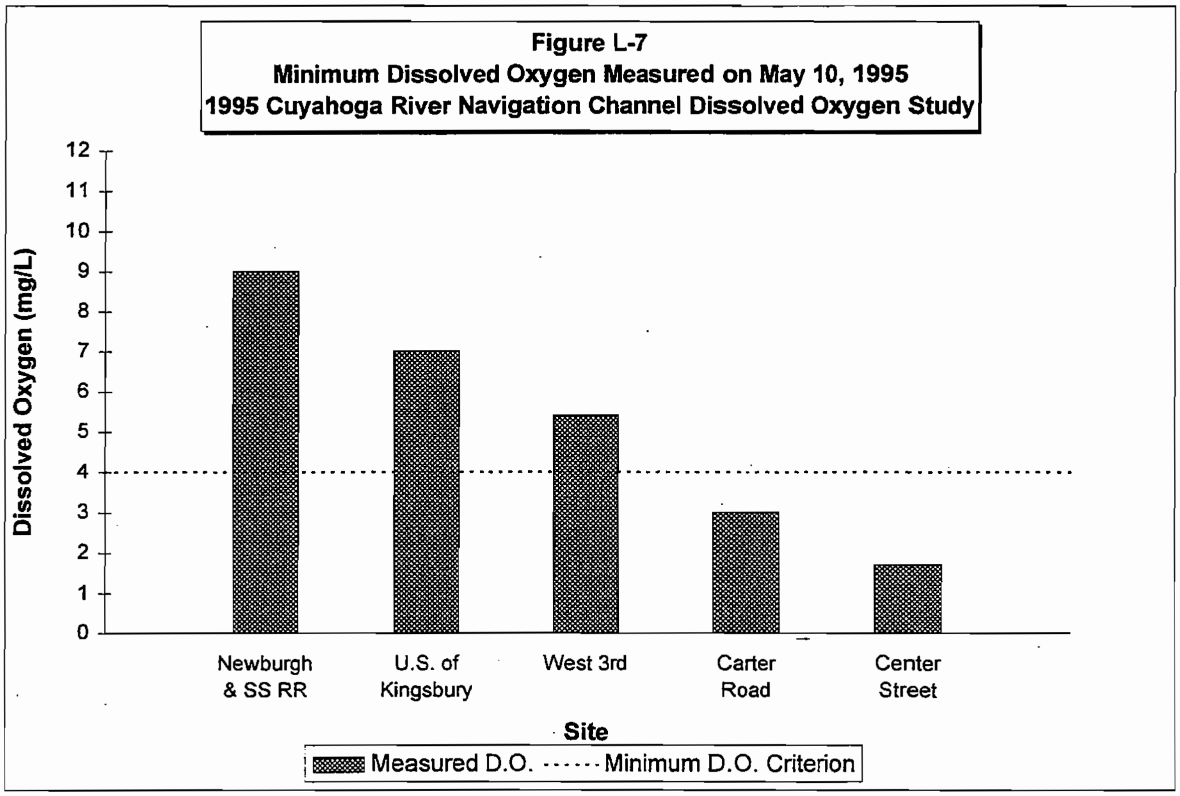


Figure L-7
Minimum Dissolved Oxygen Measured on May 10, 1995
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Dissolved Oxygen (mg/L)
0
1
2
3
4
5
6
7
8
9
10
11
12
Newburgh & SS RR
U.S. of Kingsbury
West 3rd
Carter Road
Center Street
Site
Measured D.O.
Minimum D.O. Criterion

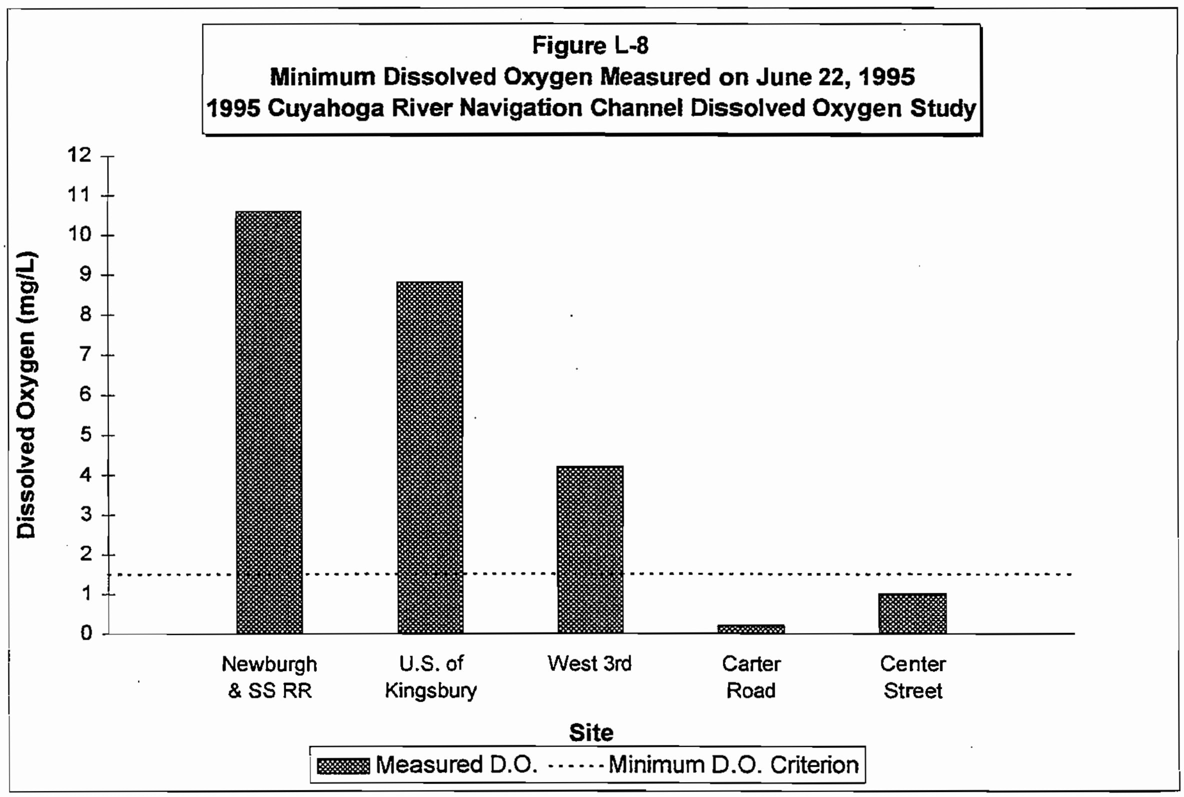


Figure L-8
Minimum Dissolved Oxygen Measured on June 22, 1995
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study
Dissolved Oxygen (mg/L)
0
1
2
3
4
5
6
7
8
9
10
11
12
Newburgh & SS RR
U.S. of Kingsbury
West 3rd
Carter Road
Center Street
Site
Measured D.O.
Minimum D.O. Criterion

Figure L-9
Minimum Dissolved Oxygen Measured on June 23, 1995
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study

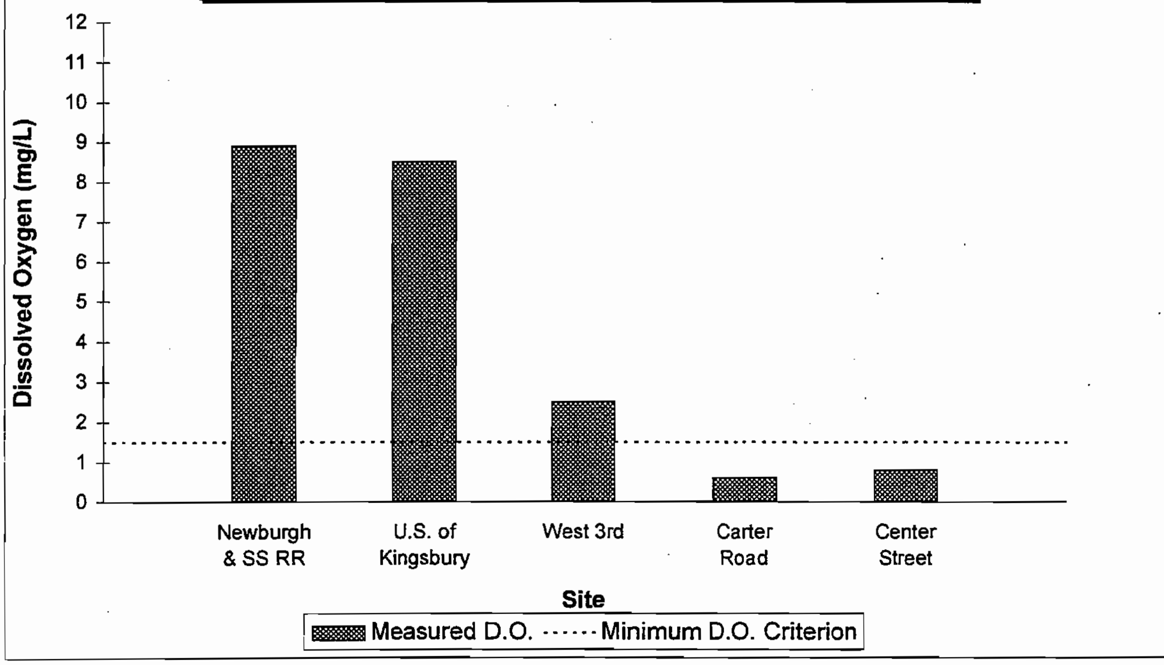


Figure L-10
Minimum Dissolved Oxygen Measured on July 14, 1995
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study

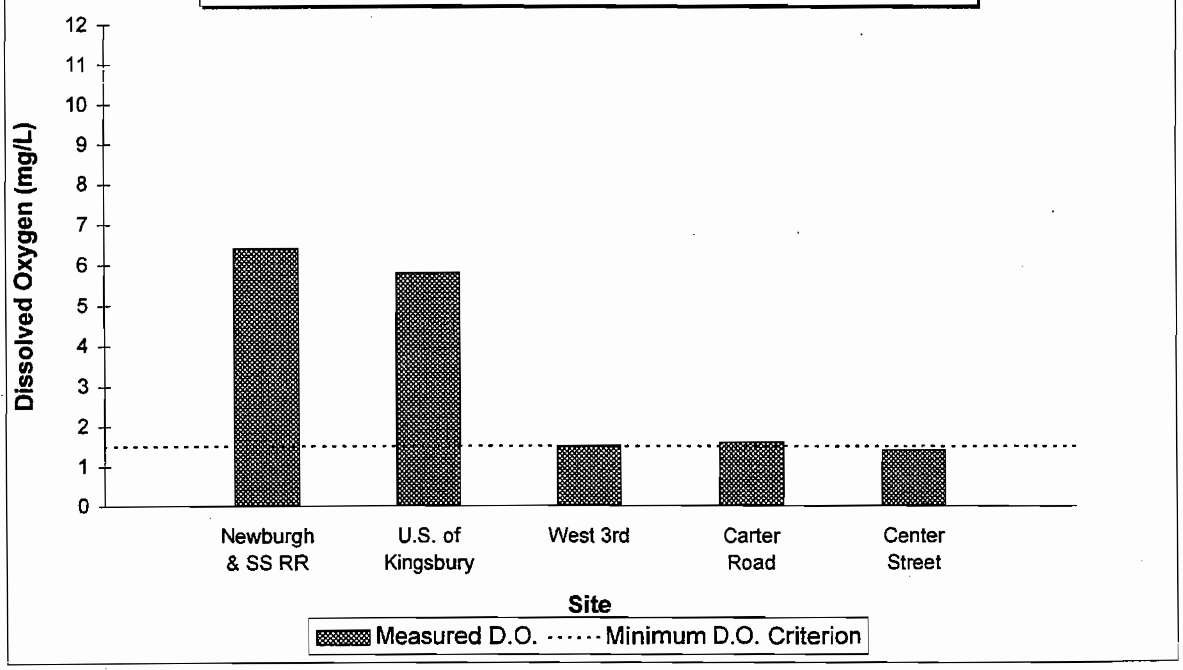


Figure L-11
Minimum Dissolved Oxygen Measured on July 19, 1995
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study

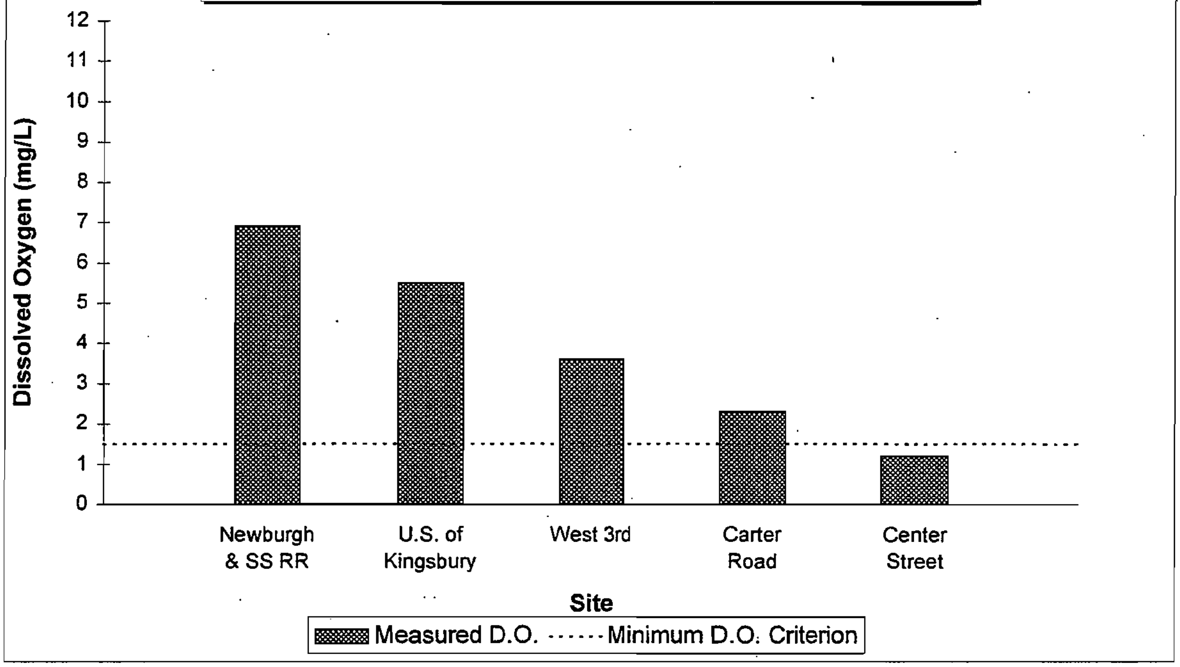
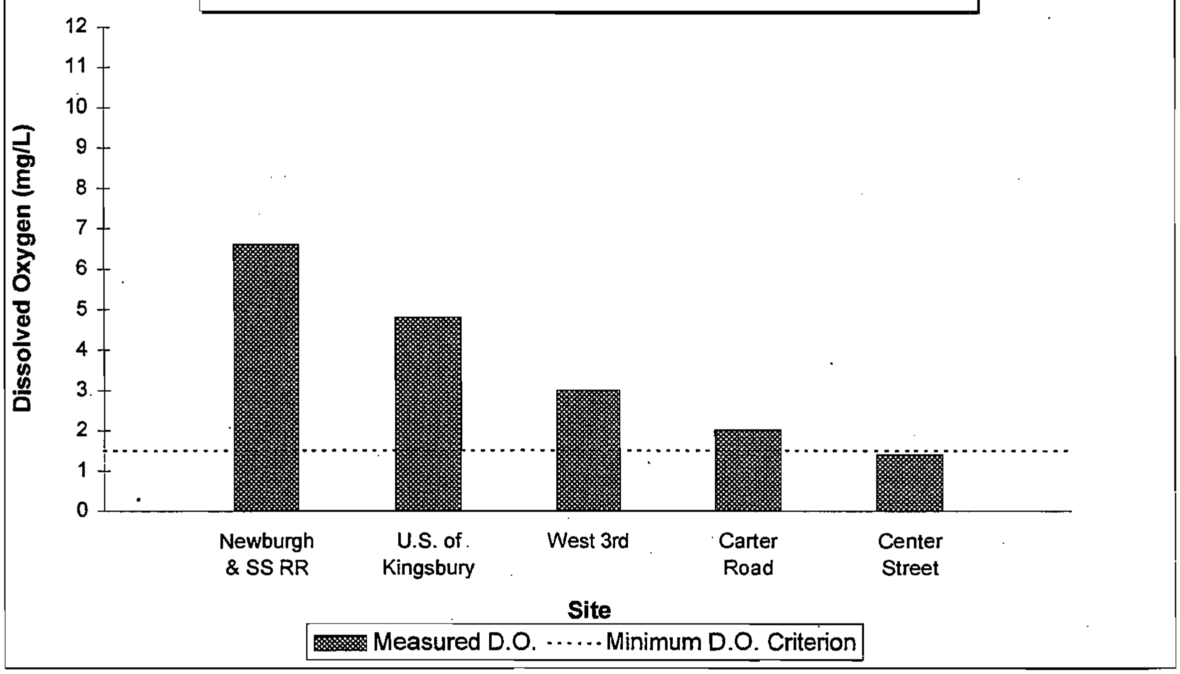


Figure L-12
Minimum Dissolved Oxygen Measured on July 21, 1995
1995 Cuyahoga River Navigation Channel Dissolved Oxygen Study



APPENDIX M
MILL CREEK BIOMONITORING SURVEY, 1995

The Northeast Ohio Regional Sewer District's 1991 CSO Phase I Study identified the need for a comprehensive and consolidated approach for the control of the range of pollution problems in the Mill Creek area. During 1995, the District began the Mill Creek Watershed Management Project (the Mill Creek Project), a comprehensive study which utilized the watershed approach to evaluate the sewer system and water quality within the Mill Creek drainage basin. The goals of the Mill Creek Project were as follows:

- To develop a comprehensive plan responsive to water quality and capacity related issues.
- To initiate design studies as early as practical (The 1991 CSO Phase I Study suggested that a single large tunnel might be the backbone of an integrated solution for both separate and combined sewer areas within the Mill Creek Watershed).
- To involve the public in a long term plan to restore Mill Creek and solve stormwater management issues.

The Mill Creek project team utilized the watershed approach not only to evaluate many possible sources of pollution including SSO's, CSO's, stormwater drainage, septic tank discharges and landfill leachate, but also to gather "information from the public in the Mill Creek service area regarding their concerns for water quality in the creek." (Montgomery Watson, 1995) The Mill Creek project team believed this approach would improve cost/benefit ratios and create a partnering atmosphere for the District and the 11 communities within the Mill Creek service area. It was hoped that this strategy would allow the District to present both analytical data and public opinion to the Ohio EPA and U.S. EPA as justification for establishing water quality standards which apply during wet weather.

The Mill Creek Water Quality monitoring program was designed to characterize the water quality of Mill Creek and pollutant sources entering the creek. W_2O, Inc. of Mississauga, Ontario, Canada was engaged to perform most of the water quality monitoring associated with the project. The District's Water Quality and Industrial Surveillance Department (WQIS), however, conducted biomonitoring which included evaluations of the creek's aquatic habitat and the collection of fish and macroinvertebrates. WQIS also coordinated toxicity testing which was conducted by the District's Analytical Services Department.

Biomonitoring sites utilized by WQIS for the Mill Creek project are shown in Figure M-1. Eight sites which were selected specifically for the project are described below.

Cuyahoga River

Site A is located on the Cuyahoga River upstream of Mill Creek, approximately 200 feet north of Granger Road.

Site B is located on the Cuyahoga River downstream of Mill Creek, immediately west of the I-77 bridge.

Mill Creek

Site 32.2 is located on Mill Creek upstream of the Warner Road tributary. It is adjacent to General Chemical Property.

Site 32.4 is located on Mill Creek, immediately downstream of the Mill Creek falls.

Site 32.6 is located on Mill Creek, downstream of the Cranwood Branch, just northwest of the former ODOT facility.

Site 32.8 is located on Mill Creek, upstream of the Cranwood Branch and downstream of Broadway Avenue, near the entrance to the Cleveland Metroparks' Garfield Reservation.

Site 34.5 is located on Mill Creek, immediately downstream of Miles Road.

Site 35.2 is located on Mill Creek north of Halburton Road near Canterbury Golf Course in Shaker Heights.

Locations of the remaining Mill Creek biomonitoring sites are described in the Mill Creek section of the 1993-1995 Greater Cleveland Area Environmental Water Quality Assessment.

Toxicity Testing

Chronic and Acute toxicity testing of waters collected from all of the Mill Creek biomonitoring sites was conducted on *Pimephales promelas* (fathead minnows) and *Ceriodaphnia dubia* (water fleas) during August and October 1995. The NEORSD staff, however, has been unable to reach definite conclusions based upon the results of the toxicity tests. Additional toxicity testing is planned for the future.

Habitat Assessment

Northeast Ohio Regional Sewer District (NEORSD) Investigators employed Ohio EPA's Qualitative Habitat Evaluation Index (QHEI) to assess the aquatic habitat at all thirteen biomonitoring sites between August 16 and August 22, 1995. QHEI evaluations were conducted under low flow conditions, which enabled investigators to measure pool and riffle/run depth when they were near their minimum (worst case) and facilitated the determination of the amount of instream cover. The 150-200 meter stream segment evaluated at each biomonitoring site was the same segment which was electroshocked for fish collection. Where electroshocking was not performed (at the Cuyahoga River sites), habitat evaluations were conducted over a stream segment of approximately 200 meters. QHEI results are displayed graphically in Figure M-2 and field scoring sheets are located in Appendix F.

Narrative ratings of Mill Creek's habitat, based on the QHEI scores, ranged from Fair-Poor (the range which lies between Poor and Good-Fair) to Excellent. The lowest QHEI scores were obtained at Site 35.2 and Cuyahoga River Site B. Site 35.2, which was the furthest upstream site, exhibited no sinuosity, poor development, and a lack of riffles. The major difference between QHEI scores at Cuyahoga River Sites A and B was the substrate quality. Sand is the predominant substrate type at Site B, whereas Site A is characterized by a gravel and sand substrate. The gravel and sand substrate at Site A results in a higher score for the substrate metric and contributes to a higher overall score.

Overall, the QHEI scores suggest that the biomonitoring sites used in the Mill Creek Watershed Study exhibited similar habitat quality. The majority of the sites scored in the Good-Fair or Excellent-Good range (the range that lies between Good-Fair and Excellent). There is no discernible trend in the scores which would suggest that habitat quality generally improves or declines from upstream to downstream.

Mill Creek Sites 32.2, 32.4, 32.6, 32.8, 34.5 and 35.2 and Cuyahoga River Sites A and B were selected for the purposes of the Mill Creek Watershed Study and had not been utilized by NEORSD prior to 1995. Although sites were initially located using only a map, final site locations were established during a field investigation. The final site locations were reasonably close to the initial locations, but had to be accessible to personnel and equipment. When two or more stream segments were being considered for selection as the final site location, the segment which, based upon a cursory observation, appeared to exhibit better habitat characteristics was selected. The site selection process therefore, may have introduced an upward bias into the QHEI scores.

NEORSD had performed QHEI evaluations at Sites 31.0, 32.0, 33.0, 34.0, and 35.0 in 1991. Figure M-3, which compares 1991 and 1995 QHEI scores, shows that sites were given higher scores in 1995 than in 1991. There may be several reasons for these scoring differences. Prior to 1995, NEORSD had not conducted electroshocking on Mill Creek. In 1991, the habitat at each site was evaluated over a stream segment which was approximately centered at the point where NEORSD had routinely collected samples for chemical and bacteriological analysis. Although stream segments which were electroshocked in 1995 were, in general, centered on the same points, Sites 33.0 and 35.0 were moved slightly for the purpose of this study. Site 33.0 was moved approximately 300 feet upstream of NEORSD's historical Site 33.0 to avoid electroshocking the pond-like habitat which is created by the retaining wall at Wolf Creek's confluence with Mill Creek. Site 35.0 was moved approximately 200 feet upstream of NEORSD's historical Site 35.0 to avoid electroshocking the culverted section of the creek under Northfield Road. Because Sites 33.0 and 35.0 were moved slightly between 1991 and 1995, their respective QHEI scores from the two years may not be comparable. QHEI scores for sites 31.0, 32.0, and 34.0 from 1991, however, can be compared to scores for the same sites for 1995 since the sites evaluated were not changed.

Several modifications to Ohio EPA's QHEI scoring methods which were instituted between 1991 and 1995 can result in slightly higher scores when the new methods are used. Two points are now given if five or more substrate types are present. The methods used in 1991, however, assigned the Number of Substrate Types subcomponent of the Substrate Metric a maximum score of one point. Additionally, the subcomponent "Rootmats," which was not included in the scoring methods used in 1991, has been added to the instream cover metric and is assigned a score of one.

Finally, the 1991 and 1995 Mill Creek QHEI evaluations were conducted by different Investigators. A comparison of the QHEI scoring revealed that different habitat subcomponents were selected in several metrics, resulting in minor scoring differences between the 1991 and 1995 evaluations. Evaluating habitat using the QHEI is a subjective process and is dependant upon the scorer's visual estimate and assessment of ecological conditions. Although there may be several reasons for the QHEI scoring differences, it is not likely that there were major habitat modifications at these Mill Creek locations between 1991 and 1995.

The average QHEI score calculated by NEORSD investigators for Mill Creek and its tributaries which were monitored during 1995 was 67.8. According to Ohio EPA's *The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application*, "Stream reaches with QHEI scores averaging > 60 will likely have the potential to attain the WWH use" (p. 40). Fish and Macroinvertebrate collection results, however, indicate that Mill Creek is not meeting the biocriteria of the Warmwater Habitat Aquatic Life Use Designation.

The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application also states, "IBI scores of less than 20 are usually associated with "toxic" impacts where large components of the community are lost or disrupted and the abundance and biomass of the community is greatly reduced" (p. 9). Ohio EPA, in the same document, states: "For impacts solely attributable to habitat modification IBI scores rarely descend below an IBI of 20 regardless of the QHEI score."

Although the preceding paragraph and Section 12 (Toxicity Evaluation) of the Mill Creek Watershed Study Water Quality Monitoring Report suggest that "toxic impacts" may be affecting the biota of Mill Creek, evidence exists which suggests that habitat may also be having an effect. Ohio EPA, in *The Qualitative Habitat Evaluation Index (QHEI): Rationale, Methods, and Application*, makes the following statements:

- "Sites with fast currents, for all sampler types, had higher IBI scores than expected by chance" (p. 24).
- "Streams with little or no sinuosity were associated with lower IBI scores for all sampler types" (p. 25).
- "Instream cover was usually positively correlated with the IBI" (p. 25)
- "Unstable and highly embedded substrates are associated with lower IBI values in wading and headwater sites" (p. 27).

The following information was compiled from QHEI Field Sheets (located in Appendix F) used by NEORSD investigators to evaluate habitat at biomonitoring sites on Mill Creek and its tributary streams:

- Currents were described as "fast" at only three of 11 sites.
- Sinuosity was described as "low," "low/none," or "none" at nine of 11 sites.
- The amount of instream cover was described as "sparse" at nine of 11 sites.
- Substrate embeddedness was described as "normal," "normal/moderate," or "moderate" at nine of 11 sites. Hester-Dendy artificial substrate samplers were, upon their retrieval however, found to be embedded in the substrate at five of the 11 sites (see the macroinvertebrate collection section).

According to Ohio EPA's *Biological Criteria for the Protection of Aquatic Life: Volume II*, reference sites should "... be representative of the watershed for which they are to serve as a control" (p. 2-1). Ohio EPA reference sites were selected, in part, during the agency's 1983-84 Stream Regionalization Project (SRP). Ohio EPA states, in *Biological Criteria for the Protection of Aquatic Life: Volume i*, that during the SRP study design, "Watersheds with evidence of substantial human disturbance were eliminated. This was done by examining maps of human population density, current and past land uses, compiling a watershed disturbance ranking, and rating the size and location of point source discharges. From this exercise 'least-impacted' sites were selected" (p. 2-2).

It would appear, therefore, that urban watersheds like that of Mill Creek, which have been extensively developed and which include high proportions of impervious ground, may not be adequately represented in Ohio EPA's reference site data base. Predictions of an urban stream's potential to meet biological criteria, based upon what has been observed at reference sites, may therefore not be appropriate. Additionally, fluctuations in water temperature and stream flow rates, which may adversely affect the biota of Mill Creek and other urban streams, are not evaluated by the QHEI.

Fish Collection

Fish community health was assessed by NEORSD Investigators using electroshocking methods and the application of two indices–the Index of Biotic Integrity (IBI) and the Modified Index of Well-Being (MIwb)--which are recognized by the Ohio Environmental Protection Agency.

The IBI uses 12 metrics to evaluate structural and functional attributes of a fish community. Examples of structural attributes are fish numbers and diversity, while functional attributes include feeding strategies, environmental tolerances, and disease symptoms. The IBI assigns each metric a score of 1, 3, or 5 by comparing the results obtained at the survey site to those which have been attained at reference sites. The individual metrics are then summed to obtain an IBI score between 12 and 60. The fish community at each site is assigned a narrative rating of "Exceptional," "Good," "Fair," "Poor," or "Very Poor," based upon its numeric score as described in Ohio EPA's *Compendium of Biological Results from the Ohio Rivers, Streams, and Lakes (1989).*

The MIwb, which is based upon the structural aspects of a fish community, is calculated at sites which have a tributary drainage area greater than 20 square miles. The MIwb incorporates the following four fish community measures: number of individuals, biomass, the Shannon Diversity Index based on numbers of fishes, and the Shannon Diversity Index based on weight of fishes. The MIwb score is the result of a mathematical calculation using the formula:

$$MIwb = 0.5 \ln N + 0.5 \ln B + \bar{H}(No.) + \bar{H}(Wt.)$$

where:

N = Relative numbers of all species excluding species designated "highly tolerant"

B = Relative weights of all species excluding species designated "highly tolerant"

$\bar{H}(No.)$ = Shannon Diversity Index based on numbers

$\bar{H}(Wt.)$ = Shannon Diversity Index based on weight

Shannon Diversity Index

$$\bar{H} = -\sum \left[\left(\frac{n_i}{N}\right) \log_e \left(\frac{n_i}{N}\right)\right]$$

where:

n_i = Relative numbers or weight of species

N = Total number or weight of the sample

Fish electroshocking was performed at the following biomonitoring sites:

Site 35.2	Mill Creek north of Halburton Road
Site 35.0	Mill Creek at Northfield Road
Site 34.5	Mill Creek downstream of Miles Avenue
Site 34.0	Mill Creek at Rex Avenue
Site 33.0	Wolf Creek
Site 32.8	Mill Creek downstream of Wolf Creek
Site 32.6	Mill Creek at Broadway Avenue
Site 32.4	Mill Creek downstream of the Mill Creek falls
Site 32.2	Mill Creek upstream of the Warner Road tributary
Site 32.0	Warner Road tributary
Site 31.0	Mill Creek at Canal Road

The IBI and the MIwb were calculated at Sites 31.0 and 32.2. These sites have drainage areas greater than 20 square miles and are considered wading sites. The remaining sites, which have tributary drainage areas of 20 square miles or less, are considered headwater sites. Only the IBI was calculated for these sites.

A summary of NEORSD's electroshocking results is presented in Table M-1. Individual IBI metric scores are shown in Table M-2. More detailed tables which, for each sample event, list the species collected, their numbers, mass, pollution tolerances, and incidences of DELT anomalies can be found in Appendix E. Figures M-4 through M-6 display graphically the Mill Creek IBI and MIwb scores. Figure M-7 shows the proportion of highly tolerant fishes collected at each site on the mainstem of the creek and Figure M-8 displays the incidence of DELT (deformities, eroded fins, lesions, and tumors) anomalies.

Electroshocking was performed twice at each location, with a waiting period of at least six weeks between passes, using NEORSD's longline bank electroshocking equipment. All fish, with the exception of the *Pomoxis* genus (Crappie) obtained at Site 35.0, were identified to species level in the field and returned to the creek. Members of the *Pomoxis* genus collected at Site 35.0 were placed in formalin and taken to the Ohio State University Museum of Biological Diversity, where they were identified by the Curator of Fishes.

Fish Collection Summary

In order to meet the biological criteria of the Warmwater Habitat Aquatic Life Use Designation, biological index scores must, at a minimum, fall into the "Good" range. All sites which were electroshocked for the Mill Creek Watershed Study obtained index scores in the "Very Poor" or "Poor" ranges. Sites 35.2, 34.5, 34.0, 33.0, 32.6, 32.4, 32.2, and 32.0 each obtained an IBI score of 12, which is the lowest possible score, on at least one of the two sampling dates. There were no fish collected at sites 35.2, 34.5, and 33.0 on at least one of the two sample dates. Several sites obtained a slightly higher score on the second sampling date than on the first. One possible explanation is that earlier in the season, water temperature and the metabolic rates of fishes are lower. Fish are less active and tend to inhabit deeper pools where they are able to avoid being electroshocked. Later in the season, as temperatures and metabolic rates increase, fish become more active and are more likely to be captured.

Figure M-7 shows that fish communities throughout Mill Creek tend to be dominated by species which are highly tolerant of environmental disturbances. This is less pronounced, however, at Sites 31.0 and 32.2, which are the sites on the mainstem of Mill Creek closest to the Cuyahoga River. The reduced proportion of tolerant species at these sites is due, at least in part, to the presence of fish which have migrated from the Cuyahoga River in search of food and/or refuge. According to Ohio EPA's *Biological Criteria for the Protection of Aquatic Life: Volume II*, tolerant fish species tend toward community predominance with decreasing water and/or habitat quality (p. 4-29)

While habitat quality at the majority of the Mill Creek biomonitoring sites was rated "Good-Fair" or better according to Ohio EPA's Qualitative Habitat Evaluation Index, chemical and bacteriological data collected by W_2O and NEORSD indicate that water quality may be a factor in the failure of Mill Creek's fish communities to attain biological criteria. Chemical and bacteriological data collected by W_2O in 1995 during dry weather at Sites 32.2, 32.6, 34.0, and 35.0 revealed elevated NH_3-N concentrations at Site 32.2, elevated fecal coliform concentrations at Sites 32.2, 32.6, and 34.0, and elevated *E. coli* concentrations at all four sites (see Sections 6.3.1 and 6.3.2. of the Mill Creek Watershed Study Water Quality Monitoring Report). Bacteriological water quality criteria are intended to protect the recreational uses of a water body. Although elevated levels of fecal coliform and/or *E. coli* bacteria may not directly impact the health of a fish community, these bacteria may be an indicator of the presence of other pollutants which could have an adverse impact on aquatic life. W_2O's wet weather monitoring of the same four sites indicated elevated fecal coliform and *E. coli* concentrations at all four sites. Continuous dissolved oxygen monitoring at Sites 32.2, 32.6, and 35.0 between May 2 and August 2, 1995 indicated that the Warmwater Habitat aquatic life use designation's outside mixing zone minimum at-any-time dissolved oxygen criteria were not met at Site 32.2 on 34 occasions, at Site 32.6 on 3 occasions, and at Site 35.0 on 20 occasions (see Section 6.5.4 of the Mill Creek Watershed Study Water Quality Monitoring Report).

Additional data indicating that water quality may be a factor in the failure of the creek's fish communities to meet water quality criteria were obtained during the toxicity testing portion of the Mill Creek Watershed Study. During the first chronic toxicity tests, the Warmwater Habitat (WWH) aquatic life use designation outside mixing zone (OMZ) maximum criterion was not met for copper at Sites 33.0 and 34.0; the WWH OMZ average criteria were not met for copper at Site 34.0, for iron at Sites 31.0 and 32.2, and for ammonia at Site 32.2; and the WWH OMZ minimum at-any-time dissolved oxygen criterion was not met at Site 35.2. Additionally, all of the Mill Creek biomonitoring sites had elevated fecal coliform concentrations during the first chronic test. The failure to meet most of the water quality criteria discussed above is attributable to a rain event which occurred during the first chronic toxicity test. During the second chronic toxicity test, elevated fecal coliform concentrations were recorded at Site 34.0 (6600/100 mL on 10/9/95 and 7800/mL on 10/13/95). During the acute toxicity testing, a failure to meet the WWH OMZ minimum at any time dissolved oxygen criterion and an elevated fecal coliform concentration were recorded at Site 35.2.

Figure M-8 shows the incidence of DELT Anomalies on fishes collected on Mill Creek by NEORSD Investigators during 1995. According to Ohio EPA's *Biological Criteria for the Protection of Aquatic Life: Volume II*, "Common causes of DELT (deformities, eroded fins, lesions, and tumors) anomalies...include the effects of bacterial, viral, fungal, and parasitic infections, neoplastic diseases and chemicals. An increase in the frequency of these anomalies is generally an indication of stress and environmental degradation which may be caused by chemical pollutants, overcrowding, improper diet, excessive siltation, and other disturbances" (p. 4-53). The figure indicates that during the first of the two electroshocking passes, DELT anomalies were observed only at Site 35.0. This site also exhibited high mortality in *C. dubia* during the first chronic toxicity test. While Sites 31.0 and 32.0 exhibited the highest incidence of DELT anomalies on the second sampling pass, some of the fish collected at Site 31.0 which had DELT anomalies represented species not found at most Mill Creek Sites. Some of these fishes had probably migrated upstream from the Cuyahoga River. A portion of the DELT anomalies observed at Mill Creek Site 31.0 may therefore be a result of environmental influences on the Cuyahoga River.

One DELT anomaly was observed at Site 32.0 during the second electroshocking pass. Although the proportion of DELT anomalies was relatively high (2.8%), only 35 fish were collected and the site was assigned the most favorable score (5) for the percent DELT Anomalies metric of the IBI. IBI scoring procedures ordinarily assign the percent DELT anomalies metric the least favorable score (1) when DELT anomalies are observed on more than 1.3% of the fish collected. When fewer than 200 but more than 24 fish are collected at headwater sites, however, and only one DELT anomaly is observed, the percent DELT anomalies metric is assigned a score of 5. Headwater sites at which fewer than 25 fish are collected are, by default, assigned a score of 1. A score of 1 may also be assigned when fewer than 200 fish are collected (per 0.3 km of stream length electroshocked) and the sample is predominated by young fish which have not yet accrued DELT anomalies.

Mill Creek fish communities were rated from "very poor" to "poor" using the IBI and MIwb and were dominated by species which are tolerant of water quality disturbances and degraded habitat. If factors currently impairing the health of Mill Creek's fish communities can be remediated, recovery may begin to occur between the Cuyahoga River and the Mill Creek falls. The falls, upstream of Site 32.4, however, are a physical barrier which would undoubtedly impede upstream recolonization.

Macroinvertebrate Collection

Northeast Ohio Regional Sewer District (NEORSD) Investigators conducted benthic macroinvertebrate sampling at 10 of the 11 Mill Creek biomonitoring sites (all except Site 35.2) and at the two Cuyahoga River biomonitoring sites between July 3 and September 26, 1995. Three biological indices - the Invertebrate Community Index (ICI), the Hilsenhoff Biotic Index (HBI), and the North Carolina Biotic Index (NCBI) - were employed to assess the invertebrate community in the Mill Creek Watershed.

The ICI was developed by the Ohio Environmental Protection Agency (OEPA) to evaluate macroinvertebrate communities and to determine whether a stream or river is meeting its aquatic life use designation. ICI calculations are based on a collection of macroinvertebrates using a cluster of five Hester-Dendy artificial substrate samplers. Additionally, a qualitative multi-habitat sample is collected with a kick net at the time the artificial substrates are removed from the creek. The invertebrates are then separated from the debris which is collected and identified to the lowest possible taxonomic level. The ICI uses 10 metrics to evaluate the condition of a macroinvertebrate community. Each metric is assigned a score of 0, 2, 4, or 6 by comparing results obtained at the survey site to those which have been attained at reference sites. The individual metrics are summed to obtain an ICI score between 0 and 60. The macroinvertebrate community at each site is assigned a narrative rating of "Exceptional," "Good," "Fair," "Poor," or "Very Poor" based upon its numeric score as described in Ohio EPA's *Compendium of Biological Results from the Ohio Rivers, Streams, and Lakes (1989)*. Assuming that all other factors remain constant, ICI scores generally increase with increasing water quality.

The HBI was developed in Wisconsin by Dr. William Hilsenhoff in 1977 and revised in 1982, 1987, and 1988. The HBI is useful because it is a sensitive indicator of organic and nutrient pollution which can result in low dissolved oxygen concentrations. It was not designed, however, to evaluate the impacts of inorganic pollution on benthic fauna. HBI calculations are based on a collection of arthropods using a D-frame kick net. The invertebrates are identified to the lowest possible taxonomic level and are then assigned an established tolerance value between 0 and 10. A numeric score is obtained using the formula:

$$HBI = \sum \frac{n_i a_i}{N}$$

where:

n_i = Total number of individuals in the ith taxa
a_i = Tolerance value of the ith taxa
N = Total number of individuals in a sample

The site is then assigned a narrative rating which is reflective of the level of organic pollution that may be impacting the site. Assuming that all other factors remain constant, HBI scores generally decrease with increasing water quality. The NCBI is a modification of the HBI which includes non-arthropods and their corresponding tolerance values in the bioassessment of streams.

In addition to these biological indices, several other interpretive techniques were used to compare the various sample sites and to better understand Mill Creek's invertebrate community structure and diversity. These techniques, which utilized kick net data, included the use of measures such as the Shannon Diversity Index and various ratios using specific taxa and functional feeding groups. Macroinvertebrate data is summarized in Tables M-3 and M-4 and more detailed macroinvertebrate data is located in Appendix D.

Macroinvertebrate Data Collected Using Hester-Dendy Artificial Substrate Samplers

Hester-Dendy Artificial Substrate Samplers were, upon their retrieval, found embedded in the substrate of the creek at four of the eight (50%) biomonitoring sites located on the mainstream of Mill Creek and were rendered useless for data collection purposes. Mr. Jeff DeShon of the Ohio EPA, in a telephone conversation on January 18, 1996, indicated that the agency typically experiences an artificial substrate sampler recovery rate of approximately 90%. Ohio EPA estimates that approximately half of the samplers which are not recovered are vandalized and the other half are lost as a result of environmental factors such as sedimentation or wash-out. It is possible that factors responsible for the atypically high incidence of artificial substrate sampler embeddedness are adversely affecting the biota of Mill Creek but are unmeasurable by traditional means such as the Ohio EPA's Qualitative Habitat Evaluation Index (QHEI).

ICI scores were not calculated for biomonitoring Sites 34.5, 34.0, 32.8, 32.6 and 32.0, because the artificial substrate samplers at these locations became embedded in sediment. The remaining seven sites received narrative ratings ranging from "Fair" to "Good." An ICI score of at least 34 (Good) is required to meet Ohio EPA's biological criteria for Warmwater Habitat (WWH) aquatic life use in the Erie-Ontario Lake Plain (EOLP) ecoregion. Site 32.4, which had an ICI score of 38 (Good), was the only Mill Creek site to meet the OEPA WWH macroinvertebrate criterion. The remaining Mill Creek sites received "Fair" narrative ratings, with scores ranging from 16 to 22. Cuyahoga River Sites A and B received "Marginally Good" ratings, with each site receiving a score of 30. ICI scores are displayed graphically in Figure M-9.

Individual metrics of the ICI are assigned scores of 0, 2, 4, or 6, with higher scores being more desirable. Site 32.4, which had the highest ICI score, received the highest possible score (6) for the following five metrics: Metric 1 (Total Number of Taxa), Metric 3 (Number of Caddisfly Taxa), Metric 4 (Number of Dipteran Taxa), Metric 5 (Percent Mayflies), and Metric 6 (Percent Caddisflies). Site 35.0 received scores of 6 for Metrics 1 and 4, and Site 32.2 received a score of 6 for Metric 4. The remaining sites on Mill Creek and its tributaries received no individual metric scores of 6.

All five sites on Mill Creek and its tributaries for which ICI scores were calculated received the lowest possible score (0) for Metric 2 (Number of Mayfly Taxa). According to Ohio EPA's *Biological Criteria for the Protection of Aquatic Life: Volume II*, Mayflies are "decidedly pollution sensitive and are often first to disappear with the onset of perturbation" (p. 5-5). Because all five sites received scores of 0, the creek's benthic macroinvertebrate community appears to be adversely affected by pollutants at all of those sites.

Four of the five sites on Mill Creek and its tributaries received scores of 0 for Metric 8 (Percent other Diptera and Non-insects), which is one of two negative ICI metrics. The fifth site, Site 32.4, received a score of 2, the second lowest score. According to Ohio EPA, "Taxa in these groups of macroinvertebrates, though often present as part of a healthy stream community, are those that tend to predominate under adverse water quality conditions" (*Biological Criteria for the Protection of Aquatic Life: Volume II*, p. 5-13). OEPA, in the same document states, "In many cases, even under minor influences, these organisms will comprise over 90 percent of the individuals collected in an invertebrate sample" (p. 5-13). Although Dipterans (other than Tanytarsini midges) and non-insects comprised over 90 percent of the individuals collected at three of the five biomonitoring sites, the above passage suggests the possibility that this may have been a result of "minor influences."

Two scores of 2 and one score each of 0, 4, and 6 were recorded for Metric 3 (Number of Caddisfly Taxa) for the five sites on Mill Creek and its tributaries for which ICI scores were calculated. According to Ohio EPA's *Biological Criteria for the Protection of Aquatic Life: Volume II*, Caddisflies tend "to be a little more pollution tolerant as a group than Mayflies" (p. 5-5) OEPA also states that few Caddisflies "can tolerate heavy pollutional stress..." (P. 5-5). If Mill Creek were suffering "heavy pollutional stress," lower scores for ICI Metric 3 may have been expected at more sites.

The ICI score of 30 (Marginally Good) which was calculated for the Cuyahoga River site upstream of Mill Creek (Site A) was identical to that which was calculated for the Cuyahoga River Site downstream of Mill Creek (Site B). Although scores for four of the ICI metrics were not identical at the upstream and downstream locations, the difference in individual metrics between the two sites was never more than 2 points. The results of the ICI evaluation suggest that any effects that Mill Creek may be having on the Cuyahoga River benthic macroinvertebrate community are slight.

The ICI scores obtained on Mill Creek indicate that the invertebrate community is under some stress from one or a combination of environmental factors including physical, chemical, and/or biological stressors. Although the ICI data is limited, it is possible that the stressors which may be affecting Mill Creek's fish communities are also affecting the creek's macroinvertebrate communities.

Macroinvertebrate Data Collected Using D-Frame Kick Nets

HBI, NCBI, and Shannon Diversity Index

The Hilsenhoff Biotic Index (HBI) and North Carolina Biotic Index (NCBI) may be correlated to the amount of organic pollution in a stream. All other variables remaining the same, the index scores (range 0-10) become higher as the amount of organic pollution increases.

The Shannon Diversity Index is a measure of the diversity of the benthic community. Increased diversity may be correlated to improved water and/or habitat quality. The index, which becomes higher with an increase in diversity, is calculated as follows:

$$\bar{d} = -\sum_{i=1}^{s} \frac{n_i}{n} \log_e \frac{n_i}{n}$$

where:

$\bar{d}$ = Shannon Diversity Index
n_i = Total number of individuals in the ith taxa
n = The total number of individuals, and
s = The total number of taxa

Despite the limited amount of ICI data, kick net sampling generated enough data to characterize Mill Creek's invertebrate community using the HBI and NCBI. The HBI narrative ratings ranged from "Fairly Poor" to "Good." Mill Creek HBI scores, which are displayed graphically in Figure M-10, exhibit a general trend of increasing water quality in a downstream direction starting at Site 35.0. These ratings may be misleading, however. According to Dr. Hilsenhoff, a "Fair" rating indicates a fairly significant amount of organic pollution is present in the stream. Even a "Good" rating indicates that there is some organic pollution present. Only HBI ratings of "Excellent" indicate no apparent organic pollution. Ranges of HBI scores and their corresponding narrative ratings are listed below:

HBI Score	Narrative Rating
0.00 - 3.50	Excellent
3.51 - 4.50	Very Good
4.51 - 5.50	Good
5.51 - 6.50	Fair
6.51 - 7.50	Fairly Poor
7.51 - 8.50	Poor
8.51 - 10.00	Very Poor

Figure M-11 compares non-seasonally adjusted HBI scores from 1991 to non-seasonally adjusted HBI scores obtained in 1995. The figure indicates that HBI scores improved from 1991 to 1995 at Sites 32.0, 33.0, and 34.0 and deteriorated from 1991 to 1995 at Sites 31.0 and 35.0. Figure M-12 displays NCBI scores and Figure M-13 shows HBI, NCBI, and Shannon Diversity Index Scores on the same graph.

The HBI and NCBI data indicate that Mill Creek's benthic macroinvertebrate community is impacted by organic pollution. The greatest impact was noted at Sites 34.0 and 34.5, which received the highest HBI and NCBI scores and some of the lowest diversity values. These values indicate that significant organic pollution exists at Site 34.0 and 34.5, with some organic pollution at all other sites which were monitored on Mill Creek and its tributaries. The substrate of the creek at Site 34.5 was, on several occasions during the study, covered by the filamentous bacteria *Sphaerotilus*, which is also indicative of the presence of organic pollution. Except at Site 32.6, HBI, NCBI and Shannon Diversity Index scores indicate a gradual improvement of the benthic community and water quality downstream of Site 34.0.

A noticeable decrease in the HBI and Shannon Diversity Index scores relative to sites immediately upstream and downstream was observed at Site 32.6. This location had the lowest diversity of all sites sampled in Mill Creek and its tributaries. The corresponding improvement in the HBI score indicates that the low diversity may not be related to organic pollution (HBI scores are correlated to organic pollution) but rather to other environmental stressors, such as habitat impacts or toxicants. Site 32.6 had a very low percent shredder composition and relatively high abundance of midges tolerant to toxicants; both may be contributing to the low diversity. The disproportionate abundance of the Mayfly *Baetis flavistriga* (77% of entire macroinvertebrate population) suggests that there may have been a brief episode of stress at this site. Because this mayfly has a high propensity to drift, it may have been able to recolonize the area with little competition for substrate from other organisms. The highly tolerant midges may have been present because they were not eliminated by the period of stress. The lack of a dramatic decrease in NCBI scores may have been attributable to the tolerance values assigned to *Baetis flavistriga* and the inclusion of non-arthropods in the calculation of the NCBI. A slight increase in the NCBI and decrease in the Shannon Diversity Index at Site 31.0, which is just upstream of Mill Creek's confluence with the Cuyahoga River, suggests that the benthic community at this site may be impacted by upstream sources or by the Cuyahoga River.

Proportion of Shredders and Scrapers

Shredders are a functional feeding group of benthic macroinvertebrates which feed on live and dead vascular plant tissue such as leaves, wood and coarse particulate organic matter (CPOM). Shredders are sensitive to riparian zone impacts, organic pollution and toxicants. They are generally found to be a greater proportion of the entire benthic community in upstream headwater sections of a stream. The relative abundance of shredders to other functional feeding groups gradually decreases from upstream to downstream, as less CPOM is available and more fine particulate organic matter (FPOM), dissolved organic material (DOM), and ultra-fine particulate organic matter (UPOM) become available. Scrapers are another functional feeding group of benthic macroinvertebrates which feed on periphyton (diatoms, other attached algae) and other associated material. The proportion of this functional feeding group tends to gradually increase from upstream to downstream. Scrapers increase in relative abundance as more DOM, sunlight (due to less canopy cover) and other nutrients become available for periphyton production. As more and more DOM, FPOM, UPOM and sunlight become available within the stream, scrapers and other functional feeding groups begin to compete for space with shredders. A sudden change in the gradual downstream decrease in the proportion of shredders and/or in the gradual downstream increase in the proportion of scrapers may indicate the presence of an environmental disturbance.

Figure M-14 displays the proportion of shredders and scrapers at each biomonitoring site on the mainstem of Mill Creek. The figure indicates that a higher proportion of scrapers than might have been expected and a lower proportion of shredders than might have been expected were observed at Site 35.0. This may be attributable to the land uses (i.e. golf courses) and lack of canopy near Site 35.0.

Downstream of Site 34.5, the expected gradual changes in the proportions of shredders and scrapers were generally observed except at Sites 32.8, 32.6, and 32.4. Abrupt changes in the expected trends may be attributable to several factors. Riparian zone impacts near Site 32.6, where a new housing construction project (the Mill Creek subdivision) has begun, may be affecting the shredder population. Organic pollution, which can be a source of nutrients for some species of periphyton, may also be affecting the benthic community in this area. An increase in the amount of periphyton, and therefore in the proportion of scrapers is sometimes observed downstream of sources or organic pollution.

Dramatic changes in the proportions of shredders and scrapers were not observed between Cuyahoga River Sites A and B.

Ratio of Scrapers to Filterers

Filterers are another group of macroinvertebrates which are included in a larger functional feeding group called collectors. Filterers are classified as suspension feeders and ingest FPOM, which is suspended in the water column. Filterers are capable of attaching themselves to filamentous algae and aquatic mosses which become abundant as a result of organic enrichment. Besides providing nutrients for the filamentous algae and mosses, organic enrichment also provides FPOM and DOM for filterers to utilize as a food source. Although some filterers can tolerate organic enrichment, they are sensitive to toxicants which may become bound to the FPOM.

Shifts in the ratio of scrapers-to-filterers may indicate changes in the food sources which are available for the macroinvertebrate community. The proportion of scrapers and the scrapers-to-filterers ratio usually increase as the abundance of diatoms (which are sensitive to organic pollution) increases, and usually decrease as the amount of filamentous algae and mosses increase. The relative abundance of filterers tends to increase and the scrapers-to-filterers ratio tends to decrease as the amount of filamentous algae and aquatic mosses increase. The scrapers-to-filterers ratio is best utilized in conjunction with the HBI and NCBI indices and the number of Ephemeroptera, Plecoptera, and Tricoptera (EPT) taxa in order to determine whether changes are due to organic pollution. An increase in the scrapers-to-filterers ratio in conjunction with high HBI, high NCBI and low EPT scores may indicate the effects of toxicants. Figure M-15, which shows the ratio of scrapers-to-filterers, the HBI, the NCBI, and the EPT Index, indicates that toxicants may be present at Site 34.0.

The ratio of scrapers-to-filterers was relatively consistent on the Cuyahoga River from Site A to Site B. The ratio of scrapers-to-filterers is more effective when applied upstream and downstream of suspected sources of stress rather than as an absolute measure of macroinvertebrate health.

Ratio of EPT to (Chironomidae + EPT)

Ephemeropterans, Plecopterans and Trichopterans (EPT) are organisms which are sensitive to environmental stress and are usually the first group of organisms to disappear from an impacted stream location. Although there are exceptions, the family Chironomidae (midge flies) is generally tolerant to environmental stressors. In general, the greater the relative abundance of EPT to Chironomidae, the better the water quality. Subtle changes in this ratio may indicate problems when comparing data collected upstream and downstream of a suspected pollutant source. According to the U.S. EPA's *Rapid Bioassessment Protocols for Use in Streams and Rivers*, a relatively even distribution of all four groups (an EPT to (Chironomidae + EPT) ratio of approximately 0.75) indicates a good biotic condition (p. 6-14). Figure M-16, which displays the EPT to (Chironomidae + EPT) ratio, shows lower relative scores for this ratio, and indicates the possibility of impairment at Sites 34.0 and 34.5. Table M-4 indicates that a relatively low score was also observed at Site 32.0 (Warner Road Tributary).

Ratio of (*Cricotopus* + *Chironomus* + *Polypedilum*) to Chironomidae

The ratio of (*Cricotopus* + *Chironomus* + *Polypedilum*) to Chironomidae is based on the relative abundance of the organic pollution tolerant midge genera *Chironomus*, *Cricotopus*, and *Polypedilum* (which belong to the family Chironomidae) to the abundance of the entire family Chironomidae which also consists of some sensitive and facultative species. Figure M-17 displays graphically the (*Polypedilum* + *Cricotopus* + *Chironomus*)-to-Chironomidae ratio. The figure indicates that Sites 31.0, 34.0 and 34.5 exhibited the highest proportion of pollution tolerant midges.

Macroinvertebrate Collection Summary

Sampling data indicate that the macroinvertebrate communities of Mill Creek and its tributaries are being impacted to varying degrees. Although ICI scores ranged from 16 (Fair) to 38 (Good), Hester-Dendy artificial substrate samplers were, upon retrieval, found buried in the substrate at five of 12 biomonitoring sites. HBI scores ranged from 6.75 (Fairly Poor) to 4.56 (Good) and NCBI scores ranged from 8.28 (Poor) to 5.62 (Good).

Table M-5 examines eight measures of macroinvertebrate community health which were calculated using kick net data. Although several of these measures were discussed individually in the preceding paragraphs, the table uses all eight measures concurrently. Each site was ranked from best (1) to worst (12) for each of the eight measures. An average of the eight ranks was calculated for each site and the sites were then ranked based on that average. The last column of the table indicates that the sites which, based upon this exercise, received the four lowest rankings were also four of the sites at which Hester-Dendy artificial substrate samplers were embedded in the substrate of the creek. This may suggest a correlation between the condition of Mill Creek's macroinvertebrate communities and the factors which caused the artificial substrates to become embedded.

Table M-1
1995 Mill Creek Fish Collection Summary

First Pass

Biomonitoring Site	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomolies (%)	IBI Numerical Score	IBI Narrative Rating	MIwb Numerical Score	MIwb Narrative Rating
35.2	11-Jul-95	0	0	0	12	Very Poor		
35.0	10-Jul-95	272	90	1.8	16	Very Poor		
34.5	28-Jul-95	0	0	0	12	Very Poor		
34.0	10-Jul-95	6	100	0	12	Very Poor		
33.0	10-Jul-95	0	0	0	12	Very Poor		
32.8	26-Jul-95	206	99	0	20	Poor		
32.6	21-Jun-95	3	100	0	12	Very Poor		
32.4	12-Jul-95	2	100	0	12	Very Poor		
32.2	16-Jun-95	19	58	0	12	Very Poor	2.2	Very Poor
32.0	16-Jun-95	2	100	0	12	Very Poor		
31.0	16-Jun-95	21	43	0	14	Very Poor	2.8	Very Poor

Second Pass

Biomonitoring Site	Date	Fish Collected (#)	Tolerant Fish (%)	DELT Anomolies (%)	IBI Numerical Score	IBI Narrative Rating	MIwb Numerical Score	MIwb Narrative Rating
35.2	12-Sep-95	0	0	0	12	Very Poor		
35.0	12-Sep-95	426	99	0.46	18	Poor		
34.5	06-Sep-95	52	100	0	14	Very Poor		
34.0	06-Sep-95	550	100	0	20	Poor		
33.0	06-Sep-95	0	0	0	12	Very Poor		
32.8	12-Sep-95	554	100	0.36	18	Poor		
32.6	08-Aug-95	110	98	0	12	Very Poor		
32.4	25-Sep-95	442	87	0	22	Poor		
32.2	07-Aug-95	383	49	0.52	26	Poor	5.4	Poor
32.0	08-Aug-95	35	100	2.8	18	Poor		
31.0	03-Aug-95	157	67	3.2	24	Poor	5.7	Poor

Table M-2
Index of Biotic Integrity Individual Metric Scores

Headwater Sites

	First Pass									Second Pass								
Biomonitoring Sites	35.2	35	34.5	34	33	32.8	32.6	32.4	32	35.2	35	34.5	34	33	32.8	32.6	32.4	32
Metric 1 (Total species)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metric 2 (Darters + sculpin)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metric 3 (Headwater species)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metric 4 (Minnow species)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1
Metric 5 (Sensitive species)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metric 6 (% Tolerant species)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metric 7 (% Pioneering species	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1	5	3
Metric 8 (% Omnivores)	1	5	1	1	1	5	1	1	1	1	5	1	5	1	5	1	5	1
Metric 9 (% Insectivores)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metric 10 (Simple lithophils)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metric 11 (% DELT anomalies)	1	1	1	1	1	5	1	1	1	1	3	1	5	1	3	1	5	5
Metric 12 (Fish numbers)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
IBI Score (Sum of Metrics 1-12	12	16	12	12	12	20	12	12	12	12	18	14	20	12	18	12	26	18

Wading Sites

	First Pass		Second Pass	
Biomonitoring Sites	32.2	31	32.2	31
Metric 1 (Total species)	1	1	3	3
Metric 2 (Darter species)	1	1	1	1
Metric 3 (Sunfish species)	1	1	3	3
Metric 4 (Sucker species)	1	1	1	1
Metric 5 (Intolerant species)	1	1	1	1
Metric 6 (% Tolerant species)	1	3	3	1
Metric 7 (% Omnivores)	1	1	3	1
Metric 8 (% Insectivores)	1	1	1	1
Metric 9 (% Top carnivores)	1	1	1	3
Metric 10 (Simple lithophils)	1	1	3	5
Metric 11 (% DELT anomalies)	1	1	3	1
Metric 12 (Fish numbers)	1	1	3	1
IBI Score (Sum of Metrics 1-12)	12	14	26	22

Table M-3
Summary of 1995 Mill Creek Macroinvertebrate Data Collected Using Hester - Dendy Artificial Substrate samplers

Biomonitoring Site	35.0	*34.5	*34.0	33.0	*32.8	*32.6	32.4	32.2	*32.0	31.0	A	B
ICI Metric 1 (Total Number of Taxa)	6 (43)			4 (28)			6 (47)	4 (31)		2 (25)	6 (47)	6 (35)
ICI Metric 2 (Number of Mayfly Taxa)	0 (0)			0 (1)			0 (2)	0 (0)		0 (1)	2 (4)	2 (5)
ICI Metric 3 (Number of Caddisfly Taxa)	0 (0)			2 (1)			6 (3)	2 (1)		4 (2)	6 (6)	4 (3)
ICI Metric 4 (Number of Dipteran Taxa)	6 (34)			4 (19)			6 (33)	6 (23)		4 (17)	6 (22)	6 (16)
ICI Metric 5 (% Mayflies)	0 (0)			2 (0.1)			6 (30.6)	0 (0)		2 (3.5)	2 (3.4)	4 (19.3)
ICI Metric 6 (% Caddisflies)	0 (0)			2 (0.8)			6 (21.0)	2 (1.2)		2 (3.0)	2 (14.6)	2 (5.3)
ICI Metric 7 (% Tanytarsini Midges)	4 (13.9)			2 (0.1)			2 (0.6)	2 (2.9)		2 (0.5)	2 (3.6)	2 (1.5)
ICI Metric 8 (% Other Diptera & Non-Insects)	0 (87.6)			0 (98.0)			2 (47.7)	0 (95.0)		0 (93.0)	0 (71.7)	2 (58.0)
ICI Metric 9 (% Tolerant Organisms)	4 (14.6)			0 (82.0)			2 (19.7)	0 (48.0)		0 (64.0)	0 (11.0)	0 (18.8)
ICI Metric 10 (Qualitative EPT Taxa)	2 (5)			0 (3)			2 (6)	4 (9)		2 (7)	4 (12)	2 (10)
ICI Score (Sum of Metrics 1-10)	22			16			38	20		18	30	30
ICI Narrative Rating	Fair			Fair			Good	Fair		Fair	Marginally Good	Marginally Good
Shannon Diversity Index	2.66			1.11			2.25	2.69		2.43	2.27	2.85

*Samplers found embedded in sediment upon retreival - unable to calculate ICI at these locations

Table M-4
Summary of 1995 Mill Creek Macroinvertebrate Data Collected Using Kick Nets

Biomonitoring Site	35.0	*34.5	*34.0	33.0	*32.8	*32.6	32.4	32.2	*32.0	31.0	A	B
HBI Score	5.40	6.75	6.29	5.87	5.63	4.56	5.50	5.06	6.39	4.77	5.52	4.85
NCBI Score	6.80	8.28	8.21	6.43	7.85	7.37	7.17	6.53	8.04	7.17	6.56	5.62
Shannon Diversity Index	2.24	2.05	1.96	1.81	2.08	0.95	2.09	2.53	2.10	2.25	2.76	2.51
% Shredders	12	78	65	3	18	3	10	22	14	20	7	4
% Scrapers	45	7	21	50	38	83	62	40	8	65	44	46
Ratio Scrapers / Filterers	0.67	2.00	4.65	1.74	1.64	7.69	4.60	1.88	0.63	7.0	1.75	1.07
Ratio EPT / (Chironomidae + EPT)	0.74	0.08	0.23	0.81	0.65	0.96	0.77	0.64	0.17	0.77	0.81	0.91
Ratio EPT / Chironomidae	2.87	0.08	0.31	4.22	1.84	24.70	3.26	1.81	0.20	3.43	4.38	9.71
Ratio Cricotopus+Chironomus+Polypedilum / Chironomidae	0.63	0.92	0.92	0.20	0.77	0.69	0.47	0.68	0.19	0.90	0.38	0.00
Total Number of Taxa	21	21	26	18	29	21	27	37	16	15	24	27
Number of Mayfly Taxa	1	2	1	1	1	1	2	2	0	2	7	8
Number of Caddisfly Taxa	4	1	2	1	2	3	4	6	2	5	3	3
Number of EPT Taxa	5	3	3	2	3	4	6	8	2	7	10	11
% Tolerant Organisms (per OEPA)	13.0	64.0	61.0	11.0	23.1	2.0	12.0	18.0	24.0	39.0	8.9	0.6

Table M-5
1995 Mill Creek Biomonitoring Site Ranking Based On Kick Net Data

Biomonitoring Site	HBI		NCBI		Shannon Diversity Index		EPT/ (Chironimidae+EPT)		(Cricotopus+Chironomus+ Polypedilum)/Chironimidae	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	Score	Rank
35.0	5.40	5	6.80	5	2.24	5	0.74	7	0.63	6
*34.5	6.75	12	8.28	12	2.05	9	0.08	12	0.92	11.5
*34.0	6.29	10	8.21	11	1.96	10	0.23	10	0.92	11.5
33.0	5.87	9	6.43	2	1.81	11	0.81	4	0.20	3
*32.8	5.63	8	7.85	9	2.08	8	0.65	8	0.77	9
*32.6	4.56	1	7.37	8	0.95	12	0.96	1	0.69	8
32.4	5.50	6	7.17	6.5	2.09	7	0.77	6	0.47	5
32.2	5.06	4	6.53	4	2.53	2	0.64	9	0.68	7
*32.0	6.39	11	8.04	10	2.10	6	0.17	11	0.19	2
31.0	4.77	2	7.17	6.5	2.25	4	0.77	5	0.90	10
A	5.52	7	6.56	3	2.76	1	0.81	3	0.38	4
B	4.85	3	5.62	1	2.51	3	0.91	2	0.00	1

Biomonitoring Site	Total Number of Taxa		Number of EPT Taxa		% Tolerant Organisms		Average Rank	Final Rank
	Score	Rank	Score	Rank	Score	Rank		
35.0	21	8.5	5	6	13.0	6	6.06	6
*34.5	21	8.5	3	9	34.0	12	10.75	12
*34.0	26	5	3	9	61.0	11	9.69	11
33.0	18	10	2	11.5	11.0	4	6.81	8
*32.8	29	2	3	9	23.1	8	7.63	9
*32.6	21	7	4	7	2.0	2	5.75	5
32.4	27	3.5	6	5	12.0	5	5.50	4
32.2	37	1	8	3	18.0	7	4.63	3
*32.0	16	11	2	11.5	24.0	9	8.94	10
31.0	15	12	7	4	39.0	10	6.69	7
A	24	6	10	2	8.9	3	3.63	2
B	27	3.5	11	1	0.6	1	1.94	1

*Hester-Dendy artificial substrate samplers found embedded in sediment upon retreival

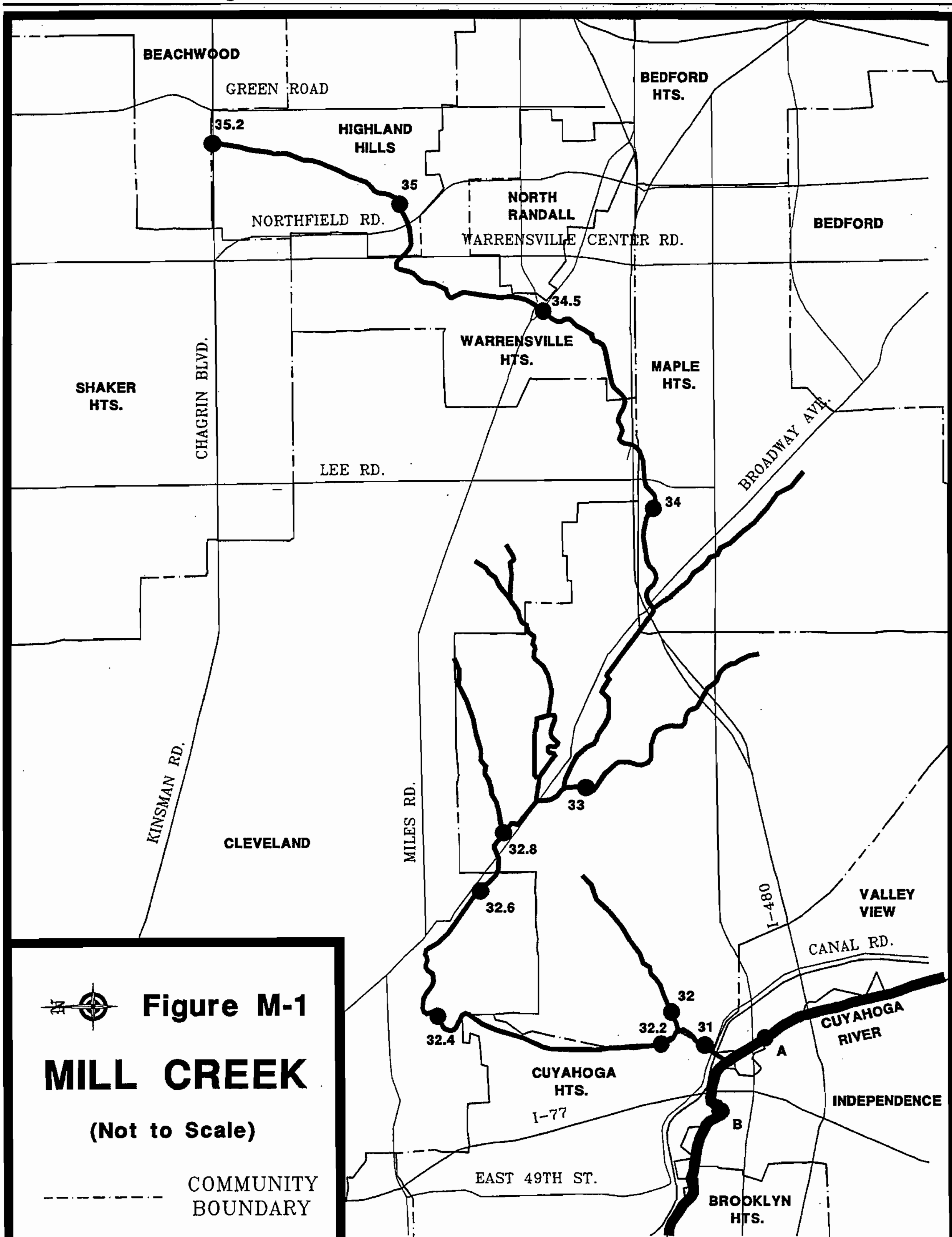


Figure M-1

MILL CREEK

(Not to Scale)

COMMUNITY BOUNDARY

Figure M-2
Mill Creek Qualitative Habitat Evaluation Index Scores
August 16, 1995 - August 22, 1995

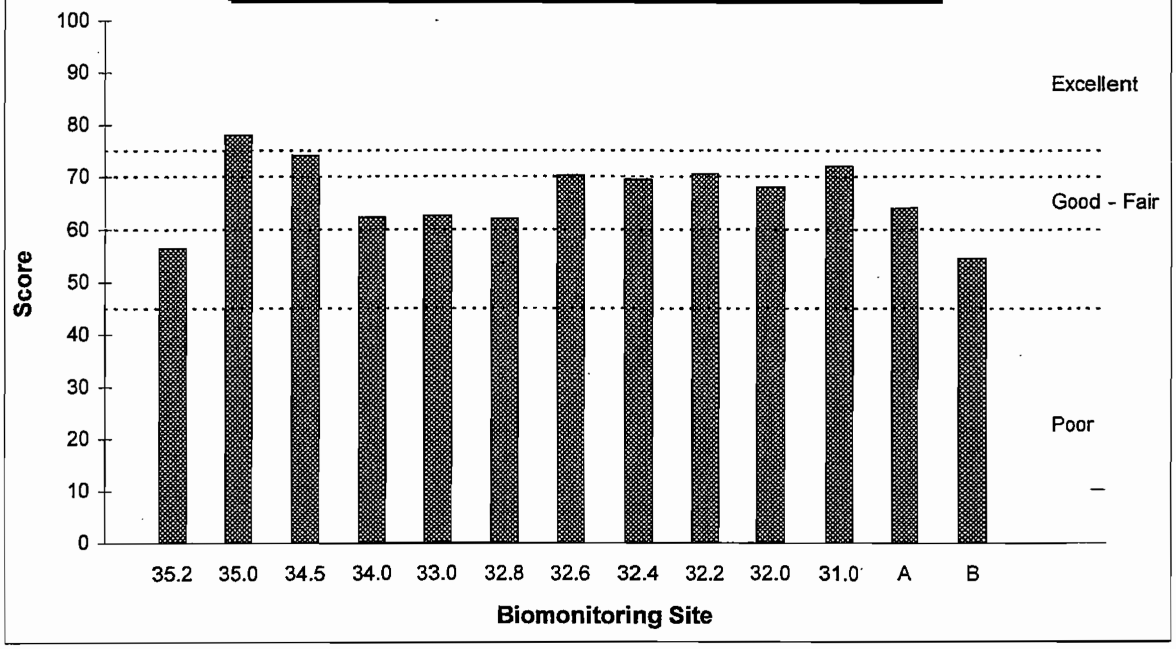


Figure M-3
Mill Creek Qualitative Habitat Evaluation Index Comparison
1991 vs. 1995

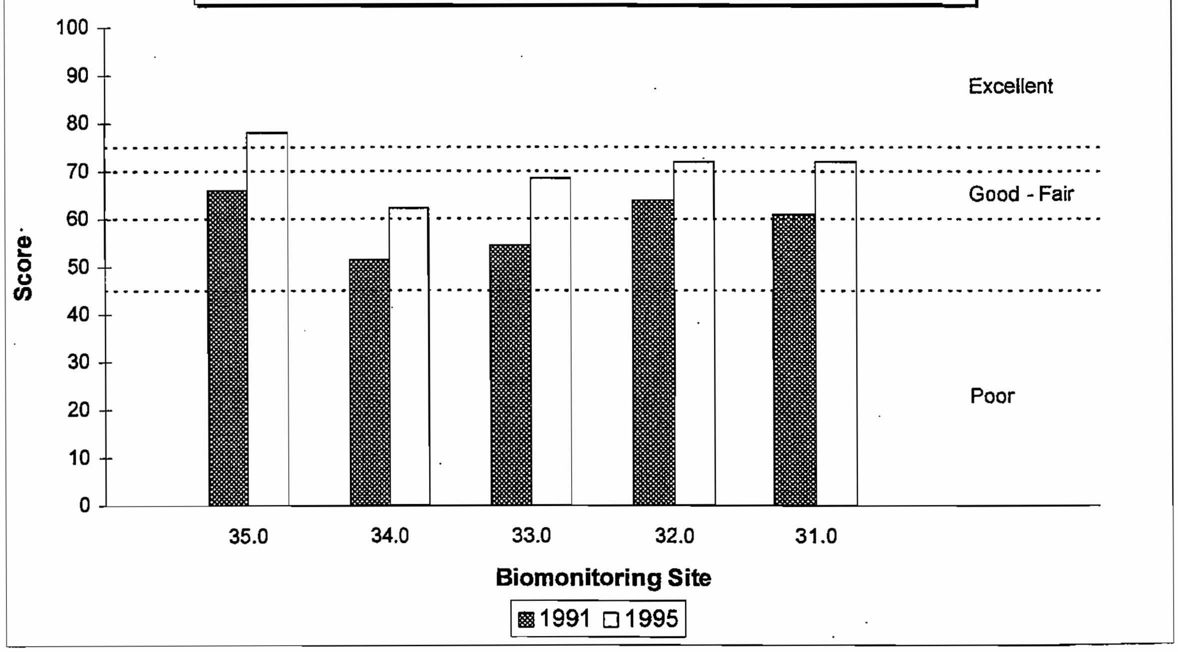


Figure M-4
1995 Mill Creek Index of Biotic Integrity Scores
Headwater Sites

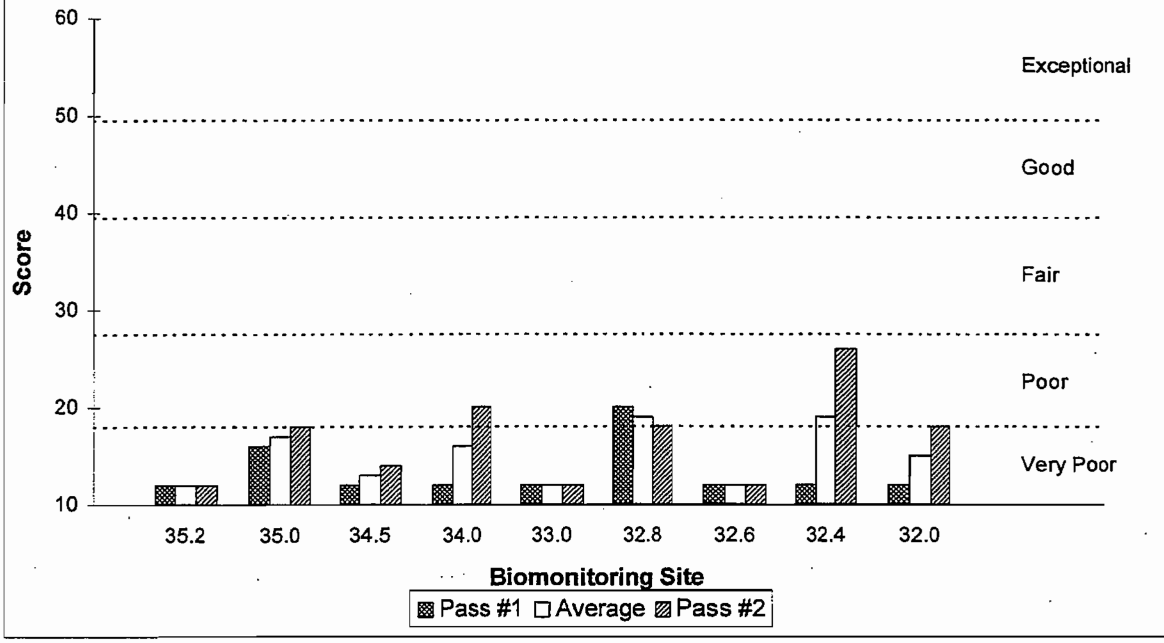
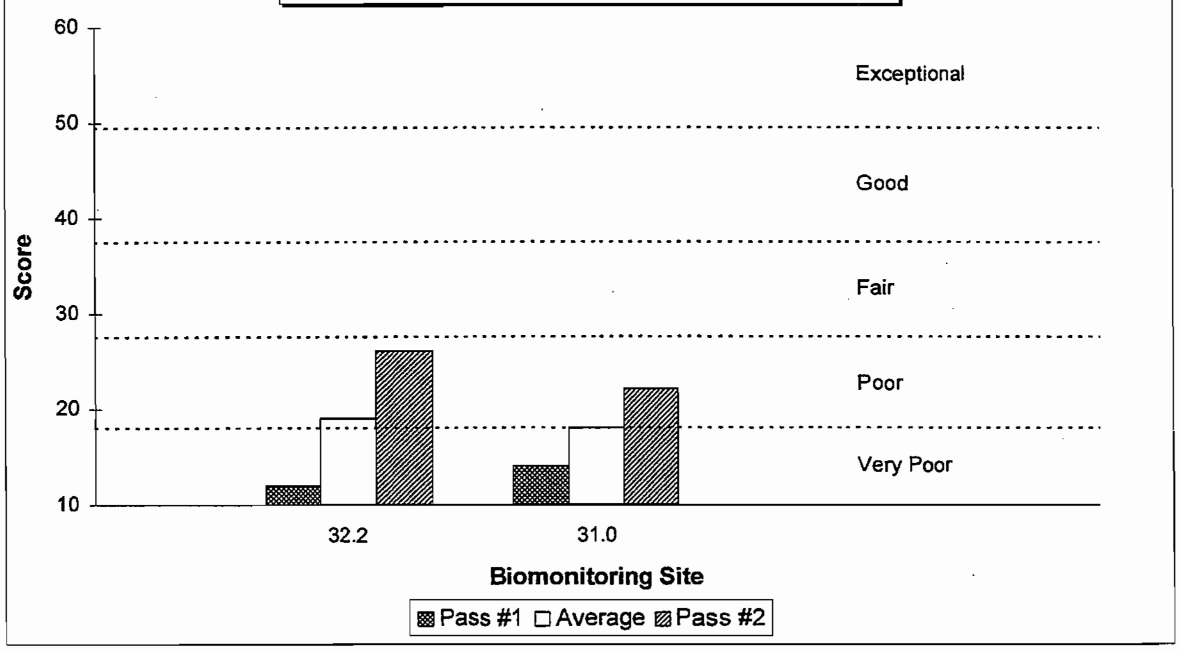
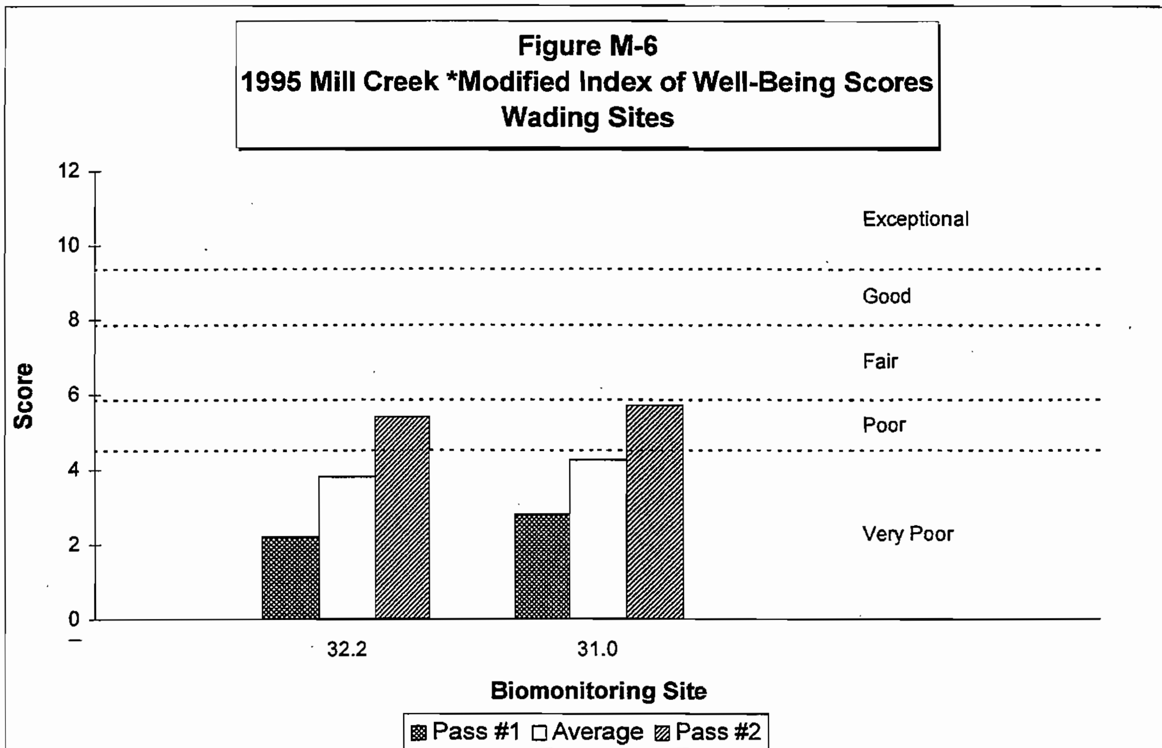
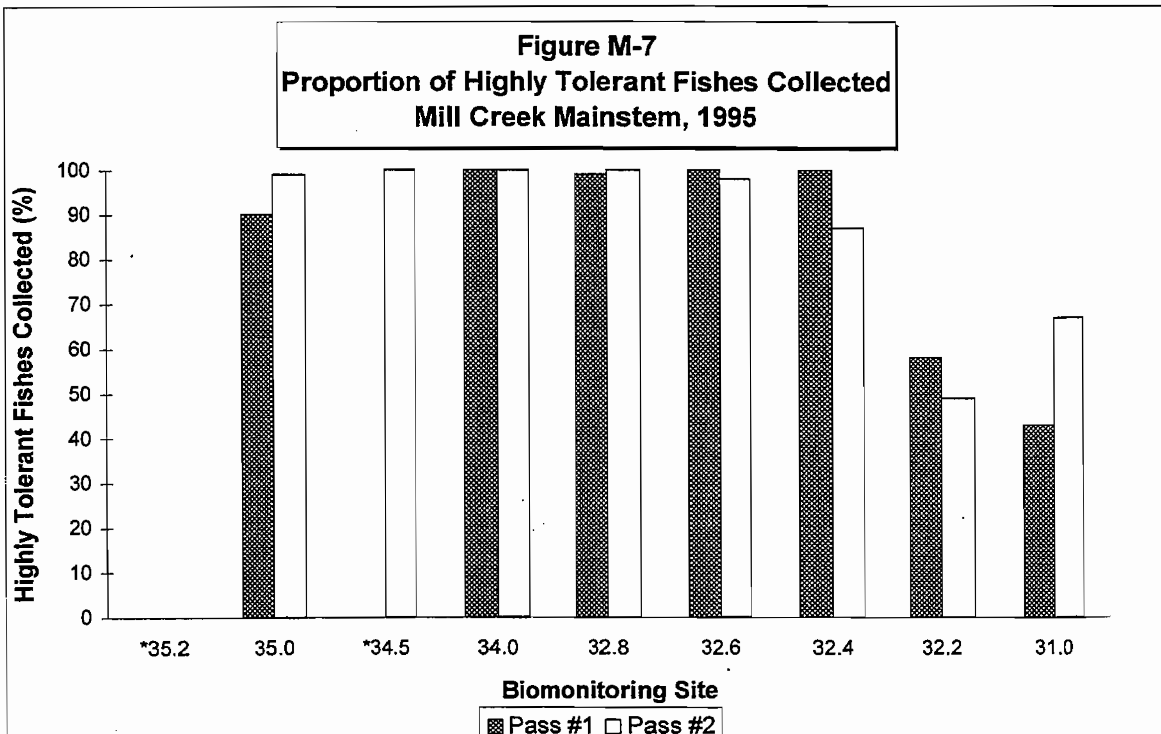


Figure M-5
1995 Mill Creek Index of Biotic Integrity Scores
Wading Sites

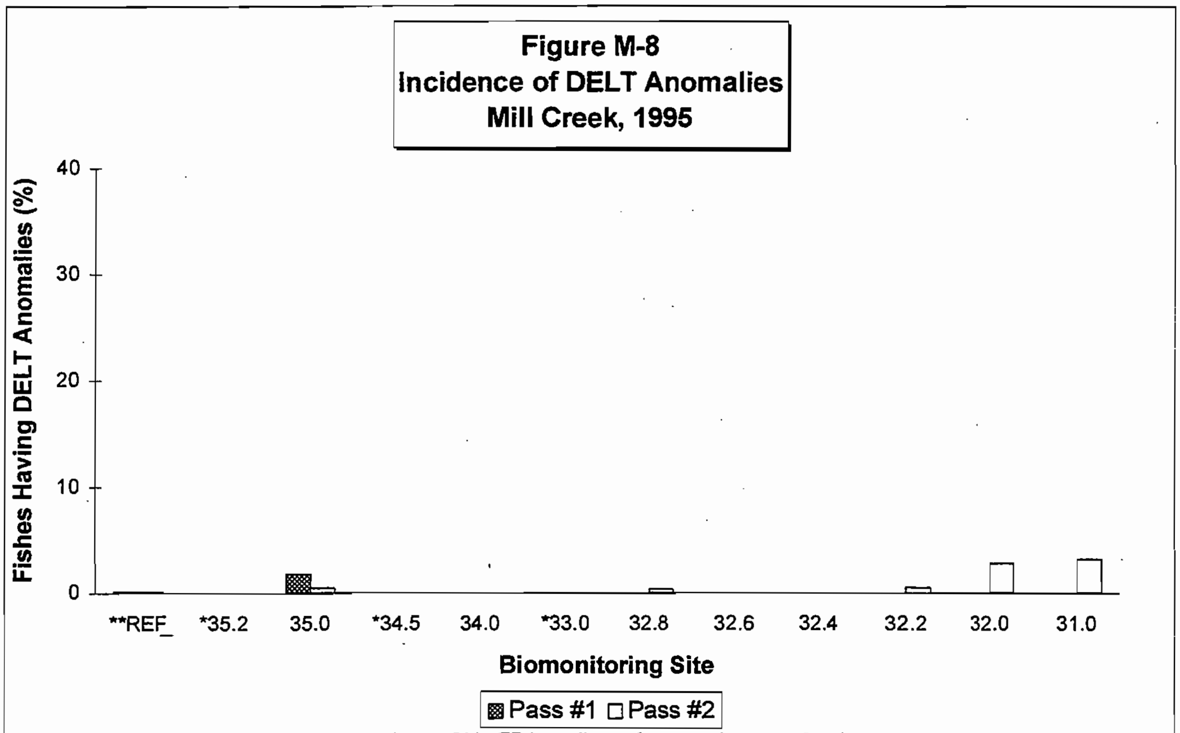




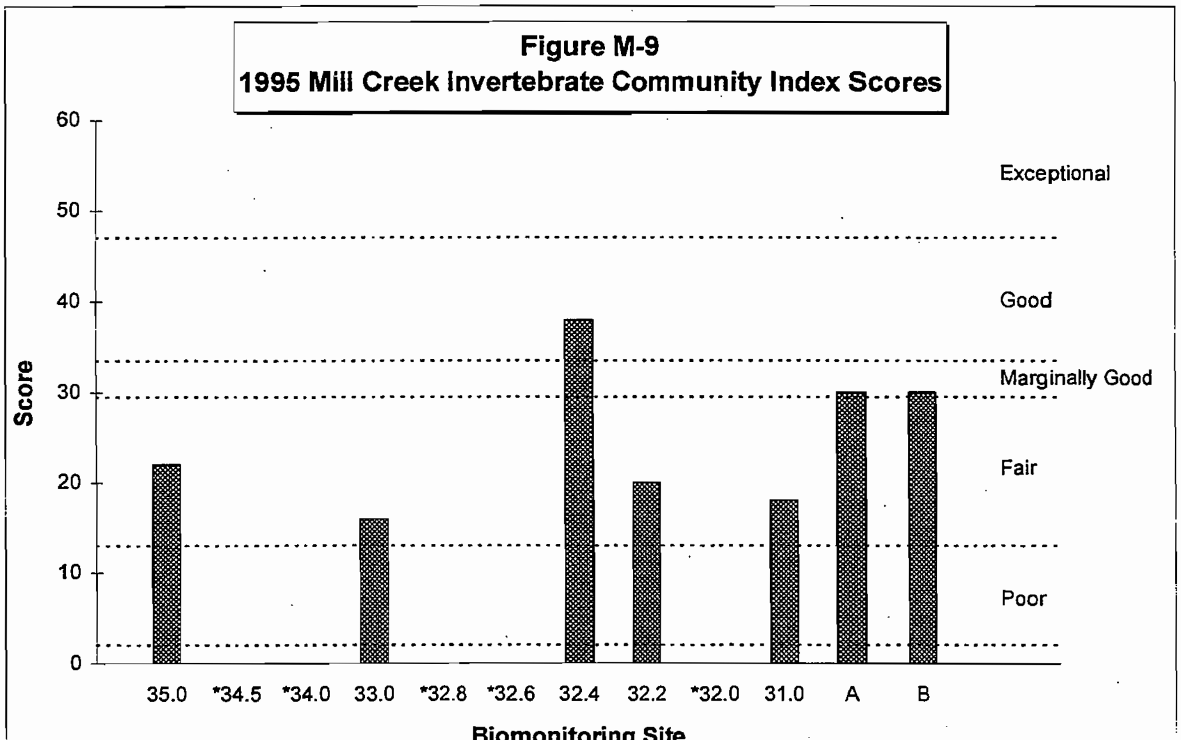
*The MIwb is calculated only at sites having a drainage area greater than 20 square miles.



*No fish were collected at Site 35.2 on either pass or at Site 34.5 on the first pass.



**The median incidence of DELT anomalies at Ohio EPA wading reference sites was 0.1%.
*No fish were collected at Sites 35.2 and 33.0 on either pass or at Site 34.5 on the first pass.



*Samplers found embedded in sediment upon retreival - unable to calculate ICI at these locations

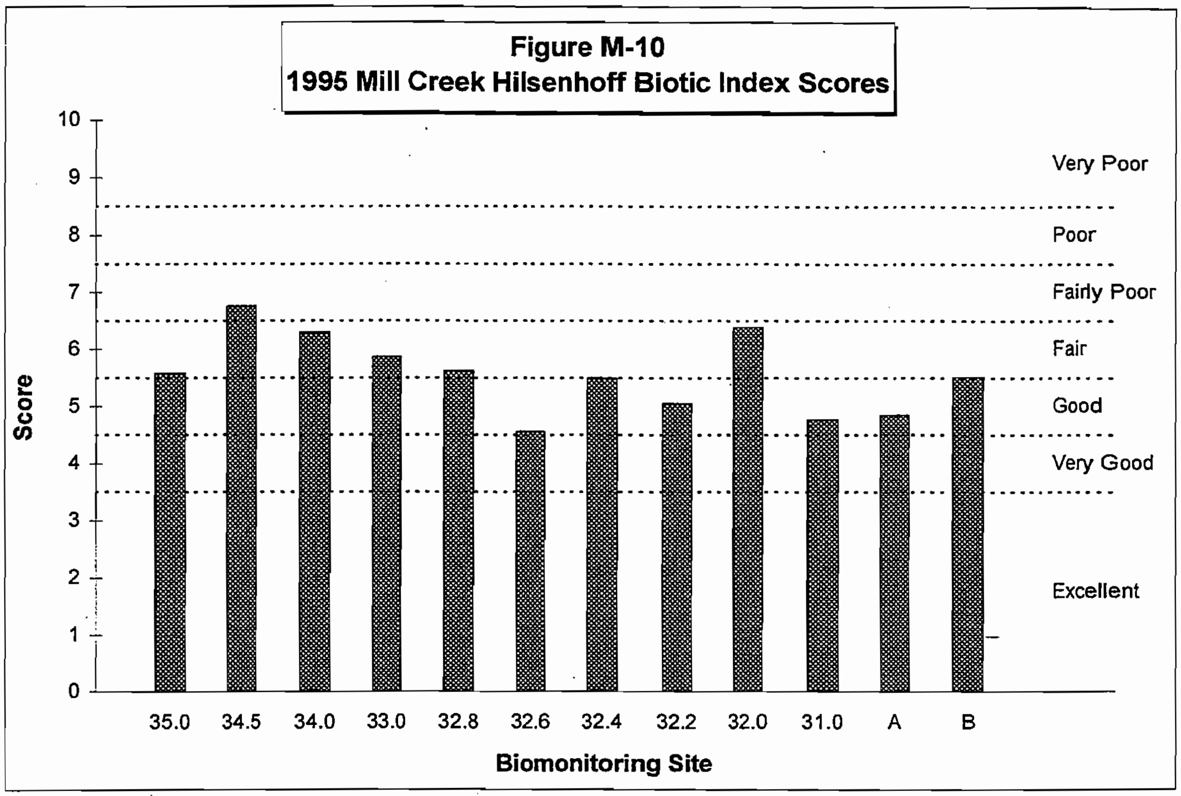


Figure M-10
1995 Mill Creek Hilsenhoff Biotic Index Scores
Score
10
9
8
7
6
5
4
3
2
1
0
Very Poor
Poor
Fairly Poor
Fair
Good
Very Good
Excellent
35.0
34.5
34.0
33.0
32.8
32.6
32.4
32.2
32.0
31.0
A
B
Biomonitoring Site

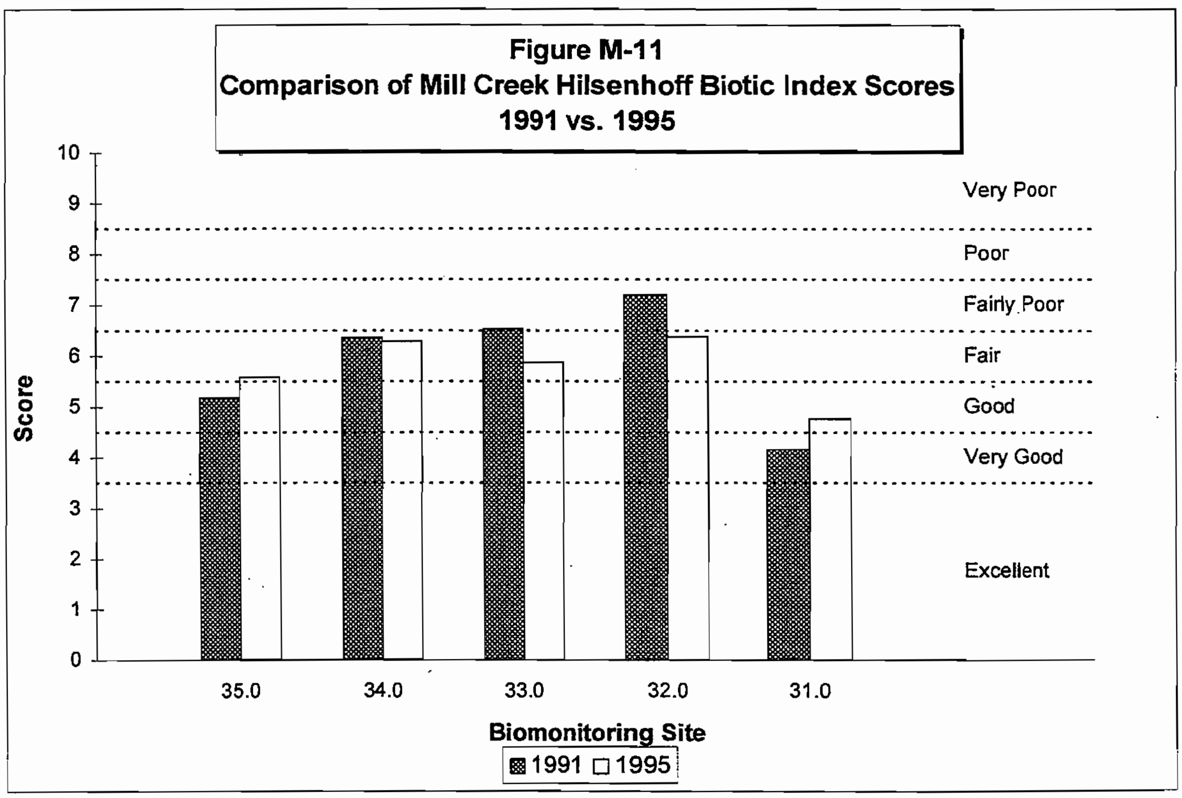


Figure M-11
Comparison of Mill Creek Hilsenhoff Biotic Index Scores
1991 vs. 1995
Score
10
9
8
7
6
5
4
3
2
1
0
Very Poor
Poor
Fairly Poor
Fair
Good
Very Good
Excellent
35.0
34.0
33.0
32.0
31.0
Biomonitoring Site
1991
1995

Figure M-12
1995 Mill Creek North Carolina Biotic Index Scores

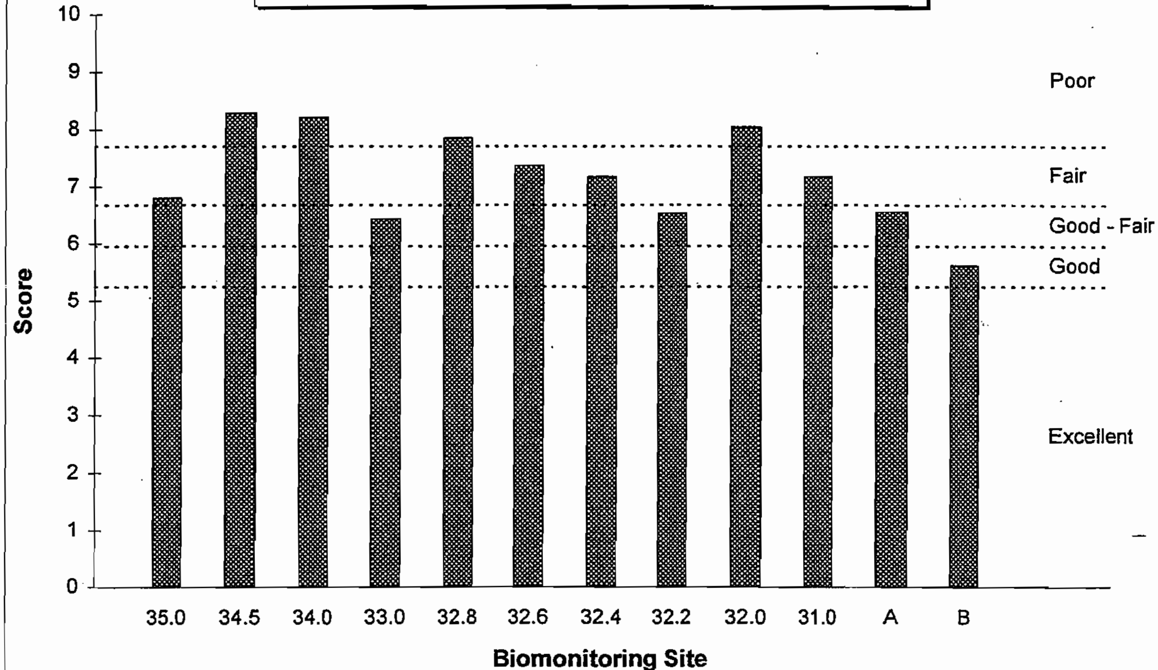


Figure M-13
1995 HBI, NCBI, and Shannon Diversity Index Scores
Mill Creek Mainstem

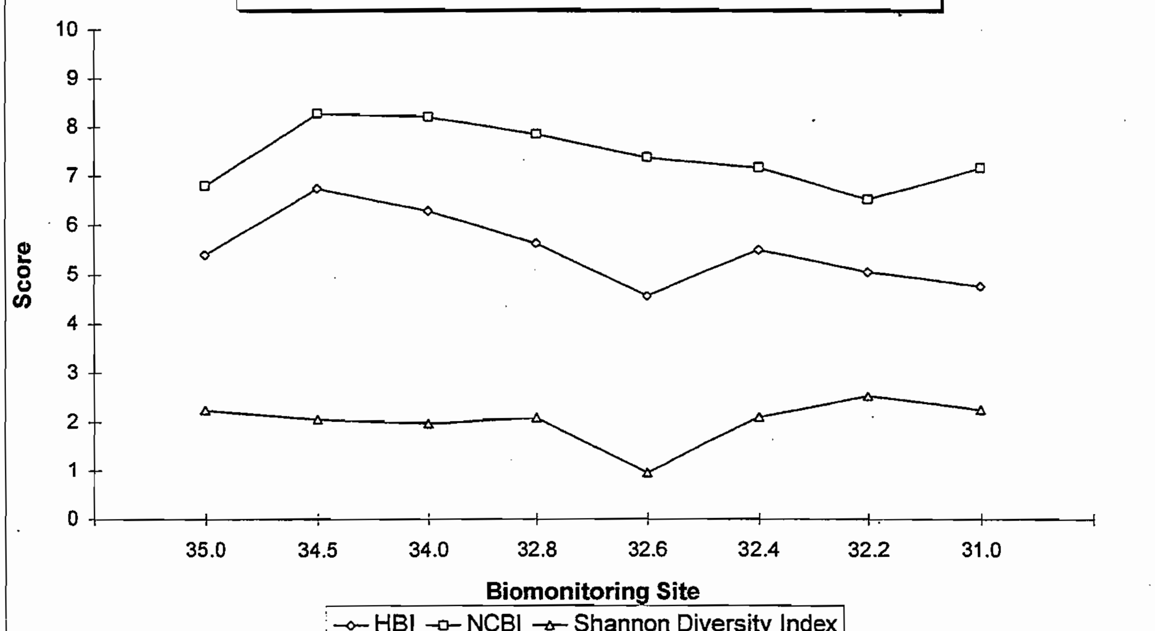


Figure M-14
Proportion of Shredders and Scrapers
Mill Creek Mainstem, 1995

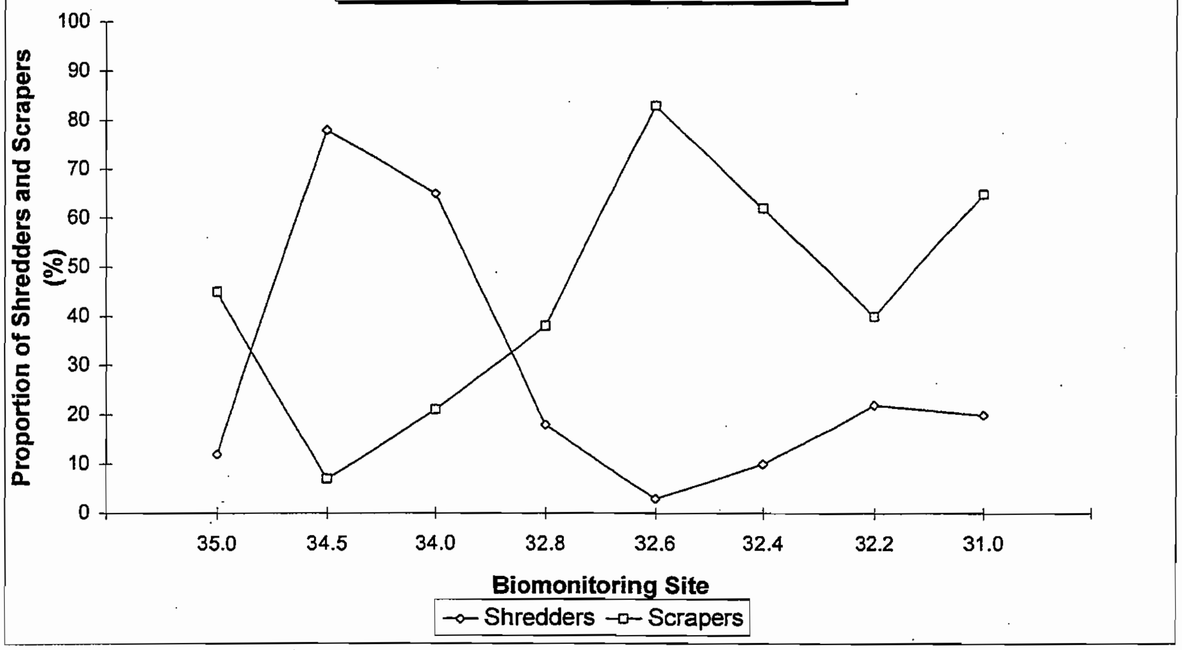


Figure M-15
HBI, NCBI, Scrapers to Filterers Ratio, and Number of EPT Taxa
Mill Creek Mainstem, 1995

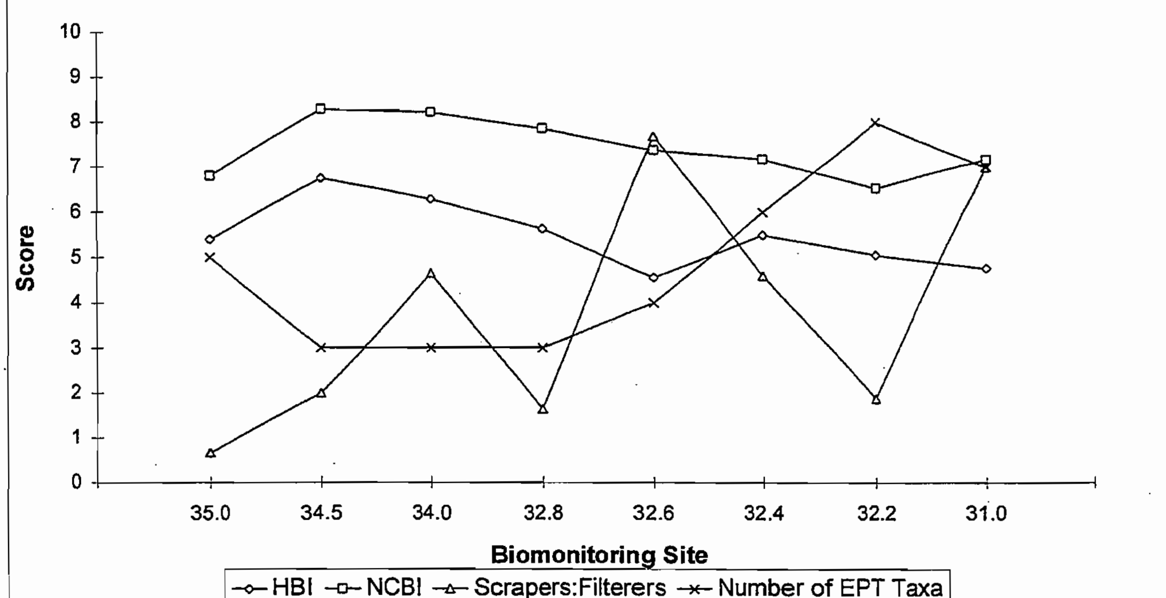


Figure M-16
Ratio of EPT to (Chironomidae + EPT)
Mill Creek Mainstem, 1995

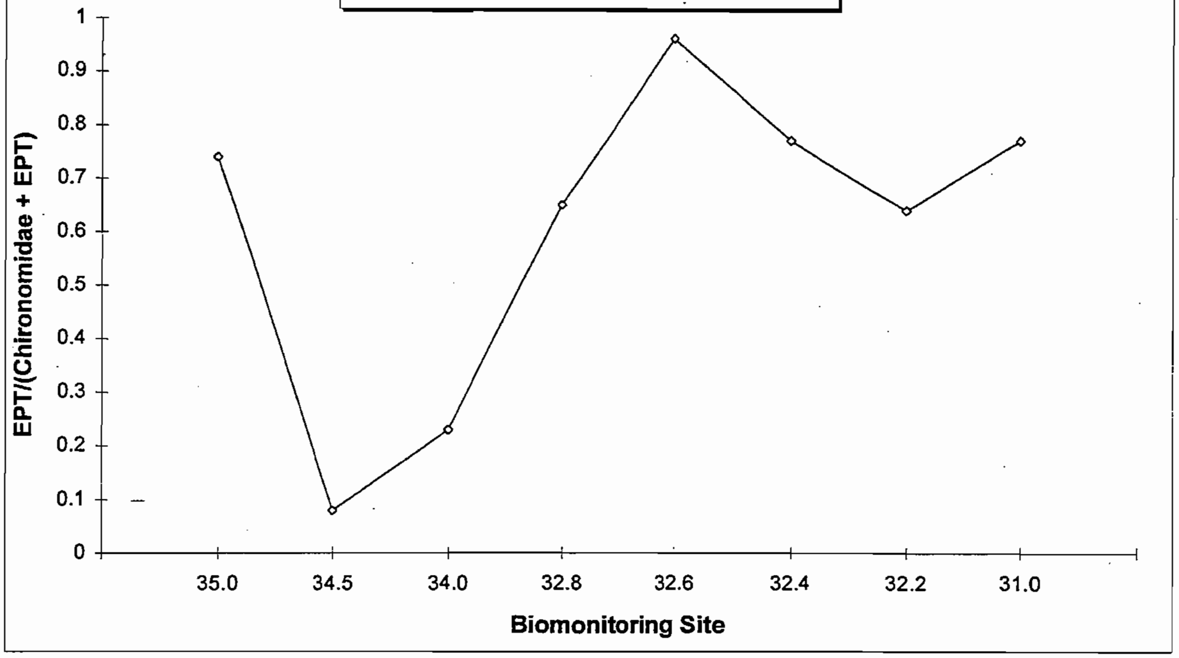
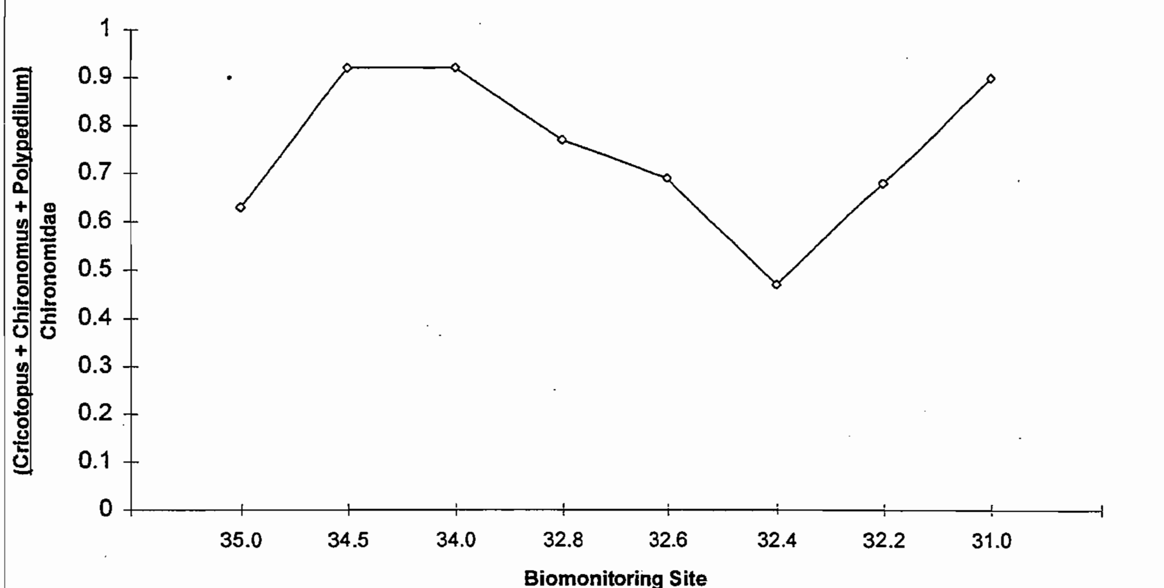


Figure M-17
Ratio of (Cricotopus + Chironomus + Polypedilum) to Chironomidae
Mill Creek Mainstem, 1995



APPENDIX N
CLEVELAND METROPARKS STREAM SAMPLING, 1993 - 1995

In 1991, the Cleveland Metroparks began collecting water samples from area streams within the park system to monitor fecal coliform levels. Sixteen sites were selected on nine area streams within the Cleveland Metroparks for water quality monitoring (Table N-1). The sample locations have been designated Primary Contact Recreational Use by Ohio EPA.

Samples were collected, in general, on a monthly basis throughout 1993 - 1995, from all sample locations by Cleveland Metroparks Department of Park Operations personnel. Samples were obtained at least 24 hours following a rain event. The Cleveland Metroparks laboratory provided bacteriological analyses of all samples and reported the results to NEORSD.

The bacteriological data showed that the fecal coliform concentrations periodically exceeded the numerical criterion for Primary Contact Recreational Use of 2,000 organisms per 100 mL at eight of the sixteen sample locations (Figure N-1). However, the bacteria levels in these creeks do not exhibit trends of increasing concentrations but generally represent single event elevations.

A total of 451 samples were collected from 1993 to 1995. Seventeen of the 451 samples had concentrations which exceeded the Ohio EPA numerical criterion for Primary Contact Recreational Use, and of the 17 exceedences, at least 12 may be attributed to wet weather events (Table N-7). NEORSD rain gauge data and the National Oceanic and Atmospheric Administration (NOAA) local climatological data were reviewed to determine if these exceedences could be related to wet weather events. Wet weather can cause sewage collection systems to become overloaded and overflow to surface waters via combined sewer overflows and/or sanitary sewer overflows. Storm water runoff from urban and agricultural areas to surface waters may also affect concentrations of fecal coliform. The fact that these samples were obtained within three days after a wet weather event may explain the elevated fecal coliform concentrations, since some elevated flows probably had not yet completely subsided.

Five of the 17 exceedences remain unexplained since wet weather did not appear to be related. They may be attributable to undetected dry weather sewer overflows, sewer leaks, septic tank discharges, or other urban/agricultural sources. A review of NEORSD Sewer Maintenance & Control records revealed no information that could explain these elevated levels.

The bacteriological sampling represents an ongoing effort by the Cleveland Metroparks to monitor area streams due to their high ecological importance and recreational use. In addition, the continued sampling will aid in the development of a more extensive bacteriological data base that would facilitate the response to sewage related water quality disruptions at these locations.

Table N-1
Cleveland Metroparks Stream Sampling 1993 - 1995
Site Locations

Rocky River 1	--	East Branch, Eastland Road Ford
Rocky River 2	--	Hilliard Road Bridge
Rocky River 3	--	East Branch, Barrett Road Ford
Big Creek 1	--	East Branch, Memphis Road
Big Creek 2	--	West Branch, Memphis Road
Mill Creek	--	Garfield Park
Wolf Creek	--	Garfield Park
Tinkers Creek 1	--	Broadway Avenue
Tinkers Creek 2	--	Richmond Road
Chippewa Creek	--	Chippewa Creek Road @ Ford
Euclid Creek 1	--	East Branch, Highland Road
Euclid Creek 2	--	West Branch, Highland Road
Chagrin River 1	--	Solon Road
Chagrin River 2	--	Wilson Mills Road
Cuyahoga River	--	State Route 82

Table N-2
1993 Cleveland Metroparks Stream Sampling
Fecal Coliform Concentrations
(organisms per 100 milliliters)

Sample Location	Sample Date									
	2/10	2/11	3/31	4/1	5/3	5/4	5/18	5/19	6/3	6/4
Rocky River 1	320	—	1100	—	480	—	160	—	160	—
Rocky River 2	$\boxed{3160}$	—	1350	—	380	—	370	—	570	—
Rocky River 3	1120	—	1800	—	550	—	100	—	260	—
Big Creek 1	$\boxed{2570}$	—	$\boxed{3000}$	—	600	—	200	—	400	—
Big Creek 2	910	—	$\boxed{2500}$	—	480	—	90	—	1200	—
Big Creek 3	$\boxed{2710}$	—	$\boxed{2800}$	—	610	—	190	—	1150	—
Mill Creek	$\boxed{76000}$	$\boxed{88000}$	$\boxed{7000}$	—	630	—	400	—	420	—
Wolf Creek	$\boxed{2600}$	1450	1250	—	310	—	220	—	320	—
Tinkers Creek 1	—	330	—	950	—	770	—	270	—	1150
Tinkers Creek 2	—	280	—	850	—	580	—	190	—	470
Chippewa Creek	—	80	—	190	—	60	30	—	—	40
Euclid Creek 1	360	20	—	80	—	180	—	210	120	—
Euclid Creek 2	440	—	—	360	—	270	—	300	210	—
Chagrin River 1	—	20	—	300	—	90	—	25	—	110
Chagrin River 2	—	40	—	90	—	140	—	25	—	60
Cuyahoga River	—	470	—	1100	—	440	150	—	—	680

Sample Location	Sample Date								
	7/6	7/7	7/20	7/21	8/31	9/1	9/14	10/26	12/14
Rocky River 1	260	—	190	—	410	—	380	190	290
Rocky River 2	140	—	360	—	720	—	680	170	310
Rocky River 3	360	—	390	—	970	—	490	220	230
Big Creek 1	480	—	410	—	770	—	1160	280	350
Big Creek 2	320	—	340	—	380	—	880	180	270
Big Creek 3	260	—	310	—	490	—	880	160	360
Mill Creek	580	—	400	—	850	—	790	510	350
Wolf Creek	700	—	850	—	410	—	310	340	250
Tinkers Creek 1	—	1180	—	650	620	—	470	170	400
Tinkers Creek 2	—	660	—	540	880	—	410	270	310
Chippewa Creek	—	270	—	140	170	—	80	40	20
Euclid Creek 1	—	1100	—	350	—	750	580	110	50
Euclid Creek 2	—	820	—	210	—	1300	410	140	130
Chagrin River 1	—	450	—	210	190	—	160	70	40
Chagrin River 2	—	340	—	90	320	—	380	40	110
Cuyahoga River	—	1300	—	1100	$\boxed{2400}$	—	1300	460	420

$\boxed{}$ Fecal Coliform Excursions from Ohio EPA Primary Contact Criterion

Table N-3
1994 Cleveland Metroparks Stream Sampling
Fecal Coliform Concentrations
(organisms per 100 milliliters)

Sample Location	Sample Date									
	3/18	5/19	6/8	7/7	7/20	8/30	8/31	9/21	10/17	10/18
Rocky River 1	180	270	390	200	160	330	—	225	305	—
Rocky River 2	150	180	240	250	200	210	—	310	240	—
Rocky River 3	600	330	290	3850	270	370	—	350	260	—
Big Creek 1	260	550	400	850	680	530	—	775	470	—
Big Creek 2	1220	130	140	250	230	350	—	230	260	—
Big Creek 3	1270	210	150	550	220	400	—	505	290	—
Mill Creek	1800	260	290	900	280	630	—	940	500	—
Wolf Creek	800	310	90	340	180	390	—	430	660	—
Tinkers Creek 1	200	430	320	400	180	280	—	290	490	—
Tinkers Creek 2	210	280	290	550	230	330	—	360	400	—
Chippewa Creek	20	25	20	80	150	—	40	105	30	—
Euclid Creek 1	40	130	80	190	130	—	160	220	—	170
Euclid Creek 2	56	90	60	230	140	—	100	310	—	150
Chagrin River 1	48	75	100	110	80	—	80	155	80	—
Chagrin River 2	64	90	50	150	80	—	130	130	—	120
Cuyahoga River	270	330	400	650	580	—	670	820	440	—

Table N-4
1995 Cleveland Metroparks Stream Sampling
Fecal Coliform Concentrations
(organisms per 100 milliliters)

Sample Location	Sample Date											
	3/16	3/17	4/5	4/6	7/10	7/13	7/31	9/5	9/11	10/16	10/17	10/26
Rocky River 1	—	970	330	—	580	330	400	290	340	370	—	170
Rocky River 2	—	1080	3850	—	270	250	270	190	270	290	—	210
	—	—	1770	—	—	—	—	—	—	—	—	—
Rocky River 3	—	590	180	—	430	390	480	330	310	350	—	90
Big Creek 1	1700	—	1200	—	310	350	610	750	510	600	—	530
Big Creek 2	3100	—	220	—	520	440	150	180	160	280	—	90
Big Creek 3	2400	—	1250	—	400	360	500	650	450	540	—	610
Mill Creek	1020	—	970	—	390	510	440	340	380	610	—	1180
Wolf Creek	1350	—	2850	—	520	290	290	570	490	440	—	530
Tinkers Creek 1	640	—	—	290	450	350	660	270	310	—	300	170
Tinkers Creek 2	920	—	—	350	350	320	580	320	300	—	340	250
Chippewa Creek	25	—	25	—	120	50	70	40	30	90	—	35
Euclid Creek 1	—	220	—	130	260	80	220	150	180	—	170	90
Euclid Creek 2	—	480	—	210	310	130	260	130	200	—	280	120
Chagrin River 1	—	40	—	184	190	80	100	90	110	—	110	35
Chagrin River 2	—	80	—	40	260	70	70	100	140	—	140	60
Cuyahoga River	—	1550	2340	—	820	570	1220	630	490	550	—	670

Fecal Coliform Excursions from Ohio EPA Primary Contact Criterion

Table N-5
Cleveland Metroparks Stream Sampling
1993-1995 Fecal Coliform Concentrtations
(Organisms Per 100 Milliliters)

Sample Location	N	Maximum	75th Percentile	Median	25th Percentile	Minimum	Geometric Mean
Rocky River 1	28	1100	382.5	312.5	197.5	160	306
Rocky River 2	29	3850	570	270	210	140	385
Rocky River 3	28	3850	505	355	267.5	90	396
Big Creek 1	28	3000	771.25	540	400	200	602
Big Creek 2	28	3100	490	275	180	90	343
Big Creek 3	28	2800	707.5	495	305	150	521
Mill Creek	29	88000	940	580	400	260	857
Wolf Creek	29	2850	700	430	310	90	491
Tinkers Creek 1	28	1180	625	375	287.5	170	400
Tinkers Creek 2	28	920	542.5	345	287.5	190	384
Chippewa Creek	28	270	93.75	45	30	20	55
Euclid Creek 1	29	1100	220	170	110	20	160
Euclid Creek 2	28	1300	310	210	130	56	214
Chagrin River 1	28	450	156.25	95	73.75	20	94
Chagrin River 2	28	380	140	90	63	25	97
Cuyahoga River	28	2400	1100	640	455	150	673

N = Number of times sites were sampled during 1993.

Table N-6
NEORSD Rain Gauge Site Locations

Rain Gauge Site	Address
Brecksville Jr. High School	27 Public Square
James Rhodes High School	5100 Biddulph Road
John Marshall High School	3952 West 140th Street
Maple Heights City Hall	5353 Lee Road
North Royalton City Hall	1384 Ridge Road
Parma City Hall	6611 Ridge Road

Table N-7
Cleveland Metroparks Sampling Events with Fecal Coliform Criterion Excursions Compared with Associated Rain Events Detected by NEORSD Rain Gauge Data and/or NOAA Local Climatological Data

SAMPLING EVENTS EXCEEDING CRITERIA			ASSOCIATED RAIN EVENTS		
Sampling Date	Sampling Location	Fecal Coliform Concentrations	Rain Event Data	Rain Guage Location	Rainfall (Inches)
2/10/93	Rocky River 2	3,160*	2/8/93	North Royalton	0.12
2/10/93	Big Creek 1	2,570*	2/7/93	Parma	0.17
			2/8/93	Parma	0.02
			2/9/93	Parma	0.07
2/10/93	Big Creek 3	2,710*	2/7/93	James Rhodes H.S.	0.11
			2/9/93	James Rhodes H.S.	0.02
2/10/93	Mill Creek	76,000	2/8/93	Maple Heights	0.2
2/10/93	Wolf Creek	2,600*	2/8/93	Maple Heights	0.2
3/31/93	Big Creek 1	3,000*	3/28/93	Hopkins International Airport	0.08
3/31/93	Big Creek 2	2,500*	3/28/93	Hopkins International Airport	0.08
3/31/93	Big Creek 3	2,800*	3/28/93	Hopkins International Airport	0.08
3/31/93	Mill Creek	7,000	3/28/93	Hopkins International Airport	0.08
8/31/93	Cuyahoga River	2,400	8/28/93	Hopkins International Airport	0.06
7/7/94	Rocky River 3	3,850*	7/5/94	Hopkins International Airport	0.23
4/5/95	Rocky River 2	3,850*	4/3/95	John Marshall H.S.	0.05
			4/4/95	John Marshall H.S.	0.05
4/5/95	Wolf Creek	2,850*	4/3/95	Maple Heights	0.14
			4/4/95	Maple Heights	0.02
4/5/95	Cuyahoga River	2,340*	4/3/95	Brecksville Jr. H.S.	0.03
			4/4/95	Brecksville Jr. H.S.	0.26

* - May be attributable to wet weather.

Figure N-1
1993-1995 Cleveland Metroparks Fecal Coliform Concentrations
(Maximum, 75th Percentile, Median, 25th Percentile, Minimum)