

Division of Surface Water

**Biological and Water Quality
Study of the Grand River
Basin 2003-2004**

Hydrologic Units 04110004 050 and 04110004 060

Ashtabula, Geauga and Lake Counties



November 1, 2006

Bob Taft, Governor, State of Ohio
Joseph Koncelik, Director

Biological and Water Quality Study of the
Lower Grand River 2003 - 2004
Hydrologic Units
(04110004 050 and 04110004 060)

Ashtabula, Geauga, and Lake Counties

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NOTICE TO USERS

Ohio EPA incorporated biological criteria into the Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1) regulations in February 1990 (effective May 1990). These criteria consist of numeric values for the Index of Biotic Integrity (IBI) and Modified Index of Well-Being (MIwb), both of which are based on fish assemblage data, and the Invertebrate Community Index (ICI), which is based on macroinvertebrate assemblage data. Criteria for each index are specified for each of Ohio's five ecoregions (as described by Omernik 1987), and are further organized by organism group, index, site type, and aquatic life use designation. These criteria, along with the existing chemical and whole effluent toxicity evaluation methods and criteria, figure prominently in the monitoring and assessment of Ohio's surface water resources.

The following documents support the use of biological criteria by outlining the rationale for using biological information, the methods by which the biocriteria were derived and calculated, the field methods by which sampling must be conducted, and the process for evaluating results:

Ohio Environmental Protection Agency. 1987a. Biological criteria for the protection of aquatic life: Volume I. The role of biological data in water quality assessment. Div. Water Qual. Monit. &

Assess., Surface Water Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1987b. Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Div. Water Qual. Monit. & Assess., Surface Water Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1989b. Addendum to Biological criteria for the protection of aquatic life: Volume II. Users manual for biological field assessment of Ohio surface waters. Div. Water Qual. Plan. & Assess., Ecological Assessment Section, Columbus, Ohio.

Ohio Environmental Protection Agency. 1989c. Biological criteria for the protection of aquatic life: Volume III. Standardized biological field sampling and laboratory methods for assessing fish and macroinvertebrate communities. Div. Water Quality Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio.

Ohio Environmental Protection Agency. 1990. The use of biological criteria in the Ohio EPA surface water monitoring and assessment program. Div. Water Qual. Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio.

Rankin, E.T. 1989. The qualitative habitat evaluation index (QHEI): rationale, methods, and application. Div. Water Qual. Plan. & Assess., Ecol. Assess. Sect., Columbus, Ohio.

Since the publication of the preceding guidance documents, the following new publications by the Ohio EPA have become available. These publications should also be consulted as they represent the latest information and analyses used by the Ohio EPA to implement the biological criteria.

DeShon, J.D. 1995. Development and application of the invertebrate community index (ICI), pp. 217-243. in W.S. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Risk-based Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

Rankin, E. T. 1995. The use of habitat assessments in water resource management programs, pp. 181-208. in W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

Yoder, C.O. and E.T. Rankin. 1995. Biological criteria program development and implementation in Ohio, pp. 109-144. in W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

Yoder, C.O. and E.T. Rankin. 1995. Biological response signatures and the area of degradation value: new tools for interpreting multimetric data, pp. 263-286. in W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

Yoder, C.O. 1995. Policy issues and management applications for biological criteria, pp. 327-344. in W. Davis and T. Simon (eds.). Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making. Lewis Publishers, Boca Raton, FL.

Yoder, C.O. and E.T. Rankin. 1995. The role of biological criteria in water quality monitoring, assessment, and regulation. Environmental Regulation in Ohio: How to Cope With the Regulatory Jungle. Inst. of Business Law, Santa Monica, CA. 54 pp.

These documents and this report can be obtained by writing to:

Ohio EPA, Division of Surface Water
Monitoring and Assessment Section
4675 Homer-Ohio Lane
Groveport, Ohio 43125

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FOREWORD

What is a Biological and Water Quality Survey?

A biological and water quality survey, or “biosurvey”, is an interdisciplinary monitoring effort coordinated on a waterbody specific or watershed scale. This effort may involve a relatively simple setting focusing on one or two small streams, one or two principal stressors, and a handful of sampling sites or a much more complex effort including entire drainage basins, multiple and overlapping stressors, and tens of sites. Each year Ohio EPA conducts biosurveys in 10-15 different study areas with an aggregate total of 250-300 sampling sites.

Ohio EPA employs biological, chemical, and physical monitoring and assessment techniques in biosurveys in order to meet three major objectives: 1) determine the extent to which use designations assigned in the Ohio Water Quality Standards (WQS) are either attained or not attained; 2) determine if use designations assigned to a given water body are appropriate and attainable; and 3) determine if any changes in key ambient biological, chemical, or physical indicators have taken place over time, particularly before and after the implementation of point source pollution controls or best management practices. The data gathered by a biosurvey is processed, evaluated, and synthesized in a biological and water quality report. Each biological and water quality study contains a summary of major findings and recommendations for revisions to WQS, future monitoring needs, or other actions which may be needed to resolve existing impairment of designated uses. While the principal focus of a biosurvey is on the status of aquatic life uses, the status of other uses such as recreation and water supply, as well as human health concerns, are also addressed.

The findings and conclusions of a biological and water quality study may factor into regulatory actions taken by Ohio EPA (*e.g.*, NPDES permits, Director’s Orders, the Ohio Water Quality Standards [OAC 3745-1]), and are eventually incorporated into Water Quality Permit Support Documents (WQPSDs), State Water Quality Management Plans, the Ohio Nonpoint Source Assessment, and the Ohio Water Resource Inventory (305[b] report).

Hierarchy of Indicators

A carefully conceived ambient monitoring approach, using cost-effective indicators comprised of ecological, chemical, and toxicological measures, can ensure that all relevant pollution sources are judged objectively on the basis of environmental results. Ohio EPA relies on a tiered approach in attempting to link the results of administrative activities with true environmental measures. This integrated approach is outlined in Figure 1 and includes a hierarchical continuum from administrative to true environmental indicators. The six “levels” of indicators include: 1) actions taken by regulatory agencies (permitting, enforcement, grants); 2) responses by the regulated community (treatment works, pollution prevention); 3) changes in discharged quantities (pollutant loadings); 4) changes in ambient conditions (water quality, habitat); 5) changes in uptake and/or assimilation (tissue contamination, biomarkers, wasteload allocation); and, 6) changes in health, ecology, or other effects (ecological condition, pathogens). In this process the results of administrative activities (levels 1 and 2) can be linked to efforts to improve water quality (levels 3,

4, and 5) which should translate into the environmental “results” (level 6). Thus, the aggregate effect of billions of dollars spent on water pollution control since the early 1970s can now be determined with quantifiable measures of environmental condition. Superimposed on this hierarchy is the concept of stressor, exposure, and response indicators. *Stressor* indicators generally include activities which have the potential to degrade the aquatic environment such as pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. *Exposure* indicators are those which measure the effects of stressors and can include whole effluent toxicity tests, tissue residues, and biomarkers, each of which provides evidence of biological exposure to a stressor or bioaccumulative agent. *Response* indicators are generally composite measures of the cumulative effects of stress and exposure and include the more direct measures of community and population response that are represented here by the biological indices which comprise Ohio’s biological criteria. Other response indicators could include target assemblages, *i.e.*, rare, threatened, endangered, special status, and declining species or bacterial levels which serve as surrogates for the recreational uses. These indicators represent the essential technical elements for watershed-based management approaches. The key, however, is to use the different indicators *within* the roles which are most appropriate for each. Describing the causes and sources associated with observed impairments revealed by the biological criteria and linking this with pollution sources involves an interpretation of multiple lines of evidence including water chemistry data, sediment data, habitat data, effluent data, biomonitoring results, land use data, and biological response signatures within the biological data itself. Thus the assignment of principal causes and sources of impairment represents the association of impairments (defined by response indicators) with stressor and exposure indicators. The principal reporting venue for this process on a watershed or subbasin scale is a biological and water quality report. These reports then provide the foundation for aggregated assessments such as the Ohio Water Resource Inventory (305[b] report), the Ohio Nonpoint Source Assessment, and other technical bulletins.

Ohio Water Quality Standards: Designated Aquatic Life Use

The Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1) consist of designated uses and chemical, physical, and biological criteria designed to represent measurable properties of the environment that are consistent with the goals specified by each use designation. Use designations consist of two broad groups, aquatic life and non-aquatic life uses. In applications of the Ohio WQS to the management of water resource issues in Ohio’s rivers and streams, the aquatic life use criteria frequently result in the most stringent protection and restoration requirements, hence their emphasis in biological and water quality reports. Also, an emphasis on protecting for aquatic life generally results in water quality suitable for all uses. The five different aquatic life uses currently defined in the Ohio WQS are described as follows:

- 1) *Warmwater Habitat (WWH)* - this use designation defines the “typical” warmwater assemblage of aquatic organisms for Ohio rivers and streams; *this use represents the principal restoration target for the majority of water resource management efforts in Ohio.*

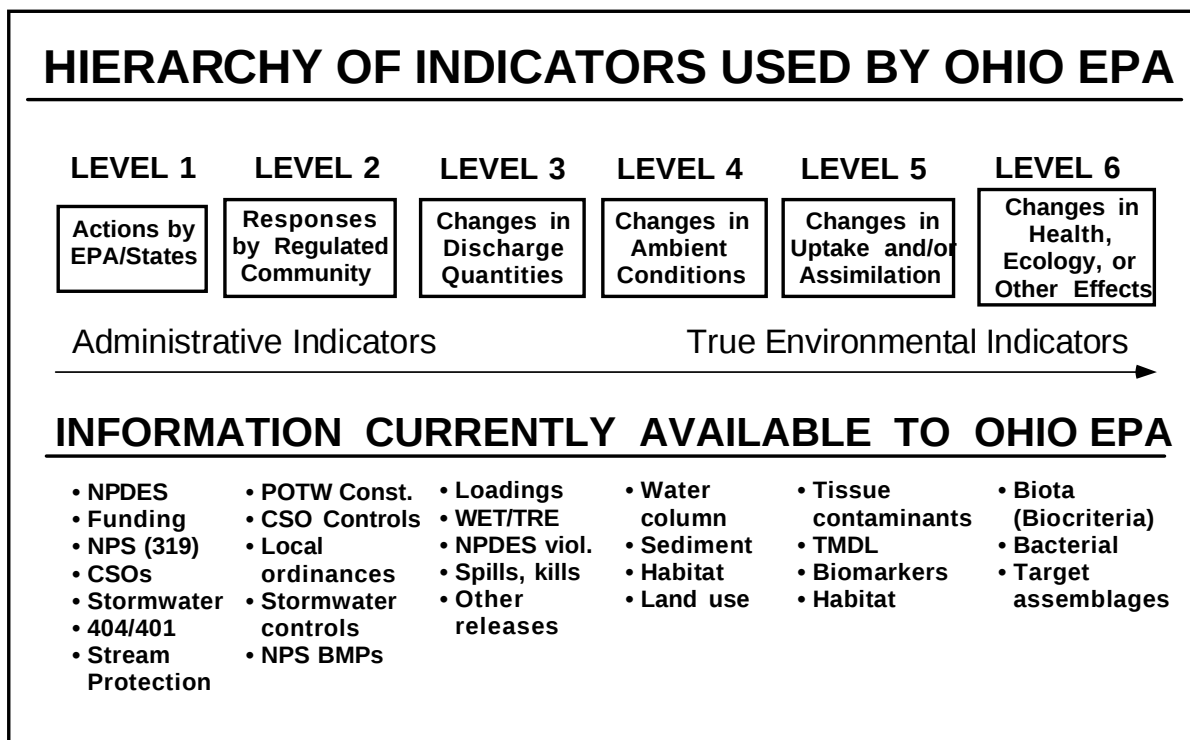


Figure 1. Hierarchy of administrative and environmental indicators used by Ohio EPA for monitoring, assessment, reporting and evaluating program effectiveness. This is patterned after a model developed by the U.S. EPA, Office of Water.

- 2) *Exceptional Warmwater Habitat (EWH)* - this use designation is reserved for waters which support “unusual and exceptional” assemblages of aquatic organisms which are characterized by a high diversity of species, particularly those which are highly intolerant and/or rare, threatened, endangered, or special status (i.e., declining species); *this designation represents a protection goal for water resource management efforts dealing with Ohio’s best water resources.*
- 3) *Cold-water Habitat (CWH)* - this use is intended for waters which support assemblages of cold water organisms and/or those which are stocked with salmonids with the intent of providing a put-and-take fishery on a year round basis which is further sanctioned by the Ohio DNR, Division of Wildlife; this use should not be confused with the Seasonal Salmonid Habitat (SSH) use which applies to the Lake Erie tributaries which support periodic “runs” of salmonids during the spring, summer, and/or fall.
- 4) *Modified Warmwater Habitat (MWH)* - this use applies to streams and rivers which have been subjected to extensive, maintained, and essentially permanent hydromodifications such that the biocriteria for the WWH use are not attainable *and where the activities have been sanctioned by state or federal law*; the representative aquatic assemblages are generally composed of species which are tolerant to low dissolved oxygen, silt, nutrient enrichment, and poor quality habitat.

5) *Limited Resource Water (LRW)* - this use applies to small streams (usually <3 mi.² drainage area) and other water courses which have been irretrievably altered to the extent that no appreciable assemblage of aquatic life can be supported; such waterways generally include small streams in extensively urbanized areas, those which lie in watersheds with extensive drainage modifications, those which completely lack water on a recurring annual basis (*i.e.*, true ephemeral streams), or other irretrievably altered waterways.

Chemical, physical, and/or biological criteria are generally assigned to each use designation in accordance with the broad goals defined by each. As such the system of use designations employed in the Ohio WQS constitutes a “tiered” approach in that varying and graduated levels of protection are provided by each. This hierarchy is especially apparent for parameters such as dissolved oxygen, ammonia-nitrogen, temperature, and the biological criteria. For other parameters such as heavy metals, the technology to construct an equally graduated set of criteria has been lacking, thus the same water quality criteria may apply to two or three different use designations.

Ohio Water Quality Standards: Non-Aquatic Life Uses

In addition to assessing the appropriateness and status of aquatic life uses, each biological and water quality survey also addresses non-aquatic life uses such as recreation, water supply, and human health concerns as appropriate. The recreation uses most applicable to rivers and streams are the Primary Contact Recreation (PCR) and Secondary Contact Recreation (SCR) uses. The criterion for designating the PCR use is simply having a water depth of at least one meter over an area of at least 100 square feet or where canoeing is a feasible activity. If a water body is too small and shallow to meet either criterion the SCR use applies. The attainment status of PCR and SCR is determined using bacterial indicators (*e.g.*, fecal coliform, *E. coli*) and the criteria for each are specified in the Ohio WQS.

Water supply uses include Public Water Supply (PWS), Agricultural Water Supply (AWS), and Industrial Water Supply (IWS). Public Water Supplies are simply defined as segments within 500 yards of a potable water supply or food processing industry intake. The Agricultural Water Supply (AWS) and Industrial Water Supply (IWS) use designations generally apply to all waters unless it can be clearly shown that they are not applicable. An example of this would be an urban area where livestock watering or pasturing does not take place, thus the AWS use would not apply. Chemical criteria are specified in the Ohio WQS for each use and attainment status is based primarily on chemical-specific indicators. Human health concerns are additionally addressed with fish tissue data, but any consumption advisories are issued by the Ohio Department of Health and detailed in other documents.

Introduction

A biological and water quality survey of the lower Grand River basin (USGS Hydrologic Units 04110004 050 and 04110004 060) was conducted in 2003 and 2004. Hydrologic Unit 050 comprises the Mill Creek catchment in Ashtabula County. Unit 060 comprises the Grand River mainstem and all tributaries downstream from the confluence with Mill Creek. The main objectives of the survey were:

- 1) to assess the overall quality of surface waters within the hydrologic units,
- 2) monitor for trends or changes in biological or water quality,
- 3) assign aquatic life uses to unassessed waters,
- 4) evaluate publicly owned wastewater treatment plants (WWTP) in Chardon, Jefferson and Painesville,
- 5) assess the Grand River mainstem in the vicinity of the adjacent waste containment ponds formerly used by the now abandoned Diamond Shamrock chemical plant, and
- 6) provide information for completion of a Total Maximum Daily Load Study.

The findings of this evaluation factor into regulatory actions taken by the Ohio EPA (e.g., NPDES permits, Director's Orders, the Ohio Water Quality Standards [OAC 3745-1], Water Quality Permit Support Documents [WQPSDs]) and are incorporated into State Water Quality Management Plans, the Ohio Nonpoint Source Assessment and the biennial Integrated Water Quality Monitoring and Assessment Report (305[b] and 303[d]).

Executive Summary

The results of this survey show that the Grand River and its tributaries continue to harbor a rich and diverse biological assemblage containing many rare and threatened species, and several state endangered species. This exceptional biological richness is the direct result of the fact that the physical habitat of the Grand River and most of its tributaries has, by dint of isolation from the surrounding uplands, been minimally altered and therefore remains largely intact. Also, land preservation through park land acquisition and conservation easements, and the numerous woodlots dotting the watershed, has maintained forest cover along much of the riparian zone, the adjacent valley slopes, and in the uplands; consequently, the water resource is, with few exceptions, very good and approaches pristine in a few cases.

Localized areas of aquatic life use impairment were observed around the western periphery of the lower hydrologic unit (04110004 060; see Figure 2), and were caused by urban/suburban landuse. Waterbodies so affected include Kellogg Creek, Ellison Creek, Jordan Creek, the headwaters of Big Creek, and Red Creek. Suburban landuse within the Red Creek catchment is so dense as to likely preclude attainment of the WWH aquatic life use given the way stormwater management was historically practiced. Similarly, the headwaters of Kellogg Creek are highly impacted, but the lower reaches are still marginally meeting expectations for WWH.

In the Mill Creek catchment (hydrologic unit 04110004 050), aquatic life impairment in Cemetery Creek was caused by a combination of urban/suburban impacts and wastewater loadings, both from the Village of Jefferson. Also, agricultural landuse is higher within the Mill Creek subcatchment compared to that downstream, and is generally reflected in nutrient concentrations (TKN, TP, and NH_3N) elevated relative to the reference condition, and an increase in the number of modified habitat attributes. Collectively, these stressors acted to impair the aquatic community in Mill Creek in the vicinity of Clay Road (River Mile 25.7).

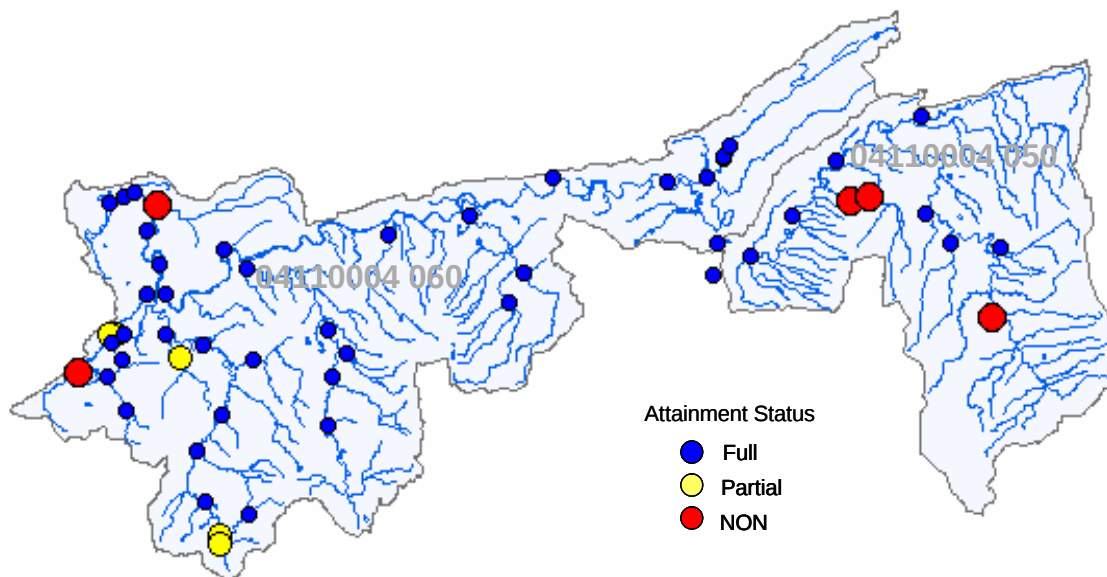


Figure 2. Attainment status of sites sampled during the 2003-2004 biological and water quality survey of the lower Grand River basin.

Highlights

- In Hydrologic Unit 0411004 060 (the lower mainstem unit) all of the Grand River mainstem and most of its tributaries are meeting their designated aquatic life uses.
 - Exceptions include:
 - Red Creek - urban/suburban stormwater,
 - Kellogg Creek - urban/suburban stormwater,
 - Big Creek in Chardon - urban/suburban stormwater,
 - Jordan Creek - suburban development, and
 - Ellison Creek - met WWH marginally due to impacts associated with the urban/suburban milieu
- Biological communities in the Grand River in the vicinity of the Diamond Shamrock lagoons met aquatic life use standards.
 - However, discharges of hexavalent chromium from the abandoned waste ponds to the river continues. Those discharges exceed water quality standards for the prevention of acute and chronic toxicity.
 - Aquatic life impairment was measured as recently as 2002, 2001 and 2000.
 - A load reduction of 40% is needed to meet applicable water quality standards for hexavalent chromium during periods of low stream flow.
 - Annual, periodic monitoring for hexavalent chromium and TDS in the Grand River adjacent to the Diamond Works site should continue indefinitely. Triennial biological monitoring to document recovery trends is also recommended.
- The Grand River is the only Ohio tributary to Lake Erie that harbors a self-sustaining population of Great Lakes muskellunge, and therefore is a priority for conservation.
 - The Grand River also has a native population of walleye and northern pike making it singularly unique among Ohio streams.
 - The Grand River and its tributaries provide habitat for many species considered rare by Ohio EPA, or listed as threatened or endangered by the Ohio Department of Natural Resources including:
 - 32 macroinvertebrate and freshwater mussel species, and
 - 11 fish species.
- The greatest threat to the rich biological diversity of the Grand River basin is suburbanization.
 - Regional planning, stream protection policies, comprehensive construction site management plans, construction site performance bonds, identification and preservation of sensitive areas, and above all, defined limits to growth are needed to maintain the biological integrity of the Grand River.
 - The Grand River is an economic asset to Northeast Ohio worth maintaining in its current state.
 - The Grand River and its tributaries are especially sensitive to pollution and disturbance

because of limited summer base flows.

- In Hydrologic Unit 04110004 050 (the Mill Creek unit), eight of eleven sites sampled met standards for aquatic life use; the three sites not meeting are:
 - Cemetery Creek (two sites) - one site impaired by suburban stormwater, and one site from a faulty sewer pump station.
 - Mill Creek at Clay Road - impaired by historic channel modification for agricultural drainage, low dissolved oxygen and nutrients.

Recommendations - Hydrologic Unit 04110004 060

Status of Non-aquatic Life Uses

All non-aquatic life uses should remain as presently designated in the Ohio Water Quality Standards for all of the waters surveyed within the hydrologic unit.

Grand River (03-001)

Status of Aquatic Life Uses

Aquatic life in the Grand River is fully attaining standards for Exceptional Warmwater Habitat (EWH) from Sweitzer Road (RM 42.2) to the SR 2 bridge in Painesville (RM 5.2), and is fully meeting standards for Warmwater Habitat (WWH) downstream from the SR 2 bridge. The Seasonal Salmonid use designation currently in place should be retained.

Other Recommendations and Future Monitoring Concerns

The Grand River is an economic asset to Northeast Ohio, but is especially sensitive to pollution and disturbance because of limited summer base flows. Therefore, regional planning, stream protection policies, comprehensive construction site management plans, construction site performance bonds, identification and preservation of sensitive areas, and above all, defined limits to growth are needed to maintain the biological integrity of the Grand River. The TMDL being developed for Grand River should use the existing baseflow as the target condition to maintain.

Red Creek (03-004)

Status of Aquatic Life Uses

Aquatic life in Red Creek did not meet standards for WWH, and will be difficult to achieve given the historic practices of stormwater management in densely populated areas.

Other Recommendations and Future Monitoring Concerns

The Center for Watershed Protection provides suggestions for stormwater retrofit in urbanized areas at the following link: http://www.cwp.org/retrofit_article.htm.

Big Creek (03-100)

Status of Aquatic Life Uses

Big Creek is designated WWH for aquatic life use, and is attaining that use from its confluence with the Grand River to upstream from Woodin Road (RM 14.6). A small portion of the stream

is in partial attainment of the WWH standard, owing to urban/suburban stormwater runoff from Chardon.

Other Recommendations and Future Monitoring Concerns

The Big Creek catchment drains the most rapidly suburbanizing townships in the Grand River watershed. Aggressive management, as outlined previously for the Grand River mainstem, is required to preserve the existing beneficial uses. Also, because Big Creek is a major tributary of the flow limited Grand River mainstem, preserving the existing hydrology of Big Creek and its tributaries is important for maintaining the long-term health of the Grand River.

Kellogg Creek (03-005) and Ellison Creek (03-006)

Status of Aquatic Life Uses

Kellogg and Ellison Creeks have a WWH aquatic life use designation. Ellison Creek is currently meeting this use, albeit narrowly. Kellogg Creek is impaired upstream from I-90, but continues to meet WWH from there to its confluence with Big Creek. Kellogg Creek also has a seasonal salmonid aquatic life use, as is appropriate. The presence of naturally reproduced steelhead trout in Ellison Creek demonstrates that it should also be designated seasonal salmonid habitat.

Other Recommendations and Future Monitoring Concerns

The existing population density and inertia toward continued growth in Concord Township is likely to limit any recovery of impaired segments and in all probability will push currently attaining segments past their tipping points and into non-attainment. Therefore, the management goal for Kellogg Creek and its tributaries should be directed at minimizing downstream impacts to the Grand River mainstem. To that end, homeowners should be educated and encouraged to naturalize their landscaping and avoid using fertilizers, herbicides and insecticides. Click on the following the link for examples. <http://www.epa.gov/ecopage/landscape/index.html> Also, where riparian habitat can be enhanced or reforested, that should be an obvious priority.

Jordon Creek (03-101)

Status of Aquatic Life Uses

Jordan (Gordon) Creek currently has a default WWH designation, but is recommended for Coldwater Habitat based on the presence of seven coldwater macroinvertebrate taxa.

Other Recommendations and Future Monitoring Concerns

The pace of suburban development within the Jordan Creek catchment is likely reaching the tipping point for sustained biotic integrity. To avoid aquatic life impairment, management should be directed toward naturalized landscapes that preserve as much ecological function as possible, in this case, the coldwater nature of the fauna.

East Creek (03-102), Jenks Creek (03-104), and Cutts Creek (03-105)

Status of Aquatic Life Uses

East, Jenks, and Cutts Creeks have a CWH aquatic life use, all are meeting that use based on the presence of coldwater macroinvertebrate taxa.

Other Recommendations and Future Monitoring Concerns

Comprehensive landuse planning, conservation easements, pre- and post-construction site management, a strong stream protection policy, and naturalized landscapes for new residential (or commercial) development will be needed to maintain the biotic integrity of these waters.

Paine Creek (03-110)*Status of Aquatic Life Uses*

Paine Creek downstream from Paine Falls is designated EWH and it is meeting that use. Upstream from Paine Falls, the default WWH designation was confirmed.

Other Recommendations and Future Monitoring Concerns

Paine Creek has very limited summer base flows, and is therefore especially vulnerable to anthropogenic disturbance. Fortunately, the catchment is relatively undeveloped, and the lower six miles of the mainstem are protected as parkland. The tributaries originating from the east, off Thompson Ledges, are important to maintaining base flow to Paine Creek (and, axiomatically, to the Grand River), and should obviously be targeted for protection (easements, deed restrictions, etc.).

Trib. to Paine Cr. @ RM 7.2 (03-113) and Phelps Creek (03-112)*Status of Aquatic Life Uses*

Both of these streams originate off the Thompson Ledges formation, and are high quality coldwater streams, and are recommended for a dual EWH/CWH aquatic life use based on the macroinvertebrate communities found in each.

Other Recommendations and Future Monitoring Concerns

All of the small streams and primary headwaters draining from Thompson Ledges should be targeted for protection.

Bates Creek (03-111)*Status of Aquatic Life Uses*

Bates Creek forms the headwaters of Paine Creek, has limited summer flow, and drains wet forests and wetlands. Its default aquatic life use designation of WWH was confirmed by this survey. The fish community rated fair due to the natural limitations inherent in streams draining wetlands.

Other Recommendations and Future Monitoring Concerns

Follow-up monitoring to confirm wetlands as limiting the fish community in Bates Creek is warranted.

Talcott Creek (03-007)*Status of Aquatic Life Uses*

Talcott Creek is recommended for a CWH aquatic life use based on the presence of eight coldwater macroinvertebrate taxa.

Other Recommendations and Future Monitoring Concerns

Being a direct coldwater tributary to the Grand River, protecting the existing hydrology of this stream is important to maintaining the long-term health of the Grand River.

Mill Creek (03-009)*Status of Aquatic Life Uses*

Mill Creek has a default WWH aquatic life use, this use has been confirmed for the reach downstream from Doty Road (RM 1.5). Upstream from Doty Road, Mill Creek is recommended for a CWH aquatic life use.

Other Recommendations and Future Monitoring Concerns

Being a direct high quality tributary to the Grand River, protecting the existing hydrology of Mill Creek is important to sustaining base flows and maintaining the long-term health of the Grand River.

Tributary to Mill Creek @ RM 4.3 (03-041)*Status of Aquatic Life Uses*

This formerly undesignated stream is recommended for a CWH aquatic life use.

Other Recommendations and Future Monitoring Concerns

This is one of the highest quality small streams in the Grand River basin.

Coffee Creek (03-010)*Status of Aquatic Life Uses*

Coffee Creek is meeting its WWH aquatic life use.

Other Recommendations and Future Monitoring Concerns

The lower one mile of Coffee Creek flows through a large wooded area before entering the Grand River. This area should be preserved as a buffer against stormwater from the industrial park south of I-90 in Austinburg. Also, the existing riparian buffers along the length of the Creek should be protected.

Mill Creek (03-120)*Status of Aquatic Life Uses*

Mill Creek is designated WWH, and that use was met at all locations except for the sample collected near the junction of Clay Road and SR 307 (RM 25.6). The stream in this reach is impaired by sedimentation due to channelization of the headwaters upstream from this point. A detectable impact was evident downstream from Cemetery Creek, but the impact did not result in the loss of aquatic life use.

Other Recommendations and Future Monitoring Concerns

Channelized segments with eroding stream banks upstream from Clay Road should be identified and targeted for restoration.

Griggs Creek (03-121)*Status of Aquatic Life Uses*

Griggs Creek has a WWH aquatic life use. That use remains unconfirmed.

Other Recommendations and Future Monitoring Concerns

The creek should be resampled in a reach not flowing through a wetland.

Askue Run (03-122)*Status of Aquatic Life Uses*

A WWH aquatic life use is recommended for Askue Run based on the fish and macroinvertebrate communities sampled at Denmark Road.

Peters Creek (03-123)*Status of Aquatic Life Uses*

A WWH aquatic life use is recommended for Peters Creek based on the fish and macroinvertebrate communities sampled at Clay Road.

Cemetery Creek (03-124)*Status of Aquatic Life Uses*

Cemetery Creek is designated WWH. That use was not met at the two locations sampled. The WWH is appropriate for the Creek downstream from the Jefferson WWTP, where suitable habitat quality and perennial flow do not limit the fish community. Downstream from the WWTP, the biological communities were impaired by a failing sewer pump station. Upstream from the WWTP, flow is so limited as to warrant further assessment for Primary Headwater Habitat (PHWH) classification.

Other Recommendations and Future Monitoring Concerns

Follow-up monitoring is needed to confirm that the pump station has been fixed and the biological communities are now meeting WWH.

Table 1. Aquatic life use attainment status for stations sampled in the Grand River basin, 2000 - 2004. The Index of Biotic Integrity (IBI) and Modified Index of Well-being (MIWb), and Invertebrate Community Index (ICI) are scores derived, respectively, from the composition of fish and macroinvertebrate communities in said samples. The Qualitative Habitat Evaluation Index (QHEI) is a measure of the ability of the physical habitat at a given sampling location to support a biotic community. All sites are located within the Erie-Ontario Lake Plain Ecoregion. For any marginally satisfied bio-criterion, suspected causes and sources are italicized. All tributary samples were collected in 2004 unless otherwise noted.

and sources are ranked. All tributary samples were collected in 2004 unless otherwise noted.							
River Mile	Attainment						
Fish/Invertebrate	IBI	MIwb ^a	ICI ^b	QHEI	Status	Causes ^c	Sources ^c
<i>03-001 Grand River EWH Aquatic Life Use</i>							
2003/2004							
42.4/44.0	42*	8.0*	48	64.5	Full	No impairment - this site is in the transition zone between EWH/WWH	
40.9/40.7	52	--	E	73.0	Full		
36.3	50	--	--	57.5	(Full)		
34/34.5	56	9.7	52	75.5	Full		
28.4	51	--	54	81.5	Full		
22.6	54	10.4	48	80.0	Full		
13.6	52	9.9	52	85.5	Full		
8.5/8.7	60	9.8	56	91.0	Full		
8.0	58	10.0	--	84.0	Full		
6.1	58	9.8	54	78.0	Full		
<i>WWH/Lacustrary Aquatic Life Use</i>							
2004							
4.3	42/44	8.6	56	56.5	Full	Biology met interim lacustrary criteria, but hexavalent chromium present in excess of water quality standards in 2004, and impairment noted in 2002	
3.9	36 ^{ns} /42	8.6	56	54.0	Full		
3.2/3.4	42/44	9.2	56	51.0	Full		
2002							
3.5	36 ^{ns} /--	8.3*	--	47.5	Partial	TDS/Toxicity	Hazardous waste

Table 1. Continued.

River Mile					Attainment		
Fish/Invertebrate	IBI	MIwb ^a	ICI ^b	QHEI	Status ^c	Causes ^d	Sources ^e
<i>03-001 Grand River - continued. WWH Lacustuary Aquatic Life Use</i>							
2002							
2.0	36*	9.4			Partial	TDS/Toxicity	Hazardous waste
0.8	42	9.8			Full		
0.5	34*	8.7			Partial	Unknown	
0.2	36*	9.1			Partial	Unkonwn	
2001- Enviroscience data							
5.5	40/--	8.7/--	42/--	88.5	Full		
4.8	42/--	8.5*/--	44/--	92.0	Partial	TDS/Toxicity	Hazardous waste
3.8	30*/--	7.2*/--	28/42	79.0	Partial	TDS/Toxicity	Hazardous waste
3.4	24*/--	6.3*/--	14/16*	62.0	NON	TDS/Toxicity	Hazardous waste
2000- Enviroscience data							
5.5	46/--	9.9/--	40/--	81.0	Full		
4.8	40/--	9.1/--	46/--	84.0	Full		
3.8	28*/--	7.5*/--	28/38	64.5	Partial	TDS/Toxicity	Hazardous waste
3.4	26*/--	6.9*/--	10/18*	57.5	NON	TDS/Toxicity	Hazardous waste
<i>03-004 Red Creek WWH Aquatic Life Use</i>							
0.5	30*	--	F	67.0	NON	Flow alteration, toxicity	Urban runoff
<i>03-005 Kellogg Creek WWH Aquatic Life Use</i>							
2004							
5.7/5.4	24*	--	P	59.0	NON	Toxicity	Urban Runoff
0.2	44	--	MG	67.0	Full	<i>Sediment</i>	<i>Urban Runoff</i>

Table 1. Continued.

River Mile					Attainment			
Fish/Invertebrate	IBI	MIwb ^a	ICI ^b	QHEI	Status ^c	Causes ^d	Sources ^e	
03-005 Kellogg Creek WWH Aquatic Life Use								
2000								
3.3	44	--	F	81.5	Partial	Toxicity	Urban Runoff	
3.1	46	--	F	81.0	Partial	Toxicity	Urban Runoff	
2.6	36 ^{ns}	--	--	62.5	(Full)			
2.5	44	--	--	66.0	(Full)			
0.1	46	--	--	67.0	(Full)			
03-006 Ellison Creek WWH Aquatic Life Use								
2004								
1.2/0.6	44	--	MG	59.0	Full	Sediment	Land Development	
2000								
3.7	40	--	MG	67.5	Full			
2.3	46	--	G	76.5	Full			
03-007 Talcott Creek WWH Aquatic Life Use CWH proposed								
1.5	22	--	E	61.0	Full†	No impairment - natural limitations to fish community		
03-009 Mill Creek CWH Aquatic Life Use								
5.0/4.8	34	--	E	74.5	Full†			
WWH Aquatic Life Use								
1.4/1.7	34 ^{ns}	7.7 ^{ns}	E	54.5	Full	State species of concern macroinvertebrate collected		
03-041 Trib. to Mill CWH Aquatic Life Use								
1.6	40	--	E	79.0	Full†	Fish naturally limited		

Table 1. Continued.

Table 1. Continued							
River Mile					Attainment		
Fish/Invertebrate	IBI	MIwb ^a	ICI ^b	QHEI	Status ^c	Causes ^d	Sources ^e
03-010 Coffee Creek WWH Aquatic Life Use							
2004							
0.2	38 ^{ns}	--	MG	65.5	Full	Sedimentation	Urban Runoff
2000							
1.3/1.9	46	--	42	69.0	Full		
1.2	40	--	54	80.0	Full		
0.2	36 ^{ns}	--	54	76.0	Full		
03-100 Big Creek WWH Aquatic Life Use							
2003							
16.2/16.1	58	--	22*	62.0	Partial	Habitat Alteration	Urban Runoff
16	52	--	28*	82.0	Partial		Urban Runoff
14/13.8	40	--	44	75.0	Full		
9.3/9.5	48	--	G	85.0	Full		
4.9/4.8	38	7.9	50	66.5	Full		
2.5/2.7	44	7.1*	54	50.5	Partial	Natural Limits	
2000							
0.6	44	7.8	--	--	Full		
03-101 Jordon Creek WWH Aquatic Life Use CWH proposed							
1.1/0.6	34	--	G	59.5	Full†	Flow alternation	Development

Table 1. Continued.

Table 1. Continued.						
River Mile					Attainment	
Fish/Invertebrate	IBI	MIwb ^a	ICI ^b	QHEI	Status ^c	Causes ^d
Sources ^e						
03-102 East Creek WWH Aquatic Life Use CWH proposed						
2004						
1.2/1.1	28	--	E	58.0	Full [†]	Transition between WWH and PHWH
2000						
1.2	40	--	--	0.0	(Full) [†]	
03-103 Aylworth Creek CWH Aquatic Life Use						
2000						
0.9	36	--	--	0.0	(Full) [†]	Transition between WWH and PHWH
03-104 Jenks Creek WWH/CWH Aquatic Life Use						
0.1	56	--	G	80.5	Full	
03-105 Cutts Creek CWH Aquatic Life Use						
1.2	38	--	G	73.0	Full	Transition between WWH and PHWH
03-110 Paine Creek WWH Aquatic Life Use						
5.6/6.1	36 ^{ns}	--	E	81.5	Full	Coldwater bugs, redbside dace
3.0	34 ^{ns}	--	--	69.5	Full	
EWH Aquatic Life Use						
0.5	48	8.5*	E	60.5	Partial	Natural Limits - state endangered macroinvertebrate collected

Table 1. Continued.

River Mile	Fish/Invertebrate	IBI	MIwb ^a	ICI ^b	QHEI	Attainment Status ^c	Causes ^d	Sources ^e
<i>03-111 Bates Creek WWH Aquatic Life Use</i>								
2004								
2.2/3.3		32*	--	E	83.5	Partial	State threatened and species of concern macroinvertebrates Natural -wetlands	
2000								
0.6		24*	--	--	--	(NON)	Unknown - data collected by DNR	
<i>03-112 Phelps Creek WWH Aquatic Life Use - CWH proposed</i>								
0.1		--	--	VG	--	(Full) [†]		
<i>03-113 Trib. to Paine WWH Aquatic Life Use - CWH proposed</i>								
0.4		36	--	E	55.0	Full [†]	Transition between WWH and PHWH; 9 coldwater bugs	
<i>03-120 Mill Creek WWH Aquatic Life Use</i>								
25.6/25.7		30*	6.0*	F	72.0	NON	Sedimentation	Ag Channelization
18.2/17.8		52	9.3	52	80.5	Full		
9.7				E		(Full)		
6.5/7.2		36	8.7	46	87.5	Full		
4.1		30	7.7 ^{ns}	--	58.0	Partial	Natural featureless bedrock - 2004 sample at RM 3.7 overrides 2003 result	
3.7/2.9		48	8.1	52	83.5	Full		
<i>03-121 Griggs Creek WWH Aquatic Life Use</i>								
2.0		34*	--	30 ^{ns}	50.5	Parital	Natural Limits	Wetlands

Table 1. Continued.

River Mile	Fish/Invertebrate	IBI	MIwb ^a	ICI ^b	QHEI	Attainment Status ^c	Causes ^d	Sources ^e
03-122	Askue Run	WWH Aquatic Life Use						
0.1		38 ^{ns}	--	G	78.5	Full		
03-123	Peters Creek	WWH Aquatic Life Use						
0.2/0.6		42	--	MG	76.5	Full		
03-124	Cemetery Creek	WWH Aquatic Life Use						
2.1/2.4		26*	--	F	78.0	NON	Flow alteration	Urban runoff
1.3/1.2		26*	--	F	64.5	NON	Organic Enrichment/Toxicity	Sewer pump station
		IBI		MIwb		ICI		
		WWH	EWB	WWH	EWB	WWH	EWB	
Headwaters		40	50	NA	NA	34	46	
Wadeable		38	50	7.9	9.4	34	46	
Boat		40	50	8.7	9.6	34	46	
Lacustrary [@]		42	50	8.6	10.0	NA	NA	

a- MIwb is not applicable to headwater streams with drainage areas ≤ 20 mi².

b- A qualitative narrative evaluation based on community composition, EPT taxa richness, and QCTV scores.

c- Causes and Sources listed are considered to be a primary influence on water quality, but may not be the only issue leading to impairment. See text for discussion of additional causes that cumulatively have led to impairment.

* - Indicates significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units).

^{ns} - Nonsignificant departure from biocriteria (≤ 4 IBI or ICI units, or ≤ 0.5 MIwb units).

[†] - Coldwater Aquatic Life Use (existing or proposed) - biological criteria do not apply. Attainment status is qualitatively based on narrative assessment of the number of coldwater macroinvertebrate and/or fish taxa, their relative abundance, and the presence of salamanders.

[@] - Lacustraries are drowned river mouths of tributaries to Lake Erie; the upper boundary is typically defined as the first upstream riffle or the upstream extent of seiche influence; biocriteria for lacustraries are interim measures and do not apply formally toward attainment status.

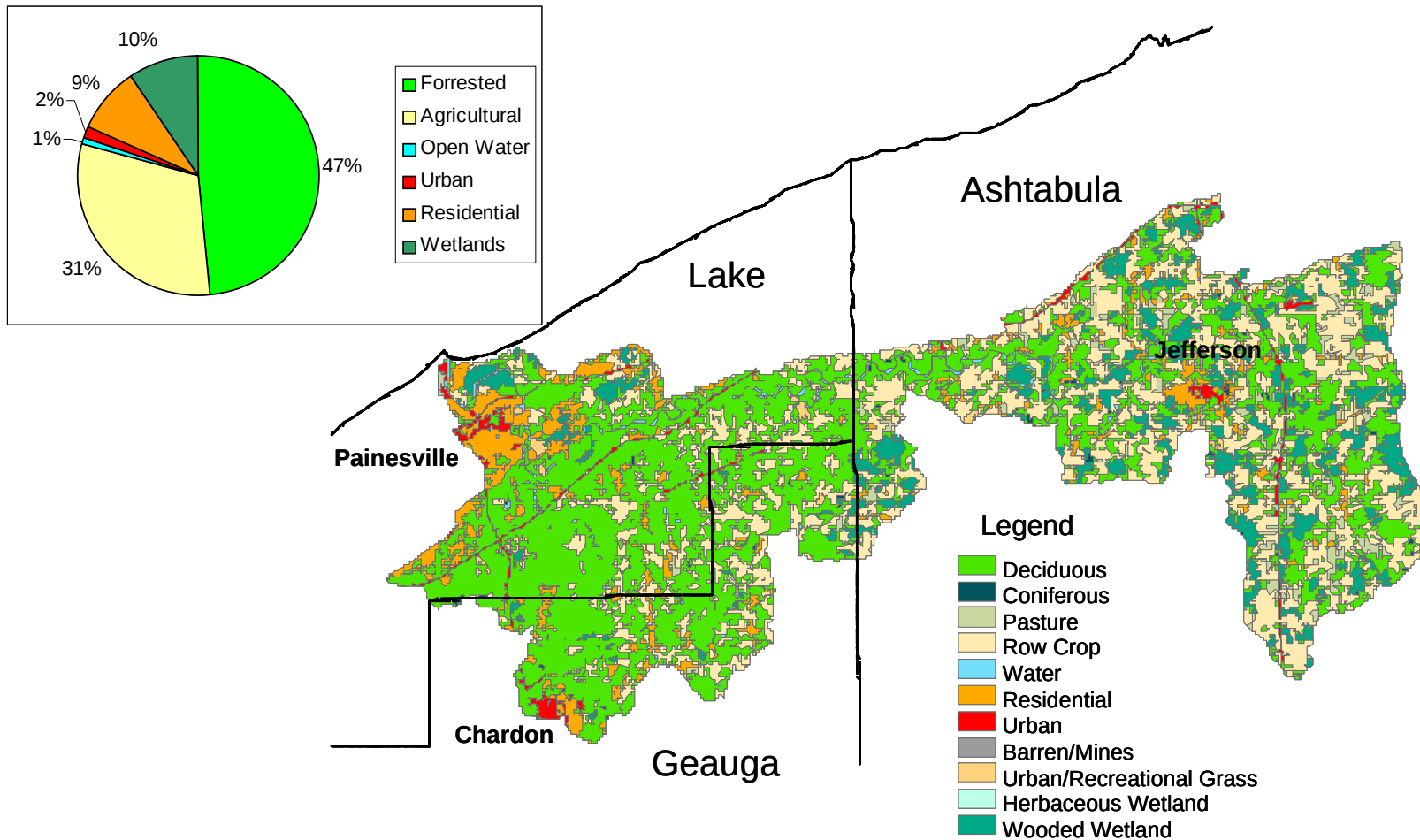


Figure 3. Level-II classification map for the surveyed portion of the Grand River basin based on Landsat-7 analysis consisting of the following eleven categories: deciduous forest, coniferous forest, row crops, pasture, commercial/industrial/transportation, residential, urban/recreational grasses, barren/mines, water, woody wetlands, and herbaceous wetlands.

Study Area

The portion of the Grand River basin surveyed in 2003/2004 was the mainstem and its tributaries downstream from Mill Creek (hydrologic unit 04110004 060), and the Mill Creek subcatchment (hydrologic unit 04110004 050). Table 3 lists specific sampling locations and the samples collected at each (see Figure 2 for geographic scope). The Grand River downstream from Mill Creek transitions from a low-gradient swamp stream to a higher-gradient bedrock stream near Mechanicsville. The mainstem and tributaries draining Lake and Geauga Counties cut through erodible shale bedrock, and are deeply incised thanks to scouring flows associated with snowmelt. This has resulted in spectacular scenery, including deep, canyon-like gorges, numerous cascades and waterfalls in the adjoining tributaries, and has fortuitously helped to preserve the physical habitat and water quality of the mainstem through isolation. Land use in the hydrologic units surveyed transitions from urban/suburban on the western edge to rural-agricultural in the eastern two thirds (Figure 3). For more detailed information on climate, surficial and bedrock geology, environmental setting, flora and fauna, and glacial history please see: http://www.grandriverpartners.org/the_grand_river.htm.

The most significant threat to the Grand River and its tributaries is changing land use brought on by suburban development. The Grand River is particularly sensitive to perturbation because its bedrock and surficial geology limits sustained base-flow (as discussed below). Kellogg Creek and Red Creek, draining the most suburbanized portions of the basin, no longer meet the biological criteria for Warmwater Habitat aquatic life use, and serve as examples of what will happen if growth is not properly planned and controlled. Various studies from around the country have documented that as the amount of impervious cover in a watershed exceeds roughly 5 %, streams begin to deteriorate and may fall below Clean Water Act goals. Streams become irreparably damaged when impervious cover exceeds 25 % (see Figure 6). In a study of urban and suburban streams in Ohio, Miltner et al. (2004) documented significant impairment and loss of sensitive fish species from Rocky Fork of Big Walnut, a stream draining the rapidly suburbanizing eastern fringe of the Columbus Metropolitan Area. The decline in Rocky Fork occurred as the watershed shifted from 2 to 5 % impervious cover. Rocky Fork is roughly the same size as Big Creek and Paine Creek, and is similar in that it drains relatively shallow bedrock. Impervious cover represents a threat to streams in two ways: impervious surfaces alter the hydrology of a watershed by speeding drainage and reducing infiltration, and the surfaces themselves and adjacent managed yards accumulate toxic levels of contaminants. The upshot of all this is that as a watershed becomes hardened, not only is more water carried to its streams in a shorter period of time during storm events, the water itself may be toxic. And reduced base-flows (and associated higher stream temperatures) simply diminish habitat for aquatic life. Estimated from 1994 Landsat imagery, impervious cover in the Kellogg Creek subcatchment was 5.8 %, and in Big Creek exclusive of Kellogg Creek, impervious cover totaled 2.2 %. For the Paine Creek catchment, the total was 0.6%. Comparing 1990 to 2000 census data, population and housing density in census blocks either straddling or within the Big Creek and Paine Creek catchments increased between 27 % (i.e., Leroy Township) and 79 % (basically the Jordan Creek subcatchment).

Water Quantity

Flow in the lower Grand River is fed primarily by rainfall and snow melt, with very little base flow sustained by ground water due to the river's glacial history and bedrock geology.

Consequently, discharge becomes quite small in the summer relative to drainage area.

Axiomatically, the Grand River and its adjoining tributaries have limited assimilative capacity, and so are quite fragile, and can be expected to reach their tipping point at comparatively modest amounts of suburban development (in the range of 3 to 5 percent impervious cover and as demonstrated by Kellogg Creek; see Figure 7). The minimum 7-day average stream flow with a 10-year recurrence interval (7Q10) for the USGS gauge at SR 84, where the drainage area is 685 mi², is 9.0 cfs (Table 2). For comparison, the 7Q10 for the Chagrin River at Willoughby is 14 cfs at a drainage area of 246 mi². Discharge in the Grand River during the summer is strongly related to rainfall in the preceding month (i.e., lagged flow, Figure 4-C; $R^2 = 0.39$, $P < 0.0001$), and has shown a downward trend (Figure 4-A; $0.05 > P < 0.10$) commensurate with average monthly precipitation between 1974 and 1997 (Figure 4-B).

Table 2. Low flow characteristics for the Grand River (USGS 2001).

Location	Drainage Area	7Q10 (cfs)	Minimum
Grand River @ SR 84	685	9.0	5.1
Grand River @ SR 528	581	0.9	0.0
Chagrin River @ Willoughby	246	14.0	3.0

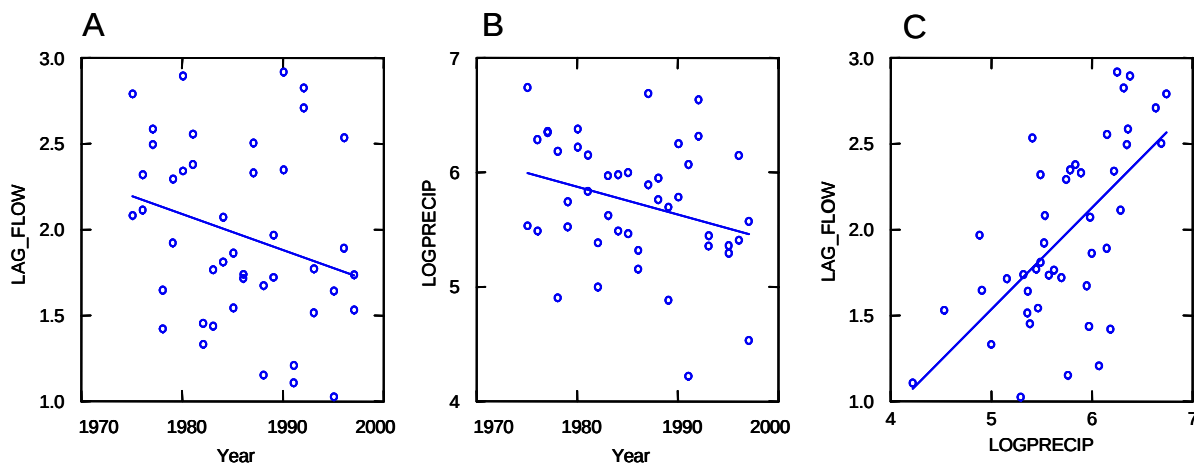


Figure 4. Mean discharge for July and August by year (A), mean monthly precipitation for June and July by year (B), and mean monthly discharge lagged to mean monthly precipitation (C).

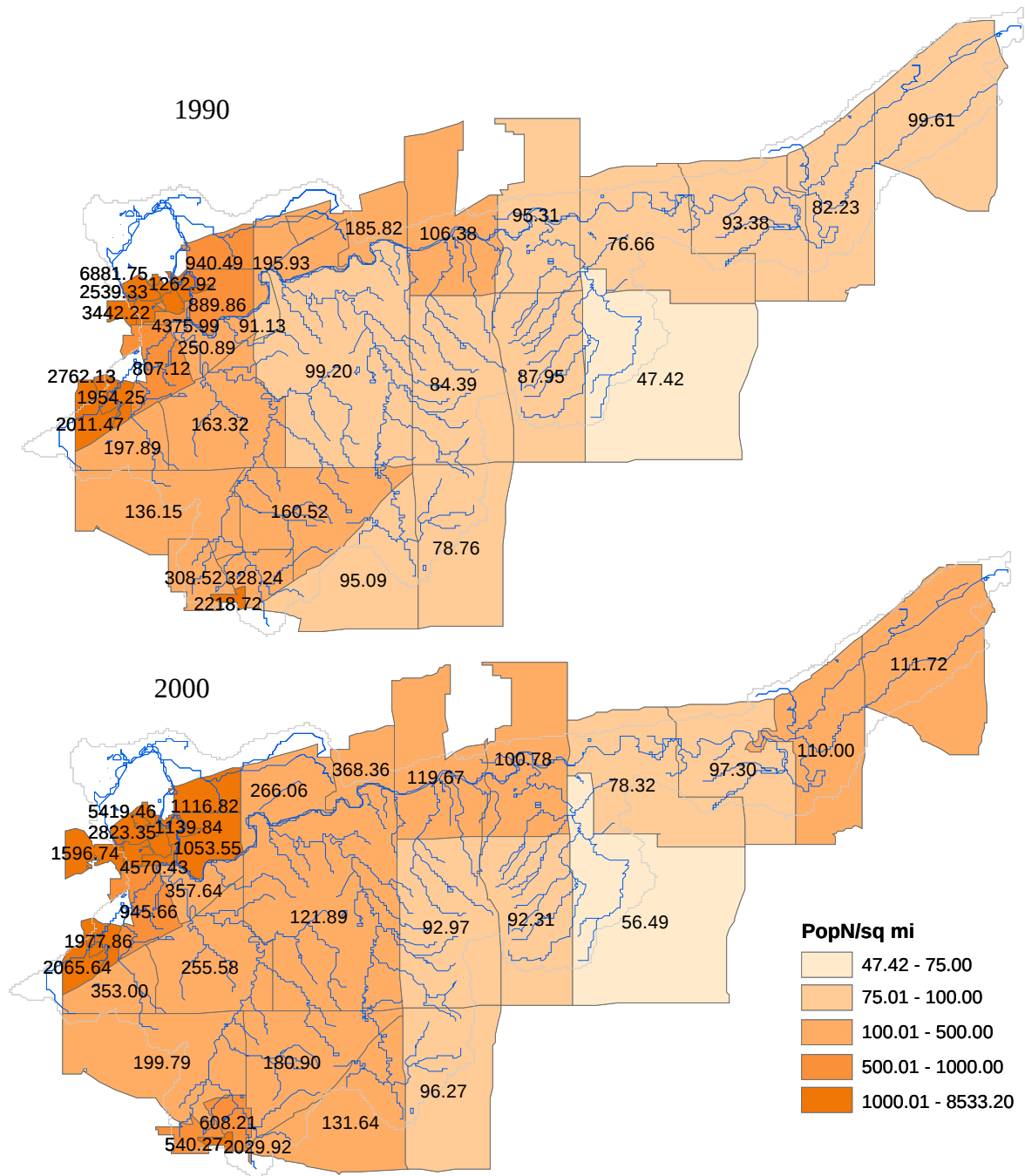


Figure 5. Population (shown within blocks) and population density (color-coded) in census blocks comprising the lower Grand River hydrologic unit (04110004 060) in 1990 and 2000.

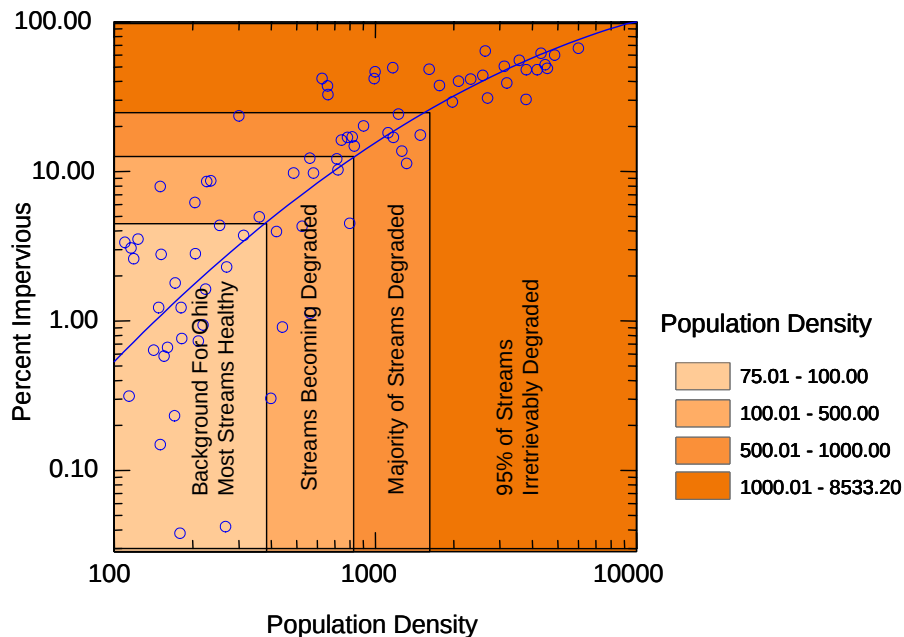


Figure 6. Relationship between population density, percent imperviousness and biological health of streams in Ohio. The plotted points are for streams in the Columbus Metropolitan Area and show a typical relationship between population density and calculated amounts of impervious cover (*sensu* Stankowski 1972). The legend is color-coded the same as that for Figure 5, and corresponds to the shading used on the plot to denote thresholds for stream biological health.

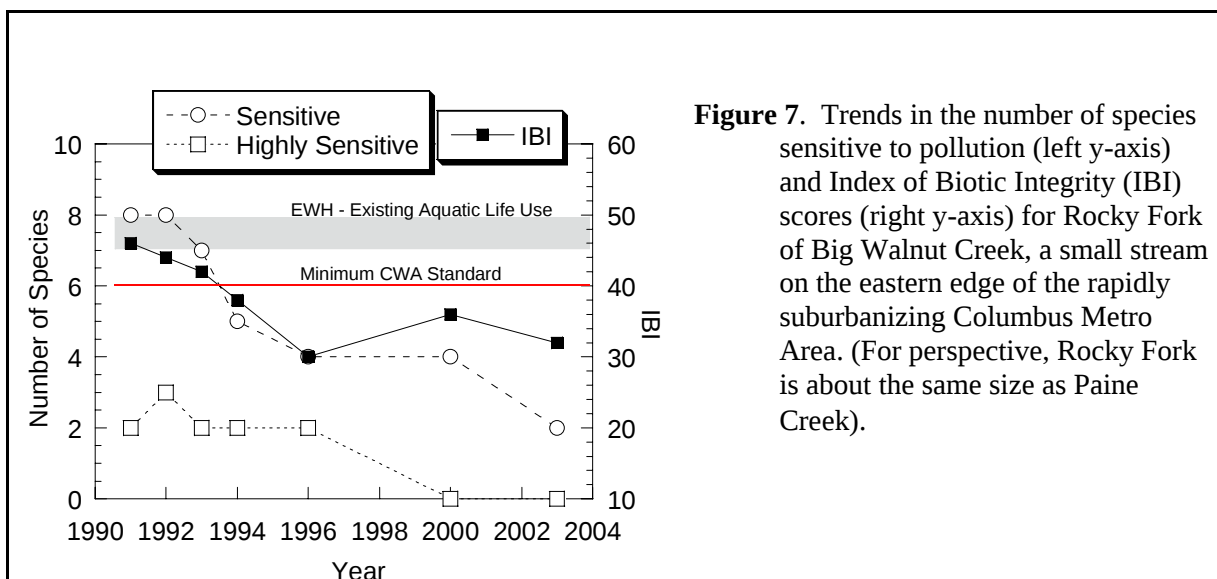


Figure 7. Trends in the number of species sensitive to pollution (left y-axis) and Index of Biotic Integrity (IBI) scores (right y-axis) for Rocky Fork of Big Walnut Creek, a small stream on the eastern edge of the rapidly suburbanizing Columbus Metro Area. (For perspective, Rocky Fork is about the same size as Paine Creek).

Table 3. Sampling locations, samples collected and geographic coordinates for the 2003/2004 Grand River survey.

STORET	RM	Sample	Location	Latitude	Longitude
Hydrologic Unit 04110004060					
<i>1990 Grand River 03-001</i>					
G02G15	39.90	B, C, F	@ Cork Cold Springs Rd.	41.73100	-80.86920
G02W04	36.38	C	Just above Coffee Creek-	41.75564	-80.87258
G02W17	36.30	B, C, F	at Tote Rd.	41.75500	-80.87444
G02G03	35.40	C	Just Dst Coffee Creek, Riv	41.75830	-80.88970
G02W18	34.42	B, C, F	@ Sexton	41.75470	-80.89800
G02W19	28.42	B, C, F	@ Brandt Rd.	41.75750	-80.97110
502510	22.10	B, C, F	@ Sr 528	41.74150	-81.04670
G02G14	16.42	C	@ Blair Rd.	41.72860	-81.13720
G02W14	13.60	B, C, F, D	@ Vrooman Rd.	41.72620	-81.18510
502530	8.45	B, C, F, D	@ Sr 84	41.71900	-81.22780
G02S13	6.10	B, C, F	@ Recreation Park	41.72670	-81.23780
G02P14	4.80	C	Ust Red Creek	41.74944	-81.23611
G02P18	4.00	B, C, F	Dst Diamond Shamrock Swale	41.75139	-81.24833
G02P19	3.60	B, C, F	@ Pipe Bridge	41.74667	-81.25500
G02S14	3.10	C	Ust Painesville WWTP	41.74556	-81.26306
G02P21	2.76	C	@ St. Clair	41.74111	-81.26250
502520	2.30	B, C, F	@ Sr 535	41.73570	-81.26600
<i>Red Creek 03-004</i>					
G02G21	0.50	B, C, F	@ Mantle Rd.	41.74730	-81.22750
<i>Kellogg Creek 03-005</i>					
G02G25	4.20	B, C, F	@ Brenel Rd.	41.66590	-81.28300
G02G23	0.20	B, C, F	Ust Sr 86	41.70520	-81.23520
<i>Ellison Creek 03-006</i>					
Ec2	3.65	B, C, F	Ust Golf Course	41.65250	-81.25030
Ec1	2.00	B, C, F	@ River Run Dr.	41.66730	-81.25880
G02G39	1.27	B, C, F	@ Pinehill Rd.	41.67390	-81.25260
G02P10	0.57	B, C	@ Prouty Rd.	41.67889	-81.25917

Table 3. Continued.

STORET	RM	Sample	Location	Latitude	Longitude
<i>Mill Creek 03-009</i>					
G02G26	5.00	B, C, F	@ Aitkins	41.71270	-80.99250
G02G10	1.38	B, C, F, D	@ Doty Rd.	41.73990	-81.02660
<i>Trib to Mill Creek @ RM 4.4 (03-041)</i>					
G02G27	1.60	B, C, F, D	@ Mosely & Short	41.69870	-81.00310
<i>Coffee Creek 03-010</i>					
G02W02	2.17	C	College St near Austin	41.77431	-80.85678
G02W01	1.96	B, C, F	Sr 307 near Austinburg	41.77189	-80.85833
G02G01	1.27	B, C, F	Dst Austinburg WWTP	41.76500	-80.86210
G02W03	0.06	B, C, F	Lampson Road	41.75639	-80.87333
<i>Talcott Creek 03-032</i>					
G02G29	0.20	B, C, F	@ Stoney Glen Camp	41.73210	-81.07970
<i>Big Creek 03-100</i>					
G02S16	16.42	B, C, F	@ US 6	41.58390	-81.19020
G02E04	16.10	C	Chardon WWTP Effluent to Big Ck.	41.59083	-81.19167
G02W21	15.80	B, C, F	Dst Chardon WWTP	41.58890	-81.19180
G02S15	14.06	B, C, F	@ Woodin Rd.	41.60590	-81.19970
G02G16	9.35	B, C, F	@ Sr 608	41.64930	-81.18740
G02W22	4.98	B, C, F	@ Williams Rd.	41.68120	-81.19860
G02W23	2.47	B, C, F	@ Fay Rd.	41.69700	-81.22760
<i>Jordan Creek 03-101</i>					
G02G31	0.50	B, C, F	@ Alexander Rd.	41.67440	-81.21520
<i>East Creek 03-102</i>					
G02G32	1.20	B, C, F	@ Callow Rd.	41.67360	-81.16780
<i>Jenks Creek 03-104</i>					
G02W24	0.10	B, C, F	@ Private Drive off Robins	41.63110	-81.20440

Table 3. Continued.

STORET	RM	Sample	Location	Latitude	Longitude
<i>Cutts Creek 03-105</i>					
G02G33	1.20	B, C, F	@ Cutts Rd.	41.59970	-81.17170
<i>Paine Creek 03-110</i>					
G02G35	5.60	B, C, F, D	@ Leroy Center Rd.	41.68670	-81.11890
G02P01	0.46	B, C, F	@ Seely Rd.	41.71790	-81.17030
<i>Bates Creek 03-111</i>					
G02G36	3.30	B, C, F	@ Sr 166	41.63030	-81.11420
G02G40	0.00	C	@ Leroy Thompson Rd.	41.66120	-81.11800
<i>Phelps Creek 03-112</i>					
G02G37	0.10	B, C	@ Leroy Thompson Rd.	41.66440	-81.11660
<i>Paine Creek Trib @ RM 6.7 03-113</i>					
G02G38	0.40	B, C, F	@ Leroy Thompson Rd	41.67530	-81.10690
Hydrologic Unit 04110004050					
<i>Mill Creek 03-120</i>					
G02G13	25.67	B, C, F	Clay Rd.	41.68740	-80.69030
G02S04	18.20	B, C, F	Netcher Rd.	41.73770	-80.73150
G02S05	10.00	B, C, F	Doyle Rd.	41.76220	-80.79030
G02G17	6.49	B, C, F	Mill Creek Rd.	41.73680	-80.81600
G02G11	4.09	B, C, F	Forman Rd.	41.72060	-80.83570
G02G18	3.50	B, C, F	Gravel Road Ust Sr 45	41.71860	-80.84540
<i>Griggs Creek 03-121</i>					
G02G12	2.05	B, C, F	Giddings Rd.	41.78300	-80.73380
<i>Askue Run 03-122</i>					
G02G19	0.10	B, C, F	Denmark Rd.	41.72240	-80.71620
<i>Peters Creek 03-123</i>					
G02G20	0.20	B, C, F	@ Clay Rd.	41.72030	-80.68510

Table 3. Continued.

STORET	RM	Sample	Location	Latitude	Longitude
<i>Cemetery Creek 03-124</i>					
G02S09	2.10	B, C, F	Ust WWTP/dst Elm St.	41.74570	-80.76940
G02S08	1.25	B, C, F	Dst Jefferson WWTP	41.74470	-80.78190
G02S07	0.07	C	Hickok Rd.	41.75190	-81.79940

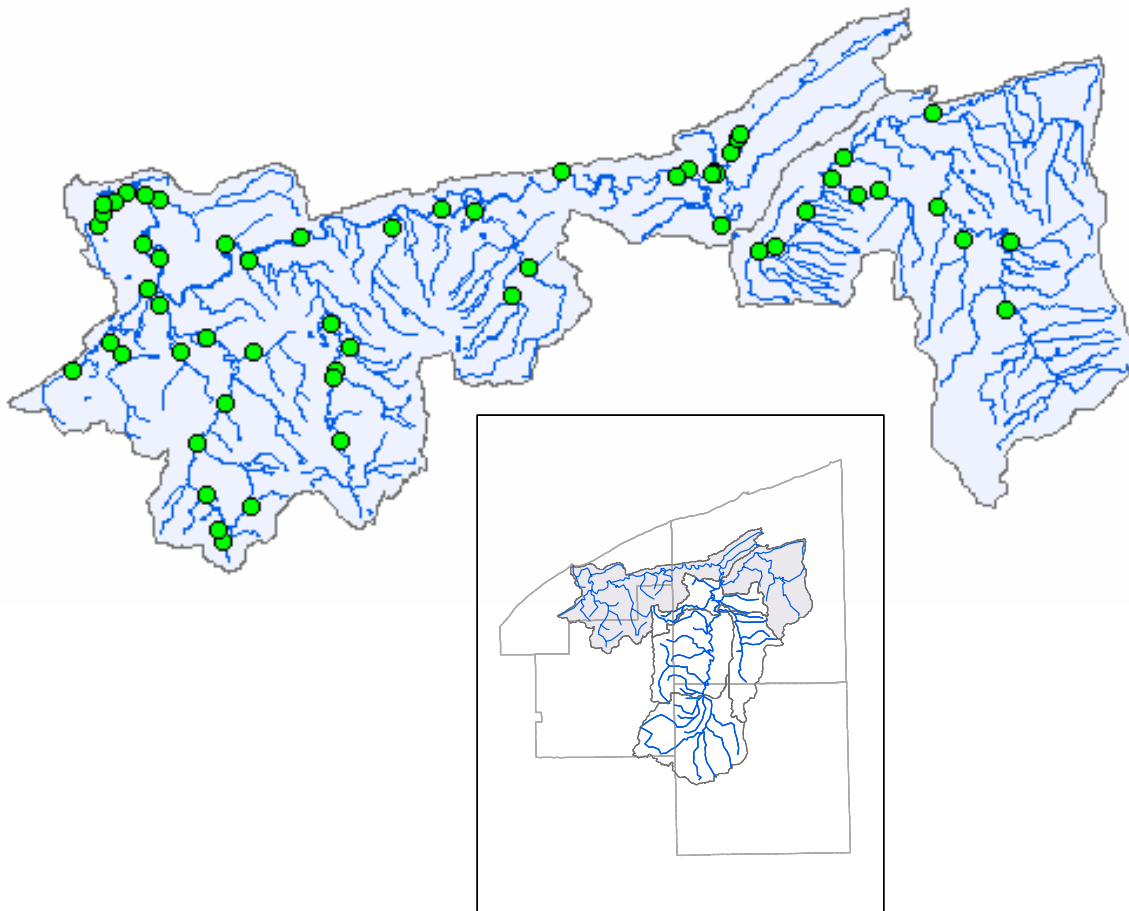


Figure 8. Approximate locations of sampling points in the 2003/04 survey of the lower Grand River basin, and geographic scope of the survey (inset).

Pollutant Loadings

Big Creek - Chardon Village WWTP (RM 9.32/16.1, 3PB00010/OH0022659)

The village of Chardon WWTP was originally constructed in 1916 and most recently updated in August 2001 with the installation of oxidation ditches and a new sand filter. The current NPDES permit expired on September 30, 2004 and a renewal draft permit is set to expire on January 31, 2009. Current daily average design flow after plant expansion is 1.808 mgd. Effluent flow during the 2004 survey was about 60 % of design flow. Wet stream processes include flow equalization basins, bar screening, grit removal, oxidation ditch, phosphorus removal, final settling, tertiary filtration, and ultraviolet disinfection.

Pollutant loadings for select chemical parameters and effluent flow over the past two decades are shown in Figures 9 - 13. Both flow and loadings have remained relatively constant from 2001 to 2004, after the most recent upgrade. Prior to 1999 the WWTP reported violations of effluent discharge limits for total suspended solids, ammonia-N, total phosphorus, and BOD, in addition to recording average daily effluent flows well above the previous design criterion.

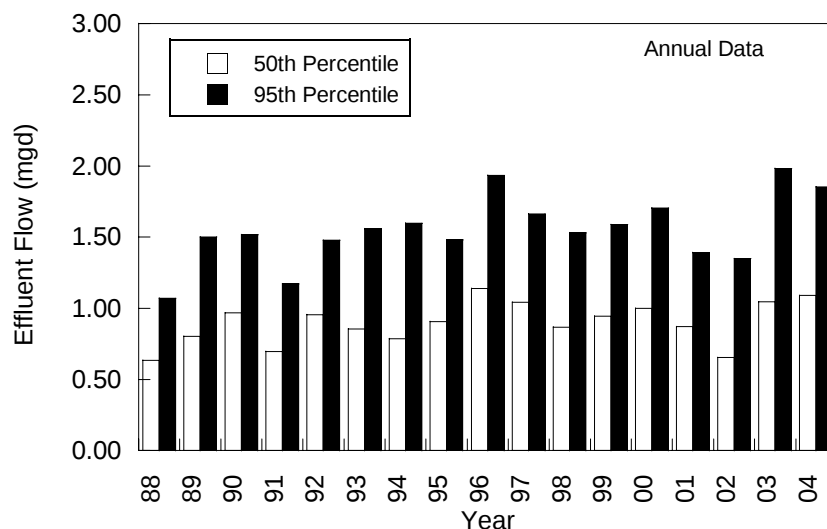


Figure 9. Annual median and 95th percentile effluent flows for the Chardon WWTP, 1988 - 2004.

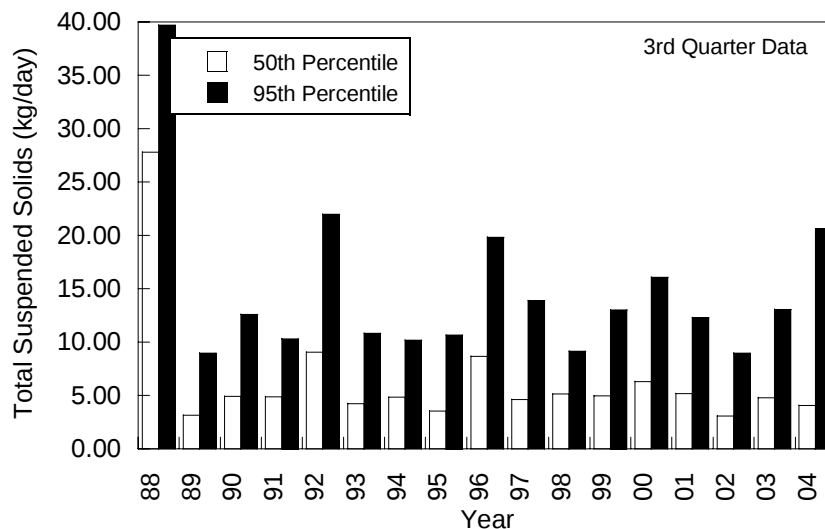


Figure 10. Third quarter median and 95th percentile total suspended solids loadings by the Chardon WWTP, 1988 - 2004.

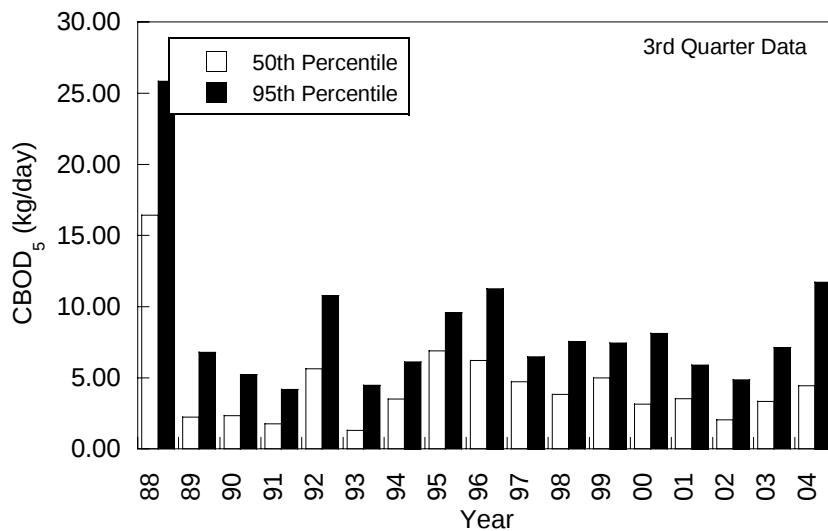


Figure 11. Third quarter median and 95th percentile loadings of biochemical oxygen demanding substances from the Chardon WWTP, 1988 - 2004.

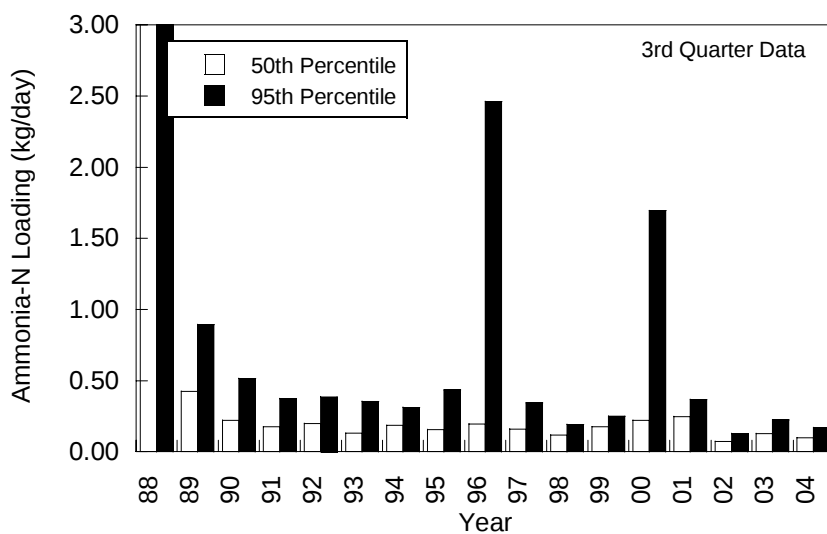


Figure 12. Third quarter median and 95th percentile ammonia-nitrogen loadings from the Chardon WWTP, 1988 - 2004.

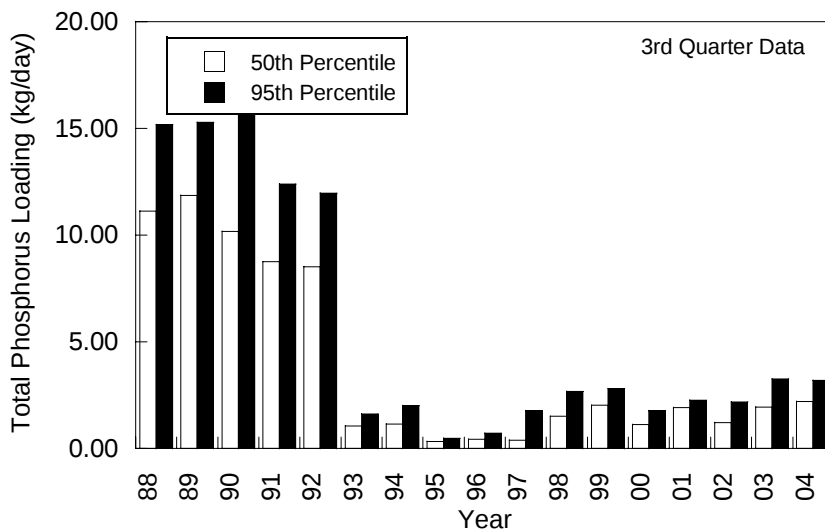


Figure 13. Third quarter median and 95th percentile loadings of total phosphorus from the Chardon WWTP, 1988 - 2005.

Cemetery Creek - Jefferson Village WWTP (RM 41.28/8.42/1.65, 3PC00021/OH0025887)

The village of Jefferson WWTP was originally constructed in the 1950s. It was updated in 1974 and select treatment processes were improved in the mid 1990s including expanded flow equalization, clarification, sludge handling, and a laboratory upgrade. The current NPDES permit expired on November 30, 2004 and will be renewed June 1, 2005. Daily average design flow is 0.95 mgd. Effluent flow during the 2004 survey was about 50 % of design flow. Wet stream processes include flow equalization, comminutor, bar screening, primary settling, aeration, secondary settling, phosphorus removal, and chlorination/dechlorination.

Pollutant loadings for select chemical parameters and effluent flow over the past two decades are shown in Figures 14 - 18. Flow and loadings have remained relatively constant from the late 1990s to 2004, with the exception of 2003 where chemical loading spikes are associated with increased effluent flow. A review of monthly operating data from the period spanning 2003-2004 showed a number of violations of NPDES permit limits for total phosphorus, a potential causal factor for downstream nutrient enrichment. A pump station located upstream from the WWTP discharge was reported to have eight by-pass events during this time period. Field observations in Cemetery Creek downstream from the WWTP discharge during the summer of 2004 documented excessive growths of algae covering the stream bed substrate. The renewal NPDES permit includes a schedule of compliance for the village to evaluate and implement a general plan to address infiltration and inflow to eliminate the pump station overflows.

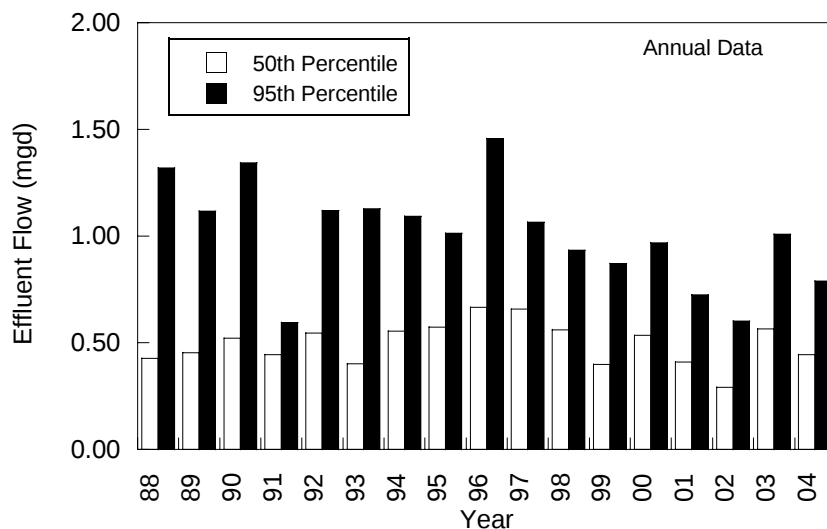


Figure 14. Annual median and 95th percentile effluent flows for the Jefferson WWTP, 1988 - 2004.

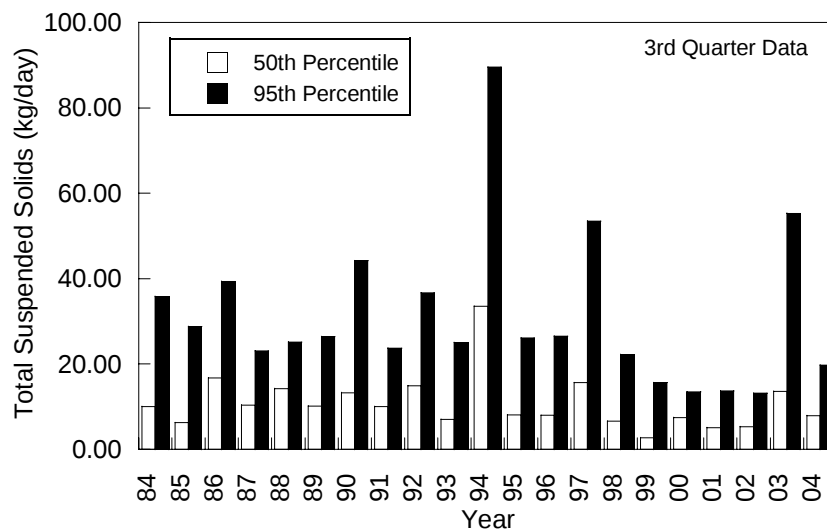


Figure 15. Third quarter median and 95th percentile loadings of total suspended solids from the Jefferson WWTP, 1988 - 2005.

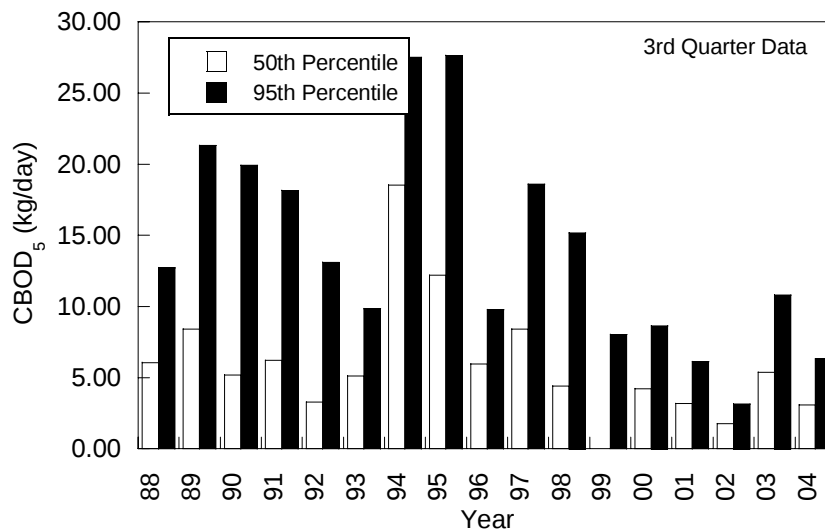


Figure 16. Third quarter median and 95th percentile loadings of biochemical oxygen demanding substances from the Jefferson WWTP, 1988 - 2005.

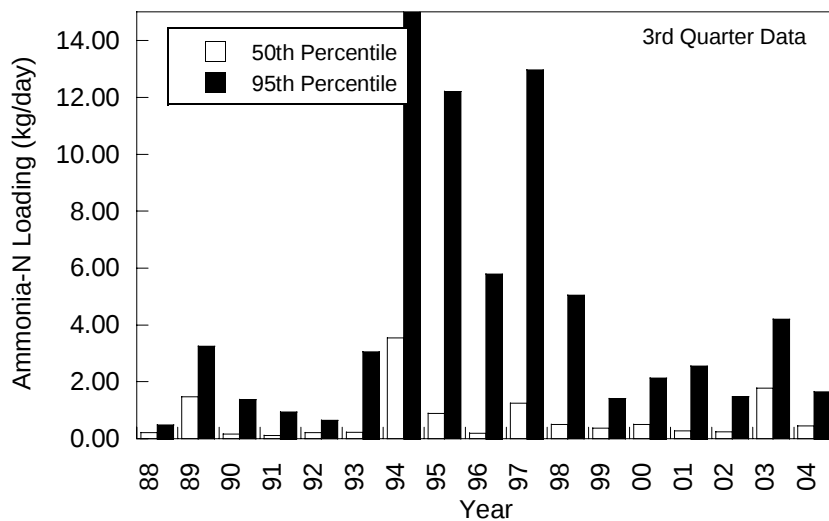


Figure 17. Third quarter median and 95th percentile loadings of ammonia-nitrogen from the Jefferson WWTP, 1988 - 2005.

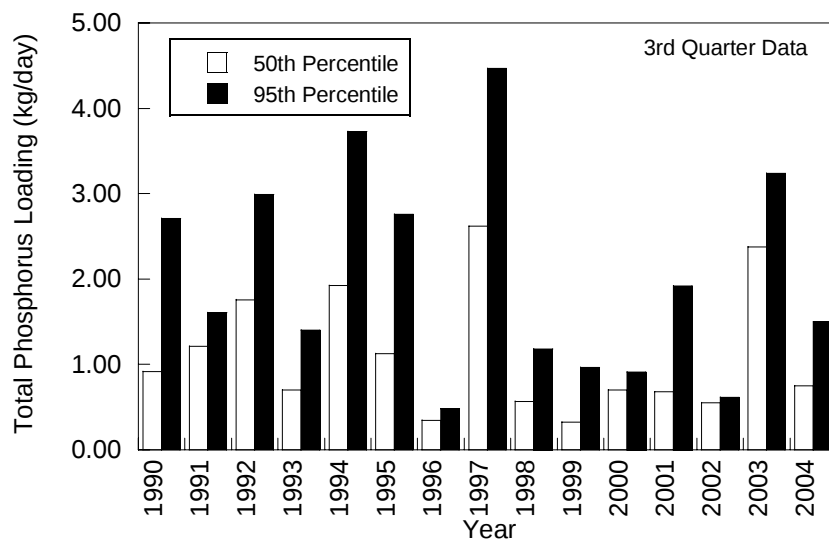


Figure 18. Third quarter median and 95th percentile loadings of total phosphorus from the Jefferson WWTP, 1988 - 2005.

Grand River - City of Painesville WWTP (RM 2.85, 3PD00029/OH0026948)

The city of Painesville WWTP was originally constructed in 1978 and most recently upgraded in 2000. The current NPDES permit expires on July 31, 2007. Daily average design flow is 6.0 mgd. Effluent flow during the 2004 survey was near 50% of design flow. Wet stream processes include influent screening, comminutor, grit removal, primary settling, intermediate settling, activated sludge, phosphorus removal, final settling, tertiary filtration, and chlorination/dechlorination. The city has an approved pre-treatment program.

Pollutant loadings for select chemical parameters and effluent flow over the past two decades are shown in Figures 19 - 22. Flow and loadings have remained relatively constant from 2000 to 2004, after the most recent upgrade. Bioassay tests conducted in 2001 showed 100% mortality to both fathead minnows and *Ceriodaphnia* during a July 25-26 sample, however, no toxicity was found in a follow-up August 29-30 test.

Sometime after September 28, 2004 the WWTP switched from one stage to two stage nitrification on a trial basis, which resulted in a plant upset and highly elevated levels of ammonia-N in the effluent. Ammonia-N as high as 19.58 mg/l was reported on monthly operating reports. The trial nitrification test was discontinued and by November 14, 2004 the ammonia-N concentration in the effluent returned to normal levels (0.61 mg/l).

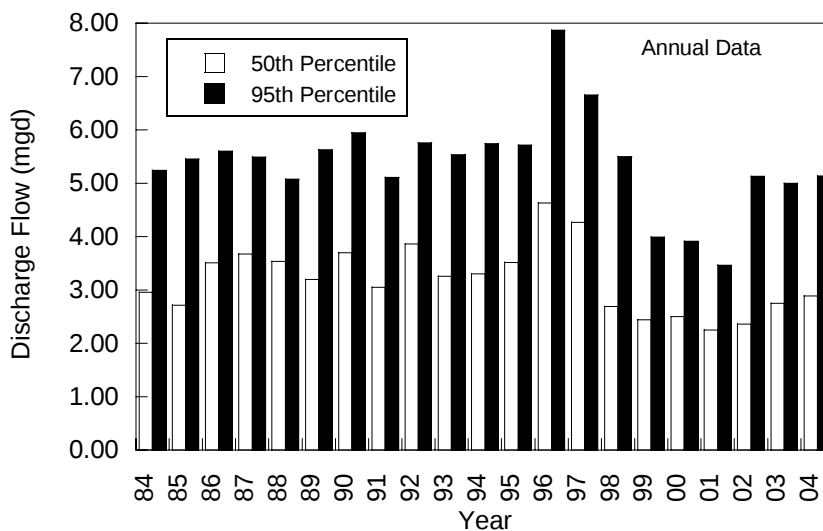


Figure 19. Annual median and 95th percentile effluent flows for the Painesville WWTP, 1984 - 2004.

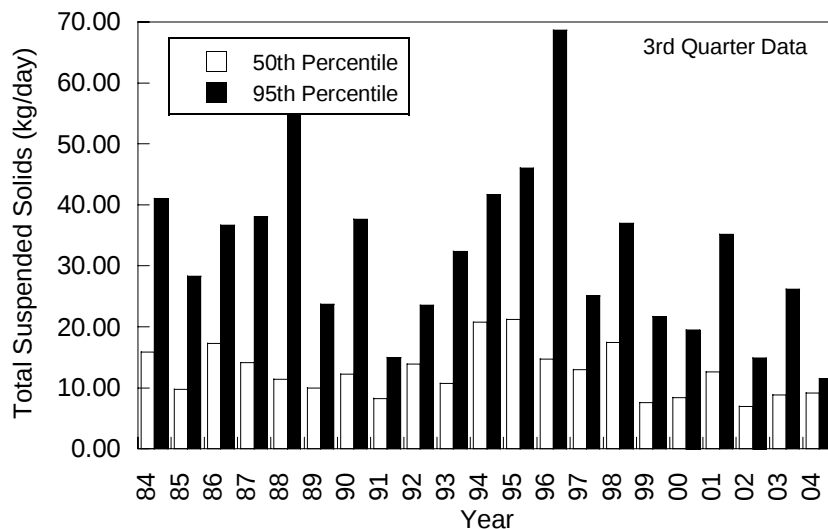


Figure 20. Third quarter median and 95th percentile loadings of total suspended solids from the Painesville WWTP, 1984 - 2005.

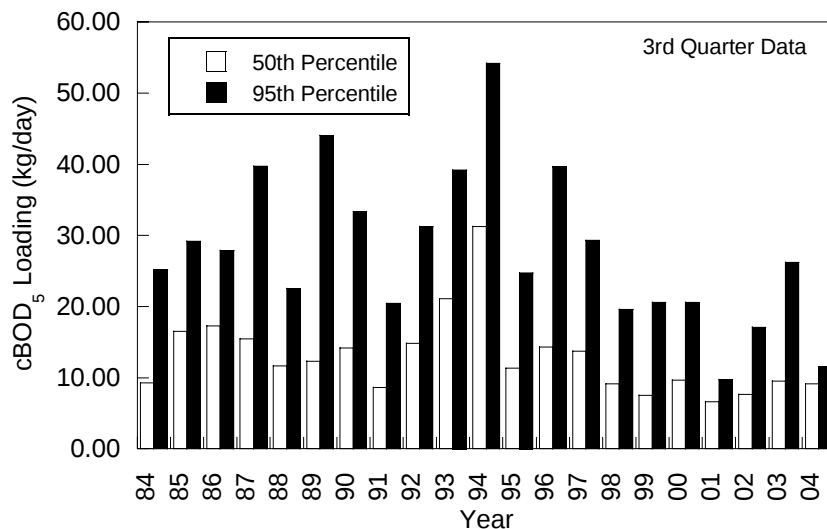


Figure 21. Third quarter median and 95th percentile loadings of biochemical oxygen demanding substances from the Painesville WWTP, 1984 - 2005.

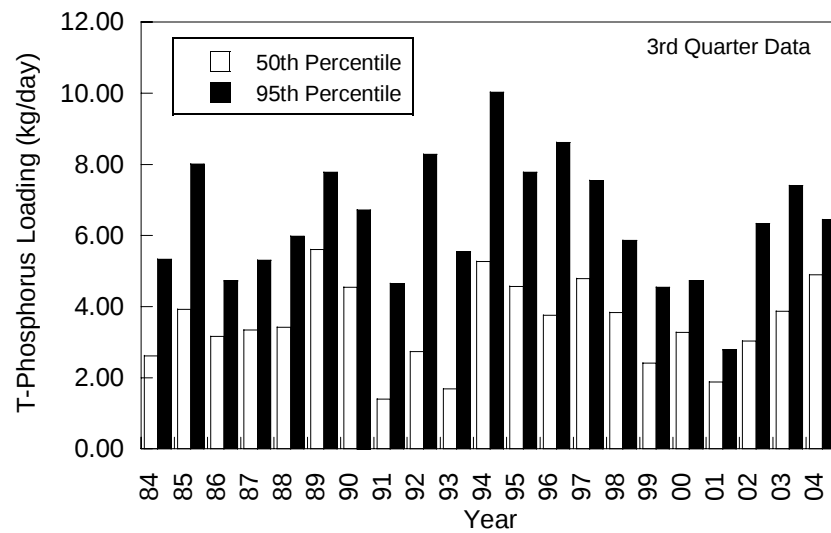


Figure 22. Third quarter median and 95th percentile loadings of total phosphorus from the Painesville WWTP, 1984 - 2005.

Surface Water Quality

The Lower Grand River Hydrologic Unit (4110004-060)

The surface waters in the lower Grand River unit possess, with few exceptions, good to excellent chemical integrity (Table 7). Streams showing the highest degree of chemical integrity include Paine Creek and its tributaries, Mill Creek (Lake County) and its tributaries, Talcott Creek, and the Grand River mainstem upstream from the area influenced by the Diamond Shamrock lagoons (see Figures 33 and 34). Big Creek and its tributaries draining from the east also have excellent water quality. It cannot be overstated that much of the riparian lands and adjacent slopes running to the uplands are protected and forested is largely responsible for the high degree of chemical integrity. The relatively high percent forest cover and low intensity of agriculture within the hydrologic unit are also important factors explaining good water quality.

Localized areas of marginal to poor water quality within the hydrologic unit are attributable to urban land use and waste water loadings. Elevated concentrations of nutrients were detected downstream from the Chardon WWTP, but were assimilated without apparent harm to the biota. Similarly, the Austinburg WWTP contributed significant nutrient loads to Coffee Creek, but those loads were assimilated before entering the Grand River. Elevated concentrations of TKN in the Kellogg Creek and Red Creek catchments are associated with high-intensity residential land use. One violation of the maximum anytime ammonia-nitrogen standard was recorded for Ellison Creek downstream from a small package plant, and a single ammonia-nitrogen value exceeded the 30-day average standard in a sample collected in the Grand River downstream from the Painesville WWTP (Table 9). Several detections of lead exceeding the minimum standard to prevent chronic toxicity were noted; all are likely the result of road surface runoff, but none appear to have caused detectable harm to biota in the affected reaches (Table 9).

Former Diamond Shamrock Facility

The Diamond Shamrock Painesville Works is an approximately 1,100 acre former chemical manufacturing facility located in Lake County, Ohio (Figure 23). The Grand River bisects the Diamond Shamrock Painesville Works and Lake Erie borders it to the north. The facility operated from 1912 through 1977 and manufactured a variety of products that included soda ash, baking soda, chromium compounds, carbon tetrachloride, hydrochloric and sulfuric acids, chlorinated wax, and coke. Diamond Shamrock also generated their own electricity in an on-site power plant. A number of solution mining wells were located on the property for the purpose of extracting salt from deposits located beneath the site for use in manufacturing processes. Several individuals and companies purchased property from Diamond Shamrock and operated industrial facilities within the former facility boundaries, including an aluminum smelting plant, a polyvinyl chloride monomer facility and a coke plant.



Figure 23. Aerial photograph of the Diamond Shamrock Painesville Works site. The site is bisected by the Grand River (upstream control site at RM 6.1 not depicted).

In 1995, the Director of the Ohio EPA entered into Final Findings and Orders (DFFOs) with several potentially responsible parties (PRPs) for the site for the performance of a remedial investigation and feasibility study at the Diamond Shamrock Painesville Works. For purposes of investigation and remediation, the Diamond Shamrock Painesville Works has been divided into twenty-two operable units. Two phases of remedial investigation (RI) were conducted by the Painesville PRP Group and other signatories to the 1995 DFFOs, with oversight by Ohio EPA. The remedial investigation included sampling of surface and subsurface soils, surface water, sediment and groundwater for the purpose of determining the nature and extent of contamination within the site. Supplemental sampling of surface and subsurface soils were also conducted for an interested land developer. The data obtained from the remedial and supplemental investigations were used to conduct a baseline risk assessment and to determine the need to evaluate remedial alternatives. For additional information on contaminant concentrations, please refer to the Phase I Remedial Investigation Report (SECOR, 1999) and Phase II Remedial Investigation Report (SECOR, 2003), and the Baseline Risk assessment for the Grand River and Lake Erie (Hull and Associates, 2003).

In March 2004, the Ohio EPA was notified that a release of contaminated groundwater from Operable Unit 20 (OU20 - the chromate waste lagoon) was discovered. The release occurred at the southeast side of the impoundment dike (Figure 23), discharging to a swale found on the eastern property boundary. Contaminated water containing extremely high levels of hexavalent chromium (Cr^{6+}) was discharged to the swale and then via the swale to the Grand River (confluence at approximately RM 4.3). Remedial actions to intercept the leachate discharge were taken through the installation of a sheet pile wall along the southeast margin of the impoundment dike, along with an up-gradient interception trench and collection system to prevent the migration of pollutants to the Grand River.

In June 2005, the Ohio EPA Division of Emergency and Remedial Response (DERR) noted the presence of a new seep along the south side of OU20. As part of the continuing emergency response action, another sheet pile wall was installed, driven into bedrock, to block the movement of contaminated groundwater and leachate toward the Grand River. A series of collection wells were installed up-gradient of the wall to collect the contaminated water. Operation of the collection system continues to the present day. Since the installation of the second sheet pile wall and collection system, no new outbreaks have been noted. Additional site investigation and implementation of remedial measures will likely be necessary before the emergency action taken to address these releases will be deemed to be complete.

With respect to water quality in the Grand River, the two primary pollutants of concern related to the Diamond Shamrock Painesville Works are hexavalent chromium (Cr^{6+}) and total dissolved solids (TDS). Data presented in the Phase I Remedial Investigation Report (SECOR, 1999) indicate a very consistent release rate for Cr^{6+} for the 15 years prior to the study. For samples collected downstream of OU20, the Outside Mixing Zone Average (OMZA) water quality criterion (16 $\mu\text{g/l}$, Table of OAC 3745-1-07) was exceeded in 91 out of 148 samples (61.5%) and the Outside Mixing Zone Maximum (OMZM) criterion (11 $\mu\text{g/l}$) was exceeded in 60 out of 148 samples (40.5%). The great majority of these exceedances occurred during periods of low stream flow, when the increased concentration of leachate can be expected to have the greatest influence on the biological community. Sampling conducted for the Phase II RI in 2000 and 2001 determined that detectable Cr^{6+} concentrations in the Grand River become evident between river mile 4.7 and 4.2 (Figure 24), which coincides with the upstream boundary of the chrome waste lagoon (operable unit 20) located along the north bank of the river from approximately river mile 3.5 to 4.3. This unit was used for the disposal of chromium contaminated wastes. Sampling within the site has detected elevated concentrations of Cr^{6+} in the groundwater trapped within the unit, with concentrations as high as 1,200 mg/l (SECOR, 1999). Water quality sampling in the Grand River for the Phase II RI found that the OMZA for Cr^{6+} was exceeded in 40% of the samples ($n=139$) collected from the river from river mile 4.2 to 2.37, and the OMZM was exceeded in 22% of the samples.

Stream monitoring data for dissolved Cr^{6+} is also collected from the Grand River by the Painesville Wastewater Treatment Plant (WWTP) at a downstream monitoring site located at St. Clair Ave. (RM 2.76) (Figure 25). Grab samples collected by the WWTP on a monthly basis

from 2000 through 2005 have detected exceedances of the OMZA in 20 out of 79 samples (25.3%) and of the OMZM in 11 out of 79 samples (13.9%). Since there have been few instances of detectable concentrations of dissolved hexavalent chromium in the Painesville WWTP effluent (Figure 25), it can be concluded that the source of the exceedances in the Grand River downstream of the WWTP discharge result from releases occurring from the Painesville Works Site upstream.

Ohio EPA collected samples from the Grand River during the 2004 sampling period at sites upstream and downstream of OU20 and the Diamond Shamrock site (Table 3, Figure 23). The purpose of the sampling was to determine the water quality impacts to the Grand River caused by releases of Cr^{6+} , TDS, or other pollutants from OU20 or other pathways within the former Diamond Shamrock site. Samples were collected during periods of base flow or low flow conditions in the Grand River (Figure 26) in order to approximate worst-case conditions with respect to the impacts of leachate release upon the river. Spatial composite samples were collected at each location by mixing grab samples collected from 0.5 m below the river surface and from 0.5 m above the river bottom at four locations along a cross section of the river. A horizontally aligned PVC Van Dorn bottle was used to collect the water samples at the appropriate depths. At sampling points where the stream depth was 1.5 m or less in depth, a single aliquot of water was collected at mid-depth.

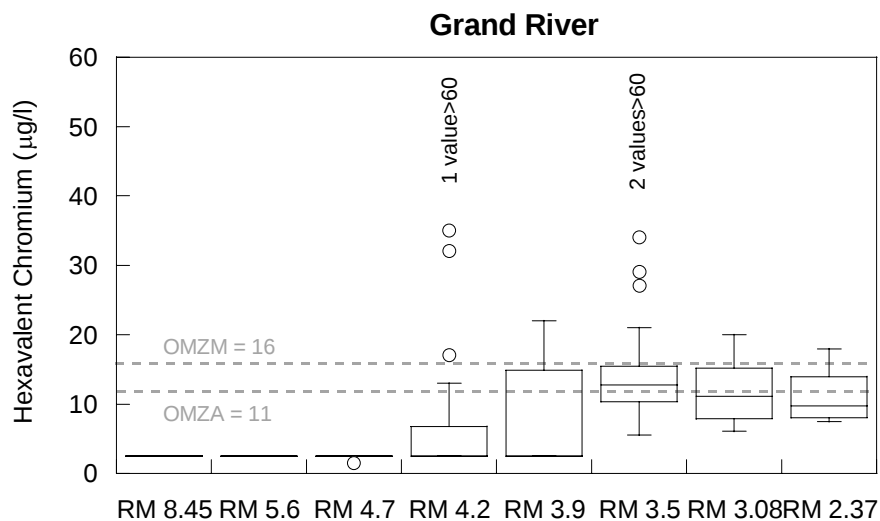


Figure 24. Monitoring results for Cr^{6+} in the Grand River from the Phase II RI at the Diamond Shamrock Painesville Works site (Hull, 2003).

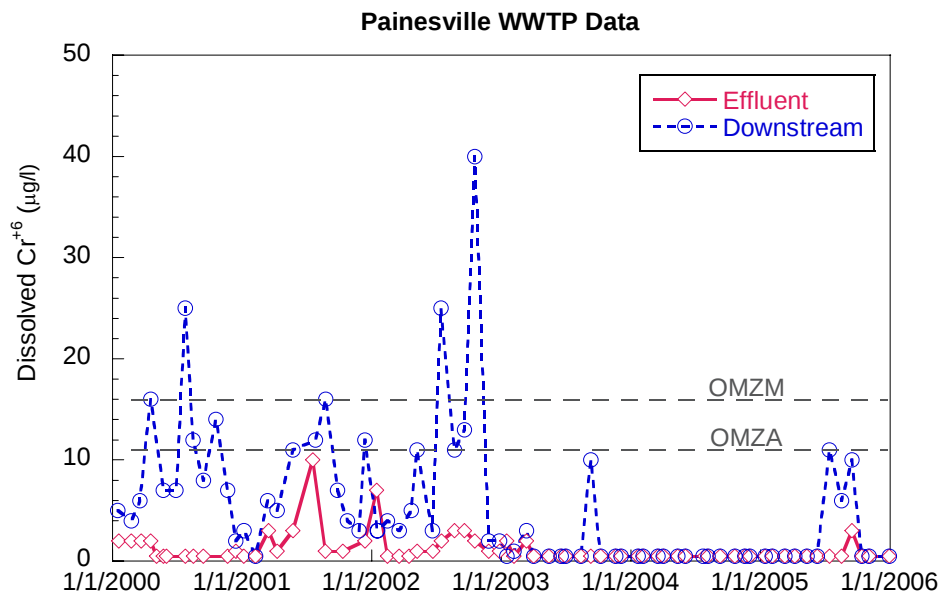


Figure 25. Results for Cr^{6+} analyses for water samples collected from the Grand River at St. Clair Ave (RM 2.76) by the Painesville WWTP, 2000-2005.

The resulting composite sample was thoroughly mixed, and approximately 200 ml of the sample was filtered through a $0.45\ \mu$ membrane filter for analysis for dissolved Cr^{6+} . The remainder of the whole water portion of the composite sample was utilized to analyze for other constituents including biological oxygen demand (BOD_5), chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), nutrients (ammonia nitrogen, nitrate-nitrite nitrogen, nitrite nitrogen, total Kjeldahl nitrogen, and total phosphorus), principle ions (Ca, Na, K, chlorides, sulfate), alkalinity, hardness, and metals (Al, As, Ba, Cd, Cr, Cu, Fe, Hg, Pb, Mg, Mn, Ni, Se, and Sr). Field measurements were also taken for temperature, pH, dissolved oxygen, and specific conductance at each location and depth where water samples were collected.

The results from the 2004 sampling campaigns for Cr^{6+} conducted by Ohio EPA (Figure 27) were very similar to the results reported from the Phase II RI (Figure 24). Detectable concentrations of dissolved Cr^{6+} were not noted at either of the sites located upstream of the boundary swale for the Painesville Works site. Concentrations of Cr^{6+} were more elevated at the pipe bridge (RM 3.60) than at the RM 4.00 sampling site located just downstream of the boundary swale that had received the release of Cr^{6+} contaminated leachate in the spring of 2004. Apparently, the measures implemented to intercept leachate directed toward the swale adjacent to OU20 were very effective in preventing direct release of Cr^{6+} contaminated water to the Grand River, but other pathways existed that allowed leachate to be discharged to the river between the swale and the pipe bridge. Localized concentration of contaminants within the river channel may also occur at times that are dependent upon channel morphology, hydraulic interconnections between groundwater and surface water, and in-stream flow conditions.

Table 4. Location information for Ohio EPA water quality sampling of the Grand River in the vicinity of the Diamond Shamrock Painesville Works site.

Location	STORET Station Code	River Mile	Latitude (DD)	Longitude (DD)
Recreation Park	G02S13	6.10	41.7267	-81.2378
Upstream Red Creek	G02P14	4.80	41.7494	-81.2861
Downstream Diamond Shamrock Swale	G02P18	4.00	41.7514	-81.2483
Pipe Bridge	G02P19	3.60	41.7467	-81.2550
Upstream Painesville WWTP	G02S14	3.10	41.7456	-81.2631
St. Clair Avenue	G02P23	2.76	41.7411	-81.2625

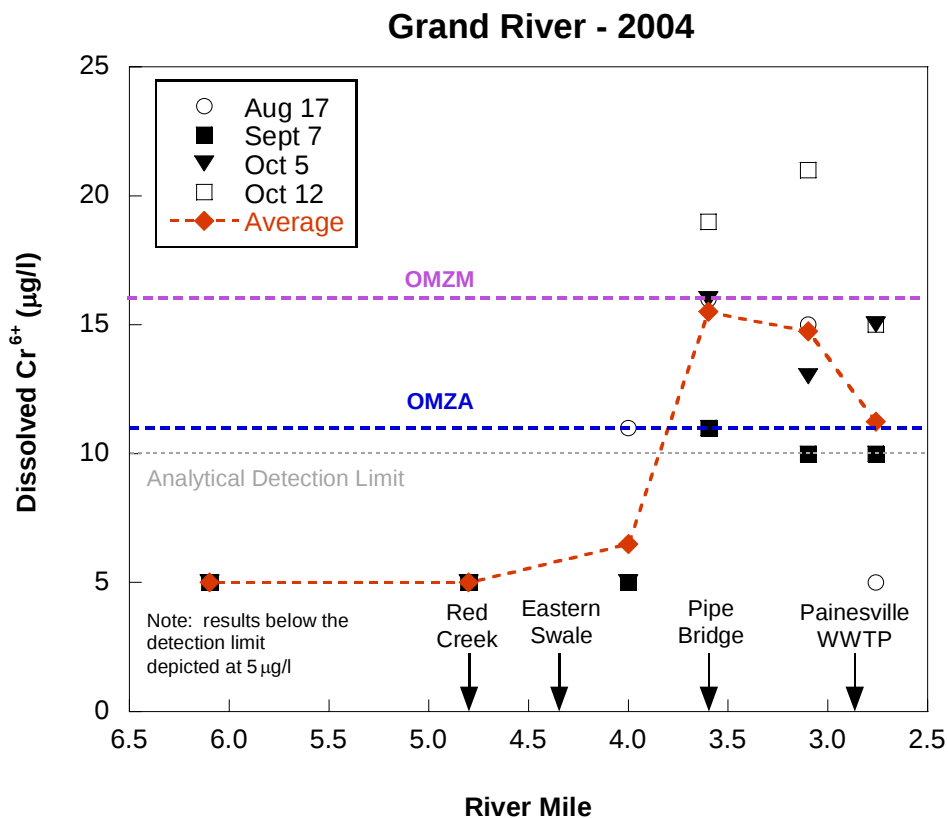


Figure 26. Dissolved hexavalent chromium concentrations for composite samples collected from the Grand River, 2004.

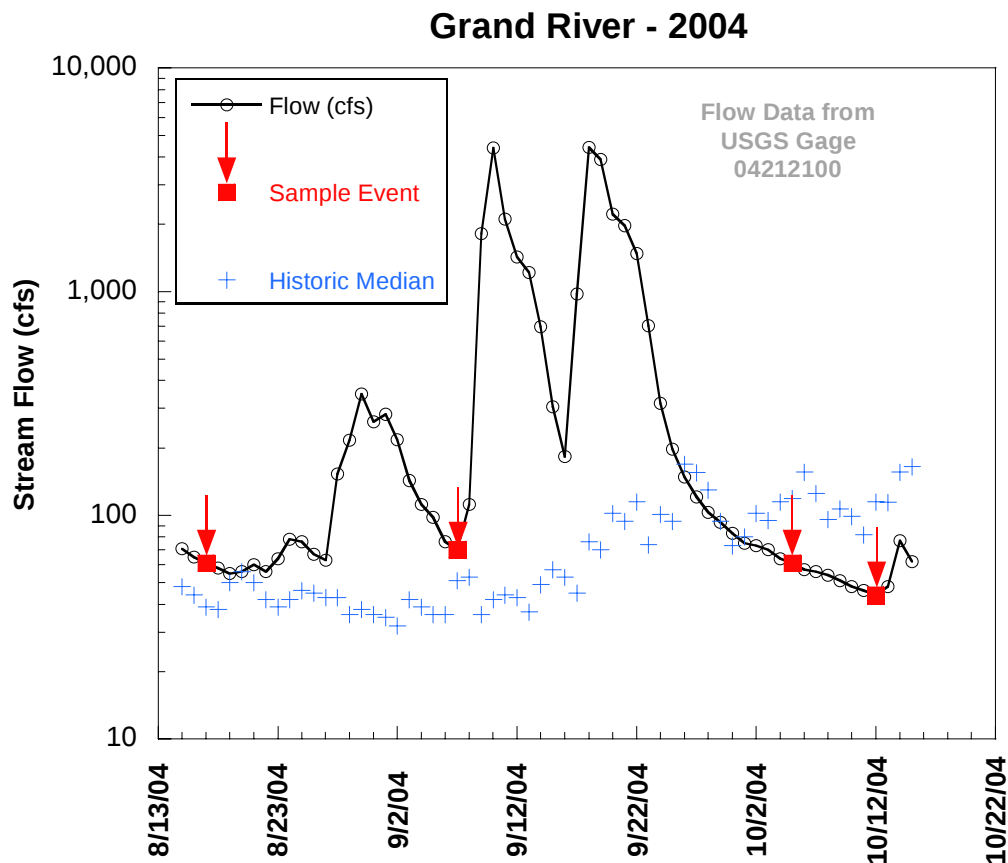


Figure 27. Stream flow conditions in the Grand River during the 2004 Ohio EPA sampling in proximity to the Diamond Shamrock Painesville Works site. Flow data is for the USGS gage at SR 84 (Station 04212100, USGS, 2005).

The results from the 2004 sampling campaigns for Cr^{6+} conducted by Ohio EPA (Figure 27) were very similar to the results reported from the Phase II RI (Figure 24). Detectable concentrations of dissolved Cr^{6+} were not noted at either of the sites located upstream of the boundary swale for the Painesville Works site. Concentrations of Cr^{6+} were more elevated at the pipe bridge (RM 3.60) than at the RM 4.00 sampling site located just downstream of the boundary swale that had received the release of Cr^{6+} contaminated leachate in the spring of 2004. Apparently, the measures implemented to intercept leachate directed toward the swale adjacent to OU20 were very effective in preventing direct release of Cr^{6+} contaminated water to the Grand River, but other pathways existed that allowed leachate to be discharged to the river between the swale and the pipe bridge. Localized concentration of contaminants within the river channel may also occur at times that are dependent upon channel morphology, hydraulic interconnections between groundwater and surface water, and in-stream flow conditions.

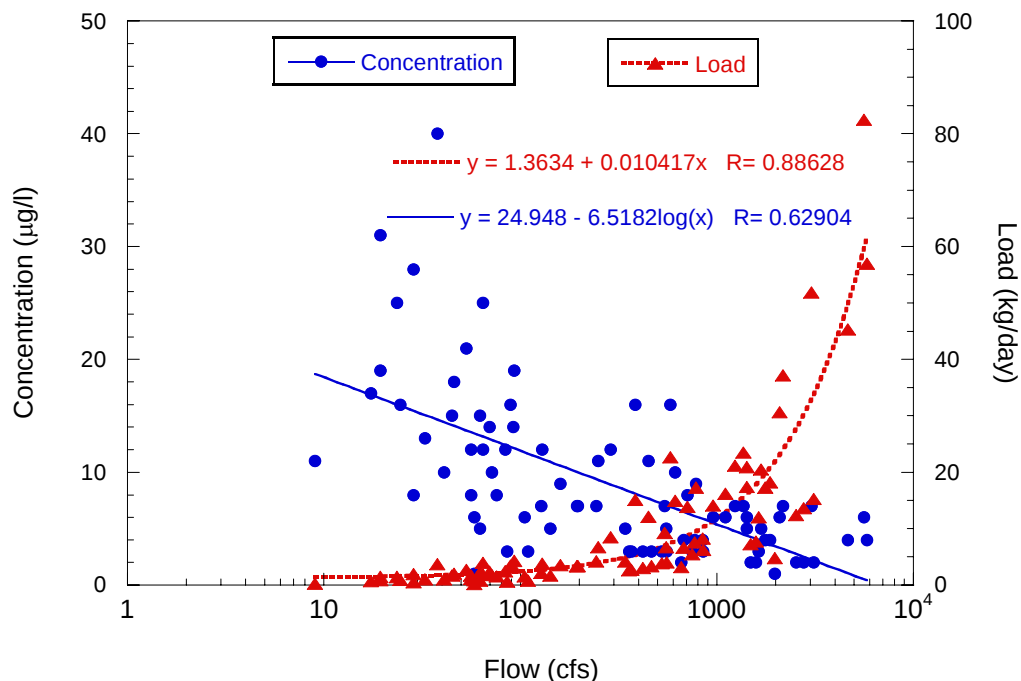


Figure 28. Relationship of stream flow in the Grand River at RM 2.76 to Cr⁶⁺ concentrations and loads. Stream flow data from the USGS gage at SR 84 have been adjusted for flows from Red Creek and the Painesville WWTP

Dissolved Cr⁶⁺ concentrations were most elevated at the pipe bridge sampling location (RM 3.60). Three of the four composite samples collected from this location were at or above the OMZM water quality criterion, and none of the samples were below the OMZA water quality criterion. Dissolved Cr⁶⁺ concentrations remained elevated to the St. Clair Ave. sampling site (RM 2.76), with average concentrations exceeding the OMZA water quality criterion at the pipe bridge and at the other two downstream sites. The OMZA for dissolved Cr⁶⁺ was exceeded in 75% of the samples collected at sites downstream of OU20 and the OMZM was exceeded in 16% of the samples. It is interesting to note that the average dissolved Cr⁶⁺ concentration at St. Clair Ave. exceeded the OMZA water quality criterion even with the dilution resulting from the discharge of effluent from the Painesville WWTP to the Grand River (discharging at RM 2.9).

Analysis of the relationship between stream flow and dissolved Cr^{6+} concentrations and flow corrected loads of Cr^{6+} in the Grand River (Figure 28) indicate a negative correlation between stream flow and in-stream concentration of Cr^{6+} , but a positive correlation of Cr^{6+} load to stream flow. These relationships indicate that there may be an inter-connectivity of river and groundwater hydrologies when water levels in the river are elevated that also plays a role in the behavior of Cr^{6+} releases from OU20. Analysis of the frequency of occurrence of non-detectable concentrations ($< 1 - <10 \mu\text{g/l}$) of Cr^{6+} in the Grand River downstream of OU20 versus stream flow (Figure 29) further illustrates this point. Structural measures that will create isolation of the groundwater within OU20 from both release to the Grand River and intrusion of river water into OU20 will be necessary in order to control loadings of Cr^{6+} and protect in-stream water quality.

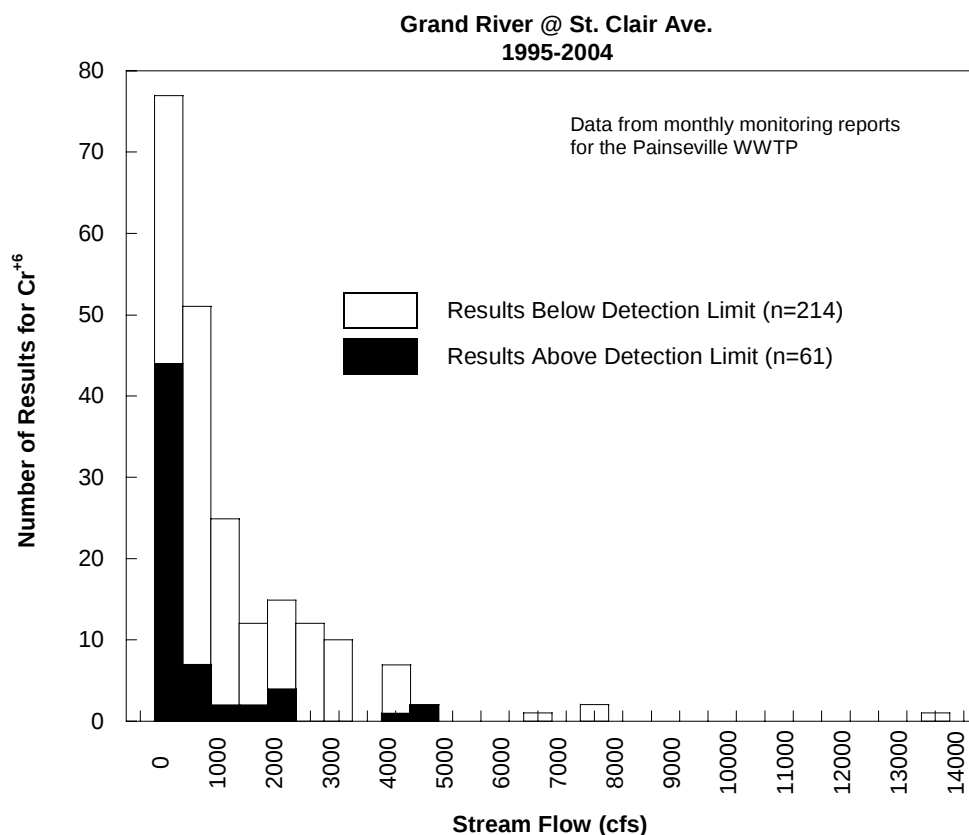


Figure 29. Frequency of non-detectable and detectable Cr^{6+} analytical results for the Grand River downstream of OU20 and the Painesville WWTP, 1995-2004.

Load duration analysis is a tool that can be used to quantify the loading reductions for Cr^{6+} to the Grand River that will be necessary to meet the water quality criteria. This procedure uses pollutant loading information at various streamflow values to determine the extent of loading reductions that are needed to meet applicable criteria under varying flow regimes (Cleland, 2000). Data from the USGS flow gage located at State Route 84 (RM 8.7) were used to develop a flow duration curve (Figure 30). The graphic interpretation of the data provides a curve showing the percent of the time the flow in the river was less than the corresponding flow value. The flow values for the Grand River were corrected for flow contributions from the watershed downstream of the gage and from the Painesville WWTP to develop a flow duration curve for the Grand River at St. Clair Ave (RM 2.76). Using this information, the concentration in the river can be used to determine the mass load of Cr^{6+} passing by a point at the time of sample collection. Loading values corresponding to the applicable water quality criteria can then be superimposed upon this graphic representation of the loading estimates to indicate data points where loadings are unacceptably high, creating a violation or exceedance of the standard (Figure 31). For purposes of clarity, only instances where Cr^{6+} was found at detectable concentrations are depicted in Figure 31. This is logical because of the complex nature of releases of Cr^{6+} to the river and because it is necessary to determine appropriate loading reductions for instances when this pollutant is being released.

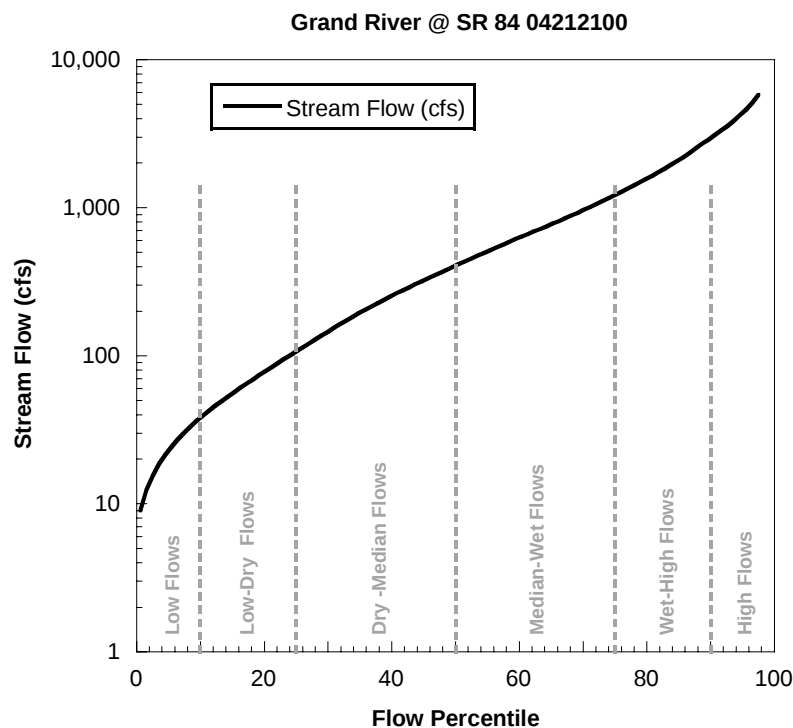


Figure 30. Flow duration curve for the USGS gage at State Route 84.

Analysis of the results presented in Figure 31 indicates that loadings of Cr^{6+} to the Grand River from OU20 are most problematic under low flow conditions. This is characteristic of a situation where contaminated groundwater is being released to the river. Eighty percent of the instances where the OMZM for Cr^{6+} was exceeded occurred when the streamflow was less than the 25th percentile value (low and low-dry flow conditions). From these data it is possible to analyze pollutant loadings under the varying flow regimes to determine the average case loading reductions for Cr^{6+} that are necessary in order to meet the water quality criteria (Table 4). And from these calculations, loading reductions of 40 percent are needed to ensure that the OMZA water quality criterion is met under low flow conditions (i.e., < 25th percentile flow duration). Since low flow conditions in the river are also typically the most critical time of stress for aquatic organisms, the urgency of efforts to reduce loadings of Cr^{6+} from OU20 is further underscored.

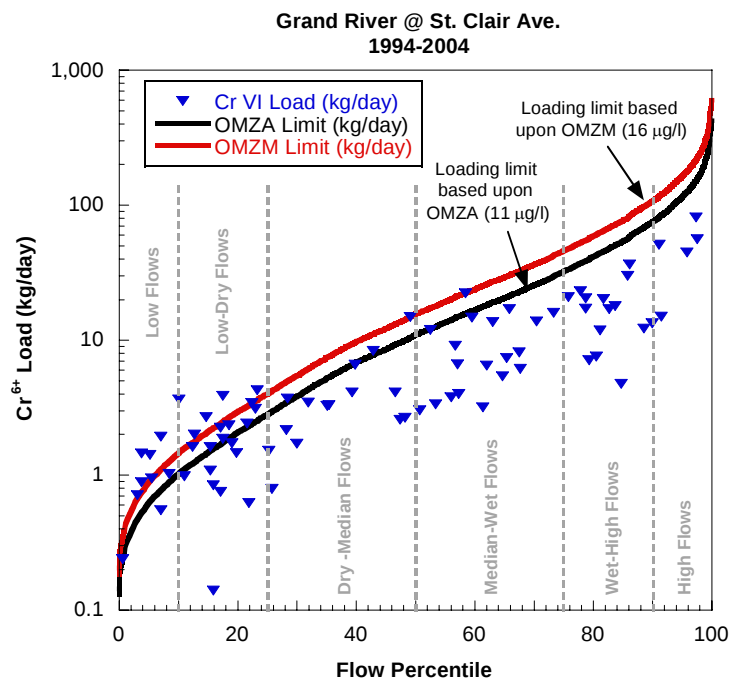


Figure 31. Load duration curve for Cr^{6+} in the Grand River downstream of the Diamond Shamrock Painesville Works site.

Total dissolved solids concentrations for the spatial composite samples did not exceed the water quality criterion of 1,500 mg/l at any of the sites sampled in 2004 (Figure 32). However, TDS concentrations in the Grand River increased significantly within and downstream of the reach bordering OU20. Median TDS concentrations more than doubled at the pipe bridge sampling location (567 mg/l, RM 3.60) versus the site upstream of Red Creek (262 mg/l, RM 4.80), indicating the releases of this pollutant to the river within this reach.

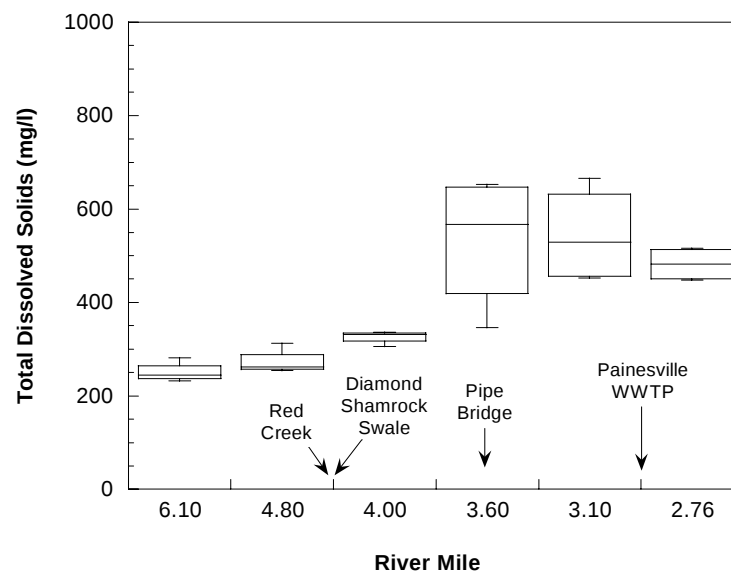


Figure 32. Total dissolved solids concentrations in spatial composite samples from the Grand River in the vicinity of the Diamond Shamrock Painesville Works site, 2004.

Table 5. Evaluation of load reductions for Cr^{6+} to the Grand river in the vicinity of the Diamond shamrock Painesville Works site necessary to meet applicable water quality criteria.

Flow Condition	OMZA Load Limit (kg/day)	OMZM Load Limit (kg/day)	Observed Load (kg/day)	Load Reduction to Meet OMZA (kg/day)	Load Reduction to Meet OMZM (kg/day)
Low Flows	0.604	0.859	1.015	0.411 (40.5%)	0.156 (15.3%)
Low-Dry	1.800	2.560	2.029	0.229 (11.3%)	NA
Dry-Median	8.210	8.835	4.202	NA	NA
Median-Wet	19.437	27.655	9.247	NA	NA
Wet-High	49.325	70.178	17.308	NA	NA
High Flows	134.303	191.083	49.434	NA	NA

Field conductivity measurements taken within the stream cross section in conjunction with the collection of water samples used to make up spatial composite samples (Table 3) identified a hot spot for the release of TDS to the river at the pipe bridge (RM 3.60). Consistently higher specific conductance readings were collected from the bottom water in this location, especially along the right (north) bank of the stream. Apparent releases of contaminated groundwater, likely through fissures in the underlying bedrock, resulted in a localized elevation in conductivity (TDS) and a violation of the water quality criterion on September 7, 2004. Similar results were observed on three of the four sampling dates at this station, although the values observed on the other dates were well below the water quality criterion for specific conductance of 2,400 $\mu\text{mhos/cm}$. Other than the identification of this particular hot spot, the more detailed field monitoring did not find a specific trend in the release of TDS to the river along the cross section of the channel. It appears that the release of TDS to the river may be dispersed along the margins of OU20, with the likelihood that fractured bedrock provides conduits for the movement of contaminated groundwater toward the stream.

In summary, the weight of evidence of the data collected to date indicates that exceedances of the water quality criteria for Cr^{6+} , and on a localized basis TDS, continue to be caused by releases of contaminated groundwater for OU20 within the Diamond Shamrock Painesville Works site. Load reductions for Cr^{6+} of over 40 percent under low flow conditions in the Grand River must be the minimum design target for corrective measures to be taken at OU20 to protect water quality. These measures will have to be maintained in perpetuity, since the amount of time necessary to completely attenuate the source of Cr^{6+} is extensive and removal of the waste mass causing the release appears impracticable. It is likely that efforts necessary to control the release

of Cr^{6+} will be sufficient to also address localized problems relating to the release of TDS to the river, although this should be confirmed by an adequate long-term monitoring program.

It is recommended that sufficient long-term monitoring of both TDS and dissolved Cr^{6+} be carried out as long as site operation and maintenance is necessary to control sources of these pollutants associated with OU20. Periodic review of the sampling plans and procedures, as well as the analytical results obtained from the monitoring efforts by the Ohio EPA is vital in order to ensure that progress is made in meeting the water quality criteria.

Based upon analysis of historical and current effluent and downstream monitoring data available from monthly monitoring reports submitted by the Painesville WWTP, it does not appear justified to require that the burden for monitoring in-stream dissolved Cr^{6+} be borne by the WWTP, at least at the frequencies currently required. However, the data obtained at the St. Clair Ave. (RM 2.76) location is critical for monitoring long-term trends in the concentrations and loadings of Cr^{6+} in the river. It is recommended that efforts be made to shift the burden for monthly Cr^{6+} monitoring at the St. Clair Ave. location to the PRP group in order to maintain this essential data series.

Table 6. Field conductivity readings taken during the collection of spatial composite water samples in the Grand River, 2004.

Site	River Mile	Date	Depth	River Left	Left Mid-Channel	Right Mid-Channel	River Right
Upstream Red Creek	4.8	8/17/2004	mid-depth	382	390	390	445
		9/7/2004	mid-depth	612	481	468	457
		10/5/2004	mid-depth	416	364	341	340
		10/12/2004	mid-depth	419	443	439	448
Downstream Diamond Swale	4	8/17/2004	mid-depth	534	524	525	522
		9/7/2004	mid-depth	553	551	551	550
		10/5/2004	mid-depth	480	466	463	457
		10/12/2004	mid-depth	560	563	559	559
Pipe Bridge	3.6	8/17/2004	surface	718	594	649	664
			bottom		718	1,364	1,188
		9/7/2004	surface	808	815	792	813
			bottom	820	896	7,089^a	3,582^a
		10/5/2004	surface	501	490	493	561
			bottom			830	558
		10/12/2004	surface	795	617	654	778
			bottom	823	1,047	968	1,141
Upstream Painesville WWTP	3.1	8/17/2004	surface	796	826	819	819
			bottom		855	831	
		9/7/2004	surface	751	859	853	855
			bottom	796	894	917	868
		10/5/2004	surface	586	578	564	579
			bottom	585	581	566	740
St. Clair Ave.	2.76	8/17/2004	surface	717	723	712	706
			bottom	728	734	740	738
		9/7/2004	surface	714	720	727	722
			bottom	714	719	724	716
		10/5/2004	surface	690	649	651	673
			bottom	685	650	650	648
		10/12/2004	surface	799	813	848	866
			bottom	800	804	820	846

^a Value exceeds the water quality criterion of 2,400 µmhos/cm @ 25°C for conductivity.

Mill Creek Hydrologic Unit (4110004-050)

Surface waters in the Mill Creek hydrologic unit tended to have elevated concentrations of nutrients, with mean concentrations of nitrate-nitrite nitrogen, TKN and total phosphorus in water samples approaching or exceeding the 90th percentile of similar-sized reference streams within the Erie-Ontario Lake Plain ecoregion. Sources of nutrients include agricultural land use and the Jefferson WWTP. Low dissolved oxygen was documented in Mill Creek at Clay Road (RM 25.62), where the stream is a low-gradient, historically channelized swamp stream.

Table 7. Summary statistics for selected water quality parameters sampled in the lower Grand River hydrologic unit (4110004060) stratified by drainage area. Mean and median values within drainage strata were computed from the geometric means of individual sampling locations (N). The 90th percentile value from similar-sized Erie-Ontario Lake Plain reference sites is shown for comparison.

		BOD5	TSS	NH3N	TKN	NO _x	TP
Very Small ($< 5 \text{ mi}^2$) N = 17	Median	1.00	2.50	0.025	0.53	0.37	0.033
	Mean	1.21	5.50	0.030	0.52	0.88	0.107
	SD	0.76	10.70	0.014	0.24	1.50	0.156
	Ref. 90 th %	3.10	43.20	0.190	1.08	2.70	0.214
Small ($5 - 20 \text{ mi}^2$) N = 10	Median	1.00	6.00	0.025	0.55	0.45	0.090
	Mean	1.13	17.83	0.078	0.59	1.14	0.080
	SD	0.47	44.78	0.076	0.21	1.42	0.061
	Ref. 90 th %	3.10	43.20	0.190	1.08	2.70	0.214
Medium ($20 - 50 \text{ mi}^2$) N = 14	Median	1.00	2.50	0.025	0.34	0.16	0.019
	Mean	1.19	26.27	0.033	0.35	0.23	0.040
	SD	0.58	83.72	0.020	0.14	0.23	0.080
	Ref. 90 th %	3.10	42.30	0.125	0.90	1.82	0.200
Large River ($> 500 \text{ mi}^2$) N = 17	Median	1.00	8.00	0.025	0.59	0.29	0.051
	Mean	1.30	15.58	0.087	0.63	0.32	0.068
	SD	0.65	22.17	0.218	0.27	0.37	0.136
	Ref. 90 th %	2.00	44.70	0.560	1.00	1.82	0.256

Table 8. Summary statistics for selected water quality parameters sampled in the Mill Creek hydrologic unit (4110004050) stratified by drainage area. Mean and median values within drainage strata were computed from the geometric means of individual sampling locations (N). The 90th percentile value from similar-sized Erie-Ontario Lake Plain reference sites is shown for comparison.

		BOD5	TSS	NH ₃ N	TKN	NO _x N	TP
Very Small (< 5 mi ²) N = 3	Median	1.00	3.75	0.082	0.86	0.51	0.083
	Mean	3.38	7.25	0.100	0.89	3.29	0.468
	SD	6.72	6.12	0.075	0.37	4.40	0.742
	Ref. 90 th %	3.10	43.20	0.190	1.08	2.70	0.214
Small (5 - 20 mi ²) N = 3	Median	1.00	6.50	0.025	0.88	0.28	0.099
	Mean	1.47	9.93	0.037	0.89	2.07	0.146
	SD	1.22	8.97	0.020	0.16	2.94	0.136
	Ref. 90 th %	3.10	43.20	0.190	1.08	2.70	0.214
Medium (20 - 50 mi ²) N = 2	Median	2.00	5.00	0.081	1.08	0.72	0.117
	Mean	2.20	11.53	0.083	1.12	0.87	0.141
	SD	1.49	14.38	0.046	0.34	0.72	0.077
	Ref. 90 th %	3.10	42.30	0.125	0.90	1.82	0.200
Large (50 - 500 mi ²) N = 4	Median	1.00	2.50	0.025	0.80	0.71	0.069
	Mean	1.38	10.74	0.036	0.77	0.83	0.091
	SD	0.59	14.25	0.018	0.15	0.65	0.065
	Ref. 90 th %	2.00	44.70	0.560	1.00	1.82	0.256

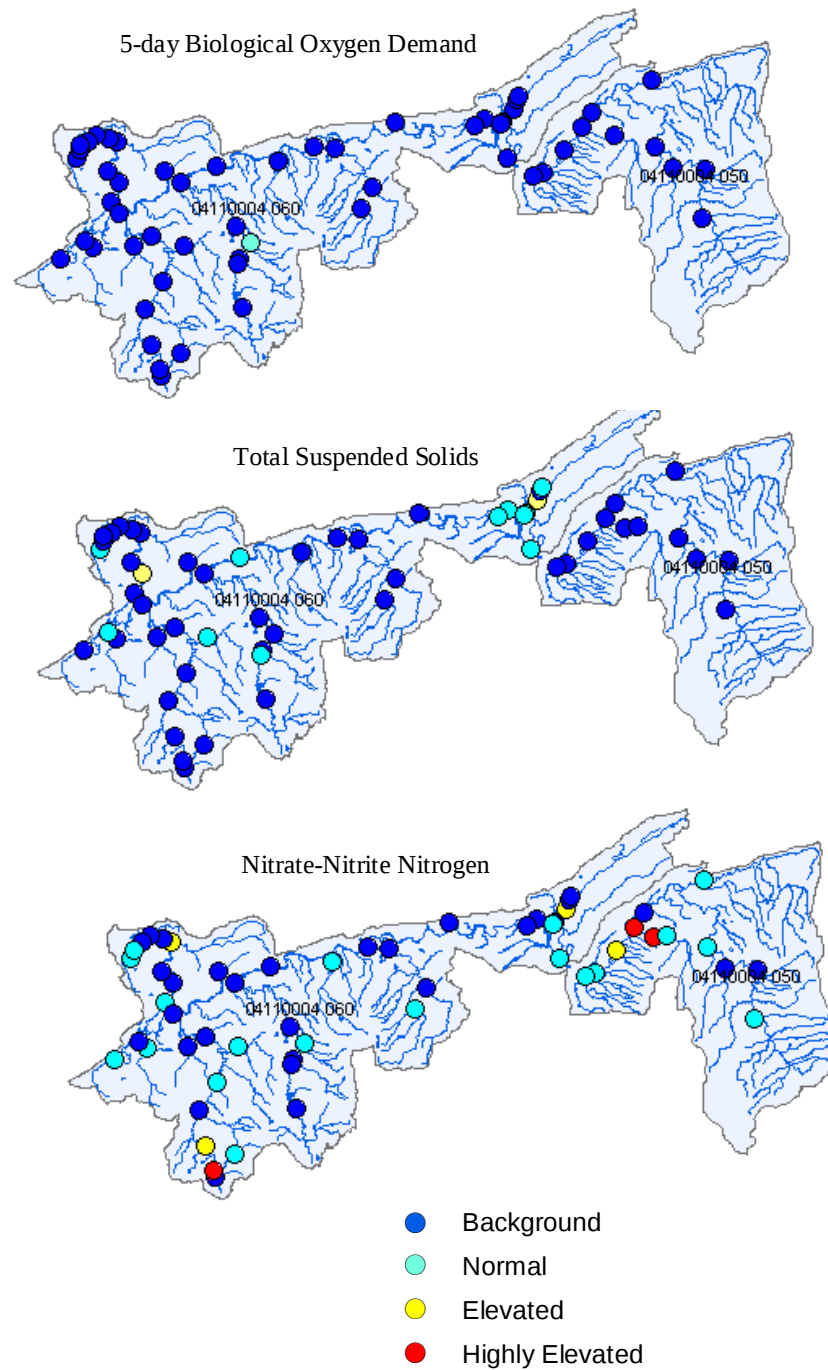


Figure 33. Rankings of selected chemical concentrations found in water samples collected during the 2003/2004 Grand River basin survey. Rankings are in comparison to the least-impacted reference condition for the Erie-Ontario Lake Plain Ecoregion of Ohio.

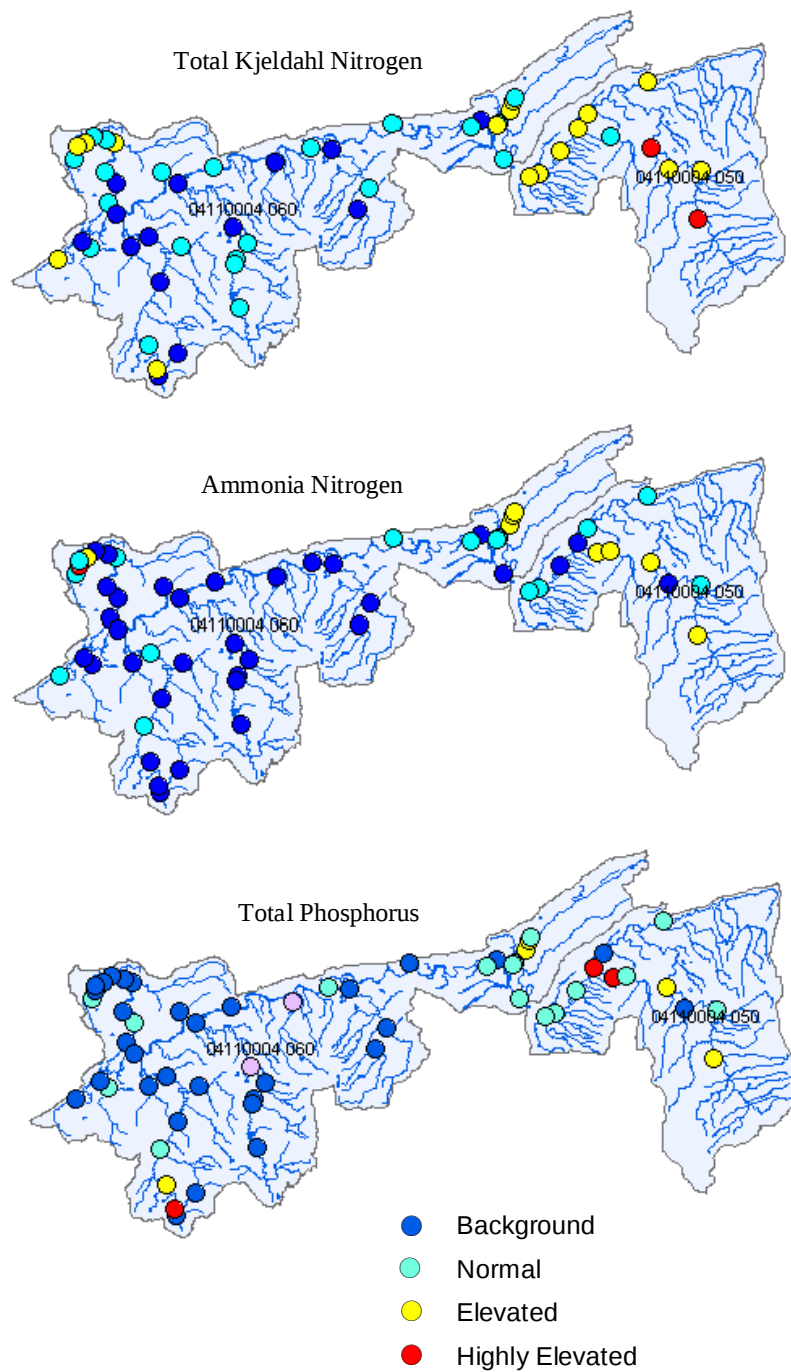


Figure 34. Rankings of selected chemical concentrations found in water samples collected during the 2003/2004 Grand River basin survey. Rankings are in comparison to the least-impacted reference condition for the Erie-Ontario Lake Plain Ecoregion of Ohio.

Table 9. Exceedences of Ohio EPA water quality criteria (OAC 3745-1) observed in water samples collected from the Grand River basin, 2003 and 2004.

Location	Date	Parameter (value)	Criterion
Mill Creek @ Clay Rd.	7/12/2004	D.O. (3.48 mg/l)	any-time minimum
Mill Creek @ Clay Rd.	9/23/2003	Lead (6.7 mg/l)	chronic toxicity
Mill Creek @ Doty Rd.	7/12/2004	Lead (12.8 mg/l)	chronic toxicity
Paine Creek @ Seely Rd.	9/10/2003	D.O. (4.37 mg/l)	any-time minimum
Ellison Creek ust Golf Course	7/31/2000	Ammonia (9.72 mg/l)	any-time maximum
Ellison Creek @ River Run Dr.	7/31/2000	Lead (25 mg/l)	chronic toxicity
Grand River @ St. Clair	10/5/2004	Ammonia (1.12 mg/l) [†]	30-day average
Grand River @ SR 84	5/06/2003	Lead (15.5 mg/l)	chronic toxicity
Grand River @ SR 84	3/17/2003	Lead (6.1 mg/l)	chronic toxicity
Grand River @ SR 84	3/14/2001	Lead (4.9 mg/l)	chronic toxicity

[†]Value exceeds the criterion limit, but is not a 30-day average

Recreational Uses

Water quality criteria for determining whether rivers and streams are suitable for recreational uses are established in the Ohio Water Quality Standards (Table 7-13 in OAC 3745-1-07) based upon the presence or absence of bacteria indicators in the water column. Indicator organisms used for these determinations are fecal coliform bacteria and *Escherichia coli*.

Fecal coliform bacteria are microscopic organisms that are present in large numbers in the feces and intestinal tracts of humans and other warm-blooded animals. *E. coli* typically comprises approximately 97 percent of the organisms found in the fecal coliform bacteria of human feces (Dufour, 1977), but there is currently no simple way to differentiate between human and animal sources of coliform bacteria in surface waters, although methodologies for this type of analysis are becoming more practicable. These microorganisms can enter water bodies where there is a direct discharge of human and animal wastes, or may enter water bodies along with runoff from soils where these wastes have been deposited.

Pathogenic (disease causing) organisms are typically present in the environment in such small amounts that it is impractical to monitor them directly. Fecal coliform bacteria, including *E. coli*, by themselves are usually not pathogenic. However, some strains of *E. coli* can be toxic, causing serious illness. Although not necessarily agents of disease, fecal coliform bacteria and *E. coli* may indicate the potential presence of pathogenic organisms that enter the environment through the same pathways. When fecal coliform bacteria or *E. coli* are present in high numbers in a water sample, it invariably means that the water has received fecal matter from one source or another. Swimming or other recreational-based contact with water having a high fecal coliform or *E. coli* count may result in ear, nose, and throat infections, as well as stomach upsets, skin rashes, and diarrhea. Young children, the elderly, and those with depressed immune systems are most susceptible to infection.

Designations of recreational uses for water bodies in the Grand River watershed are listed in OAC Rule 3745-1-10. All water bodies with designated recreational uses in the Grand River watershed are designated for Primary Contact Recreation, which "...are waters that, during the recreation season, are suitable for full-body contact recreation such as ... swimming, canoeing, and SCUBA diving with minimal threat to public health as a result of water quality" [OAC 3745-1-07 (B)(4)(b)]. There are no known designated bathing areas within the areas assessed for the Grand River watershed in 2003 and 2004. Applicable water quality criteria for the Primary Contact Recreational Use for the Grand River study area are listed in Table 10. Bacteriological results from environmental samples are typically reported as colony forming units (cfu) per 100 ml of water.

For purposes of assessing bacteriological data collected from the Grand River Assessment Units (AU's), fecal coliform and *E. coli* results from ambient samples collected during the years 1998 through 2004 were pooled in order to calculate geometric means and to determine the 90th percentile. Data from sites along the mainstem of the Grand River where the upstream

watershed area exceeded 500 mi² [Large River Assessment Unit (LRAU sites)] were analyzed separately from data collected from tributaries within the HUC11 AU's. Only data collected during the recreational season (May 1 through October 15) are used for the analysis. The results of the analyses are compared to the primary contact recreational use water quality criteria to determine the degree of attainment. Based upon the current water quality criteria, only one of the two indicators must be in attainment in order to meet the criteria. Given the current water quality criteria, in almost all instances fecal coliform results are determinate in assessing attainment. Therefore, data analysis presented in this report is limited to the use of fecal coliform results although analyses were also conducted for *E. coli* in the majority of the samples (results provided in the appendices to this report).

Table 10. Primary Contact Recreational Use Water Quality Criteria applicable to the Grand River Study Area (Table 7-13 of OAC 3745-1-07). At least one of the two bacteriological standards (fecal coliform or *E. coli*) must be met. These criteria apply outside of the mixing zone.

Primary Contact

Fecal coliform - geometric mean fecal coliform content (either MPN or MF), based upon 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 percent of the samples taken during any thirty-day period.

E. coli - geometric mean *E. coli* content (either MPN or MF), based upon 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 percent of the samples taken during any thirty-day period.

For purposes of reporting the attainment status for a particular Assessment Unit, the following protocol is followed:

1. Where sufficient data is available for direct comparison to the water quality criteria (5 samples collected within a thirty-day period), compliance with the criteria determines the attainment status. Violations of either the geometric mean or 10 percent criteria represents NON-Attainment and values below the criteria indicate FULL Attainment.
2. Where sufficient data is not available for direct comparison to the water quality criteria, pooled data for a period of record is compared to the water quality criteria as follows:
 - A) NON-Attainment is assigned when both the geometric mean and the 90th percentile for the data exceed the applicable water quality criteria.
 - B) PARTIAL Attainment is assigned when the geometric mean for the pooled data is less than the water quality criteria but the 90th percentile exceeds the water quality criteria.
 - C) FULL Attainment is assigned when both the geometric mean and the 90th percentile for the pooled data are below the applicable water quality criteria.

Grand River Large River Assessment Unit

Ambient fecal coliform data from 12 sites along the Grand LRAU were analyzed to determine the degree of attainment with the recreational use criteria. Two strategies were used in this analysis. First, statistics were developed for pooled data from sampling conducted by the Ohio EPA during the period of 1998-2004. Although this data does not meet the specific requirements found in OAC 3745-1-07, this approach does allow for a comparison of ambient data to the water quality criteria over a longer averaging period throughout various stream flow conditions. Secondly, a minimum of five samples were collected from nine locations along the Grand River LRAU during the period of June 15 through July 15, 2004 (intensive sampling period). This data provides a direct comparison to applicable water quality criteria.

Both analytical approaches for the LRAU bacteriological data resulted in the same conclusions. The geometric mean fecal coliform water quality criteria were met at all of the LRAU sites when either the pooled ambient data (Table 11) or the intensive sampling period data (Figure 35) were examined. Analysis of the 90th percentile data for fecal coliform bacteria found that only the site at State Rt. 535 (RM 2.30) exceeded the criterion (Table 11, Figures 35 and 36). This result holds true for both data sets, indicating that this condition is persistent at this location. In addition, analysis of monthly operating report data from the Painesville Wastewater Treatment Plant (WWTP) (Table 12) indicates that similar results for fecal coliform data are true for ambient sampling locations in the Grand River both upstream and downstream of the WWTP outfall (located at River Mile 2.96). Elevated fecal coliform levels appear to be correlated with higher flow conditions and may be the result of urban runoff from within the City of Painesville or the result of poorly operating wastewater treatment facilities upstream of the Painesville WWTP.

The Ohio EPA recently issued an NPDES permit for the Spring Lake Mobile Home Park which operates a 5,700 gallon per day treatment plant system located on the Grand River just downstream of State Rt. 2 (at approximately RM 5.4). This wastewater treatment plant was found to be organically overloaded and to be producing a marginal quality effluent during an inspection by the Ohio EPA on April 27, 2004. The NPDES permit for this facility (Permit 3PV00120, OH0134694) which became effective on August 1, 2004 requires the installation of flow equalization, dechlorination facilities, and improved sludge holding by August 1, 2005. No self-monitoring data for fecal coliform bacteria is available for this facility for operations during the 2003-2004 water quality survey period. Data for this facility should be scrutinized before and after the installation of improved treatment equipment to determine if this facility is operating in compliance with its NPDES permit.

Table 11. Summary statistics for fecal coliform data from sites within the Grand River Large River Assessment Unit, 1998-2004.
All values reported as cfu/100 ml unless otherwise noted.

River Mile	Location	STORET ID	Number of Samples	Geometric Mean	90th Percentile	Percent >1000	Percent >2000	Percent >5000	Minimum	Maximum
2.30	State Rt. 535	502520	11	456	3,300 ¹	36.4%	27.3%	9.1%	20	28,000
6.10	Recreation Park	G02S13	7	442	1,344	14.3%	14.3%	0.0%	80	2,400
8.45	State Rt. 84	502530	43	264	1,660	16.3%	7.0%	2.3%	40	5,200
13.60	Vrooman Rd.	G02G14	11	95	450	0.0%	0.0%	0.0%	20	500
16.42	Blair Rd.	G02W14	8	138	788	12.5%	0.0%	0.0%	40	1,600
22.10	State Rt. 528	502510	8	60	288	0.0%	0.0%	0.0%	10	540
28.42	Brandt Rd.	G02W19	7	41	238	0.0%	0.0%	0.0%	10	460
34.42	Sexton Rd.	G02W18	12	243	1,767	16.7%	8.3%	0.0%	20	3,500
35.40	Dst. Coffee Creek, River Right	G02G03	3	65	146	0.0%	0.0%	0.0%	33	170
36.30	Tote Rd.	G02W17	1	110	110	0.0%	0.0%	0.0%	110	110
36.38	Ust. Coffee Creek, River Left	G02W04	4	74	140	0.0%	0.0%	0.0%	50	170
39.90	Cork cold Spring Rd.	G02G15	11	199	1,500	18.2%	9.1%	0.0%	40	2,200
43.32	Sweitzer Rd. ²	G02W16	8	554	5,630 ¹	25.0%	25.0%	25.0%	80	6,400

¹Exceeds the Primary Contact Recreational Use Water Quality Criterion (Table 7-13, OAC 3745-1-07).

²Site located upstream of the Large River Assessment Unit demarcation.

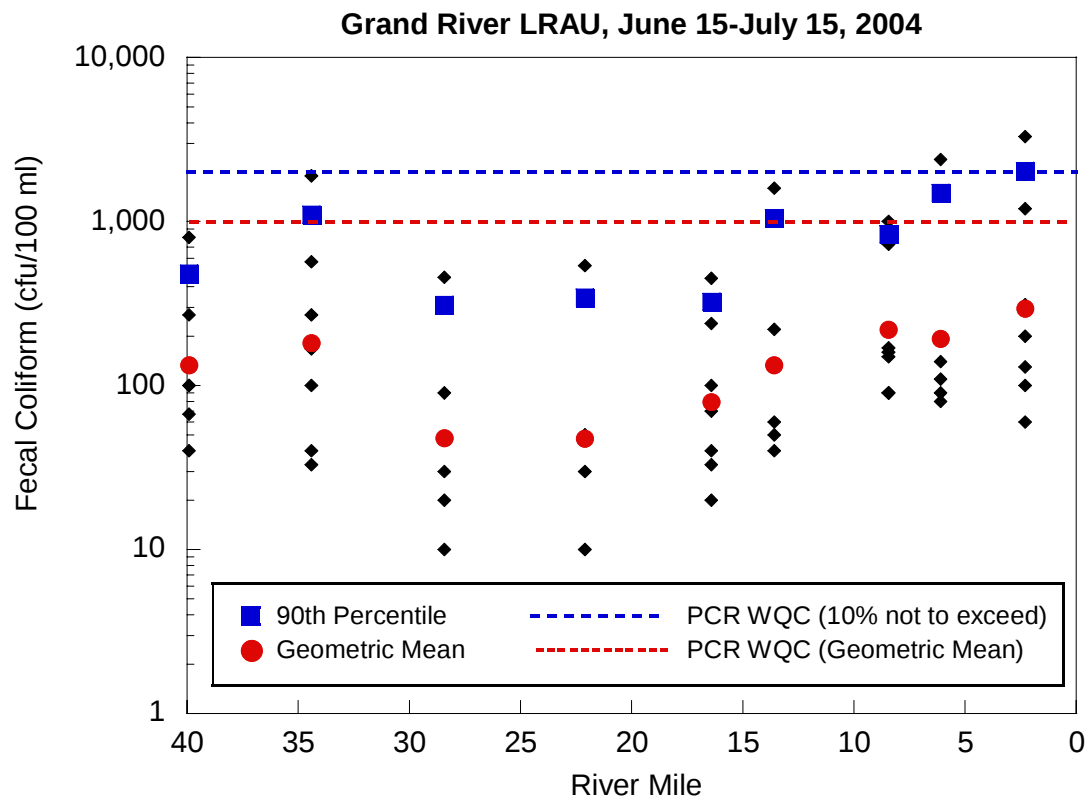


Figure 35. Results of fecal coliform bacteria analyses from Grand River LRAU sites, June 15-July 15, 2004.

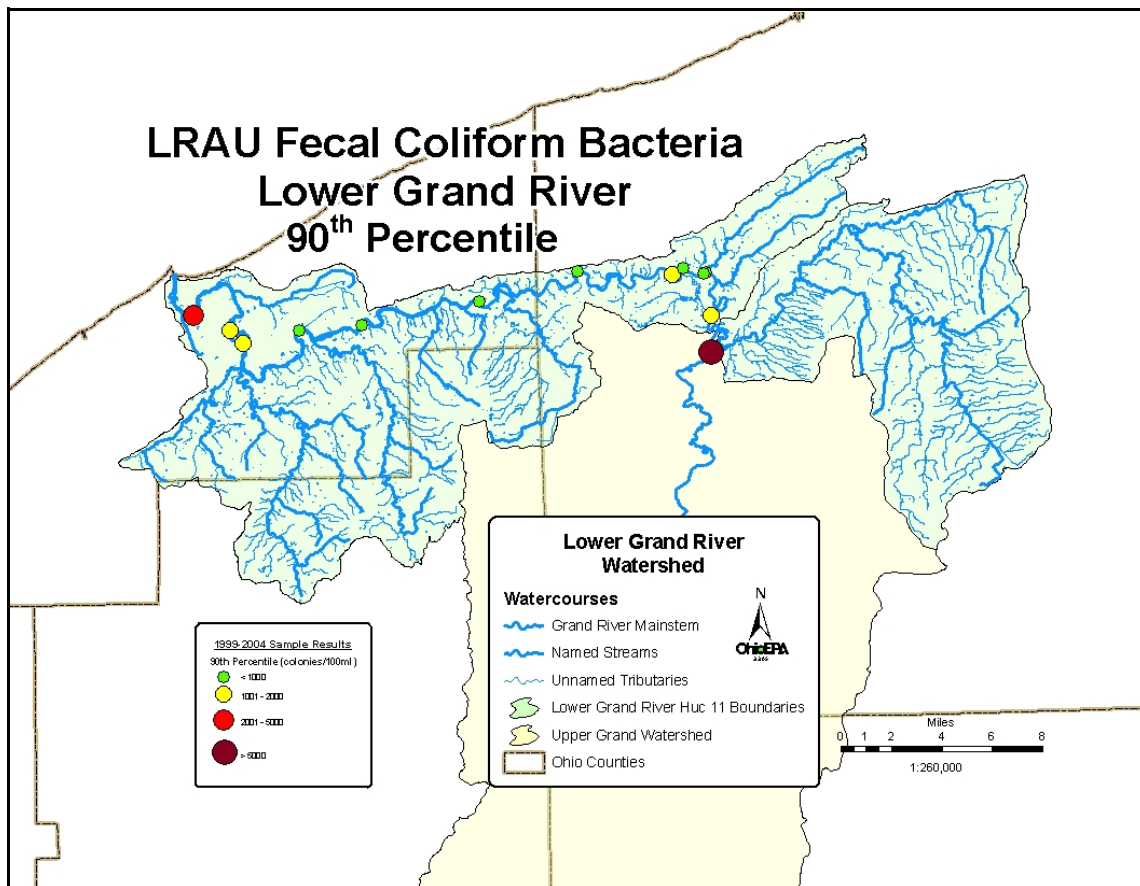


Figure 36. Ninetieth percentile fecal coliform counts in water quality samples collected from the Grand River Large River Assessment Unit, 1999 - 2004.

Table 12. Results of self-monitoring data from the Painesville WWTP for fecal coliform bacteria, 1998-2004.

	Upstream (801 sampling station) (RM 3.0)	Painesville WWTP 001 Outfall (RM 2.96)	St. Clair Ave. Downstream (901 sampling station) (RM 2.76)
Geometric Mean (cfu/100ml)	261.3	7.9	164.4
90th Percentile (cfu/100ml)	2,177	220	2,819
Number of Samples	84	835	97

HUC 11 Assessment Units

Ambient fecal coliform data from 42 sampling locations within the Mill Creek (04110004050) and lower Grand River (04110004060) AU's was analyzed to determine the degree of attainment with the recreational use criteria. The Mill Creek AU had 12 sampling locations on 5 different streams, while 30 sampling locations were distributed over 16 streams within the lower Grand River AU (Figures d and e). Data from Grand River LRAU mainstem sites are excluded from these analyses. Comparison of the results with the applicable water quality criteria found that both AU's were in PARTIAL attainment for recreational use (Table 13).

Mill Creek (04110004050)

Pooled data analysis for fecal coliform in the Mill Creek AU found that the geometric mean was below the water quality criteria, but that the 90th percentile exceeded the 10 percent water quality criteria (Table 13). Problem areas evident through spatial analysis of the data (Figures 37 and 38) include Griggs Creek, where both the geometric mean (1,780 cfu/100 ml) and the 90th percentile (19,700 cfu/100 ml) exceeded the PCR water quality criteria at the single sampling location on this stream (n=8), and the upstream reaches of Mill Creek. Fecal coliform counts at the most upstream sampling location on Mill Creek at Clay Rd. (RM 25.67) were elevated above the PCR water quality criteria (geometric mean = 2,763 cfu/100 ml, 90th percentile = 9,810 cfu/100 ml, n=8). All other instances where the PCR water quality criteria were exceeded within the AU were for the 10 percent criteria and were restricted to sampling sites along the mainstem of Mill Creek. Ninetieth percentile values were 13,160 cfu/100 ml and 3,790 cfu/100 ml at Netcher Rd. (RM 18.2) and Forman Rd. (RM 4.09), respectively.

Although spatial analysis of the data may at first indicate that the instances of elevated 90th percentile fecal coliform counts were isolated along the mainstem of Mill Creek, this conclusion should be viewed with caution. All of the sites where pooled values exceeded the 10 percent water quality criteria were sentinel sampling sites which were visited 8 times under varying seasonal and flow conditions while the remaining sites were sampled only 2-3 times under summertime low flow conditions. It is possible that equivalent sampling effort at all sites would have revealed a greater degree of departure from the PCR criteria throughout the watershed than is depicted in Figure 38.

Attainment of the geometric mean fecal coliform criteria in conjunction with elevated 90th percentile values is indicative that non-point sources are the main causes of the observed condition. Likely non-point sources for fecal coliform contamination within the Mill Creek AU include poorly operating onsite home sewage treatment systems and runoff from agricultural operations. With the exception of the City of Jefferson, the Mill Creek AU is largely unsewered. In addition, agricultural land use is intensive within

many portions of the Mill Creek watershed. Efforts to reduce fecal coliform loadings with the watershed should focus upon characterization of the relative contributions of these sources and the institution of appropriate best management practices that will reduce loadings caused by runoff events.

Grand River Below Mill Creek to Lake Erie (04110004060)

The geometric mean for pooled fecal coliform data collected during the period of 1998-2004 for the Lower Grand River AU met the PCR water quality criterion. However, the 90th percentile for the pooled data exceeded the 10 percent water quality criterion (Table 13). As is the case with the Mill Creek AU, multi-flow condition data collected from sentinel sampling locations throughout the lower Grand River AU indicates that the 10 percent criterion for fecal coliform is exceeded, while focused low flow sampling from the remainder of the sites within the watershed did not exceed this criterion. Non-point sources of fecal coliform bacteria, mobilized by precipitation events are the likely cause of the observed outcome. Locally concentrated housing areas with failing onsite wastewater treatment systems and agricultural operations within the AU are the most likely sources for this contamination.

The sub-watershed within the lower Grand River AU that is of main concern is Coffee Creek, where results from a year 2000 water quality survey found bacteria counts that exceeded both the geometric mean and 10 percent criteria (Figures 37 and 38, Table 13). Coffee Creek drains a moderately sized commercial area surrounding State Route 45 interchange from Interstate 90 and through the Village of Austinburg which has a high density of failing onsite wastewater treatment systems in the town center. Although much of the Village is served by an Ashtabula County operated wastewater treatment plant, there are also several small "package" treatment facilities operated within the vicinity. There have been discussions between Ashtabula County and the Ohio EPA regarding expansion of this facility to service additional customers, but no formal plans for this expansion have yet been submitted. A thorough study of the sources of bacterial contamination to Coffee Creek in the Austinburg area should be conducted and plans developed to tie in failing systems to the Austinburg WWTP to alleviate this problem.

Table 13. Summary statistics for fecal coliform data from HUC 11 Assessment Units in the Grand River study area, 1998-2004.

HUC11 Watershed	HUC14 Watershed	Number of Samples	Geometric Mean	90th Percentile	Minimum	Maximum	Percent >1000	Percent >2000	Percent >5000	Attainment Status
04110004050 Mill Creek										
	04110004050010	22	821	<u>6,750</u>	33	28,000	31.8%	22.7%	18.2%	
	04110004050020	8	1,780	<u>19,700</u>	250	26,000	50.0%	37.5%	37.5%	
	04110004050030	21	308	1,900	20	4,700	33.3%	9.5%	0.0%	
04110004050 Total		51	619	<u>6,300</u>	20	28,000	35.3%	19.6%	13.7%	PARTIAL
04110004060 Grand River (below Mill Creek to Lake Erie)										
	04110004060010	16	1,672	<u>12,500</u>	140	18,000	68.8%	31.3%	18.8%	
	04110004060030	14	223	1,942	30	7,400	14.3%	14.3%	7.1%	
	04110004060040	3	55	150	30	180	0.0%	0.0%	0.0%	
	04110004060050	21	178	440	21	5,000	9.5%	9.5%	0.0%	
	04110004060060	29	246	1,440	20	7,000	10.3%	10.3%	6.9%	
	04110004060070	21	389	1,000	49	47,000	9.5%	4.8%	4.8%	
	04110004060080	3	389	862	190	1,000	0.0%	0.0%	0.0%	
04110004060 Total		107	322	3,280	20	47,000	18.7%	12.1%	6.5%	PARTIAL
Key to data qualifiers: Bold type indicates values exceeding the Primary Contact Recreation criteria.										
<u>Bold Underlined</u> type indicates values exceeding the Secondary Contact Recreation criteria.										

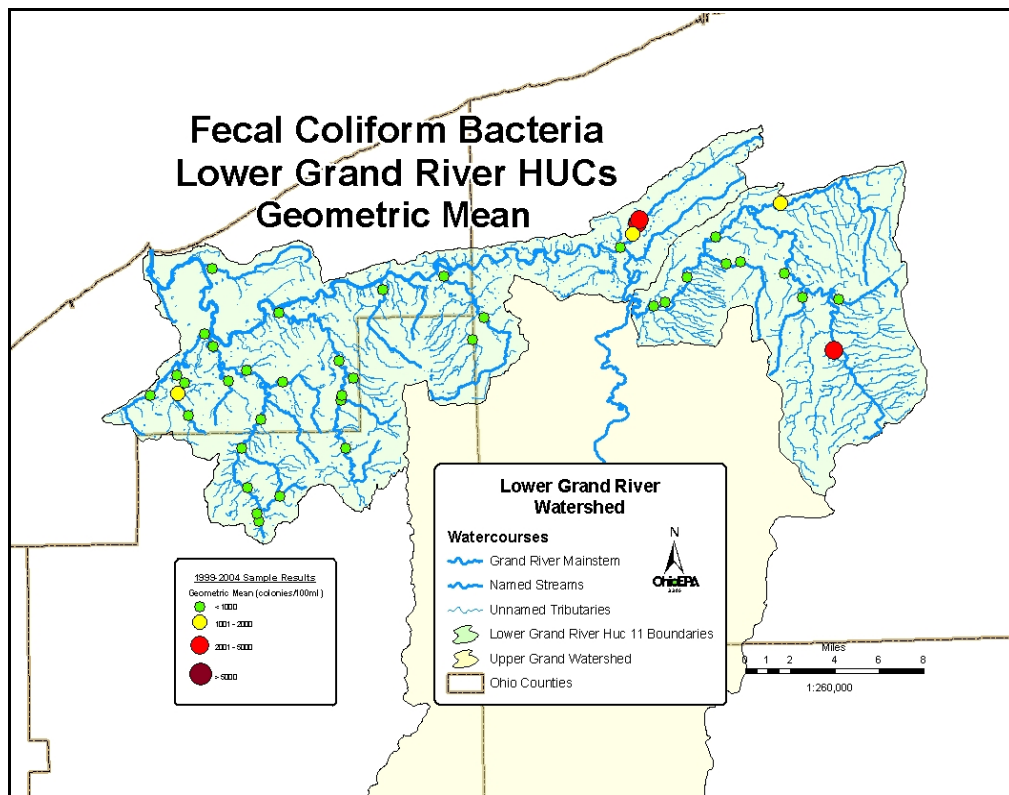


Figure 37. Geometric means of fecal coliform counts in water quality samples collected from the Lower Grand River Hydrologic Assessment Unit, 1999 - 2004.

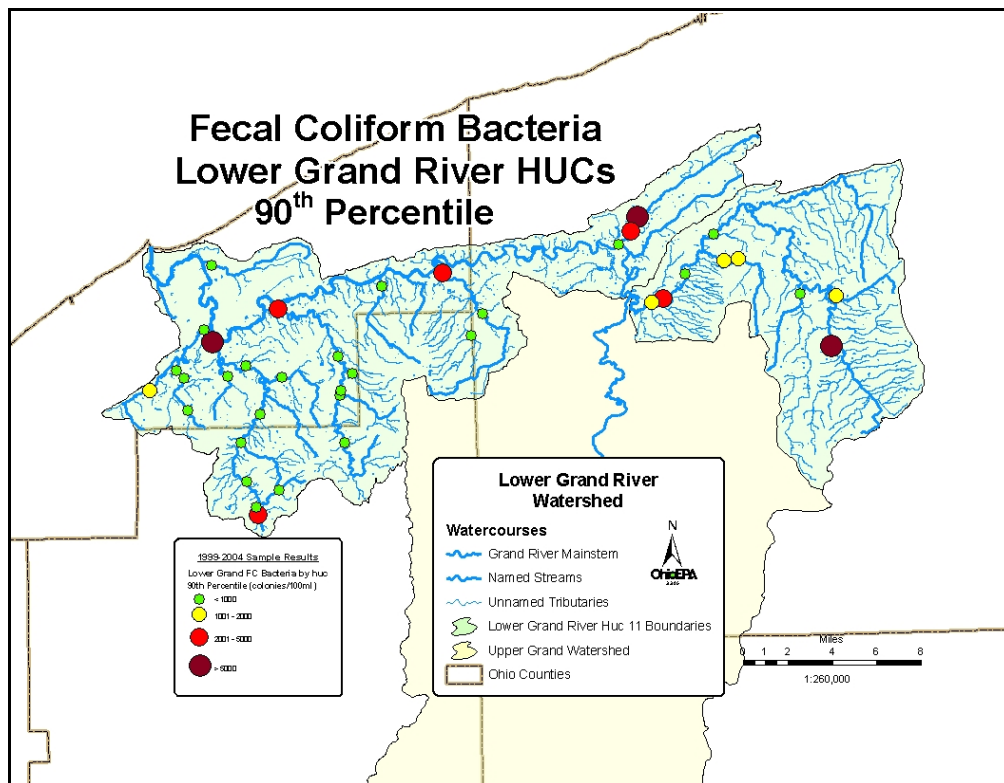


Figure 38. Ninetieth percentile fecal coliform counts in water quality samples collected from the Lower Grand River Hydrologic Assessment Unit, 1999 - 2004.

Physical Habitat Quality for Aquatic Life

Grand River and Tributaries Downstream from Mill Creek (Hydrologic Unit 04110004 060) Grand River (03-001)

The character and physical habitat of the Grand River changes abruptly near Mechanicsville where the river makes its westward turn toward Lake County and its eventual union with Lake Erie. Upstream from Mechanicsville, the river flows through the lacustrine deposits of a former glacial lake. There, the river is a classic swamp-wetland type stream with low gradient (< 1 ft/mi), fine sediments (typically small gravels to clay), and few riffles. Consequently, large woody debris, rootwads, rootmats, undercut banks and deep pools characterize the habitat. The fish fauna in this reach very much resembles a swamp-stream association: trout-perch, silver redhorse, sunfish and blackside darters are common. The wetland environs also provide spawning habitat for the Great Lakes muskellunge and northern pike. A native population of walleye exists as well. In short, the habitat in this reach of the Grand River supports one of the few intact type-locality faunal assemblages found anywhere in Ohio.

Downstream from Mechanicsville, the gradient increases and the river flows in a series of pools, glides, runs, and riffles through a shale gorge. Long stretches of shallow bedrock alternate with aggregations of glacial till to form glides and riffles, and deeper pools exist where the river erodes former depositional areas. Water quality in the river is fortuitously protected by the shale gorge that the river flows through and the scouring flows that formed it, as the steep bluffs and regular flooding generally preclude development within the floodplain. Habitat quality in this reach of the river is among the best anywhere in Ohio.

Big Creek and Tributaries

Big Creek and its tributaries drain the heart of Ohio's snow belt. A high gradient, combined with torrential, scouring flows and discontinuities in bedrock have resulted in beautiful cascades and waterfalls along the length of Big Creek and in many of its tributaries, especially the portion of the drainage in Lake County. The scouring flows, however, result in long stretches of bedrock punctuated by short aggregations of glacial till and fractured bedrock; the effect is more apparent moving downstream, and is reflected in successively decreasing QHEI scores downstream from SR 608 (RM 9.3) [Table 10]. The upshot is, that from a fish's eye-view, the habitat becomes marginal in the lower 5 miles of the creek. Identical conditions exist in East Creek and Gordon Creek, and to a lesser extent in Ellison Creek.

Kellogg Creek is different in that it runs parallel to the Portage Escarpment (also called the Lake Escarpment Moraine), and therefore tends to be rich (or formerly so) in glacial till. In all likelihood, Kellogg Creek was formerly a *bona fide* coldwater stream; however, suburban development has altered the character of the stream. The headwater reach between King Memorial Road and Johnny Cake Ridge appears to have been channelized in its past, and the downstream site (upstream SR 86) had a bedload of pulverized shale, an artifact of suburbanized land use. Despite these limitations, the habitat in Kellogg Creek is capable of supporting a WWH fish community.

The headwater portion of the Big Creek drainage in Geauga County, being smaller and therefore subject to less scouring energy, and having a thicker glacial drift than the portion in Lake County, generally has stream habitat that is more conducive to supporting fish communities in accordance with expectations derived for till-plain streams (Figure 39).

Paine Creek and Tributaries, Talcott Creek, and Mill Creek

Each of these tributaries are very analogous to Big Creek in that they also have high gradients, discontinuities in bedrock, and are subject to scouring flows that result in long bedrock glides, cascades and water falls. And like Big Creek the headwaters of Paine Creek (Bates Creek) and Mill Creek have habitat more conducive to supporting till-plain stream fish communities. Bates Creek at Radcliffe Road, and an unnamed tributary to Mill Creek sampled near the junction of Belle and Short Roads, have virtually intact physical stream habitat; most notably, the substrates are a nearly silt-free heterogenous mix of fractured sandstone bedrock and glacial till.

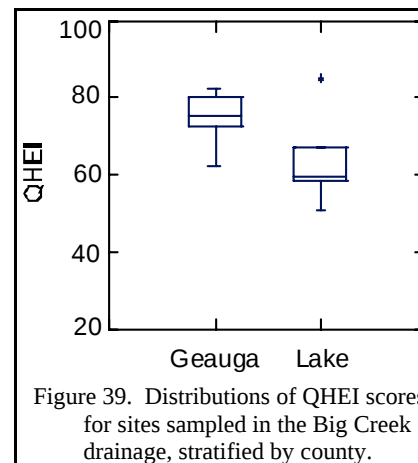


Figure 39. Distributions of QHEI scores for sites sampled in the Big Creek drainage, stratified by county.

Red Creek

Red Creek drains a suburbanized former lake plain; consequently, its parent, fine-grained lacustrine substrates are moderately embedded with silt. The lower reach, where sampled, had not been channelized, and so has sufficient habitat attributes to support a warmwater stream fish assemblage. Also, Red Creek has sustained flow throughout the summer owing to ground water from beach ridges and a thick soil horizon. The estimated amount of impervious surface, based on 1994 Landsat satellite imagery is ~ 7.5%, which further suggests that Red Creek has the potential to support a WWH fish assemblage.

Coffee Creek

Coffee Creek drains lacustrine deposits in a mostly rural area. Despite being rural, anthropogenic disturbance and stormwater from Austinburg has mobilized the fine sediments, resulting in a bedload of sand and silt.

Mill Creek (Ashtabula County) and Tributaries (Hydrologic Unit 04110004 050)

Mill Creek (Ashtabula County)

Stream habitat in Mill Creek and its tributaries varies widely from location to location, both within and between streams, depending on the type and thickness of glacial deposits and depth of bedrock. Near Eagleville, the mainstem cuts through sandstone bedrock as it drops into the Grand River Valley; consequently, the habitat in this reach ranges from shallow flow over denuded bedrock (Forman Road [RM 4.1]) to richer habitat characterized by deeper pools and aggregations of fractured bedrock and till (adjacent to the Eagleville cemetery [RM 3.7]). Further upstream, the topography is flat, and the creek flows through glacial drift of varying thickness and over sandstone bedrock. The habitat is characterized by slow, deep pools with

vegetated margins (Lizard's Tail) and short riffles. Upstream from the confluence with Griggs Creek, the habitat is dominated by shallow flow over shale and sandstone bedrock. The headwater site at Clay Road was a swamp stream. For the mainstem as a whole, the habitat is capable of supporting warmwater fish communities. However, because shallow bedrock dominates the drainage, baseflow is very low during the summer, and is the limiting habitat factor.

Griggs Creek

The site sampled on Griggs Creek was in a beaver dam pool, and so is likely not entirely characteristic of adjacent reaches. The creek parallels a ridge moraine rich in sand and gravel, and so should have good flow and be capable of supporting warmwater fish communities.

Askue Run and Peters Creek

Askue Run and Peters Creek both contain habitat suitable for warmwater stream fish communities in accordance with expectations for their size and ecoregion. Peters Creek, at the location sampled, is a classic northern swamp forest stream. It has an abundance of tag alder choking and braiding the channel, along with stands of quaking aspen in the surrounding upland.

Cemetery Creek

The macrohabitats at two locations on Cemetery Creek, RMs 1.2 and 2.1 were evaluated with the QHEI. The site at Chestnut Street (RM 2.1) flows through a residential area but has, remarkably enough, neither been channelized nor denuded of its riparian buffer. The otherwise high quality substrates were moderately embedded with silt from upstream sources. The QHEI score of 78.0 suggest this site is capable of supporting a WWH fauna.

Downstream from Poplar Street, the stream was historically channelized though most warmwater habitat features have been recovered over time. The QHEI score of 64.5 paired with only one high-influence modified habitat attribute suggest the stream is capable of supporting a WWH stream fish community.

[illegible]

Table 14. Grand River QHEI Matrix

River Mile	QHEI	Gradient (ft/mile)	WWH Attributes									MWH Attributes										Total MLL MWH Attributes	(MWH/HL+1)/(WWH+1) Ratio	(MWH/MLL+1)/(MWH+1) Ratio																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
			No Channelization or Recovered Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	Total WWH Attributes	High Influence			Moderate Influence																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
													Channelized or No Recovery Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (WD, HW)	Total HLL MWH Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin				Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent and Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Table 14. Grand River QHEI Matrix

River Mile	QHEI	Gradient (ft/mile)	WWH Attributes										MWH Attributes										Total MLL MWH Attributes	(MWH+1)/(WWH+1) Ratio	(MWH+1)/(MWH+1) Ratio
			No Channelization or Recovered Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	Total WWH Attributes	High Influence				Moderate Influence								
													Channelized or No Recovery Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (WD, HW)	Total HLL MWH Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development			
Key QHEI Components																									
(03-105) Cutts Creek																									
Year: 2004																									
1.2	73.0	38.46		8		0																			

Table 14. Grand River QHEI Matrix

River Mile		QHEI	Gradient (ft/mile)	WWH Attributes								MWH Attributes												Total MLL MWH Attributes	(MWH+1)/(WWH+1) Ratio	(MWH+1)/(MWH+1) Ratio					
				No Channelization or Recovered Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	High Influence				Moderate Influence														
													Total WWH Attributes				Channelized or No Recovery Silt/Muck Substrates				No Sinuosity Sparse/No Cover Max Depth < 40 cm (WD, HW)						Total HLL MWH Attributes				Recovering Channel Heavy/Moderate Silt Cover Sand Substrates (Boat) Hardpan Substrate Origin Fair/Poor Development Low Sinuosity Only 1-2 Cover Types Intermittent and Poor Pools No Fast Current High/Mod. Overall Embeddedness High/Mod. Riffle Embeddedness No Riffle
(03-124) Cemetery Creek																															
Year: 2003																															
2.1		78.0	25.64		9		0		1	0.00	0.00																				
1.3		64.5	14.29		7		1		2	0.00	1.00																				

Biological Assessment: Fish Communities

Grand River and Tributaries Downstream from Mill Creek (Hydrologic Unit 04110004 060) *Grand River (03-001)*

Fish communities in the Grand River have an exceptionally high degree of biological integrity. This is obvious in the consistently high IBI scores along the length of the mainstem and between sampling years, and is also evident in the unusually high percent composition of pollution intolerant species making up electrofishing samples (Figure 40). Furthermore, the Grand River is one of the few rivers in Ohio that has a full suite of endemic, naturally reproducing and self-sustaining top carnivores including walleye, northern pike and muskellunge. The latter is the Great Lakes subspecies (*Esox masquinongy masquinongy*), and so represents a vitally important area for genetic and habitat conservation. Given the propensity for muskellunge to differentiate into unique strains, the population in the Grand River may well be a truly endemic strain. As it stands, it is the last naturally reproducing muskellunge population found in any of Ohio's Lake Erie tributaries.

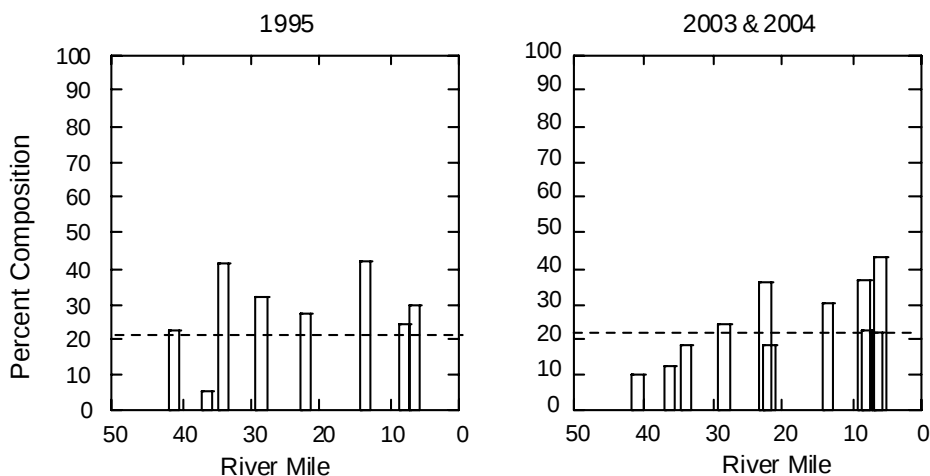


Figure 40. Percent composition of pollution intolerant fishes in electrofishing samples collected in the Grand River mainstem, 1995 and 2003/2004. The dashed horizontal line represents 2 SD from the mean for samples collected state-wide from similar-sized streams.

The site sampled at Sweitzer Road (RM 42.4) did not meet the EWH biocriteria. However, that site is near the transition between WWH and EWH, and lacks a riffle within the sampling zone, so the results do not indicate a water quality or aquatic life use impairment. Similarly the MIWb scores that did not meet the EWH biocriterion were due to natural limitations (very deep, slow-current, lacustrine habitat) or sampling inefficiency. The issue of sampling inefficiency is illustrated by the MIWb scores at SR 528 (RM 22.1), where low flows in 2003 necessitated using the wading method, which is a relatively inefficient method for the size of the river at that location regardless of flow. In 2004, when flows were favorable for the more apt boat method,

MIWb scores were solidly in the EWH range. At Brandt Road (RM 28.4) the boat method is precluded regardless of flow, but like RM 22.1, the wading method is inefficient for the size of the river. Low flows in 2003 precluded sampling in riffles at RM 6.1, the resulting contrast with 2004 results are obvious (Table 15).

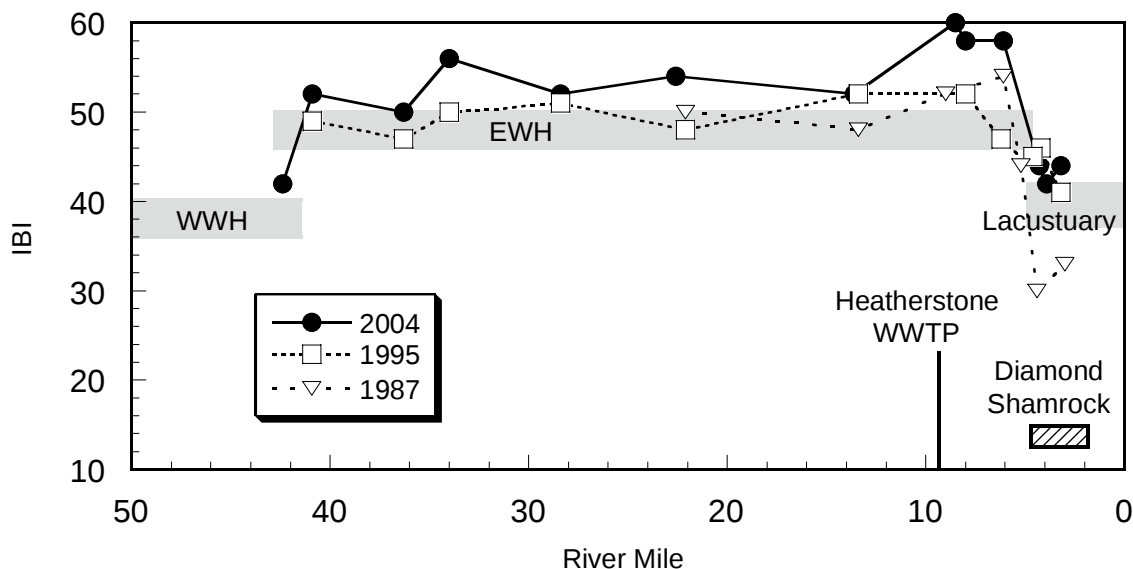


Figure 41. Longitudinal plot of Index of Biotic Integrity (IBI) scores for the Grand River from 1987 through 2004. (Note: for clarity, scores for 2003 and 2004, and 1994 and 1995 are grouped).

Grand River in the Vicinity of the Diamond Shamrock Waste Lakes

Waste containment ponds from the abandoned Diamond Alkali chemical plant are located adjacent to the Grand River (Figure 42). The Diamond Shamrock Works produced chromate compounds, chlorine, chlorinated paraffins, and coke. Diamond Shamrock also accepted and disposed of used spent pickle liquor from nearby steel industries. Eight pollution sources are associated with the Diamond Shamrock Works; 0.75 million tons of chromate waste materials, three waste lakes, a waste water retention basin, a hazardous waste landfill, chromate effluent treatment lagoons, and contaminated soils in the main production area. As part of a remedial effort, clay dikes and caps have been placed around and over the waste lagoons; however, chromium continues to leak into the Grand River, with at least two known discharges reported during the spring of 2004 that violated water quality standards for hexavalent chromium.

Fish samples were collected at three locations along the area flanking the Diamond Shamrock waste lakes (Figure 42). IBI and MIWb scores for each of the locations sampled met applicable biocriteria (WWH and/or lacustuary IBI; warmwater habitat MIWb); however, the percent of fish having anomalous deformities, eroded fins, lesions, or tumors (DELT) was elevated above

background conditions at each location sampled, all compositional metrics were suppressed, and the relative abundance of all non-pollution tolerant fish was lower than expected. Furthermore, samples collected in 2000 and 2001 by Enviroscience showed significant impairment in the reach as reflected in both the IBI and MIWb scores (Figures 39 and 44). Collectively these findings demonstrate that recovery in the lower Grand is transient and incomplete. The reach, therefore, remains impaired.

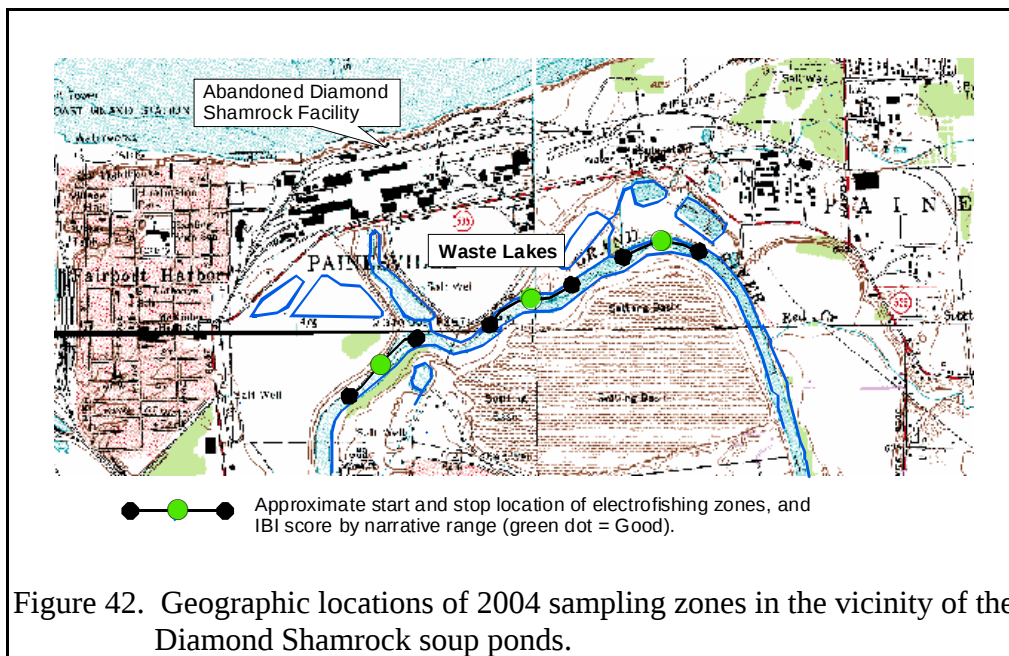


Figure 42. Geographic locations of 2004 sampling zones in the vicinity of the Diamond Shamrock soup ponds.

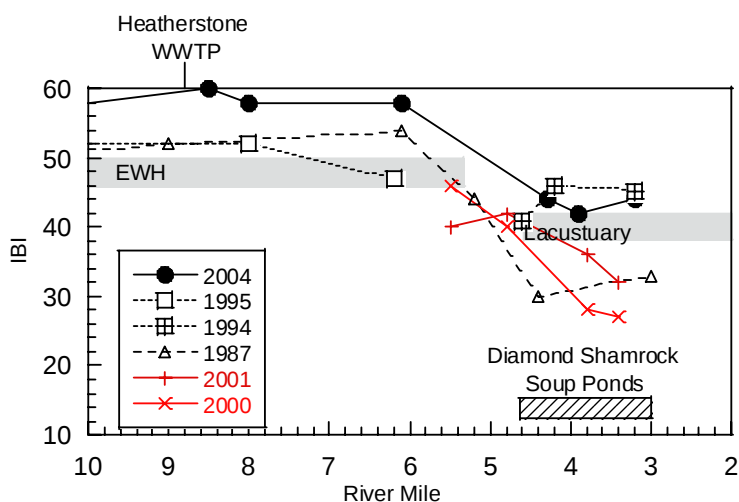


Figure 43. IBI scores for samples collected in the lower reach of the Grand River, 1987 - 2004. Note that 2000 and 2001 data are from Enviroscience.

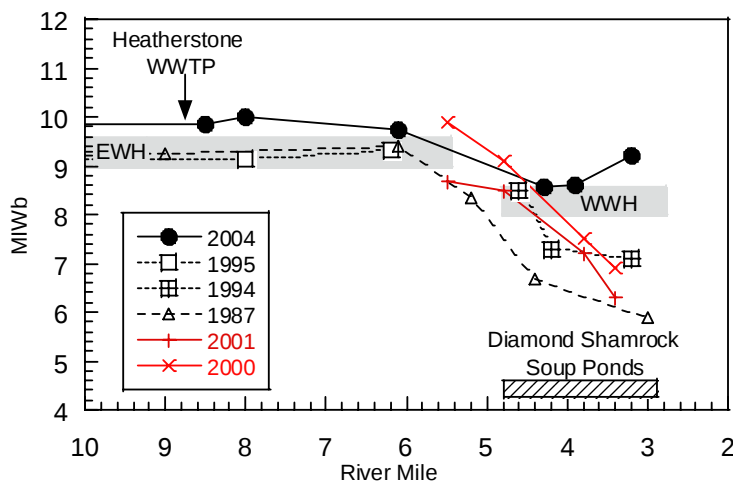


Figure 44. MIWb scores for samples collected in the lower reach of the Grand River, 1987 - 2004. Note that 2000 and 2001 data are from Enviroscience.

Big Creek and Tributaries

Considerable improvement in fish communities occurred between 1995 and 2004 in Big Creek (Figure 45), consequently to dechlorinization of the Chardon WWTP effluent in June of 1995 (Ohio EPA 1996). The improvement was most apparent in an increased number of fish species, an overall increased relative abundance of most fishes, and a decrease by roughly half in the relative composition of pollution tolerant species. All sites on Big Creek met the IBI biocriterion for WWH. The Williams Road site (RM 4.9) did not meet the MIWb bio-criterion because of the natural limitation of bedrock and little cover. Like the Grand River, Big Creek is deeply incised within a steep valley. Significant portions of the valley and slope to the uplands are preserved as conservation areas through private easements, Lake Metroparks, the Cleveland Museum of Natural History, and the Geauga Park District. The challenge for Big Creek now is to prevent suburban development from saturating the uplands and eroding the gains made by improved sewage treatment and land conservation.

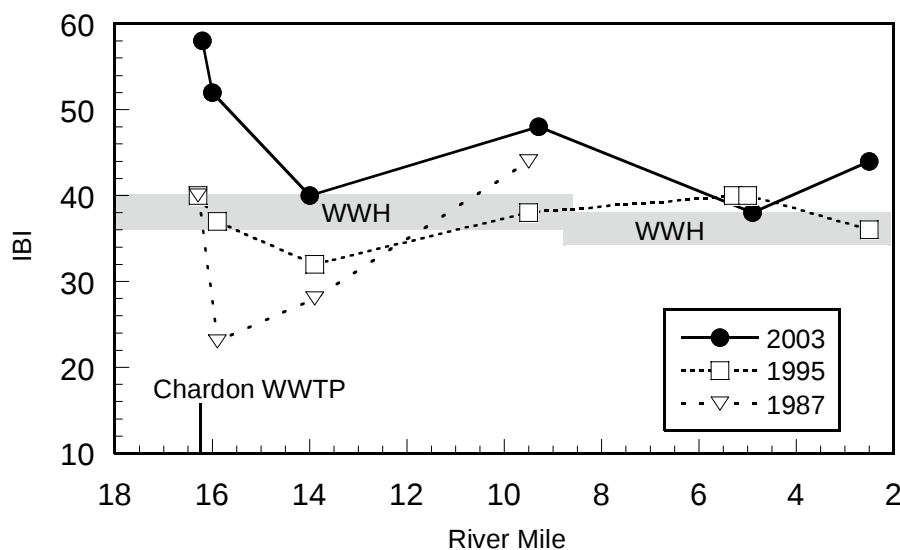


Figure 45. Plot of Index of Biotic Integrity scores by river mile for the sites sampled in Big Creek, 1987 through 2003. The location of the Chardon WWTP is shown for reference.

Kellogg Creek, including Ellison Creek, is the second most suburbanized subcatchment in the Grand River basin, with approximately 5.8% percent of its area in impervious cover as estimated from the Anderson Level III 1994 Landsat classification (ODNR). However, because the suburban neighborhoods comprising the catchment are generally older and the landscaping well-established, the satellite imagery likely underestimates the total amount of impervious cover. Census data from 2000 shows population densities exceeding 1000 people•mi⁻² in census blocks traversed by SR 84. The most upstream site sampled (Brennel Road, RM 5.7) had a poor fish community, reflecting significant degradation due to residential land use. Fish communities at the remaining downstream sites were stressed as evidenced by a higher-than-expected proportion of tolerant fishes, and fewer than expected numbers of pollution sensitive species. However, despite the evident stress, all the remaining sites at least marginally satisfied the WWH biocriterion owing to the ameliorative influences of riparian buffers, high gradient and groundwater inputs.

Ellison Creek is similarly stressed, though more by recent construction than total suburban landuse (Figure 46), and though stressed, the IBI scores at the three locations sampled met the WWH biocriterion. Again, a high gradient and riparian buffers help ameliorate suburban impacts.

The remnant coldwater character of Kellogg Creek and Ellison Creek was evident in the collection of reddsides dace and naturally reproduced young-of-the-year steelhead trout in both streams. Fish communities in both creeks are not likely to retain their remaining biotic integrity with further increases in suburban development.

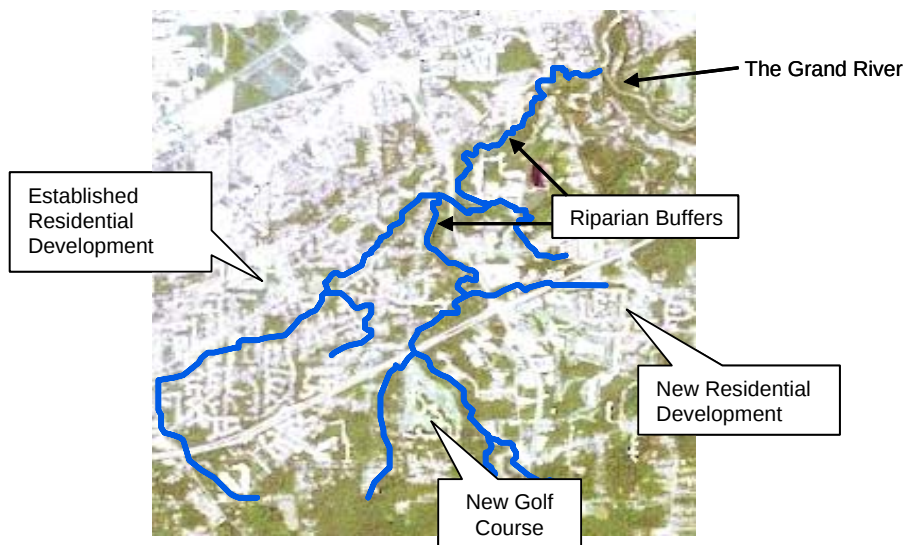


Figure 46. Annotated satellite image of the Kellogg Creek subcatchment showing recent suburbanization. The stream trace from the US EPA Reach File 3 is superimposed on the image.

Direct tributaries to Big Creek sampled since 2000 include Cutts Creek, Jenks Creek, Aylworth Creek, East Creek and Jordan Creek. Jordan Creek and East Creek did not meet the biocriterion for WWH headwaters; however, in East Creek, numerous salamanders were collected in the riffles, suggesting that it functions as a primary headwater stream, and the IBI score may not accurately reflect water quality or aquatic life use attainment. Cutts Creek and Aylworth Creek are similar to East Creek in that they also function equally as a primary headwater stream at the locations sampled. Jordan Creek, at the location sampled, was lacking in habitat, being primarily bedrock with little or no cover. A follow-up sample should be collected to verify the status of its aquatic life use. Jenks Creek is a beautiful, fully attaining headwater stream well-worth preserving.

Paine Creek and Tributaries

Because the stream habitat in Paine Creek and its tributaries is largely dominated by bedrock and heavily influenced alternately by torrential flows from snow-melt and very low summer flows, fish communities are naturally limited such that they are hard pressed to meet the biocriteria

expectations derived for till-plains-type streams. And, in fact, most of the IBI scores marginally attained their biocriterion for respective stream sizes; the MIWb scores at all wadeable sites did not achieve their respective biocriterion. Despite the natural limitations to the fish community, Paine Creek is highly aesthetic and supports populations of bigeye chub and river chub, both pollution intolerant species with declining state-wide distributions. Bigeye chub are particularly susceptible to smothering silts (Trautman 1981); fortunately, like Big Creek, Paine Creek's flood plain and valley slopes have largely been preserved through conservation easements and parkland. The unique ecological aspects of the Paine Creek watershed is also evident from data collected by the Lake County Soil and Water Conservation Service and Ohio EPA-NEDO showing that a number of small, direct tributaries to Paine Creek are Class III primary headwaters.

Bates Creek at Radcliffe Road contains nearly silt-free, well-structured physical habitat (QHEI = 83.5), and is naturally limited by wetlands and low stream flow. The effect of low stream flow is apparent in the metric scores for the number of headwater, sensitive and darter/sculpin species as each departed significantly from that expected for the given stream size. New home construction and shifting landuses are ruled-out as a possible cause of impairment given that the population density in census blocks straddling the Bates Creek subcatchment has remained fairly stable between the 1990 and 2000 censuses, increasing roughly 23% from approximately 90 people•mi⁻², to 112 people•mi⁻². By contrast, population densities in the Kellogg Creek subcatchment average ~ 1500 people•mi⁻² (Kellogg Creek can support a higher density than Paine Creek because groundwater ameliorates the impacts of suburbanization). Furthermore, sedimentation was simply not evident.

Mill Creek and Talcott Creek

Being snow-belt streams, fish communities in Talcott Creek and the lower reaches of Mill Creek are, again, subject to the natural limitations of torrential scouring flows, lengthy stretches of shallow bedrock, and low summer flows. Not surprisingly, the fish sample from Talcott Creek did not meet the IBI biocriterion, and those in Mill Creek at Doty Road, only marginally so. Further upstream, at Ross Road and in a tributary sampled at Bell and Short Roads, where the effects of snow melt are less pronounced, and summer base-flow is more sustained relative to the drainage area owing to Thompson Ledges, fish samples met the WWH biocriterion. The fish sampled from the branch of Mill Creek draining from the east (sampled at Atkins Road) inexplicably scored Fair; no impairment is suspected.

Red Creek

Red Creek is the most urbanized catchment in the Grand River basin, with mixed commercial, industrial and residential landuse. Impervious cover is estimated at 7.6% from landsat imagery, and population densities within the subcatchment range between ~ 250 and 1100 people•mi⁻². Not coincidentally, the fish community sampled at Mantle Road did not meet WWH. The individual IBI metrics suggest episodic events that pauperize the fish community and contribute to contaminated sediments as evidenced by fewer than expected species, low relative abundance, and no darters. Sustained flow was evidenced in the collection of 12 steelhead trout smolts.

Coffee Creek

Fish communities met the WWH biocriterion for headwaters at all locations sampled in 2004 and 2000, though only marginally so at the site sampled at Lampson Road in both years. No sand darters were collected in 2004.

Mill Creek (Ashtabula County) and Tributaries (Hydrologic Unit 04110004 050)*Mill Creek*

Fish communities met the WWH biocriteria for wadeable streams at all locations sampled except for the most upstream site at Clay Road (RM 25.6). There, the fish community was impaired due to sedimentation from channelization upstream from SR 307. A slight impact to the fish community from the Jefferson WWTP was evident in the samples collected at Calpin Road (RM 6.5) and Foreman Road (RM 4.1), as evidenced by marginal fish community performance driven by elevated abundance of bluntnose minnows, an omnivore favored by organic enrichment.

Cemetery Creek

Fish communities in Cemetery Creek again failed to meet standards both upstream and downstream from the Jefferson WWTP, though conditions have improved slightly downstream from the plant compared to 1995 when acute toxicity was very apparent. Now, the toxicity is chronic and apparently caused by a failing sewer pump station. Upstream from the plant, urban runoff, organic enrichment and limited flows combine to impair the fish community.

Griggs Creek

Fish from Griggs Creek were sampled in a beaver pond, and reflect well what one would expect of fish living in a beaver pond.

Peters Creek and Askue Run

Fish samples collected from Peters Creek and Askue Run met the standard for WWH headwater streams.

Table 15. Fish community attributes for sites sampled in the Grand River Basin 1995 - 2004 grouped by 11 digit hydrologic unit. MIWb and IBI scores not meeting water quality standards are denoted with an asterisk, and those departing from water quality standards within a margin of error are denoted by the superscript ns. The sample year is listed for water bodies sampled in multiple years, otherwise the sample year is 2004.

River Mile	Cumulative Species	Mean Species	Relative Number	Relative Weight	QHEI	MIWb	IBI	Narrative Evaluation
Hydrologic Unit 04110004 060								
<i>03-001 Grand River Exceptional Warmwater Habitat (EOLP)</i>								
2003/2004								
†42.4 ^A	17	17	200.0	71.59	64.5	8.0*	42*	Fair/Good
†40.9 ^A	20	20	412.0	85.96	73.0	9.0*	52	Good/Exceptional
†36.3 ^A	17	17	342.0	67.09	57.5	8.6*	50	Marginal/Except.
34.0 ^A	28	28	600.0	90.37	75.5	9.7	56	Exceptional
†28.4 ^D	27	27	448.5	18.07	81.5	8.7*	52	Good/Exceptional
28.4 ^D	22	22	336.0	10.85	81.5	8.6*	50	Good/Exceptional
†22.1 ^D	26	26	595.5	15.10	80.0	9.2	52	V.Good/Except.
22.1 ^A	37	37	638.0	75.97	80.0	10.4	54	Exceptional
13.2 ^A	28	28	738.0	85.52	91.0	9.9	52	Exceptional
8.5 ^A	26	26	716.7	161.46	91.0	9.8	60	Exceptional
†8.0 ^A	27	27	508.0	65.93	84.0	10.0	58	Exceptional
6.2 ^A	27	27	570.0	78.25	78.0	9.8	58	Exceptional
†6.2 ^A	15	15	372.0	97.39	78.0	9.0*	50	Good/Exceptional
<i>Warmwater/Lacustrine Habitat (EOLP)</i>								
4.3 ^{Ae}	17	17	204.0	42.58	56.5	8.6	42/44	Good
3.9 ^{Ae}	17	17	220.0	47.51	54.0	8.6	36/42	Good
3.2 ^{Ae}	18	18	294.0	49.58	51.0	9.2	42/44	Good
2002								
3.5 ^{Ae}	13	13	252.0	121.77	47.5	8.3*	36 ^{ns} /--	Fair
1999								
16.4 ^D	23	19	204.6	1.794	--	7.3*	40*	Fair/Good
14.4 ^A	27	21	356.0	73.17	--	9.0*	54	Good/Exceptional
1997								
30.3 ^D	22	22	427.5	6.73	0.0	8.6*	48	Good/V.Good
30.7 ^D	21	21	793.5	4.99	0.0	8.0*	40*	Marginal/Good
29.5 ^D	24	24	870.0	24.06	0.0	10.1	52	Exceptional

† Grand River mainstem sites sampled in 2003

Table 15. Continued.

River Mile	Cumulative Species	Mean Species	Relative Number	Relative Weight	QHEI	MIWb	IBI	Narrative Evaluation
<i>03-001 Grand River</i>								
1996								
30.7 ^D	45	33	581.3	20.75	0.0	9.5	44	Very Good
1995								
40.9 ^A	34	26	444.0	52.57	66.5	9.1	49	Very Good
36.3 ^A	25	21	233.0	45.80	57.0	8.5*	47	Good/V.Good
34.0 ^A	28	21	390.4	54.88	60.0	8.5*	50	Good/Except.
28.4 ^D	25	22	676.8	39.83	81.5	9.5	51	V.Good/Except.
22.1 ^D	23	21	729.8	20.63	87.5	9.5	48	Very Good
13.4 ^A	24	23	550.0	44.14	91.0	9.1	52	V.Good/Except.
8.0 ^A	32	24	362.0	74.61	78.0	9.1	52	V.Good/Except.
6.2 ^A	32	26	478.0	40.27	76.0	9.3	47	V.Good/Except.
Hydrologic Unit 04110004 050								
<i>03-120 Mill Creek Warmwater Habitat (EOLP)</i>								
2003/2004								
25.6	10	10	305.1	5.47	72.0	6.0*	30*	Fair
18.2	21	21	1593.8	6.93	80.5	9.3	52	V.Good/Except.
6.5	25	25	1320.0	11.97	87.5	8.7	36	Good/Marginal
4.1	20	20	740.0	2.32	58.0	7.7	30*	Marginal/Fair
3.7	23	23	399.0	5.20	83.5	8.1	48	Good/V.Good
1995								
18.1	18	16	732.4	3.31	80.0	8.0	40	Good
10.0	25	22	474.8	7.75	79.5	8.5	47	Good/V.Good
<i>03-121 Griggs Creek Warmwater Habitat (EOLP)</i>								
2.0	8	8	204.0	5.41	50.5	--	34*	Fair
<i>03-122 Askue Run Warmwater Habitat (EOLP)</i>								
0.1	12	12	307.0	0.00	78.5	--	38	Marginal
<i>03-123 Peters Creek Warmwater Habitat (EOLP)</i>								
0.2	11	11	552.0	0.00	76.5	--	42	Good

Table 15. Continued.

River Mile	Cumulative Species	Mean Species	Relative Number	Relative Weight	QHEI	MIWb	IBI	Narrative Evaluation
03-124 Cemetery Creek Warmwater Habitat (EOLP)								
2004								
2.1	12	12	1829.8	0.00	78.0	--	26*	Poor
1.3	11	11	2151.0	0.00	64.5	--	26*	Poor
1995								
2.5	1	7	984.0	2.12	42.0	--	26*	Poor
1.3	11	8	2138.0	9.08	55.5	--	27*	Poor
Hydrologic Unit 04110004 060								
03-004 Red Creek Warmwater Habitat (EOLP)								
0.5	7	7	108.0	0.00	67.0	--	30*	Fair
03-005 Kellogg Creek Warmwater Habitat (EOLP)								
2004								
5.7	6	6	486.0	0.00	59.0	--	24*	Poor
0.2	18	18	789.4	0.00	67.0	--	44	Good
2000								
3.1	20	20	1707.1	0.00	81.0	--	46	V.Good
3.3	17	17	682.6	0.00	81.5	--	44	Good
2.5	19	19	715.5	0.00	66.0	--	44	Good
2.6	19	19	1635.0	0.00	62.5	--	36	Marginal
0.1	24	24	1558.0	9.08	0.0	--	46	V.Good
03-006 Ellison Creek Warmwater Habitat (EOLP)								
2004								
1.2	11	11	568.0	0.00	59.0	--	44	Good
2000								
3.7	9	9	777.0	0.00	67.5	--	40	Good
2.3	8	8	960.0	0.00	76.5	--	46	V.Good
03-007 Talcott Creek Warmwater Habitat (EOLP)								
1.5	5	5	355.4	0.00	61.0	--	22*	Poor
03-008 Griswold Creek Warmwater Habitat (EOLP)								
2000								
0.9	2	2	307.5	3.02	0.0	--	24*	Poor

Table 15. Continued.

River Mile	Cumulative Species	Mean Species	Relative Number	Relative Weight	QHEI	MIWb	IBI	Narrative Evaluation
<i>03-009 Mill Creek Warmwater Habitat (EOLP)</i>								
2004								
5.0	8	8	263.1	0.00	74.5	--	34*	Fair
1.4	14	14	805.5	7.43	54.5	--	34	Marginal
2003								
1.3	12	12	652.0	0.00	65.0	7.7	34	Marginal
1999								
3.7	15	15	1568.0	4.70	0.0	--	42	Good
<i>03-041 Trib. to Mill Warmwater Habitat (EOLP)</i>								
1.6	9	9	683.2	0.00	79.0	--	40	Good
<i>03-010 Coffee Creek Warmwater Habitat (EOLP)</i>								
2004								
0.2	18	18	94.0	0.00	65.5	--	38	Marginal
2000								
1.2	21	21	1470.0	0.00	80.0	--	40	Good
1.3	22	22	1139.9	0.00	69.0	--	46	V.Good
0.2	22	22	1470.1	0.00	76.0	--	36	Marginal
<i>03-100 Big Creek Warmwater Habitat (EOLP)</i>								
2003								
16.2	12	12	948.0	0.00	62.0	--	58	Exceptional
16.0	10	10	825.0	0.00	82.0	--	52	Exceptional
14.0	11	11	1011.0	0.00	75.0	--	40	Good
9.3	14	14	1737.0	0.00	85.0	--	48	Very Good
4.9	13	13	2182.0	12.18	66.5	7.9	38	Marginal/Good
2.5	14	14	404.4	0.81	50.5	7.1*	44	Fair/Good
1995								
16.3	3	8	973.5	4.76	61.5	--	40	Good
15.9	2	6	236.0	1.02	54.0	--	37	Marginal
13.9	2	8	560.6	6.78	71.0	--	32*	Fair
9.5	2	14	1502.3	6.83	73.0	--	38	Marginal
5.0	11	11	1643.7	6.47	71.0	7.7	40	Good
5.3	12	12	1111.6	7.84	71.0	7.8	40	Good
2.5	17	15	1179.4	4.85	59.0	6.8*	36	Fair/Marginal

Table 15. Continued.

River Mile	Cumulative Species	Mean Species	Relative Number	Relative Weight	QHEI	MIWb	IBI	Narrative Evaluation
<i>03-101 Jordon Creek (Formerly known as Gordon Creek) Warmwater Habitat (EOLP)</i>								
1.1	6	6	774.0	0.00	59.5	--	34*	Fair
<i>03-102 East Creek Warmwater Habitat (EOLP)</i>								
2004								
1.2	7	7	540.0	0.00	58.0	--	28*	Fair
2000								
1.2	7	7	2490.0	12.25	--	--	40	Good
<i>03-103 Aylworth Creek Warmwater Habitat (EOLP)</i>								
2000								
0.9	8	8	837.2	2.63	--	--	36	Marginal
<i>03-104 Jenks Creek Warmwater Habitat (EOLP)</i>								
2004								
0.1	15	15	2497.5	0.00	80.5	--	56	Exceptional
1995								
0.1	11	11	338.4	1.59	70.0	--	42	Good
<i>03-105 Cutts Creek Warmwater Habitat (EOLP)</i>								
2004								
1.2	8	8	401.6	0.00	73.0	--	38	Marginal
1996								
1.3	8	8	145.0	0.00	68.0	--	34*	Fair
<i>03-110 Paine Creek Warmwater Habitat (EOLP)</i>								
2004								
5.6	15	15	1933.5	0.00	81.5	--	36	Marginal
3.0	13	13	812.0	0.00	69.5	--	34*	Fair
<i>Exceptional Warmwater Habitat (EOLP)</i>								
1995								
0.5	27	27	622.5	3.57	60.5	8.5*	48	Good/V.Good
0.2	27	24	598.9	6.05	74.5	8.7*	51	Good/Exceptional

Table 15. Continued.

River Mile	Cumulative Species	Mean Species	Relative Number	Relative Weight	QHEI	MIWb	IBI	Narrative Evaluation
<i>03-111 Bates Creek Warmwater Habitat (EOLP)</i>								
2004								
2.2	12	12	864.9	0.00	83.5	--	32*	Fair
2000								
0.6	11	11	2835.0	21.67	0.0	--	24*	Poor
<i>03-113 Trib. to Paine Creek @ RM Warmwater Habitat (EOLP)</i>								
0.4	9	9	550.0	0.00	55.0	--	36	Marginal

Ecoregion Biocriteria: Erie-Ontario Lake Plain

Site Type	IBI			MIwb		
	WWH	EWB	MWH ^c	WWH	EWB	MWH ^c
Headwaters	40	50	24	NA	NA	NA
Wading	38	50	24	7.9	9.4	5.6
Boat	40	48	24	8.7	9.6	5.7

a - MIwb is not applicable to headwater streams with drainage areas ≤ 20 mi².

ns - Nonsignificant departure from biocriteria (≤ 4 IBI units or ≤ 0.5 MIwb units).

* - Indicates significant departure from applicable biocriteria (> 4 IBI units or > 0.5 MIwb units). Underlined scores are in the Poor or Very Poor range.

Biological Quality: Macroinvertebrate Communities***Grand River and Tributaries Downstream from Mill Creek (Hydrologic Unit 04110004 060)***

Macroinvertebrate communities were evaluated at 35 stations in the lower Grand River assessment unit during 2003 and 2004 (WAU 04110004-060) (Table 17). The community performance was evaluated as exceptional at 19 stations, very good at two, good at four, marginally good at three, fair at two, low fair at one, poor at one, and three lacustuary stations that scored high on the Lacustuary ICI. The station with the highest total mayfly (Ephemeroptera), stonefly (Plecoptera), and caddisfly (Trichoptera) taxa richness (EPT) was on the Grand River upstream from SR 84 (RM 8.7) with 39 taxa. The station with the highest number of total sensitive taxa was on the Grand River upstream from SR 528 (RM 22.6) with 59 taxa. Twenty-three sensitive taxa (excluding the freshwater mussels) found in this assessment unit are noteworthy because they are not commonly collected in state-wide collections (Table 18). In addition to these, the state listed Species of Concern crayfish *Orconectes propinquus* (Great Lakes Crayfish) was collected at 19 of the 35 stations in this assessment unit. Seventeen species of freshwater mussels (Unionidae) were collected from the lower Grand River and are presented in Table 19 (along with those collected from Mill Creek (03-120)). In total, this study found two state Endangered species, three state Threatened species, and four state Species of Concern to be present in the lower Grand River basin. This assessment unit had an unusually high number of uncommonly collected sensitive taxa and state listed species, which is an indication of the exceptional resource quality in the lower Grand River basin.

The entire free-flowing Grand River mainstem sampled in this study from RM 44.0 to 6.1 was supporting exceptional macroinvertebrate communities (Fig. 47, Table 17). A high EPT and sensitive taxa diversity existed throughout this reach. The two most upstream stations were located in the low gradient upper part of the river which probably accounted for the relatively lower diversity at those stations. The station upstream from SR 84 (RM 8.7) was located downstream from the Lake County Heatherstone WWTP (RM 8.8). There was no discernable impact from the WWTP discharge. The free flowing lower Grand River has maintained exceptional macroinvertebrate communities since 1987 (Fig. 49). ICI scores and EPT and sensitive taxa diversity in 2004 were as high or higher than previous years. The macroinvertebrate community performance in the Grand River lacustuary adjacent to the Diamond Shamrock waste lagoons was as high or higher than previous years (Fig. 49).

Three macroinvertebrate collection stations were located in the upper lacustuary adjacent to the Diamond Shamrock waste lagoons (Fig. 47, Table 17). The upstream two of these stations (RMs 4.4, 3.9), in particular, were in the area of transition between stream habitat and lacustuary. They both were affected by seiches from Lake Erie, but, were at the same time stream-like in character and able to support many of the rheophilic organisms present upstream. The station (RM 3.4) downstream from the pipe bridge was the most lake-like, but it still was supporting a fair number of rheophilic taxa. All three stations scored high on the lacustuary ICI. The diversity of EPT and sensitive taxa gradually declined in a downstream direction, which was probably due more to an increase in lacustuary habitat than any impact from the landfills. Overall, no impact could be

detected at this time from the landfills at these three stations.

Coffee Creek was sampled at three locations in 2000 to evaluate the Austinburg WWTP (RM 1.36) and once in 2004 near the mouth. There was no discernable impact from the WWTP discharge. Diversity of EPT and sensitive taxa for the most part slightly improved downstream from the WWTP. However, the communities appeared to be mildly impacted by siltation and embedded substrates at all the stations and enrichment at the upstream station (RM 1.9).

Mill Creek, Talcott Creek, and Paine Creek sub-watershed tributaries to the Grand River were supporting exceptionally high quality macroinvertebrate communities including many infrequently collected sensitive taxa and three state listed taxa (Table 18). Upper Mill Creek, Tributary to Mill Creek (RM 4.34), Talcott Creek, upper Paine Creek, Phelps Creek, and Tributary to Paine Creek (RM 7.17) were characterized by coolwater/coldwater macroinvertebrate communities (Table 17). The unusually high quality macroinvertebrate communities in these streams was probably due to the streams flowing through highly wooded ravines with continuous groundwater flow and limited development.

Big Creek was evaluated from its headwaters in the vicinity of the Chardon WWTP (RM 16.1) to Fay Road (RM 2.7) (Fig. 48). The macroinvertebrate communities were degraded both upstream (RM 16.1) and downstream (RM 16.0) from the WWTP. There was no indication of a further impact from the WWTP discharge. EPT and sensitive taxa diversity remained about the same or were slightly higher and the predominance of tolerant organisms did not increase downstream from the WWTP. The impact observed was attributed to urban development but should be further investigated to see if there are any specific improvements or unknown sources of impairment that can be corrected. Community performance gradually improved downstream with exceptional communities present at Williams Road (RM 4.8) and Fay Road (RM 2.7). The middle reach of Big Creek (Woodin Rd., RM 13.8 to SR 608, RM 9.5) was characterized by coolwater/coldwater macroinvertebrate communities. Macroinvertebrate community performance in Big Creek in 2003 was similar to that in 1987 and 1995 (Fig. 50). However, conditions appear to have improved somewhat since 1987 when no EPT or sensitive taxa were found downstream from the Chardon WWTP.

The Big Creek tributaries Cutts Creek, Jenks Creek, East Creek, and Jordan Creek were all supporting coolwater/coldwater macroinvertebrate communities. Cutts Creek, Jenks Creek, and Jordan Creek were only meeting WWH expectations while East Creek was supporting an exceptional community. Increased development in this basin may be depressing community diversity and composition compared to the Paine and Mill Creek basins.

Ellison Creek was sampled at three stations and Kellogg Creek at two in 2000 to evaluate stormwater runoff controls associated with the construction of a golf course east of Hermitage Road and adjacent to Ellison Creek. The upstream Ellison Creek station (RM 3.7) was supporting a diverse community including eight coolwater taxa. The station located downstream (RM 2.3) from the golf course construction had a marked reduction in diversity of EPT,

sensitive, and coolwater taxa. Increased siltation was observed at this station, presumably from upstream construction. EPT and sensitive taxa diversity increased slightly near the mouth (RM 0.3), but remained well below that present upstream from the golf course. Excessive silt continued to be present at this station. The Kellogg Creek stations sampled in 2000 upstream (RM 3.3) and downstream (RM 3.1) from the confluence of Ellison Creek both had impaired communities, but did not exhibit any discernable impact from Ellison Creek. Low EPT and sensitive taxa diversity in conjunction with high predominance of flatworms and aquatic sow bugs (pollution facultative) at both stations was probably an indication of enrichment and mild toxicity from the surrounding developed areas. Sampling in 2004 found similar results near the mouth of Ellison Creek at RM 0.6 with an impaired community that was just barely meeting WWH expectations. Kellogg Creek sampling found a highly degraded community farther upstream at Button Road (RM 5.4) and near the mouth at SR86 (RM 0.2) a community that improved to barely meet WWH expectations.

The macroinvertebrate community sampled on Red Creek (RM 0.5) was highly degraded with low EPT and sensitive taxa diversity. Stream substrates were embedded, which is an indication of increased sedimentation and possibly an increased flow flashiness. The impact at this station may be a combination of various causes associated with the surrounding urban area.

Seventeen species of freshwater mussels were found during this study compared to the 16 found during the 1995 Ohio EPA study (Table 19, Ohio EPA 1997). Twenty-three mussel species were found during a 1995 survey by Zimmerman. The number of mussel species present in the lower Grand River has remained constant over the last decade. A review of mussel collection data however shows that seven species of mussel have their distributions restricted to the mainstem reach below Harpersfield Dam (Table 16). Of those seven, three may be restricted by habitat requirements, one by a combination of host and habitat requirement, and three appear restricted by host requirement alone. The latter three all use freshwater drum as a host for dispersal of glochidia. Freshwater drum are absent above Harpersfield Dam in the Grand River. Trautman (1981) notes that where mill-dams are present, freshwater drum become extirpated from the reaches upstream.

Table 16. Unionid species found only downstream from Harpersfield Dam. Under the heading "Habitat," a Y denotes that the distribution is likely limited by habitat, and an N denotes that habitat is not apparently limiting (based on Waters 1995). Rare, threatened and endangered status is noted in the right hand column.

Genus	Species	Habitat	Host	RTE
Alasmidonta	marginata	Y	hog suckers/rock bass	
Epioblasma	triquetra	?	log perch	T
Lampsilis	fasciola	Y	smallmouth bass	S
Leptodea	fragilis	N	freshwater drum	
Potamilus	alatus	N	freshwater drum	
Simpsonaias	ambigua	?	mud puppy	S
Truncilla	truncata	N	freshwater drum	S

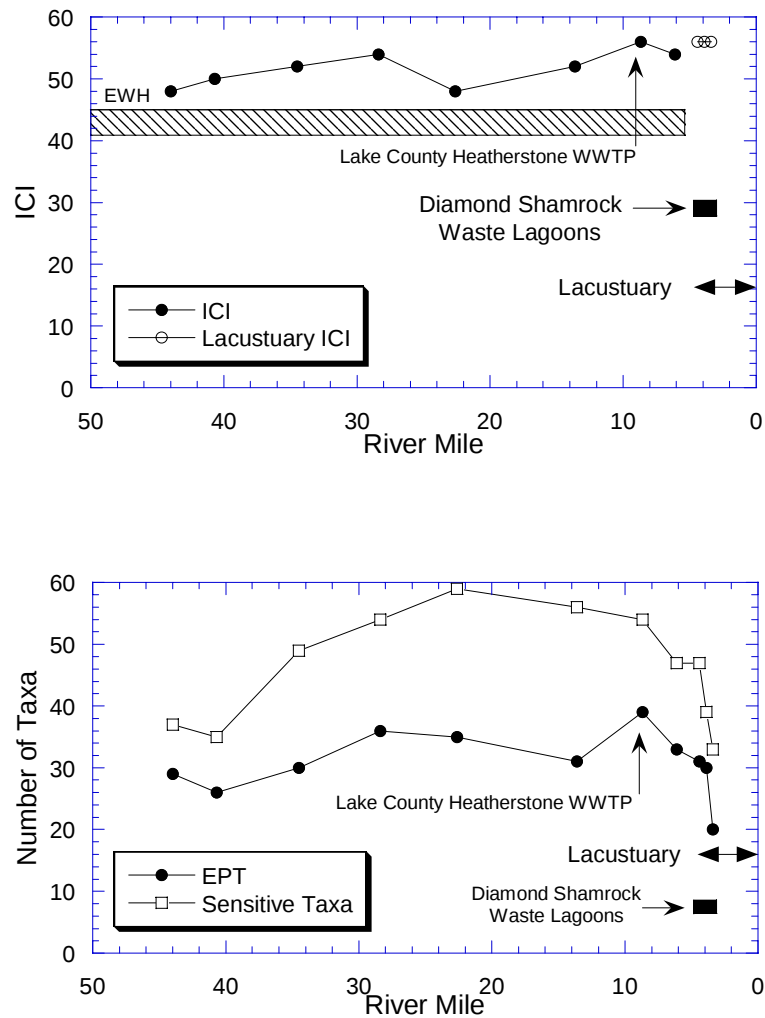


Figure 47. Longitudinal trend of the Invertebrate Community Index (ICI), total EPT, and total sensitive taxa in the lower Grand River, 2004. The station at RM 40.7 is based only on the qualitative sample.

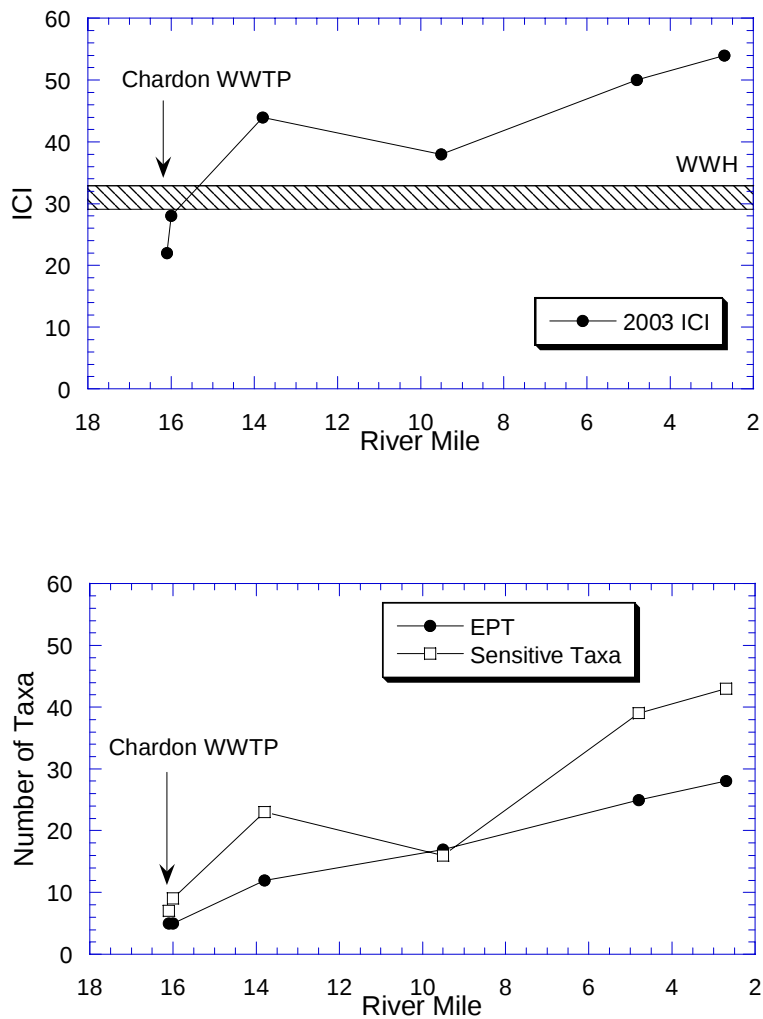


Figure 48. Longitudinal trend of the Invertebrate Community Index (ICI), total EPT, and total sensitive taxa in Big Creek, 2003. The station at RM 9.5 is based only on the qualitative sample.

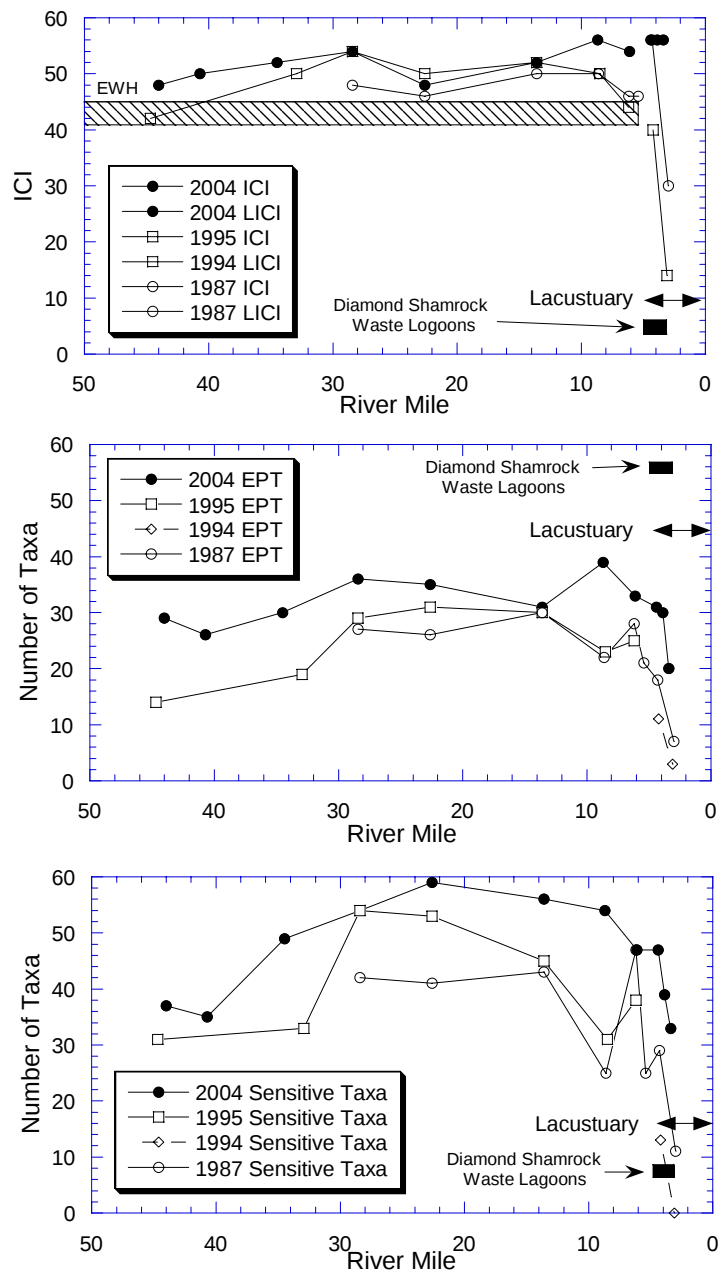


Figure 49. Longitudinal trend of the Invertebrate Community Index (ICI), total EPT, and total sensitive taxa in the lower Grand River, 1987-2004. Stations based only on qualitative data were 2004 RM 40.7; 1995 RMs 32.9, 8.5; and 1987 RMs 8.6, 5.4.

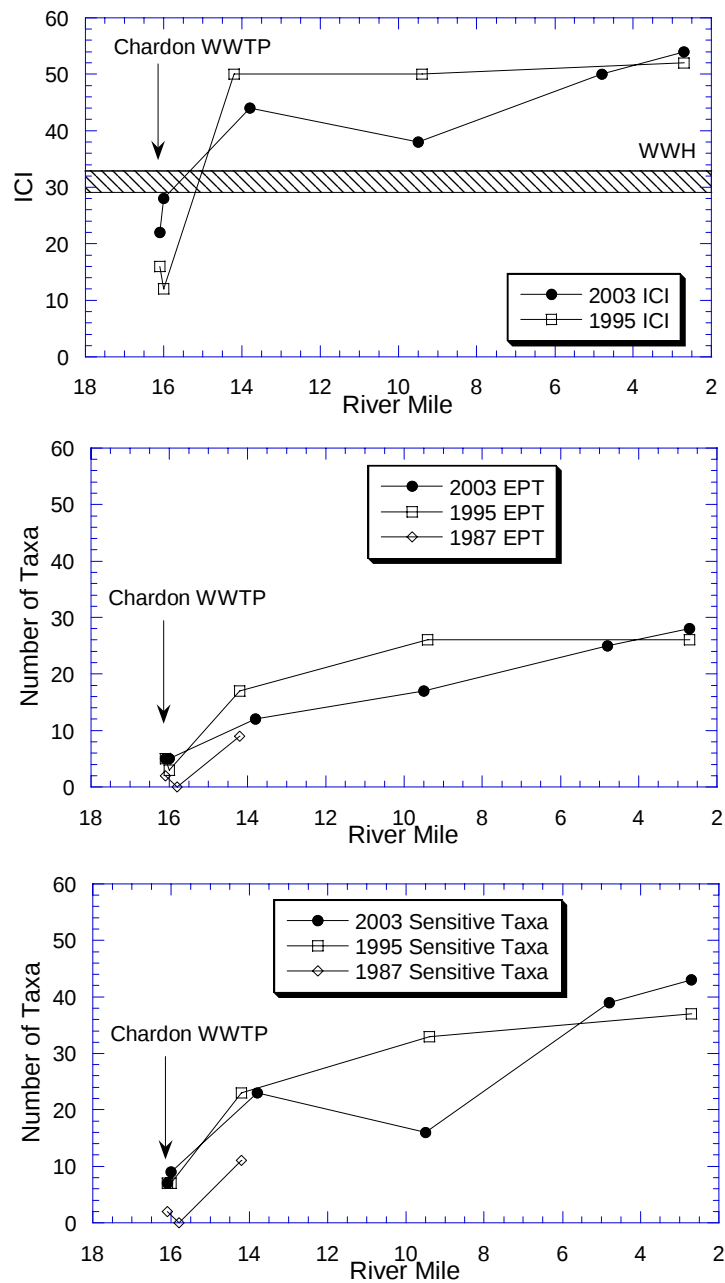


Figure 50. Longitudinal trend of the Invertebrate Community Index (ICI), total EPT, and total sensitive taxa in Big Creek, 1987-2003. Stations based only on the qualitative sample were all the 1987 samples and 2003 RM 9.5.

Table 17. Summary of macroinvertebrate data collected from artificial substrates (quantitative sampling) and natural substrates (qualitative sampling) in the Grand River study area, July to October, 2003 and 2004.

Stream RM	Dr. Ar. (sq. mi.)	Data Codes	Qual. Taxa	EPT Ql. / Total	Sensitive Taxa Ql. / Total	Density Ql. / Qt.	CW Taxa	Predominant Organisms on the Natural Substrates With Tolerance Category(ies) in Parentheses	ICI	Narrative Evaluation
Grand River (03-001)										
44.0	406	-	73	27 / 29	34 / 37	L-M / 875	2	Hydropsychid caddisflies (F,MI), midges (F,MI), baetid mayflies (F,I)	48	Exceptional
40.7	521	-	73	26 / -	35 / -	L-M / -	1	Hydropsychid caddisflies (F), midges (F,MI), baetid mayflies (F,I)	-	Exceptional
34.5	549	-	78	27 / 30	41 / 49	L-M / 1649	0	Caddisflies (F,MI,I), midges (F,MI,I), baetid mayflies (F,I)	52	Exceptional
28.4	554	-	77	33 / 36	47 / 54	M-H / 1501	0	Caddisflies (F,MI,I), midges (F,MI), <i>Petrophila</i> moths (I)	54	Exceptional
22.6	581	13,15	78	32 / 35	48 / 59	M / 514	0	Hydropsychid caddisflies (F,MI), midges (F,MI), <i>Petrophila</i> moths	48	Exceptional
13.6	630	-	75	27 / 31	47 / 56	/ 1580	0	Midges (MI,F), caddisflies (I,F), mayflies (I,F)	52	Exceptional
8.7	685	-	61	30 / 39	38 / 54	M / 3215	0	Midges (MI,F), caddisflies (F,I), baetid mayflies (I,F)	56	Exceptional
6.1	687	-	61	31 / 33	39 / 47	M / 1883	0	Midges (MI,F), caddisflies (I,MI,F), mayflies (I,F)	54	Exceptional
4.4	698	11	52	24 / 31	33 / 47	M / 682	0	Midges (MI,F), <i>Petrophila</i> moths (I), <i>Psychomyia</i> caddisflies (I)	56 ^L	
3.9	699	11	51	20 / 30	28 / 39	M / 1110	0	Midges (F,MI), <i>Petrophila</i> moths (I), hydroptilid caddisflies (F)	56 ^L	

Stream RM	Dr. Ar. (sq. mi.)	Data Codes	Qual. Taxa	EPT Ql. / Total	Sensitive Taxa Ql. / Total	Density Ql. / Qt.	CW Taxa	Predominant Organisms on the Natural Substrates With Tolerance Category(ies) in Parentheses	ICI	Narrative Evaluation
3.4	700	8,11	49	14 / 20	22 / 33	L / 805	0	Mayflies (MI,F), midges (T,F,MI)	56 ^L	
Coffee Creek (03-010)										
1.9**	9.3	-	61	9 / 9	22 / 29	L-M / 694	5	Midges (MI,F), hydropsychid caddisflies (F)	42	Very Good
1.2**	10.1	-	43	10 / 15	13 / 28	M / 374	1	Hydropsychid caddisflies (F)	54	Exceptional
0.2**	12.0	-	33	12 / 16	16 / 27	M-H / 319	1	Hydropsychid caddisflies (F), <i>Nigronia</i> (F)	54	Exceptional
0.2	12.0	-	40	11	11	Low	0	Midges (F)	-	Marg. Good
Mill Creek (03-009)										
4.8	5.1	-	64	30	40	Moderate	8	Caddisflies (MI,F), midges (F,MI), baetid mayflies (F)	-	Exceptional
1.7	20.3	-	55	26	31	L-M	2	Caddisflies (MI,F), midges (MI,F), baetid mayflies (F,I)	-	Exceptional
Tributary to Mill Creek (RM 4.34) (03-041)										
1.6	5.2	-	63	25	35	Moderate	6	Caddisflies (MI), baetid mayflies (MI,F), midges (MI,F), blackflies (F)	-	Exceptional
Talcott Creek (03-007)										
0.4	~5.9	-	57	25	32	Moderate	8	Caddisflies (MI), midges (MI), baetid mayflies (MI)	-	Exceptional
Paine Creek (03-110)										
6.1	20.8	-	62	31	35	Moderate	4	Mayflies (MI,F), caddisflies (MI), midges (MI)	-	Exceptional

Stream RM	Dr. Ar. (sq. mi.)	Data Codes	Qual. Taxa	EPT Ql. / Total	Sensitive Taxa Ql. / Total	Density Ql. / Qt.	CW Taxa	Predominant Organisms on the Natural Substrates With Tolerance Category(ies) in Parentheses	ICI	Narrative Evaluation
0.5	28.6	-	54	26	28	L-M	0	Midges (MI,F), blackflies (F), hydropsychid caddisflies (F,MI), baetid mayflies (F)	-	Exceptional
Bates Creek (03-111)										
3.3	11.4	-	75	25	36	Moderate	3	Caddisflies (F,MI), midges (MI), mayflies (F,I,MI)	-	Exceptional
Phelps Creek (03-150)										
0.1	29.2	-	57	19	33	Moderate	6	Mayflies (MI,I), midges (MI), hydropsychid caddisflies (MI,F)	-	Very Good
Tributary to Paine Creek (RM 7.17) (03-113)										
0.4	2.8	-	57	23	32	Moderate	9	Caddisflies (MI), midges (F,MI), mayflies (MI)	-	Exceptional
Big Creek (03-100)										
16.1*	1.2	-	21	5 / 5	1 / 7	L-M / 129	1	Baetid mayflies (F), <i>Tipula</i> crane flies (F)	22	Fair
16.0*	1.2	-	29	5 / 5	4 / 9	L-M / 221	2	Hydropsychid caddisflies (F), <i>Tipula</i> crane flies (F)	28	Fair
13.8*	5.9	-	39	9 / 12	10 / 23	M / 215	4	Hydropsychid caddisflies (F), Midges (MI,F)	44	Very Good
9.5*	14.9	-	49	17 / -	16 / -	M / -	4	Hydropsychid caddisflies (MI)	-	Good
4.8*	28	-	45	19 / 25	20 / 39	L-M / 503	2	Hydropsychid caddisflies (F,MI)	50	Exceptional
2.7*	35	-	56	20 / 28	22 / 43	L-M / 205	2	Caddisflies (F,MI), mayflies (MI)	54	Exceptional
Cutts Creek (03-105)										

Stream RM	Dr. Ar. (sq. mi.)	Data Codes	Qual. Taxa	EPT Ql. / Total	Sensitive Taxa Ql. / Total	Density Ql. / Qt.	CW Taxa	Predominant Organisms on the Natural Substrates With Tolerance Category(ies) in Parentheses	ICI	Narrative Evaluation
1.2	0.9	-	48	15	24	L-M	8	Midges (MI,F), hydropsychid caddisflies (F)	-	Good
Jenks Creek (03-104)										
0.1*	2.8	-	38	15	18	Low	5	Hydropsychid caddisflies (MI), baetid mayflies (F)	-	Good
East Creek (03-102)										
1.1	4.4	15	52	21 / 23	28 / 41	L / 225	9	Midges (MI,F), hydropsychid caddisflies (MI,F)	(44)	Exceptional
Jordan Creek (03-101)										
0.6	~5.9	-	41	14	19	L-M	7	Hydropsychid caddisflies (F), midges (MI,F), baetid mayflies (F,MI)	-	Good
Kellogg Creek (03-005)										
3.3**	5.8	16	26	6	5	M-H	0	Flatworms (F), sow bugs (F,MT), heptageniid mayflies (F)	-	Fair
3.1**	11.6	16	25	11	8	Moderate	0	Sow bugs (F), water penny beetle larvae (MI), flatworms (F)	-	Fair
5.4	~4.0	-	25	2	3	L-M	0	Flatworms (F), baetid mayflies (F), midges (F)	-	Poor
0.2	13.1	-	45	11	17	L-M	2	Blackflies (F), hydropsychid caddisflies (F), midges (F,MI), baetid mayflies (F)	-	Marg. Good
Ellison Creek (03-006)										
3.7**	2.3	-	51	17	24	Moderate	8	Caddiflies (MI,F)	-	Good
2.3**	3.7	-	43	9	14	Moderate	2	Hydropsychid caddisflies (F), baetid mayflies (F,MI), blackflies (F)	-	Marg. Good

Stream RM	Dr. Ar. (sq. mi.)	Data Codes	Qual. Taxa	EPT Ql. / Total	Sensitive Taxa Ql. / Total	Density Ql. / Qt.	CW Taxa	Predominant Organisms on the Natural Substrates With Tolerance Category(ies) in Parentheses	ICI	Narrative Evaluation
0.3**	5.8	-	53	10	16	M-H	1	Hydropsychid caddisflies (F,MI), flatworms (F), baetid mayflies (F)	-	Marg. Good
0.6	5.8	-	44	11	13	L-M	2	Hydropsychid caddisflies (F), midges (MI,F), baetid mayflies (F)	-	Marg. Good
Red Creek (03-004)										
0.5	9.4	-	32	4	4	L-M	1	Midges (F,MI,MT), hydropsychid caddisflies (F)	-	Low Fair

RM: River Mile.

Dr. Ar.: Drainage Area

Data Codes: 8=Non-Detectable Current, 11=Lake Erie Influence (Lacustrary), 12=Suspected High Water Influence/Disturbance, 13=Suspected Disturbance By Vandalism, 15=Current >0.0 fps but <0.3 fps, 16=Fall Sampling (Subsequent to 9-30), 29=Primary Headwater Habitat Stream.

Ql.: Qualitative sample collected from the natural substrates.

Sensitive Taxa: Taxa listed on the Ohio EPA Macroinvertebrate Taxa List as MI (moderately intolerant) or I (intolerant).

Qt.: Quantitative sample collected on Hester-Dendy artificial substrates, density is expressed in organisms per square foot.

Qualitative sample relative density: L=Low, M=Moderate, H=High.

CW: Coolwater/Coldwater.

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant

* 2003 sample

** 2000 sample

^L Lacustrary ICI

Table 18. Uncommonly collected sensitive macroinvertebrate taxa collection locations in the lower Grand River basin, 2000, 2003, and 2004. State listed taxa: **E**=Endangered, **T**=Threatened, **SC**=Species of Concern.

Taxa	Collection Locations by River Mile
Mayflies	
<i>Acentrella parvula</i>	Grand R. 44.0, 28.4, 22.6, 13.6, 8.7, 6.1, 4.4, 3.9
<i>Acentrella turbida</i>	Grand R. 22.6, 8.7, 6.1; Mill Cr. 4.8, 1.7; Trib. to Mill Cr. (RM 4.4) 1.6; Paine Cr. 6.1, 0.5; Big Cr. 4.8
<i>Acerpenna macdunnoughi</i>	Mill Cr. 4.8; Paine Cr. 6.1, 0.5; Bates Cr. 3.3, East Cr. 1.1
<i>Stenonema ithaca</i> (SC)	Mill Cr. 1.7; Talcott Cr. 0.4; Bates Cr. 3.3
<i>Stenonema mediopunctatum</i>	Grand R. 34.5, 28.4, 22.6, 13.6, 8.7, 6.1, 4.4, 3.9, 3.4; Paine Cr. 0.5
<i>Stenonema modestum</i>	Trib. to Mill Cr. (RM 4.4) 1.6; Paine Cr. 6.1, 0.5; Phelps Cr. 0.1; Trib. to Paine Cr. (RM 7.17) 0.4; East Cr. 1.1
<i>Serratella deficiens</i>	Grand R. 40.7, 34.5, 28.4, 22.6, 13.6, 8.7, 6.1, 4.4, 3.9, 3.4
Dragonfly	
<i>Boyeria grafiana</i>	Mill Cr. 4.8; Trib. to Mill Cr. (RM 4.4) 1.6; Talcott Cr. 0.4; Paine Cr. 6.1; Phelps Cr. 0.1; Big Cr. 16.0; Cutts Cr. 1.2; Jenks Cr. 0.1; East Cr. 1.1; Jordan Cr. 0.6
Stoneflies	
<i>Acroneuria carolinensis</i>	Mill Cr. 4.8, 1.7; Trib. to Mill Cr. (RM 4.4) 1.6; Talcott Cr. 0.4; Paine Cr. 0.5; Trib. to Paine Cr. (RM 7.17) 0.4; Big Cr. 4.8, 2.7; East Cr. 1.1; Ellison Cr. 3.7
<i>Acroneuria internata</i>	Grand R. 28.4, 22.6, 13.6, 8.7, 6.1, 4.4, 3.9; Mill Cr. 1.7
<i>Acroneuria lycorias</i>	Grand R. 13.6
<i>Agnetina capitata</i> complex	Grand R. 28.4, 22.6, 8.7, 6.1, 4.4, 3.9; Paine Cr. 6.1; Phelps Cr. 0.1; East Cr. 1.1
<i>Neoperla clymene</i> complex	Grand R. 28.4, 22.6, 13.6, 8.7, 6.1, 4.4, 3.9; Paine Cr. 6.1
Caddisflies	
<i>Psychomyia flavida</i>	Grand R. 44.0, 40.7, 34.5, 28.4, 22.6, 8.7, 6.1, 4.4, 3.9; Trib. to Mill Cr. (RM 4.4) 1.6; Talcott Cr. 0.4
<i>Hydropsyche frisoni</i>	Grand R. 34.5, 28.4, 22.6, 13.6, 8.7, 6.1, 4.4, 3.9
<i>Macrostemum zebratum</i>	Grand R. 34.5, 28.4, 22.6, 13.6, 8.7, 6.1, 4.4; Paine Cr. 0.5
<i>Leucotrichia pictipes</i>	Grand R. 28.4, 8.7, 6.1, 4.4, 3.9; Paine Cr. 6.1; Ellison Cr. 0.6
<i>Goera stylata</i>	East Cr. 1.1
<i>Psilotreta indecisa</i> (T)	Paine Cr. 6.1; Bates Cr. 3.3; Ellison Cr. 3.7
Beetle	
<i>Microcylloepus pusillus</i>	Bates Cr. 3.3
Midges	
<i>Rheopelopia acra</i> (E)	Grand R. 28.4, 22.6, 13.6; Paine Cr. 0.5
<i>Nanocladius</i> (P.) <i>downesi</i>	Grand R. 22.6, 8.7, 6.1, 4.4; Mill Cr. 4.8, 1.7; Trib. to Mill Cr. (RM 4.4) 1.6; Talcott Cr. 0.4; Phelps Cr. 0.1
<i>Synorthocladius semivirens</i>	Grand R. 13.6; Mill Cr. 4.8
<i>Neozavrelia</i> sp. 1	Trib. to Mill Cr. (RM 4.4) 1.6

Table 19. Freshwater mussels (Unionidae) collected live or fresh-dead from the Grand River (03-001) and Mill Creek (03-120), 2003 and 2004. State listed taxa: **E**=Endangered, **T**=Threatened, **SC**=Species of Concern.

Species	Grand River RM												Mill Cr. RM				
	44.0	40.7	34.5	28.4	22.6	13.6	8.7	6.1	4.4	3.9	3.4	25.7	17.8	9.7	7.2	3.2	
<i>Actinonaias ligamentina</i>	X	X	X			X		X									
<i>Alasmidonta marginata</i> (SC)						X		X									
<i>Amblema plicata</i>			X														
<i>Elliptio dilatata</i>	X	X	X			X							X	X			
<i>Epioblasma triquetra</i> (E)						X											
<i>Fusconaia flava</i>						X								X			
<i>Lampsilis cardium</i>			X			X										X	
<i>Lampsilis radiata luteola</i>	X	X	X			X							X	X		X	
<i>Lasmigona costata</i>	X	X	X			X							X	X		X	
<i>Leptodea fragilis</i>								X		X							
<i>Ligumia recta</i> (T)		X															
<i>Obovaria subrotunda</i>	X																
<i>Potamilus alatus?</i>						X		X	X								
<i>Ptychobranhus fasciolaris</i> (SC)						X										X	
<i>Pyganodon grandis</i>	X			X										X			
<i>Strophitus undulatus</i>					X	X							X				
<i>Truncilla donaciformis</i> (T)										X							
Total Taxa Per Station:	6	5	6	1	1	11	0	4	1	2	0	0	4	5	0	4	

Mill Creek (Ashtabula County) and Tributaries (Hydrologic Unit 04110004 050)

Macroinvertebrate communities were evaluated at 10 stations in the Mill Creek assessment unit (WAU 04110004-050) (Table 20). The community performance was evaluated as exceptional at four stations, good at one, marginally good at two, fair at one, and low fair at two. The station with the highest total mayfly (Ephemeroptera), stonefly (Plecoptera), and caddisfly (Trichoptera) taxa richness (EPT) was on Mill Creek at SR 45 (RM 2.9) with 27 taxa. The station with the highest number of total sensitive taxa was Mill Creek at Netcher Road (RM 17.8) with 42 taxa. Sensitive taxa found in this assessment unit which are noteworthy because they are not commonly collected were the mayfly *Serratella deficiens* in Mill Creek (RM 2.9), the midge *Synorthocladius semivirens* in Mill Creek (RMs 7.2, 2.9), and the freshwater mussel *Ptychobranhus fasciolaris* (Kidney Shell) (state listed Species of Concern) in Mill Creek (RM 3.2 - a 2004 qualitative sample not used in this analysis). The state listed Species of Concern crayfish *Orconectes propinquus* (Great Lakes Crayfish) was collected at six of the 10 stations in this assessment unit.

The most upstream macroinvertebrate community sampled in Mill Creek (RM 25.7) was performing at a depressed level with an ICI value of 24 (Fair) and low diversity of EPT and sensitive taxa (Table 20, Fig. 51). The stream in this area is low gradient with beaver dams and is stained brown with tannins from the adjacent swamp forests. The most common organisms at this station were tolerant oligochaetes, (aquatic segmented worms), *Crangonyx sp.* (scud), and *Dicrotendipes simpsoni* (midge), that, along with the low community performance, would be consistent with a low D.O. impact to the community. The remaining communities sample in Mill Creek were performing at an exceptional level with relatively high EPT and sensitive taxa diversity. There was no discernable impact from Jefferson, via Cemetery Creek. This study found eight species of freshwater mussels (Unionidae) to be extant in Mill Creek.

Macroinvertebrate communities sampled in Peters Creek (RM 0.6) and Griggs Creek (RM 3.5) were just barely meeting Warmwater Habitat expectations. Relatively low EPT and sensitive taxa diversity indicated some sort of mild impact. Both of these streams are relatively low gradient with at least Griggs Creek having beaver dams observed upstream from the collection area. It is possible that wetland conditions were exacerbating enrichment from agricultural activities and poorly operating home waste systems. The Askue Run (RM 0.1) station was supporting a good community with moderate diversity of EPT and sensitive taxa.

The Cemetery Creek stations were only supporting degraded communities with low diversity of EPT and sensitive taxa. The upstream station (RM 2.4) was impacted by channel modifications, embedded substrates, and apparently urban runoff. The downstream station (RM 1.2) was located in an area with improved habitat, but was downstream from the Jefferson WWTP (RM 1.65) and the rest of Jefferson. There was no indication of a severe impact from the WWTP, but there also was no improvement from upstream conditions. The communities upstream and downstream from the Jefferson WWTP were also found to be highly degraded in 1995. The upstream station had two EPT and two sensitive taxa compared to one EPT and two sensitive taxa downstream.

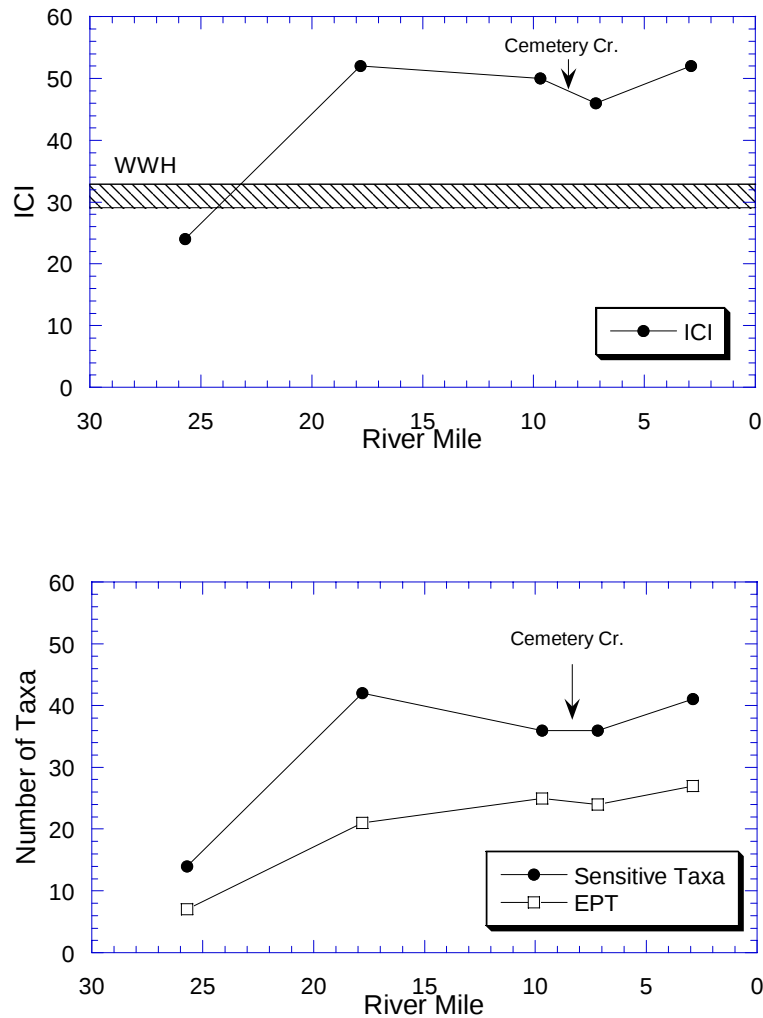


Figure 51. Longitudinal trend of the Invertebrate Community Index (ICI), total EPT, and total sensitive taxa in Mill Creek, 2003 and 2004.

Table 20. Summary of macroinvertebrate data collected from artificial substrates (quantitative sampling) and natural substrates (qualitative sampling) in the Mill Creek assessment unit, July to October, 2003 and 2004.

Stream RM	Dr. Ar. (sq. mi.)	Data Codes	Qual. Taxa	EPT Ql. / Total	Sensitive Taxa Ql. / Total	Density Ql. / Qt.	Predominant Organisms on the Natural Substrates With Tolerance Category(ies) in Parentheses	ICI	Narrative Evaluation
Mill Creek (03-120)									
25.7*	21.6	-	36	6 / 7	6 / 14	L / 436	Blackflies (F)	24	Fair
17.8	49	-	73	21 / 21	34 / 42	M / 1181	Caddisflies (F,MI), midges (MI,F), baetid mayflies (F,I)	52	Exceptional
9.7	80	-	73	25 / -	36 / -	M / -	Caddisflies (F,MI), midges (F,MI), baetid mayflies (I,F)	-	Exceptional
7.2*	87	16	63	23 / 24	28 / 36	M / 387	Hydropsychid caddisflies (F,MI), fingernail clams (F), water penny beetle larvae (MI)	46	Exceptional
2.9*	101	16	54	22 / 27	26 / 41	L-M / 543	Hydropsychid caddisflies (MI), Isonychia mayflies (MI)	52	Exceptional
Peters Creek (03-123)									
0.6	3.3	-	33	11	12	L-M	Hydropsychid caddisflies (F), midges (MI,F)	-	Marg. Good
Askue Run (03-122)									
0.1	5.6	-	64	17	24	L-M	Midges (F,MI), hydropsychid caddisflies (F)	-	Good
Griggs Creek (03-121)									
3.5*	14.1	12,13,16	48	12 / 13	9 / 15	L-M / 84	<i>Rheotanytarsus pellucidus</i> midges (MI), hydropsychid caddisflies (F), blackflies (F)	30	Marg. Good
Cemetery Creek (03-124)									

Stream RM	Dr. Ar. (sq. mi.)	Data Codes	Qual. Taxa	EPT Ql. / Total	Sensitive Taxa Ql. / Total	Density Ql. / Qt.	Predominant Organisms on the Natural Substrates With Tolerance Category(ies) in Parentheses	ICI	Narrative Evaluation
2.4*	4.5	-	29	3	5	Low	Baetid mayflies (F), hydropsychid caddisflies (F)	-	Low Fair
1.2*	5.0	-	26	4	3	Moderate	Hydropsychid caddisflies (F), midges (F)	-	Low Fair

Table M. Continued.

RM: River Mile.

Dr. Ar.: Drainage Area

Data Codes: 12= Suspected High Water Influence/Disturbance, 13= Suspected Disturbance By Vandalism, 16= Fall Sampling (Subsequent to 9-30).

Ql.: Qualitative sample collected from the natural substrates.

Sensitive Taxa: Taxa listed on the Ohio EPA Macroinvertebrate Taxa List as MI (moderately intolerant) or I (intolerant).

Qt.: Quantitative sample collected on Hester-Dendy artificial substrates, density is expressed in organisms per square foot.

Qualitative sample relative density: L=Low, M=Moderate, H=High.

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant

* 2003 sample

L Lacustrary ICI

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Appendices

to the

Biological and Water Quality Study of the
Lower Grand River, 2003-2004, Units
(04110004 050 and 04110004 060)

Ashtabula, Geauga, and Lake Counties

November 1, 2006

OEPA Technical Report
MAS/2006-11-6

Appendix 1.1

Water Chemistry Data From the 1999 - 2004 Survey of the Lower Grand River Hydrologic Units
(04110004 050 and 04110004 060)

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
04110004050 [Mill Creek]													
010 [Mill Creek (2) headwaters to above Griggs Cr.]													
03-120 Mill Creek (Grand R. RM 41.28)													
	18.20	G02S04	Netcher Rd.	8/6/2003		19.97	9.14	100.6	7.84	228	46.4	61	162
				8/27/2003		19.97	9.14	100.6	7.84	228	97.0	114	280
				9/10/2003		18.14	7.81	82.8	7.89	477	83.1	118	334
				9/23/2003		16.55	7.90	81.0	7.24	220	50.3	68	184
				10/9/2003		11.14	10.38	94.5	7.73	180	64.2	66	158
				12/10/2003		1.78	13.59	97.8	7.64	193	58.7	99	226
				4/29/2004		12.48	11.95	112.2	8.00	244	72.1	85	192
				6/3/2004		18.24	8.12	86.3	7.71	320	86.1	106	236
				6/24/2004		19.61	8.21	89.7	7.75	347	119.0	115	244
				7/12/2004		23.90	6.92	82.1	7.89	389	88.9	110	236
				8/2/2004		21.23	7.60	85.7	7.33	142	38.6	54	122
	25.67	G02G13	Clay Rd.	8/6/2003		20.56	7.24	80.6	7.53	401	107.0	132	260
				8/27/2003		23.43	9.46	111.0	7.52	568	100.0	167	464
				9/10/2003		18.91	8.08	87.0	8.44	451	104.0	141	308
				9/23/2003	FD	16.09	7.09	72.0	7.40	168	44.7	66	176
				9/23/2003	FD	16.09	7.09	72.0	7.40	168	45.6	66	166
				10/9/2003		12.14	8.32	77.6	7.90	248	90.5	113	208
				12/10/2003		1.69	12.26	88.0	7.64	168	74.9	103	208
				4/29/2004	FD	11.64	9.97	91.9	7.95	252	90.8	106	198
				4/29/2004	FD						87.5	110	198
				6/3/2004		18.34	6.35	67.7	7.53	395	124.0	144	288
				6/24/2004		20.55	6.35	70.6	7.71	399	157.0	164	268
				7/12/2004	FD	21.92	3.48	39.8	8.10	564	125.0	157	358
				7/12/2004	FD	21.92	3.48	39.8	8.10	564	126.0	154	348
				8/2/2004	FD	19.72	6.64	72.6	7.59	172	55.1	73	148
				8/2/2004	FD	19.72	6.64	72.6	7.59	172	55.5	73	152
03-122 Askue Run													
	0.10	G02G19	Denmark Rd.	6/3/2004		17.36	10.32	107.8	7.83	367	75.9	90	250
				6/24/2004		19.27	9.42	102.2	7.90	315	86.5	87	216
				8/2/2004		19.51	8.58	93.5	7.58	127	31.8	45	118
03-123 Peters Creek													
	0.20	G02G20	Clay Rd.	6/3/2004		15.81	8.26	83.4	7.86	324	117.0	144	246
				6/24/2004		16.43	7.85	80.3	7.88	352	146.0	150	260
				8/2/2004		19.13	8.05	87.0	7.58	123	32.2	56	118

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
020 [Griggs Creek]													
	03-121 Griggs Creek												
	2.05	G02G12	Giddings Rd.										
				8/6/2003		19.84	7.07	77.5	8.07	367	61.8	96	234
				8/27/2003	FD	22.23	5.34	61.0	7.25	523	59.1	96	230
				8/27/2003	FD	22.23	5.34	61.0	7.25	523	56.7	73	164
				9/10/2003		17.98	7.71	81.5	7.65	263	48.2	82	204
				9/23/2003		16.06	7.18	72.8	7.10	174	39.4	54	178
				10/9/2003		11.23	9.67	88.2	7.76	141	48.8	63	138
				12/10/2003		1.66	13.19	94.5	7.70	113	44.9	71	146
				4/29/2004		12.49	11.49	107.9	7.82	171	58.6	66	162
				6/3/2004		18.51	6.98	74.5	7.53	215	79.6	85	180
				6/24/2004		19.40	7.02	76.3	7.62	233	84.9	80	172
				7/12/2004		21.80	6.64	75.8	7.82	463	61.7	52	274
				8/2/2004		20.79	7.00	78.3	7.24	100	53.7	40	102
030 [Mill Creek (2) below Griggs Cr. to Grand R.]													
	03-120 Mill Creek (Grand R. RM 41.28)												
	3.50	G02G18	SR 45										
				6/3/2004		19.29	9.96	108.1	7.88	299	77.6	104	218
				6/24/2004		21.24	9.99	112.7	8.01	324	92.6	99	216
				8/2/2004		21.50	8.25	93.4	7.43	135	35.9	51	118
				8/9/2004		19.07	8.86	95.8	7.80	256			164
	4.09	G02G11	Forman Rd.										
				8/6/2003		21.74	10.03	114.2	7.82	276	60.8	87	186
				8/27/2003		23.16	9.43	110.0	7.70	460	70.7	115	290
				9/10/2003		19.24	10.30	111.8	8.38	434	63.7	106	296
				9/23/2003		16.12	8.99	91.4	7.48	249	53.0	71	208
				10/9/2003	FD	11.48	11.36	104.2	7.72	183	58.5	73	172
				10/9/2003	FD	11.48	11.36	104.2	7.72	183	58.2	73	170
				12/10/2003		2.22	14.08	102.6	7.56	217	61.7	101	244
				4/29/2004		13.24	12.86	122.8	8.56	245	66.8	82	224
				6/3/2004		19.34	10.33	112.3	8.17	301	73.6	101	222
				6/24/2004		21.29	10.71	120.9	8.55	316	87.9	99	210
				7/12/2004		22.90	8.01	93.3	8.03	315	72.4	90	206
				8/2/2004		21.50	8.20	92.9	7.40	134	39.0	51	120
	6.49	G02G17	Mill Creek Rd.										
				8/28/2003		21.26	9.48	107.0	7.81	545	79.3	141	354
				9/10/2003		20.71	11.84	132.2	8.55	483	67.2	115	316
				10/9/2003		11.72	11.12	102.6	7.66	188	58.4	73	168
	10.00	G02S05	Doyle Rd.										
				8/28/2003		21.30	4.81	54.3	7.37	324	72.2	87	172
				9/10/2003		18.98	8.40	90.6	7.59	490	71.8	106	334
				10/9/2003		11.16	10.29	93.7	7.64	172	57.8	73	148

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
	03-124 Cemetery Creek												
	0.07	G02S07	Hickok Rd.	8/28/2003		18.64	8.61	92.4	7.53	635	88.5	165	496
				9/10/2003		19.05	10.12	109.5	7.90	730	91.6	200	514
				10/9/2003		13.13	10.44	99.6	7.58	554	101.0	181	416
	1.25	G02S08	dst Jefferson WWTP	8/28/2003		21.39	6.86	77.7	7.30	794	83.7	178	512
				9/10/2003		20.51	7.37	82.0	7.25	812	87.0	209	568
				10/9/2003		15.10	8.81	87.8	7.32	612	102.0	181	446
	2.10	G02S09	ust WWTP/dst Elm St.	8/28/2003		17.67	6.23	65.5	7.45	476	108.0	149	324
				9/10/2003		17.62	8.65	90.8	7.60	554	107.0	173	386
				10/9/2003		12.05	9.94	92.5	7.54	378	104.0	137	288

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Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
04110004060 [Grand River (below Mill Creek to Lake Erie)]													
010 [Grand River below Mill Cr. (2) to below Coffee Cr.]													
03-021 Coffee Creek													
	0.06	G02W03	Lampson Rd.	6/27/2000		20.30	7.90		7.90		148.0	202	422
				7/20/2000		16.40	9.40		8.00		134.0	222	476
				7/31/2000		21.30	7.90		8.00		139.0	232	410
				8/22/2000		16.40	9.70		8.10		150.0	232	396
	1.27	G02G01	Dst Austinburg WWTP	6/27/2000		16.60	7.10		7.70		151.0	221	426
				7/20/2000		16.30	8.00		7.60		145.0	228	444
				7/31/2000		21.00	6.40		7.70		153.0	237	402
				8/22/2000		16.20	7.80		7.50		141.0	235	446
	1.96	G02W01	SR 307	6/27/2000		20.30	6.50		7.70		162.0	216	404
				7/20/2000		17.90	6.90		7.70		150.0	219	452
				7/31/2000		20.80	4.60		7.60		164.0	226	403
				8/22/2000		16.10	7.70		7.80		168.0	240	382
	2.17	G02W02	College St.	6/27/2000		19.80	6.50		7.60		163.0	213	430
				7/20/2000		16.90	7.20		7.60		152.0	226	452
				7/31/2000		20.40	5.70		7.70		161.0	231	392
				8/22/2000		15.30	7.10		7.80		169.0	237	384
030 [Mill Creek (3)]													
03-009 Mill Creek (Grand R. RM 23.58)													
	1.38	G02G10	Doty Rd.	8/27/2003		23.73	8.83	104.4	7.71	356	47.6	105	234
				9/10/2003		18.82	10.20	109.7	8.30	266	49.5	82	182
				9/23/2003		15.85	9.69	97.9	7.53	138	44.7	54	122
				10/9/2003		11.09	11.69	106.3	7.80	153	46.4	82	122
				12/10/2003		2.53	14.11	103.5	7.71	89			
				8/6/2003		21.83	9.15	104.4	7.97	237	54.1	80	150
				4/29/2004		15.99	11.69	118.5	8.78	195	49.7	66	130
				6/3/2004		17.08	10.20	105.8	7.74	218	55.7	80	160
				6/24/2004		20.51	11.14	123.9	8.14	443	86.0	103	188
				7/12/2004		21.07	8.51	95.7	7.82	277	65.6	114	234
				8/2/2004		21.28	9.30	105.0	8.30	228	54.2	80	162
				8/9/2004		19.22	10.71	116.1	8.44	288			168
	1.60	G02G27	Mosely & Short Rds	6/3/2004		14.82	9.40	92.9	7.61	294	59.4	96	218
				6/24/2004		16.43	10.03	102.7	7.76	576	90.5	117	270
				8/2/2004		19.02	8.75	94.5	7.82	349	66.1	99	250
				8/9/2004		16.37	9.82	100.3	8.02	225			148

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
03-009 Mill Creek (Grand R. RM 23.58) (cont.)													
	5.00	G02G26	Aitkins Rd.	6/3/2004		15.03	9.76	96.8	7.79	147	62.9	71	120
				6/24/2004		16.79	11.00	113.4	7.81	295	85.1	82	156
				8/2/2004		19.28	9.09	98.6	7.82	127	46.5	56	108
040 [Grand River below Mill Cr. (3) to above Paine Cr.]													
	03-032 Talcott Creek												
	0.20	G02G29	Stoney Glen Camp	6/3/2004		16.25	10.02	102.1	7.78	270	44.5	82	198
				6/24/2004		18.91	13.27	142.9	8.45	490	70.8	100	210
				8/2/2004		20.41	9.05	100.4	8.09	301	53.4	85	206
050 [Paine Creek]													
	03-110 Paine Creek												
	0.46	G02P01	Seely Rd.	8/6/2003		21.41	9.20	104.0	8.02	268	57.1	82	150
				8/27/2003	FD	23.43	8.94	105.1	8.04	338	68.0	108	218
				8/27/2003	FD	23.43	8.94	105.1	8.04	338	68.7	108	212
				9/10/2003		18.49	4.37	46.6	8.30	313	71.0	105	206
				9/23/2003		15.79	9.61	96.9	7.86	188	55.1	76	156
				10/9/2003	FD	12.74	11.37	107.4	7.96	202	62.5	82	140
				10/9/2003	FD	12.74	11.37	107.4	7.96	202	62.3	82	136
				12/10/2003		2.24	15.26	111.1	7.94	151			
				4/29/2004		14.51	11.46	112.6	8.41	257	64.5	85	168
				6/3/2004	FD	17.97	9.89	104.5	8.29	234	69.0	96	184
				6/3/2004	FD	17.97	9.89	104.5	8.29	234	67.4	94	186
				6/24/2004	FD	24.05	9.30	110.6	8.53	318	98.5	108	196
				6/24/2004	FD	24.05	9.30	110.6	8.53	318	102.0	110	196
				7/12/2004	FD	22.54	8.59	99.4	7.96	361	63.6	103	222
				7/12/2004	FD	22.54	8.59	99.4	7.96	361	63.7	96	226
				8/2/2004		22.85	9.28	107.9	8.34	278	77.4	90	176
	5.60	G02G35	Leroy Center Rd.	6/3/2004		16.34	9.77	99.8	7.83	271	85.2	97	176
				6/24/2004		18.16	10.56	112.1	7.94	494	124.0	124	218
				8/2/2004		22.32	8.71	100.3	8.24	267	79.6	92	170
				8/9/2004		16.91	8.48	87.6	7.92	333			208
	03-111 Bates Creek												
	3.30	G02G36	SR 166	6/3/2004		20.12	9.79	108.0	7.91	296	100.0	111	188
				6/24/2004		22.44	10.59	122.3	8.09	541	136.0	113	
				8/2/2004		25.18	8.89	108.0	8.17	253	79.7	95	166
	0.52	G02G40	Leroy-Thompson Rd.	6/24/2004		20.46	11.59	128.8	8.46	524	136.0	113	
				8/2/2004		23.32	8.63	101.3	8.43	251	79.6	92	170
				6/3/2004		18.00	10.02	105.9	8.13	244	85.2	97	176

*FD = Field Duplicate

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Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
03-112 Phelps Creek													
	0.10	G02G37	Leroy-Thompson Rd.	6/3/2004		16.26	10.15	103.5	8.12	351	100.0	124	246
				6/24/2004		18.49	11.15	119.2	8.29	630	144.0	148	278
				8/2/2004		21.70	8.93	101.6	8.46	373	89.2	106	250
03-113 Talcott Creek													
	0.40	G02G38	Leroy-Thompson Rd.	6/3/2004		13.91	9.91	96.1	7.78	427	138.0	177	324
				6/24/2004		15.64	9.58	96.6	7.93	824	199.0	204	390
				8/2/2004		20.98	8.99	100.8	8.47	304	109.0	131	218
060 [Big Creek (except Kellogg Cr.)]													
03-100 Big Creek													
	2.47	G02W23	Fay Rd.	8/6/2003	FD	20.85	9.20	103.1	8.10	639	146.0	228	412
				8/6/2003	FD	20.85	9.20	103.1	8.10	639	148.0	228	404
				8/27/2003		26.04	9.72	120.2	8.29	800	128.0	212	478
				9/10/2003		19.04	10.63	114.9	8.35	567	125.0	201	388
				9/23/2003		16.33	9.78	99.8	7.98	312	83.9	106	232
				10/7/2003		8.25	13.13	111.7	7.71	327	134.0	170	296
				12/10/2003	FD	2.98	15.45	114.9	8.11	236			
				4/29/2004		12.82	12.39	117.3	8.60	421	117.0	163	274
				6/3/2004		17.69	10.78	113.3	8.47	463	150.0	210	356
				6/24/2004		19.72	10.01	109.7	8.36	579	200.0	231	400
				7/12/2004		22.22	8.85	101.9	8.27	695	135.0	212	450
				8/2/2004		19.28	9.61	104.3	8.35	430	128.0	161	298
	4.98	G02W22	Williams Rd.	8/28/2003		17.97	10.08	106.0	8.60	633	137.0	193	416
				9/10/2003		18.42	11.64	124.3	8.44	561	141.0	216	380
				10/7/2003		9.01	12.91	111.9	7.76	322	135.0	164	300
	9.35	G02G16	SR 608	8/28/2003		17.70	8.88	93.0	8.08	663	153.0	203	454
				9/10/2003		16.94	10.63	110.1	8.00	626	166.0	233	448
				10/7/2003		8.99	12.24	106.1	7.64	381	158.0	192	342
	14.06	G02S15	Woodin Rd.	8/28/2003	FD	18.59	7.58	81.0	7.94	840	146.0	204	554
				8/28/2003	FD						145.0	202	554
				9/10/2003		17.65	8.43	88.7	7.88	975	175.0	246	686
				10/7/2003		9.39	11.87	103.8	7.58	501	167.0	204	440
	15.80	G02W21	Dst Chardon WWTP	8/28/2003		21.45	8.23	93.0	7.90	1,270	168.0	243	796
				9/10/2003		20.36	8.96	99.7	7.91	1,230	175.0	255	818
				10/7/2003		14.36	10.69	104.9	7.45	870	186.0	242	674

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
03-100 Big Creek (cont.)													
	16.42	G02S16	U.S. 6	8/28/2003		21.07	9.80	110.0	7.72	786	200.0	239	494
				9/10/2003		16.82	9.59	99.1	7.80	885	176.0	272	632
				10/7/2003		11.83	12.30	113.9	7.64	346	144.0	167	296
03-101 Gordon Creek													
	0.50	G02G31	Alexander Rd.	6/3/2004		16.30	11.55	117.9	8.45	485	171.0	254	396
				6/24/2004		19.69	10.83	118.7	8.35	654	244.0	301	456
				8/2/2004		19.19	9.92	107.5	8.22	599	170.0	237	412
03-102 East Creek													
	1.20	G02G32	Callow Rd.	6/3/2004		14.78	9.79	96.7	8.26	308	107.0	129	260
				6/24/2004		19.38	9.43	102.6	8.45	429	160.0	150	290
				8/2/2004		20.15	9.50	104.8	8.13	319	88.8	101	228
03-104 Jenks Creek													
	0.10	G02W24	Robinson Rd.	8/28/2003		16.47	9.68	99.0	8.17	351	145.0	174	280
				9/10/2003		16.23	9.55	97.4	7.90	341	143.0	178	250
				10/7/2003		8.85	12.04	103.9	7.69	184	99.6	111	198
03-105 Cutts Creek													
	1.20	G02G33	Cutts Rd.	6/3/2004		14.37	8.11	79.4	8.04	321	154.0	188	272
				6/24/2004		18.00	9.51	100.6	8.20	396	215.0	199	284
				8/2/2004		19.48	9.85	107.4	8.08	452	144.0	168	310
070 [Kellogg Creek]													
03-005 Kellogg Creek													
	0.20	G02G23	SR 86	6/3/2004		18.02	10.60	112.2	8.26	635	130.0	221	490
				6/24/2004		19.11	10.00	108.3	8.27	744	180.0	244	514
				8/2/2004		20.39	9.54	105.8	8.31	332	126.0	158	294
	4.20	G02G25	Brenel Rd.	6/3/2004		17.25	8.79	91.7	7.91	697	150.0	260	552
				6/24/2004		17.87	7.41	78.3	7.76	837	226.0	284	602
				8/2/2004		19.14	7.71	83.5	7.67	653	130.0	190	448
03-006 Ellison Creek													
	0.57	G02P10	Prouty Rd.	6/21/2000		21.88	9.45		8.63	461	99.0	163	368
				6/27/2000		24.95	9.45		8.77	546	118.0	171	416
				7/20/2000		22.13	11.30		8.73	532	126.0	214	438
				7/31/2000		22.99	9.22		8.34	421	93.0	182	332
	1.27	G02G39	Pinehill Rd.	6/3/2004		20.51	10.55	117.3	8.57	500	98.5	178	364
				6/24/2004		18.99	9.57	103.3	8.25	501	121.0	172	348
				8/2/2004		20.62	9.35	104.2	8.13	501	98.2	145	332

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Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Temperature (deg C)	Dissolved Oxygen (mg/l)	D.O. Saturation (%)	pH (S.U.)	Specific Conductance- Field (µmhos/cm)	Alkalinity- CaCO3 (mg/l)	Hardness- CaCO3 (mg/l)	Total Dissolved Solids (mg/l)
03-006 Ellison Creek (cont.)													
	2.00	EC1	River Run Dr.	6/21/2000		20.38	8.38		8.03	345	90.0	135	292
				6/27/2000		22.28	8.55		8.12	402	117.0	145	328
				7/20/2000		18.62	11.24		8.29	420	125.0	194	396
				7/31/2000		21.61	7.75		7.55	484	96.0	176	472
	3.65	EC2	Upstream Golf Course	6/21/2000		19.21	8.60		8.04	360	106.0	144	390
				6/27/2000		20.45	8.42		8.07	361	122.0	144	287
				7/20/2000		16.90	10.03		8.16	336	122.0	170	318
				7/31/2000		20.10	8.89		8.09	361	120.0	168	302
080 [Grand River below Paine Cr. to Lake Erie (except Big Cr.)]													
03-004 Red Creek													
	0.50	G02G21	Mantle Rd.	6/3/2004		17.21	9.91	103.2	8.19	775	156.0	387	676
				6/24/2004		17.05	9.14	95.0	8.10	841	201.0	389	694
				8/2/2004		19.29	9.10	98.9	7.96	832	153.0	325	636

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Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/	STORET	Date	QA/QC*	Total	Specific	BOD 5 (mg/l)	COD (mg/l)	Calcium (mg/l)	Chloride (mg/l)	Potassium (µg/l)	Sodium (mg/l)	Sulfate (mg/l)	
	Stream Name/ River Mile	Station			Location	Suspended Solids (mg/l)								Conductance- Lab (µmhos/cm)
04110004050 [Mill Creek]														
010 [Mill Creek (2) headwaters to above Griggs Cr.]														
03-120 Mill Creek (Grand R. RM 41.28)														
	18.20	G02S04	Netcher Rd.											
				8/6/2003		18	257	2.7	144	18	37.2	4	25	14.4
				8/27/2003		14	437	6.2	61	31	56.6	17	31	15.8
				9/10/2003		<5	578	<2.0	32	34	102.0	6	61	31.4
				9/23/2003		56	280	4.5	33	19	36.5	6	22	20
				10/9/2003		<5	261	<2.0	27	18	25.8	3	12	18.6
				12/10/2003		6	380	<2.0	20	28	63.6	3	36	19.1
				4/29/2004		<5	336	<2.0	26	24	48.3	2	30	6.2
				6/3/2004		6	381	<2.0	38	31	55.0	3	32	13.5
				6/24/2004		<5	422	<2.0	34	33	63.8	4	36	13.7
				7/12/2004		6	424	2.1	22	31	64.5	4	34	15.8
				8/2/2004		13	166	2.3	35	15	14.9	4	8	12.9
	25.67	G02G13	Clay Rd.											
				8/6/2003		<5	450	<2.0	44	38	61.4	5	35	16.5
				8/27/2003		<5	767	<2.0	45	47	159.0	8	80	15.2
				9/10/2003		5	539	<2.0	124	40	79.2	6	46	28.8
				9/23/2003	FD	29	214	3.7	43	18	18.7	6	11	18.9
				9/23/2003	FD	27	214	3.8	36	18	18.8	6	11	17.6
				10/9/2003		<5	350	<2.0	27	32	35.5	3	20	19.8
				12/10/2003		42	324	21.0	78	28	33.7	9	18	16.6
				4/29/2004	FD	<5	349	<2.0	21	31	41.0	2	26	12.6
				4/29/2004	FD	<5	349	<2.0	21	31	41.2	2	26	12.4
				6/3/2004		8	472	<2.0	41	41	62.7	4	36	15.3
				6/24/2004		<5	465	<2.0	32	46	53.6	4	32	17.2
				7/12/2004	FD	<5	630	2.0	31	43	108.0	4	53	17
				7/12/2004	FD	<5	633	2.0	28	42	108.0	4	52	17.8
				8/2/2004	FD	8	207	2.0	37	21	16.9	4	10	15.1
				8/2/2004	FD	8	209	2.3	39	21	17.2	4	10	15.8
03-122 Askue Run														
	0.10	G02G19	Denmark Rd.											
				6/3/2004		5	452	<2.0	44	26	85.2	2	50	8.4
				6/24/2004		<5	381	<2.0	34	25	65.1	2	45	6.9
				8/2/2004		9	162	<2.0	35	13	20.6	2	13	15.2
03-123 Peters Creek														
	0.20	G02G20	Clay Rd.											
				6/3/2004		7	410	<2.0	41	41	46.6	3	29	16.5
				6/24/2004		5	449	<2.0	32	42	51.7	3	32	13.8
				8/2/2004		9	154	<2.0	37	16	10.4	2	6	17.8

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Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Total Suspended Solids (mg/l)	Specific Conductance- Lab (µmhos/cm)	BOD 5 (mg/l)	COD (mg/l)	Calcium (mg/l)	Chloride (mg/l)	Potassium (µg/l)	Sodium (mg/l)	Sulfate (mg/l)
020 [Griggs Creek]														
	03-121 Griggs Creek													
	2.05	G02G12	Giddings Rd.	8/6/2003		16	390	<2.0	24	27	57.5	4	38	21
				8/27/2003	FD	15	386	<2.0	29	27	56.7	4	37	21
				8/27/2003	FD	<5	245	<2.0	35	21	27.6	3	26	14.7
				9/10/2003		<5	320	<2.0	35	23	51.8	4	26	19.9
				9/23/2003		20	223	3.0	36	15	30.5	5	17	17.3
				10/9/2003		<5	204	<2.0	31	17	21.6	2	13	15.8
				12/10/2003		24	219	<2.0	54	20	26.2	3	14	14.4
				4/29/2004		<5	231	<2.0	34	18	27.6	2	18	11.2
				6/3/2004		5	253	<2.0	44	24	26.9	2	18	<5
				6/24/2004		<5	279	<2.0	45	22	39.0	3	28	<5
				7/12/2004		30	496	5.1	39	16	101.0	2	68	18.7
				8/2/2004		7	121	<2.0	42	11	8.9	3	6	11
030 [Mill Creek (2) below Griggs Cr. to Grand R.]														
	03-120 Mill Creek (Grand R. RM 41.28)													
	3.50	G02G18	SR 45	6/3/2004		<5	346	<2.0	30	30	49.1	4	27	18.5
				6/24/2004		<5	369	<2.0	29	28	54.9	4	32	17.1
				8/2/2004		27	156	2.3	30	14	14.2	4	9	12.6
				8/9/2004		5	293		26		36.7			19
	4.09	G02G11	Forman Rd.	8/6/2003		20	303	2.1	27	25	40.1	4	24	16.9
				8/27/2003		<5	481	<2.0	22	33	81.5	5	42	28
				9/10/2003		<5	515	<2.0	28	31	95.6	5	51	28.4
				9/23/2003		30	318	2.5	33	20	45.9	5	27	20.8
				10/9/2003	FD	<5	264	<2.0	31	21	29.6	3	18	19
				10/9/2003	FD	<5	264	<2.0	24	21	30.1	3	18	19.1
				12/10/2003		13	413	<2.0	51	29	68.7	3	38	21.5
				4/29/2004		<5	328	<2.0	26	23	47.1	2	30	13.4
				6/3/2004		<5	354	<2.0	30	29	51.8	4	28	16.9
				6/24/2004		<5	365	<2.0	29	28	55.4	4	33	16
				7/12/2004		51	354	<2.0	17	26	52.0	4	27	18.7
				8/2/2004		22	155	2.2	35	14	13.9	4	8	12.3
	6.49	G02G17	Mill Creek Rd.	8/28/2003		<5	617	<2.0	24	40	108.0	6	55	36.9
				9/10/2003		<5	558	<2.0	25	33	105.0	6	57	29.3
				10/9/2003		<5	267	<2.0	31	21	32.5	3	18	19.8
	10.00	G02S05	Doyle Rd.	8/28/2003		<5	363	<2.0	37	25	54.3	4	31	16.6
				9/10/2003		<5	586	<2.0	32	31	112.0	6	64	30.7
				10/9/2003		<5	248	<2.0	31	21	26.9	3	16	17.6

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	03-124 Cemetery Creek 0.07	G02S07	Hickok Rd.	8/28/2003		21	763	<2.0	20	48	130.0	7	72	41.7
				9/10/2003		6	872	<2.0	12	57	159.0	8	82	46.8
				10/9/2003		<5	762	<2.0	17	51	132.0	7	67	40.3
	1.25	G02S08	dst Jefferson WWTP	8/28/2003		20	896	20.0	37	50	158.0	9	87	45.9
				9/10/2003		<5	939	<2.0	19	59	171.0	9	90	48.1
				10/9/2003		<5	802	<2.0	21	51	140.0	7	72	41.4
	2.10	G02S09	ust WWTP/dst Elm St.	8/28/2003		14	581	<2.0	20	45	91.5	4	46	30.7
				9/10/2003		<5	683	<2.0	12	51	121.0	5	60	34.2
				10/9/2003		<5	529	<2.0	21	40	80.8	3	42	28.5

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/	STORET	Date	QA/QC*	Total	Specific	BOD 5 (mg/l)	COD (mg/l)	Calcium (mg/l)	Chloride (mg/l)	Potassium (µg/l)	Sodium (mg/l)	Sulfate (mg/l)	
	River Mile	Station			Location	Suspended Solids (mg/l)								Conductance- Lab (µmhos/cm)
04110004060	[Grand River (below Mill Creek to Lake Erie)]													
	010 [Grand River below Mill Cr. (2) to below Coffee Cr.]													
	03-021 Coffee Creek													
	0.06	G02W03	Lampson Rd.											
				6/27/2000	34	687	<2.0	65	61	94.0	3	60	44	
				7/20/2000	11	787	<2.0	26	69	116.0	4	67	46	
				7/31/2000	16	680	<2.0	19	70	82.0	5	48	56	
				8/22/2000	5	693	<2.0	26	70	77.0	4	45	55	
	1.27	G02G01	Dst Austinburg WWTP											
				6/27/2000	73	760	<2.0	28	67	108.0	4	68	46	
				7/20/2000	25	756	<2.0	21	70	104.0	4	64	45	
				7/31/2000	21	678	<2.0	19	72	77.0	4	46	54	
				8/22/2000	21	736	<2.0	20	71	84.0	6	48	52	
	1.96	G02W01	SR 307											
				6/27/2000	18	720	<2.0	28	65	100.0	3	63	42	
				7/20/2000	9	742	2.1	24	68	105.0	3	62	43	
				7/31/2000	9	664	2.4	22	69	73.0	3	46	52	
				8/22/2000	5	641	<2.0	23	73	61.0	3	36	51	
	2.17	G02W02	College St.											
				6/27/2000	20	726	<2.0	31	64	98.0	3	62	42	
				7/20/2000	17	739	<2.0	24	69	103.0	3	60	43	
				7/31/2000	12	667	<2.0	19	71	76.0	3	45	55	
				8/22/2000	8	648	<2.0	26	72	59.0	3	35	51	
	030 [Mill Creek (3)]													
	03-009 Mill Creek (Grand R. RM 23.58)													
	1.38	G02G10	Doty Rd.											
				8/27/2003	<5	370	<2.0	<10	29	43.4	5	25	55.5	
				9/10/2003	<5	312	<2.0	12	23	35.3	4	21	38.7	
				9/23/2003	11	181	<2.0	23	15	16.1	4	11	19.9	
				10/9/2003	<5	214	<2.0	14	23	17.5	3	16	24.3	
				12/10/2003										
				8/6/2003	<5	257	<2.0	14	22	25.1	4	16	26.8	
				4/29/2004	<5	224	<2.0	17	18	23.2	2	15	20	
				6/3/2004	<5	265	<2.0	12	22	26.8	4	17	26.2	
				6/24/2004	<5	339	<2.0	12	28	190.0	5	28	32.2	
				7/12/2004	456	347	3.0	14	31	41.0	5	27	39.8	
				8/2/2004	<5	280	<2.0	22	22	32.1	5	20	23.6	
				8/9/2004	<5	335		21		42.2			30	
	1.60	G02G27	Mosely & Short Rds											
				6/3/2004	<5	384	<2.0	<10	27	54.0	9	31	34.4	
				6/24/2004	<5	486	<2.0	<10	32	74.4	12	46	38.2	
				8/2/2004	6	445	<2.0	20	28	66.4	10	40	33.4	
				8/9/2004	7	275		<10		17.5			24.2	

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03-009 Mill Creek (Grand R. RM 23.58) (cont.)														
	5.00	G02G26	Aitkins Rd.	6/3/2004		<5	185	<2.0	20	20	11.7	2	9	10.3
				6/24/2004		<5	254	2.5	29	23	28.6	2	18	<5
				8/2/2004		<5	162	<2.0	30	16	10.1	2	8	14.8
040 [Grand River below Mill Cr. (3) to above Paine Cr.]														
	03-032 Talcott Creek													
	0.20	G02G29	Stoney Glen Camp	6/3/2004		<5	343	<2.0	<10	23	53.7	2	30	30.3
				6/24/2004		<5	387	<2.0	<10	27	59.9	3	41	29.4
				8/2/2004		<5	374	<2.0	12	24	57.5	2	36	29
050 [Paine Creek]														
	03-110 Paine Creek													
	0.46	G02P01	Seely Rd.	8/6/2003		<5	295	<2.0	11	23	30.8	3	24	32.7
				8/27/2003	FD	<5	356	<2.0	<10	30	37.6	3	26	41.8
				8/27/2003	FD	<5	357	<2.0	<10	30	37.4	3	26	41.6
				9/10/2003		<5	370	<2.0	<10	29	41.6	3	28	38.7
				9/23/2003		18	247	2.5	23	22	23.9	3	16	20.3
				10/9/2003	FD	<5	273	<2.0	11	23	25.2	2	17	27.7
				10/9/2003	FD	<5	273	<2.0	11	23	25.9	2	17	27.6
				12/10/2003										
				4/29/2004		7	309	<2.0	15	24	38.1	2	26	24.7
				6/3/2004	FD	<5	318	<2.0	11	27	34.9	2	24	32.2
				6/3/2004	FD	<5	313	<2.0	11	26	34.7	2	23	30.4
				6/24/2004	FD	5	361	<2.0	13	30	41.3	3	30	27.8
				6/24/2004	FD	5	360	<2.0	11	31	41.3	3	33	28
				7/12/2004	FD	37	405	<2.0	<10	28	54.8	3	37	44.3
				7/12/2004	FD	35	406	<2.0	<10	27	54.9	3	36	45
				8/2/2004		<5	312	<2.0	20	26	35.4	3	24	23.4
	5.60	G02G35	Leroy Center Rd.	6/3/2004		<5	299	<2.0	15	29	32.3	2	21	15.9
				6/24/2004		<5	388	<2.0	<10	35	41.7	2	28	21.1
				8/2/2004		11	291	<2.0	22	27	30.1	3	19	15
				8/9/2004		<5	410		43		43.0			23.7
	03-111 Bates Creek													
	3.30	G02G36	SR 166	6/3/2004		<5	335	<2.0	22	33	36.8	2	25	12.8
				6/24/2004			399		20	32		3	21	
				8/2/2004		5	283	<2.0	37	28	27.3	3	18	14.3
	0.52	G02G40	Leroy-Thompson Rd.	6/24/2004			399		20	32		3	21	
				8/2/2004		11	291	<2.0	22	27	30.1	3	19	15
				6/3/2004		<5	299	<2.0	15	29	32.3	2	21	15.9

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Total Suspended Solids (mg/l)	Specific Conductance- Lab (µmhos/cm)	BOD 5 (mg/l)	COD (mg/l)	Calcium (mg/l)	Chloride (mg/l)	Potassium (µg/l)	Sodium (mg/l)	Sulfate (mg/l)
03-112 Phelps Creek														
	0.10	G02G37	Leroy-Thompson Rd.	6/3/2004		<5	449	<2.0	15	35	57.1	2	36	28.8
				6/24/2004		<5	500	<2.0	18	41	63.3	3	48	32.2
				8/2/2004		<5	450	<2.0	30	31	62.6	3	45	23.9
03-113 Talcott Creek														
	0.40	G02G38	Leroy-Thompson Rd.	6/3/2004		<5	578	<2.0	<10	51	75.8	2	48	31.3
				6/24/2004		<5	706	<2.0	<10	57	92.3	2	65	35.1
				8/2/2004		6	375	4.4	23	36	30.6	3	20	22.8
060 [Big Creek (except Kellogg Cr.)]														
03-100 Big Creek														
	2.47	G02W23	Fay Rd.	8/6/2003	FD	<5	720	<2.0	<10	65	93.7	6	55	68.6
				8/6/2003	FD	<5	722	<2.0	<10	65	93.9	6	55	69.4
				8/27/2003		<5	805	<2.0	13	62	124.0	10	71	68.2
				9/10/2003		<5	686	<2.0	<10	54	87.9	5	52	70.1
				9/23/2003		50	408	<2.0	16	31	48.8	4	31	30
				10/7/2003		<5	513	<2.0	17	50	49.7	4	32	47.4
				12/10/2003	FD									
				4/29/2004		<5	534	<2.0	12	47	67.4	3	43	36.6
				6/3/2004		<5	647	<2.0	<10	61	80.2	4	47	60.2
				6/24/2004		<5	712	<2.0	<10	66	95.3	5	58	61.1
				7/12/2004		160	797	3.1	55	62	125.0	12	69	64.9
				8/2/2004		<5	515	<2.0	15	48	56.2	5	37	39.8
	4.98	G02W22	Williams Rd.	8/28/2003		<5	743	<2.0	11	56	109.0	8	61	57.2
				9/10/2003		<5	690	<2.0	<10	60	87.6	6	56	62.7
				10/7/2003		<5	496	<2.0	14	49	47.5	4	31	42.7
	9.35	G02G16	SR 608	8/28/2003		<5	762	<2.0	11	60	108.0	8	59	55.8
				9/10/2003		<5	794	<2.0	<10	67	101.0	7	59	63.2
				10/7/2003		<5	589	<2.0	14	57	61.1	5	39	47.1
	14.06	G02S15	Woodin Rd.	8/28/2003	FD	<5	967	<2.0	17	62	166.0	17	95	57.5
				8/28/2003	FD	<5	966	<2.0	14	61	167.0	17	95	57.5
				9/10/2003		<5	1,210	<2.0	<10	74	222.0	17	122	68.8
				10/7/2003		<5	770	<2.0	14	62	104.0	11	65	54.6
	15.80	G02W21	Dst Chardon WWTP	8/28/2003		<5	1,390	<2.0	37	71	265.0	33	148	86.7
				9/10/2003		<5	1,460	<2.0	12	74	283.0	28	155	82.1
				10/7/2003		<5	1,180	<2.0	20	74	191.0	25	120	78.4

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Total Suspended Solids (mg/l)	Specific Conductance- Lab (µmhos/cm)	BOD 5 (mg/l)	COD (mg/l)	Calcium (mg/l)	Chloride (mg/l)	Potassium (µg/l)	Sodium (mg/l)	Sulfate (mg/l)
03-100 Big Creek (cont.)														
	16.42	G02S16	U.S. 6	8/28/2003		5	852	<2.0	11	76	126.0	2	69	31.3
				9/10/2003		<5	1,120	<2.0	25	84	214.0	3	104	52.4
				10/7/2003		<5	496	<2.0	14	52	51.5	2	31	29.7
03-101 Gordon Creek														
	0.50	G02G31	Alexander Rd.	6/3/2004		5	700	<2.0	<10	77	85.2	2	45	56
				6/24/2004		<5	815	<2.0	<10	91	102.0	3	55	61.2
				8/2/2004		<5	717	<2.0	12	72	90.9	4	51	58
03-102 East Creek														
	1.20	G02G32	Callow Rd.	6/3/2004		<5	450	<2.0	14	37	56.0	3	34	30.4
				6/24/2004		<5	533	<2.0	<10	42	66.6	4	48	36.4
				8/2/2004		53	386	<2.0	22	29	50.6	4	34	22.6
03-104 Jenks Creek														
	0.10	G02W24	Robinson Rd.	8/28/2003		<5	425	<2.0	<10	50	16.0	2	14	37.6
				9/10/2003		<5	434	<2.0	<10	50	20.9	2	16	35.1
				10/7/2003		<5	283	<2.0	17	33	14.1	2	12	22.9
03-105 Cutts Creek														
	1.20	G02G33	Cutts Rd.	6/3/2004		<5	474	<2.0	14	57	37.9	2	22	26
				6/24/2004		<5	509	<2.0	<10	60	43.6	3	27	25.2
				8/2/2004		<5	545	<2.0	20	51	64.4	4	43	23.2
070 [Kellogg Creek]														
03-005 Kellogg Creek														
	0.20	G02G23	SR 86	6/3/2004		5	884	<2.0	14	62	154.0	4	87	60.8
				6/24/2004		<5	929	<2.0	20	68	168.0	4	98	60.1
				8/2/2004		21	508	<2.0	15	47	55.9	5	36	38.9
	4.20	G02G25	Brenel Rd.	6/3/2004		6	989	<2.0	14	71	174.0	4	104	71.2
				6/24/2004		15	1,070	<2.0	18	76	185.0	4	110	84.7
				8/2/2004		<5	782	<2.0	22	53	131.0	4	81	58.8
03-006 Ellison Creek														
	0.57	G02P10	Prouty Rd.	6/21/2000		8	665	<2.0		44	114.0	5	71	60
				6/27/2000		6	741	<2.0	16	47	114.0	5	71	63
				7/20/2000		5	779	<2.0	12	56	114.0	5	71	69
				7/31/2000		279	587	3.4	18	48	79.0	6	51	60
	1.27	G02G39	Pinehill Rd.	6/3/2004		<5	656	<2.0	11	48	110.0	3	59	47.2
				6/24/2004		5	619	<2.0	<10	46	102.0	3	54	44.2
				8/2/2004		6	576	<2.0	17	40	91.7	4	53	41.4

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Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Total Suspended Solids (mg/l)	Specific Conductance- Lab (µmhos/cm)	BOD 5 (mg/l)	COD (mg/l)	Calcium (mg/l)	Chloride (mg/l)	Potassium (µg/l)	Sodium (mg/l)	Sulfate (mg/l)
03-006 Ellison Creek (cont.)														
	2.00	EC1	River Run Dr.	6/21/2000		15	507	<2.0	14	36	75.0	4	49	41
				6/27/2000		21	573	<2.0	12	40	76.0	4	53	46
				7/20/2000		8	666	<2.0	12	53	82.0	4	55	61
				7/31/2000		580	703	17.0	42	44	90.0	16	51	69
	3.65	EC2	Upstream Golf Course	6/21/2000		32	536	<2.0	14	41	88.0	3	52	23
				6/27/2000		5	540	<2.0	10	41	75.0	3	54	29
				7/20/2000		5	545	<2.0	10	50	66.0	2	42	34
				7/31/2000		5	524	<2.0	10	49	64.0	2	41	37
080 [Grand River below Paine Cr. to Lake Erie (except Big Cr.)]														
03-004 Red Creek														
	0.50	G02G21	Mantle Rd.	6/3/2004		9	1,090	<2.0	<10	117	121.0	3	73	221
				6/24/2004		<5	1,090	<2.0	<10	118	134.0	4	81	202
				8/2/2004		<5	1,020	<2.0	17	99	138.0	5	80	163

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)
	River Mile	Station													
04110004050 [Mill Creek]															
010 [Mill Creek (2) headwaters to above Griggs Cr.]															
03-120 Mill Creek (Grand R. RM 41.28)															
	18.20	G02S04	Netcher Rd.	8/6/2003		0.094	0.030	0.55	1.14	0.109	796	<2.0	26	<0.20	<30
				8/27/2003		0.214	<0.020	0.13	1.97	0.297	230	5.2	39	<0.20	<30
				9/10/2003		0.053	<0.020	0.99	1.08	0.048	<200	2.2	38	<0.20	<30
				9/23/2003		0.089	0.041	1.49	1.04	0.233	1820	3.2	35	<0.20	<30
				10/9/2003		<0.050	<0.020	0.72	0.58	0.075	<200	<2.0	21	<0.20	<30
				12/10/2003		0.050	<0.020	0.57	0.60	0.070	424	<2.0	28	<0.20	<30
				4/29/2004		<0.050	<0.020	0.16	0.93	0.047	<200	2.0	20	<0.20	<30
				6/3/2004		<0.050	<0.020	0.59	0.91	0.070	<200	2.6	27	<0.20	<30
				6/24/2004		<0.050	<0.020	0.57	0.92	0.087	<200	2.8	32	<0.20	<30
				7/12/2004		0.091	<0.020	<0.10	0.78	0.047	<200	2.4	29	<0.20	<30
				8/2/2004		0.062	<0.020	1.23	1.08	0.118	701	<2.0	25	<0.20	<30
	25.67	G02G13	Clay Rd.	8/6/2003		0.101	0.029	0.33	1.26	0.143	213	3.4	37	<0.20	<30
				8/27/2003		0.118	<0.020	0.31	1.66	0.117	<200	3.4	47	<0.20	<30
				9/10/2003		0.057	<0.020	0.27	0.99	0.080	<200	2.3	34	<0.20	<30
				9/23/2003	FD	0.053	0.046	2.43	1.08	0.249	1770	2.3	31	<0.20	<30
				9/23/2003	FD	<0.050	0.046	2.50	1.20	0.269	1790	2.3	32	<0.20	<30
				10/9/2003		0.058	0.027	1.41	0.72	0.074	<200	<2.0	33	<0.20	<30
				12/10/2003		2.000	0.034	1.38	3.40	0.301	1270	2.1	36	<0.20	<30
				4/29/2004	FD	<0.050	<0.020	0.37	0.97	0.066	202	2.3	23	<0.20	<30
				4/29/2004	FD	<0.050	<0.020	0.37	0.97	0.067	<200	<2.0	24	<0.20	<30
				6/3/2004		0.088	0.041	0.72	1.02	0.141	<200	2.6	34	<0.20	<30
				6/24/2004		0.099	<0.020	0.72	0.89	0.114	<200	2.6	36	<0.20	<30
				7/12/2004	FD	0.138	<0.020	0.12	1.02	0.123	<200	3.7	36	<0.20	<30
				7/12/2004	FD	0.111	<0.020	0.12	0.96	0.102	<200	3.8	36	<0.20	<30
				8/2/2004	FD	0.073	0.020	0.92	1.28	0.228	390	<2.0	29	<0.20	<30
				8/2/2004	FD	0.073	0.020	0.86	1.62	0.158	391	<2.0	30	<0.20	<30
03-122 Askue Run															
	0.10	G02G19	Denmark Rd.	6/3/2004		0.057	<0.020	0.21	0.96	0.032	<200	3.9	22	<0.20	<30
				6/24/2004		<0.050	<0.020	0.15	0.87	0.038	<200	3.1	26	<0.20	<30
				8/2/2004		<0.050	<0.020	<0.10	0.82	0.066	397	2.0	20	<0.20	<30
03-123 Peters Creek															
	0.20	G02G20	Clay Rd.	6/3/2004		0.061	<0.020	0.40	0.87	0.079	268	2.1	38	<0.20	<30
				6/24/2004		0.058	<0.020	0.28	0.71	0.061	<200	<2.0	40	<0.20	<30
				8/2/2004		<0.050	<0.020	0.20	1.06	0.106	392	<2.0	27	<0.20	<30

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Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Station	Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)
	River Mile															
020 [Griggs Creek]																
	03-121 Griggs Creek															
	2.05	G02G12	Giddings Rd.													
				8/6/2003			0.075	0.034	3.15	1.24	0.103	926	<2.0	38	<0.20	<30
				8/27/2003	FD		0.078	0.036	3.20	1.02	0.094	916	2.2	39	<0.20	<30
				8/27/2003	FD		<0.050	<0.020	0.11	0.86	0.047	<200	3.8	24	<0.20	<30
				9/10/2003			<0.050	<0.020	0.10	0.80	0.086	<200	2.4	29	<0.20	<30
				9/23/2003			0.060	0.026	0.44	0.91	0.148	1500	2.6	29	<0.20	<30
				10/9/2003			<0.050	<0.020	0.24	0.61	0.053	281	<2.0	21	<0.20	<30
				12/10/2003			<0.050	<0.020	0.26	0.56	0.056	988	<2.0	25	<0.20	<30
				4/29/2004			<0.050	<0.020	<0.10	0.93	0.061	285	2.1	17	<0.20	<30
				6/3/2004			<0.050	<0.020	0.17	0.92	0.084	<200	3.4	20	<0.20	<30
				6/24/2004			<0.050	<0.020	0.11	0.98	0.118	<200	3.4	22	<0.20	<30
				7/12/2004			0.052	<0.020	0.11	0.77	0.053	739	<2.0	20	<0.20	<30
				8/2/2004			<0.050	<0.020	0.31	1.08	0.112	381	<2.0	20	<0.20	<30
030 [Mill Creek (2) below Griggs Cr. to Grand R.]																
	03-120 Mill Creek (Grand R. RM 41.28)															
	3.50	G02G18	SR 45													
				6/3/2004			<0.050	<0.020	0.47	0.75	0.034	<200	2.5	25	<0.20	<30
				6/24/2004			<0.050	<0.020	0.66	0.80	0.041	<200	<2.0	27	<0.20	<30
				8/2/2004			0.051	<0.020	1.06	0.95	0.105	881	2.0	26	<0.20	<30
				8/9/2004			<0.050	<0.020	0.52	0.70	0.048					
	4.09	G02G11	Forman Rd.													
				8/6/2003			<0.050	<0.020	0.49	0.79	0.093	654	2.6	28	<0.20	<30
				8/27/2003			<0.050	<0.020	0.49	0.72	0.066	<200	2.0	34	<0.20	<30
				9/10/2003			<0.050	<0.020	0.73	0.84	0.054	<200	2.1	28	<0.20	<30
				9/23/2003			0.056	0.022	1.08	1.05	0.143	955	3.0	29	<0.20	<30
				10/9/2003	FD		<0.050	<0.020	0.70	0.58	0.070	401	<2.0	26	<0.20	<30
				10/9/2003	FD		<0.050	<0.020	0.71	0.59	0.068	428	<2.0	24	<0.20	<30
				12/10/2003			<0.050	<0.020	0.76	0.70	0.070	460	<2.0	28	<0.20	<30
				4/29/2004			<0.050	<0.020	0.18	0.87	0.040	227	2.3	21	<0.20	<30
				6/3/2004			<0.050	<0.020	0.50	0.84	0.054	<200	2.5	25	<0.20	<30
				6/24/2004			<0.050	<0.020	0.71	0.86	0.052	<200	3.4	24	<0.20	<30
				7/12/2004			0.064	<0.020	0.21	0.50	0.313	963	2.5	33	<0.20	<30
				8/2/2004			0.054	<0.020	1.08	0.99	0.158	840	2.2	25	<0.20	<30
	6.49	G02G17	Mill Creek Rd.													
				8/28/2003			<0.050	0.060	3.17	0.81	0.125	<200	2.9	36	<0.20	<30
				9/10/2003			<0.050	<0.020	1.13	0.85	0.087	<200	2.1	31	<0.20	<30
				10/9/2003			<0.050	<0.020	0.94	0.62	0.075	408	<2.0	25	<0.20	<30
	10.00	G02S05	Doyle Rd.													
				8/28/2003			0.079	<0.020	0.12	0.75	0.045	<200	3.3	29	<0.20	<30
				9/10/2003			<0.050	<0.020	0.44	0.86	0.041	<200	<2.0	35	<0.20	<30
				10/9/2003			<0.050	<0.020	0.70	0.61	0.061	390	<2.0	26	<0.20	<30

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Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Station	Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)
	River Mile															
03-124 Cemetery Creek	0.07	G02S07	Hickok Rd.	8/28/2003		<0.050	0.022	6.00	0.68	0.468	374	3.9	30	<0.20	<30	
				9/10/2003		<0.050	<0.020	8.75	0.89	0.415	<200	2.5	32	<0.20	<30	
				10/9/2003		<0.050	<0.020	6.30	0.96	0.237	<200	2.2	33	<0.20	<30	
	1.25	G02S08	dst Jefferson WWTP	8/28/2003		0.202	<0.020	11.90	1.62	2.130	<200	<2.0	17	<0.20	<30	
				9/10/2003		0.218	0.089	5.50	1.06	0.975	<200	<2.0	19	<0.20	<30	
				10/9/2003		0.056	0.020	7.05	1.01	0.314	<200	<2.0	22	<0.20	<30	
	2.10	G02S09	ust WWTP/dst Elm St.	8/28/2003		0.113	<0.020	0.48	0.47	0.055	<200	4.5	35	<0.20	<30	
				9/10/2003		<0.050	<0.020	0.39	0.62	0.049	<200	2.8	38	<0.20	<30	
				10/9/2003		0.105	<0.020	0.53	0.59	0.054	<200	2.1	32	<0.20	<30	

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)
	River Mile	Station													
04110004060 [Grand River (below Mill Creek to Lake Erie)]															
010 [Grand River below Mill Cr. (2) to below Coffee Cr.]															
03-021 Coffee Creek															
	0.06	G02W03	Lampson Rd.	6/27/2000		0.055	0.040	1.37	0.79	0.090	938	<2.0	63	<0.20	<30
				7/20/2000		0.096	0.066	3.40	0.90	0.070	477	<2.0	69	<0.20	<30
				7/31/2000		<0.050	<0.020	4.16	0.46	0.090	479	2.0	61	<0.20	40
				8/22/2000		<0.050	<0.020	3.50	0.52	0.090	<200	2.0	59	<0.20	<30
	1.27	G02G01	Dst Austinburg WWTP	6/27/2000		0.125	0.060	3.12	0.95	0.190	1520	2.0	73	<0.20	<30
				7/20/2000		0.280	0.070	1.54	1.10	0.100	804	3.0	72	<0.20	<30
				7/31/2000		0.156	0.064	2.06	0.49	0.130	609	2.0	69	<0.20	<30
				8/22/2000		0.156	0.060	6.80	0.79	0.170	600	<2.0	62	<0.20	<30
	1.96	G02W01	SR 307	6/27/2000		0.151	0.030	0.37	0.99	0.100	526	2.0	70	<0.20	<30
				7/20/2000		0.214	0.040	0.22	0.84	0.120	406	2.0	67	<0.20	<30
				7/31/2000		0.263	0.047	0.20	0.60	0.130	319	2.0	62	<0.20	<30
				8/22/2000		0.147	0.023	0.17	0.57	0.090	212	<2.0	58	<0.20	<30
	2.17	G02W02	College St.	6/27/2000		0.154	0.030	0.30	0.96	0.090	538	2.0	67	<0.20	<30
				7/20/2000		0.168	0.020	0.16	0.70	0.090	540	2.0	74	<0.20	<30
				7/31/2000		0.205	0.022	0.15	0.46	0.120	352	2.0	67	<0.20	<30
				8/22/2000		0.183	<0.020	0.14	0.53	0.100	244	2.0	61	<0.20	<30
030 [Mill Creek (3)]															
03-009 Mill Creek (Grand R. RM 23.58)															
	1.38	G02G10	Doty Rd.	8/27/2003		<0.050	<0.020	<0.10	<0.20	0.475	<200	<2.0	28	<0.20	<30
				9/10/2003		<0.050	<0.020	<0.10	0.27	<0.010	<200	<2.0	22	<0.20	<30
				9/23/2003		<0.050	<0.020	0.45	0.54	0.072	633	<2.0	22	<0.20	<30
				10/9/2003		<0.050	<0.020	0.44	0.25	0.028	333	<2.0	25	<0.20	<30
				12/10/2003											
				8/6/2003		<0.050	<0.020	0.11	0.44	0.058	<200	<2.0	20	<0.20	<30
				4/29/2004		<0.050	<0.020	<0.10	<0.20	0.055	<200	<2.0	19	<0.20	<30
				6/3/2004		<0.050	<0.020	0.58	0.35	<0.010	<200	<2.0	22	<0.20	<30
				6/24/2004		<0.050	<0.020	0.14	0.38	0.014	<200	<2.0	28	<0.20	<30
				7/12/2004		0.102	<0.020	0.53	0.43	0.091	7480	7.4	66	0.20	<30
				8/2/2004		<0.050	<0.020	0.41	0.74	0.033	<200	<2.0	26	<0.20	<30
				8/9/2004		<0.050	<0.020	<0.10	0.37	<0.010					
	1.60	G02G27	Mosely & Short Rds	6/3/2004		0.087	<0.020	1.28	0.45	0.030	<200	<2.0	31	<0.20	<30
				6/24/2004		<0.050	<0.020	1.18	0.38	0.050	<200	<2.0	37	<0.20	<30
				8/2/2004		<0.050	<0.020	0.56	0.62	0.053	<200	<2.0	33	<0.20	<30
				8/9/2004		<0.050	<0.020	1.19	0.31	0.012					

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	
	River Mile	Station														
03-009 Mill Creek (Grand R. RM 23.58) (cont.)	5.00	G02G26	Aitkins Rd.	6/3/2004		<0.050	<0.020	0.27	0.56	0.017	<200	<2.0	16	<0.20	<30	
				6/24/2004		<0.050	<0.020	0.19	0.53	0.027	<200	2.0	19	<0.20	<30	
				8/2/2004		<0.050	<0.020	0.17	0.85	0.048	<200	<2.0	19	<0.20	<30	
040 [Grand River below Mill Cr. (3) to above Paine Cr.]																
03-032 Talcott Creek	0.20	G02G29	Stoney Glen Camp	6/3/2004		0.110	<0.020	0.57	0.25	0.011	<200	<2.0	32	<0.20	<30	
				6/24/2004		<0.050	<0.020	0.50	0.30	<0.010	<200	<2.0	37	<0.20	<30	
				8/2/2004		<0.050	<0.020	0.26	0.52	<0.010	<200	<2.0	35	<0.20	<30	
050 [Paine Creek]																
03-110 Paine Creek	0.46	G02P01	Seely Rd.	8/6/2003		<0.050	<0.020	0.13	0.30	<0.010	<200	<2.0	21	<0.20	<30	
				8/27/2003	FD	<0.050	<0.020	0.10	<0.20	0.026	<200	<2.0	25	<0.20	<30	
				8/27/2003	FD	<0.050	<0.020	0.10	0.20	0.032	<200	<2.0	24	<0.20	<30	
				9/10/2003		<0.050	<0.020	<0.10	0.25	<0.010	<200	<2.0	21	<0.20	<30	
				9/23/2003		<0.050	<0.020	0.19	0.54	0.064	744	2.0	27	<0.20	<30	
				10/9/2003	FD	<0.050	<0.020	<0.10	0.22	<0.010	<200	<2.0	20	<0.20	<30	
				10/9/2003	FD	<0.050	<0.020	<0.10	0.22	<0.010	<200	<2.0	19	<0.20	<30	
				12/10/2003												
				4/29/2004		<0.050	<0.020	<0.10	<0.20	0.040	<200	<2.0	21	<0.20	<30	
				6/3/2004	FD	<0.050	<0.020	0.17	0.26	<0.010	<200	<2.0	21	<0.20	<30	
				6/3/2004	FD	<0.050	<0.020	0.17	0.24	<0.010	<200	<2.0	21	<0.20	<30	
				6/24/2004	FD	<0.050	<0.020	<0.10	0.42	<0.010	<200	<2.0	24	<0.20	<30	
				6/24/2004	FD	<0.050	<0.020	<0.10	0.36	<0.010	<200	<2.0	26	<0.20	<30	
				7/12/2004	FD	0.084	<0.020	0.22	0.30	0.011	545	<2.0	29	<0.20	<30	
				7/12/2004	FD	0.075	<0.020	0.20	0.27	0.010	568	<2.0	29	<0.20	<30	
				8/2/2004		<0.050	<0.020	0.13	0.46	0.052	<200	<2.0	22	<0.20	<30	
		5.60	G02G35	Leroy Center Rd.	6/3/2004		<0.050	<0.020	0.11	0.43	0.014	<200	<2.0	21	<0.20	<30
					6/24/2004		<0.050	<0.020	0.18	0.31	<0.010	<200	<2.0	26	<0.20	<30
					8/2/2004		<0.050	<0.020	<0.10	0.68	0.042	<200	<2.0	25	<0.20	<30
					8/9/2004		<0.050	<0.020	0.17	0.33	<0.010					
03-111 Bates Creek																
3.30	G02G36	SR 166	6/3/2004		<0.050	<0.020	<0.10	0.59	0.021	<200	<2.0	25	<0.20	<30		
			6/24/2004		<0.050		0.13	0.47	<0.010	257	2.5	34	<0.20	<30		
			8/2/2004		<0.050	<0.020	<0.10	0.84	0.046	<200	<2.0	25	<0.20	<30		
0.52	G02G40	Leroy-Thompson Rd.	6/24/2004		<0.050		0.13	0.47	<0.010	257	2.5	34	<0.20	<30		
			8/2/2004		<0.050	<0.020	<0.10	0.68	0.042	<200	<2.0	25	<0.20	<30		
			6/3/2004		<0.050	<0.020	0.11	0.43	0.014	<200	<2.0	21	<0.20	<30		

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Station	Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)
	River Mile															
060 [Big Creek (except Kellogg Cr.)]	03-112 Phelps Creek															
	0.10	G02G37	Leroy-Thompson Rd.													
				6/3/2004			<0.050	<0.020	0.42	0.44	0.013	<200	<2.0	29	<0.20	<30
				6/24/2004			<0.050	<0.020	0.27	0.42	0.022	<200	<2.0	32	<0.20	<30
				8/2/2004			<0.050	<0.020	0.27	0.79	0.050	<200	<2.0	28	<0.20	<30
	03-113 Talcott Creek															
	0.40	G02G38	Leroy-Thompson Rd.													
				6/3/2004			<0.050	<0.020	0.37	<0.20	0.040	<200	<2.0	44	<0.20	<30
				6/24/2004			<0.050	<0.020	0.39	0.40	0.011	<200	<2.0	49	<0.20	<30
				8/2/2004			<0.050	<0.020	0.56	0.66	0.082	<200	<2.0	37	<0.20	<30
	03-100 Big Creek															
	2.47	G02W23	Fay Rd.													
				8/6/2003	FD		<0.050	<0.020	<0.10	0.23	0.017	<200	<2.0	48	<0.20	<30
				8/6/2003	FD		<0.050	<0.020	<0.10	0.29	0.012	<200	<2.0	45	<0.20	<30
				8/27/2003			<0.050	<0.020	0.62	0.39	0.021	<200	2.2	50	<0.20	<30
				9/10/2003			<0.050	<0.020	<0.10	0.24	0.013	<200	<2.0	40	<0.20	<30
				9/23/2003			<0.050	0.034	0.43	0.56	0.055	1270	3.0	30	<0.20	<30
				10/7/2003			<0.050	<0.020	0.29	0.34	0.020	<200	<2.0	33	<0.20	<30
				12/10/2003	FD											
				4/29/2004			<0.050	<0.020	<0.10	0.24	0.042	<200	<2.0	33	<0.20	<30
				6/3/2004			<0.050	<0.020	<0.10	0.20	0.021	<200	<2.0	39	<0.20	<30
				6/24/2004			<0.050	<0.020	<0.10	0.36	<0.010	<200	<2.0	47	<0.20	<30
				7/12/2004			0.057	<0.020	1.13	0.38	0.063	3170	4.9	73	<0.20	<30
				8/2/2004			<0.050	<0.020	0.20	0.37	0.036	<200	<2.0	35	<0.20	<30
	4.98	G02W22	Williams Rd.													
			8/28/2003			<0.050	<0.020	0.38	0.29	<0.010	<200	<2.0	42	<0.20	<30	
			9/10/2003			<0.050	<0.020	<0.10	0.23	0.040	<200	<2.0	40	<0.20	<30	
			10/7/2003			0.065	<0.020	0.36	0.36	0.018	<200	<2.0	32	<0.20	<30	
	9.35	G02G16	SR 608													
			8/28/2003			<0.050	<0.020	0.45	0.27	0.014	<200	2.7	44	<0.20	<30	
			9/10/2003			<0.050	<0.020	0.40	0.25	<0.010	<200	<2.0	48	<0.20	<30	
			10/7/2003			<0.050	<0.020	0.63	0.37	0.029	<200	<2.0	39	<0.20	<30	
	14.06	G02S15	Woodin Rd.													
			8/28/2003	FD		<0.050	<0.020	1.70	0.50	0.176	<200	2.8	45	<0.20	<30	
			8/28/2003	FD		<0.050	<0.020	1.71	0.59	0.160	<200	2.8	43	<0.20	<30	
			9/10/2003			<0.050	<0.020	2.95	0.55	0.269	<200	3.1	49	<0.20	<30	
			10/7/2003			<0.050	<0.020	1.48	0.59	0.098	<200	<2.0	42	<0.20	<30	
	15.80	G02W21	Dst Chardon WWTP													
			8/28/2003			<0.050	0.021	4.35	0.59	0.450	<200	2.0	41	<0.20	<30	
			9/10/2003			<0.050	<0.020	5.40	0.76	0.583	<200	2.1	41	<0.20	<30	
			10/7/2003			<0.050	<0.020	4.09	0.90	0.239	<200	<2.0	49	<0.20	<30	

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Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Station	Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)
	River Mile															
03-100 Big Creek (cont.)	16.42	G02S16	U.S. 6		8/28/2003		<0.050	<0.020	0.12	0.27	0.306	<200	2.2	71	<0.20	<30
					9/10/2003		<0.050	<0.020	0.58	0.56	0.032	<200	2.0	65	<0.20	<30
					10/7/2003		<0.050	<0.020	0.14	0.31	0.011	<200	<2.0	49	<0.20	<30
	03-101 Gordon Creek															
	0.50	G02G31	Alexander Rd.		6/3/2004		<0.050	<0.020	0.14	<0.20	<0.010	<200	<2.0	53	<0.20	<30
					6/24/2004		<0.050	<0.020	0.15	0.28	<0.010	<200	<2.0	67	<0.20	<30
					8/2/2004		<0.050	<0.020	0.29	0.33	0.037	<200	<2.0	52	<0.20	<30
	03-102 East Creek															
	1.20	G02G32	Callow Rd.		6/3/2004		0.051	<0.020	0.72	0.37	0.036	<200	<2.0	28	<0.20	<30
					6/24/2004		<0.050	<0.020	0.50	0.41	0.021	<200	<2.0	33	<0.20	<30
					8/2/2004		<0.050	<0.020	0.37	0.72	0.051	<200	2.0	27	<0.20	<30
	03-104 Jenks Creek															
	0.10	G02W24	Robinson Rd.		8/28/2003		<0.050	<0.020	0.43	0.21	0.271	<200	<2.0	32	<0.20	<30
					9/10/2003		<0.050	<0.020	0.15	<0.20	0.024	<200	<2.0	32	<0.20	<30
					10/7/2003		0.067	<0.020	<0.10	0.43	0.033	206	<2.0	24	<0.20	<30
	03-105 Cutts Creek															
	1.20	G02G33	Cutts Rd.		6/3/2004		0.057	<0.020	0.80	0.28	<0.010	<200	<2.0	41	<0.20	<30
					6/24/2004		<0.050	<0.020	0.30	0.25	0.016	<200	<2.0	45	<0.20	<30
					8/2/2004		<0.050	<0.020	0.47	0.57	0.100	<200	<2.0	40	<0.20	<30
	070 [Kellogg Creek]															
03-005 Kellogg Creek																
0.20	G02G23	SR 86		6/3/2004		<0.050	<0.020	0.59	0.49	0.244	<200	<2.0	39	<0.20	<30	
				6/24/2004		<0.050	<0.020	0.50	0.71	0.022	<200	<2.0	45	<0.20	<30	
				8/2/2004		<0.050	<0.020	0.31	0.45	0.031	455	2.2	36	<0.20	<30	
4.20	G02G25	Brenel Rd.		6/3/2004		0.127	0.036	0.55	0.86	0.017	<200	2.7	45	<0.20	<30	
				6/24/2004		0.064	<0.020	0.46	0.87	0.025	<200	2.2	49	<0.20	<30	
				8/2/2004		0.068	<0.020	0.49	0.81	0.024	291	2.5	39	<0.20	<30	
03-006 Ellison Creek																
0.57	G02P10	Prouty Rd.		6/21/2000			0.020				550	<8.0	30	<0.20	<30	
				6/27/2000		<0.050	<0.020	0.32	0.49	<0.050	275	<2.0	25	<0.20	<30	
				7/20/2000		<0.050	<0.020	<0.10	0.35	<0.050	<200	<2.0	33	<0.20	<30	
				7/31/2000		<0.050	0.074	0.36	0.34	0.170	6760	3.0	65	<0.20	47	
1.27	G02G39	Pinehill Rd.		6/3/2004		0.061	<0.020	0.43	0.42	0.053	<200	<2.0	28	<0.20	<30	
				6/24/2004		<0.050	<0.020	0.43	0.44	0.099	<200	<2.0	27	<0.20	<30	
				8/2/2004		<0.050	<0.020	0.36	0.57	0.059	270	2.6	28	<0.20	<30	

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Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/		STORET Station	Location	Date	QA/QC*	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)	NO2 + NO3-N Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)
	River Mile															
03-006 Ellison Creek (cont.)	2.00	EC1	River Run Dr.	6/21/2000		<0.050	0.020	0.52	0.38	0.050	560	2.0	29	<0.20	<30	
				6/27/2000		<0.050	0.040	0.50	0.42	<0.050	1040	<2.0	27	<0.20	<30	
				7/20/2000		<0.050	0.030	0.54	0.27	<0.050	684	<2.0	37	<0.20	<30	
				7/31/2000		9.720	0.283	0.83	17.40	13.000	20200	6.0	119	0.30	110	
	3.65	EC2	Upstream Golf Course	6/21/2000		<0.050	<0.020	0.49	0.28	<0.050	755	<2.0	38	<0.20	<30	
				6/27/2000		<0.050	<0.020	0.43	0.34	<0.050	<200	<2.0	32	<0.20	<30	
				7/20/2000		<0.050	<0.020	0.43	<0.20	<0.050	<200	<2.0	32	<0.20	<30	
				7/31/2000		<0.050	<0.020	0.47	<0.20	<0.050	228	<2.0	31	<0.20	44	
	080 [Grand River below Paine Cr. to Lake Erie (except Big Cr.)]															
	03-004 Red Creek															
	0.50	G02G21	Mantle Rd.	6/3/2004		0.111	0.066	1.42	0.54	0.098	<200	2.4	60	<0.20	<30	
				6/24/2004		0.064	0.036	1.71	0.73	0.036	<200	<2.0	65	<0.20	<30	
				8/2/2004		0.084	0.033	1.54	0.68	0.066	<200	2.3	59	<0.20	<30	

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Copper (µg/l)	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
04110004050 [Mill Creek]															
010 [Mill Creek (2) headwaters to above Griggs Cr.]															
03-120 Mill Creek (Grand R. RM 41.28)															
	18.20	G02S04	Netcher Rd.	8/6/2003		<10	1,300	<2.0	4	36	<0.20	<40	<2	68	10
				8/27/2003		<10	950	<2.0	9	244	<0.20	<40	<2	102	<10
				9/10/2003		<10	476	<2.0	8	30	<0.20	<40	<2	123	<10
				9/23/2003		<10	2,720	2.1	5	96	<0.20	<40	<2	68	17
				10/9/2003		<10	246	<2.0	5	<10	<0.20	<40	<2	69	<10
				12/10/2003		<10	924	<2.0	7	58	<0.20	<40	<2	98	11
				4/29/2004		<10	951	<2.0	6	44	<0.20	<40	<2	78	<10
				6/3/2004		<10	1,070	<2.0	7	48	<0.20	<40	<2	94	<10
				6/24/2004		<10	895	<2.0	8	42	<0.20	<40	<2	150	<10
				7/12/2004		<10	397	<2.0	8	96	<0.20	<40	<2	125	<10
				8/2/2004		<10	1,400	<2.0	4	38	<0.20	<40	<2	49	<10
	25.67	G02G13	Clay Rd.	8/6/2003		<10	1,110	<2.0	9	43	<0.20	<40	<2	116	<10
				8/27/2003		<10	581	4.7	12	263	<0.20	<40	<2	169	17
				9/10/2003		<10	570	<2.0	10	45	<0.20	<40	<2	130	<10
				9/23/2003	FD	<10	2,160	6.7	5	35	<0.20	<40	<2	54	12
				9/23/2003	FD	<10	2,200	5.4	5	35	<0.20	<40	<2	54	11
				10/9/2003		<10	648	<2.0	8	19	<0.20	<40	<2	98	<10
				12/10/2003		25	1,800	3.6	8	84	<0.20	<40	<2	78	20
				4/29/2004	FD	<10	911	<2.0	7	65	<0.20	<40	<2	92	<10
				4/29/2004	FD	<10	904	<2.0	8	66	<0.20	<40	<2	94	<10
				6/3/2004		<10	1,170	<2.0	10	80	<0.20	<40	<2	122	<10
				6/24/2004		<10	966	<2.0	12	96	<0.20	<40	<2	142	<10
				7/12/2004	FD	<10	432	<2.0	12	568	<0.20	<40	<2	145	<10
				7/12/2004	FD	<10	449	<2.0	12	559	<0.20	<40	<2	142	<10
				8/2/2004	FD	<10	1,210	<2.0	5	34	<0.20	<40	<2	65	<10
				8/2/2004	FD	<10	1,230	<2.0	5	34	<0.20	<40	<2	66	<10
03-122 Askue Run															
	0.10	G02G19	Denmark Rd.	6/3/2004		<10	1,280	<2.0	6	126	<0.20	<40	<2	104	<10
				6/24/2004		<10	920	<2.0	6	70	<0.20	<40	<2	114	<10
				8/2/2004		<10	1,360	<2.0	3	66	<0.20	<40	<2	60	<10
03-123 Peters Creek															
	0.20	G02G20	Clay Rd.	6/3/2004		<10	1,180	<2.0	10	91	<0.20	<40	<2	123	13
				6/24/2004		<10	774	<2.0	11	76	<0.20	<40	<2	137	<10
				8/2/2004		<10	1,160	<2.0	4	49	<0.20	<40	<2	51	<10

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Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Copper (µg/l)	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
020 [Griggs Creek]															
	03-121 Griggs Creek														
	2.05	G02G12	Giddings Rd.	8/6/2003		<10	1,390	<2.0	7	103	<0.20	<40	<2	111	<10
				8/27/2003	FD	<10	1,360	<2.0	7	103	<0.20	<40	<2	110	<10
				8/27/2003	FD	<10	712	<2.0	5	137	<0.20	<40	<2	80	<10
				9/10/2003		<10	963	<2.0	6	76		<40	<2	93	<10
				9/23/2003		<10	2,050	2.0	4	44	<0.20	<40	<2	66	14
				10/9/2003		<10	817	<2.0	5	29	<0.20	<40	<2	69	<10
				12/10/2003		<10	1,620	<2.0	5	100	<0.20	<40	<2	78	<10
				4/29/2004		<10	1,260	<2.0	5	68	<0.20	<40	<2	68	<10
				6/3/2004		<10	1,550	<2.0	6	116	<0.20	<40	<2	86	<10
				6/24/2004		<10	1,410	<2.0	6	133	<0.20	<40	<2	93	10
				7/12/2004		<10	1,720	<2.0	3	172	<0.20	<40	<2	58	<10
				8/2/2004		<10	1,160	<2.0	3	33	<0.20	<40	<2	40	<10
030 [Mill Creek (2) below Griggs Cr. to Grand R.]															
	03-120 Mill Creek (Grand R. RM 41.28)														
	3.50	G02G18	SR 45	6/3/2004		<10	739	<2.0	7	41	<0.20	<40	<2	99	<10
				6/24/2004		<10	710	<2.0	7	37	<0.20	<40	<2	109	<10
				8/2/2004		<10	1,710	<2.0	4	48	<0.20	<40	<2	50	<10
				8/9/2004											
	4.09	G02G11	Forman Rd.	8/6/2003		<10	1,150	2.2	6	48	<0.20	<40	<2	102	14
				8/27/2003		<10	236	<2.0	8	26	<0.20	<40	<2	131	<10
				9/10/2003		<10	402	<2.0	7	19		<40	<2	127	<10
				9/23/2003		<10	1,660	2.1	5	58	<0.20	<40	<2	89	12
				10/9/2003	FD	<10	871	<2.0	5	14	<0.20	<40	<2	79	<10
				10/9/2003	FD	<10	904	<2.0	5	13	<0.20	<40	<2	77	<10
				12/10/2003		<10	1,180	<2.0	7	56	<0.20	<40	<2	108	<10
				4/29/2004		<10	1,020	<2.0	6	37	<0.20	<40	<2	82	<10
				6/3/2004		<10	858	<2.0	7	39	<0.20	<40	<2	98	<10
				6/24/2004		<10	771	<2.0	7	31	<0.20	<40	<2	106	<10
				7/12/2004		<10	1,990	2.9	6	82	<0.20	<40	<2	100	<10
				8/2/2004		<10	1,590	<2.0	4	45	<0.20	<40	<2	49	10
	6.49	G02G17	Mill Creek Rd.	8/28/2003		<10	267	<2.0	10	26	<0.20	<40	<2	170	<10
				9/10/2003		<10	372	<2.0	8	20		<40	<2	136	<10
				10/9/2003		<10	874	<2.0	5	16	<0.20	<40	<2	78	<10
	10.00	G02S05	Doyle Rd.	8/28/2003		<10	448	<2.0	6	98	<0.20	<40	<2	94	<10
				9/10/2003		<10	481	<2.0	7	32		<40	<2	126	<10
				10/9/2003		<10	865	<2.0	5	19	<0.20	<40	<2	74	<10

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Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Copper (µg/l)	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
03-124 Cemetery Creek	0.07	G02S07	Hickok Rd.	8/28/2003		<10	895	<2.0	11	48	<0.20	<40	<2	210	15
				9/10/2003		<10	267	<2.0	14	22		<40	<2	245	13
				10/9/2003		<10	409	<2.0	13	25	<0.20	<40	<2	218	<10
	1.25	G02S08	dst Jefferson WWTP	8/28/2003		13	1,960	2.0	13	51	<0.20	<40	<2	205	47
				9/10/2003		<10	150	<2.0	15	28		<40	<2	241	17
				10/9/2003		<10	437	<2.0	13	31	<0.20	<40	<2	221	<10
	2.10	G02S09	ust WWTP/dst Elm St.	8/28/2003		<10	820	<2.0	9	186	<0.20	<40	<2	232	<10
				9/10/2003		<10	369	<2.0	11	77		<40	<2	270	<10
				10/9/2003		<10	507	<2.0	9	29	<0.20	<40	<2	194	<10

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04110004060 [Grand River (below Mill Creek to Lake Erie)]																
010 [Grand River below Mill Cr. (2) to below Coffee Cr.]																
03-021 Coffee Creek																
	0.06	G02W03	Lampson Rd.	6/27/2000		<2	2,180	<2.0	12	120		<40	<2	182	14	
				7/20/2000		4	1,100	<2.0	12	92		<40	<2	197	21	
				7/31/2000		3	1,110	<2.0	14	85		<40	<2	201	19	
				8/22/2000		3	476	<2.0	14	57		<40	<2	204	11	
	1.27	G02G01	Dst Austinburg WWTP	6/27/2000		7	3,440	<2.0	13	194		<40	<2	207	21	
				7/20/2000		3	1,710	<2.0	13	174		<40	<2	197	22	
				7/31/2000		3	1,110	<2.0	14	211		<40	<2	200	25	
				8/22/2000		6	1,240	<2.0	14	140		<40	<2	215	72	
	1.96	G02W01	SR 307	6/27/2000		2	1,640	<2.0	13	174		<40	<2	210	14	
				7/20/2000		<2	1,220	<2.0	12	176		<40	<2	181	10	
				7/31/2000		<2	583	<2.0	13	274		<40	<2	194	12	
				8/22/2000		<2	688	<2.0	14	108		<40	<2	190	<10	
	2.17	G02W02	College St.	6/27/2000		<2	1,710	<2.0	13	213		<40	<2	205	<10	
				7/20/2000		<2	1,560	<2.0	13	217		<40	<2	181	16	
				7/31/2000		<2	728	<2.0	13	248		<40	<2	181	15	
				8/22/2000		<2	814	<2.0	14	151		<40	<2	194	<10	
	030 [Mill Creek (3)]															
	03-009 Mill Creek (Grand R. RM 23.58)															
		1.38	G02G10	Doty Rd.	8/27/2003		<10	50	3.0	8	<10	<0.20	<40	<2	118	<10
					9/10/2003		<10	71	<2.0	6	10		<40	<2	99	<10
9/23/2003						<10	1,030	<2.0	4	23	<0.20	<40	<2	55	11	
10/9/2003						<10	780	<2.0	6	14	<0.20	<40	<2	73	<10	
12/10/2003																
8/6/2003						<10	50	<2.0	6	<10	<0.20	<40	<2	88	<10	
4/29/2004						<10	313	<2.0	5	11	<0.20	<40	<2	59	<10	
6/3/2004						<10	108	<2.0	6	<10	<0.20	<40	<2	78	<10	
6/24/2004						<10	91	<2.0	8	<10	<0.20	<40	<2	108	<10	
7/12/2004						10	14,400	12.8	9	330	<0.20	<40	<2	102	50	
8/2/2004						<10	519	<2.0	6	16	<0.20	<40	<2	84	<10	
8/9/2004																
1.60		G02G27	Mosely & Short Rds	6/3/2004		<10	369	<2.0	7	26	<0.20	<40	<2	95	<10	
				6/24/2004		<10	255	<2.0	9	30	<0.20	<40	<2	132	<10	
				8/2/2004		<10	766	<2.0	7	39	<0.20	<40	<2	110	<10	
				8/9/2004												

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03-009 Mill Creek (Grand R. RM 23.58) (cont.)	5.00	G02G26	Aitkins Rd.	6/3/2004		<10	405	<2.0	5	16	<0.20	<40	<2	51	<10			
				6/24/2004		<10	317	<2.0	6	17	<0.20	<40	<2	66	18			
				8/2/2004		<10	896	<2.0	4	24	<0.20	<40	<2	45	<10			
	040 [Grand River below Mill Cr. (3) to above Paine Cr.]																	
	03-032 Talcott Creek	0.20	G02G29	Stoney Glen Camp	6/3/2004		<10	86	<2.0	6	<10	<0.20	<40	<2	78	<10		
					6/24/2004		<10	50	<2.0	8	<10	<0.20	<40	<2	101	<10		
					8/2/2004		<10	252	<2.0	6	10	<0.20	<40	<2	88	<10		
	050 [Paine Creek]																	
03-110 Paine Creek	0.46	G02P01	Seely Rd.	8/6/2003		<10	85	<2.0	6	10	<0.20	<40	<2	81	<10			
				8/27/2003	FD	<10	51	<2.0	8	<10	<0.20	<40	<2	98	<10			
				8/27/2003	FD	<10	55	<2.0	8	<10	<0.20	<40	<2	97	<10			
				9/10/2003		<10	78	<2.0	8	<10	<0.20	<40	<2	99	<10			
				9/23/2003		<10	1,270	<2.0	5	41	<0.20	<40	<2	64	23			
				10/9/2003	FD	<10	194	<2.0	6	<10	<0.20	<40	<2	72	<10			
				10/9/2003	FD	<10	200	<2.0	6	<10	<0.20	<40	<2	72	<10			
				12/10/2003														
				4/29/2004		<10	228	<2.0	6	11	<0.20	<40	<2	70	<10			
				6/3/2004	FD	<10	84	<2.0	7	11	<0.20	<40	<2	81	<10			
				6/3/2004	FD	<10	92	<2.0	7	13	<0.20	<40	<2	78	<10			
				6/24/2004	FD	<10	176	<2.0	8	17	<0.20	<40	<2	96	14			
				6/24/2004	FD	<10	166	<2.0	8	15	<0.20	<40	<2	103	16			
				7/12/2004	FD	<10	1,200	2.6	8	48	<0.20	<40	<2	97	<10			
				7/12/2004	FD	<10	1,200	2.9	7	46	<0.20	<40	<2	95	<10			
				8/2/2004		<10	389	<2.0	6	17	<0.20	<40	<2	78	<10			
				5.60	G02G35	Leroy Center Rd.	6/3/2004		<10	439	<2.0	6	27	<0.20	<40	<2	79	<10
							6/24/2004		<10	73	<2.0	9	<10	<0.20	<40	<2	106	<10
							8/2/2004		<10	811	<2.0	6	38	<0.20	<40	<2	78	<10
							8/9/2004											
				03-111 Bates Creek														
				3.30	G02G36	SR 166	6/3/2004		<10	551	<2.0	7	89	<0.20	<40	<2	95	<10
							6/24/2004		<10	1,290	<2.0	8	166	<0.20	<40	<2	107	<10
							8/2/2004		<10	950	<2.0	6	50	<0.20	<40	<2	81	<10
				0.52	G02G40	Leroy-Thompson Rd.	6/24/2004		<10	1,290	<2.0	8	166		<40	<2	107	<10
							8/2/2004		<10	811	<2.0	6	38	<0.20	<40	<2	78	<10
							6/3/2004		<10	439	<2.0	6	27	<0.20	<40	<2	79	<10

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03-112 Phelps Creek															
	0.10	G02G37	Leroy-Thompson Rd.	6/3/2004		<10	150	<2.0	9	22	<0.20	<40	<2	103	<10
				6/24/2004		<10	134	<2.0	11	14	<0.20	<40	<2	131	<10
				8/2/2004		<10	556	<2.0	7	26	<0.20	<40	<2	94	<10
03-113 Talcott Creek															
	0.40	G02G38	Leroy-Thompson Rd.	6/3/2004		<10	106	<2.0	12	<10	<0.20	<40	<2	111	<10
				6/24/2004		<10	59	<2.0	15	<10	<0.20	<40	<2	134	<10
				8/2/2004		<10	454	<2.0	10	59	<0.20	<40	<2	104	<10
060 [Big Creek (except Kellogg Cr.)]															
03-100 Big Creek															
	2.47	G02W23	Fay Rd.	8/6/2003	FD	<10	50	<2.0	16	<10	<0.20	<40	<2	185	<10
				8/6/2003	FD	<10	50	<2.0	16	<10	<0.20	<40	<2	182	<10
				8/27/2003		<10	236	<2.0	14	14	<0.20	<40	<2	181	11
				9/10/2003		<10	91	<2.0	16	<10		<40	<2	170	<10
				9/23/2003		<10	2,190	2.4	7	51	<0.20	<40	<2	88	13
				10/7/2003		<10	184	<2.0	11	13		<40	<2	126	<10
				12/10/2003	FD										
				4/29/2004		<10	132	<2.0	11	16	<0.20	<40	<2	120	<10
				6/3/2004		<10	66	<2.0	14	11	<0.20	<40	<2	153	11
				6/24/2004		<10	118	<2.0	16	11	<0.20	<40	<2	181	<10
				7/12/2004		<10	6,170	5.2	14	211	<0.20	<40	<2	178	27
				8/2/2004		<10	341	<2.0	10	16	<0.20	<40	<2	130	<10
	4.98	G02W22	Williams Rd.	8/28/2003		<10	56	<2.0	13	<10	<0.20	<40	<2	168	<10
				9/10/2003		<10	100	<2.0	16	<10		<40	<2	196	<10
				10/7/2003		<10	176	<2.0	10	12		<40	<2	128	<10
	9.35	G02G16	SR 608	8/28/2003		<10	173	<2.0	13	39	<0.20	<40	<2	173	<10
				9/10/2003		<10	162	<2.0	16	31		<40	<2	208	<10
				10/7/2003		<10	198	<2.0	12	28		<40	<2	150	<10
	14.06	G02S15	Woodin Rd.	8/28/2003	FD	<10	204	<2.0	12	31	<0.20	<40	<2	197	14
				8/28/2003	FD	<10	210	<2.0	12	30	<0.20	<40	<2	196	13
				9/10/2003		<10	210	<2.0	15	25		<40	<2	258	26
				10/7/2003		<10	281	<2.0	12	23		<40	<2	177	13
	15.80	G02W21	Dst Chardon WWTP	8/28/2003		<10	104	<2.0	16	<10	<0.20	<40	<2	258	50
				9/10/2003		<10	141	<2.0	17	<10		<40	<2	290	71
				10/7/2003		<10	266	<2.0	14	41		<40	<2	241	31

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Copper (µg/l)	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
03-100 Big Creek (cont.)															
	16.42	G02S16	U.S. 6	8/28/2003		<10	739	<2.0	12	308	<0.20	<40	<2	146	<10
				9/10/2003		<10	266	<2.0	15	43		<40	<2	252	<10
				10/7/2003		<10	298	<2.0	9	75		<40	<2	101	<10
03-101 Gordon Creek															
	0.50	G02G31	Alexander Rd.	6/3/2004		<10	124	<2.0	15	50	<0.20	<40	<2	143	<10
				6/24/2004		<10	163	<2.0	18	47	<0.20	<40	<2	180	<10
				8/2/2004		<10	304	<2.0	14	51	<0.20	<40	<2	155	<10
03-102 East Creek															
	1.20	G02G32	Callow Rd.	6/3/2004		<10	170	<2.0	9	15	<0.20	<40	<2	101	<10
				6/24/2004		<10	155	<2.0	11	17	<0.20	<40	<2	129	<10
				8/2/2004		<10	453	<2.0	7	20	<0.20	<40	<2	88	<10
03-104 Jenks Creek															
	0.10	G02W24	Robinson Rd.	8/28/2003		<10	204	<2.0	12	14	<0.20	<40	<2	132	<10
				9/10/2003		<10	202	<2.0	13	10		<40	<2	145	<10
				10/7/2003		<10	625	<2.0	7	11		<40	<2	84	<10
03-105 Cutts Creek															
	1.20	G02G33	Cutts Rd.	6/3/2004		<10	120	<2.0	11	34	<0.20	<40	<2	128	<10
				6/24/2004		<10	134	<2.0	12	35	<0.20	<40	<2	149	<10
				8/2/2004		<10	470	<2.0	10	30	<0.20	<40	<2	139	<10
070 [Kellogg Creek]															
03-005 Kellogg Creek															
	0.20	G02G23	SR 86	6/3/2004		<10	228	<2.0	16	50	<0.20	<40	<2	187	<10
				6/24/2004		<10	180	<2.0	18	31	<0.20	<40	<2	222	<10
				8/2/2004		<10	1,100	<2.0	10	32	<0.20	<40	<2	126	<10
	4.20	G02G25	Brenel Rd.	6/3/2004		<10	459	<2.0	20	176	<0.20	<40	<2	208	<10
				6/24/2004		<10	760	<2.0	23	245	<0.20	<40	<2	249	<10
				8/2/2004		<10	670	<2.0	14	148	<0.20	<40	<2	178	<10
03-006 Ellison Creek															
	0.57	G02P10	Prouty Rd.	6/21/2000		2	1,120	<2.0	13	38		<40	8	139	14
				6/27/2000		<2	552	<2.0	13	29		<40	<2	153	<10
				7/20/2000		<2	189	<2.0	18	15		<40	<2	198	<10
				7/31/2000		9	12,000	13.0	15	362		<40	<2	144	60
	1.27	G02G39	Pinehill Rd.	6/3/2004		<10	257	<2.0	14	45	<0.20	<40	<2	172	21
				6/24/2004		<10	491	<2.0	14	43	<0.20	<40	<2	208	35
				8/2/2004		<10	800	<2.0	11	56	<0.20	<40	<2	154	26

*FD = Field Duplicate

Appendix 1.1. Surface water analytical results for the non-Large River Assessment Unit sampling sites within the lower Grand River study area, 1999-2004.

Assessment Unit/ HUC 14 Watershed	River Code/ Stream Name/ River Mile	STORET Station	Location	Date	QA/QC*	Copper (µg/l)	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
03-006 Ellison Creek (cont.)															
	2.00	EC1	River Run Dr.	6/21/2000		<2	1,090	<2.0	11	50		<40	<2	108	16
				6/27/2000		<2	1,480	<2.0	11	67		<40	<2	120	20
				7/20/2000		<2	779	<2.0	15	97		<40	<2	149	15
				7/31/2000		13	29,200	25.0	16	1050		45	<2	141	155
	3.65	EC2	Upstream Golf Course	6/21/2000		3	1,190	<2.0	10	72		<40	<2	103	16
				6/27/2000		<2	190	<2.0	10	10		<40	<2	105	14
				7/20/2000		<2	50	<2.0	11	<10		<40	<2	115	12
				7/31/2000		<2	486	<2.0	11	13		<40	<2	114	11
080 [Grand River below Paine Cr. to Lake Erie (except Big Cr.)]															
03-004 Red Creek															
	0.50	G02G21	Mantle Rd.	6/3/2004		<10	455	3.1	23	229	<0.20	<40	<2	282	79
				6/24/2004		<10	591	<2.0	23	124	<0.20	<40	<2	310	<10
				8/2/2004		<10	584	<2.0	19	84	<0.20	<40	<2	275	<10

Appendix 1.2

Water Chemistry Data from the 1999 - 2004 Survey of the Grand River Mainstem (Large River Hydrologic Unit)

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Temperature	Dissolved	D.O.		Specific	Alkalinity-	Hardness-	Total	Total
Mile/	Station	Location	Date	QA/QC*	(deg C)	Oxygen	Saturation	pH	Conductance-	CaCO3	CaCO3	Dissolved	Suspended
						(mg/l)	(%)	(S.U.)	Field	(mg/l)	(mg/l)	Solids	Solids
									(µmhos/cm)			(mg/l)	(mg/l)
39.90	G02G15	Cork Cold Spring Rd.											
			8/6/2003		21.89	8.08	92.2	7.55	259	68.3	96.0	182	31
			8/27/2003		22.66	5.88	68.0	7.43	340	101.0	131.0	222	12
			9/10/2003		19.21	6.86	74.3	7.57	316	84.0	122.0	224	11
			10/9/2003		11.58	10.08	92.7	7.41	187	73.6	91.0	162	14
			4/29/2004		13.04	9.91	94.2	7.62	210	74.5	91.0	222	<5
			6/3/2004		18.35	7.52	80.1	7.42	247	87.5	110.0	180	16
			6/24/2004		20.84	9.02	100.9	7.54	456	127.0	128.0	200	18
			7/12/2004		21.62	6.30	71.6	7.75	347	113.0	131.0	230	10
			8/2/2004		21.29	6.43	72.6	7.37	135	42.5	56.0	116	68
36.38	G02W04	Upstream Coffee Creek											
			6/27/2000		23.80	6.30		7.60	219	78.0	96.2	184	14
			7/20/2000		21.10	6.50		7.70	316	101.0	149.0	258	13
			7/31/2000		23.70	7.90		7.90	290	101.0	134.0	213	18
			8/22/2000		19.60	7.30		7.70	290	96.0	131.0	224	13
36.30	G02W17	Tote Rd.											
			6/27/2000		22.90	5.50		7.40	220	79.0	96.2	180	11
35.40	G02G03	Downstream Coffee Creek											
			7/20/2000		21.20	7.10		7.70	318	102.0	149.0	269	13
			7/31/2000		23.50	7.50		7.90	296	101.0	140.0	220	12
			8/22/2000		19.50	7.20		7.90	292	96.0	131.0	224	10
34.42	G02W18	Sexton Rd.											
			8/6/2003		22.73	5.48	63.6	7.09	269	77.3	103.0	182	20
			8/27/2003		26.04	10.27	126.7	8.12	316	87.1	113.0	206	8
			9/10/2003	FD	20.03	8.16	89.9	7.79	314	80.0	110.0	218	7
			9/10/2003	FD	20.03	8.16	89.9	7.79	314	78.4	110.0	216	8
			9/23/2003		16.98	7.75	80.2	7.61	214	58.1	77.0	184	71
			10/9/2003		11.06	10.16	92.3	8.08	192	73.6	91.0	150	14
			12/10/2003		1.75	13.81	99.2	7.61	145	64.5	103.0	182	6
			4/29/2004		12.68	10.82	102.0	7.76	228	73.8	94.0	180	12
			6/3/2004	FD	19.02	6.81	73.5	7.34	240	80.2	105.0	180	17
			6/3/2004	FD	19.02	6.81	73.5	7.34	240	82.8	99.0	186	16
			6/24/2004	FD	21.41	7.51	85.1	7.53	449	114.0	122.0	202	14
			6/24/2004	FD	21.41	7.51	85.1	7.53	449	109.0			
			7/12/2004		22.61	6.53	75.6	7.62	337	94.3	122.0	206	35
			8/2/2004	FD	21.44	6.36	72.0	7.29	134	42.2	56.0	122	70
			8/2/2004	FD	21.44	6.36	72.0	7.29	134	42.6	56.0	120	70

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Temperature	Dissolved	D.O.		Specific	Alkalinity-	Hardness-	Total	Total
Mile/	Station	Location	Date	QA/QC*	(deg C)	Oxygen	Saturation	pH	Conductance-	CaCO3	CaCO3	Dissolved	Suspended
						(mg/l)	(%)	(S.U.)	Field	(mg/l)	(mg/l)	Solids	Solids
									(µmhos/cm)			(mg/l)	(mg/l)
28.42	G02W19	Brandt Rd.	8/28/2003		22.20	8.86	101.8	8.06	277	86.7	105.0	178	6
			9/10/2003		20.31	6.72	74.4	8.34	309	77.5	110.0	214	5
			10/9/2003		10.56	11.40	102.4	7.95	185	71.8	91.0	166	8
22.10	502510	SR 528	8/6/2003		22.96	9.24	107.7	8.10	255	73.5	96.0	176	<5
			8/27/2003		25.96	8.95	110.3	8.00	295	75.9	105.0	186	<5
			9/10/2003		20.79	8.82	98.6	8.49	310	78.0	110.0	216	<5
			10/9/2003		11.06	11.26	102.3	7.78	185	69.0	91.0	158	8
16.42	G02G14	Blair Rd.	8/27/2003		26.15	8.55	105.7	7.79	311	75.2	105.0	196	6
			9/10/2003		20.46	9.18	102.0	8.49	304	76.9	108.0	208	5
			9/23/2003		16.82	8.59	88.6	7.60	244	65.9	94.0	192	55
			10/9/2003		12.11	10.99	102.3	7.63	190	70.1	85.0	162	8
			12/10/2003		2.03	14.33	103.7	7.76	139	53.3	91.0	172	10
			4/29/2004		13.73	12.15	117.3	8.16	229	68.2	91.0	172	9
			6/3/2004		19.58	9.32	101.7	8.11	217	81.2	99.0	184	6
			6/24/2004		24.36	11.06	132.4	8.70	289	102.0	108.0	196	<5
			7/12/2004		25.41	7.32	89.4	7.96	371	99.1	131.0	218	9
			8/2/2004		22.26	8.36	96.1	7.51	116	41.8	56.0	120	62
13.60	G02W14	Vrooman Rd.	8/6/2003		23.08	8.05	94.0	7.84	274	71.6	96.0	182	11
			8/28/2003		24.22	7.98	95.3	7.93	309	77.8	105.0	156	<5
			9/10/2003		20.48	7.20	80.0	8.23	311	76.6	110.0	210	5
			10/9/2003		12.70	10.75	101.4	7.64	195	68.0	91.0	154	8
			8/9/2004		22.86	8.93	103.9	8.08	272			160	8
8.45	502530	SR 84 Gage Location	1/19/1999							54.0	178.0	618	23
			2/24/1999		0.00	14.10		8.20	202	42.0	109.0	218	<5
			3/23/1999		5.58	12.84		7.73	154	37.0	93.7	174	9
			4/13/1999		10.60	10.97		7.40	139	33.0	74.6	174	63
			5/10/1999		20.03	10.14		8.04	295	72.0	136.0	228	5
			6/2/1999		21.58	8.15		7.84	293	76.0	113.0	206	<5
			7/7/1999		25.40	7.19		7.83	317	60.0	108.0	232	42.5
			8/9/1999		24.10	8.80		8.07	462	117.0	168.0	280	34.5
			9/27/1999		16.92	9.43		7.93	421	97.0	162.0	308	12
			10/12/1999		13.43	10.94		8.06	327	100.0	171.0	294	11.5
			11/4/1999		6.90	11.77		7.04	100	32.9	67.2	144	97.5
			12/14/1999		4.61	12.20			165	57.0	109.0	216	198

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Temperature	Dissolved	D.O.		Specific	Alkalinity-	Hardness-	Total	Total
Mile/	Station	Location	Date	QA/QC*	(deg C)	Oxygen	Saturation	pH	Conductance-	CaCO3	CaCO3	Dissolved	Suspended
						(mg/l)	(%)	(S.U.)	Field	(mg/l)	(mg/l)	Solids	Solids
									(µmhos/cm)			(mg/l)	(mg/l)
8.45	502530	SR 84 Gage Location (cont.)											
			1/11/2000		3.00	12.69		6.84	143	45.0	91.2	174	24
			2/9/2000		0.08	13.76		7.79	255	78.0	150.0	332	<5
			3/6/2000		4.76	12.63		7.85	171	55.0	100.0	220	7.5
			4/11/2000		6.32	11.86		7.64	99	38.0	65.5	142	50
			5/24/2000		15.64	9.59		7.66	147	49.2	77.1	170	32
			6/14/2000		23.20	8.83		8.06	192	65.9	84.6	166	43
			7/24/2000		22.17	8.29		8.59	328	132.0	152.0	362	<5
			8/8/2000		23.28	8.16		7.81	274	60.0	84.6	172	23
			8/22/2000		22.26	9.37		8.26	328	96.0	148.0	250	<5
			9/19/2000		18.29	8.81		8.10	373	109.0	147.0	262	<5
			10/30/2000		8.62	12.20		7.98	275	102.0	143.0	257	<5
			11/15/2000		3.54	14.10		8.16	217	111.0	145.0	300	<5
			12/4/2000		0.08	15.07		7.68	143	63.0	105.0	208	8
			1/22/2001		0.08	14.22	97.6	7.55	215	57.6	107.0	254	5
			2/8/2001		0.31	14.10		7.48	210	47.3	99.0	240	6
			3/14/2001		2.75	12.62		7.80	171	35.0	76.0	204	210
			4/3/2001		6.33	12.09		8.12	217	47.6	89.0	208	<5
			5/30/2001		13.66	9.52		7.65	336	72.4	119.0	264	17
			6/5/2001		15.85	10.70	108.0	8.04	357	74.0	117.0	260	7
			7/12/2001		25.83	9.96	122.5	8.56	360	78.6	105.0	220	13
			8/1/2001		27.69	8.80	111.9	8.26	507	92.9	157.0	290	7
			9/10/2001		23.17	7.32	85.8	8.00	529	119.0	174.0	344	5
			10/1/2001		14.82	11.06	109.4	8.17	423	101.0	156.0	340	<5
			11/13/2001		6.36	14.83		7.85	247	86.6	140.0	276	<5
			1/23/2002		0.79	14.30	99.8	8.25	231	64.5	119.0	256	<5
			2/25/2002		3.54	13.59	102.5	7.50	205	58.4	108.0	212	10
			3/28/2002		3.63	13.34	100.9	7.58	186	41.9	80.0	192	138
			4/10/2002		8.00	12.59	106.4	7.90	193	56.1	87.0	10	21
			4/24/2002		12.95	11.99	113.7	8.05	239	71.4	108.0	206	<5
			5/22/2002		14.10	13.54	131.8	7.92	200	64.7	91.0	174	13
			6/3/2002		19.56	8.56	93.4	8.05	287	98.2	128.0	212	6
			7/2/2002		31.40	8.10	109.8	8.19	423	96.8	136.0	248	6
			8/5/2002		27.60	7.13	90.5	7.97	488	125.0	166.0	292	11
			9/23/2002		17.85	8.58	90.5	8.00	389	106.0	163.0	306	7
			10/9/2002		15.49	12.34	123.9	8.41	386	108.0	168.0	324	8
			11/18/2002		3.96	14.99	114.4	8.14	307	104.0	185.0	346	<5
			12/12/2002		0.49	15.57	108.2	8.60	398	81.1	181.0	460	<5
			1/29/2003		0.20	12.80	88.2	7.47	312	75.4	148.0	336	<5

*FD = Field Duplicate

River	STORET				Temperature	Dissolved	D.O.		Specific	Alkalinity-	Hardness-	Total	Total
Mile/	Station	Location	Date	QA/QC*	(deg C)	Oxygen	Saturation	pH	Conductance-	CaCO3	CaCO3	Dissolved	Suspended
						(mg/l)	(%)	(S.U.)	Field	(mg/l)	(mg/l)	Solids	Solids
									(µmhos/cm)			(mg/l)	(mg/l)
8.45	502530	SR 84 Gage Location (cont.)											
			3/17/2003		0.89	13.51	94.8	7.69	122	32.3	67.0	144	294
			4/16/2003		15.56	10.18	102.3	7.70	269	58.1	96.0	202	5
			5/6/2003		15.75	10.05	101.4	7.65	206	49.3	90.0	194	734
			6/9/2003		18.26	8.43	89.7	7.61	318	76.2	110.0	240	5
			7/23/2003		20.19	7.54	83.3	7.43	160	42.5	66.0	320	148
			7/31/2003		22.55	7.44	86.0	7.84	241	66.6	85.0	166	6
			8/6/2003		23.18	7.85	91.9	7.74	318	74.5	105.0	200	8
			8/27/2003		24.06	7.76	92.5	7.74	496	96.7	150.0	326	12
			9/10/2003		20.60	8.60	95.8	8.21	344	81.5	119.0	224	5
			9/23/2003		16.88	8.77	90.6	7.72	239	64.2	85.0	180	48
			10/9/2003		13.11	10.65	101.4	7.65	224	74.5	96.0	172	6
			12/10/2003		2.42	15.26	111.7	7.83	199	66.4	119.0	222	8
			4/29/2004		12.99	11.06	105.1	7.88	243	69.6	94.0	190	8
			6/3/2004		20.17	9.11	100.6	7.99	268	87.2	122.0	218	5
			6/24/2004		23.14	9.02	105.5	8.29	324	108.0	115.0	210	<5
			7/12/2004		24.70	7.34	88.5	7.95	518	118.0	169.0	314	7
			8/2/2004		22.07	7.80	89.4	7.69	145	43.3	56.0	130	80
			8/9/2004	FD	23.26	9.03	105.9	8.14	308			178	7
			8/9/2004	FD	23.26	9.03	105.9	8.14	308			174	5
			11/4/2004		10.38	10.52	94.1	7.73	275	78.3	124.0	236	21
			12/7/2004		4.96	12.71	99.5	7.52	165	53.3	95.0	168	9
6.10	G02S13	Recreation Park											
			8/28/2003	FD	25.54	9.18	112.4	8.13	483	94.1	141.0	290	7
			8/28/2003	FD	25.54	9.18	112.4	8.13	483	94.1	141.0	290	7
			9/10/2003		22.62	10.65	123.4	8.58	349	82.4	119.0	232	<5
			10/9/2003		13.31	10.90	104.3	7.72	221	72.5	94.0	172	7
			8/17/2004		24.20	14.56	173.8	9.04	361	91.8	127.0	242	<5
			9/7/2004		23.05	8.81		7.86	452	106.0	157.0	282	<5
			10/5/2004		15.23	12.27		8.97	332	91.2	131.0	232	<5
			10/12/2004		15.37	13.42		9.05	395	102.0	136.0	246	<5
4.80	G02P14	Upstream Red Creek											
			8/17/2004		23.61	13.80		8.83	406	93.3	144.0	260	<5
		Spatial Cor	9/7/2004		23.02	9.04		8.46	489	106.0	169.0	312	<5
		Spatial Cor	10/5/2004		15.33	12.59		8.98	365	93.3	144.0	254	<5
		Spatial Cor	10/12/2004		15.98	12.23		8.86	437	100.0	146.0	264	<5

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Temperature	Dissolved	D.O.		Specific	Alkalinity-	Hardness-	Total	Total
Mile/	Station	Location	Date	QA/QC*	(deg C)	Oxygen	Saturation	pH	Conductance-	CaCO3	CaCO3	Dissolved	Suspended
						(mg/l)	(%)	(S.U.)	Field	(mg/l)	(mg/l)	Solids	Solids
									(µmhos/cm)			(mg/l)	(mg/l)
4.00	G02P18	Downstream D.S. Swale											
			8/17/2004		21.13	9.96		8.32	526	95.1	178.0	336	<5
		Spatial Composite	9/7/2004	FD	22.37	7.38		8.03	551	108.0	178.0	330	10
		Spatial Composite	9/7/2004	FD	22.37	7.38		8.03	551	107.0	187.0	328	11
		Spatial Composite	10/5/2004		12.47	10.12		8.12	467	96.5	164.0	306	<5
		Spatial Composite	10/12/2004		13.24	9.51		8.36	561	103.0	180.0	334	<5
3.60	G02P19	Pipe Bridge											
			8/17/2004		22.03	9.78		8.64	842	92.2	258.0	642	5
		Spatial Composite	9/7/2004		22.81	7.08		8.01	1,952	106.0	270.0	652	9
		Grab (river right botto	9/7/2004		23.14	6.73		7.44	7,089	100.0	1120.0	3,430	17
		Spatial Composite	10/5/2004		12.57	9.85		8.49	572	95.0	178.0	346	<5
		Spatial Composite	10/12/2004		13.73	9.60		8.54	853	98.1	240.0	492	5
3.10	G02S14	Upstream Painesville WWTP											
			8/17/2004	FD	22.95	11.68		8.74	824	92.0	271.0	666	5
		Spatial Composite	8/17/2004	FD	22.95	11.68		8.74	824	92.7	266.0	654	6
		Spatial Composite	9/7/2004		23.71	8.28		8.44	849	103.0	250.0	598	10
		Spatial Composite	10/5/2004		13.35	10.77		8.76	597	94.6	203.0	452	8
		Spatial Composite	10/12/2004		14.76	9.99		8.60	748	100.0	223.0	460	5
2.76	G02P21	St. Clair Ave.											
			8/17/2004		22.87	10.83		8.54	725	93.6	226.0	516	9
		Spatial Composite	9/7/2004		23.62	8.48		8.42	720	104.0	205.0	454	13
		Spatial Composite	10/5/2004	FD	14.50	9.25		8.47	662	101.0	213.0	448	7
		Spatial Composite	10/5/2004	FD	14.50	9.25		8.47	662	99.3	213.0	456	7
		Spatial Composite	10/12/2004		15.33	9.11		8.54	825	108.0	235.0	510	6
2.30	502520	SR 535											
			8/6/2003		24.11	7.16	85.4	7.88	498	65.8	146.0	336	38
			8/27/2003		25.00	5.35	65.0	7.47	957	83.9	263.0	726	15
			9/10/2003		22.30	9.41	108.5	8.41	534	83.5	168.0	378	10
			9/23/2003		17.00	8.66	89.7	7.77	258	63.6	87.0	194	46
			10/9/2003		13.02	10.29	97.8	7.64	341	76.0	131.0	272	8
			12/10/2003		2.47	14.60	107.0	7.63	233	65.9	142.0	262	<5
			4/29/2004		12.34	10.55	98.7	8.01	354	74.9	124.0	268	8
			6/3/2004		20.82	8.43	94.3	7.97	484	85.2	189.0	390	11
			6/24/2004		23.53	9.05	106.7	8.21	561	109.0	175.0	396	18
			7/12/2004		25.35	9.41	114.9	8.35	836	93.8	248.0	546	26
			8/2/2004		21.98	7.81	89.3	7.72	150	44.0	59.0	124	101

*FD = Field Duplicate

River	STORET				Specific Conductance- Lab	BOD 5	COD	Calcium	Chloride	Potassium	Sodium	Sulfate	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)
Mile/	Station	Location	Date	QA/QC*	(µmhos/cm)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(µg/l)	(mg/l)	(mg/l)		
39.90	G02G15	Cork Cold Spring Rd.												
			8/6/2003		282	<2.0	24	27	27.8	4	18	20.5	<0.050	<0.020
			8/27/2003		356	<2.0	26	36	27.2	4	18	24.1	<0.050	<0.020
			9/10/2003		374	<2.0	22	34	38.6	4	24	30.7	<0.050	<0.020
			10/9/2003		267	<2.0	27	25	21.6	3	13	22.7	<0.050	<0.020
			4/29/2004		283	<2.0	18	25	28.1	2	18	18.6	<0.050	<0.020
			6/3/2004		292	<2.0	25	31	25.3	3	16	21.9	<0.050	0.021
			6/24/2004		344	<2.0	26	35	31.5	3	23	23.8	<0.050	<0.020
			7/12/2004		399	2.1	17	36	37.3	3	22	26.5	0.054	<0.020
			8/2/2004		163	2.9	32	16	11.4	4	7	14.7	0.062	<0.020
36.38	G02W04	Upstream Coffee Creek												
			6/27/2000		290	2.0	31	27	28.0	4	18	18.0	0.065	0.020
			7/20/2000		433	2.3	24	40	42.0	4	27	35.0	<0.050	0.020
			7/31/2000		384	3.2	29	37	35.0	3	25	30.0	<0.050	<0.020
			8/22/2000		390	<2.0	38	36	36.0	4	23	35.0	<0.050	<0.020
36.30	G02W17	Tote Rd.												
			6/27/2000		289	<2.0	34	27	29.0	4	18	19.0	0.068	0.020
35.40	G02G03	Downstream Coffee Creek												
			7/20/2000		439	<2.0	27	40	42.0	4	27	36.0	<0.050	0.020
			7/31/2000		388	2.8	29	38	36.0	4	25	29.0	<0.050	<0.020
			8/22/2000		399	<2.0	32	36	37.0	5	26	33.0	<0.050	<0.020
34.42	G02W18	Sexton Rd.												
			8/6/2003		290	<2.0	21	28	23.1	4	14	22.5	0.053	<0.020
			8/27/2003		315	2.2	26	32	24.8	4	17	23.5	<0.050	<0.020
			9/10/2003	FD	357	<2.0	28	31	35.0	4	22	32.3	<0.050	<0.020
			9/10/2003	FD	357	<2.0	22	31	35.5	4	22	32.4	<0.050	<0.020
			9/23/2003		272	3.2	30	21	26.8	4	16	22.6	0.060	0.025
			10/9/2003		267	<2.0	24	25	22.3	3	14	23.0	0.063	<0.020
			12/10/2003		300	<2.0	20	28	30.3	3	18	27.2	<0.050	<0.020
			4/29/2004		286	<2.0	26	26	29.3	2	19	19.3	<0.050	<0.020
			6/3/2004	FD	280	<2.0	33	29	24.1	3	15	20.0	0.052	0.023
			6/3/2004	FD	284	<2.0	33	28	24.6	3	15	19.6	<0.050	0.021
			6/24/2004	FD	334	<2.0	29	34	32.1	4	23	22.9	<0.050	<0.020
			6/24/2004	FD	331		29	31		3	21		<0.050	
			7/12/2004		370	2.4	14	34	39.1	3	23	23.5	0.110	<0.020
			8/2/2004	FD	162	2.7	30	16	12.2	4	7	14.5	0.064	<0.020
			8/2/2004	FD	162	2.7	30	16	11.9	4	7	13.9	0.067	<0.020

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Specific Conductance- Lab	BOD 5	COD	Calcium	Chloride	Potassium	Sodium	Sulfate	NH3+NH4-N	NO2-N
Mile/	Station	Location	Date	QA/QC*	(µmhos/cm)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(µg/l)	(mg/l)	(mg/l)	Total (mg/l)	Total (mg/l)
28.42	G02W19	Brandt Rd.	8/28/2003		304	<2.0	33	29	23.5	3	16	23.2	<0.050	<0.020
			9/10/2003		349	<2.0	28	31	34.2	4	22	32.6	<0.050	<0.020
			10/9/2003		262	<2.0	24	25	21.8	3	13	23.2	0.064	<0.020
22.10	502510	SR 528	8/6/2003		275	<2.0	27	27	22.0	4	14	22.9	<0.050	<0.020
			8/27/2003		294	<2.0	22	29	22.8	4	16	24.6	<0.050	<0.020
			9/10/2003		349	<2.0	28	31	35.2	4	22	31.7	<0.050	<0.020
			10/9/2003		260	<2.0	21	25	21.3	3	13	23.0	<0.050	<0.020
16.42	G02G14	Blair Rd.	8/27/2003		309	<2.0	22	29	28.2	4	19	26.5	<0.050	<0.020
			9/10/2003		348	<2.0	38	30	35.6	4	21	32.5	<0.050	<0.020
			9/23/2003		314	2.1	30	26	31.5	5	20	26.9	0.050	0.020
			10/9/2003		260	<2.0	24	24	21.3	3	13	23.8	<0.050	<0.020
			12/10/2003		281	<2.0	20	25	31.8	3	19	25.9	<0.050	<0.020
			4/29/2004		278	<2.0	26	25	29.6	2	20	18.6	<0.050	<0.020
			6/3/2004		284	<2.0	28	28	23.5	3	15	22.2	<0.050	<0.020
			6/24/2004		320	<2.0	23	30	32.1	3	22	25.7	<0.050	<0.020
			7/12/2004		389	<2.0	12	36	39.9	3	24	28.2	0.073	<0.020
			8/2/2004		159	2.8	27	16	12.5	4	8	13.8	0.071	<0.020
13.60	G02W14	Vrooman Rd.	8/6/2003		293	<2.0	31	27	25.2	4	15	27.1	<0.050	<0.020
			8/28/2003		326	<2.0	27	29	30.2	3	19	31.5	<0.050	<0.020
			9/10/2003		352	<2.0	25	31	35.1	4	22	34.5	<0.050	<0.020
			10/9/2003		265	<2.0	24	25	20.9	3	14	23.6	<0.050	<0.020
			8/9/2004		296		29		26.3			28.1	<0.050	<0.020
8.45	502530	SR 84 Gage Location	1/19/1999		1110	<2.0	16	48	272.0	5	157	61.0	0.110	0.020
			2/24/1999		348	<2.0	22	29	49.0	3	27	46.0	<0.050	<0.020
			3/23/1999		259	<2.0	18	26	37.0	2	24	48.0	<0.050	<0.020
			4/13/1999		215	<2.0	32	20	27.0	3	15	32.0	0.060	0.03
			5/10/1999		363	<2.0	17	38	41.0	3	24	50.0	<0.050	<0.020
			6/2/1999		335	<2.0	18	32	689.0	3	27	40.0	0.063	<0.020
			7/7/1999		430	<2.0	24	30	46.0	4	33	34.0	<0.050	0.05
			8/9/1999		499	<2.0	16	46	54.0	4	33	47.0	<0.050	<0.020
			9/27/1999		537	<2.0	<10	45	61.0	4	37	55.0	<0.050	<0.020
			10/12/1999		527	<2.0	22	47	58.0	5	39	58.0	<0.050	<0.020
			11/4/1999		190	5.0	41	17	17.0	5	9	26.0	<0.050	0.04
			12/14/1999		331	3.1	39	29	37.0	4	24	41.0	<0.050	0.05

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Specific Conductance-									NO2-N
Mile/	Station	Location	Date	QA/QC*	Lab	BOD 5	COD	Calcium	Chloride	Potassium	Sodium	Sulfate	NH3+NH4-N	Total
					(µmhos/cm)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(µg/l)	(mg/l)	(mg/l)	Total (mg/l)	(mg/l)
8.45	502530	SR 84 Gage Location (cont.)												
			1/11/2000		301	<2.0	23	25	36.0	3	22	35.0	<0.050	0.020
			2/9/2000		595	<2.0	13	42	96.0	3	54	54.0	<0.050	<0.020
			3/6/2000		361	<2.0	15	27	48.0	2	27	42.0	<0.050	<0.020
			4/11/2000		209	<2.0	31	18	26.0	3	14	30.0	0.052	0.04
			5/24/2000		227	<2.0	39	21	21.0	3	14	24.0	0.085	0.020
			6/14/2000		201	2.0	37	24	21.0	3	15	10.0	<0.050	0.020
			7/24/2000		464	<2.0	16	41	45.0	4	29	47.0	<0.050	<0.020
			8/8/2000		286	<2.0	27	24	29.0	4	20	25.0	<0.050	0.023
			8/22/2000		460	<2.0	23	41	50.0	5	34	42.0	<0.050	<0.020
			9/19/2000		463	<2.0	18	39	47.0	4	32	36.0	<0.050	<0.020
			10/30/2000		430	<2.0	25	39	41.0	5	26	39.0	<0.050	<0.020
			11/15/2000		505	<2.0	16	40	62.0	4	32	43.0	<0.050	<0.020
			12/4/2000		382	<2.0	24	29	46.0	4	26	36.0	<0.050	<0.020
			1/22/2001		457	<2.0	23	28	72.6	3	42	35.0	0.130	0.020
			2/8/2001		424	<2.0	14	28	75.3	3	43	37.3	0.074	0.020
			3/14/2001		325	<2.0	15	19	57.4	4	35	26.7	0.129	0.024
			4/3/2001		359	<2.0	12	24	53.4	2	33	32.8	<0.050	<0.020
			5/30/2001		447	<2.0	20	33	64.0	3	37	31.0	<0.050	0.025
			6/5/2001		451	<2.0	17	32	63.2	3	38	36.2	<0.050	<0.020
			7/12/2001		355	2.2	<10	29	39.8	3	24	30.2	<0.050	<0.020
			8/1/2001		511	<2.0	25	43	68.9	5	43	39.0	0.174	0.022
			9/10/2001		607	<2.0	<10	45	77.7	6	52	52.6	0.221	0.037
			10/1/2001		620	<2.0	<10	41	87.6	5	53	52.4	<0.050	<0.020
			11/13/2001		472	<2.0	13	38	54.2	5	35	48.2	<0.050	<0.020
			1/23/2002		438	<2.0	16	33	63.1	3	36	43.1	<0.050	<0.020
			2/25/2002		375	<2.0	<10	30	49.4	3	29	38.3	<0.050	<0.020
			3/28/2002		330	<2.0	13	22	52.7	3	30	26.6	<0.050	0.028
			4/10/2002		298	<2.0	10	25	37.0	2	22	33.6	<0.050	<0.020
			4/24/2002		327	<2.0	32	30	31.8	2	21	30.4	<0.050	<0.020
			5/22/2002		263	<2.0	104	25	21.6	2	17	26.1	<0.050	<0.020
			6/3/2002		358	<2.0	30	35	34.9	3	27	32.4	<0.050	<0.020
			7/2/2002		407	<2.0	19	38	40.6	4	26	35.9	0.096	<0.020
			8/5/2002		506	2.2	19	45	61.8	4	36	43.0	0.392	0.021
			9/23/2002		531	<2.0	15	44	68.6	5	40	57.9	0.251	0.03
			10/9/2002		554	<2.0	19	46	70.2	5	45	62.6	<0.050	0.027
			11/18/2002		591	<2.0	17	51	75.0	5	47	73.8	<0.050	<0.020
			12/12/2002		858	<2.0	14	51	160.0	4	97	60.7	<0.050	<0.020
			1/29/2003		616	<2.0	14	41	102.0	3	57	59.1	<0.050	<0.020

*FD = Field Duplicate

River	STORET				Specific Conductance- Lab	BOD 5	COD	Calcium	Chloride	Potassium	Sodium	Sulfate	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)
Mile/	Station	Location	Date	QA/QC*	(µmhos/cm)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(µg/l)	(mg/l)	(mg/l)		
8.45	502530	SR 84 Gage Location (cont.)												
			3/17/2003		224	<2.0	<10	17	30.6	3	19	21.6	0.080	0.021
			4/16/2003		345	<2.0	21	27	42.0	2	24	38.3	<0.050	<0.020
			5/6/2003		258	2.9	28	23	31.8	4	21	24.1	<0.050	0.111
			6/9/2003		385	<2.0	25	31	45.6	3	29	32.8	<0.050	<0.020
			7/23/2003		182	3.5	19	18	15.7	4	10	17.6	0.233	0.031
			7/31/2003		260	<2.0	26	24	22.4	4	14	24.3	<0.050	<0.020
			8/6/2003		338	<2.0	21	29	34.1	4	21	31.3	<0.050	<0.020
			8/27/2003		518	<2.0	19	42	68.4	6	40	47.8	0.123	0.029
			9/10/2003		396	<2.0	22	33	43.9	4	26	39.1	0.137	<0.020
			9/23/2003		306	2.1	20	24	31.9	4	20	25.2	<0.050	0.021
			10/9/2003		300	<2.0	27	27	26.8	3	17	26.7	<0.050	<0.020
			12/10/2003		388	<2.0	17	33	52.3	3	31	31.7	<0.050	<0.020
			4/29/2004		299	<2.0	26	26	33.7	2	22	21.4	<0.050	<0.020
			6/3/2004		350	<2.0	22	34	35.4	3	23	27.0	<0.050	<0.020
			6/24/2004		365	<2.0	23	33	40.3	3	26	24.7	<0.050	<0.020
			7/12/2004		559	<2.0	14	48	66.5	5	39	47.6	0.070	<0.020
			8/2/2004		163	2.8	30	16	13.3	4	8	13.8	0.061	<0.020
			8/9/2004	FD	334		26		33.2			30.9	<0.050	<0.020
			8/9/2004	FD	335		29		33.1			30.4	<0.050	<0.020
			11/4/2004		389	<2.0	25	35	45.0	5	27	30.4	<0.050	<0.020
			12/7/2004		282	<2.0	30	25	27.1	4	16	31.5	0.051	<0.020
6.10	G02S13	Recreation Park												
			8/28/2003	FD	498	<2.0	17	40	65.2	5	38	46.7	0.061	0.026
			8/28/2003	FD	498	<2.0	17	40	65.2	5	38	46.7	0.061	0.026
			9/10/2003		391	<2.0	22	33	44.0	4	26	37.5	<0.050	<0.020
			10/9/2003		295	<2.0	21	26	26.8	3	17	26.6	<0.050	<0.020
			8/17/2004		398	<2.0	17	36	46.4	4	28	37.7	<0.050	<0.020
			9/7/2004		465	<2.0	15	43	50.3	5	33	41.0	<0.050	<0.020
			10/5/2004		372	<2.0	18	36	37.6	4	25	35.3	<0.050	<0.020
			10/12/2004		416	<2.0	15	38	44.7	4	27	41.6	<0.050	<0.020
4.80	G02P14	Upstream Red Creek												
			8/17/2004		436	<2.0	20	41	56.1	4	31	36.7	<0.050	<0.020
		Spatial Cor	9/7/2004		510	<2.0	25	48	63.4	5	36	40.2	<0.050	<0.020
		Spatial Cor	10/5/2004		412	<2.0	18	41	50.2	4	28	35.8	<0.050	<0.020
		Spatial Cor	10/12/2004		454	<2.0	21	42	55.7	4	29	41.3	<0.050	<0.020

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Specific Conductance- Lab	BOD 5	COD	Calcium	Chloride	Potassium	Sodium	Sulfate	NH3+NH4-N Total (mg/l)	NO2-N Total (mg/l)
Mile/	Station	Location	Date	QA/QC*	(µmhos/cm)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(µg/l)	(mg/l)	(mg/l)		
4.00	G02P18	Downstream D.S. Swale												
			8/17/2004		568	<2.0	20	55	94.9	4	40	41.2	<0.050	<0.020
		Spatial Composite	9/7/2004	FD	569	<2.0	15	53	79.8	4	39	41.7	<0.050	<0.020
		Spatial Composite	9/7/2004	FD	569	<2.0	18	55	79.6	5	40	41.7	<0.050	<0.020
		Spatial Composite	10/5/2004		490	<2.0	29	49	69.4	4	33	39.3	<0.050	<0.020
		Spatial Composite	10/12/2004		582	<2.0	21	54	95.1	4	37	46.2	<0.050	<0.020
3.60	G02P19	Pipe Bridge												
			8/17/2004		880	<2.0	22	87	191.0	5	66	41.0	0.055	0.021
		Spatial Composite	9/7/2004		907	<2.0	20	90	182.0	5	67	41.4	0.073	<0.020
		Grab (river right botto	9/7/2004		4000	<2.0	45	431	1150.0	9	306	41.5	0.318	<0.020
		Spatial Composite	10/5/2004		559	<2.0	18	55	91.9	4	39	39.4	<0.050	<0.020
		Spatial Composite	10/12/2004		866	<2.0	18	78	178.0	4	57	45.1	0.076	<0.020
3.10	G02S14	Upstream Painesville WWTP												
			8/17/2004	FD	899	<2.0	20	92	196.0	5	69	42.4	0.052	<0.020
		Spatial Composite	8/17/2004	FD	901	<2.0	20	90	196.0	5	68	42.8	0.061	<0.020
		Spatial Composite	9/7/2004		878	<2.0	20	82	172.0	5	65	42.1	<0.050	<0.020
		Spatial Composite	10/5/2004		652	<2.0	18	65	121.0	5	49	42.0	<0.050	<0.020
		Spatial Composite	10/12/2004		786	<2.0	15	73	157.0	4	53	48.8	0.052	<0.020
2.76	G02P21	St. Clair Ave.												
			8/17/2004		786	<2.0	22	74	158.0	5	62	48.4	<0.050	<0.020
		Spatial Composite	9/7/2004		743	<2.0	20	64	130.0	5	58	48.4	<0.050	<0.020
		Spatial Composite	10/5/2004	FD	748	<2.0	24	69	140.0	5	64	48.5	1.100	<0.020
		Spatial Composite	10/5/2004	FD	752	<2.0	21	69	140.0	5	63	47.5	1.120	<0.020
		Spatial Composite	10/12/2004		868	<2.0	18	76	173.0	5	70	57.4	1.670	<0.020
2.30	502520	SR 535												
			8/6/2003		522	<2.0	21	47	94.5	4	41	33.6	0.066	<0.020
			8/27/2003		942	<2.0	19	89	195.0	5	71	56.2	0.099	0.020
			9/10/2003		607	<2.0	19	51	101.0	5	45	46.8	<0.050	<0.020
			9/23/2003		331	2.0	23	25	39.8	4	22	26.0	<0.050	0.024
			10/9/2003		458	<2.0	21	41	72.0	4	29	30.8	0.054	<0.020
			12/10/2003		445	<2.0	17	42	69.8	3	33	35.7	0.078	<0.020
			4/29/2004		444	<2.0	26	38	68.6	2	34	26.6	0.056	<0.020
			6/3/2004		621	<2.0	22	61	112.0	4	46	33.8	0.087	<0.020
			6/24/2004		633	<2.0	20	57	122.0	4	50	32.1	<0.050	<0.020
			7/12/2004		903	2.8	36	83	192.0	4	70	42.2	0.059	<0.020
			8/2/2004		170	2.6	32	17	15.1	4	9	14.1	0.070	<0.020

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				NO2&NO3 N-	TKN	Phosphorus-	Aluminum	Arsenic	Barium	Cadmium	Chromium	Cr+6 - Dissolved	Copper
Mile/	Station	Location	Date	QA/QC*	Total (mg/l)	(mg/l)	Total (mg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
39.90	G02G15	Cork Cold Spring Rd.												
			8/6/2003		0.54	0.68	0.115	879	3.0	32	<0.2	<30		<10
			8/27/2003		0.31	0.56	0.038	240	3.5	37	<0.2	<30		<10
			9/10/2003		0.40	0.64	0.053	350	3.3	36	<0.2	<30		<10
			10/9/2003		0.45	0.52	0.069	419	2.4	28	<0.2	<30		<10
			4/29/2004		0.17	0.68	0.039	373	2.3	25	<0.2	<30		<10
			6/3/2004		0.62	0.59	0.079	297	3.0	30	<0.2	<30		<10
			6/24/2004		0.50	0.63	0.054	410	3.2	36	<0.2	<30		<10
			7/12/2004		0.26	0.48	0.054	<200	2.2	34	<0.2	<30		<10
			8/2/2004		0.59	0.92	0.105	1,440	2.6	32	<0.2	<30		<10
36.38	G02W04	Upstream Coffee Creek												
			6/27/2000		0.50	1.07	0.100	537	3.0	32	<0.2	<30		<2
			7/20/2000		0.52	0.6	0.070	691	2.0	44	<0.2	<30		<2
			7/31/2000		<0.10	0.51	0.060	523	3.0	42	<0.2	<30		2
			8/22/2000		0.15	0.49	0.070	402	3.0	42	<0.2	<30		<2
36.30	G02W17	Tote Rd.												
			6/27/2000		0.53	0.99	0.100	595	3.0	31	<0.2	<30		3
35.40	G02G03	Downstream Coffee Creek												
			7/20/2000		0.50	0.45	0.050	727	2.0	44	<0.2	<30		<2
			7/31/2000		<0.10	0.505	<0.050	453	2.0	41	<0.2	<30		<2
			8/22/2000		0.22	0.51	0.060	408	3.0	39	<0.2	<30		<2
34.42	G02W18	Sexton Rd.												
			8/6/2003		0.53	0.64	0.085	480	3.3	34	<0.2	<30		<10
			8/27/2003		<0.10	0.56	0.054	<200	2.9	32	<0.2	<30		<10
			9/10/2003	FD	0.40	0.64	0.040	206	2.9	30	<0.2	<30		<10
			9/10/2003	FD	0.40	0.63	0.045	208	2.9	31	<0.2	<30		<10
			9/23/2003		0.50	0.68	0.095	1,560	3.7	33	<0.2	<30		<10
			10/9/2003		0.43	0.59	0.075	462	2.2	27	<0.2	<30		<10
			12/10/2003		0.42	0.47	0.034	419	2.0	27	<0.2	<30		<10
			4/29/2004		0.16	0.53	0.046	513	2.6	26	<0.2	<30		<10
			6/3/2004	FD	0.66	0.71	0.074	364	2.7	30	<0.2	<30		<10
			6/3/2004	FD	0.64	0.57	0.088	378	3.1	30	<0.2	<30		<10
			6/24/2004	FD	0.57	0.59	0.051	320	2.6	36	<0.2	<30		<10
			6/24/2004	FD	0.63	0.66	0.053	285	<2.0	32	<0.2	<30		<10
			7/12/2004		0.40	0.5	0.028	607	2.4	42	0.3	<30		<10
			8/2/2004	FD	0.60	0.9	0.114	1,600	2.6	33	<0.2	<30		<10
			8/2/2004	FD	0.58	0.74	0.110	1,500	2.4	33	<0.2	<30		<10

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River Mile/	STORET Station	Location	Date	QA/QC*	Cr+6 -									
					NO2&NO3 N- Total (mg/l)	TKN (mg/l)	Phosphorus- Total (mg/l)	Aluminum (µg/l)	Arsenic (µg/l)	Barium (µg/l)	Cadmium (µg/l)	Chromium (µg/l)	Dissolved (µg/l)	Copper (µg/l)
28.42	G02W19	Brandt Rd.	8/28/2003		<0.10	0.65	0.026	<200	2.6	26	<0.2	<30		<10
			9/10/2003		0.26	0.63	0.037	<200	2.6	27	<0.2	<30		<10
			10/9/2003		0.42	0.46	0.103	427	2.1	27	<0.2	<30		<10
22.10	502510	SR 528	8/6/2003		0.42	0.59	0.075	<200	2.5	28	<0.2	<30		<10
			8/27/2003		<0.10	0.55	0.027	<200	2.8	26	<0.2	<30		<10
			9/10/2003		0.21	0.62	0.062	<200	2.3	28	<0.2	<30		<10
			10/9/2003		0.44	0.53	0.068	379	2.1	26	<0.2	<30		<10
16.42	G02G14	Blair Rd.	8/27/2003		<0.10	0.54	0.025	<200	2.2	26	<0.2	<30		<10
			9/10/2003		0.14	0.57	0.021	<200	2.6	29	<0.2	<30		<10
			9/23/2003		0.56	0.65	0.115	1,060	3.6	38	<0.2	<30		<10
			10/9/2003		0.45	0.51	0.054	377	2.2	25	<0.2	<30		<10
			12/10/2003		0.41	0.47	0.045	486	<2.0	25	<0.2	<30		<10
			4/29/2004		0.11	0.84	0.039	316	<2.0	25	<0.2	<30		<10
			6/3/2004		0.56	0.56	0.055	<200	2.8	24	<0.2	<30		<10
			6/24/2004		0.23	0.5	0.066	<200	3.1	24	<0.2	<30		<10
			7/12/2004		0.15	0.48	0.039	<200	<2.0	31	<0.2	<30		<10
			8/2/2004		0.56	0.73	0.110	1,490	3.2	32	<0.2	<30		<10
13.60	G02W14	Vrooman Rd.	8/6/2003		0.29	0.64	0.041	241	2.2	25	<0.2	<30		<10
			8/28/2003		<0.10	0.51	0.019	<200	2.1	26	<0.2	<30		<10
			9/10/2003		0.13	0.61	0.028	<200	2.1	26	<0.2	<30		<10
			10/9/2003		0.45	0.47	0.076	383	<2.0	26	<0.2	<30		<10
			8/9/2004		0.41	0.53	0.020							
8.45	502530	SR 84 Gage Location	1/19/1999		1.51	0.71	0.110	779	<2.0	47	<0.2	<30		2
			2/24/1999		0.94	0.24	<0.050	555	<2.0	27	<0.2	<30		2
			3/23/1999		<0.10	<0.20	0.050	750	<2.0	25	<0.2	<30		2
			4/13/1999		0.77	0.65	0.570	2,980	<2.0	39	<0.2	<30		<10
			5/10/1999		0.10	0.53	<0.050	<200	<2.0	29	<0.2	<30		<2
			6/2/1999		0.44	0.87	0.280	220	<2.0	28	<0.2	<30		2
			7/7/1999		1.02	0.51	0.130	1,440	2.0	34	<0.2	<30		3
			8/9/1999		<0.10	0.38	0.050	713	2.0	43	<0.2	<30		2
			9/27/1999		0.42	0.21	0.070	336	<2.0	37	<0.2	<30		<2
			10/12/1999		0.33	0.28	0.050	276	<2.0	37	<0.2	<30		<2
			11/4/1999		1.19	0.56	0.100	2,890	2.0	38	<0.2	<30		4
			12/14/1999		0.57	0.42	0.110	4,880	2.0	53	0.2	<30		6

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				NO2&NO3 N-	TKN	Phosphorus-	Aluminum	Arsenic	Barium	Cadmium	Chromium	Cr+6 -	Copper
Mile/	Station	Location	Date	QA/QC*	Total (mg/l)	(mg/l)	Total (mg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	Dissolved (µg/l)	(µg/l)
8.45	502530	SR 84 Gage Location (cont.)												
			1/11/2000		0.75	0.5	0.050	1,090	<2.0	30	<0.2	<30		2
			2/9/2000		8.95	0.42	<0.050	<200	<2.0	36	<0.2	<30		<2
			3/6/2000		0.42	0.47	<0.050	497	<2.0	27	<0.2	<30		<2
			4/11/2000		0.38	0.81	0.070	2,860	2.0	33	<0.2	<30		5
			5/24/2000		0.33	0.6	0.100	1,510	<2.0	28	<0.2	<30		<10
			6/14/2000		0.47	0.795	0.070	1,460	2.0	28	<0.2	<30		<10
			7/24/2000		<0.10	0.41	0.050	<200	<2.0	33	<0.2	<30		3
			8/8/2000		0.45	0.465	0.065	814	2.0	29	<0.2	<30		3
			8/22/2000		0.15	0.43	0.070	<200	2.0	36	<0.2	<30		<2
			9/19/2000		<0.10	0.25	<0.050	<200	<2.0	31	<0.2	<30		<2
			10/30/2000		<0.10	0.61	<0.050	<200	2.0	32	<0.2	<30		<2
			11/15/2000		0.33	0.41	<0.050	<200	<2.0	36	<0.2	<30		<2
			12/4/2000		0.90	0.42	0.060	620	<2.0	28	<0.2	<30		<2
			1/22/2001		0.97	0.28	0.070	398	<2.0	29	<0.2	<30		<2
			2/8/2001		0.96	0.42	<0.050	792	<2.0	31	<0.2	<30		<2
			3/14/2001		0.82	0.83	0.090	4,990	2.1	46	<0.2	<30		5.3
			4/3/2001		0.32	0.83	0.050	463	<2.0	25	<0.2	<30		<2
			5/30/2001		0.98	0.89	0.087	440	2.0	32	<0.2	<30		<10
			6/5/2001		0.67	0.83	0.052	237	<2.0	30	<0.2	<30		<2
			7/12/2001		0.18	0.74	0.051	290	2.1	26	<0.2	<30		<10
			8/1/2001		<0.10	0.66	<0.050	216	2.3	34	<0.2	<30		<10
			9/10/2001		0.10	0.83	0.051	206	2.1	41	<0.2	<30		<10
			10/1/2001		0.16	0.55	<0.050	254	<2.0	36	<0.2	<30		<2
			11/13/2001		0.12	0.55	<0.050	<200	<2.0	30	<0.2	<30		<10
			1/23/2002		0.94	0.49	<0.050	490	<2.0	31	<0.2	<30		<10
			2/25/2002		0.72	0.48	0.074	934	<2.0	30	<0.2	<30		<10
			3/28/2002		0.62	0.5	0.103	3,350	<2.0	43	<0.2	<30		<10
			4/10/2002		0.50	0.55	0.053	1,300	<2.0	27	<0.2	<30		<10
			4/24/2002		0.31	0.6	<0.050	445	2.3	27	<0.2	<30		<10
			5/22/2002		0.36	0.85	0.069	678	<2.0	24	<0.2	<30		<10
			6/3/2002		<0.10	0.62	0.050	214	<2.0	29	<0.2	<30		<10
			7/2/2002		0.15	0.81	<0.050	247	2.5	33	<0.2	<30		<10
			8/5/2002		0.13	1.03	0.083	372	<2.0	42	<0.2	<30		<10
			9/23/2002		0.16	0.97	0.067	<200	2.0	40	<0.2	<30		<10
			10/9/2002		0.19	<0.20	1.440	253	<2.0	41	<0.2	<30		<10
			11/18/2002		0.74	0.38	0.329	<200	<2.0	40	<0.2	<30		<10
			12/12/2002		1.00	0.52	<0.050	<200	<2.0	42	<0.2	<30		<10
			1/29/2003		1.12	0.69	<0.050	201	<2.0	35	<0.2	<30		<10

River Mile/	STORET Station	Location	Date	QA/QC*	NO2&NO3 N-	TKN	Phosphorus-	Aluminum	Arsenic	Barium	Cadmium	Chromium	Cr+6 - Dissolved	Copper
					Total (mg/l)	(mg/l)	Total (mg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
8.45	502530	SR 84 Gage Location (cont.)												
			3/17/2003		1.04	0.69	0.102	4,970	5.6	49	<0.2	<30		<10
			4/16/2003		0.45	0.62	<0.050	258	<2.0	27	<0.2	<30		<10
			5/6/2003		0.42	0.49	0.212	10,500	9.5	83	0.3	<30		15
			6/9/2003		0.58	0.63	0.047	<200	<2.0	29	<0.2	<30		<10
			7/23/2003		1.11	0.7	0.132	2,140	4.0	38	<0.2	<30		<10
			7/31/2003		0.43	0.61	0.070	<200	2.0	26	<0.2	<30		<10
			8/6/2003		0.32	0.57	0.033	268	2.2	26	<0.2	<30		<10
			8/27/2003		0.40	0.59	0.043	259	2.1	37	<0.2	<30		<10
			9/10/2003		0.13	0.63	0.029	<200	2.7	27	<0.2	<30		<10
			9/23/2003		0.51	0.6	0.086	1,040	3.0	30	<0.2	<30		<10
			10/9/2003		0.46	0.51	0.059	338	<2.0	27	<0.2	<30		<10
			12/10/2003		0.45	0.46	0.065	518	<2.0	28	<0.2	<30		<10
			4/29/2004		0.14	0.88	0.069	299	2.8	26	<0.2	<30		<10
			6/3/2004		0.48	0.48	0.064	<200	2.6	27	<0.2	<30		<10
			6/24/2004		0.23	0.55	0.033	<200	<2.0	25	<0.2	<30		<10
			7/12/2004		<0.10	0.36	0.087	<200	<2.0	40	<0.2	<30		<10
			8/2/2004		0.54	0.78	0.074	1,640	3.3	31	<0.2	<30		<10
			8/9/2004	FD	0.42	0.44	0.028							
			8/9/2004	FD	0.38	0.54	0.034							
			11/4/2004		0.39	0.68	0.050	327	2.4	33	<0.2	<30		<10
			12/7/2004		0.60	0.62	0.070	387	<2.0	27	<0.2	<30		<10
6.10	G02S13	Recreation Park												
			8/28/2003	FD	0.24	0.46	0.166	<200	2.5	33	<0.2	<30		<10
			8/28/2003	FD	0.24	0.46	0.166	<200	2.5	33	<0.2	<30		<10
			9/10/2003		<0.10	0.53	0.063	<200	2.7	26	<0.2	<30		<10
			10/9/2003		0.48	0.45	0.066	335	2.2	28	<0.2	<30		<10
			8/17/2004		<0.10	0.55	0.174	<200	<2.0	28	<0.2	<30	<10	<10
			9/7/2004		0.13	0.52	0.027	<200	<2.0	36	<0.2	<30	<10	<10
			10/5/2004		0.18	0.47	0.023	<200	<2.0	26	<0.2	<30	<10	<10
			10/12/2004		0.15	0.47	0.045	<200	2.0	25	<0.2	<30	<10	<10
4.80	G02P14	Upstream Red Creek												
			8/17/2004		<0.10	0.54	0.027	<200	<2.0	32	<0.2	<30	<10	<10
		Spatial Cor	9/7/2004		0.29	0.54	0.022	<200	2.1	38	<0.2	<30	<10	<10
		Spatial Cor	10/5/2004		0.21	0.51	0.015	<200	<2.0	30	<0.2	<30	<10	<10
		Spatial Cor	10/12/2004		<0.10	0.52	0.043	<200	<2.0	28	<0.2	<30	<10	<10

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				NO2&NO3 N-	TKN	Phosphorus-	Aluminum	Arsenic	Barium	Cadmium	Chromium	Cr+6 - Dissolved	Copper
Mile/	Station	Location	Date	QA/QC*	Total (mg/l)	(mg/l)	Total (mg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
4.00	G02P18	Downstream D.S. Swale												
			8/17/2004		0.15	0.58	0.024	<200	<2.0	36	<0.2	<30	11	<10
		Spatial Composite	9/7/2004	FD	0.25	0.57	0.014	264	2.4	40	<0.2	<30	<10	<10
		Spatial Composite	9/7/2004	FD	0.27	0.58	0.011	289	2.5	41	<0.2	<30	<10	<10
		Spatial Composite	10/5/2004		0.23	0.51	0.014	<200	<2.0	33	<0.2	<30	<10	<10
		Spatial Composite	10/12/2004		0.71	0.7	0.022	<200	<2.0	33	<0.2	<30	<10	<10
3.60	G02P19	Pipe Bridge												
			8/17/2004		<0.10	0.71	0.018	<200	<2.0	47	<0.2	<30	16	<10
		Spatial Composite	9/7/2004		0.17	0.68	0.013	260	2.3	54	<0.2	<30	11	<10
		Grab (river right botto	9/7/2004		0.14	0.93	0.024	351	<2.0	193	<0.2	<30	13	<10
		Spatial Composite	10/5/2004		<0.10	0.59	0.023	<200	<2.0	35	<0.2	<30	16	<10
		Spatial Composite	10/12/2004		0.11	0.71	0.017	<200	<2.0	41	<0.2	<30	19	<10
3.10	G02S14	Upstream Painesville WWTP												
			8/17/2004	FD	<0.10	0.83	0.024	<200	2.2	50	<0.2	<30	15	<10
		Spatial Composite	8/17/2004	FD	<0.10	0.79	0.020	<200	<2.0	49	<0.2	<30	15	<10
		Spatial Composite	9/7/2004		0.23	0.62	0.024	268	2.5	51	<0.2	<30	10	<10
		Spatial Composite	10/5/2004		<0.10	0.67	0.065	<200	<2.0	38	<0.2	<30	13	<10
		Spatial Composite	10/12/2004		<0.10	0.63	0.012	<200	<2.0	40	<0.2	<30	21	<10
2.76	G02P21	St. Clair Ave.												
			8/17/2004		0.58	0.7	0.047	<200	2.0	47	<0.2	<30	<10	<10
		Spatial Composite	9/7/2004		0.70	0.62	0.018	311	<2.0	46	<0.2	<30	10	<10
		Spatial Composite	10/5/2004	FD	0.37	1.71	0.052	<200	<2.0	42	<0.2	<30	16	<10
		Spatial Composite	10/5/2004	FD	0.35	1.77	0.062	<200	<2.0	41	<0.2	<30	14	<10
		Spatial Composite	10/12/2004		0.16	2.37	0.046	<200	<2.0	41	<0.2	<30	15	<10
2.30	502520	SR 535												
			8/6/2003		0.64	0.59	0.044	1,420	2.6	41	<0.2	<30		<10
			8/27/2003		0.79	0.81	0.041	280	2.1	58	<0.2	<30		<10
			9/10/2003		0.49	0.63	0.062	<200	2.9	36	<0.2	<30		<10
			9/23/2003		0.51	0.59	0.072	1,170	3.3	31	<0.2	<30		<10
			10/9/2003		0.61	0.59	0.061	360	2.2	32	<0.2	<30		<10
			12/10/2003		0.51	0.49	0.063	300	<2.0	31	<0.2	<30		<10
			4/29/2004		0.24	1.18	0.054	380	2.1	31	<0.2	<30		<10
			6/3/2004		0.76	0.54	0.394	<200	3.1	41	<0.2	<30		<10
			6/24/2004		0.65	0.87	0.034	283	2.8	38	<0.2	<30		<10
			7/12/2004		0.44	0.38	0.213	416	6.0	55	<0.2	<30		<10
			8/2/2004		0.56	0.71	0.096	1,830	3.4	34	<0.2	<30		<10

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River Mile/	STORET Station	Location	Date	QA/QC*	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
39.90	G02G15	Cork Cold Spring Rd.	8/6/2003		1,830	<2.0	7	94	<0.2	<40	<2	101	<10
			8/27/2003		837	<2.0	10	148	<0.2	<40	<2	126	<10
			9/10/2003		1,260	<2.0	9	120		<40	<2	115	<10
			10/9/2003		1,390	<2.0	7	74	<0.2	<40	<2	80	<10
			4/29/2004		1,420	<2.0	7	92	<0.2	<40	<2	79	14
			6/3/2004		1,700	<2.0	8	125	<0.2	<40	<2	94	<10
			6/24/2004		1,660	<2.0	10	154	<0.2	<40	<2	120	<10
			7/12/2004		573	<2.0	10	132	<0.2	<40	<2	121	<10
			8/2/2004		2,860	<2.0	4	111	<0.2	<40	<2	50	<10
36.38	G02W04	Upstream Coffee Creek	6/27/2000		1,740	<2.0	7	123		<40	<2	113	<10
			7/20/2000		1,010	<2.0	12	160		<40	<2	142	14
			7/31/2000		848	<2.0	10	177		<40	<2	134	10
			8/22/2000		901	<2.0	10	166		<40	<2	133	<10
36.30	G02W17	Tote Rd.	6/27/2000		1,800	<2.0	7	127		<40	<2	117	10
35.40	G02G03	Downstream Coffee Creek	7/20/2000		1,050	<2.0	12	144		<40	<2	142	12
			7/31/2000		752	<2.0	11	150		<40	<2	132	<10
			8/22/2000		771	<2.0	10	162		<40	<2	131	<10
34.42	G02W18	Sexton Rd.	8/6/2003		1,580	<2.0	8	118	<0.2	<40	<2	95	<10
			8/27/2003		625	2.3	8	64	<0.2	<40	<2	108	<10
			9/10/2003	FD	964	<2.0	8	102		<40	<2	111	<10
			9/10/2003	FD	956	<2.0	8	102		<40	<2	110	<10
			9/23/2003		3,080	2.5	6	118	<0.2	<40	<2	75	15
			10/9/2003		1,400	<2.0	7	77	<0.2	<40	<2	80	<10
			12/10/2003		1,270	<2.0	8	77	<0.2	<40	<2	86	<10
			4/29/2004		1,440	<2.0	7	89	<0.2	<40	<2	81	<10
			6/3/2004	FD	1,800	<2.0	8	138	<0.2	<40	<2	91	<10
			6/3/2004	FD	1,810	<2.0	7	135	<0.2	<40	<2	88	<10
			6/24/2004	FD	1,430	<2.0	9	175	<0.2	<40	<2	115	<10
			6/24/2004	FD	1,350	<2.0	8	163		<40	<2	106	<10
			7/12/2004		1,390	<2.0	9	217	<0.2	<40	<2	114	<10
			8/2/2004	FD	3,180	2.4	4	115	<0.2	<40	<2	49	<10
			8/2/2004	FD	3,100	2	4	115	<0.2	<40	<2	49	<10

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Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River Mile/	STORET Station	Location	Date	QA/QC*	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
28.42	G02W19	Brandt Rd.	8/28/2003		437	<2.0	8	64	<0.2	<40	<2	98	<10
			9/10/2003		688	<2.0	8	34		<40	<2	109	<10
			10/9/2003		1,300	<2.0	7	55	<0.2	<40	<2	78	<10
22.10	502510	SR 528	8/6/2003		835	<2.0	7	34	<0.2	<40	<2	90	<10
			8/27/2003		385	<2.0	8	41	<0.2	<40	<2	98	<10
			9/10/2003		524	<2.0	8	29		<40	<2	105	<10
			10/9/2003		1,170	<2.0	7	36	<0.2	<40	<2	79	<10
16.42	G02G14	Blair Rd.	8/27/2003		429	<2.0	8	38	<0.2	<40	<2	98	<10
			9/10/2003		1,110	<2.0	8	37		<40	<2	106	<10
			9/23/2003		2,400	2.1	7	117	<0.2	<40	<2	90	17
			10/9/2003		1,110	<2.0	6	29	<0.2	<40	<2	77	<10
			12/10/2003		1,210	<2.0	7	48	<0.2	<40	<2	78	<10
			4/29/2004		1,110	<2.0	7	35	<0.2	<40	<2	78	<10
			6/3/2004		1,240	<2.0	7	28	<0.2	<40	<2	88	<10
			6/24/2004		774	<2.0	8	30	<0.2	<40	<2	101	<10
			7/12/2004		359	<2.0	10	43	<0.2	<40	<2	119	<10
			8/2/2004		3,050	2.1	4	122	<0.2	<40	<2	51	14
13.60	G02W14	Vrooman Rd.	8/6/2003		819	<2.0	7	32	<0.2	<40	<2	89	<10
			8/28/2003		376	<2.0	8	45	<0.2	<40	<2	96	<10
			9/10/2003		634	<2.0	8	39		<40	<2	108	<10
			10/9/2003		1,140	<2.0	7	31	<0.2	<40	<2	79	<10
			8/9/2004										
8.45	502530	SR 84 Gage Location	1/19/1999		1,070	<2.0	14	80		<40	<2	163	<10
			2/24/1999		832	<2.0	9	43		<40	<2	99	<10
			3/23/1999		1,040	<2.0	7	34		<40	<2	82	<10
			4/13/1999		3,310	2	6	81		<40	<2	67	21
			5/10/1999		495	<2.0	10	42	<0.2	<40	<2	111	<10
			6/2/1999		423	<2.0	8	33		<40	<2	117	<10
			7/7/1999		2,300	<2.0	8	72		<40	<2	108	18
			8/9/1999		1,030	<2.0	13	106		<40	<2	149	10
			9/27/1999		636	<2.0	12	60		<40	<2	135	<10
			10/12/1999		657	<2.0	13	73		<40	<2	156	<10
			11/4/1999		4,840	3	6	152		<40	<2	57	18
			12/14/1999		8,760	7	9	255		<40	<2	91	53

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Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River	STORET				Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Selenium	Strontium	Zinc
Mile/	Station	Location	Date	QA/QC*	(µg/l)	(µg/l)	(mg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
8.45	502530	SR 84 Gage Location (cont.)											
			1/11/2000		1,690	<2.0	7	44		<40	<2	78	<10
			2/9/2000		592	<2.0	11	28		<40	<2	130	<10
			3/6/2000		862	<2.0	8	29		<40	<2	89	<10
			4/11/2000		3,660	3	5	72		<40	<2	62	20
			5/24/2000		2,520	<2.0	6	64		<40	<2	74	16
			6/14/2000		2,480	2	6	86		<40	<2	82	<10
			7/24/2000		217	<2.0	12	35		<40	<2	151	<10
			8/8/2000		1,380	<2.0	6	56		<40	<2	86	<10
			8/22/2000		314	<2.0	11	36		<40	<2	141	12
			9/19/2000		391	<2.0	12	29		<40	<2	153	<10
			10/30/2000		272	<2.0	11	15		<40	<2	137	<10
			11/15/2000		380	<2.0	11	16		<40	<2	134	<10
			12/4/2000		1,000	<2.0	8	35		<40	<2	96	<10
			1/22/2001		927	<2.0	9	42		<40	<2	104	<10
			2/8/2001		1,060	<2.0	7	46		<40	<2	97	11
			3/14/2001		7,930	4.9	7	190		<40	<2	73	37
			4/3/2001		792	<2.0	7	31		<40	<2	88	<10
			5/30/2001		1,010	<2.0	9	55		<40	<2	112	<10
			6/5/2001		715	<2.0	9	38		<40	<2	117	<10
			7/12/2001		513	<2.0	8	80		<40	<2	104	<10
			8/1/2001		427	<2.0	12	93		<40	<2	148	<10
			9/10/2001		386	<2.0	15	77		<40	<2	184	<10
			10/1/2001		383	<2.0	13	47		<40	<2	162	<10
			11/13/2001		394	<2.0	11	28		<40	<2	133	16
			1/23/2002		878	<2.0	9	35		<40	<2	109	<10
			2/25/2002		1,210	<2.0	8	35		<40	<2	93	22
			3/28/2002		5,020	4.2	6	153		<40	<2	71	25
			4/10/2002		1,720	<2.0	6	46		<40	<2	76	<10
			4/24/2002		1,010	<2.0	8	35		<40	<2	94	<10
			5/22/2002		1,480	<2.0	7	42		<40	<2	79	23
			6/3/2002		567	<2.0	10	35		<40	<2	119	<10
			7/2/2002		324	<2.0	10	65		<40	<2	126	<10
			8/5/2002		462	<2.0	13	124		<40	<2	153	10
			9/23/2002		420	<2.0	13	73		<40	<2	155	<10
			10/9/2002		490	<2.0	13	98		<40	<2	169	<10
			11/18/2002		342	<2.0	14	26		<40	<2	163	<10
			12/12/2002		352	<2.0	13	36		<40	<2	165	15
			1/29/2003		306	<2.0	11	27		<40	<2	138	<10

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Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River Mile/	STORET Station	Location	Date	QA/QC*	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
8.45	502530	SR 84 Gage Location (cont.)											
			3/17/2003		9,950	6.1	6	291		<40	<2	58	38
			4/16/2003		893	<2.0	7	30		<40	<2	83	12
			5/6/2003		23,200	15.5	8	436		<40	<4	71	78
			6/9/2003		906	<2.0	8	30		<40	<2	99	<10
			7/23/2003		4,590	3.5	5	178		<40	<2	55	24
			7/31/2003		775	<2.0	6	24		<40	<2	77	14
			8/6/2003		758	<2.0	8	29	<0.2	<40	<2	95	<10
			8/27/2003		646	2	11	51	<0.2	<40	<2	146	<10
			9/10/2003		536	<2.0	9	34		<40	<2	115	<10
			9/23/2003		2,110	2	6	83	<0.2	<40	<2	81	10
			10/9/2003		1,020	<2.0	7	29	<0.2	<40	<2	84	<10
			12/10/2003		1,240	<2.0	9	43	<0.2	<40	<2	95	13
			4/29/2004		1,030	<2.0	7	34	<0.2	<40	<2	79	11
			6/3/2004		1,100	<2.0	9	32	<0.2	<40	<2	100	<10
			6/24/2004		720	<2.0	8	41	<0.2	<40	<2	104	<10
			7/12/2004		316	<2.0	12	41	<0.2	<40	<2	144	<10
			8/2/2004		3,380	2.3	4	123	<0.2	<40	<2	51	13
			8/9/2004	FD									
			8/9/2004	FD									
			11/4/2004		1,120	<2.0	9	46		<40	<2	111	<10
			12/7/2004		1,220	<2.0	8	37		<40	<2	79	<10
6.10	G02S13	Recreation Park											
			8/28/2003	FD	364	<2.0	10	44	<0.2	<40	<2	124	<10
			8/28/2003	FD	364	<2.0	10	44	<0.2	<40	<2	124	<10
			9/10/2003		488	<2.0	9	33		<40	<2	115	<10
			10/9/2003		1,030	<2.0	7	29	<0.2	<40	<2	84	<10
			8/17/2004		359	<2.0	9	28	<0.2	<40	<2	114	<10
			9/7/2004		212	<2.0	12	32	<0.2	<40	<2	140	<10
			10/5/2004		542	<2.0	10	25		<40	<2	114	<10
			10/12/2004		316	<2.0	10	16	<0.2	<40	<2	117	<10
4.80	G02P14	Upstream Red Creek											
			8/17/2004		303	<2.0	10	27	<0.2	<40	<2	130	<10
		Spatial Cor	9/7/2004		179	<2.0	12	31	<0.2	<40	<2	156	<10
		Spatial Cor	10/5/2004		543	<2.0	10	24		<40	<2	127	<10
		Spatial Cor	10/12/2004		302	<2.0	10	18	<0.2	<40	<2	129	<10

*FD = Field Duplicate

Appendix 1.2. Surface water analytical results for the Grand River Large River Assessment Unit, 1999-2004 (all samples are grab samples unless otherwise noted).

River Mile/	STORET Station	Location	Date	QA/QC*	Iron (µg/l)	Lead (µg/l)	Magnesium (mg/l)	Manganese (µg/l)	Mercury (µg/l)	Nickel (µg/l)	Selenium (µg/l)	Strontium (µg/l)	Zinc (µg/l)
4.00	G02P18	Downstream D.S. Swale											
			8/17/2004		379	<2.0	10	47	<0.2	<40	<2	170	<10
		Spatial Composite	9/7/2004	FD	390	<2.0	11	50	<0.2	<40	<2	167	<10
		Spatial Composite	9/7/2004	FD	435	<2.0	12	53	<0.2	<40	<2	175	<10
		Spatial Composite	10/5/2004		550	<2.0	10	29		<40	<2	148	<10
		Spatial Composite	10/12/2004		352	<2.0	11	30	<0.2	<40	<2	165	<10
3.60	G02P19	Pipe Bridge											
			8/17/2004		449	<2.0	10	60	<0.2	<40	<2	270	<10
		Spatial Composite	9/7/2004		416	<2.0	11	77	<0.2	<40	<2	279	<10
		Grab (river right botto	9/7/2004		955	<2.0	12	327	<0.2	<40	<2	1,320	<10
		Spatial Composite	10/5/2004		565	<2.0	10	31		<40	<2	169	<10
		Spatial Composite	10/12/2004		467	<2.0	11	41	<0.2	<40	<2	240	<10
3.10	G02S14	Upstream Painesville WWTP											
			8/17/2004	FD	416	<2.0	10	55	<0.2	<40	<2	281	<10
		Spatial Composite	8/17/2004	FD	398	<2.0	10	54	<0.2	<40	<2	276	<10
		Spatial Composite	9/7/2004		406	<2.0	11	60	<0.2	<40	<2	264	<10
		Spatial Composite	10/5/2004		624	<2.0	10	35		<40	<2	203	<10
		Spatial Composite	10/12/2004		403	<2.0	10	33	<0.2	<40	<2	225	<10
2.76	G02P21	St. Clair Ave.											
			8/17/2004		551	<2.0	10	47	<0.2	<40	<2	233	<10
		Spatial Composite	9/7/2004		483	<2.0	11	52	<0.2	<40	<2	214	<10
		Spatial Composite	10/5/2004	FD	611	<2.0	10	39		<40	<2	220	<10
		Spatial Composite	10/5/2004	FD	601	<2.0	10	39		<40	<2	219	<10
		Spatial Composite	10/12/2004		409	<2.0	11	36	<0.2	<40	<2	241	<10
2.30	502520	SR 535											
			8/6/2003		2,390	<2.0	7	60	<0.2	<40	<2	148	12
			8/27/2003		700	<2.0	10	76	<0.2	<40	<2	275	12
			9/10/2003		644	<2.0	10	62		<40	<2	175	<10
			9/23/2003		2,330	2.4	6	90	<0.2	<40	<2	85	13
			10/9/2003		1,040	<2.0	7	36	<0.2	<40	<2	127	<10
			12/10/2003		952	<2.0	9	45	<0.2	<40	<2	126	<10
			4/29/2004		1,110	<2.0	7	46	<0.2	<40	<2	119	<10
			6/3/2004		1,260	<2.0	9	71	<0.2	<40	<2	187	<10
			6/24/2004		1,130	<2.0	8	82	<0.2	<40	<2	188	<10
			7/12/2004		928	4.4	10	85	<0.2	<40	<2	265	23
			8/2/2004		3,970	2.7	4	138	<0.2	<40	<2	54	16

*FD = Field Duplicate

Appendix 2.1

Fish Index of Biotic Integrity (IBI) Scores from the Survey of the Lower Grand River
Hydrologic Units, 2003 - 2004.
(04110004 050 and 04110004 060)

River Mile	Type	Date	Drainage area (sq mi)	Number of						Percent of Individuals					Rel.No. minus tolerants /(0.3km)	IBI	
				Total species	Minnow species	Headwater species	Sensitive species	Darter & Sculpin species	Simple Lithophils	Tolerant fishes	Omni- vores	Pioneering fishes	Insect- ivores	DELT anomalies			
Red Creek - (03-004)																	
Year: 2004																	
0.50	E	07/27/2004	9.4	6(1)	3(1)	1(1)	1(1)	0(1)	3(3)	46(3)	15(5)	20(5)	33(3)	0.0(5)	58(1) *	30	
Kellogg Creek - (03-005)																	
Year: 2004																	
5.70	E	07/16/2004	3.8	6(3)	4(3)	1(1)	0(1)	1(1)	2(1)	67(1)	21(3)	66(1)	8(1)	0.0(5)	158(3)	24	
0.20	E	07/16/2004	13.1	17(5)	6(3)	1(1)	5(3)	3(3)	5(3)	9(5)	3(5)	8(5)	43(3)	0.0(5)	716(3)	44	
Ellison Creek - (03-006)																	
Year: 2004																	
1.20	E	07/14/2004	5.6	10(3)	3(3)	2(3)	1(1)	3(3)	3(3)	22(5)	1(5)	16(5)	41(5)	0.0(5)	442(3)	44	
Talcott Creek - (03-007)																	
Year: 2004																	
1.50	E	07/27/2004	5.4	5(1)	2(1)	1(1)	0(1)	0(1)	2(1)	85(1)	2(5)	55(3)	16(1)	0.0(5)	53(1)	22	
Mill Creek - (03-009)																	
Year: 2004																	
5.00	E	07/15/2004	4.8	8(3)	4(3)	3(3)	0(1)	2(3)	3(3)	71(1)	7(5)	20(5)	14(1)	0.0(5)	76(1)	34	
Coffee Creek - (03-010)																	
Year: 2004																	
0.20	E	07/22/2004	12.0	18(5)	9(5)	0(1)	4(3)	4(3)	5(3)	34(3)	17(3)	43(3)	38(3)	0.0(5)	62(1) *	38	
Trib. to Mill Cr. - (03-041)																	
Year: 2004																	
1.60	E	07/15/2004	3.6	9(3)	4(3)	3(3)	2(3)	3(5)	4(3)	66(1)	5(5)	37(3)	30(3)	0.0(5)	233(3)	40	
Big Creek - (03-100)																	
Year: 2003																	
16.20	E	09/02/2003	1.2	12(5)	6(5)	4(5)	2(5)	2(5)	4(5)	31(5)	3(5)	19(5)	18(3)	0.0(5)	651(5)	58	
16.00	E	09/02/2003	1.2	10(5)	6(5)	3(3)	1(3)	2(5)	5(5)	49(3)	1(5)	36(3)	23(5)	0.0(5)	420(5)	52	
14.00	E	09/03/2003	5.9	11(3)	5(3)	1(1)	1(1)	2(3)	4(3)	35(3)	8(5)	19(5)	27(3)	0.0(5)	657(5)	40	
9.30	E	09/02/2003	14.9	14(3)	7(5)	3(3)	3(3)	3(3)	6(3)	21(5)	9(5)	13(5)	32(3)	0.0(5)	1367(5)	48	
Gordon Creek - (03-101)																	

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

River Mile	Type	Date	Drainage area (sq mi)	Number of						Percent of Individuals					Rel.No. minus tolerants /(0.3km)	IBI	
				Total species	Minnow species	Headwater species	Sensitive species	Darter & Sculpin species	Simple Lithophils	Tolerant fishes	Omni- vores	Pioneering fishes	Insect- ivores	DELT anomalies			
Year: 2004																	
1.10	E	07/14/2004	3.3	5(1)	3(3)	1(1)	1(1)	2(3)	2(1)	47(3)	0(5)	21(5)	6(1)	0.0(5)	412(5)	34	
East Creek - (03-102)																	
Year: 2004																	
1.20	E	07/15/2004	4.4	7(3)	3(3)	1(1)	0(1)	0(1)	1(1)	60(1)	0(5)	44(3)	12(1)	0.0(5)	214(3)	28	
Jenks Creek - (03-104)																	
Year: 2003																	
0.10	E	09/04/2003	2.8	15(5)	8(5)	4(5)	3(3)	3(5)	7(5)	23(5)	4(5)	15(5)	15(3)	0.0(5)	1913(5)	56	
Cutts Creek - (03-105)																	
Year: 2004																	
1.20	E	07/14/2004	0.9	8(5)	3(3)	1(1)	1(3)	2(5)	3(5)	70(1)	31(1)	35(3)	5(1)	0.0(5)	120(5)	38	
Bates Creek - (03-111)																	
Year: 2004																	
2.20	E	07/21/2004	12.7	12(3)	6(3)	1(1)	1(1)	1(1)	5(3)	50(3)	30(3)	42(3)	29(3)	0.0(5)	434(3)	32	
Trib. to Paine Creek - (03-113)																	
Year: 2004																	
0.40	E	07/15/2004	2.8	9(3)	3(3)	1(1)	2(3)	2(3)	3(3)	76(1)	0(5)	27(5)	11(1)	0.0(5)	134(3)	36	
Griggs Creek - (03-121)																	
Year: 2003																	
2.00	E	09/11/2003	14.6	8(3)	0(1)	0(1)	0(1)	0(1)	0(1)	28(5)	0(5)	10(5)	74(5)	0.0(5)	147(1)	34	
Askue Run - (03-122)																	
Year: 2004																	
0.10	E	07/22/2004	5.6	12(3)	3(3)	1(1)	2(1)	4(5)	3(3)	55(3)	8(5)	58(1)	51(5)	0.0(5)	138(3)	38	
Peters Creek - (03-123)																	
Year: 2004																	
0.20	E	07/22/2004	3.7	11(5)	3(3)	1(1)	2(3)	3(5)	2(1)	49(3)	9(5)	54(3)	49(5)	0.0(5)	282(3)	42	
Cemetery Creek - (03-124)																	
Year: 2003																	
2.10	E	09/04/2003	4.7	12(5)	5(3)	0(1)	0(1)	2(3)	2(1)	76(1)	38(1)	69(1)	10(1)	0.0(5)	431(3)	26	

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

River Mile	Type	Date	Drainage area (sq mi)	Number of						Percent of Individuals					Rel.No. minus tolerants /(0.3km)	IBI
				Total species	Minnow species	Headwater species	Sensitive species	Darter & Sculpin species	Simple Lithophils	Tolerant fishes	Omni- vores	Pioneering fishes	Insect- ivores	DELT anomalies		
1.30	E	09/09/2003	4.9	11(3)	4(3)	0(1)	0(1)	2(3)	2(1)	65(1)	52(1)	70(1)	12(1)	0.0(5)	762(5)	26

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

River Mile	Type	Date	Drainage area (sq mi)	Number of					Percent of Individuals						Rel.No. minus tolerants /(0.3km)	IBI	Modified Iwb
				Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Simple Lithophils	Tolerant fishes	Omni- vores	Top carnivores	Insect- ivores	DELT anomalies			
Grand River - (03001)																	
Year: 2004																	
28.40	D	09/16/2004	554	26(5)	3(3)	4(3)	6(5)	6(3)	44(5)	12(5)	10(5)	6.4(5)	70(5)	0.0(5)	396(3)	52	8.7
Year: 2003																	
28.40	D	08/21/2003	554	22(3)	3(3)	3(3)	6(5)	5(3)	40(5)	12(5)	12(5)	9.8(5)	71(5)	0.0(5)	296(3)	50	8.6
22.30	D	08/28/2003	581	26(5)	3(3)	4(3)	6(5)	5(3)	38(5)	8(5)	7(5)	7.6(5)	82(5)	0.0(5)	546(3)	52	9.2
Mill Creek - (03009)																	
Year: 2004																	
1.30	E	07/22/2004	20	12(3)	2(3)	1(1)	0(1)	3(3)	22(3)	22(5)	6(5)	0.0(1)	24(1)	0.0(5)	510(3)	34	na
Year: 2003																	
1.40	E	08/18/2003	20	14(3)	3(3)	1(1)	0(1)	3(3)	21(3)	32(3)	23(3)	1.7(3)	29(3)	0.0(5)	546(3)	34	7.7
Big Creek - (03100)																	
Year: 2003																	
4.90	E	08/28/2003	28	13(3)	0(1)	2(3)	1(1)	3(3)	26(3)	7(5)	3(5)	0.0(1)	32(3)	0.0(5)	2038(5)	38	7.9
2.50	D	08/12/2003	35	14(3)	1(1)	1(1)	2(3)	4(3)	41(5)	6(5)	6(5)	5.3(5)	79(5)	0.0(5)	379(3)	44	7.1
Paine Creek - (03110)																	
Year: 2004																	
6.20	E	08/31/2004	20	15(3)	3(3)	2(3)	1(1)	3(3)	28(3)	50(3)	15(5)	0.0(1)	21(1)	0.1(5)	968(5)	36	na
3.00	E	07/23/2004	26	13(3)	1(1)	2(3)	0(1)	3(3)	37(5)	45(3)	13(5)	0.0(1)	12(1)	0.0(5)	446(3)	34	na
Year: 2003																	
0.50	E	08/12/2003	28	26(5)	5(5)	2(3)	3(3)	5(5)	21(3)	28(5)	20(3)	5.5(5)	38(3)	0.0(5)	450(3)	48	8.5
Mill Creek - (03120)																	
Year: 2004																	
3.70	D	08/05/2004	92	23(5)	3(3)	4(5)	3(3)	5(5)	36(5)	28(3)	22(3)	3.8(3)	59(5)	0.0(5)	288(3)	48	8.1
Year: 2003																	

na - Qualitative data, Modified Iwb not applicable.

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

River Mile	Type	Date	Drainage area (sq mi)	Number of					Percent of Individuals						Rel.No. minus tolerants /(0.3km)	IBI	Modified Iwb
				Total species	Sunfish species	Sucker species	Intolerant species	Darter species	Simple Lithophils	Tolerant fishes	Omni- vores	Top carnivores	Insect- ivores	DELT anomalies			
25.60	E	09/09/2003	21	10(3)	3(3)	0(1)	0(1)	1(1)	1(1)	58(1)	3(5)	3.8(3)	84(5)	0.0(5)	127(1)	30	6.0
18.20	D	09/11/2003	47	21(5)	4(5)	2(3)	2(1)	5(5)	20(3)	21(5)	15(5)	6.8(5)	62(5)	0.0(5)	1254(5)	52	9.3
6.50	D	09/16/2003	87	25(5)	2(3)	2(3)	2(1)	6(5)	15(1)	45(1)	43(1)	13.0(5)	28(3)	0.0(5)	725(3)	36	8.7
4.10	D	09/11/2003	92	20(3)	3(3)	1(1)	2(1)	4(3)	17(1)	39(3)	39(1)	5.1(5)	45(3)	0.5(3)	450(3)	30	7.7

na - Qualitative data, Modified Iwb not applicable.

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

● - One or more species excluded from IBI calculation.

River Mile	Type	Date	Drainage area (sq mi)	Number of				Percent of Individuals							Rel.No. minus tolerants /(1.0 km)	Modified IBI	lwb
				Total species	Sunfish species	Sucker species	Intolerant species	Rnd-bodied suckers	Simple Lithophils	Tolerant fishes	Omni- vores	Top carnivores	Insect- ivores	DELT anomalies			
Grand River - (03-001)																	
Year: 2004																	
34.00	A	08/13/2004	548	28(5)	2(3)	4(3)	6(5)	49(5)	57(5)	5(5)	5(5)	13(5)	81(5)	0.0(5)	568(5)	56	9.7
22.10	A	08/05/2004	581	35(5)	5(5)	5(3)	6(5)	23(3)	67(5)	5(5)	6(5)	7(3)	85(5)	0.3(5)	608(5)	54	10.4
13.60	A	08/11/2004	630	27(5)	3(3)	4(3)	8(5)	27(3)	46(3)	7(5)	7(5)	11(5)	79(5)	0.0(5)	690(5)	52	9.9
8.50	A	08/12/2004	685	25(5)	5(5)	6(5)	6(5)	60(5)	71(5)	1(5)	1(5)	12(5)	81(5)	0.3(5)	707(5)	60	9.8
6.10	A	08/13/2004	687	25(5)	3(3)	6(5)	6(5)	38(5)	55(5)	2(5)	4(5)	12(5)	80(5)	0.4(5)	556(5)	58	9.8
4.30	A	08/12/2004	698	17(0)	3(0)	5(0)	2(0)	37(0)	46(0)	1(0)	1(0)	28(0)	64(0)	3.5(0)	202(0)	0	8.6
3.90	A	08/12/2004	699	16(0)	3(0)	5(0)	1(0)	18(0)	21(0)	2(0)	1(0)	60(0)	35(0)	1.8(0)	216(0)	0	8.6
3.20	A	08/12/2004	701	18(0)	4(0)	5(0)	1(0)	24(0)	31(0)	5(0)	7(0)	31(0)	56(0)	4.5(0)	280(0)	0	9.2
Year: 2003																	
42.40	A	08/21/2003	417	16(3)	5(5)	2(1)	2(3)	33(3)	40(3)	10(5)	8(5)	12(5)	79(5)	3.0(3)	180(1)	42	8.0
40.90	A	08/27/2003	521	20(3)	3(3)	5(3)	4(5)	62(5)	68(5)	7(5)	7(5)	14(5)	78(5)	0.5(5)	384(3)	52	9.0
36.30	A	08/21/2003	543	17(3)	5(5)	4(3)	2(3)	53(5)	54(5)	6(5)	5(5)	27(5)	68(5)	1.2(3)	320(3)	50	8.6
13.60	A	08/28/2003	630	16(3)	3(3)	4(3)	2(3)	38(5)	49(3)	1(5)	1(5)	36(5)	62(5)	0.0(5)	272(3)	48	8.7
8.00	A	08/28/2003	686	26(5)	6(5)	7(5)	4(5)	44(5)	52(5)	5(5)	7(5)	17(5)	76(5)	0.9(3)	484(5)	58	10.0
6.20	A	08/28/2003	687	15(3)	2(3)	6(5)	2(3)	77(5)	78(5)	0(5)	10(5)	6(3)	81(5)	0.0(5)	372(3)	50	9.0
Mill Creek - (03-120)																	
Year: 2003																	
10.00	A	09/16/2003	80	11(3)	5(5)	1(1)	0(1)	32(3)	34(3)	4(5)	2(5)	20(5)	76(5)	0.0(5)	184(1) *	42	7.6

♦ - IBI is low end adjusted.

* - < 200 Total individuals in sample

** - < 50 Total individuals in sample

Appendix 2.2

Fish Species Lists for Survey Sites Sampled in the
Lower Grand River Hydrologic Units, 2003 - 2004.
(04110004 050 and 04110004 060)

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 42.40	Location:	Date Range: 08/21/2003
Time Fished: 3205 sec	Drainage: 417.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Silver Redhorse	R	I	S	M	21	42.00	21.00	19.94	27.85	474.76
Trout-perch		I	M		13	26.00	13.00	0.18	0.25	6.77
Golden Redhorse	R	I	S	M	12	24.00	12.00	5.70	7.96	237.50
Mimic Shiner	N	I	M	I	12	24.00	12.00	0.04	0.05	1.50
Spotfin Shiner	N	I	M		8	16.00	8.00	0.05	0.07	3.13
Longear Sunfish	S	I	C	M	6	12.00	6.00	0.22	0.30	18.00
Walleye	F	P	S		6	12.00	6.00	4.30	6.01	358.33
Common Carp	G	O	M	T	4	8.00	4.00	38.85	54.27	4,856.25
Bluntnose Minnow	N	O	C	T	4	8.00	4.00	0.02	0.03	2.50
Rock Bass	S	C	C		4	8.00	4.00	0.86	1.21	108.00
Black Crappie	S	I	C		2	4.00	2.00	1.10	1.54	275.00
Green Sunfish	S	I	C	T	2	4.00	2.00	0.04	0.05	9.50
Grass Pickerel		P	M	P	1	2.00	1.00	0.02	0.03	10.00
Brindled Madtom		I	C	I	1	2.00	1.00	0.02	0.03	10.00
Smallmouth Bass	F	C	C	M	1	2.00	1.00	0.19	0.27	95.00
Bluegill Sunfish	S	I	C	P	1	2.00	1.00	0.02	0.03	12.00
Green Sf X Bluegill Sf					1	2.00	1.00	0.03	0.04	13.00
Blackside Darter	D	I	S		1	2.00	1.00	0.02	0.02	8.00
<i>Mile Total</i>					100	200.00		71.59		
<i>Number of Species</i>					17					
<i>Number of Hybrids</i>					1					

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 40.90	Location:	Date Range: 08/27/2003
Time Fished:	Drainage: 521.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Golden Redhorse	R	I	S	M	88	176.00	42.72	36.58	42.56	207.84
Northern Hog Sucker	R	I	S	M	22	44.00	10.68	3.84	4.47	87.36
Silver Redhorse	R	I	S	M	14	28.00	6.80	19.43	22.60	693.93
Mimic Shiner	N	I	M	I	14	28.00	6.80	0.04	0.04	1.36
Rock Bass	S	C	C		14	28.00	6.80	1.75	2.04	62.57
Bluntnose Minnow	N	O	C	T	13	26.00	6.31	0.07	0.08	2.50
Spotfin Shiner	N	I	M		8	16.00	3.88	0.06	0.07	3.75
Walleye	F	P	S		7	14.00	3.40	5.05	5.87	360.71
Smallmouth Bass	F	C	C	M	6	12.00	2.91	3.19	3.71	265.83
Channel Catfish	F		C		4	8.00	1.94	13.79	16.04	1,723.75
Black Redhorse	R	I	S	I	3	6.00	1.46	0.86	1.00	143.33
River Chub	N	I	N	I	2	4.00	0.97	0.24	0.28	61.00
Longear Sunfish	S	I	C	M	2	4.00	0.97	0.05	0.06	13.50
Blackside Darter	D	I	S		2	4.00	0.97	0.02	0.03	5.50
Greenside Darter	D	I	S	M	2	4.00	0.97	0.01	0.01	2.50
Grass Pickerel		P	M	P	1	2.00	0.49	0.02	0.03	11.00
White Sucker	W	O	S	T	1	2.00	0.49	0.86	1.00	428.00
Bigeye Chub	N	I	S	I	1	2.00	0.49	0.00	0.00	2.00
Sand Shiner	N	I	M	M	1	2.00	0.49	0.00	0.00	2.00
Pumpkinseed Sunfish	S	I	C	P	1	2.00	0.49	0.08	0.10	42.00
<i>Mile Total</i>					206	412.00		85.96		
<i>Number of Species</i>					20					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 36.30	Location: upst. Coffee Creek	Date Range: 08/21/2003
Time Fished: 2948 sec	Drainage: 543.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Golden Redhorse	R	I	S	M	60	120.00	35.09	30.82	45.93	256.80
Rock Bass	S	C	C		33	66.00	19.30	2.40	3.58	36.39
Black Redhorse	R	I	S	I	15	30.00	8.77	7.59	11.32	253.08
Silver Redhorse	R	I	S	M	14	28.00	8.19	17.70	26.38	632.14
Smallmouth Bass	F	C	C	M	11	22.00	6.43	4.08	6.08	185.50
Longear Sunfish	S	I	C	M	11	22.00	6.43	0.52	0.78	23.64
Bluntnose Minnow	N	O	C	T	9	18.00	5.26	0.04	0.05	2.00
Mimic Shiner	N	I	M	I	6	12.00	3.51	0.02	0.03	1.67
Northern Hog Sucker	R	I	S	M	2	4.00	1.17	1.34	2.00	335.00
Spotfin Shiner	N	I	M		2	4.00	1.17	0.01	0.02	3.50
Walleye	F	P	S		2	4.00	1.17	1.76	2.63	441.00
Golden Shiner	N	I	M	T	1	2.00	0.58	0.02	0.03	10.00
Yellow Bullhead		I	C	T	1	2.00	0.58	0.48	0.72	240.00
Trout-perch		I	M		1	2.00	0.58	0.02	0.03	9.00
Black Crappie	S	I	C		1	2.00	0.58	0.17	0.25	85.00
Bluegill Sunfish	S	I	C	P	1	2.00	0.58	0.01	0.01	5.00
Pumpkinseed Sunfish	S	I	C	P	1	2.00	0.58	0.11	0.16	55.00
<i>Mile Total</i>					171	342.00		67.09		
<i>Number of Species</i>					17					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 34.00	Location:	Date Range: 08/13/2004
Time Fished:	Drainage: 549.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Golden Redhorse	R	I	S	M	78	156.00	26.00	31.69	35.07	203.16
Northern Hog Sucker	R	I	S	M	35	70.00	11.67	13.28	14.69	189.69
Black Redhorse	R	I	S	I	31	62.00	10.33	23.67	26.20	381.82
Trout-perch		I	M		26	52.00	8.67	0.08	0.09	1.58
Rock Bass	S	C	C		26	52.00	8.67	2.90	3.21	55.77
Mimic Shiner	N	I	M	I	16	32.00	5.33	0.08	0.09	2.47
Spotfin Shiner	N	I	M		15	30.00	5.00	0.13	0.14	4.33
Bluntnose Minnow	N	O	C	T	15	30.00	5.00	0.11	0.12	3.53
Rosefin Shiner	N	I	S	M	7	14.00	2.33	0.06	0.07	4.57
Smallmouth Bass	F	C	C	M	7	14.00	2.33	4.00	4.43	285.71
Sand Shiner	N	I	M	M	6	12.00	2.00	0.02	0.02	1.67
Blackside Darter	D	I	S		6	12.00	2.00	0.01	0.01	1.00
Grass Pickerel		P	M	P	4	8.00	1.33	0.08	0.09	10.00
Greenside Darter	D	I	S	M	4	8.00	1.33	0.03	0.03	3.75
Silver Redhorse	R	I	S	M	3	6.00	1.00	4.19	4.64	698.33
River Chub	N	I	N	I	3	6.00	1.00	0.44	0.48	73.00
Stonecat Madtom		I	C	I	3	6.00	1.00	0.17	0.19	29.00
Logperch	D	I	S	M	3	6.00	1.00	0.06	0.07	10.33
Striped Shiner	N	I	S		2	4.00	0.67	0.03	0.04	8.00
Yellow Perch			M		2	4.00	0.67	0.03	0.04	8.50
Muskellunge [S]	F	P	M		1	2.00	0.33	9.00	9.96	4,500.00
Emerald Shiner	N	I	S		1	2.00	0.33	0.01	0.01	5.00
Silver Shiner	N	I	S	I	1	2.00	0.33	0.00	0.00	1.00
Rosyface Shiner	N	I	S	I	1	2.00	0.33	0.01	0.01	3.00
Yellow Bullhead		I	C	T	1	2.00	0.33	0.21	0.23	105.00
Largemouth Bass	F	C	C		1	2.00	0.33	0.05	0.05	23.00
Bluegill Sunfish	S	I	C	P	1	2.00	0.33	0.02	0.02	8.00
Fantail Darter	D	I	C		1	2.00	0.33	0.00	0.00	2.00
<i>Mile Total</i>					300	600.00		90.37		
<i>Number of Species</i>					28					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 28.40	Location:	Date Range: 08/21/2003
Time Fished:	Drainage: 554.0 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Greenside Darter	D	I	S	M	37	55.50	16.52	0.30	2.78	5.42
Bluntnose Minnow	N	O	C	T	26	39.00	11.61	0.19	1.72	4.79
River Chub	N	I	N	I	24	36.00	10.71	0.63	5.85	17.62
Fantail Darter	D	I	C		19	28.50	8.48	0.06	0.54	2.05
Striped Shiner	N	I	S		18	27.00	8.04	0.17	1.52	6.12
Central Stoneroller	N	H	N		16	24.00	7.14	0.05	0.42	1.93
Rock Bass	S	C	C		15	22.50	6.70	1.73	15.90	76.67
Mimic Shiner	N	I	M	I	13	19.50	5.80	0.03	0.25	1.38
Black Redhorse	R	I	S	I	10	15.00	4.46	2.70	24.89	180.00
Golden Redhorse	R	I	S	M	9	13.50	4.02	3.75	34.57	277.78
Smallmouth Bass	F	C	C	M	7	10.50	3.13	0.25	2.34	24.14
Spotfin Shiner	N	I	M		6	9.00	2.68	0.03	0.30	3.60
Stonecat Madtom		I	C	I	6	9.00	2.68	0.39	3.57	43.00
Blackside Darter	D	I	S		5	7.50	2.23	0.02	0.14	2.00
Logperch	D	I	S	M	5	7.50	2.23	0.09	0.83	12.00
Northern Hog Sucker	R	I	S	M	2	3.00	0.89	0.29	2.70	97.50
Bigeye Chub	N	I	S	I	1	1.50	0.45	0.00	0.02	1.00
Silver Shiner	N	I	S	I	1	1.50	0.45	0.00	0.02	1.00
Rosefin Shiner	N	I	S	M	1	1.50	0.45	0.00	0.03	2.00
Green Sunfish	S	I	C	T	1	1.50	0.45	0.05	0.41	30.00
Bluegill Sunfish	S	I	C	P	1	1.50	0.45	0.13	1.18	85.00
Rainbow Darter	D	I	S	M	1	1.50	0.45	0.00	0.03	2.00
<i>Mile Total</i>					224	336.00		10.85		
<i>Number of Species</i>					22					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 28.40	Location:	Date Range: 09/16/2004
Time Fished:	Drainage: 554.0 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Greenside Darter	D	I	S	M	52	78.00	17.39	0.23	1.26	2.92
Central Stoneroller	N	H	N		36	54.00	12.04	0.24	1.30	4.34
River Chub	N	I	N	I	35	52.50	11.71	0.55	3.03	10.43
Bluntnose Minnow	N	O	C	T	28	42.00	9.36	0.06	0.35	1.52
Black Redhorse	R	I	S	I	22	33.00	7.36	9.62	53.24	291.38
Fantail Darter	D	I	C		22	33.00	7.36	0.04	0.23	1.23
Blackside Darter	D	I	S		21	31.50	7.02	0.08	0.42	2.38
Striped Shiner	N	I	S		11	16.50	3.68	0.11	0.63	6.82
Rock Bass	S	C	C		11	16.50	3.68	1.05	5.79	63.36
Northern Hog Sucker	R	I	S	M	9	13.50	3.01	0.65	3.62	48.33
Sand Shiner	N	I	M	M	9	13.50	3.01	0.02	0.12	1.56
Smallmouth Bass	F	C	C	M	7	10.50	2.34	0.35	1.91	32.86
Golden Redhorse	R	I	S	M	4	6.00	1.34	2.25	12.46	375.00
Creek Chub	N	G	N	T	4	6.00	1.34	0.01	0.04	1.25
Rosyface Shiner	N	I	S	I	4	6.00	1.34	0.01	0.06	1.75
Stonecat Madtom		I	C	I	4	6.00	1.34	0.08	0.43	13.00
Silver Shiner	N	I	S	I	3	4.50	1.00	0.01	0.04	1.67
Logperch	D	I	S	M	3	4.50	1.00	0.11	0.60	24.00
Rainbow Darter	D	I	S	M	3	4.50	1.00	0.01	0.04	1.67
Spotfin Shiner	N	I	M		2	3.00	0.67	0.04	0.22	13.00
Bluegill Sunfish	S	I	C	P	2	3.00	0.67	0.04	0.21	12.50
Johnny Darter	D	I	C		2	3.00	0.67	0.01	0.04	2.50
White Sucker	W	O	S	T	1	1.50	0.33	0.02	0.08	10.00
Common Carp	G	O	M	T	1	1.50	0.33	2.48	13.70	1,650.00
Mimic Shiner	N	I	M	I	1	1.50	0.33	0.00	0.01	1.00
Largemouth Bass	F	C	C		1	1.50	0.33	0.02	0.13	15.00
Green Sunfish	S	I	C	T	1	1.50	0.33	0.01	0.07	8.00
<i>Mile Total</i>					299	448.50		18.06		
<i>Number of Species</i>					27					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 22.30	Location: St. Rt. 528	Date Range: 08/28/2003
Time Fished:	Drainage: 581.0 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Sand Shiner	N	I	M	M	98	147.00	24.69	0.24	1.60	1.65
Striped Shiner	N	I	S		68	102.00	17.13	1.60	10.60	15.67
River Chub	N	I	N	I	36	54.00	9.07	1.62	10.73	30.00
Greenside Darter	D	I	S	M	27	40.50	6.80	0.15	0.97	3.60
Mimic Shiner	N	I	M	I	26	39.00	6.55	0.06	0.42	1.62
Bluntnose Minnow	N	O	C	T	26	39.00	6.55	0.17	1.15	4.46
Northern Hog Sucker	R	I	S	M	18	27.00	4.53	2.54	16.84	94.15
Smallmouth Bass	F	C	C	M	17	25.50	4.28	1.56	10.34	61.18
Rock Bass	S	C	C		13	19.50	3.27	1.04	6.91	53.46
Blackside Darter	D	I	S		12	18.00	3.02	0.03	0.18	1.50
Golden Redhorse	R	I	S	M	10	15.00	2.52	4.10	27.13	273.00
Central Stoneroller	N	H	N		9	13.50	2.27	0.14	0.89	10.00
Creek Chub	N	G	N	T	6	9.00	1.51	0.02	0.10	1.67
Rosyface Shiner	N	I	S	I	6	9.00	1.51	0.03	0.21	3.50
Spotfin Shiner	N	I	M		5	7.50	1.26	0.04	0.29	5.80
Fantail Darter	D	I	C		4	6.00	1.01	0.02	0.10	2.50
Black Redhorse	R	I	S	I	3	4.50	0.76	1.50	9.94	333.33
Rainbow Darter	D	I	S	M	3	4.50	0.76	0.02	0.10	3.33
Pumpkinseed Sunfish	S	I	C	P	2	3.00	0.50	0.09	0.61	30.50
Logperch	D	I	S	M	2	3.00	0.50	0.05	0.30	15.00
White Sucker	W	O	S	T	1	1.50	0.25	0.02	0.11	11.00
Bigeye Chub	N	I	S	I	1	1.50	0.25	0.01	0.04	4.00
Emerald Shiner	N	I	S		1	1.50	0.25	0.00	0.02	2.00
Silverjaw Minnow	N	I	M		1	1.50	0.25	0.01	0.03	3.00
Brindled Madtom		I	C	I	1	1.50	0.25	0.02	0.12	12.00
Bluegill Sunfish	S	I	C	P	1	1.50	0.25	0.04	0.28	28.00
<i>Mile Total</i>					397	595.50		15.09		
<i>Number of Species</i>					26					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 22.10	Location:	Date Range: 08/05/2004
Time Fished:	Drainage: 581.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Striped Shiner	N	I	S		76	152.00	23.82	2.09	2.75	13.73
Silver Shiner	N	I	S	I	36	72.00	11.29	0.19	0.24	2.57
Black Redhorse	R	I	S	I	35	70.00	10.97	19.14	25.20	273.44
Northern Hog Sucker	R	I	S	M	19	38.00	5.96	5.41	7.12	142.32
Golden Redhorse	R	I	S	M	17	34.00	5.33	10.63	13.99	312.50
Spotfin Shiner	N	I	M		15	30.00	4.70	0.15	0.20	5.00
Mimic Shiner	N	I	M	I	15	30.00	4.70	0.07	0.09	2.33
River Chub	N	I	N	I	14	28.00	4.39	1.06	1.40	37.86
Rosyface Shiner	N	I	S	I	14	28.00	4.39	0.08	0.11	2.86
Smallmouth Bass	F	C	C	M	11	22.00	3.45	5.74	7.56	260.91
Rock Bass	S	C	C		9	18.00	2.82	1.40	1.84	77.67
Bluntnose Minnow	N	O	C	T	8	16.00	2.51	0.04	0.06	2.63
Gizzard Shad		O	M		7	14.00	2.19	0.80	1.05	57.14
Greenside Darter	D	I	S	M	6	12.00	1.88	0.06	0.07	4.67
Silver Redhorse	R	I	S	M	3	6.00	0.94	5.72	7.53	953.33
Common Carp	G	O	M	T	3	6.00	0.94	12.40	16.32	2,066.67
Sand Shiner	N	I	M	M	3	6.00	0.94	0.02	0.03	3.33
Central Stoneroller	N	H	N		3	6.00	0.94	0.05	0.07	8.33
Bluegill Sunfish	S	I	C	P	3	6.00	0.94	0.08	0.10	12.67
Stonecat Madtom		I	C	I	2	4.00	0.63	0.17	0.23	43.00
White Perch	E		M		2	4.00	0.63	0.17	0.22	42.50
Blackside Darter	D	I	S		2	4.00	0.63	0.01	0.01	2.00
Logperch	D	I	S	M	2	4.00	0.63	0.05	0.06	11.50
White Sucker	W	O	S	T	1	2.00	0.31	0.01	0.01	5.00
Golden Shiner	N	I	M	T	1	2.00	0.31	0.00	0.01	2.00
Emerald Shiner	N	I	S		1	2.00	0.31	0.01	0.01	3.00
Channel Catfish	F		C		1	2.00	0.31	2.80	3.69	1,400.00
Yellow Bullhead		I	C	T	1	2.00	0.31	0.32	0.42	160.00
Brown Bullhead		I	C	T	1	2.00	0.31	1.52	2.00	759.00
Trout-perch		I	M		1	2.00	0.31	0.01	0.01	5.00
Black Crappie	S	I	C		1	2.00	0.31	0.48	0.63	238.00
Longear Sunfish	S	I	C	M	1	2.00	0.31	0.03	0.04	15.00
Pumpkinseed Sunfish	S	I	C	P	1	2.00	0.31	0.03	0.04	15.00
Walleye	F	P	S		1	2.00	0.31	0.45	0.59	225.00
Rainbow Darter	D	I	S	M	1	2.00	0.31	0.01	0.01	3.00
Fantail Darter	D	I	C		1	2.00	0.31	0.00	0.00	1.00
Freshwater Drum			M	P	1	2.00	0.31	4.80	6.32	2,400.00
<i>Mile Total</i>					319	638.00		75.97		
<i>Number of Species</i>					37					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 13.60	Location: Vrooman Rd.	Date Range: 08/28/2003
Time Fished: 2878 sec	Drainage: 630.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Rock Bass	S	C	C		38	76.00	27.54	4.10	9.88	53.95
Golden Redhorse	R	I	S	M	18	36.00	13.04	11.22	27.03	311.67
Northern Hog Sucker	R	I	S	M	18	36.00	13.04	5.50	13.25	152.78
Black Redhorse	R	I	S	I	16	32.00	11.59	5.23	12.59	163.33
Smallmouth Bass	F	C	C	M	11	22.00	7.97	2.02	4.88	92.00
Bluegill Sunfish	S	I	C	P	10	20.00	7.25	0.24	0.57	11.80
Silver Shiner	N	I	S	I	7	14.00	5.07	0.16	0.39	11.43
Striped Shiner	N	I	S		5	10.00	3.62	0.24	0.58	24.00
Sand Shiner	N	I	M	M	4	8.00	2.90	0.00	0.00	0.25
Common Carp	G	O	M	T	2	4.00	1.45	10.20	24.57	2,550.00
Spotfin Shiner	N	I	M		2	4.00	1.45	0.03	0.07	7.50
Pumpkinseed Sunfish	S	I	C	P	2	4.00	1.45	0.09	0.22	22.50
Silver Redhorse	R	I	S	M	1	2.00	0.72	0.90	2.17	450.00
Blackside Darter	D	I	S		1	2.00	0.72	0.01	0.02	5.00
Logperch	D	I	S	M	1	2.00	0.72	0.02	0.04	8.00
Greenside Darter	D	I	S	M	1	2.00	0.72	0.00	0.00	1.00
Freshwater Drum			M	P	1	2.00	0.72	1.55	3.73	775.00
<i>Mile Total</i>					138	276.00		41.51		
<i>Number of Species</i>					17					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 13.60	Location: Vrooman Rd.	Date Range: 08/11/2004
Time Fished:	Drainage: 630.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Mimic Shiner	N	I	M	I	93	186.00	25.20	0.29	0.33	1.54
Black Redhorse	R	I	S	I	42	84.00	11.38	21.66	25.33	257.89
Northern Hog Sucker	R	I	S	M	36	72.00	9.76	13.37	15.63	185.67
Striped Shiner	N	I	S		27	54.00	7.32	0.67	0.79	12.48
Rock Bass	S	C	C		25	50.00	6.78	3.52	4.11	70.36
Golden Redhorse	R	I	S	M	20	40.00	5.42	14.65	17.13	366.33
Bluntnose Minnow	N	O	C	T	20	40.00	5.42	0.12	0.14	3.00
Emerald Shiner	N	I	S		18	36.00	4.88	0.12	0.14	3.39
Smallmouth Bass	F	C	C	M	16	32.00	4.34	0.58	0.68	18.13
River Chub	N	I	N	I	9	18.00	2.44	0.71	0.83	39.44
Central Stoneroller	N	H	N		9	18.00	2.44	0.04	0.05	2.33
Greenside Darter	D	I	S	M	9	18.00	2.44	0.05	0.06	2.78
Silver Shiner	N	I	S	I	7	14.00	1.90	0.03	0.03	1.86
Rosyface Shiner	N	I	S	I	6	12.00	1.63	0.01	0.01	0.83
Brindled Madtom		I	C	I	5	10.00	1.36	0.06	0.07	6.00
Common Carp	G	O	M	T	4	8.00	1.08	22.00	25.73	2,750.00
Spotfin Shiner	N	I	M		4	8.00	1.08	0.06	0.07	8.00
Bluegill Sunfish	S	I	C	P	4	8.00	1.08	0.21	0.25	26.75
Stonecat Madtom		I	C	I	3	6.00	0.81	0.22	0.26	37.33
Blackside Darter	D	I	S		3	6.00	0.81	0.01	0.01	1.00
Logperch	D	I	S	M	2	4.00	0.54	0.11	0.13	27.50
River Redhorse [S]	R	I	S	I	1	2.00	0.27	0.00	0.00	2.00
Channel Catfish	F		C		1	2.00	0.27	1.44	1.68	720.00
White Bass	F	P	M		1	2.00	0.27	0.13	0.15	64.00
Longear Sunfish	S	I	C	M	1	2.00	0.27	0.02	0.03	12.00
Yellow Perch			M		1	2.00	0.27	0.01	0.02	7.00
Fantail Darter	D	I	C		1	2.00	0.27	0.01	0.01	3.00
Freshwater Drum			M	P	1	2.00	0.27	5.40	6.31	2,700.00
<i>Mile Total</i>					369	738.00		85.52		
<i>Number of Species</i>					28					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 8.50	Location: St. Rt. 84	Date Range: 08/12/2004
Time Fished:	Drainage: 685.0 sq mi	
Dist Fished: 0.42 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Black Redhorse	R	I	S	I	86	204.76	28.57	48.17	29.83	235.23
Golden Redhorse	R	I	S	M	64	152.38	21.26	70.18	43.47	460.58
Northern Hog Sucker	R	I	S	M	24	57.14	7.97	4.01	2.48	70.13
Striped Shiner	N	I	S		19	45.24	6.31	2.49	1.54	55.00
Rock Bass	S	C	C		17	40.48	5.65	2.41	1.49	59.59
Smallmouth Bass	F	C	C	M	17	40.48	5.65	5.51	3.41	136.06
Silver Shiner	N	I	S	I	11	26.19	3.65	0.17	0.10	6.40
Freshwater Drum			M	P	11	26.19	3.65	5.67	3.51	216.33
Spotfin Shiner	N	I	M		8	19.05	2.66	0.10	0.06	5.38
Silver Redhorse	R	I	S	M	6	14.29	1.99	10.52	6.52	736.67
River Chub	N	I	N	I	5	11.91	1.66	0.64	0.40	54.00
Mimic Shiner	N	I	M	I	5	11.91	1.66	0.02	0.01	2.00
Channel Catfish	F		C		5	11.91	1.66	9.31	5.77	782.00
Bluegill Sunfish	S	I	C	P	5	11.91	1.66	0.16	0.10	13.80
Fantail Darter	D	I	C		4	9.52	1.33	0.03	0.02	3.25
White Sucker	W	O	S	T	3	7.14	1.00	0.99	0.61	138.33
Stonecat Madtom		I	C	I	2	4.76	0.66	0.11	0.07	22.50
Quillback Carpsucker	C	O	M		1	2.38	0.33	0.60	0.37	250.00
Rosyface Shiner	N	I	S	I	1	2.38	0.33	0.00	0.00	1.00
Central Stoneroller	N	H	N		1	2.38	0.33	0.00	0.00	1.00
White Perch	E		M		1	2.38	0.33	0.11	0.07	45.00
Black Crappie	S	I	C		1	2.38	0.33	0.01	0.00	3.00
Largemouth Bass	F	C	C		1	2.38	0.33	0.16	0.10	65.00
Green Sunfish	S	I	C	T	1	2.38	0.33	0.03	0.02	13.00
Pumpkinseed Sunfish	S	I	C	P	1	2.38	0.33	0.02	0.01	10.00
Logperch	D	I	S	M	1	2.38	0.33	0.05	0.03	19.00
<i>Mile Total</i>					301	716.67		161.46		
<i>Number of Species</i>					26					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 8.00	Location:	Date Range: 08/28/2003
Time Fished: 3144 sec	Drainage: 686.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	35	70.00	13.78	9.42	14.29	134.62
Black Redhorse	R	I	S	I	34	68.00	13.39	10.98	16.66	161.48
Golden Redhorse	R	I	S	M	31	62.00	12.20	16.39	24.86	264.33
Bluegill Sunfish	S	I	C	P	28	56.00	11.02	0.55	0.83	9.78
Smallmouth Bass	F	C	C	M	21	42.00	8.27	1.66	2.52	39.52
Rock Bass	S	C	C		15	30.00	5.91	1.62	2.46	54.00
River Chub	N	I	N	I	11	22.00	4.33	0.50	0.75	22.55
Spotfin Shiner	N	I	M		11	22.00	4.33	0.06	0.10	2.91
Rosyface Shiner	N	I	S	I	9	18.00	3.54	0.05	0.07	2.67
Striped Shiner	N	I	S		8	16.00	3.15	0.14	0.22	9.00
Bluntnose Minnow	N	O	C	T	7	14.00	2.76	0.06	0.09	4.29
Silver Redhorse	R	I	S	M	6	12.00	2.36	6.73	10.21	561.00
Largemouth Bass	F	C	C		6	12.00	2.36	1.21	1.83	100.67
Spotted Sucker	R	I	S		5	10.00	1.97	1.40	2.12	140.00
Gizzard Shad		O	M		4	8.00	1.57	2.50	3.79	312.50
Quillback Carpsucker	C	O	M		3	6.00	1.18	0.44	0.66	73.00
Common Carp	G	O	M	T	3	6.00	1.18	11.30	17.14	1,883.33
Mimic Shiner	N	I	M	I	3	6.00	1.18	0.01	0.02	2.00
Black Crappie	S	I	C		3	6.00	1.18	0.33	0.50	54.67
Sand Shiner	N	I	M	M	2	4.00	0.79	0.01	0.02	3.00
Pumpkinseed Sunfish	S	I	C	P	2	4.00	0.79	0.04	0.06	10.00
Blackside Darter	D	I	S		2	4.00	0.79	0.01	0.02	2.50
White Sucker	W	O	S	T	1	2.00	0.39	0.32	0.49	160.00
White Crappie	S	I	C		1	2.00	0.39	0.09	0.13	44.00
Green Sunfish	S	I	C	T	1	2.00	0.39	0.02	0.02	8.00
Yellow Perch			M		1	2.00	0.39	0.09	0.13	44.00
Fantail Darter	D	I	C		1	2.00	0.39	0.00	0.00	1.00
<i>Mile Total</i>					254	508.00		65.93		
<i>Number of Species</i>					27					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2003
River Mile: 6.20	Location: upst. St. Rt. 2, at park	Date Range: 08/28/2003
Time Fished:	Drainage: 687.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Golden Redhorse	R	I	S	M	60	120.00	32.26	32.87	33.76	273.95
Black Redhorse	R	I	S	I	39	78.00	20.97	23.62	24.25	302.78
Northern Hog Sucker	R	I	S	M	32	64.00	17.20	9.94	10.20	155.26
Silver Redhorse	R	I	S	M	12	24.00	6.45	16.22	16.66	675.83
Gizzard Shad		O	M		10	20.00	5.38	6.04	6.20	302.00
Quillback Carpsucker	C	O	M		8	16.00	4.30	5.36	5.50	335.00
Rock Bass	S	C	C		7	14.00	3.76	1.03	1.06	73.57
Freshwater Drum			M	P	5	10.00	2.69	1.04	1.06	103.60
Bluegill Sunfish	S	I	C	P	4	8.00	2.15	0.29	0.30	36.75
Smallmouth Bass	F	C	C	M	3	6.00	1.61	0.42	0.43	70.00
Striped Shiner	N	I	S		2	4.00	1.08	0.22	0.23	55.00
Shorthead Redhorse	R	I	S	M	1	2.00	0.54	0.21	0.22	105.00
River Chub	N	I	N	I	1	2.00	0.54	0.04	0.04	20.00
White Bass	F	P	M		1	2.00	0.54	0.07	0.07	35.00
Largemouth Bass	F	C	C		1	2.00	0.54	0.02	0.02	10.00
<i>Mile Total</i>					186	372.00		97.39		
<i>Number of Species</i>					15					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 6.10	Location: upst. St. Rt. 2, at park	Date Range: 08/13/2004
Time Fished:	Drainage: 687.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	49	98.00	17.19	1.73	2.22	17.69
River Chub	N	I	N	I	39	78.00	13.68	3.72	4.76	47.73
Black Redhorse	R	I	S	I	36	72.00	12.63	23.79	30.40	330.43
Silver Shiner	N	I	S	I	24	48.00	8.42	0.34	0.44	7.17
Golden Redhorse	R	I	S	M	22	44.00	7.72	13.60	17.38	309.06
Rock Bass	S	C	C		19	38.00	6.67	2.96	3.78	77.89
Smallmouth Bass	F	C	C	M	16	32.00	5.61	3.24	4.14	101.25
Rosyface Shiner	N	I	S	I	12	24.00	4.21	0.03	0.04	1.25
Stonecat Madtom		I	C	I	9	18.00	3.16	0.44	0.56	24.44
Spotfin Shiner	N	I	M		8	16.00	2.81	0.05	0.07	3.38
Striped Shiner	N	I	S		7	14.00	2.46	0.02	0.03	1.43
Bluegill Sunfish	S	I	C	P	7	14.00	2.46	0.61	0.78	43.33
Freshwater Drum			M	P	6	12.00	2.11	0.75	0.96	62.33
Gizzard Shad		O	M		5	10.00	1.75	1.82	2.33	182.40
Common Carp	G	O	M	T	5	10.00	1.75	22.70	29.01	2,270.00
Sand Shiner	N	I	M	M	5	10.00	1.75	0.03	0.04	3.00
Emerald Shiner	N	I	S		3	6.00	1.05	0.02	0.03	3.33
White Perch	E		M		3	6.00	1.05	0.18	0.24	30.67
Mimic Shiner	N	I	M	I	2	4.00	0.70	0.01	0.02	3.00
Silver Redhorse	R	I	S	M	1	2.00	0.35	1.24	1.58	620.00
Shorthead Redhorse	R	I	S	M	1	2.00	0.35	0.48	0.61	240.00
White Sucker	W	O	S	T	1	2.00	0.35	0.09	0.12	45.00
Bluntnose Minnow	N	O	C	T	1	2.00	0.35	0.00	0.00	1.00
Channel Catfish	F		C		1	2.00	0.35	0.30	0.38	150.00
Pumpkinseed Sunfish	S	I	C	P	1	2.00	0.35	0.03	0.04	15.00
Greenside Darter	D	I	S	M	1	2.00	0.35	0.02	0.02	8.00
Round Goby					1	2.00	0.35	0.03	0.04	17.00
<i>Mile Total</i>					285	570.00		78.25		
<i>Number of Species</i>					27					
<i>Number of Hybrids</i>					0					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 4.30	Location:	Date Range: 08/12/2004
Time Fished: 2400 sec	Drainage: 698.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Rock Bass	S	C	C		21	42.00	20.59	2.10	4.93	50.00
Golden Redhorse	R	I	S	M	20	40.00	19.61	21.01	49.34	525.18
Bluegill Sunfish	S	I	C	P	16	32.00	15.69	1.14	2.67	35.56
Black Redhorse	R	I	S	I	9	18.00	8.82	6.00	14.09	333.33
Northern Hog Sucker	R	I	S	M	8	16.00	7.84	3.40	7.99	212.50
Smallmouth Bass	F	C	C	M	6	12.00	5.88	1.50	3.52	125.00
Rosyface Shiner	N	I	S	I	4	8.00	3.92	0.01	0.01	0.75
Logperch	D	I	S	M	3	6.00	2.94	0.09	0.22	15.33
Spotfin Shiner	N	I	M		2	4.00	1.96	0.02	0.04	4.50
Channel Catfish	F		C		2	4.00	1.96	1.77	4.16	442.50
Largemouth Bass	F	C	C		2	4.00	1.96	1.47	3.45	367.50
Freshwater Drum			M	P	2	4.00	1.96	0.33	0.78	82.50
Round Goby					2	4.00	1.96	0.03	0.08	8.00
Silver Redhorse	R	I	S	M	1	2.00	0.98	2.90	6.81	1,450.00
White Sucker	W	O	S	T	1	2.00	0.98	0.49	1.16	247.00
Striped Shiner	N	I	S		1	2.00	0.98	0.00	0.00	1.00
Pumpkinseed Sunfish	S	I	C	P	1	2.00	0.98	0.10	0.24	52.00
Hybrid X Sunfish					1	2.00	0.98	0.21	0.50	107.00
<i>Mile Total</i>					102	204.00		42.58		
<i>Number of Species</i>					17					
<i>Number of Hybrids</i>					1					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 3.90	Location:	Date Range: 08/12/2004
Time Fished:	Drainage: 699.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Rock Bass	S	C	C		50	100.00	45.45	5.10	10.73	51.00
Bluegill Sunfish	S	I	C	P	12	24.00	10.91	0.37	0.77	15.25
Smallmouth Bass	F	C	C	M	11	22.00	10.00	2.29	4.81	103.91
Golden Redhorse	R	I	S	M	10	20.00	9.09	8.80	18.52	440.00
Black Redhorse	R	I	S	I	6	12.00	5.45	3.50	7.37	291.67
Largemouth Bass	F	C	C		5	10.00	4.55	1.59	3.35	159.00
Silver Redhorse	R	I	S	M	3	6.00	2.73	8.00	16.84	1,333.33
Bigmouth Buffalo	C	I	M		2	4.00	1.82	11.00	23.15	2,750.00
Round Goby					2	4.00	1.82	0.01	0.03	3.50
Northern Hog Sucker	R	I	S	M	1	2.00	0.91	0.55	1.16	275.00
Common Carp	G	O	M	T	1	2.00	0.91	3.50	7.37	1,750.00
Emerald Shiner	N	I	S		1	2.00	0.91	0.01	0.01	3.00
Channel Catfish	F		C		1	2.00	0.91	2.50	5.26	1,250.00
Green Sunfish	S	I	C	T	1	2.00	0.91	0.01	0.03	7.00
Hybrid X Sunfish					1	2.00	0.91	0.21	0.45	107.00
Yellow Perch			M		1	2.00	0.91	0.05	0.11	25.00
Blackside Darter	D	I	S		1	2.00	0.91	0.00	0.00	1.00
Logperch	D	I	S	M	1	2.00	0.91	0.02	0.04	10.00
<i>Mile Total</i>					110	220.00		47.51		
<i>Number of Species</i>					17					
<i>Number of Hybrids</i>					1					

River Code: 03-001	Stream: Grand River	Sample Date: 2004
River Mile: 3.20	Location:	Date Range: 08/12/2004
Time Fished:	Drainage: 700.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Bluegill Sunfish	S	I	C	P	30	60.00	20.41	2.91	5.86	48.43
Rock Bass	S	C	C		25	50.00	17.01	2.40	4.84	48.00
Golden Redhorse	R	I	S	M	19	38.00	12.93	15.09	30.43	397.06
Black Redhorse	R	I	S	I	13	26.00	8.84	8.51	17.16	327.27
Smallmouth Bass	F	C	C	M	13	26.00	8.84	7.42	14.97	285.38
Round Goby					9	18.00	6.12	0.06	0.11	3.11
Largemouth Bass	F	C	C		7	14.00	4.76	3.54	7.14	252.71
Pumpkinseed Sunfish	S	I	C	P	6	12.00	4.08	0.62	1.24	51.33
Logperch	D	I	S	M	6	12.00	4.08	0.22	0.44	18.33
Gizzard Shad		O	M		5	10.00	3.40	1.52	3.07	152.00
Bluntnose Minnow	N	O	C	T	4	8.00	2.72	0.02	0.04	2.50
Northern Hog Sucker	R	I	S	M	3	6.00	2.04	2.55	5.14	425.00
White Sucker	W	O	S	T	2	4.00	1.36	0.01	0.03	3.50
Silver Redhorse	R	I	S	M	1	2.00	0.68	4.70	9.48	2,350.00
Emerald Shiner	N	I	S		1	2.00	0.68	0.00	0.00	1.00
Striped Shiner	N	I	S		1	2.00	0.68	0.00	0.01	2.00
Spotfin Shiner	N	I	M		1	2.00	0.68	0.00	0.01	2.00
Green Sunfish	S	I	C	T	1	2.00	0.68	0.01	0.03	7.00
<i>Mile Total</i>					147	294.00		49.58		
<i>Number of Species</i>					18					
<i>Number of Hybrids</i>					0					

River Code: 03-004	Stream: Red Creek	Sample Date: 2004
River Mile: 0.50	Location:	Date Range: 07/27/2004
Time Fished:	Drainage: 9.4 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNr status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Striped Shiner	N	I	S		15	30.00	27.78			
Rainbow Trout	E		N		12	24.00	22.22			
Creek Chub	N	G	N	T	10	20.00	18.52			
White Sucker	W	O	S	T	8	16.00	14.81			
Blacknose Dace	N	G	S	T	6	12.00	11.11			
Stonecat Madtom		I	C	I	2	4.00	3.70			
Green Sunfish	S	I	C	T	1	2.00	1.85			
<i>Mile Total</i>					54	108.00				
<i>Number of Species</i>					7					
<i>Number of Hybrids</i>					0					

River Code: 03-005	Stream: Kellogg Creek	Sample Date: 2004
River Mile: 5.70	Location: Brand Rd.	Date Range: 07/16/2004
Time Fished:	Drainage: 3.8 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	106	212.00	43.62			
Central Stoneroller	N	H	N		60	120.00	24.69			
Bluntnose Minnow	N	O	C	T	36	72.00	14.81			
Johnny Darter	D	I	C		19	38.00	7.82			
White Sucker	W	O	S	T	16	32.00	6.58			
Blacknose Dace	N	G	S	T	6	12.00	2.47			
<i>Mile Total</i>					243	486.00				
<i>Number of Species</i>					6					
<i>Number of Hybrids</i>					0					

River Code: 03-005	Stream: Kellogg Creek	Sample Date: 2004
River Mile: 0.20	Location: St. Rt. 86	Date Range: 07/16/2004
Time Fished:	Drainage: 13.1 sq mi	
Dist Fished: 0.16 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNr status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		190	356.25	45.13			
Rainbow Darter	D	I	S	M	92	172.50	21.85			
Fantail Darter	D	I	C		36	67.50	8.55			
Creek Chub	N	G	N	T	24	45.00	5.70			
Rainbow Trout	E		N		15	28.13	3.56			
Striped Shiner	N	I	S		14	26.25	3.33			
Sand Shiner	N	I	M	M	10	18.75	2.38			
White Sucker	W	O	S	T	8	15.00	1.90			
Stonecat Madtom		I	C	I	8	15.00	1.90			
Bluegill Sunfish	S	I	C	P	8	15.00	1.90			
Bluntnose Minnow	N	O	C	T	3	5.63	0.71			
Johnny Darter	D	I	C		3	5.63	0.71			
Common Shiner	N	I	S		2	3.75	0.48			
Yellow Bullhead		I	C	T	2	3.75	0.48			
Smallmouth Bass	F	C	C	M	2	3.75	0.48			
Green Sunfish	S	I	C	T	2	3.75	0.48			
Northern Hog Sucker	R	I	S	M	1	1.88	0.24			
Pumpkinseed Sunfish	S	I	C	P	1	1.88	0.24			
<i>Mile Total</i>					421	789.38				
<i>Number of Species</i>					18					
<i>Number of Hybrids</i>					0					

River Code: 03-006	Stream: Ellison Creek	Sample Date: 2004
River Mile: 1.20	Location: Pine Hill Rd.	Date Range: 07/14/2004
Time Fished:	Drainage: 5.6 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNr status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		92	184.00	32.39			
Fantail Darter	D	I	C		57	114.00	20.07			
Blacknose Dace	N	G	S	T	46	92.00	16.20			
Johnny Darter	D	I	C		30	60.00	10.56			
Rainbow Darter	D	I	S	M	24	48.00	8.45			
Creek Chub	N	G	N	T	14	28.00	4.93			
Rainbow Trout	E		N		10	20.00	3.52			
Bluegill Sunfish	S	I	C	P	5	10.00	1.76			
Largemouth Bass	F	C	C		3	6.00	1.06			
White Sucker	W	O	S	T	2	4.00	0.70			
Green Sunfish	S	I	C	T	1	2.00	0.35			
<i>Mile Total</i>					284	568.00				
<i>Number of Species</i>					11					
<i>Number of Hybrids</i>					0					

River Code: 03-007	Stream: Talcott Creek	Sample Date: 2004
River Mile: 1.50	Location: upst. Ford Rd.	Date Range: 07/27/2004
Time Fished:	Drainage: 5.4 sq mi	
Dist Fished: 0.13 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	82	189.23	53.25			
Blacknose Dace	N	G	S	T	44	101.54	28.57			
Bluegill Sunfish	S	I	C	P	23	53.08	14.94			
White Sucker	W	O	S	T	3	6.92	1.95			
Green Sunfish	S	I	C	T	2	4.62	1.30			
<i>Mile Total</i>					154	355.39				
<i>Number of Species</i>					5					
<i>Number of Hybrids</i>					0					

River Code: 03-009	Stream: Mill Creek (Grand R. RM 23.58)	Sample Date: 2004
River Mile: 5.00	Location:	Date Range: 07/15/2004
Time Fished:	Drainage: 4.8 sq mi	
Dist Fished: 0.13 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Blacknose Dace	N	G	S	T	51	117.69	44.74			
Creek Chub	N	G	N	T	21	48.46	18.42			
Fantail Darter	D	I	C		14	32.31	12.28			
South. Redbelly Dace	N	H	S		13	30.00	11.40			
White Sucker	W	O	S	T	8	18.46	7.02			
Central Stoneroller	N	H	N		5	11.54	4.39			
Green Sunfish	S	I	C	T	1	2.31	0.88			
Johnny Darter	D	I	C		1	2.31	0.88			
<i>Mile Total</i>					114	263.08				
<i>Number of Species</i>					8					
<i>Number of Hybrids</i>					0					

River Code: 03-009	Stream: Mill Creek (Grand R. RM 23.58)	Sample Date: 2003
River Mile: 1.40	Location:	Date Range: 08/18/2003
Time Fished: 3053 sec	Drainage: 20.3 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		198	297.00	36.87	1.88	25.30	6.33
Bluntnose Minnow	N	O	C	T	94	141.00	17.50	0.49	6.65	3.51
Bluegill Sunfish	S	I	C	P	61	91.50	11.36	0.85	11.41	9.25
Common Shiner	N	I	S		40	60.00	7.45	0.31	4.21	5.21
White Sucker	W	O	S	T	27	40.50	5.03	2.03	27.27	50.00
Blacknose Dace	N	G	S	T	25	37.50	4.66	0.12	1.60	3.17
Rainbow Darter	D	I	S	M	19	28.50	3.54	0.05	0.69	1.78
Fantail Darter	D	I	C		18	27.00	3.35	0.04	0.59	1.61
Creek Chub	N	G	N	T	15	22.50	2.79	0.60	8.03	26.47
Green Sunfish	S	I	C	T	11	16.50	2.05	0.31	4.20	18.91
Green Sf X Hybrid					10	15.00	1.86	0.32	4.27	21.11
Largemouth Bass	F	C	C		9	13.50	1.68	0.34	4.52	24.89
Longear Sunfish	S	I	C	M	5	7.50	0.93	0.08	1.09	10.80
Johnny Darter	D	I	C		4	6.00	0.74	0.01	0.16	2.00
Fathead Minnow	N	O	C	T	1	1.50	0.19	0.00	0.04	2.00
<i>Mile Total</i>					537	805.50		7.43		
<i>Number of Species</i>					14					
<i>Number of Hybrids</i>					1					

River Code: 03-009	Stream: Mill Creek (Grand R. RM 23.58)	Sample Date: 2004
River Mile: 1.30	Location:	Date Range: 07/22/2004
Time Fished:	Drainage: 20.3 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		176	352.00	53.99			
Creek Chub	N	G	N	T	29	58.00	8.90			
Rainbow Darter	D	I	S	M	24	48.00	7.36			
Blacknose Dace	N	G	S	T	23	46.00	7.06			
Fantail Darter	D	I	C		23	46.00	7.06			
Striped Shiner	N	I	S		18	36.00	5.52			
Bluntnose Minnow	N	O	C	T	14	28.00	4.29			
Bluegill Sunfish	S	I	C	P	7	14.00	2.15			
White Sucker	W	O	S	T	4	8.00	1.23			
Common Shiner	N	I	S		4	8.00	1.23			
Johnny Darter	D	I	C		2	4.00	0.61			
Green Sunfish	S	I	C	T	1	2.00	0.31			
Green Sf X Hybrid					1	2.00	0.31			
<i>Mile Total</i>					326	652.00				
<i>Number of Species</i>					12					
<i>Number of Hybrids</i>					1					

River Code: 03-010	Stream: Coffee Creek	Sample Date: 2004
River Mile: 0.20	Location: Lampson Rd.	Date Range: 07/22/2004
Time Fished:	Drainage: 12.2 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		8	16.00	17.02			
Creek Chub	N	G	N	T	7	14.00	14.89			
Bluntnose Minnow	N	O	C	T	6	12.00	12.77			
Grass Pickerel		P	M	P	5	10.00	10.64			
Silverjaw Minnow	N	I	M		3	6.00	6.38			
Blackside Darter	D	I	S		3	6.00	6.38			
Sand Shiner	N	I	M	M	2	4.00	4.26			
Fathead Minnow	N	O	C	T	2	4.00	4.26			
Rainbow Darter	D	I	S	M	2	4.00	4.26			
Striped Shiner	N	I	S		1	2.00	2.13			
Common Shiner	N	I	S		1	2.00	2.13			
Spotfin Shiner	N	I	M		1	2.00	2.13			
Trout-perch		I	M		1	2.00	2.13			
Rock Bass	S	C	C		1	2.00	2.13			
Green Sunfish	S	I	C	T	1	2.00	2.13			
Longear Sunfish	S	I	C	M	1	2.00	2.13			
Johnny Darter	D	I	C		1	2.00	2.13			
Greenside Darter	D	I	S	M	1	2.00	2.13			
<i>Mile Total</i>					47	94.00				
<i>Number of Species</i>					18					
<i>Number of Hybrids</i>					0					

Species List

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River Code: 03-041	Stream: Trib. to Mill Creek (Grand R 23.58/4.34)	Sample Date: 2004
River Mile: 2.00	Location:	Date Range: 07/15/2004
Time Fished:	Drainage: 3.6 sq mi	
Dist Fished: 0.13 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	100	230.77	33.78			
Blacknose Dace	N	G	S	T	78	180.00	26.35			
Rainbow Darter	D	I	S	M	37	85.39	12.50			
Redside Dace	N	I	S	I	31	71.54	10.47			
White Sucker	W	O	S	T	16	36.92	5.41			
Central Stoneroller	N	H	N		13	30.00	4.39			
Fantail Darter	D	I	C		13	30.00	4.39			
Johnny Darter	D	I	C		7	16.15	2.36			
Green Sunfish	S	I	C	T	1	2.31	0.34			
<i>Mile Total</i>					296	683.08				
<i>Number of Species</i>					9					
<i>Number of Hybrids</i>					0					

River Code: 03-100	Stream: Big Creek	Sample Date: 2003
River Mile: 16.20	Location: upst. Chardon WWTP	Date Range: 09/02/2003
Time Fished: 2342 sec	Drainage: 1.2 sq mi	
Dist Fished: 0.10 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		162	486.00	51.27			
Creek Chub	N	G	N	T	53	159.00	16.77			
Blacknose Dace	N	G	S	T	33	99.00	10.44			
Common Shiner	N	I	S		31	93.00	9.81			
Rainbow Darter	D	I	S	M	9	27.00	2.85			
Brook Stickleback		I	C		9	27.00	2.85			
Fathead Minnow	N	O	C	T	8	24.00	2.53			
Central Mudminnow		I	C	T	5	15.00	1.58			
Largemouth Bass	F	C	C		3	9.00	0.95			
Redside Dace	N	I	S	I	1	3.00	0.32			
Black Bullhead		I	C	P	1	3.00	0.32			
Fantail Darter	D	I	C		1	3.00	0.32			
<i>Mile Total</i>					316	948.00				
<i>Number of Species</i>					12					
<i>Number of Hybrids</i>					0					

River Code: 03-100	Stream: Big Creek	Sample Date: 2003
River Mile: 16.00	Location: dst. Chardon WWTP	Date Range: 09/02/2003
Time Fished: 1962 sec	Drainage: 1.2 sq mi	
Dist Fished: 0.10 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	97	291.00	35.27			
Central Stoneroller	N	H	N		74	222.00	26.91			
Rainbow Darter	D	I	S	M	44	132.00	16.00			
Blacknose Dace	N	G	S	T	35	105.00	12.73			
Common Shiner	N	I	S		16	48.00	5.82			
South. Redbelly Dace	N	H	S		3	9.00	1.09			
Fathead Minnow	N	O	C	T	2	6.00	0.73			
Fantail Darter	D	I	C		2	6.00	0.73			
White Sucker	W	O	S	T	1	3.00	0.36			
Bluegill Sunfish	S	I	C	P	1	3.00	0.36			
<i>Mile Total</i>					275	825.00				
<i>Number of Species</i>					10					
<i>Number of Hybrids</i>					0					

River Code: 03-100	Stream: Big Creek	Sample Date: 2003
River Mile: 14.00	Location: Woodin Rd.	Date Range: 09/03/2003
Time Fished: 3151 sec	Drainage: 5.9 sq mi	
Dist Fished: 0.10 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		126	378.00	37.39			
Creek Chub	N	G	N	T	56	168.00	16.62			
Common Shiner	N	I	S		44	132.00	13.06			
Rainbow Darter	D	I	S	M	43	129.00	12.76			
Blacknose Dace	N	G	S	T	33	99.00	9.79			
White Sucker	W	O	S	T	23	69.00	6.82			
Bluntnose Minnow	N	O	C	T	5	15.00	1.48			
Johnny Darter	D	I	C		3	9.00	0.89			
Largemouth Bass	F	C	C		2	6.00	0.59			
Yellow Bullhead		I	C	T	1	3.00	0.30			
Bluegill Sunfish	S	I	C	P	1	3.00	0.30			
<i>Mile Total</i>					337	1,011.00				
<i>Number of Species</i>					11					
<i>Number of Hybrids</i>					0					

River Code: 03-100	Stream: Big Creek	Sample Date: 2003
River Mile: 9.30	Location:	Date Range: 09/02/2003
Time Fished: 3520 sec	Drainage: 14.9 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		541	811.50	46.72			
Rainbow Darter	D	I	S	M	186	279.00	16.06			
Blacknose Dace	N	G	S	T	98	147.00	8.46			
Bluntnose Minnow	N	O	C	T	79	118.50	6.82			
Common Shiner	N	I	S		78	117.00	6.74			
Creek Chub	N	G	N	T	40	60.00	3.45			
Fantail Darter	D	I	C		39	58.50	3.37			
Northern Hog Sucker	R	I	S	M	32	48.00	2.76			
White Sucker	W	O	S	T	28	42.00	2.42			
Johnny Darter	D	I	C		25	37.50	2.16			
Silverjaw Minnow	N	I	M		5	7.50	0.43			
Largemouth Bass	F	C	C		4	6.00	0.35			
Green Sunfish	S	I	C	T	2	3.00	0.17			
Redside Dace	N	I	S	I	1	1.50	0.09			
<i>Mile Total</i>					1,158	1,737.00				
<i>Number of Species</i>					14					
<i>Number of Hybrids</i>					0					

River Code: 03-100	Stream: Big Creek	Sample Date: 2003
River Mile: 4.90	Location:	Date Range: 08/28/2003
Time Fished: 2117 sec	Drainage: 28.0 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		675	1,350.00	61.87	6.91	56.71	5.12
Common Shiner	N	I	S		108	216.00	9.90	1.29	10.56	5.95
Rainbow Darter	D	I	S	M	100	200.00	9.17	0.26	2.10	1.28
River Chub	N	I	N	I	50	100.00	4.58	1.02	8.34	10.16
Fantail Darter	D	I	C		40	80.00	3.67	0.15	1.22	1.85
Blacknose Dace	N	G	S	T	37	74.00	3.39	0.21	1.70	2.80
Northern Hog Sucker	R	I	S	M	33	66.00	3.02	1.77	14.52	26.79
Bluntnose Minnow	N	O	C	T	29	58.00	2.66	0.16	1.28	2.69
White Sucker	W	O	S	T	6	12.00	0.55	0.32	2.63	26.67
Johnny Darter	D	I	C		6	12.00	0.55	0.02	0.16	1.67
Sand Shiner	N	I	M	M	4	8.00	0.37	0.01	0.10	1.50
Striped Shiner	N	I	S		2	4.00	0.18	0.08	0.66	20.00
Silverjaw Minnow	N	I	M		1	2.00	0.09	0.00	0.03	2.00
<i>Mile Total</i>					1,091	2,182.00		12.18		
<i>Number of Species</i>					13					
<i>Number of Hybrids</i>					0					

River Code: 03-100	Stream: Big Creek	Sample Date: 2003
River Mile: 2.50	Location:	Date Range: 08/12/2003
Time Fished:	Drainage: 36.0 sq mi	
Dist Fished: 0.21 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Rainbow Darter	D	I	S	M	104	148.57	36.75	0.16	19.50	1.06
Silverjaw Minnow	N	I	M		48	68.57	16.96	0.14	17.76	2.08
Sand Shiner	N	I	M	M	47	67.14	16.61	0.12	15.40	1.85
Central Stoneroller	N	H	N		27	38.57	9.54	0.06	7.83	1.63
Bluntnose Minnow	N	O	C	T	18	25.71	6.36	0.06	7.08	2.22
Smallmouth Bass	F	C	C	M	14	20.00	4.95	0.03	4.22	1.71
Common Shiner	N	I	S		10	14.29	3.53	0.02	2.11	1.20
Stonecat Madtom		I	C	I	4	5.71	1.41	0.11	13.66	19.33
Fantail Darter	D	I	C		4	5.71	1.41	0.01	1.12	1.50
Northern Hog Sucker	R	I	S	M	2	2.86	0.71	0.04	4.47	12.50
River Chub	N	I	N	I	2	2.86	0.71	0.02	1.99	5.50
Rock Bass	S	C	C		1	1.43	0.35	0.03	3.73	21.00
Johnny Darter	D	I	C		1	1.43	0.35	0.00	0.37	2.00
Greenside Darter	D	I	S	M	1	1.43	0.35	0.01	0.75	4.00
<i>Mile Total</i>					283	404.29		0.81		
<i>Number of Species</i>					14					
<i>Number of Hybrids</i>					0					

River Code: 03-101	Stream: Jordan Creek	Sample Date: 2004
River Mile: 1.10	Location: Alexander Rd.	Date Range: 07/14/2004
Time Fished:	Drainage: 3.3 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		183	366.00	47.29			
Blacknose Dace	N	G	S	T	115	230.00	29.72			
Creek Chub	N	G	N	T	66	132.00	17.05			
Johnny Darter	D	I	C		15	30.00	3.88			
Rainbow Darter	D	I	S	M	6	12.00	1.55			
Western Mosquitofish	E	I	N		2	4.00	0.52			
<i>Mile Total</i>					387	774.00				
<i>Number of Species</i>					6					
<i>Number of Hybrids</i>					0					

River Code: 03-102	Stream: East Creek	Sample Date: 2004
River Mile: 1.20	Location: Callow Rd.	Date Range: 07/15/2004
Time Fished:	Drainage: 4.4 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	116	232.00	42.96			
Central Stoneroller	N	H	N		75	150.00	27.78			
Blacknose Dace	N	G	S	T	43	86.00	15.93			
Bluegill Sunfish	S	I	C	P	25	50.00	9.26			
Green Sunfish	S	I	C	T	4	8.00	1.48			
Pumpkinseed Sunfish	S	I	C	P	4	8.00	1.48			
Largemouth Bass	F	C	C		2	4.00	0.74			
Green Sf X Hybrid					1	2.00	0.37			
<i>Mile Total</i>					270	540.00				
<i>Number of Species</i>					7					
<i>Number of Hybrids</i>					1					

River Code: 03-104	Stream: Jenks Creek	Sample Date: 2003
River Mile: 0.10	Location:	Date Range: 09/04/2003
Time Fished: 2213 sec	Drainage: 2.8 sq mi	
Dist Fished: 0.08 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		391	1,466.25	58.71			
Blacknose Dace	N	G	S	T	78	292.50	11.71			
Creek Chub	N	G	N	T	51	191.25	7.66			
Common Shiner	N	I	S		28	105.00	4.20			
Bluntnose Minnow	N	O	C	T	26	97.50	3.90			
Silverjaw Minnow	N	I	M		18	67.50	2.70			
Rainbow Darter	D	I	S	M	17	63.75	2.55			
Fantail Darter	D	I	C		17	63.75	2.55			
Largemouth Bass	F	C	C		12	45.00	1.80			
Bluegill Sunfish	S	I	C	P	9	33.75	1.35			
South. Redbelly Dace	N	H	S		7	26.25	1.05			
Johnny Darter	D	I	C		6	22.50	0.90			
Northern Hog Sucker	R	I	S	M	4	15.00	0.60			
White Sucker	W	O	S	T	1	3.75	0.15			
Redside Dace	N	I	S	I	1	3.75	0.15			
<i>Mile Total</i>					666	2,497.50				
<i>Number of Species</i>					15					
<i>Number of Hybrids</i>					0					

River Code: 03-105	Stream: Cutts Creek	Sample Date: 2004
River Mile: 1.20	Location:	Date Range: 07/14/2004
Time Fished:	Drainage: 0.9 sq mi	
Dist Fished: 0.13 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Blacknose Dace	N	G	S	T	66	152.31	37.93			
Bluntnose Minnow	N	O	C	T	53	122.31	30.46			
Central Stoneroller	N	H	N		45	103.85	25.86			
Johnny Darter	D	I	C		5	11.54	2.87			
Green Sunfish	S	I	C	T	2	4.62	1.15			
White Sucker	W	O	S	T	1	2.31	0.57			
Bluegill Sunfish	S	I	C	P	1	2.31	0.57			
Rainbow Darter	D	I	S	M	1	2.31	0.57			
<i>Mile Total</i>					174	401.54				
<i>Number of Species</i>					8					
<i>Number of Hybrids</i>					0					

River Code: 03-110	Stream: Paine Creek	Sample Date: 2004
River Mile: 6.20	Location: road at Hells Hollow	Date Range: 08/31/2004
Time Fished: 2760 sec	Drainage: 20.8 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		432	648.00	33.51			
Blacknose Dace	N	G	S	T	239	358.50	18.54			
Bluntnose Minnow	N	O	C	T	152	228.00	11.79			
Creek Chub	N	G	N	T	144	216.00	11.17			
Johnny Darter	D	I	C		72	108.00	5.59			
Striped Shiner	N	I	S		68	102.00	5.28			
Green Sunfish	S	I	C	T	50	75.00	3.88			
White Sucker	W	O	S	T	38	57.00	2.95			
Bluegill Sunfish	S	I	C	P	34	51.00	2.64			
Yellow Bullhead		I	C	T	21	31.50	1.63			
Rainbow Darter	D	I	S	M	16	24.00	1.24			
Fantail Darter	D	I	C		12	18.00	0.93			
Green Sf X Hybrid					7	10.50	0.54			
Pumpkinseed Sunfish	S	I	C	P	2	3.00	0.16			
Northern Hog Sucker	R	I	S	M	1	1.50	0.08			
Redside Dace	N	I	S	I	1	1.50	0.08			
<i>Mile Total</i>					1,289	1,933.50				
<i>Number of Species</i>					15					
<i>Number of Hybrids</i>					1					

River Code: 03-110	Stream: Paine Creek	Sample Date: 2004
River Mile: 3.00	Location:	Date Range: 07/23/2004
Time Fished:	Drainage: 26.0 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNr status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		181	362.00	44.58			
Blacknose Dace	N	G	S	T	94	188.00	23.15			
White Sucker	W	O	S	T	45	90.00	11.08			
Creek Chub	N	G	N	T	27	54.00	6.65			
Fantail Darter	D	I	C		16	32.00	3.94			
Johnny Darter	D	I	C		14	28.00	3.45			
Bluntnose Minnow	N	O	C	T	9	18.00	2.22			
Green Sunfish	S	I	C	T	8	16.00	1.97			
Rainbow Darter	D	I	S	M	4	8.00	0.99			
Northern Hog Sucker	R	I	S	M	3	6.00	0.74			
Striped Shiner	N	I	S		3	6.00	0.74			
Common Shiner	N	I	S		1	2.00	0.25			
Silverjaw Minnow	N	I	M		1	2.00	0.25			
<i>Mile Total</i>					406	812.00				
<i>Number of Species</i>					13					
<i>Number of Hybrids</i>					0					

River Code: 03-110	Stream: Paine Creek	Sample Date: 2003
River Mile: 0.50	Location: Seeley Rd.	Date Range: 08/12/2003
Time Fished: 2607 sec	Drainage: 27.7 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Central Stoneroller	N	H	N		125	187.50	30.12	0.88	24.67	4.69
Bluntnose Minnow	N	O	C	T	72	108.00	17.35	0.37	10.24	3.38
Bluegill Sunfish	S	I	C	P	43	64.50	10.36	0.48	13.47	7.44
Rainbow Darter	D	I	S	M	41	61.50	9.88	0.11	3.00	1.73
Smallmouth Bass	F	C	C	M	18	27.00	4.34	0.05	1.52	2.00
Fantail Darter	D	I	C		14	21.00	3.37	0.04	1.15	1.93
Blacknose Dace	N	G	S	T	12	18.00	2.89	0.05	1.32	2.58
Creek Chub	N	G	N	T	11	16.50	2.65	0.26	7.33	15.82
Longear Sunfish	S	I	C	M	10	15.00	2.41	0.23	6.31	15.00
White Sucker	W	O	S	T	9	13.50	2.17	0.08	2.25	5.89
Green Sunfish	S	I	C	T	9	13.50	2.17	0.08	2.33	6.11
Northern Hog Sucker	R	I	S	M	8	12.00	1.93	0.33	9.18	27.25
Common Shiner	N	I	S		6	9.00	1.45	0.04	1.09	4.33
Silverjaw Minnow	N	I	M		6	9.00	1.45	0.02	0.67	2.67
Striped Shiner	N	I	S		4	6.00	0.96	0.15	4.10	24.25
Greenside Darter	D	I	S	M	4	6.00	0.96	0.04	1.01	6.00
Rainbow Trout	E		N		3	4.50	0.72	0.01	0.39	3.00
River Chub	N	I	N	I	3	4.50	0.72	0.08	2.33	18.33
Sand Shiner	N	I	M	M	3	4.50	0.72	0.01	0.25	2.00
Yellow Bullhead		I	C	T	2	3.00	0.48	0.11	3.17	37.50
Rock Bass	S	C	C		2	3.00	0.48	0.04	1.09	13.00
Largemouth Bass	F	C	C		2	3.00	0.48	0.05	1.52	18.00
Blackside Darter	D	I	S		2	3.00	0.48	0.01	0.17	2.00
Johnny Darter	D	I	C		2	3.00	0.48	0.00	0.08	1.00
Bigeye Chub	N	I	S	I	1	1.50	0.24	0.01	0.17	4.00
Stonecat Madtom		I	C	I	1	1.50	0.24	0.00	0.06	1.00
Warmouth Sunfish	S	C	C		1	1.50	0.24	0.03	0.84	20.00
Green Sf X Hybrid					1	1.50	0.24	0.02	0.42	10.00
<i>Mile Total</i>					415	622.50		3.56		
<i>Number of Species</i>					27					
<i>Number of Hybrids</i>					1					

River Code: 03-111	Stream: Bates Creek	Sample Date: 2004
River Mile: 2.20	Location:	Date Range: 07/21/2004
Time Fished:	Drainage: 12.7 sq mi	
Dist Fished: 0.17 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Bluntnose Minnow	N	O	C	T	138	243.53	28.16			
Central Stoneroller	N	H	N		119	210.00	24.29			
Rainbow Darter	D	I	S	M	115	202.94	23.47			
Creek Chub	N	G	N	T	65	114.71	13.27			
Blacknose Dace	N	G	S	T	17	30.00	3.47			
Yellow Bullhead		I	C	T	11	19.41	2.24			
White Sucker	W	O	S	T	9	15.88	1.84			
Common Shiner	N	I	S		9	15.88	1.84			
Green Sunfish	S	I	C	T	4	7.06	0.82			
Striped Shiner	N	I	S		1	1.77	0.20			
Largemouth Bass	F	C	C		1	1.77	0.20			
Bluegill Sunfish	S	I	C	P	1	1.77	0.20			
<i>Mile Total</i>					490	864.71				
<i>Number of Species</i>					12					
<i>Number of Hybrids</i>					0					

River Code: 03-113	Stream: Trib. to Paine Creek (RM 7.17)	Sample Date: 2004
River Mile: 0.40	Location:	Date Range: 07/15/2004
Time Fished:	Drainage: 2.8 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Blacknose Dace	N	G	S	T	154	308.00	56.00			
Creek Chub	N	G	N	T	49	98.00	17.82			
Central Stoneroller	N	H	N		39	78.00	14.18			
Johnny Darter	D	I	C		20	40.00	7.27			
Rainbow Darter	D	I	S	M	6	12.00	2.18			
Green Sunfish	S	I	C	T	4	8.00	1.45			
White Sucker	W	O	S	T	1	2.00	0.36			
Smallmouth Bass	F	C	C	M	1	2.00	0.36			
Largemouth Bass	F	C	C		1	2.00	0.36			
<i>Mile Total</i>					275	550.00				
<i>Number of Species</i>					9					
<i>Number of Hybrids</i>					0					

River Code: 03-120	Stream: Mill Creek (Grand R. RM 41.28)	Sample Date: 2003
River Mile: 25.60	Location:	Date Range: 09/09/2003
Time Fished: 1919 sec	Drainage: 21.6 sq mi	
Dist Fished: 0.18 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNr status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Green Sunfish	S	I	C	T	56	93.33	30.60	1.24	22.71	13.30
Bluegill Sunfish	S	I	C	P	41	68.33	22.40	0.98	17.92	14.34
Yellow Bullhead		I	C	T	33	55.00	18.03	1.52	27.85	27.70
Pumpkinseed Sunfish	S	I	C	P	18	30.00	9.84	0.66	11.98	21.82
Green Sf X Hybrid					9	15.00	4.92	0.47	8.54	31.11
Creek Chub	N	G	N	T	7	11.67	3.83	0.43	7.92	37.14
Bluntnose Minnow	N	O	C	T	6	10.00	3.28	0.01	0.15	0.83
Central Mudminnow		I	C	T	5	8.33	2.73	0.08	1.46	9.60
Largemouth Bass	F	C	C		5	8.33	2.73	0.02	0.42	2.80
Grass Pickerel		P	M	P	2	3.33	1.09	0.05	0.97	16.00
Rainbow Darter	D	I	S	M	1	1.67	0.55	0.00	0.05	2.00
<i>Mile Total</i>					183	305.00		5.47		
<i>Number of Species</i>					10					
<i>Number of Hybrids</i>					1					

River Code: 03-120	Stream: Mill Creek (Grand R. RM 41.28)	Sample Date: 2003
River Mile: 18.20	Location: upst. Netcher Rd.	Date Range: 09/11/2003
Time Fished: 3198 sec	Drainage: 47.0 sq mi	
Dist Fished: 0.16 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Fantail Darter	D	I	C		203	380.63	23.88	0.39	5.57	1.01
Bluntnose Minnow	N	O	C	T	131	245.63	15.41	0.66	9.46	2.67
Central Stoneroller	N	H	N		99	185.63	11.65	1.15	16.59	6.20
Rainbow Darter	D	I	S	M	86	161.25	10.12	0.18	2.65	1.14
Johnny Darter	D	I	C		73	136.88	8.59	0.23	3.25	1.64
Rock Bass	S	C	C		45	84.38	5.29	1.29	18.61	15.29
Bluegill Sunfish	S	I	C	P	44	82.50	5.18	0.52	7.53	6.33
Greenside Darter	D	I	S	M	43	80.63	5.06	0.21	3.09	2.65
Creek Chub	N	G	N	T	32	60.00	3.76	0.78	11.25	13.00
Striped Shiner	N	I	S		32	60.00	3.76	0.45	6.49	7.50
Grass Pickerel		P	M	P	10	18.75	1.18	0.31	4.44	16.40
Yellow Bullhead		I	C	T	10	18.75	1.18	0.08	1.14	4.20
Pumpkinseed Sunfish	S	I	C	P	10	18.75	1.18	0.23	3.36	12.40
Blackside Darter	D	I	S		10	18.75	1.18	0.11	1.57	5.80
Green Sunfish	S	I	C	T	8	15.00	0.94	0.11	1.63	7.50
Stonecat Madtom		I	C	I	3	5.63	0.35	0.03	0.49	6.00
Largemouth Bass	F	C	C		3	5.63	0.35	0.03	0.38	4.67
Golden Redhorse	R	I	S	M	2	3.75	0.24	0.08	1.08	20.00
Redfin Shiner	N	I	N		2	3.75	0.24	0.02	0.25	4.50
Mimic Shiner	N	I	M	I	2	3.75	0.24	0.02	0.22	4.00
Northern Hog Sucker	R	I	S	M	1	1.88	0.12	0.04	0.55	20.00
Green Sf X Hybrid					1	1.88	0.12	0.03	0.43	16.00
<i>Mile Total</i>					850	1,593.75		6.93		
<i>Number of Species</i>					21					
<i>Number of Hybrids</i>					1					

River Code: 03-120	Stream: Mill Creek (Grand R. RM 41.28)	Sample Date: 2003
River Mile: 10.00	Location: Doyle Rd.	Date Range: 09/16/2003
Time Fished: 3300 sec	Drainage: 80.0 sq mi	
Dist Fished: 0.50 km	Basin: Grand River	No of Passes: 1
		Sampler Type: A

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Northern Hog Sucker	R	I	S	M	31	62.00	32.29	8.37	29.77	135.00
Bluegill Sunfish	S	I	C	P	26	52.00	27.08	2.30	8.18	44.23
Rock Bass	S	C	C		12	24.00	12.50	3.70	13.16	154.17
Black Crappie	S	I	C		7	14.00	7.29	1.97	7.01	140.86
Pumpkinseed Sunfish	S	I	C	P	5	10.00	5.21	0.21	0.74	20.80
Largemouth Bass	F	C	C		4	8.00	4.17	0.90	3.19	112.00
Yellow Bullhead		I	C	T	2	4.00	2.08	0.81	2.89	203.00
Warmouth Sunfish	S	C	C		2	4.00	2.08	0.18	0.65	46.00
Green Sf X Hybrid					2	4.00	2.08	0.58	2.08	146.00
Logperch	D	I	S	M	2	4.00	2.08	0.07	0.26	18.00
Grass Pickerel		P	M	P	1	2.00	1.04	0.41	1.45	204.00
Common Carp	G	O	M	T	1	2.00	1.04	8.60	30.59	4,300.00
Bluntnose Minnow	N	O	C	T	1	2.00	1.04	0.01	0.03	4.00
<i>Mile Total</i>					96	192.00		28.11		
<i>Number of Species</i>					12					
<i>Number of Hybrids</i>					1					

River Code: 03-120	Stream: Mill Creek (Grand R. RM 41.28)	Sample Date: 2003
River Mile: 6.50	Location: Creek Rd.	Date Range: 09/16/2003
Time Fished: 2132 sec	Drainage: 87.0 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Bluntnose Minnow	N	O	C	T	378	567.00	43.00	1.58	13.22	2.79
Central Stoneroller	N	H	N		135	202.50	15.36	1.45	12.13	7.16
Greenside Darter	D	I	S	M	69	103.50	7.85	0.33	2.73	3.15
Smallmouth Bass	F	C	C	M	63	94.50	7.17	1.50	12.57	15.90
Rock Bass	S	C	C		48	72.00	5.46	2.93	24.46	40.63
Mimic Shiner	N	I	M	I	31	46.50	3.53	0.09	0.76	1.97
Northern Hog Sucker	R	I	S	M	24	36.00	2.73	1.88	15.70	52.17
Sand Shiner	N	I	M	M	24	36.00	2.73	0.08	0.69	2.30
Redfin Shiner	N	I	N		20	30.00	2.28	0.07	0.58	2.30
Striped Shiner	N	I	S		19	28.50	2.16	0.44	3.70	15.56
Rainbow Darter	D	I	S	M	17	25.50	1.93	0.07	0.58	2.71
Creek Chub	N	G	N	T	9	13.50	1.02	0.53	4.47	39.56
Silverjaw Minnow	N	I	M		7	10.50	0.80	0.04	0.30	3.43
Yellow Bullhead		I	C	T	7	10.50	0.80	0.33	2.75	31.33
Fantail Darter	D	I	C		7	10.50	0.80	0.02	0.20	2.29
Johnny Darter	D	I	C		6	9.00	0.68	0.02	0.15	2.00
Stonecat Madtom		I	C	I	5	7.50	0.57	0.19	1.56	24.80
White Sucker	W	O	S	T	2	3.00	0.23	0.26	2.21	88.00
Largemouth Bass	F	C	C		2	3.00	0.23	0.02	0.20	8.00
Grass Pickerel		P	M	P	1	1.50	0.11	0.03	0.24	19.00
Common Shiner	N	I	S		1	1.50	0.11	0.02	0.15	12.00
Spotfin Shiner	N	I	M		1	1.50	0.11	0.01	0.05	4.00
Green Sunfish	S	I	C	T	1	1.50	0.11	0.04	0.29	23.00
Blackside Darter	D	I	S		1	1.50	0.11	0.01	0.08	6.00
Logperch	D	I	S	M	1	1.50	0.11	0.03	0.24	19.00
<i>Mile Total</i>					879	1,318.50		11.96		
<i>Number of Species</i>					25					
<i>Number of Hybrids</i>					0					

River Code: 03-120	Stream: Mill Creek (Grand R. RM 41.28)	Sample Date: 2003
River Mile: 4.10	Location:	Date Range: 09/11/2003
Time Fished: 2190 sec	Drainage: 92.0 sq mi	
Dist Fished: 0.15 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Bluntnose Minnow	N	O	C	T	143	286.00	38.65	0.52	22.55	1.83
Greenside Darter	D	I	S	M	47	94.00	12.70	0.27	11.45	2.83
Mimic Shiner	N	I	M	I	45	90.00	12.16	0.13	5.59	1.44
Central Stoneroller	N	H	N		41	82.00	11.08	0.07	3.18	0.90
Fantail Darter	D	I	C		17	34.00	4.59	0.05	2.15	1.47
Rock Bass	S	C	C		14	28.00	3.78	0.55	23.58	19.57
Northern Hog Sucker	R	I	S	M	9	18.00	2.43	0.17	7.23	9.33
Redfin Shiner	N	I	N		9	18.00	2.43	0.02	1.03	1.33
Johnny Darter	D	I	C		8	16.00	2.16	0.03	1.25	1.80
Silverjaw Minnow	N	I	M		7	14.00	1.89	0.02	0.95	1.57
Bluegill Sunfish	S	I	C	P	7	14.00	1.89	0.13	5.68	9.43
Common Shiner	N	I	S		5	10.00	1.35	0.02	0.77	1.80
Smallmouth Bass	F	C	C	M	4	8.00	1.08	0.18	7.83	22.75
Spotfin Shiner	N	I	M		3	6.00	0.81	0.01	0.52	2.00
Rainbow Darter	D	I	S	M	3	6.00	0.81	0.01	0.52	2.00
Sand Shiner	N	I	M	M	2	4.00	0.54	0.01	0.52	3.00
Yellow Bullhead		I	C	T	2	4.00	0.54	0.07	3.10	18.00
Pumpkinseed Sunfish	S	I	C	P	2	4.00	0.54	0.04	1.64	9.50
Stonecat Madtom		I	C	I	1	2.00	0.27	0.01	0.34	4.00
Largemouth Bass	F	C	C		1	2.00	0.27	0.00	0.17	2.00
<i>Mile Total</i>					370	740.00		2.32		
<i>Number of Species</i>					20					
<i>Number of Hybrids</i>					0					

River Code: 03-120	Stream: Mill Creek (Grand R. RM 41.28)	Sample Date: 2004
River Mile: 3.70	Location:	Date Range: 08/05/2004
Time Fished:	Drainage: 92.0 sq mi	
Dist Fished: 0.20 km	Basin: Grand River	No of Passes: 1
		Sampler Type: D

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Bluntnose Minnow	N	O	C	T	57	85.50	21.43	0.33	6.35	3.86
Greenside Darter	D	I	S	M	49	73.50	18.42	0.28	5.35	3.79
Central Stoneroller	N	H	N		29	43.50	10.90	0.36	7.00	8.37
Northern Hog Sucker	R	I	S	M	24	36.00	9.02	2.25	43.29	62.50
Mimic Shiner	N	I	M	I	22	33.00	8.27	0.08	1.44	2.27
Fantail Darter	D	I	C		18	27.00	6.77	0.05	1.02	1.94
Stonecat Madtom		I	C	I	15	22.50	5.64	0.47	9.12	21.07
Creek Chub	N	G	N	T	10	15.00	3.76	0.04	0.71	2.44
Rainbow Darter	D	I	S	M	10	15.00	3.76	0.02	0.29	1.00
Striped Shiner	N	I	S		7	10.50	2.63	0.14	2.77	13.71
Smallmouth Bass	F	C	C	M	4	6.00	1.50	0.40	7.72	66.75
Largemouth Bass	F	C	C		4	6.00	1.50	0.02	0.33	2.75
Green Sunfish	S	I	C	T	3	4.50	1.13	0.03	0.56	6.33
Golden Redhorse	R	I	S	M	2	3.00	0.75	0.38	7.22	125.00
White Sucker	W	O	S	T	2	3.00	0.75	0.01	0.10	1.50
Yellow Bullhead		I	C	T	2	3.00	0.75	0.03	0.58	10.00
Johnny Darter	D	I	C		2	3.00	0.75	0.00	0.04	0.50
Grass Pickerel		P	M	P	1	1.50	0.38	0.01	0.15	5.00
Black Redhorse	R	I	S	I	1	1.50	0.38	0.16	3.04	105.00
Silverjaw Minnow	N	I	M		1	1.50	0.38	0.00	0.06	2.00
Rock Bass	S	C	C		1	1.50	0.38	0.14	2.60	90.00
Bluegill Sunfish	S	I	C	P	1	1.50	0.38	0.01	0.21	7.00
Blackside Darter	D	I	S		1	1.50	0.38	0.01	0.15	5.00
<i>Mile Total</i>					266	399.00		5.20		
<i>Number of Species</i>					23					
<i>Number of Hybrids</i>					0					

River Code: 03-121	Stream: Griggs Creek	Sample Date: 2003
River Mile: 2.00	Location:	Date Range: 09/11/2003
Time Fished: 1674 sec	Drainage: 14.6 sq mi	
Dist Fished: 0.10 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Pumpkinseed Sunfish	S	I	C	P	15	45.00	22.06	0.44	8.10	9.73
Bluegill Sunfish	S	I	C	P	14	42.00	20.59	0.86	15.97	20.57
Grass Pickerel		P	M	P	12	36.00	17.65	0.81	15.03	22.58
Yellow Bullhead		I	C	T	12	36.00	17.65	2.49	46.03	69.17
Green Sunfish	S	I	C	T	7	21.00	10.29	0.19	3.55	9.14
Rock Bass	S	C	C		3	9.00	4.41	0.13	2.33	14.00
White Crappie	S	I	C		2	6.00	2.94	0.26	4.88	44.00
Green Sf X Hybrid					2	6.00	2.94	0.22	3.99	36.00
Largemouth Bass	F	C	C		1	3.00	1.47	0.01	0.11	2.00
<i>Mile Total</i>					68	204.00		5.41		
<i>Number of Species</i>					8					
<i>Number of Hybrids</i>					1					

River Code: 03-122	Stream: Askue Run	Sample Date: 2004
River Mile: 0.10	Location:	Date Range: 07/22/2004
Time Fished:	Drainage: 5.6 sq mi	
Dist Fished: 0.13 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	42	96.92	31.58			
Green Sunfish	S	I	C	T	16	36.92	12.03			
Bluegill Sunfish	S	I	C	P	16	36.92	12.03			
Fantail Darter	D	I	C		15	34.62	11.28			
Central Stoneroller	N	H	N		13	30.00	9.77			
Johnny Darter	D	I	C		11	25.39	8.27			
Bluntnose Minnow	N	O	C	T	8	18.46	6.02			
Yellow Bullhead		I	C	T	4	9.23	3.01			
Rainbow Darter	D	I	S	M	4	9.23	3.01			
White Sucker	W	O	S	T	2	4.62	1.50			
Central Mudminnow		I	C	T	1	2.31	0.75			
Greenside Darter	D	I	S	M	1	2.31	0.75			
<i>Mile Total</i>					133	306.92				
<i>Number of Species</i>					12					
<i>Number of Hybrids</i>					0					

River Code: 03-123	Stream: Peters Creek	Sample Date: 2004
River Mile: 0.20	Location:	Date Range: 07/22/2004
Time Fished:	Drainage:	
Dist Fished: 0.05 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	31	186.00	33.70			
Rainbow Darter	D	I	S	M	22	132.00	23.91			
Johnny Darter	D	I	C		10	60.00	10.87			
Central Stoneroller	N	H	N		7	42.00	7.61			
Green Sunfish	S	I	C	T	6	36.00	6.52			
White Sucker	W	O	S	T	5	30.00	5.43			
Fantail Darter	D	I	C		4	24.00	4.35			
Bluntnose Minnow	N	O	C	T	3	18.00	3.26			
Bluegill Sunfish	S	I	C	P	2	12.00	2.17			
Largemouth Bass	F	C	C		1	6.00	1.09			
Longear Sunfish	S	I	C	M	1	6.00	1.09			
<i>Mile Total</i>					92	552.00				
<i>Number of Species</i>					11					
<i>Number of Hybrids</i>					0					

River Code: 03-124	Stream: Cemetery Creek	Sample Date: 2003
River Mile: 2.10	Location:	Date Range: 09/04/2003
Time Fished: 2099 sec	Drainage: 4.7 sq mi	
Dist Fished: 0.11 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Creek Chub	N	G	N	T	237	646.36	35.32			
Bluntnose Minnow	N	O	C	T	185	504.55	27.57			
Central Stoneroller	N	H	N		108	294.55	16.10			
White Sucker	W	O	S	T	71	193.64	10.58			
Green Sunfish	S	I	C	T	20	54.55	2.98			
Bluegill Sunfish	S	I	C	P	19	51.82	2.83			
Johnny Darter	D	I	C		18	49.09	2.68			
Silverjaw Minnow	N	I	M		5	13.64	0.75			
Spotfin Shiner	N	I	M		4	10.91	0.60			
Blackside Darter	D	I	S		2	5.46	0.30			
Black Bullhead		I	C	P	1	2.73	0.15			
Largemouth Bass	F	C	C		1	2.73	0.15			
<i>Mile Total</i>					671	1,830.00				
<i>Number of Species</i>					12					
<i>Number of Hybrids</i>					0					

River Code: 03-124	Stream: Cemetery Creek	Sample Date: 2003
River Mile: 1.30	Location: Poplar St.	Date Range: 09/09/2003
Time Fished: 1532 sec	Drainage: 4.9 sq mi	
Dist Fished: 0.10 km	Basin: Grand River	No of Passes: 1
		Sampler Type: E

Species Name / ODNR status	IBI Grp	Feed Guild	Breed Guild	Tol	# of Fish	Relative Number	% by Number	Relative Weight	% by Weight	Ave(gm) Weight
Bluntnose Minnow	N	O	C	T	362	1,086.00	50.49			
Central Stoneroller	N	H	N		187	561.00	26.08			
Creek Chub	N	G	N	T	67	201.00	9.34			
Silverjaw Minnow	N	I	M		37	111.00	5.16			
Johnny Darter	D	I	C		20	60.00	2.79			
Green Sunfish	S	I	C	T	19	57.00	2.65			
White Sucker	W	O	S	T	14	42.00	1.95			
Largemouth Bass	F	C	C		4	12.00	0.56			
Bluegill Sunfish	S	I	C	P	4	12.00	0.56			
Blackside Darter	D	I	S		2	6.00	0.28			
Yellow Bullhead		I	C	T	1	3.00	0.14			
<i>Mile Total</i>					717	2,151.00				
<i>Number of Species</i>					11					
<i>Number of Hybrids</i>					0					

Appendix 3.1

Invertebrate Community Index (ICI) Scores from the Survey of the Lower Grand River
Hydrologic Units, 2003 - 2004.
(04110004 050 and 04110004 060)

River Mile	Drainage Area (sq mi)	Number of				Percent:					Qual. EPT	Eco- region	ICI	
		Total Taxa	Mayfly Taxa	Caddisfly Taxa	Dipteran Taxa	Mayflies	Caddis- flies	Tany- tarsini	Other Dipt/NI	Tolerant Organisms				
Grand River (03-001)														
Year: 2004														
44.00	406.0	29(4)	5(2)	7(6)	13(4)	36.8(6)	11.8(2)	44.2(6)	6.3(6)	1.3(6)	27(6)	3	48	
34.50	549.0	48(6)	11(6)	9(6)	17(6)	14.4(4)	49.4(6)	6.2(2)	29.2(4)	0.8(6)	27(6)	3	52	
28.40	554.0	45(6)	9(6)	11(6)	14(6)	9.6(2)	23.4(4)	47.3(6)	18.4(6)	0.4(6)	33(6)	3	54	
22.60	581.0	50(6)	12(6)	6(6)	24(6)	19.7(4)	6.4(2)	42.3(6)	28.9(4)	4.6(2)	32(6)	3	48	
13.60	630.0	45(6)	11(6)	10(6)	14(6)	10.9(2)	9.4(2)	70.3(6)	8.8(6)	1.0(6)	27(6)	3	52	
8.70	685.0	56(6)	11(6)	12(6)	20(6)	14.7(4)	17.0(4)	52.1(6)	15.1(6)	1.6(6)	30(6)	3	56	
6.10	687.0	43(6)	11(6)	10(6)	16(6)	23.2(4)	33.0(6)	18.0(4)	25.3(4)	1.9(6)	31(6)	3	54	
Big Creek (03-100)														
Year: 2003														
16.10	1.2	27(4)	2(0)	1(4)	18(4)	4.0(2)	0.5(2)	15.0(4)	80.2(0)	28.8(0)	5(2)	3	22	
16.00	1.2	36(4)	0(0)	2(4)	22(6)	0.0(0)	1.7(6)	7.1(2)	88.7(0)	17.5(4)	5(2)	3	28	
13.80	5.9	43(6)	6(4)	4(6)	26(6)	8.0(2)	6.7(6)	12.4(4)	72.3(0)	6.2(6)	9(4)	3	44	
4.80	28.0	48(6)	6(4)	10(6)	26(6)	9.3(2)	26.9(6)	21.0(4)	41.7(4)	0.8(6)	19(6)	3	50	
2.70	35.0	50(6)	10(6)	9(6)	28(6)	14.6(4)	14.4(6)	25.6(4)	45.3(4)	2.9(6)	20(6)	3	54	
East Creek (03-102)														
Year: 2004														
1.10	4.4	43(6)	10(6)	0(0)	24(6)	12.3(4)	0.0(0)	44.6(6)	40.9(4)	3.8(6)	21(6)	3	44	
Mill Creek (Grand R. RM 41.28) (03-120)														
Year: 2004														
17.80	49.0	33(4)	7(4)	4(6)	15(4)	27.6(4)	22.3(6)	32.8(6)	12.0(6)	1.1(6)	21(6)	3	52	
Year: 2003														
25.70	21.6	35(4)	2(0)	2(4)	21(6)	0.6(2)	0.6(2)	19.1(4)	79.7(0)	30.2(0)	6(2)	3	24	
7.20	87.0	38(6)	4(2)	6(6)	19(4)	5.3(2)	14.4(4)	42.4(6)	37.0(4)	2.7(6)	23(6)	3	46	
2.90	101.0	53(6)	11(6)	8(6)	20(6)	20.7(4)	11.4(4)	26.5(4)	36.9(4)	3.9(6)	22(6)	3	52	
Griggs Creek (03-121)														
Year: 2003														
3.50	14.1	28(4)	3(2)	1(2)	18(4)	14.3(4)	4.0(6)	5.7(2)	75.5(0)	38.2(0)	12(6)	3	30	

River Mile	Percent Lacus- tuary	Number of			Percent:					Diptera ₂ / ft	Qual. EPT	Eco- region	LICI
		Total Taxa	Sensitive Taxa	Dipteran Taxa	Mayflies & Caddisflies	Gath- erers ^a	Sensitive Organisms	Other Diptera ^b	Predom Taxon				
Grand River (03-001)													
Year: 2004													
4.40	95.7	52(6)	35(6)	18(4)	49.0(6)	55.3(6)	73.3(6)	29.7(6)	15.8(6)	299(4)	24(6)	3	56
3.90	84.8	48(6)	31(6)	13(4)	46.5(6)	44.4(6)	78.6(6)	21.4(6)	23.9(6)	550(4)	20(6)	3	56
3.40	73.9	49(6)	26(6)	22(6)	44.9(6)	74.6(4)	62.7(6)	37.6(6)	29.6(6)	384(4)	14(6)	3	56

^a Percent of total gatherers as individuals excluding zebra mussels (*Dreissena polymorpha*).^b Percent of dipterans as individuals excluding the midge tribe Tanytarsini.

Appendix 3.2

Macroinvertebrate Species Lists for Survey Sites Sampled in the
Lower Grand River Hydrologic Units, 2003 - 2004.
(04110004 050 and 04110004 060)

Ohio EPA/DSW Ecological Assessment Section

Macroinvertebrate Collection

Collection Date: 08/17/2004 River Code: 03-001 RM: 44.00 Site: Grand River dst. Fobes Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	68901	<i>Macronychus glabratus</i>	20 +
03600	<i>Oligochaeta</i>	+	69200	<i>Optioservus sp</i>	+
06201	<i>Hyalella azteca</i>	+	69400	<i>Stenelmis sp</i>	4 +
06700	<i>Crangonyx sp</i>	+	74100	<i>Simulium sp</i>	16
06810	<i>Gammarus fasciatus</i>	+	77120	<i>Ablabesmyia mallochi</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	77500	<i>Conchapelopia sp</i>	19 +
08601	<i>Hydrachnidia</i>	16	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	+
11020	<i>Acerpenna pygmaea</i>	19 +	77800	<i>Helopelopia sp</i>	+
11110	<i>Acentrella parvula</i>	+	78350	<i>Meropelopia sp</i>	+
11120	<i>Baetis flavistriga</i>	5 +	78450	<i>Nilotanypus fimbriatus</i>	19 +
11130	<i>Baetis intercalaris</i>	779 +	80410	<i>Cricotopus (C.) sp</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	81810	<i>Rheocricotopus sp</i>	19
11670	<i>Procloeon viridoculare</i>	+	82300	<i>Xylotopus par</i>	+
12200	<i>Isonychia sp</i>	11 +	82820	<i>Cryptochironomus sp</i>	+
13000	<i>Leucrocuta sp</i>	+	83840	<i>Microtendipes pedellus group</i>	+
13400	<i>Stenacron sp</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	77 +
13521	<i>Stenonema femoratum</i>	+	84460	<i>Polypedilum (P.) fallax group</i>	58 +
13561	<i>Maccaffertium pulchellum</i>	796 +	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	19 +
14950	<i>Leptophlebia sp or Paraleptophlebia sp</i>	+	84750	<i>Stictochironomus sp</i>	+
17200	<i>Caenis sp</i>	+	85265	<i>Cladotanytarsus vanderwulpi group Type 5</i>	19 +
18600	<i>Ephemera sp</i>	+	85501	<i>Paratanytarsus n.sp 1</i>	19
21200	<i>Calopteryx sp</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	19
23909	<i>Boyeria vinosa</i>	+	85625	<i>Rheotanytarsus sp</i>	1720 +
34130	<i>Acroneuria frisoni</i>	16 +	85800	<i>Tanytarsus sp</i>	+
47600	<i>Sialis sp</i>	+	85802	<i>Tanytarsus curticornis</i>	155 +
48620	<i>Nigronia serricornis</i>	+	86100	<i>Chrysops sp</i>	+
50315	<i>Chimarra obscura</i>	14 +	87540	<i>Hemerodromia sp</i>	32 +
50804	<i>Lype diversa</i>	+	93900	<i>Elimia sp</i>	+
50906	<i>Psychomyia flavida</i>	+	96900	<i>Ferrissia sp</i>	+
51400	<i>Nyctiophylax sp</i>	1 +	98600	<i>Sphaerium sp</i>	+
51600	<i>Polycentropus sp</i>	1 +	99100	<i>Pyganodon grandis</i>	+
52200	<i>Cheumatopsyche sp</i>	436 +	99280	<i>Lasmigona costata</i>	+
52430	<i>Ceratopsyche morosa group</i>	27 +	99540	<i>Elliptio dilatata</i>	+
52530	<i>Hydropsyche depravata group</i>	23	99600	<i>Actinonaias ligamentina carinata</i>	+
52540	<i>Hydropsyche dicantha</i>	+	99620	<i>Obovaria subrotunda</i>	+
52570	<i>Hydropsyche simulans</i>	+	99860	<i>Lampsilis radiata luteola</i>	+
53400	<i>Protoptila sp</i>	+			
57400	<i>Neophylax sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
59001	<i>Leptoceridae</i>	16			
60300	<i>Dineutus sp</i>	+			
60400	<i>Gyrinus sp</i>	+			
67700	<i>Paracymus sp</i>	+			
68075	<i>Psephenus herricki</i>	+			

No. Quantitative Taxa: 29 Total Taxa: 80
No. Qualitative Taxa: 73 ICI: 48
Number of Organisms: 4375 Qual EPT: 27

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/17/2004 River Code: 03-001 RM: 40.70 Site: Grand River

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00401	<i>Spongillidae</i>	+	71100	<i>Hexatoma</i> sp	+
03600	<i>Oligochaeta</i>	+	77130	<i>Ablabesmyia rhamphe</i> group	+
06201	<i>Hyalella azteca</i>	+	77500	<i>Conchapelopia</i> sp	+
06810	<i>Gammarus fasciatus</i>	+	77740	<i>Hayesomyia senata</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	77800	<i>Helopelopia</i> sp	+
11020	<i>Acerpenna pygmaea</i>	+	78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+
11120	<i>Baetis flavistriga</i>	+	82141	<i>Thienemanniella xena</i>	+
11130	<i>Baetis intercalaris</i>	+	82300	<i>Xylotopus par</i>	+
11650	<i>Procloeon</i> sp (w/ hindwing pads)	+	82820	<i>Cryptochironomus</i> sp	+
11651	<i>Procloeon</i> sp (w/o hindwing pads)	+	83300	<i>Glyptotendipes (G.)</i> sp	+
12200	<i>Isonychia</i> sp	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
13400	<i>Stenacron</i> sp	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+
13521	<i>Stenonema femoratum</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
13561	<i>Maccaffertium pulchellum</i>	+	84460	<i>Polypedilum (P.) fallax</i> group	+
14950	<i>Leptophlebia</i> sp or <i>Paraleptophlebia</i> sp	+	84470	<i>Polypedilum (P.) illinoense</i>	+
16324	<i>Serratella deficiens</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum</i> group	+
17200	<i>Caenis</i> sp	+	84700	<i>Stenochironomus</i> sp	+
18600	<i>Ephemera</i> sp	+	85265	<i>Cladotanytarsus vanderwulpi</i> group Type 5	+
21200	<i>Calopteryx</i> sp	+	85625	<i>Rheotanytarsus</i> sp	+
22300	<i>Argia</i> sp	+	85802	<i>Tanytarsus curticornis</i>	+
23909	<i>Boyeria vinosa</i>	+	85821	<i>Tanytarsus glabrescens</i> group sp 7	+
34130	<i>Acroneuria frisoni</i>	+	93900	<i>Elimia</i> sp	+
43300	<i>Ranatra</i> sp	+	96900	<i>Ferrissia</i> sp	+
43570	<i>Neoplea</i> sp	+	98600	<i>Sphaerium</i> sp	+
50315	<i>Chimarra obscura</i>	+	99280	<i>Lasmigona costata</i>	+
50804	<i>Lype diversa</i>	+	99540	<i>Elliptio dilatata</i>	+
50906	<i>Psychomyia flavida</i>	+	99600	<i>Actinonaias ligamentina carinata</i>	+
51206	<i>Cyrnellus fraternus</i>	+	99780	<i>Ligumia recta</i>	+
51400	<i>Nyctiophylax</i> sp	+	99860	<i>Lampsilis radiata luteola</i>	+
51600	<i>Polycentropus</i> sp	+			
52200	<i>Cheumatopsyche</i> sp	+			
52430	<i>Ceratopsyche morosa</i> group	+	No. Quantitative Taxa: 0		Total Taxa: 73
57400	<i>Neophylax</i> sp	+	No. Qualitative Taxa: 73		ICI:
57900	<i>Pycnopsyche</i> sp	+	Number of Organisms: 0		Qual EPT: 26
58505	<i>Helicopsyche borealis</i>	+			
59110	<i>Ceraclea ancylus</i>	+			
60300	<i>Dineutus</i> sp	+			
60900	<i>Peltodytes</i> sp	+			
68075	<i>Psephenus herricki</i>	+			
68130	<i>Helichus</i> sp	+			
68601	<i>Ancyronyx variegata</i>	+			
68708	<i>Dubiraphia vittata</i> group	+			
68901	<i>Macronychus glabratus</i>	+			
69400	<i>Stenelmis</i> sp	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/17/2004 River Code: 03-001 RM: 34.50 Site: Grand River Sexton Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	219 +	59970	<i>Petrophila sp</i>	+
03121	<i>Paludicella articulata</i>	1 +	60300	<i>Dineutus sp</i>	2
03221	<i>Pectinatella magnifica</i>	1	60900	<i>Peltodytes sp</i>	+
03360	<i>Plumatella sp</i>	25	65800	<i>Berosus sp</i>	+
03600	<i>Oligochaeta</i>	64 +	68075	<i>Psephenus herricki</i>	+
06201	<i>Hyalella azteca</i>	+	68601	<i>Ancyronyx variegata</i>	+
06810	<i>Gammarus fasciatus</i>	+	68708	<i>Dubiraphia vittata group</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	68901	<i>Macronychus glabratus</i>	16 +
11020	<i>Acerpenna pygmaea</i>	14 +	69400	<i>Stenelmis sp</i>	35 +
11120	<i>Baetis flavistriga</i>	15 +	74100	<i>Simulium sp</i>	8 +
11130	<i>Baetis intercalaris</i>	431 +	77115	<i>Ablabesmyia janta</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	77120	<i>Ablabesmyia mallochii</i>	+
11670	<i>Procloeon viridoculare</i>	+	77500	<i>Conchapelopia sp</i>	54
12200	<i>Isonychia sp</i>	47 +	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	108 +
13000	<i>Leucrocota sp</i>	52	77800	<i>Helopelopia sp</i>	+
13400	<i>Stenacron sp</i>	38 +	78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+
13540	<i>Maccaffertium mediopunctatum</i>	68 +	78450	<i>Nilotanyus fimbriatus</i>	32
13561	<i>Maccaffertium pulchellum</i>	489 +	78750	<i>Rheopelopia paramaculipennis</i>	27 +
16324	<i>Serratella deficiens</i>	35	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	16
16700	<i>Tricorythodes sp</i>	1 +	80410	<i>Cricotopus (C.) sp</i>	27 +
17200	<i>Caenis sp</i>	1 +	80430	<i>Cricotopus (C.) tremulus group</i>	+
18600	<i>Ephemera sp</i>	+	82101	<i>Thienemanniella taurocapita</i>	32 +
22300	<i>Argia sp</i>	+	82121	<i>Thienemanniella lobapodema</i>	16 +
23909	<i>Boyeria vinosa</i>	+	82220	<i>Tvetenia discoloripes group</i>	54 +
24107	<i>Nasiaeschna pentacantha</i>	+	82820	<i>Cryptochironomus sp</i>	+
25010	<i>Hagenius brevistylus</i>	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
34130	<i>Acroneuria frisoni</i>	2 +	83840	<i>Microtendipes pedellus group</i>	+
43300	<i>Ranatra sp</i>	+	84060	<i>Parachironomus pectinatellae</i>	54
47600	<i>Sialis sp</i>	+	84420	<i>Polypedilum (P.) n.sp 1</i>	54
50315	<i>Chimarra obscura</i>	158 +	84450	<i>Polypedilum (Uresipedilum) flavum</i>	1560 +
50906	<i>Psychomyia flavida</i>	16 +	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
51600	<i>Polycentropus sp</i>	16 +	85615	<i>Rheotanytarsus pellucidus</i>	27
52200	<i>Cheumatopsyche sp</i>	3482 +	85625	<i>Rheotanytarsus sp</i>	377 +
52430	<i>Ceratopsyche morosa group</i>	90 +	85821	<i>Tanytarsus glabrescens group sp 7</i>	108
52540	<i>Hydropsyche dicantha</i>	32	87540	<i>Hemerodromia sp</i>	25 +
52550	<i>Hydropsyche frisoni</i>	3 +	92600	<i>Cipangopaludina sp</i>	+
52620	<i>Macrostemum zebratum</i>	229 +	93200	<i>Hydrobiidae</i>	+
53400	<i>Protophila sp</i>	+	93900	<i>Elimia sp</i>	33 +
57400	<i>Neophylax sp</i>	+	95100	<i>Physella sp</i>	+
57900	<i>Pycnopsyche sp</i>	+	96900	<i>Ferrissia sp</i>	+
58505	<i>Helicopsyche borealis</i>	+	98600	<i>Sphaerium sp</i>	1 +
59110	<i>Ceraclea ancylus</i>	+	99280	<i>Lasmigona costata</i>	+
59510	<i>Oecetis avara</i>	50 +			
59580	<i>Oecetis persimilis</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/17/2004 River Code: 03-001 RM: 34.50 Site: Grand River Sexton Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
99420	<i>Amblema plicata plicata</i>	+			
99540	<i>Elliptio dilatata</i>	+			
99600	<i>Actinonaias ligamentina carinata</i>	+			
99860	<i>Lampsilis radiata luteola</i>	+			
99880	<i>Lampsilis cardium</i>	+			

No. Quantitative Taxa: 48	Total Taxa: 91
No. Qualitative Taxa: 78	ICI: 52
Number of Organisms: 8245	Qual EPT: 27

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/17/2004 River Code: 03-001 RM: 28.40 Site: Grand River

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00401	<i>Spongillidae</i>	+	52620	<i>Macrostemum zebratum</i>	32 +
01320	<i>Hydra sp</i>	32	53800	<i>Hydroptila sp</i>	16
03121	<i>Paludicella articulata</i>	+	54000	<i>Leucotrichia pictipes</i>	+
03221	<i>Pectinatella magnifica</i>	+	57400	<i>Neophylax sp</i>	+
03360	<i>Plumatella sp</i>	4 +	58505	<i>Helicopsyche borealis</i>	+
03451	<i>Urnatella gracilis</i>	1	59100	<i>Ceraclea sp</i>	16
03600	<i>Oligochaeta</i>	32 +	59110	<i>Ceraclea ancylus</i>	+
06201	<i>Hyaella azteca</i>	+	59160	<i>Ceraclea spongillovorax</i>	+
06810	<i>Gammarus fasciatus</i>	+	59580	<i>Oecetis persimilis</i>	1
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	59970	<i>Petrophila sp</i>	+
11110	<i>Acentrella parvula</i>	31 +	60300	<i>Dineutus sp</i>	1
11119	<i>Plauditus dubius</i> or <i>P. virilis</i>	2 +	65800	<i>Berosus sp</i>	+
11130	<i>Baetis intercalaris</i>	313 +	68075	<i>Psephenus herricki</i>	+
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	68601	<i>Ancyronyx variegata</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	68708	<i>Dubiraphia vittata group</i>	+
12200	<i>Isonychia sp</i>	13 +	68901	<i>Macronychus glabratus</i>	44 +
13000	<i>Leucrocuta sp</i>	+	69400	<i>Stenelmis sp</i>	12 +
13100	<i>Nixe sp</i>	+	70600	<i>Antocha sp</i>	1
13400	<i>Stenacron sp</i>	+	71100	<i>Hexatoma sp</i>	+
13540	<i>Maccaffertium mediopunctatum</i>	163 +	74100	<i>Simulium sp</i>	16 +
13561	<i>Maccaffertium pulchellum</i>	74 +	77750	<i>Hayesomyia senata</i> or <i>Thienemannimyia norena</i>	42
16324	<i>Serratella deficiens</i>	87 +	77800	<i>Helopelopia sp</i>	+
16700	<i>Tricorythodes sp</i>	2 +	78450	<i>Nilotanypus fimbriatus</i>	16
17200	<i>Caenis sp</i>	32 +	78740	<i>Rheopelopia acra</i>	127
18100	<i>Anthopotamus sp</i>	+	80310	<i>Cardiocladius obscurus</i>	+
18600	<i>Ephemera sp</i>	+	80410	<i>Cricotopus (C.) sp</i>	42 +
22001	<i>Coenagrionidae</i>	+	80420	<i>Cricotopus (C.) bicinctus</i>	+
22300	<i>Argia sp</i>	+	80430	<i>Cricotopus (C.) tremulus group</i>	42 +
24900	<i>Gomphus sp</i>	+	81690	<i>Paratrachocladius sp</i>	+
25010	<i>Hagenius brevistylus</i>	+	82130	<i>Thienemanniella similis</i>	224 +
26700	<i>Macromia sp</i>	+	82220	<i>Tvetenia discoloripes group</i>	42 +
34140	<i>Acroneuria internata</i>	12 +	83040	<i>Dicrotendipes neomodestus</i>	42 +
34300	<i>Neoperla clymene complex</i>	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
34700	<i>Agneta capitata complex</i>	9 +	84450	<i>Polypedilum (Uresipedilum) flavum</i>	719 +
43300	<i>Ranatra sp</i>	+	84470	<i>Polypedilum (P.) illinoense</i>	+
48410	<i>Corydalis cornutus</i>	16 +	84888	<i>Xenochironomus xenolabis</i>	+
50315	<i>Chimarra obscura</i>	82 +	85615	<i>Rheotanytarsus pellucidus</i>	507
50906	<i>Psychomyia flavida</i>	16 +	85625	<i>Rheotanytarsus sp</i>	3044 +
51400	<i>Nyctiophylax sp</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	+
51600	<i>Polycentropus sp</i>	1 +	86200	<i>Tabanus sp</i>	+
52200	<i>Cheumatopsyche sp</i>	614 +	86401	<i>Atherix lantha</i>	1
52430	<i>Ceratopsyche morosa group</i>	334 +	93200	<i>Hydrobiidae</i>	+
52540	<i>Hydropsyche dicantha</i>	334 +	93900	<i>Elimia sp</i>	+
52550	<i>Hydropsyche frisoni</i>	311 +			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/17/2004 River Code: 03-001 RM: 28.40 Site: Grand River

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
96900	<i>Ferrissia sp</i>	+			
99100	<i>Pyganodon grandis</i>	+			

No. Quantitative Taxa: 45	Total Taxa: 89
No. Qualitative Taxa: 77	ICI: 54
Number of Organisms: 7503	Qual EPT: 33

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/18/2004 River Code: 03-001 RM: 22.60 Site: Grand River upst. St. Rt. 528

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	59110	<i>Ceraclea ancylus</i>	+
03040	<i>Fredericella sp</i>	2	59510	<i>Oecetis avara</i>	+
03600	<i>Oligochaeta</i>	80 +	59580	<i>Oecetis persimilis</i>	1 +
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	59970	<i>Petrophila sp</i>	+
08601	<i>Hydrachnidia</i>	12	60300	<i>Dineutus sp</i>	+
11014	<i>Acentrella turbida</i>	+	65800	<i>Berosus sp</i>	+
11020	<i>Acerpenna pygmaea</i>	1	67500	<i>Laccobius sp</i>	+
11110	<i>Acentrella parvula</i>	+	68075	<i>Psephenus herricki</i>	+
11119	<i>Plauditus dubius</i> or <i>P. virilis</i>	10 +	68130	<i>Helichus sp</i>	+
11120	<i>Baetis flavistriga</i>	5	68601	<i>Ancyronyx variegata</i>	+
11130	<i>Baetis intercalaris</i>	82 +	68901	<i>Macronychus glabratus</i>	21 +
11150	<i>Pseudocloeon propinquum</i>	+	69400	<i>Stenelmis sp</i>	28 +
11650	<i>Procloeon sp</i> (w/ hindwing pads)	+	70600	<i>Antocha sp</i>	+
12200	<i>Isonychia sp</i>	49 +	71100	<i>Hexatoma sp</i>	+
13000	<i>Leucrocuta sp</i>	10 +	74100	<i>Simulium sp</i>	8 +
13100	<i>Nixe sp</i>	+	77130	<i>Ablabesmyia rhamphe</i> group	+
13400	<i>Stenacron sp</i>	51 +	77750	<i>Hayesomyia senata</i> or <i>Thienemannimyia norena</i>	39 +
13540	<i>Maccaffertium mediopunctatum</i>	26 +	77800	<i>Helopelopia sp</i>	+
13561	<i>Maccaffertium pulchellum</i>	67 +	78401	<i>Natarsia species A</i> (sensu Roback, 1978)	+
16324	<i>Serratella deficiens</i>	38 +	78450	<i>Nilotanytus fimbriatus</i>	36
16700	<i>Tricorythodes sp</i>	91 +	78740	<i>Rheopelopia acra</i>	39
17200	<i>Caenis sp</i>	76 +	80310	<i>Cardiocladius obscurus</i>	+
18600	<i>Ephemera sp</i>	+	80360	<i>Corynoneura "celeripes"</i> (sensu Simpson & Bode, 1980)	56
21300	<i>Hetaerina sp</i>	+	80410	<i>Cricotopus (C.) sp</i>	66 +
22001	<i>Coenagrionidae</i>	+	80420	<i>Cricotopus (C.) bicinctus</i>	26
25510	<i>Stylogomphus albistylus</i>	+	80430	<i>Cricotopus (C.) tremulus</i> group	13
26700	<i>Macromia sp</i>	+	80440	<i>Cricotopus (C.) trifascia</i>	+
34140	<i>Acroneuria internata</i>	10 +	81229	<i>Nanocladius (N.) crassicornus</i>	26
34300	<i>Neoperla clymene</i> complex	+	81270	<i>Nanocladius (N.) spinipennis</i>	13
34700	<i>Agnetina capitata</i> complex	10 +	81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+
42700	<i>Belostoma sp</i>	+	82101	<i>Thienemanniella taurocapita</i>	8
43300	<i>Ranatra sp</i>	+	82121	<i>Thienemanniella lobapodema</i>	16
48410	<i>Corydalus cornutus</i>	+	82130	<i>Thienemanniella similis</i>	16 +
50315	<i>Chimarra obscura</i>	+	82220	<i>Tvetenia discoloripes</i> group	+
50906	<i>Psychomyia flavida</i>	+	82820	<i>Cryptochironomus sp</i>	+
51600	<i>Polycentropus sp</i>	+	83040	<i>Dicrotendipes neomodestus</i>	+
52200	<i>Cheumatopsyche sp</i>	72 +	83840	<i>Microtendipes pedellus</i> group	+
52430	<i>Ceratopsyche morosa</i> group	33 +	84450	<i>Polypedilum (Uresipedilum) flavum</i>	197 +
52540	<i>Hydropsyche dicantha</i>	31 +	84470	<i>Polypedilum (P.) illinoense</i>	13 +
52550	<i>Hydropsyche frisoni</i>	24 +	84540	<i>Polypedilum (Tripodura) scalaenum</i> group	26 +
52620	<i>Macrostemum zebratum</i>	+	84700	<i>Stenochironomus sp</i>	13 +
53400	<i>Protophila sp</i>	+	85264	<i>Cladotanytarsus vanderwulpi</i> group Type 4	+
53800	<i>Hydroptila sp</i>	4	85615	<i>Rheotanytarsus pellucidus</i>	+
58505	<i>Helicopsyche borealis</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/18/2004 River Code: 03-001 RM: 22.60 Site: Grand River upst. St. Rt. 528

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
85625	<i>Rheotanytarsus sp</i>	472 +			
85800	<i>Tanytarsus sp</i>	13			
85802	<i>Tanytarsus curticornis</i>	13			
85821	<i>Tanytarsus glabrescens group sp 7</i>	131			
85840	<i>Tanytarsus sepp</i>	39 +			
87540	<i>Hemerodromia sp</i>	32			
93900	<i>Elimia sp</i>	5 +			
98600	<i>Sphaerium sp</i>	+			
99180	<i>Strophitus undulatus undulatus</i>	+			

No. Quantitative Taxa: 50 Total Taxa: 96

No. Qualitative Taxa: 78 ICI: 48

Number of Organisms: 2569 Qual EPT: 32

Ohio EPA/DSW Ecological Assessment Section

Macroinvertebrate Collection

Collection Date: 08/18/2004 River Code: 03-001 RM: 13.60 Site: Grand River Vrooman Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	8	60300	<i>Dineutus sp</i>	1
01801	<i>Turbellaria</i>	+	65800	<i>Berosus sp</i>	+
03040	<i>Fredericella sp</i>	2	68075	<i>Psephenus herricki</i>	+
03600	<i>Oligochaeta</i>	80	68601	<i>Ancyronyx variegata</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	68708	<i>Dubiraphia vittata group</i>	+
08601	<i>Hydrachnidia</i>	32	68901	<i>Macronychus glabratus</i>	9
11020	<i>Acerpenna pygmaea</i>	2	69400	<i>Stenelmis sp</i>	12
11110	<i>Acentrella parvula</i>	25	70600	<i>Antocha sp</i>	+
11119	<i>Plauditus dubius or P. virilis</i>	31	71100	<i>Hexatoma sp</i>	+
11130	<i>Baetis intercalaris</i>	137	74100	<i>Simulium sp</i>	60
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	+
12200	<i>Isonychia sp</i>	65	78450	<i>Nilotanytus fimbriatus</i>	119
13000	<i>Leucrocota sp</i>	16	78740	<i>Rheopelopia acra</i>	1
13100	<i>Nixe sp</i>	+	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	16
13400	<i>Stenacron sp</i>	+	80410	<i>Cricotopus (C.) sp</i>	+
13540	<i>Maccaffertium mediopunctatum</i>	345	80420	<i>Cricotopus (C.) bicinctus</i>	+
13561	<i>Maccaffertium pulchellum</i>	82	81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	119
16324	<i>Serratella deficiens</i>	26	81270	<i>Nanocladius (N.) spinipennis</i>	+
16700	<i>Tricorythodes sp</i>	117	82070	<i>Synorthocladius semivirens</i>	60
17200	<i>Caenis sp</i>	18	82220	<i>Tvetenia discoloripes group</i>	+
18600	<i>Ephemera sp</i>	+	82820	<i>Cryptochironomus sp</i>	+
22001	<i>Coenagrionidae</i>	+	83040	<i>Dicrotendipes neomodestus</i>	60
27400	<i>Neurocordulia sp</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	119
34140	<i>Acroneuria internata</i>	21	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
34150	<i>Acroneuria lycorias</i>	1	85615	<i>Rheotanytarsus pellucidus</i>	2807
34300	<i>Neoperla clymene complex</i>	+	85625	<i>Rheotanytarsus sp</i>	1493
43300	<i>Ranatra sp</i>	+	85702	<i>Stempellina sp 2</i>	+
43570	<i>Neoplea sp</i>	+	85802	<i>Tanytarsus curticornis</i>	119
47600	<i>Sialis sp</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	1075
48410	<i>Corydalus cornutus</i>	1	85840	<i>Tanytarsus sepp</i>	60
50315	<i>Chimarra obscura</i>	+	87540	<i>Hemerodromia sp</i>	16
52200	<i>Cheumatopsyche sp</i>	365	93900	<i>Elimia sp</i>	+
52430	<i>Ceratopsyche morosa group</i>	37	95100	<i>Physella sp</i>	+
52540	<i>Hydropsyche dicantha</i>	31	99180	<i>Strophitus undulatus undulatus</i>	+
52550	<i>Hydropsyche frisoni</i>	115	99200	<i>Alasmidonta marginata</i>	+
52620	<i>Macrostemum zebratum</i>	1	99280	<i>Lasmigona costata</i>	+
53400	<i>Protophila sp</i>	1	99440	<i>Fusconaia flava</i>	+
53800	<i>Hydroptila sp</i>	190	99540	<i>Elliptio dilatata</i>	+
58505	<i>Helicopsyche borealis</i>	2	99560	<i>Ptychobranthus fasciolaris</i>	+
59100	<i>Ceraclea sp</i>	+	99600	<i>Actinonaias ligamentina carinata</i>	+
59110	<i>Ceraclea ancylus</i>	+	99700	<i>Potamilus alatus</i>	+
59510	<i>Oecetis avara</i>	3	99860	<i>Lampsilis radiata luteola</i>	+
59580	<i>Oecetis persimilis</i>	1			
59970	<i>Petrophila sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/18/2004 River Code: 03-001 RM: 13.60 Site: Grand River Vrooman Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
99880	<i>Lampsilis cardium</i>	+			
99900	<i>Epioblasma triquetra</i>	+			

No. Quantitative Taxa: 45	Total Taxa: 88
No. Qualitative Taxa: 75	ICI: 52
Number of Organisms: 7901	Qual EPT: 27

Ohio EPA/DSW Ecological Assessment Section

Macroinvertebrate Collection

Collection Date: 08/19/2004 River Code: 03-001 RM: 8.70 Site: Grand River upst. St. Rt. 84

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	64	53800	<i>Hydroptila sp</i>	12 +
01801	<i>Turbellaria</i>	+	54000	<i>Leucotrichia pictipes</i>	+
03121	<i>Paludicella articulata</i>	+	58505	<i>Helicopsyche borealis</i>	+
03360	<i>Plumatella sp</i>	1	59110	<i>Ceraclea ancylus</i>	+
03451	<i>Urnatella gracilis</i>	8	59140	<i>Ceraclea maculata</i>	1
03600	<i>Oligochaeta</i>	32 +	59570	<i>Oecetis nocturna</i>	+
05900	<i>Lirceus sp</i>	9	59580	<i>Oecetis persimilis</i>	2 +
08601	<i>Hydrachnidia</i>	32	59970	<i>Petrophila sp</i>	+
11014	<i>Acentrella turbida</i>	+	60300	<i>Dineutus sp</i>	1
11020	<i>Acerpenna pygmaea</i>	1	67700	<i>Paracymus sp</i>	+
11110	<i>Acentrella parvula</i>	1 +	68075	<i>Psephenus herricki</i>	+
11119	<i>Plauditus dubius</i> or <i>P. virilis</i>	85 +	68601	<i>Ancyronyx variegata</i>	9
11120	<i>Baetis flavistriga</i>	40 +	68901	<i>Macronychus glabratus</i>	67
11130	<i>Baetis intercalaris</i>	871 +	69400	<i>Stenelmis sp</i>	84 +
11650	<i>Procloeon sp</i> (w/ hindwing pads)	+	70600	<i>Antocha sp</i>	+
11670	<i>Procloeon viridoculare</i>	+	71910	<i>Tipula abdominalis</i>	1
12200	<i>Isonychia sp</i>	280 +	74100	<i>Simulium sp</i>	256 +
13000	<i>Leucrocuta sp</i>	+	77120	<i>Ablabesmyia mallochi</i>	+
13400	<i>Stenacron sp</i>	+	77800	<i>Helopelopia sp</i>	113
13540	<i>Maccaffertium mediopunctatum</i>	180 +	78450	<i>Nilotanytus fimbriatus</i>	64
13561	<i>Maccaffertium pulchellum</i>	205 +	80310	<i>Cardiocladius obscurus</i>	+
16324	<i>Serratella deficiens</i>	32 +	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	32
16700	<i>Tricorythodes sp</i>	463 +	80370	<i>Corynoneura lobata</i>	32
17200	<i>Caenis sp</i>	197	80420	<i>Cricotopus (C.) bicinctus</i>	113 +
18600	<i>Ephemera sp</i>	+	80430	<i>Cricotopus (C.) tremulus group</i>	113
21200	<i>Calopteryx sp</i>	+	80440	<i>Cricotopus (C.) trifascia</i>	+
22300	<i>Argia sp</i>	+	81270	<i>Nanocladius (N.) spinipennis</i>	+
34140	<i>Acroneuria internata</i>	17 +	81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+
34300	<i>Neoperla clymene complex</i>	+	82101	<i>Thienemanniella taurocapita</i>	+
34700	<i>Agneta capitata complex</i>	7	82121	<i>Thienemanniella lobapodema</i>	+
47600	<i>Sialis sp</i>	+	82130	<i>Thienemanniella similis</i>	128
48410	<i>Corydalus cornutus</i>	1	82220	<i>Tvetenia discoloripes group</i>	227 +
50315	<i>Chimarra obscura</i>	38	83040	<i>Dicretodipus neomodestus</i>	113 +
50906	<i>Psychomyia flavida</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	680 +
51300	<i>Neureclipsis sp</i>	2	84470	<i>Polypedilum (P.) illinoense</i>	113 +
51400	<i>Nyctiophylax sp</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	113
51600	<i>Polycentropus sp</i>	1 +	84960	<i>Pseudochironomus sp</i>	113
52200	<i>Cheumatopsyche sp</i>	1285 +	85615	<i>Rheotanytarsus pellucidus</i>	2831 +
52430	<i>Ceratopsyche morosa group</i>	738 +	85625	<i>Rheotanytarsus sp</i>	4983 +
52530	<i>Hydropsyche depravata group</i>	46	85821	<i>Tanytarsus glabrescens group sp 7</i>	340 +
52540	<i>Hydropsyche dicantha</i>	555	85840	<i>Tanytarsus sepp</i>	227
52550	<i>Hydropsyche frisoni</i>	50 +	87540	<i>Hemerodromia sp</i>	64 +
52620	<i>Macrostemum zebratum</i>	1	93900	<i>Elimia sp</i>	+
53400	<i>Protophila sp</i>	+	96900	<i>Ferrissia sp</i>	+

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/19/2004 River Code: 03-001 RM: 8.70 Site: Grand River upst. St. Rt. 84

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
97710	<i>Dreissena polymorpha</i>	+			

No. Quantitative Taxa: 56 Total Taxa: 89

No. Qualitative Taxa: 61 ICI: 56

Number of Organisms: 16074 Qual EPT: 30

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/19/2004 River Code: 03-001 RM: 6.10 Site: Grand River upst. St. Rt. 2, at park

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00401	<i>Spongillidae</i>	+	74100	<i>Simulium sp</i>	195
03040	<i>Fredericella sp</i>	1	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	27 +
03600	<i>Oligochaeta</i>	72 +	78450	<i>Nilotanypus fimbriatus</i>	40
11014	<i>Acentrella turbida</i>	+	80310	<i>Cardiocladius obscurus</i>	+
11110	<i>Acentrella parvula</i>	27 +	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	64
11119	<i>Plauditus dubius or P. virilis</i>	105 +	80420	<i>Cricotopus (C.) bicinctus</i>	108 +
11120	<i>Baetis flavistriga</i>	1 +	80430	<i>Cricotopus (C.) tremulus group</i>	+
11130	<i>Baetis intercalaris</i>	1083 +	81270	<i>Nanocladius (N.) spinipennis</i>	27
11650	<i>Procladius sp (w/ hindwing pads)</i>	+	81280	<i>Nanocladius (Plecopteracladius) downesi</i>	+
12200	<i>Isonychia sp</i>	86 +	82101	<i>Thienemanniella taurocapita</i>	32
13000	<i>Leucrocota sp</i>	+	82130	<i>Thienemanniella similis</i>	176 +
13100	<i>Nixe sp</i>	+	82220	<i>Tvetenia discoloripes group</i>	377 +
13400	<i>Stenacron sp</i>	2 +	82820	<i>Cryptochironomus sp</i>	+
13540	<i>Maccaffertium mediopunctatum</i>	186 +	83300	<i>Glyptotendipes (G.) sp</i>	+
13561	<i>Maccaffertium pulchellum</i>	413 +	84300	<i>Phaenopsectra obediens group</i>	27
16324	<i>Serratella deficiens</i>	51 +	84450	<i>Polypedilum (Uresipedilum) flavum</i>	1211 +
16700	<i>Tricorythodes sp</i>	163 +	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
17200	<i>Caenis sp</i>	66 +	85615	<i>Rheotanytarsus pellucidus</i>	404 +
18600	<i>Ephemera sp</i>	+	85625	<i>Rheotanytarsus sp</i>	1238 +
22300	<i>Argia sp</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	27
27400	<i>Neurocordulia sp</i>	+	85840	<i>Tanytarsus sepp</i>	27
34140	<i>Acroneuria internata</i>	8 +	87540	<i>Hemerodromia sp</i>	24
34300	<i>Neoperla clymene complex</i>	+	93200	<i>Hydrobiidae</i>	+
34700	<i>Agnetina capitata complex</i>	3 +	96900	<i>Ferrissia sp</i>	+
43300	<i>Ranatra sp</i>	+	98600	<i>Sphaerium sp</i>	+
50315	<i>Chimarra obscura</i>	38 +	99200	<i>Alasmidonta marginata</i>	+
50906	<i>Psychomyia flavida</i>	1 +	99600	<i>Actinonaias ligamentina carinata</i>	+
51300	<i>Neureclipsis sp</i>	1 +	99680	<i>Leptodea fragilis</i>	+
51400	<i>Nyctiophylax sp</i>	+	99700	<i>Potamilus alatus</i>	+
52200	<i>Cheumatopsyche sp</i>	1970 +			
52430	<i>Ceratopsyche morosa group</i>	731 +			
52540	<i>Hydropsyche dicantha</i>	266 +			
52550	<i>Hydropsyche frisoni</i>	56 +			
52620	<i>Macrostemum zebratum</i>	5 +			
53400	<i>Protophila sp</i>	+			
53800	<i>Hydrophila sp</i>	3			
54000	<i>Leucotrichia pictipes</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59001	<i>Leptoceridae</i>	32			
59970	<i>Petrophila sp</i>	1 +			
60300	<i>Dineutus sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
69400	<i>Stenelmis sp</i>	42 +			
71100	<i>Hexatoma sp</i>	+			

No. Quantitative Taxa: 43 Total Taxa: 73
No. Qualitative Taxa: 61 ICI: 54
Number of Organisms: 9417 Qual EPT: 31

Ohio EPA/DSW Ecological Assessment Section

Macroinvertebrate Collection

Collection Date: 08/19/2004 River Code: 03-001 RM: 4.40 Site: Grand River

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	38 +	65800	<i>Berosus sp</i>	+
03040	<i>Fredericella sp</i>	+	68075	<i>Psephenus herricki</i>	+
03451	<i>Urnatella gracilis</i>	8	68601	<i>Ancyronyx variegata</i>	1
03600	<i>Oligochaeta</i>	120 +	68901	<i>Macronychus glabratus</i>	34
04960	<i>Mooreobdella sp</i>	+	69400	<i>Stenelmis sp</i>	4 +
05800	<i>Caecidotea sp</i>	1	71100	<i>Hexatoma sp</i>	+
06810	<i>Gammarus fasciatus</i>	1 +	77120	<i>Ablabesmyia mallochi</i>	57
08601	<i>Hydrachnidia</i>	8	77130	<i>Ablabesmyia rhamphe group</i>	14
11110	<i>Acentrella parvula</i>	4 +	77500	<i>Conchapelopia sp</i>	29
11119	<i>Plauditus dubius or P. virilis</i>	1	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	43
11130	<i>Baetis intercalaris</i>	29			
11650	<i>Procloeon sp (w/ hindwing pads)</i>	9 +	78140	<i>Labrundinia pilosella</i>	16 +
12200	<i>Isonychia sp</i>	20	78450	<i>Nilotanytus fimbriatus</i>	16
13000	<i>Leucrocuta sp</i>	8 +	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	40
13100	<i>Nixe sp</i>	+			
13400	<i>Stenacron sp</i>	90 +	80420	<i>Cricotopus (C.) bicinctus</i>	72
13540	<i>Maccaffertium mediopunctatum</i>	96 +	80430	<i>Cricotopus (C.) tremulus group</i>	14
13561	<i>Maccaffertium pulchellum</i>	192 +	81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+
16324	<i>Serratella deficiens</i>	35	82121	<i>Thienemanniella lobapodema</i>	16
16700	<i>Tricorythodes sp</i>	540 +	82130	<i>Thienemanniella similis</i>	8
17200	<i>Caenis sp</i>	152 +	82820	<i>Cryptochironomus sp</i>	+
18100	<i>Anthopotamus sp</i>	+	83040	<i>Dicrotendipes neomodestus</i>	86
18600	<i>Ephemera sp</i>	+	84420	<i>Polypedilum (P.) n.sp 1</i>	+
22001	<i>Coenagrionidae</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	400 +
22300	<i>Argia sp</i>	+	84460	<i>Polypedilum (P.) fallax group</i>	+
34140	<i>Acroneuria internata</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
34300	<i>Neoperla clymene complex</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	29 +
34700	<i>Agnetina capitata complex</i>	1	85625	<i>Rheotanytarsus sp</i>	372 +
48410	<i>Corydalus cornutus</i>	1	85802	<i>Tanytarsus curticornis</i>	14
50315	<i>Chimarra obscura</i>	9	85821	<i>Tanytarsus glabrescens group sp 7</i>	257 +
50906	<i>Psychomyia flavida</i>	8 +	85840	<i>Tanytarsus sepp</i>	14 +
51300	<i>Neureclipsis sp</i>	2 +	87540	<i>Hemerodromia sp</i>	+
51400	<i>Nyctiophylax sp</i>	+	93200	<i>Hydrobiidae</i>	1
52200	<i>Cheumatopsyche sp</i>	392 +	93900	<i>Elimia sp</i>	11 +
52430	<i>Ceratopsyche morosa group</i>	26 +	96900	<i>Ferrissia sp</i>	13 +
52540	<i>Hydropsyche dicantha</i>	12	99700	<i>Potamilus alatus</i>	+
52550	<i>Hydropsyche frisoni</i>	12 +			
52620	<i>Macrostemum zebratum</i>	+	No. Quantitative Taxa: 52		Total Taxa: 78
53400	<i>Protoptila sp</i>	+	No. Qualitative Taxa: 52		ICI: 56
53800	<i>Hydroptila sp</i>	33 +	Number of Organisms: 3409		Qual EPT: 24
54000	<i>Leucotrichia pictipes</i>	+			
59110	<i>Ceraclea ancylus</i>	+			
59970	<i>Petrophila sp</i>	+			
63300	<i>Hydroporus sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/19/2004 River Code: 03-001 RM: 3.90 Site: Grand River

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	8	68601	<i>Ancyronyx variegata</i>	18 +
01801	<i>Turbellaria</i>	73 +	68708	<i>Dubiraphia vittata group</i>	8 +
03040	<i>Fredericella sp</i>	2	68901	<i>Macronychus glabratus</i>	22 +
03121	<i>Paludicella articulata</i>	+	69400	<i>Stenelmis sp</i>	18 +
03451	<i>Urnatella gracilis</i>	8	74501	<i>Ceratopogonidae</i>	+
03600	<i>Oligochaeta</i>	16 +	77120	<i>Ablabesmyia mallochi</i>	+
06810	<i>Gammarus fasciatus</i>	+	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	51 +
11020	<i>Acerpenna pygmaea</i>	16	80410	<i>Cricotopus (C.) sp</i>	25
11110	<i>Acentrella parvula</i>	35	80420	<i>Cricotopus (C.) bicinctus</i>	25
11130	<i>Baetis intercalaris</i>	9	80430	<i>Cricotopus (C.) tremulus group</i>	51
11650	<i>Procloeon sp (w/ hindwing pads)</i>	2 +	82820	<i>Cryptochironomus sp</i>	+
12200	<i>Isonychia sp</i>	19	83040	<i>Dicrotendipes neomodestus</i>	127 +
13000	<i>Leucrocuta sp</i>	4 +	84300	<i>Phaenopsectra obediens group</i>	25
13100	<i>Nixe sp</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	688 +
13400	<i>Stenacron sp</i>	263 +	84960	<i>Pseudochironomus sp</i>	25
13540	<i>Maccaffertium mediopunctatum</i>	69	85230	<i>Cladotanytarsus mancus group</i>	+
13561	<i>Maccaffertium pulchellum</i>	487	85265	<i>Cladotanytarsus vanderwulpi group Type 5</i>	+
16324	<i>Serratella deficiens</i>	55	85615	<i>Rheotanytarsus pellucidus</i>	204 +
16700	<i>Tricorythodes sp</i>	905 +	85625	<i>Rheotanytarsus sp</i>	1326 +
17200	<i>Caenis sp</i>	36 +	85802	<i>Tanytarsus curticornis</i>	25
18100	<i>Anthopotamus sp</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	153 +
22001	<i>Coenagrionidae</i>	+	87540	<i>Hemerodromia sp</i>	24 +
22300	<i>Argia sp</i>	+	93200	<i>Hydrobiidae</i>	17 +
26700	<i>Macromia sp</i>	1	93900	<i>Elimia sp</i>	3 +
34140	<i>Acroneuria internata</i>	1 +	96900	<i>Ferrissia sp</i>	22 +
34300	<i>Neoperla clymene complex</i>	+	99640	<i>Truncilla donaciformis</i>	+
34700	<i>Agnatina capitata complex</i>	1	99680	<i>Leptodea fragilis</i>	+
43300	<i>Ranatra sp</i>	+			
50906	<i>Psychomyia flavida</i>	8 +			
51300	<i>Neureclipsis sp</i>	5	No. Quantitative Taxa: 48		Total Taxa: 71
51400	<i>Nyctiophylax sp</i>	+	No. Qualitative Taxa: 51		ICI: 56
51600	<i>Polycentropus sp</i>	+	Number of Organisms: 5552		Qual EPT: 20
52200	<i>Cheumatopsyche sp</i>	533 +			
52430	<i>Ceratopsyche morosa group</i>	72 +			
52550	<i>Hydropsyche frisoni</i>	40			
53400	<i>Protoptila sp</i>	+			
53800	<i>Hydroptila sp</i>	24 +			
54000	<i>Leucotrichia pictipes</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59110	<i>Ceraclea ancylus</i>	+			
59580	<i>Oecetis persimilis</i>	+			
59970	<i>Petrophila sp</i>	2 +			
65800	<i>Berosus sp</i>	+			
68075	<i>Psephenus herricki</i>	1 +			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/19/2004 River Code: 03-001 RM: 3.40 Site: Grand River

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	8	77130	<i>Ablabesmyia rhamphe group</i>	46
01801	<i>Turbellaria</i>	+	77740	<i>Hayesomyia senata</i>	31
01900	<i>Nemertea</i>	+	78140	<i>Labrundinia pilosella</i>	15 +
03040	<i>Fredericella sp</i>	5 +	78750	<i>Rheopelopia paramaculipennis</i>	15
03360	<i>Plumatella sp</i>	3	80410	<i>Cricotopus (C.) sp</i>	46
03600	<i>Oligochaeta</i>	136 +	80420	<i>Cricotopus (C.) bicinctus</i>	46 +
05800	<i>Caecidotea sp</i>	+	80430	<i>Cricotopus (C.) tremulus group</i>	76
06201	<i>Hyalella azteca</i>	+	80510	<i>Cricotopus (Isocladius) sylvestris group</i>	15
06810	<i>Gammarus fasciatus</i>	+	82121	<i>Thienemanniella lobapodema</i>	24
11020	<i>Acerpenna pygmaea</i>	9	82820	<i>Cryptochironomus sp</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	26 +	83040	<i>Dicrotendipes neomodestus</i>	352
11651	<i>Procloeon sp (w/o hindwing pads)</i>	1	83050	<i>Dicrotendipes lucifer</i>	275 +
11670	<i>Procloeon viridoculare</i>	+	83158	<i>Endochironomus nigricans</i>	+
13000	<i>Leucrocuta sp</i>	3	83300	<i>Glyptotendipes (G.) sp</i>	92
13100	<i>Nixe sp</i>	+	84155	<i>Paralauterborniella nigrohalteralis</i>	+
13400	<i>Stenacron sp</i>	205 +	84210	<i>Paratendipes albimanus or P. duplicatus</i>	15 +
13521	<i>Stenonema femoratum</i>	1	84300	<i>Phaenopsectra obediens group</i>	31
13540	<i>Maccaffertium mediopunctatum</i>	30	84450	<i>Polypedilum (Uresipedilum) flavum</i>	107
13561	<i>Maccaffertium pulchellum</i>	77 +	84470	<i>Polypedilum (P.) illinoense</i>	+
16324	<i>Serratella deficiens</i>	1	84520	<i>Polypedilum (Tripodura) halterale group</i>	+
16700	<i>Tricorythodes sp</i>	1190 +	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	15
17200	<i>Caenis sp</i>	124 +	84960	<i>Pseudochironomus sp</i>	+
18100	<i>Anthopotamus sp</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	107
18600	<i>Ephemera sp</i>	+	85625	<i>Rheotanytarsus sp</i>	168
22001	<i>Coenagrionidae</i>	8 +	85800	<i>Tanytarsus sp</i>	+
22300	<i>Argia sp</i>	16 +	85802	<i>Tanytarsus curticornis</i>	76
25510	<i>Stylogomphus albistylus</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	275 +
26700	<i>Macromia sp</i>	+	85840	<i>Tanytarsus sepp</i>	15 +
27400	<i>Neurocordulia sp</i>	+	93900	<i>Elimia sp</i>	3 +
43570	<i>Neoplea sp</i>	+	96900	<i>Ferrissia sp</i>	82
51400	<i>Nyctiophylax sp</i>	2 +	97710	<i>Dreissena polymorpha</i>	+
51600	<i>Polycentropus sp</i>	1 +			
52200	<i>Cheumatopsyche sp</i>	11 +	No. Quantitative Taxa: 49		Total Taxa: 75
53800	<i>Hydroptila sp</i>	127 +	No. Qualitative Taxa: 49		ICI: 56
59110	<i>Ceraclea ancylus</i>	+	Number of Organisms: 4024		Qual EPT: 14
59970	<i>Petrophila sp</i>	+			
60900	<i>Peltodytes sp</i>	+			
65800	<i>Berosus sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68601	<i>Ancyronyx variegata</i>	16 +			
68700	<i>Dubiraphia sp</i>	8			
68901	<i>Macronychus glabratus</i>	8			
69400	<i>Stenelmis sp</i>	5 +			
77120	<i>Ablabesmyia mallochi</i>	76 +			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/11/2004 River Code: 03-004 RM: 0.50 Site: Red Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
03600	<i>Oligochaeta</i>	+			
05800	<i>Caecidotea sp</i>	+			
06700	<i>Crangonyx sp</i>	+			
08240	<i>Orconectes (Crockerinus) propinquus</i>	+			
08601	<i>Hydrachnidia</i>	+			
11120	<i>Baetis flavistriga</i>	+			
21200	<i>Calopteryx sp</i>	+			
23909	<i>Boyeria vinosa</i>	+			
45300	<i>Sigara sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
53800	<i>Hydroptila sp</i>	+			
68707	<i>Dubiraphia quadrinotata</i>	+			
69400	<i>Stenelmis sp</i>	+			
74100	<i>Simulium sp</i>	+			
77800	<i>Helopelopia sp</i>	+			
78200	<i>Larsia sp</i>	+			
78350	<i>Meropelopia sp</i>	+			
80420	<i>Cricotopus (C.) bicinctus</i>	+			
80430	<i>Cricotopus (C.) tremulus group</i>	+			
81825	<i>Rheocricotopus (Psilocricotopus) robacki</i>	+			
82141	<i>Thienemanniella xena</i>	+			
84210	<i>Paratendipes albimanus</i> or <i>P. duplicatus</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+			
85500	<i>Paratanytarsus sp</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
87510	<i>Chelifera sp</i>	+			
87540	<i>Hemerodromia sp</i>	+			
95100	<i>Physella sp</i>	+			
96002	<i>Helisoma anceps anceps</i>	+			
98600	<i>Sphaerium sp</i>	+			

No. Quantitative Taxa: 0	Total Taxa: 32
No. Qualitative Taxa: 32	ICI:
Number of Organisms: 0	Qual EPT: 4

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/12/2004 River Code: 03-005 RM: 5.40 Site: Kellogg Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
03360	<i>Plumatella sp</i>	+			
03600	<i>Oligochaeta</i>	+			
04935	<i>Erpobdella punctata punctata</i>	+			
05800	<i>Caecidotea sp</i>	+			
06700	<i>Crangonyx sp</i>	+			
08240	<i>Orconectes (Crockerinus) propinquus</i>	+			
08601	<i>Hydrachnidia</i>	+			
11120	<i>Baetis flavistriga</i>	+			
21200	<i>Calopteryx sp</i>	+			
22001	<i>Coenagrionidae</i>	+			
23600	<i>Aeshna sp</i>	+			
53800	<i>Hydroptila sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77800	<i>Helopelopia sp</i>	+			
82820	<i>Cryptochironomus sp</i>	+			
83040	<i>Dicrotendipes neomodestus</i>	+			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	+			
84315	<i>Phaenopsectra flavipes</i>	+			
84460	<i>Polypedilum (P.) fallax group</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
85800	<i>Tanytarsus sp</i>	+			
87540	<i>Hemerodromia sp</i>	+			

No. Quantitative Taxa: 0	Total Taxa: 25
No. Qualitative Taxa: 25	ICI:
Number of Organisms: 0	Qual EPT: 2

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/11/2004 River Code: 03-005 RM: 0.20 Site: Kellogg Creek St. Rt. 86

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00401	<i>Spongillidae</i>	+	97710	<i>Dreissena polymorpha</i>	+
01801	<i>Turbellaria</i>	+			
03360	<i>Plumatella sp</i>	+	No. Quantitative Taxa: 0		Total Taxa: 45
03600	<i>Oligochaeta</i>	+	No. Qualitative Taxa: 45		ICI:
04964	<i>Mooreobdella microstoma</i>	+	Number of Organisms: 0		Qual EPT: 11
05900	<i>Lirceus sp</i>	+			
06700	<i>Crangonyx sp</i>	+			
08240	<i>Orconectes (Crockerinus) propinquus</i>	+			
11120	<i>Baetis flavistriga</i>	+			
11130	<i>Baetis intercalaris</i>	+			
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+			
11670	<i>Procloeon viridoculare</i>	+			
13400	<i>Stenacron sp</i>	+			
13521	<i>Stenonema femoratum</i>	+			
21200	<i>Calopteryx sp</i>	+			
23909	<i>Boyeria vinosa</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
52540	<i>Hydropsyche dicantha</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59310	<i>Mystacides sepulchralis</i>	+			
68075	<i>Psephenus herricki</i>	+			
68601	<i>Ancyronyx variegata</i>	+			
68708	<i>Dubiraphia vittata group</i>	+			
69400	<i>Stenelmis sp</i>	+			
74100	<i>Simulium sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77500	<i>Conchapelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
78450	<i>Nilotanytus fimbriatus</i>	+			
80410	<i>Cricotopus (C.) sp</i>	+			
80420	<i>Cricotopus (C.) bicinctus</i>	+			
80750	<i>Eukiefferiella devonica group</i>	+			
81650	<i>Parametriocnemus sp</i>	+			
82100	<i>Thienemanniella sp</i>	+			
83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+			
84210	<i>Paratendipes albimanus</i> or <i>P. duplicatus</i>	+			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	+			
84470	<i>Polypedilum (P.) illinoense</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+			
84750	<i>Stictochironomus sp</i>	+			
85615	<i>Rheotanytarsus pellucidus</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
85821	<i>Tanytarsus glabrescens group sp 7</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/11/2004 River Code: 03-006 RM: 0.60 Site: Ellison Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
01900	<i>Nemertea</i>	+			
02600	<i>Nematomorpha</i>	+			
03360	<i>Plumatella sp</i>	+			
03600	<i>Oligochaeta</i>	+			
05800	<i>Caecidotea sp</i>	+			
05900	<i>Lirceus sp</i>	+			
06700	<i>Crangonyx sp</i>	+			
08240	<i>Orconectes (Crockerinus) propinquus</i>	+			
11115	<i>Baetis tricaudatus</i>	+			
11120	<i>Baetis flavistriga</i>	+			
11130	<i>Baetis intercalaris</i>	+			
13400	<i>Stenacron sp</i>	+			
13521	<i>Stenonema femoratum</i>	+			
21200	<i>Calopteryx sp</i>	+			
25510	<i>Stylogomphus albistylus</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
53800	<i>Hydroptila sp</i>	+			
54000	<i>Leucotrichia pictipes</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
67500	<i>Laccobius sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
69400	<i>Stenelmis sp</i>	+			
70600	<i>Antocha sp</i>	+			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	+			
77500	<i>Conchapelopia sp</i>	+			
77800	<i>Helopelopia sp</i>	+			
80310	<i>Cardiocladius obscurus</i>	+			
80420	<i>Cricotopus (C.) bicinctus</i>	+			
80430	<i>Cricotopus (C.) tremulus group</i>	+			
81650	<i>Parametriocnemus sp</i>	+			
81690	<i>Paratrichocladius sp</i>	+			
83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+			
84210	<i>Paratendipes albimanus</i> or <i>P. duplicatus</i>	+			
84300	<i>Phaenopsectra obediens group</i>	+			
84315	<i>Phaenopsectra flavipes</i>	+			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+			
85821	<i>Tanytarsus glabrescens group sp 7</i>	+			
87540	<i>Hemerodromia sp</i>	+			
96900	<i>Ferrissia sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/10/2004 River Code: 03-007 RM: 0.40 Site: Talcott Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	+	81650	<i>Parametriocnemus sp</i>	+
08240	<i>Orconectes (Crokerinus) propinquus</i>	+	81825	<i>Rheocricotopus (Psilocricotopus) robacki</i>	+
11115	<i>Baetis tricaudatus</i>	+	82710	<i>Chironomus (C.) sp</i>	+
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	82820	<i>Cryptochironomus sp</i>	+
11650	<i>Proclleon sp (w/ hindwing pads)</i>	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+
12800	<i>Epeorus sp</i>	+	84460	<i>Polypedilum (P.) fallax group</i>	+
13000	<i>Leucrocuta sp</i>	+	84750	<i>Stictochironomus sp</i>	+
13400	<i>Stenacron sp</i>	+	85400	<i>Micropsectra sp</i>	+
13521	<i>Stenonema femoratum</i>	+	85625	<i>Rheotanytarsus sp</i>	+
13530	<i>Maccaffertium ithaca</i>	+	85800	<i>Tanytarsus sp</i>	+
13590	<i>Maccaffertium vicarium</i>	+	86401	<i>Atherix lantha</i>	+
17200	<i>Caenis sp</i>	+	95100	<i>Physella sp</i>	+
18501	<i>Ephemeridae</i>	+	96900	<i>Ferrissia sp</i>	+
21200	<i>Calopteryx sp</i>	+			
23905	<i>Boyeria grafiana</i>	+	No. Quantitative Taxa: 0		Total Taxa: 57
25510	<i>Stylogomphus albistylus</i>	+	No. Qualitative Taxa: 57		ICI:
26100	<i>Cordulegaster sp</i>	+	Number of Organisms: 0		Qual EPT: 25
34120	<i>Acroneuria carolinensis</i>	+			
47600	<i>Sialis sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
50410	<i>Dolophilodes distinctus</i>	+			
50804	<i>Lype diversa</i>	+			
50906	<i>Psychomyia flavida</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52440	<i>Ceratopsyche slossonae</i>	+			
52450	<i>Ceratopsyche sparna</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
52540	<i>Hydropsyche dicantha</i>	+			
53300	<i>Glossosoma sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
68075	<i>Psephenus herricki</i>	+			
70600	<i>Antocha sp</i>	+			
71100	<i>Hexatoma sp</i>	+			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77500	<i>Conchapelopia sp</i>	+			
77800	<i>Helopelopia sp</i>	+			
78655	<i>Procladius (Holotanypus) sp</i>	+			
80204	<i>Brillia flavifrons group</i>	+			
81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/10/2004 River Code: 03-009 RM: 4.80 Site: Mill Creek (Grand R. RM 23.58)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	+	77120	<i>Ablabesmyia mallochi</i>	+
07860	<i>Cambarus (Puncticambarus) robustus</i>	+	77500	<i>Conchapelopia sp</i>	+
11014	<i>Acentrella turbida</i>	+	79300	<i>Trissopelopia ogemawi</i>	+
11018	<i>Acerpenna macdunnoughi</i>	+	79400	<i>Zavreliomyia sp</i>	+
11020	<i>Acerpenna pygmaea</i>	+	80351	<i>Corynoneura n.sp 1</i>	+
11115	<i>Baetis tricaudatus</i>	+	81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+
11120	<i>Baetis flavistriga</i>	+	81650	<i>Parametriocnemus sp</i>	+
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	82070	<i>Synorthocladus semivirens</i>	+
11430	<i>Dipheter hageni</i>	+	82141	<i>Thienemanniella xena</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	82200	<i>Tvetenia bavarica group</i>	+
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	82820	<i>Cryptochironomus sp</i>	+
12200	<i>Isonychia sp</i>	+	83840	<i>Microtendipes pedellus group</i>	+
13000	<i>Leucrocuta sp</i>	+	84210	<i>Paratendipes albimanus or P. duplicatus</i>	+
13400	<i>Stenacron sp</i>	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+
13521	<i>Stenonema femoratum</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
14950	<i>Leptophlebia sp or Paraleptophlebia sp</i>	+	85500	<i>Paratanytarsus sp</i>	+
17200	<i>Caenis sp</i>	+	85625	<i>Rheotanytarsus sp</i>	+
18600	<i>Ephemera sp</i>	+	85802	<i>Tanytarsus curticornis</i>	+
21200	<i>Calopteryx sp</i>	+	85840	<i>Tanytarsus sepp</i>	+
23905	<i>Boyeria grafiana</i>	+	87540	<i>Hemerodromia sp</i>	+
25510	<i>Stylogomphus albistylus</i>	+			
27500	<i>Somatochlora sp</i>	+	No. Quantitative Taxa: 0		Total Taxa: 64
33100	<i>Leuctra sp</i>	+	No. Qualitative Taxa: 64		ICI:
34120	<i>Acroneuria carolinensis</i>	+	Number of Organisms: 0		Qual EPT: 30
34130	<i>Acroneuria frisoni</i>	+			
34500	<i>Perlesta placida complex</i>	+			
36500	<i>Sweltsa sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
50410	<i>Dolophilodes distinctus</i>	+			
50804	<i>Lype diversa</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52440	<i>Ceratopsyche slossonae</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
57400	<i>Neophylax sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68130	<i>Helichus sp</i>	+			
68708	<i>Dubiraphia vittata group</i>	+			
69200	<i>Optioservus sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
72340	<i>Dixella sp</i>	+			
74100	<i>Simulium sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/17/2004 River Code: 03-009 RM: 1.70 Site: Mill Creek (Grand R. RM 23.58)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+
03600	<i>Oligochaeta</i>	+	83840	<i>Microtendipes pedellus</i> group	+
08240	<i>Orconectes (Crokerinus) propinquus</i>	+	84420	<i>Polypedilum (P.) n.sp 1</i>	+
11014	<i>Acentrella turbida</i>	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+
11120	<i>Baetis flavistriga</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
11130	<i>Baetis intercalaris</i>	+	85625	<i>Rheotanytarsus sp</i>	+
11430	<i>Diphetor hageni</i>	+	85720	<i>Stempellinella n.sp nr. flavidula</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	85840	<i>Tanytarsus sepp</i>	+
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	86100	<i>Chrysops sp</i>	+
12200	<i>Isonychia sp</i>	+	86401	<i>Atherix lantha</i>	+
13000	<i>Leucrocuta sp</i>	+	96900	<i>Ferrissia sp</i>	+
13400	<i>Stenacron sp</i>	+			
13521	<i>Stenonema femoratum</i>	+	No. Quantitative Taxa: 0		Total Taxa: 55
13530	<i>Maccaffertium ithaca</i>	+	No. Qualitative Taxa: 55		ICI:
13561	<i>Maccaffertium pulchellum</i>	+	Number of Organisms: 0		Qual EPT: 26
17200	<i>Caenis sp</i>	+			
21200	<i>Calopteryx sp</i>	+			
23909	<i>Boyeria vinosa</i>	+			
25510	<i>Stylogomphus albistylus</i>	+			
34120	<i>Acroneuria carolinensis</i>	+			
34140	<i>Acroneuria internata</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
50315	<i>Chimarra obscura</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa</i> group	+			
52440	<i>Ceratopsyche slossonae</i>	+			
52530	<i>Hydropsyche depravata</i> group	+			
52540	<i>Hydropsyche dicantha</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59310	<i>Mystacides sepulchralis</i>	+			
63300	<i>Hydroporus sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
69400	<i>Stenelmis sp</i>	+			
70600	<i>Antocha sp</i>	+			
74100	<i>Simulium sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77500	<i>Conchapelopia sp</i>	+			
77750	<i>Hayesomyia senata</i> or <i>Thienemannimyia norena</i>	+			
77800	<i>Helopelopia sp</i>	+			
80310	<i>Cardiocladius obscurus</i>	+			
80420	<i>Cricotopus (C.) bicinctus</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/09/2004 River Code: 03-010 RM: 0.20 Site: Coffee Creek Lampson Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
08220	<i>Orconectes (Gremicambarus) immunis</i>	+	No. Quantitative Taxa: 0		Total Taxa: 40
13000	<i>Leucrocuta sp</i>	+	No. Qualitative Taxa: 40		ICI:
13400	<i>Stenacron sp</i>	+	Number of Organisms: 0		Qual EPT: 11
13521	<i>Stenonema femoratum</i>	+			
13590	<i>Maccaffertium vicarium</i>	+			
14950	<i>Leptophlebia sp</i> or <i>Paraleptophlebia sp</i>	+			
17200	<i>Caenis sp</i>	+			
21200	<i>Calopteryx sp</i>	+			
23909	<i>Boyeria vinosa</i>	+			
24900	<i>Gomphus sp</i>	+			
47600	<i>Sialis sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50804	<i>Lype diversa</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
60300	<i>Dineutus sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68708	<i>Dubiraphia vittata group</i>	+			
68901	<i>Macronychus glabratus</i>	+			
69400	<i>Stenelmis sp</i>	+			
74100	<i>Simulium sp</i>	+			
77750	<i>Hayesomyia senata</i> or <i>Thienemannimyia norena</i>	+			
77800	<i>Helopelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
80204	<i>Brillia flavifrons group</i>	+			
82121	<i>Thienemanniella lobapodema</i>	+			
82820	<i>Cryptochironomus sp</i>	+			
84155	<i>Paralauterborniella nigrohalteralis</i>	+			
84210	<i>Paratendipes albimanus</i> or <i>P. duplicatus</i>	+			
84315	<i>Phaenopsectra flavipes</i>	+			
84470	<i>Polypedilum (P.) illinoense</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+			
84750	<i>Stictochironomus sp</i>	+			
85500	<i>Paratanytarsus sp</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
95100	<i>Physella sp</i>	+			
96900	<i>Ferrissia sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/10/2004 River Code: 03-041 RM: 1.60 Site: Trib. to Mill Creek (Grand R 23.58/4.34)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	78400	<i>Natarsia sp</i>	+
03600	<i>Oligochaeta</i>	+	79300	<i>Trissopelopia ogemawi</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	80351	<i>Corynoneura n.sp 1</i>	+
08601	<i>Hydrachnidia</i>	+	80410	<i>Cricotopus (C.) sp</i>	+
11014	<i>Acentrella turbida</i>	+	81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+
11115	<i>Baetis tricaudatus</i>	+	82200	<i>Tvetenia bavarica group</i>	+
11120	<i>Baetis flavistriga</i>	+	83840	<i>Microtendipes pedellus group</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	84430	<i>Polypedilum (P.) albicorne</i>	+
13000	<i>Leucrocota sp</i>	+	84480	<i>Polypedilum (P.) laetum group</i>	+
13400	<i>Stenacron sp</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
13521	<i>Stenonema femoratum</i>	+	84750	<i>Stictochironomus sp</i>	+
13555	<i>Maccaffertium modestum</i>	+	85481	<i>Neozavrelia sp 1</i>	+
13590	<i>Maccaffertium vicarium</i>	+	85625	<i>Rheotanytarsus sp</i>	+
15000	<i>Paraleptophlebia sp</i>	+	85802	<i>Tanytarsus curticornis</i>	+
17200	<i>Caenis sp</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	+
21001	<i>Calopterygidae</i>	+	85840	<i>Tanytarsus sepp</i>	+
23905	<i>Boyeria grafiana</i>	+	86100	<i>Chrysops sp</i>	+
25510	<i>Stylogomphus albistylus</i>	+	95100	<i>Physella sp</i>	+
33100	<i>Leuctra sp</i>	+	96900	<i>Ferrissia sp</i>	+
34120	<i>Acroneuria carolinensis</i>	+			
34130	<i>Acroneuria frisoni</i>	+	No. Quantitative Taxa: 0		Total Taxa: 63
47600	<i>Sialis sp</i>	+	No. Qualitative Taxa: 63		ICI:
48620	<i>Nigronia serricornis</i>	+	Number of Organisms: 0		Qual EPT: 25
50301	<i>Chimarra aterrima</i>	+			
50410	<i>Dolophilodes distinctus</i>	+			
50804	<i>Lype diversa</i>	+			
50906	<i>Psychomyia flavida</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52440	<i>Ceratopsyche slossonae</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
57400	<i>Neophylax sp</i>	+			
66200	<i>Cymbiodyta sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
69400	<i>Stenelmis sp</i>	+			
70600	<i>Antocha sp</i>	+			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	+			
74501	<i>Ceratopogonidae</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77500	<i>Conchapelopia sp</i>	+			
77800	<i>Helopelopia sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/23/2003 River Code: 03-100 RM: 16.10 Site: Big Creek dst. Chardon WWTP

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	2 +			
03600	<i>Oligochaeta</i>	146			
04935	<i>Erpobdella punctata punctata</i>	2 +			
06700	<i>Crangonyx sp</i>	1 +			
11120	<i>Baetis flavistriga</i>	25 +			
11130	<i>Baetis intercalaris</i>	+			
13521	<i>Stenonema femoratum</i>	1 +			
21200	<i>Calopteryx sp</i>	+			
22300	<i>Argia sp</i>	2 +			
23909	<i>Boyeria vinosa</i>	+			
24900	<i>Gomphus sp</i>	+			
26100	<i>Cordulegaster sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52530	<i>Hydropsyche depravata group</i>	3 +			
68025	<i>Ectopria sp</i>	+			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	+			
77800	<i>Helopelopia sp</i>	147 +			
78450	<i>Nilotanytus fimbriatus</i>	6			
80370	<i>Corynoneura lobata</i>	8			
80410	<i>Cricotopus (C.) sp</i>	5			
80420	<i>Cricotopus (C.) bicinctus</i>	18			
80430	<i>Cricotopus (C.) tremulus group</i>	5			
80510	<i>Cricotopus (Isocladius) sylvestris group</i>	5			
81040	<i>Limnophyes sp</i>	5			
81631	<i>Parakiefferiella n.sp 1</i>	5			
81825	<i>Rheocricotopus (Psilocricotopus) robacki</i>	23			
82710	<i>Chironomus (C.) sp</i>	5			
83051	<i>Dicrotendipes simpsoni</i>	5			
84430	<i>Polypedilum (P.) albicorne</i>	14			
84470	<i>Polypedilum (P.) illinoense</i>	5			
84520	<i>Polypedilum (Tripodura) halterale group</i>	5			
85821	<i>Tanytarsus glabrescens group sp 7</i>	5			
85840	<i>Tanytarsus sepp</i>	92			
86200	<i>Tabanus sp</i>	+			
87540	<i>Hemerodromia sp</i>	104			
95100	<i>Physella sp</i>	+			
96900	<i>Ferrissia sp</i>	2 +			
98200	<i>Pisidium sp</i>	+			

No. Quantitative Taxa: 27	Total Taxa: 39
No. Qualitative Taxa: 21	ICI: 22
Number of Organisms: 646	Qual EPT: 5

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/23/1903 River Code: 03-100 RM: 16.00 Site: Big Creek dst. Chardon WWTP

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	4	87400	<i>Stratiomys sp</i>	+
01801	<i>Turbellaria</i>	12	87540	<i>Hemerodromia sp</i>	65
01900	<i>Nemertea</i>	53	95100	<i>Physella sp</i>	39 +
03360	<i>Plumatella sp</i>	1 +	96002	<i>Helisoma anceps anceps</i>	1
03600	<i>Oligochaeta</i>	37 +	96900	<i>Ferrissia sp</i>	86 +
06700	<i>Crangonyx sp</i>	+	98200	<i>Pisidium sp</i>	+
08260	<i>Orconectes (Crockerinus) sanbornii sanbornii</i>	+			
11120	<i>Baetis flavistriga</i>	+	No. Quantitative Taxa: 36		Total Taxa: 50
21200	<i>Calopteryx sp</i>	8 +	No. Qualitative Taxa: 29		ICI: 28
22001	<i>Coenagrionidae</i>	1	Number of Organisms: 1104		Qual EPT: 5
22300	<i>Argia sp</i>	18 +			
23600	<i>Aeshna sp</i>	+			
23905	<i>Boyeria grafiana</i>	1 +			
25510	<i>Stylogomphus albistylus</i>	+			
52200	<i>Cheumatopsyche sp</i>	12 +			
52315	<i>Diplectrona modesta</i>	+			
52530	<i>Hydropsyche depravata group</i>	7 +			
53800	<i>Hydroptila sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
71900	<i>Tipula sp</i>	+			
71910	<i>Tipula abdominalis</i>	+			
74100	<i>Simulium sp</i>	8 +			
74501	<i>Ceratopogonidae</i>	4			
77500	<i>Conchapelopia sp</i>	54			
77800	<i>Helopelopia sp</i>	344 +			
78350	<i>Meropelopia sp</i>	18			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	8			
80370	<i>Corynoneura lobata</i>	4			
80410	<i>Cricotopus (C.) sp</i>	62 +			
80420	<i>Cricotopus (C.) bicinctus</i>	23 +			
80430	<i>Cricotopus (C.) tremulus group</i>	62 +			
80440	<i>Cricotopus (C.) trifascia</i>	8			
81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	23			
81825	<i>Rheocricotopus (Psilocricotopus) robacki</i>	8 +			
82070	<i>Synorthocladius semivirens</i>	8			
82141	<i>Thienemanniella xena</i>	+			
83040	<i>Dicrotendipes neomodestus</i>	31			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	8			
84460	<i>Polypedilum (P.) fallax group</i>	8			
84700	<i>Stenochironomus sp</i>	+			
85500	<i>Paratanytarsus sp</i>	31			
85625	<i>Rheotanytarsus sp</i>	15			
85800	<i>Tanytarsus sp</i>	24			
85821	<i>Tanytarsus glabrescens group sp 7</i>	8			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/23/2003 River Code: 03-100 RM: 13.80 Site: Big Creek dst. Woodin Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	13 +	80470	<i>Cricotopus (C.) or Orthocladius (O.) sp</i>	14
01900	<i>Nemertea</i>	5	81650	<i>Parametriocnemus sp</i>	42 +
03360	<i>Plumatella sp</i>	+	81690	<i>Paratrichocladius sp</i>	21
03600	<i>Oligochaeta</i>	12 +	82101	<i>Thienemanniella taurocapita</i>	6
06700	<i>Crangonyx sp</i>	1	82141	<i>Thienemanniella xena</i>	30
08260	<i>Orconectes (Crockerinus) sanbornii sanbornii</i>	+	82200	<i>Tvetenia bavarica group</i>	21
11120	<i>Baetis flavistriga</i>	23 +	82220	<i>Tvetenia discoloripes group</i>	21
11130	<i>Baetis intercalaris</i>	5	82730	<i>Chironomus (C.) decorus group</i>	+
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	83040	<i>Dicrotendipes neomodestus</i>	203
13400	<i>Stenacron sp</i>	2 +	83158	<i>Endochironomus nigricans</i>	7
13521	<i>Stenonema femoratum</i>	17 +	83840	<i>Microtendipes pedellus group</i>	21 +
16200	<i>Eurylophella sp</i>	1	84210	<i>Paratendipes albimanus or P. duplicatus</i>	7
17200	<i>Caenis sp</i>	38 +	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
21200	<i>Calopteryx sp</i>	+	84460	<i>Polypedilum (P.) fallax group</i>	21
22001	<i>Coenagrionidae</i>	+	84470	<i>Polypedilum (P.) illinoense</i>	11
22300	<i>Argia sp</i>	+	85500	<i>Paratanytarsus sp</i>	70
23909	<i>Boyeria vinosa</i>	+	85625	<i>Rheotanytarsus sp</i>	7
24900	<i>Gomphus sp</i>	+	85800	<i>Tanytarsus sp</i>	14
25510	<i>Stylogomphus albistylus</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	42
26100	<i>Cordulegaster sp</i>	+	86100	<i>Chrysops sp</i>	+
42700	<i>Belostoma sp</i>	+	86401	<i>Atherix lantha</i>	+
45300	<i>Sigara sp</i>	+	87540	<i>Hemerodromia sp</i>	5 +
48610	<i>Nigronia fasciatus</i>	+	95100	<i>Physella sp</i>	2
48620	<i>Nigronia serricornis</i>	+	96900	<i>Ferrissia sp</i>	+
50804	<i>Lype diversa</i>	7			
52200	<i>Cheumatopsyche sp</i>	58 +	No. Quantitative Taxa: 43		Total Taxa: 68
52440	<i>Ceratopsyche slossonae</i>	2 +	No. Qualitative Taxa: 39		ICI: 44
52530	<i>Hydropsyche depravata group</i>	5 +	Number of Organisms: 1075		Qual EPT: 9
58505	<i>Helicopsyche borealis</i>	+			
60900	<i>Peltodytes sp</i>	+			
63300	<i>Hydroporus sp</i>	+			
68075	<i>Psephenus herricki</i>	2 +			
69225	<i>Optioservus fastiditus</i>	+			
69400	<i>Stenelmis sp</i>	5 +			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	73			
77120	<i>Ablabesmyia mallochi</i>	7			
77800	<i>Helopelopia sp</i>	35			
78650	<i>Procladius sp</i>	+			
79300	<i>Trissopelopia ogemawi</i>	7			
80351	<i>Corynoneura n.sp 1</i>	4			
80370	<i>Corynoneura lobata</i>	132			
80420	<i>Cricotopus (C.) bicinctus</i>	21			
80430	<i>Cricotopus (C.) tremulus group</i>	35			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/23/2003 River Code: 03-100 RM: 9.50 Site: Big Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	85800	<i>Tanytarsus sp</i>	+
01900	<i>Nemertea</i>	+	86401	<i>Atherix lantha</i>	+
03360	<i>Plumatella sp</i>	+	87400	<i>Stratiomys sp</i>	+
06700	<i>Crangonyx sp</i>	+	95100	<i>Physella sp</i>	+
08260	<i>Orconectes (Crockerinus) sanbornii sanbornii</i>	+	96900	<i>Ferrissia sp</i>	+
11115	<i>Baetis tricaudatus</i>	+			
11120	<i>Baetis flavistriga</i>	+	No. Quantitative Taxa: 0		Total Taxa: 49
11130	<i>Baetis intercalaris</i>	+	No. Qualitative Taxa: 49		ICI:
12200	<i>Isonychia sp</i>	+	Number of Organisms: 0		Qual EPT: 17
13400	<i>Stenacron sp</i>	+			
13521	<i>Stenonema femoratum</i>	+			
13561	<i>Maccaffertium pulchellum</i>	+			
17200	<i>Caenis sp</i>	+			
21200	<i>Calopteryx sp</i>	+			
22001	<i>Coenagrionidae</i>	+			
22300	<i>Argia sp</i>	+			
33100	<i>Leuctra sp</i>	+			
45300	<i>Sigara sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52440	<i>Ceratopsyche slosonae</i>	+			
52450	<i>Ceratopsyche sparna</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
60900	<i>Peltodytes sp</i>	+			
63300	<i>Hydroporus sp</i>	+			
63900	<i>Laccophilus sp</i>	+			
65800	<i>Berosus sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
69250	<i>Optioservus ovalis</i>	+			
69400	<i>Stenelmis sp</i>	+			
71900	<i>Tipula sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77800	<i>Helopelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
81650	<i>Parametriocnemus sp</i>	+			
83040	<i>Dicrotendipes neomodestus</i>	+			
84300	<i>Phaenopsectra obediens group</i>	+			
84750	<i>Stictochironomus sp</i>	+			
85500	<i>Paratanytarsus sp</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/24/2003 River Code: 03-100 RM: 4.80 Site: Big Creek Williams Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	70600	<i>Antocha sp</i>	80
01900	<i>Nemertea</i>	24	71900	<i>Tipula sp</i>	+
03360	<i>Plumatella sp</i>	+	74501	<i>Ceratopogonidae</i>	16
03600	<i>Oligochaeta</i>	8 +	77500	<i>Conchapelopia sp</i>	22 +
05800	<i>Caecidotea sp</i>	+	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	11
06700	<i>Crangonyx sp</i>	+	77800	<i>Helopelopia sp</i>	86 +
08240	<i>Orconectes (Crokerinus) propinquus</i>	+	80351	<i>Corynoneura n.sp 1</i>	56
11014	<i>Acentrella turbida</i>	+	80370	<i>Corynoneura lobata</i>	108
11120	<i>Baetis flavistriga</i>	+	80410	<i>Cricotopus (C.) sp</i>	97
11130	<i>Baetis intercalaris</i>	8 +	80420	<i>Cricotopus (C.) bicinctus</i>	11
12200	<i>Isonychia sp</i>	12 +	81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	11
13000	<i>Leucrocuta sp</i>	31	81650	<i>Parametriocnemus sp</i>	22
13400	<i>Stenacron sp</i>	+	81690	<i>Paratrachocladius sp</i>	22
13521	<i>Stenonema femoratum</i>	+	82101	<i>Thienemanniella taurocapita</i>	88
13561	<i>Maccaffertium pulchellum</i>	5 +	82141	<i>Thienemanniella xena</i>	40
13590	<i>Maccaffertium vicarium</i>	1	82220	<i>Tvetenia discoloripes group</i>	65
17200	<i>Caenis sp</i>	176 +	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	11
18600	<i>Ephemera sp</i>	+	84210	<i>Paratendipes albimanus or P. duplicatus</i>	+
21200	<i>Calopteryx sp</i>	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	22
22001	<i>Coenagrionidae</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	54
25510	<i>Stylogomphus albistylus</i>	+	84750	<i>Stictochironomus sp</i>	11
34120	<i>Acroneuria carolinensis</i>	1	85261	<i>Cladotanytarsus vanderwulpi group Type 1</i>	11
45300	<i>Sigara sp</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	54
48410	<i>Corydalis cornutus</i>	+	85625	<i>Rheotanytarsus sp</i>	258
48620	<i>Nigronia serricornis</i>	+	85800	<i>Tanytarsus sp</i>	43
50301	<i>Chimarra aterrima</i>	1 +	85821	<i>Tanytarsus glabrescens group sp 7</i>	129 +
50315	<i>Chimarra obscura</i>	66 +	85840	<i>Tanytarsus sepp</i>	32
51400	<i>Nyctiophylax sp</i>	+	86401	<i>Atherix lantha</i>	+
51600	<i>Polycentropus sp</i>	+	87540	<i>Hemerodromia sp</i>	184
52200	<i>Cheumatopsyche sp</i>	199 +	95100	<i>Physella sp</i>	+
52430	<i>Ceratopsyche morosa group</i>	187 +	96900	<i>Ferrissia sp</i>	+
52431	<i>Ceratopsyche morosa</i>	19			
52450	<i>Ceratopsyche sparna</i>	31 +			
52530	<i>Hydropsyche depravata group</i>	1			
52540	<i>Hydropsyche dicantha</i>	163 +			
58505	<i>Helicopsyche borealis</i>	8 +	No. Quantitative Taxa: 48		Total Taxa: 75
59310	<i>Mystacides sepulchralis</i>	+	No. Qualitative Taxa: 45		ICI: 50
59510	<i>Oecetis avara</i>	1	Number of Organisms: 2513		Qual EPT: 19
60900	<i>Peltodytes sp</i>	+			
63300	<i>Hydroporus sp</i>	+			
65800	<i>Berosus sp</i>	1 +			
68075	<i>Psephenus herricki</i>	1 +			
68130	<i>Helichus sp</i>	+			
69400	<i>Stenelmis sp</i>	25 +			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/24/2003 River Code: 03-100 RM: 2.70 Site: Big Creek upst. Frys Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	59510	<i>Oecetis avara</i>	+
01900	<i>Nemertea</i>	8	59580	<i>Oecetis persimilis</i>	2
03600	<i>Oligochaeta</i>	24 +	60300	<i>Dineutus sp</i>	+
05800	<i>Caecidotea sp</i>	+	60400	<i>Gyrinus sp</i>	+
05900	<i>Lirceus sp</i>	+	60900	<i>Peltodytes sp</i>	+
06700	<i>Crangonyx sp</i>	+	63300	<i>Hydroporus sp</i>	+
08240	<i>Orconectes (Crokerinus) propinquus</i>	+	65800	<i>Berosus sp</i>	+
11020	<i>Acerpenna pygmaea</i>	4	67800	<i>Tropisternus sp</i>	+
11120	<i>Baetis flavistriga</i>	+	68075	<i>Psephenus herricki</i>	+
11130	<i>Baetis intercalaris</i>	+	68130	<i>Helichus sp</i>	+
12200	<i>Isonychia sp</i>	3 +	69400	<i>Stenelmis sp</i>	+
13000	<i>Leucrocuta sp</i>	14	70600	<i>Antocha sp</i>	12
13400	<i>Stenacron sp</i>	7 +	71800	<i>Pseudolimnophila sp</i>	4
13521	<i>Stenonema femoratum</i>	2 +	71910	<i>Tipula abdominalis</i>	1 +
13561	<i>Maccaffertium pulchellum</i>	7 +	74100	<i>Simulium sp</i>	+
13590	<i>Maccaffertium vicarium</i>	5	74501	<i>Ceratopogonidae</i>	4
15000	<i>Paraleptophlebia sp</i>	2	77120	<i>Ablabesmyia mallochi</i>	11 +
16700	<i>Tricorythodes sp</i>	10 +	77500	<i>Conchapelopia sp</i>	28 +
17200	<i>Caenis sp</i>	96 +	77750	<i>Hayesomyia senata</i> or <i>Thienemannimyia norena</i>	6
18600	<i>Ephemera sp</i>	+	77800	<i>Helopelopia sp</i>	34
21200	<i>Calopteryx sp</i>	+	78450	<i>Nilotanytus fimbriatus</i>	2
22001	<i>Coenagrionidae</i>	+	80351	<i>Corynoneura n.sp 1</i>	32
22300	<i>Argia sp</i>	+	80370	<i>Corynoneura lobata</i>	134
23600	<i>Aeshna sp</i>	+	80410	<i>Cricotopus (C.) sp</i>	11
23909	<i>Boyeria vinosa</i>	+	80420	<i>Cricotopus (C.) bicinctus</i>	6
24900	<i>Gomphus sp</i>	+	81229	<i>Nanocladius (N.) crassicornus</i>	11 +
25510	<i>Stylogomphus albistylus</i>	+	81650	<i>Parametriocnemus sp</i>	6
27500	<i>Somatochlora sp</i>	+	82070	<i>Synorthocladius semivirens</i>	6
34120	<i>Acroneuria carolinensis</i>	1	82101	<i>Thienemanniella taurocapita</i>	40
45300	<i>Sigara sp</i>	+	82141	<i>Thienemanniella xena</i>	12
47600	<i>Sialis sp</i>	+	82820	<i>Cryptochironomus sp</i>	+
48410	<i>Corydalus cornutus</i>	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	11
50301	<i>Chimarra aterrima</i>	2 +	83840	<i>Microtendipes pedellus group</i>	+
50315	<i>Chimarra obscura</i>	2 +	83900	<i>Nilothauma sp</i>	11
51400	<i>Nyctiophylax sp</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	6
51600	<i>Polycentropus sp</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	17
52200	<i>Cheumatopsyche sp</i>	86 +	85625	<i>Rheotanytarsus sp</i>	11
52430	<i>Ceratopsyche morosa group</i>	42 +	85800	<i>Tanytarsus sp</i>	39
52440	<i>Ceratopsyche slossonae</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	95 +
52450	<i>Ceratopsyche sparna</i>	4	85840	<i>Tanytarsus sepp</i>	101
52540	<i>Hydropsyche dicantha</i>	5 +	86401	<i>Atherix lantha</i>	1 +
53501	<i>Hydroptilidae</i>	4	87540	<i>Hemerodromia sp</i>	44
58505	<i>Helicopsyche borealis</i>	1 +	95100	<i>Physella sp</i>	+
59310	<i>Mystacides sepulchralis</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/24/2003 River Code: 03-100 RM: 2.70 Site: Big Creek upst. Frys Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
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No. Quantitative Taxa: 50	Total Taxa: 87
No. Qualitative Taxa: 56	ICI: 54
Number of Organisms: 1027	Qual EPT: 20

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/11/2004 River Code: 03-101 RM: 0.60 Site: Jordan Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
01900	<i>Nemertea</i>	+			
08240	<i>Orconectes (Crockerinus) propinquus</i>	+			
11115	<i>Baetis tricaudatus</i>	+			
11120	<i>Baetis flavistriga</i>	+			
11650	<i>Proclonia sp (w/ hindwing pads)</i>	+			
13000	<i>Leucrocuta sp</i>	+			
13521	<i>Stenonema femoratum</i>	+			
23905	<i>Boyeria grafiana</i>	+			
23909	<i>Boyeria vinosa</i>	+			
25510	<i>Stylogomphus albistylus</i>	+			
47600	<i>Sialis sp</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52440	<i>Ceratopsyche sloossonae</i>	+			
52450	<i>Ceratopsyche sparna</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
53800	<i>Hydroptila sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
68075	<i>Psephenus herricki</i>	+			
69210	<i>Optioservus ampliatus</i>	+			
69400	<i>Stenelmis sp</i>	+			
70700	<i>Dicranota sp</i>	+			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	+			
77800	<i>Helopelopia sp</i>	+			
78350	<i>Meropelopia sp</i>	+			
79720	<i>Diamesa sp</i>	+			
80750	<i>Eukiefferiella devonica group</i>	+			
82710	<i>Chironomus (C.) sp</i>	+			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	+			
84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+			
84700	<i>Stenochironomus sp</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
86401	<i>Atherix lantha</i>	+			
95100	<i>Physella sp</i>	+			
96900	<i>Ferrissia sp</i>	+			

No. Quantitative Taxa: 0 Total Taxa: 41
No. Qualitative Taxa: 41 ICI:
Number of Organisms: 0 Qual EPT: 14

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/18/2004 River Code: 03-102 RM: 1.10 Site: East Creek dst. Callow Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	6 +	79400	<i>Zavreliomyia sp</i>	18 +
05800	<i>Caecidotea sp</i>	+	80370	<i>Corynoneura lobata</i>	60
07860	<i>Cambarus (Puncticambarus) robustus</i>	+	81270	<i>Nanocladius (N.) spinipennis</i>	18
08601	<i>Hydrachnidia</i>	+	81650	<i>Parametriocnemus sp</i>	27
11018	<i>Acerpenna macdunnoughi</i>	12 +	82101	<i>Thienemanniella taurocapita</i>	28
11120	<i>Baetis flavistriga</i>	7 +	82141	<i>Thienemanniella xena</i>	24
11430	<i>Dipheteron hageni</i>	30 +	82820	<i>Cryptochironomus sp</i>	+
11650	<i>Procladius sp (w/ hindwing pads)</i>	28 +	83840	<i>Microtendipes pedellus group</i>	+
13000	<i>Leucrocota sp</i>	9 +	84210	<i>Paratendipes albimanus or P. duplicatus</i>	+
13400	<i>Stenacron sp</i>	2 +	84430	<i>Polypedilum (P.) albicorne</i>	27 +
13521	<i>Stenonema femoratum</i>	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	18
13555	<i>Maccaffertium modestum</i>	29 +	84450	<i>Polypedilum (Uresipedilum) flavum</i>	110 +
15000	<i>Paraleptophlebia sp</i>	6 +	84460	<i>Polypedilum (P.) fallax group</i>	27
16200	<i>Eurylophella sp</i>	10	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	18
17200	<i>Caenis sp</i>	5 +	85261	<i>Cladotanytarsus vanderwulpi group Type 1</i>	+
21200	<i>Calopteryx sp</i>	2 +	85500	<i>Paratanytarsus sp</i>	9
23905	<i>Boyeria grafiana</i>	1 +	85501	<i>Paratanytarsus n.sp 1</i>	9
23909	<i>Boyeria vinosa</i>	1	85615	<i>Rheotanytarsus pellucidus</i>	18
25510	<i>Stylogomphus albistylus</i>	+	85625	<i>Rheotanytarsus sp</i>	311 +
34120	<i>Acroneuria carolinensis</i>	5	85711	<i>Stempellinella poss. leptocelloides</i>	+
34700	<i>Agneta capitata complex</i>	10 +	85752	<i>Sublettea coffmani</i>	27
47600	<i>Sialis sp</i>	+	85800	<i>Tanytarsus sp</i>	9
48620	<i>Nigronia serricornis</i>	+	85802	<i>Tanytarsus curticornis</i>	18
50410	<i>Dolophilodes distinctus</i>	+	85818	<i>Tanytarsus glabrescens group sp 4</i>	+
50804	<i>Lype diversa</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	101 +
51400	<i>Nyctiophylax sp</i>	+	86100	<i>Chrysops sp</i>	+
51600	<i>Polycentropus sp</i>	+	87540	<i>Hemerodromia sp</i>	2
52200	<i>Cheumatopsyche sp</i>	+	95100	<i>Physella sp</i>	7 +
52430	<i>Ceratopsyche morosa group</i>	+	96900	<i>Ferrissia sp</i>	3 +
52440	<i>Ceratopsyche slosonae</i>	+			
52530	<i>Hydropsyche depravata group</i>	+	No. Quantitative Taxa: 43		
56650	<i>Goera stylata</i>	+	Total Taxa: 73		
57400	<i>Neophylax sp</i>	+	No. Qualitative Taxa: 52		
68075	<i>Psephenus herricki</i>	+	ICI: 44		
68707	<i>Dubiraphia quadrinotata</i>	+	Number of Organisms: 1126		
69400	<i>Stenelmis sp</i>	7 +	Qual EPT: 21		
71800	<i>Pseudolimnophila sp</i>	+			
74501	<i>Ceratopogonidae</i>	+			
77120	<i>Ablabesmyia mallochii</i>	+			
77500	<i>Conchapelopia sp</i>	27			
77800	<i>Helopelopia sp</i>	27 +			
78400	<i>Natarsia sp</i>	9			
78450	<i>Nilotanytus fimbriatus</i>	4			
79300	<i>Trissopelopia ogemawi</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/03/2003 River Code: 03-104 RM: 0.10 Site: Jenks Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
11115	<i>Baetis tricaudatus</i>	+			
11120	<i>Baetis flavistriga</i>	+			
11250	<i>Centroptilum</i> sp (w/o hindwing pads)	+			
13400	<i>Stenacron</i> sp	+			
13521	<i>Stenonema femoratum</i>	+			
13590	<i>Maccaffertium vicarium</i>	+			
18600	<i>Ephemera</i> sp	+			
22300	<i>Argia</i> sp	+			
23905	<i>Boyeria grafiana</i>	+			
25510	<i>Stylogomphus albistylus</i>	+			
30000	<i>Plecoptera</i>	+			
50410	<i>Dolophilodes distinctus</i>	+			
51600	<i>Polycentropus</i> sp	+			
52200	<i>Cheumatopsyche</i> sp	+			
52430	<i>Ceratopsyche morosa</i> group	+			
52440	<i>Ceratopsyche slossonae</i>	+			
52530	<i>Hydropsyche depravata</i> group	+			
53501	<i>Hydroptilidae</i>	+			
63300	<i>Hydroporus</i> sp	+			
68075	<i>Psephenus herricki</i>	+			
70600	<i>Antocha</i> sp	+			
71100	<i>Hexatoma</i> sp	+			
71910	<i>Tipula abdominalis</i>	+			
74100	<i>Simulium</i> sp	+			
74501	<i>Ceratopogonidae</i>	+			
77500	<i>Conchapelopia</i> sp	+			
77800	<i>Helopelopia</i> sp	+			
80470	<i>Cricotopus</i> (C.) or <i>Orthocladius</i> (O.) sp	+			
81650	<i>Parametriocnemus</i> sp	+			
82820	<i>Cryptochironomus</i> sp	+			
83820	<i>Microtendipes "caelum"</i> (sensu Simpson & Bode, 1980)	+			
84300	<i>Phaenopsectra obediens</i> group	+			
84315	<i>Phaenopsectra flavipes</i>	+			
84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+			
84460	<i>Polypedilum</i> (P.) <i>fallax</i> group	+			
85261	<i>Cladotanytarsus vanderwulpi</i> group Type 1	+			
95100	<i>Physella</i> sp	+			

No. Quantitative Taxa: 0	Total Taxa: 38
No. Qualitative Taxa: 38	ICI:
Number of Organisms: 0	Qual EPT: 15

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/11/2004 River Code: 03-105 RM: 1.20 Site: Cutts Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	+	85625	<i>Rheotanytarsus sp</i>	+
04664	<i>Helobdella stagnalis</i>	+	85800	<i>Tanytarsus sp</i>	+
04935	<i>Erpobdella punctata punctata</i>	+	95100	<i>Physella sp</i>	+
06201	<i>Hyalella azteca</i>	+	96900	<i>Ferrissia sp</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+			
11120	<i>Baetis flavistriga</i>	+	No. Quantitative Taxa: 0		Total Taxa: 48
11430	<i>Diphetor hageni</i>	+	No. Qualitative Taxa: 48		ICI:
13521	<i>Stenonema femoratum</i>	+	Number of Organisms: 0		Qual EPT: 15
18600	<i>Ephemera sp</i>	+			
21200	<i>Calopteryx sp</i>	+			
22001	<i>Coenagrionidae</i>	+			
23905	<i>Boyeria grafiana</i>	+			
47600	<i>Sialis sp</i>	+			
48610	<i>Nigronia fasciatus</i>	+			
50410	<i>Dolophilodes distinctus</i>	+			
50804	<i>Lype diversa</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52315	<i>Diplectrona modesta</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
57400	<i>Neophylax sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
58020	<i>Lepidostoma sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
68075	<i>Psephenus herricki</i>	+			
68707	<i>Dubiraphia quadrinotata</i>	+			
69200	<i>Optioservus sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
71100	<i>Hexatoma sp</i>	+			
71800	<i>Pseudolimnophila sp</i>	+			
72340	<i>Dixella sp</i>	+			
74100	<i>Simulium sp</i>	+			
74501	<i>Ceratopogonidae</i>	+			
77800	<i>Helopelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
79300	<i>Trissopelopia ogemawi</i>	+			
79400	<i>Zavreliomyia sp</i>	+			
82200	<i>Tvetenia bavarica group</i>	+			
83840	<i>Microtendipes pedellus group</i>	+			
84430	<i>Polypedilum (P.) albicorne</i>	+			
84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+			
84480	<i>Polypedilum (P.) laetum group</i>	+			
84700	<i>Stenochironomus sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/18/2004 River Code: 03-110 RM: 6.10 Site: Paine Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	74501	<i>Ceratopogonidae</i>	+
03600	<i>Oligochaeta</i>	+	77120	<i>Ablabesmyia mallochi</i>	+
07860	<i>Cambarus (Puncticambarus) robustus</i>	+	77500	<i>Conchapelopia sp</i>	+
11014	<i>Acentrella turbida</i>	+	77800	<i>Helopelopia sp</i>	+
11018	<i>Acerpenna macdunnoughi</i>	+	80420	<i>Cricotopus (C.) bicinctus</i>	+
11115	<i>Baetis tricaudatus</i>	+	81650	<i>Parametriocnemus sp</i>	+
11120	<i>Baetis flavistriga</i>	+	82820	<i>Cryptochironomus sp</i>	+
11130	<i>Baetis intercalaris</i>	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	83840	<i>Microtendipes pedellus group</i>	+
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	83900	<i>Nilothauma sp</i>	+
12200	<i>Isonychia sp</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
13000	<i>Leucrocuta sp</i>	+	84470	<i>Polypedilum (P.) illinoense</i>	+
13400	<i>Stenacron sp</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	+
13521	<i>Stenonema femoratum</i>	+	85625	<i>Rheotanytarsus sp</i>	+
13555	<i>Maccaffertium modestum</i>	+	86401	<i>Atherix lantha</i>	+
15000	<i>Paraleptophlebia sp</i>	+	87540	<i>Hemerodromia sp</i>	+
17200	<i>Caenis sp</i>	+	95100	<i>Physella sp</i>	+
18600	<i>Ephemera sp</i>	+	96900	<i>Ferrissia sp</i>	+
21200	<i>Calopteryx sp</i>	+			
23905	<i>Boyeria grafiana</i>	+	No. Quantitative Taxa: 0		Total Taxa: 62
25300	<i>Ophiogomphus sp</i>	+	No. Qualitative Taxa: 62		ICI:
25510	<i>Stylogomphus albistylus</i>	+	Number of Organisms: 0		Qual EPT: 31
34130	<i>Acroneuria frisoni</i>	+			
34300	<i>Neoperla clymene complex</i>	+			
34700	<i>Agnatina capitata complex</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
50410	<i>Dolophilodes distinctus</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52440	<i>Ceratopsyche slossonae</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
52540	<i>Hydropsyche dicantha</i>	+			
53800	<i>Hydroptila sp</i>	+			
54000	<i>Leucotrichia pictipes</i>	+			
58320	<i>Psilotreta indecisa</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
68075	<i>Psephenus herricki</i>	+			
68708	<i>Dubiraphia vittata group</i>	+			
69400	<i>Stenelmis sp</i>	+			
70600	<i>Antocha sp</i>	+			
74100	<i>Simulium sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/18/2004 River Code: 03-110 RM: 0.50 Site: Paine Creek Seeley Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	+	78740	<i>Rheopelopia acra</i>	+
08240	<i>Orconectes (Crokerinus) propinquus</i>	+	82820	<i>Cryptochironomus sp</i>	+
08601	<i>Hydrachnidia</i>	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
11014	<i>Acentrella turbida</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
11018	<i>Acerpenna macdunnoughi</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
11120	<i>Baetis flavistriga</i>	+	85625	<i>Rheotanytarsus sp</i>	+
11130	<i>Baetis intercalaris</i>	+	85840	<i>Tanytarsus sepp</i>	+
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	86401	<i>Atherix lantha</i>	+
12200	<i>Isonychia sp</i>	+	87540	<i>Hemerodromia sp</i>	+
13000	<i>Leucrocuta sp</i>	+	95100	<i>Physella sp</i>	+
13400	<i>Stenacron sp</i>	+			
13540	<i>Maccaffertium mediopunctatum</i>	+			
13555	<i>Maccaffertium modestum</i>	+	No. Quantitative Taxa: 0		Total Taxa: 54
13561	<i>Maccaffertium pulchellum</i>	+	No. Qualitative Taxa: 54		ICI:
13590	<i>Maccaffertium vicarium</i>	+	Number of Organisms: 0		Qual EPT: 26
17200	<i>Caenis sp</i>	+			
18600	<i>Ephemera sp</i>	+			
22300	<i>Argia sp</i>	+			
23600	<i>Aeshna sp</i>	+			
23909	<i>Boyeria vinosa</i>	+			
25510	<i>Stylogomphus albistylus</i>	+			
34120	<i>Acroneuria carolinensis</i>	+			
34130	<i>Acroneuria frisoni</i>	+			
47600	<i>Sialis sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
50315	<i>Chimarra obscura</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
52540	<i>Hydropsyche dicantha</i>	+			
52620	<i>Macrostemum zebratum</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59970	<i>Petrophila sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68700	<i>Dubiraphia sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
74100	<i>Simulium sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77500	<i>Conchapelopia sp</i>	+			
77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	+			
77800	<i>Helopelopia sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/11/2004 River Code: 03-111 RM: 3.30 Site: Bates Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00401	<i>Spongillidae</i>	+	71900	<i>Tipula sp</i>	+
01801	<i>Turbellaria</i>	+	72340	<i>Dixella sp</i>	+
03360	<i>Plumatella sp</i>	+	74100	<i>Simulium sp</i>	+
03600	<i>Oligochaeta</i>	+	77120	<i>Ablabesmyia mallochi</i>	+
04685	<i>Placobdella ornata</i>	+	77500	<i>Conchapelopia sp</i>	+
06201	<i>Hyalella azteca</i>	+	77800	<i>Helopelopia sp</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	78450	<i>Nilotanyus fimbriatus</i>	+
11018	<i>Acerpenna macdunnoughi</i>	+	79400	<i>Zavreliomyia sp</i>	+
11120	<i>Baetis flavistriga</i>	+	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	+
11130	<i>Baetis intercalaris</i>	+	80370	<i>Corynoneura lobata</i>	+
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	80410	<i>Cricotopus (C.) sp</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	81600	<i>Parachaetocladius sp</i>	+
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	81650	<i>Parametriocnemus sp</i>	+
12200	<i>Isonychia sp</i>	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
13000	<i>Leucrocota sp</i>	+	83840	<i>Microtendipes pedellus group</i>	+
13400	<i>Stenacron sp</i>	+	84420	<i>Polypedilum (P.) n.sp 1</i>	+
13521	<i>Stenonema femoratum</i>	+	84460	<i>Polypedilum (P.) fallax group</i>	+
13530	<i>Maccaffertium ithaca</i>	+	84480	<i>Polypedilum (P.) laetum group</i>	+
14950	<i>Leptophlebia sp or Paraleptophlebia sp</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
17200	<i>Caenis sp</i>	+	84700	<i>Stenochironomus sp</i>	+
21200	<i>Calopteryx sp</i>	+	84750	<i>Stictochironomus sp</i>	+
23909	<i>Boyeria vinosa</i>	+	84888	<i>Xenochironomus xenolabis</i>	+
34130	<i>Acroneuria frisoni</i>	+	85625	<i>Rheotanytarsus sp</i>	+
47600	<i>Sialis sp</i>	+	85800	<i>Tanytarsus sp</i>	+
50301	<i>Chimarra aterrima</i>	+	85802	<i>Tanytarsus curticornis</i>	+
50315	<i>Chimarra obscura</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	+
51400	<i>Nyctiophylax sp</i>	+	86100	<i>Chrysops sp</i>	+
51600	<i>Polycentropus sp</i>	+	87540	<i>Hemerodromia sp</i>	+
52200	<i>Cheumatopsyche sp</i>	+	92615	<i>Cipangopaludina japonica</i>	+
52530	<i>Hydropsyche depravata group</i>	+	96900	<i>Ferrissia sp</i>	+
53501	<i>Hydroptilidae</i>	+	98600	<i>Sphaerium sp</i>	+
57400	<i>Neophylax sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
58320	<i>Psilotreta indecisa</i>	+			
58505	<i>Helicopsyche borealis</i>	+	No. Quantitative Taxa: 0		Total Taxa: 75
67000	<i>Helophorus sp</i>	+	No. Qualitative Taxa: 75		ICI:
67700	<i>Paracymus sp</i>	+	Number of Organisms: 0		Qual EPT: 25
68025	<i>Ectopria sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68707	<i>Dubiraphia quadrinotata</i>	+			
68708	<i>Dubiraphia vittata group</i>	+			
69000	<i>Microcylloepus pusillus</i>	+			
69400	<i>Stenelmis sp</i>	+			
71100	<i>Hexatoma sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/10/2004 River Code: 03-113 RM: 0.40 Site: Trib. to Paine Creek (RM 7.17)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01900	<i>Nemertea</i>	+	82300	<i>Xylotopus par</i>	+
03360	<i>Plumatella sp</i>	+	82710	<i>Chironomus (C.) sp</i>	+
03600	<i>Oligochaeta</i>	+	82820	<i>Cryptochironomus sp</i>	+
07860	<i>Cambarus (Puncticambarus) robustus</i>	+	83840	<i>Microtendipes pedellus group</i>	+
11115	<i>Baetis tricaudatus</i>	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+
11120	<i>Baetis flavistriga</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	84460	<i>Polypedilum (P.) fallax group</i>	+
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	85400	<i>Micropsectra sp</i>	+
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	85720	<i>Stempellinella n.sp nr. flavidula</i>	+
12200	<i>Isonychia sp</i>	+	85800	<i>Tanytarsus sp</i>	+
13000	<i>Leucrocuta sp</i>	+	94400	<i>Fossaria sp</i>	+
13521	<i>Stenonema femoratum</i>	+	95100	<i>Physella sp</i>	+
13555	<i>Maccaffertium modestum</i>	+	96900	<i>Ferrissia sp</i>	+
13590	<i>Maccaffertium vicarium</i>	+			
16200	<i>Eurylophella sp</i>	+	No. Quantitative Taxa: 0		Total Taxa: 57
21200	<i>Calopteryx sp</i>	+	No. Qualitative Taxa: 57		ICI:
22300	<i>Argia sp</i>	+	Number of Organisms: 0		Qual EPT: 23
23600	<i>Aeshna sp</i>	+			
25510	<i>Stylogomphus albistylus</i>	+			
33100	<i>Leuctra sp</i>	+			
34120	<i>Acroneuria carolinensis</i>	+			
44501	<i>Corixidae</i>	+			
47600	<i>Sialis sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
50410	<i>Dolophilodes distinctus</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52440	<i>Ceratopsyche slosonae</i>	+			
53300	<i>Glossosoma sp</i>	+			
57400	<i>Neophylax sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59310	<i>Mystacides sepulchralis</i>	+			
68075	<i>Psephenus herricki</i>	+			
68901	<i>Macronychus glabratus</i>	+			
70600	<i>Antocha sp</i>	+			
70700	<i>Dicranota sp</i>	+			
71100	<i>Hexatoma sp</i>	+			
71800	<i>Pseudolimnophila sp</i>	+			
74100	<i>Simulium sp</i>	+			
74501	<i>Ceratopogonidae</i>	+			
77800	<i>Helopelopia sp</i>	+			
81650	<i>Parametriocnemus sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section

Macroinvertebrate Collection

Collection Date: 08/16/2004 River Code: 03-120 RM: 17.80 Site: Mill Creek (Grand R. RM 41.28) Netcher Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00401	<i>Spongillidae</i>	+	77120	<i>Ablabesmyia mallochi</i>	+
01801	<i>Turbellaria</i>	100 +	77500	<i>Conchapelopia sp</i>	62 +
03360	<i>Plumatella sp</i>	+	77800	<i>Helopelopia sp</i>	+
03600	<i>Oligochaeta</i>	32 +	78140	<i>Labrundinia pilosella</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	78400	<i>Natarsia sp</i>	+
08601	<i>Hydrachnidia</i>	16 +	78450	<i>Nilotanypus fimbriatus</i>	62
11020	<i>Acerpenna pygmaea</i>	594 +	80204	<i>Brillia flavifrons group</i>	+
11120	<i>Baetis flavistriga</i>	263 +	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	16
11130	<i>Baetis intercalaris</i>	690 +	80370	<i>Corynoneura lobata</i>	16
11150	<i>Pseudocloeon propinquum</i>	+	81825	<i>Rheocricotopus (Psilocricotopus) robacki</i>	31
11650	<i>Procloeon sp (w/ hindwing pads)</i>	+	82820	<i>Cryptochironomus sp</i>	+
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	83040	<i>Dicrotendipes neomodestus</i>	+
12200	<i>Isonychia sp</i>	29 +	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
13400	<i>Stenacron sp</i>	21 +	83840	<i>Microtendipes pedellus group</i>	31 +
13521	<i>Stenonema femoratum</i>	3 +	84450	<i>Polypedilum (Uresipedilum) flavum</i>	154 +
13561	<i>Maccaffertium pulchellum</i>	29 +	84460	<i>Polypedilum (P.) fallax group</i>	31 +
17200	<i>Caenis sp</i>	+	84475	<i>Polypedilum (P.) ophioides</i>	+
21200	<i>Calopteryx sp</i>	+	84490	<i>Polypedilum (Cerobregma) ontario</i>	92
22001	<i>Coenagrionidae</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
22300	<i>Argia sp</i>	+	84700	<i>Stenochironomus sp</i>	+
23909	<i>Boyeria vinosa</i>	+	84888	<i>Xenochironomus xenolabis</i>	+
34130	<i>Acroneuria frisoni</i>	11 +	85400	<i>Micropsectra sp</i>	+
47600	<i>Sialis sp</i>	+	85625	<i>Rheotanytarsus sp</i>	1846 +
50315	<i>Chimarra obscura</i>	592 +	85720	<i>Stempellinella n.sp nr. flavidula</i>	31
51400	<i>Nyctiophylax sp</i>	+	85800	<i>Tanytarsus sp</i>	+
51600	<i>Polycentropus sp</i>	+	85802	<i>Tanytarsus curticornis</i>	31
52200	<i>Cheumatopsyche sp</i>	640 +	85821	<i>Tanytarsus glabrescens group sp 7</i>	31 +
52430	<i>Ceratopsyche morosa group</i>	5 +	85840	<i>Tanytarsus sepp</i>	+
52530	<i>Hydropsyche depravata group</i>	79 +	86401	<i>Atherix lantha</i>	+
57400	<i>Neophylax sp</i>	+	87540	<i>Hemerodromia sp</i>	48 +
58505	<i>Helicopsyche borealis</i>	+	95100	<i>Physella sp</i>	+
59110	<i>Ceraclea ancylus</i>	+	96900	<i>Ferrissia sp</i>	+
59970	<i>Petrophila sp</i>	+	98600	<i>Sphaerium sp</i>	+
60400	<i>Gyrinus sp</i>	+	99180	<i>Strophitus undulatus undulatus</i>	+
63300	<i>Hydroporus sp</i>	+	99280	<i>Lasmigona costata</i>	+
68075	<i>Psephenus herricki</i>	4 +	99540	<i>Elliptio dilatata</i>	+
68601	<i>Ancyronyx variegata</i>	+	99860	<i>Lampsilis radiata luteola</i>	+
68708	<i>Dubiraphia vittata group</i>	+			
68901	<i>Macronychus glabratus</i>	8			
69210	<i>Optioservus ampliatus</i>	+			
69400	<i>Stenelmis sp</i>	290 +	No. Quantitative Taxa: 33		Total Taxa: 81
71100	<i>Hexatoma sp</i>	+	No. Qualitative Taxa: 73		ICI: 52
74100	<i>Simulium sp</i>	16 +	Number of Organisms: 5904		Qual EPT: 21
74501	<i>Ceratopogonidae</i>	+			

Ohio EPA/DSW Ecological Assessment Section Macroinvertebrate Collection

Collection Date: 08/16/2004 River Code: 03-120 RM: 9.70 Site: Mill Creek (Grand R. RM 41.28)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
00700	<i>Radiospongilla crateriformis</i>	+	68708	<i>Dubiraphia vittata</i> group	+
01801	<i>Turbellaria</i>	+	68901	<i>Macronychus glabratus</i>	+
03040	<i>Fredericella</i> sp	+	69210	<i>Optioservus ampliatus</i>	+
03600	<i>Oligochaeta</i>	+	69400	<i>Stenelmis</i> sp	+
04661	<i>Helobdella elongata</i>	+	71100	<i>Hexatoma</i> sp	+
06201	<i>Hyaella azteca</i>	+	74501	<i>Ceratopogonidae</i>	+
07860	<i>Cambarus (Puncticambarus) robustus</i>	+	77120	<i>Ablabesmyia mallochi</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	77500	<i>Conchapelopia</i> sp	+
08601	<i>Hydrachnidia</i>	+	77800	<i>Helopelopia</i> sp	+
11020	<i>Acerpenna pygmaea</i>	+	78140	<i>Labrundinia pilosella</i>	+
11125	<i>Pseudocloeon frondale</i>	+	78400	<i>Natarsia</i> sp	+
11130	<i>Baetis intercalaris</i>	+	80410	<i>Cricotopus (C.)</i> sp	+
11650	<i>Procloeon</i> sp (w/ hindwing pads)	+	83040	<i>Dicrotendipes neomodestus</i>	+
11651	<i>Procloeon</i> sp (w/o hindwing pads)	+	83820	<i>Microtendipes "caelum"</i> (sensu Simpson & Bode, 1980)	+
12200	<i>Isonychia</i> sp	+	83840	<i>Microtendipes pedellus</i> group	+
13000	<i>Leucrocuta</i> sp	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
13400	<i>Stenacron</i> sp	+	84460	<i>Polypedilum (P.) fallax</i> group	+
13521	<i>Stenonema femoratum</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum</i> group	+
13561	<i>Maccaffertium pulchellum</i>	+	84700	<i>Stenochironomus</i> sp	+
14600	<i>Choroterpes</i> sp	+	85625	<i>Rheotanytarsus</i> sp	+
17200	<i>Caenis</i> sp	+	85800	<i>Tanytarsus</i> sp	+
21200	<i>Calopteryx</i> sp	+	95100	<i>Physella</i> sp	+
23909	<i>Boyeria vinosa</i>	+	96900	<i>Ferrissia</i> sp	+
34130	<i>Acroneuria frisoni</i>	+	98600	<i>Sphaerium</i> sp	+
47600	<i>Sialis</i> sp	+	99100	<i>Pyganodon grandis</i>	+
48620	<i>Nigronia serricornis</i>	+	99280	<i>Lasmigona costata</i>	+
50315	<i>Chimarra obscura</i>	+	99440	<i>Fusconaia flava</i>	+
51400	<i>Nyctiophylax</i> sp	+	99540	<i>Elliptio dilatata</i>	+
51600	<i>Polycentropus</i> sp	+	99860	<i>Lampsilis radiata luteola</i>	+
52200	<i>Cheumatopsyche</i> sp	+			
52430	<i>Ceratopsyche morosa</i> group	+			
52530	<i>Hydropsyche depravata</i> group	+	No. Quantitative Taxa: 0	Total Taxa: 73	
57400	<i>Neophylax</i> sp	+	No. Qualitative Taxa: 73	ICI:	
57900	<i>Pycnopsyche</i> sp	+	Number of Organisms: 0	Qual EPT: 25	
58505	<i>Helicopsyche borealis</i>	+			
59110	<i>Ceraclea ancylus</i>	+			
59120	<i>Ceraclea flava</i> complex	+			
59150	<i>Ceraclea resurgens</i> group	+			
59970	<i>Petrophila</i> sp	+			
60300	<i>Dineutus</i> sp	+			
63300	<i>Hydroporus</i> sp	+			
68025	<i>Ectopria</i> sp	+			
68075	<i>Psephenus herricki</i>	+			
68601	<i>Ancyronyx variegata</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/16/2004 River Code: 03-120 RM: 3.20 Site: Mill Creek (Grand R. RM 41.28)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01900	<i>Nemertea</i>	+	80310	<i>Cardiocladius obscurus</i>	+
03600	<i>Oligochaeta</i>	+	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	+
07860	<i>Cambarus (Puncticambarus) robustus</i>	+	80370	<i>Corynoneura lobata</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	80648	<i>Epoicocladius flavens</i>	+
11014	<i>Acentrella turbida</i>	+	82220	<i>Tvetenia discoloripes group</i>	+
11020	<i>Acerpenna pygmaea</i>	+	82820	<i>Cryptochironomus sp</i>	+
11120	<i>Baetis flavistriga</i>	+	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	+
11130	<i>Baetis intercalaris</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	+
11650	<i>Procladius sp (w/ hindwing pads)</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
11651	<i>Procladius sp (w/o hindwing pads)</i>	+	84700	<i>Stenochironomus sp</i>	+
12200	<i>Isonychia sp</i>	+	85264	<i>Cladotanytarsus vanderwulpi group Type 4</i>	+
13100	<i>Nixia sp</i>	+	85625	<i>Rheotanytarsus sp</i>	+
13400	<i>Stenacron sp</i>	+	85800	<i>Tanytarsus sp</i>	+
13521	<i>Stenonema femoratum</i>	+	95100	<i>Physella sp</i>	+
13561	<i>Maccaffertium pulchellum</i>	+	96900	<i>Ferrissia sp</i>	+
16324	<i>Serratella deficiens</i>	+	99280	<i>Lasmigona costata</i>	+
16700	<i>Tricorythodes sp</i>	+	99560	<i>Ptychobranchus fasciolaris</i>	+
17200	<i>Caenis sp</i>	+	99860	<i>Lampsilis radiata luteola</i>	+
18600	<i>Ephemera sp</i>	+	99880	<i>Lampsilis cardium</i>	+
18700	<i>Hexagenia sp</i>	+			
21200	<i>Calopteryx sp</i>	+			
22300	<i>Argia sp</i>	+			
23909	<i>Boyeria vinosa</i>	+	No. Quantitative Taxa: 0		Total Taxa: 63
24710	<i>Dromogomphus spinosus</i>	+	No. Qualitative Taxa: 63		ICI:
34130	<i>Acroneuria frisoni</i>	+	Number of Organisms: 0		Qual EPT: 23
47600	<i>Sialis sp</i>	+			
50315	<i>Chimarra obscura</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52430	<i>Ceratopsyche morosa group</i>	+			
52540	<i>Hydropsyche dicantha</i>	+			
57400	<i>Neophylax sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59970	<i>Petrophila sp</i>	+			
60300	<i>Dineutus sp</i>	+			
68025	<i>Ectopria sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68901	<i>Macronychus glabratus</i>	+			
69400	<i>Stenelmis sp</i>	+			
71100	<i>Hexatoma sp</i>	+			
74100	<i>Simulium sp</i>	+			
77115	<i>Ablabesmyia janta</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77800	<i>Helopelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/22/2003 River Code: 03-120 RM: 25.70 Site: Mill Creek (Grand R. RM 41.28) Clay Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	32	85500	<i>Paratanytarsus sp</i>	59 +
01801	<i>Turbellaria</i>	151 +	85625	<i>Rheotanytarsus sp</i>	74
03600	<i>Oligochaeta</i>	457 +	85800	<i>Tanytarsus sp</i>	15 +
04935	<i>Erpobdella punctata punctata</i>	+	85802	<i>Tanytarsus curticornis</i>	104
05800	<i>Caecidotea sp</i>	4 +	85821	<i>Tanytarsus glabrescens group sp 7</i>	149
06201	<i>Hyaella azteca</i>	9 +	87540	<i>Hemerodromia sp</i>	88
06700	<i>Crangonyx sp</i>	196 +	96200	<i>Planorbella sp</i>	1
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	96900	<i>Ferrissia sp</i>	8
11020	<i>Acerpenna pygmaea</i>	+	96930	<i>Laevapex fuscus</i>	8 +
11130	<i>Baetis intercalaris</i>	+	98600	<i>Sphaerium sp</i>	+
13400	<i>Stenacron sp</i>	4 +			
13521	<i>Stenonema femoratum</i>	10 +	No. Quantitative Taxa: 35		Total Taxa: 53
22001	<i>Coenagrionidae</i>	1 +	No. Qualitative Taxa: 36		ICI: 24
44501	<i>Corixidae</i>	+	Number of Organisms: 2182		Qual EPT: 6
47600	<i>Sialis sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	8 +			
53501	<i>Hydroptilidae</i>	+			
59580	<i>Oecetis persimilis</i>	4			
60900	<i>Peltodytes sp</i>	+			
63300	<i>Hydroporus sp</i>	+			
68700	<i>Dubiraphia sp</i>	+			
71910	<i>Tipula abdominalis</i>	+			
74100	<i>Simulium sp</i>	1 +			
77120	<i>Ablabesmyia mallochi</i>	15			
77500	<i>Conchapelopia sp</i>	30 +			
77750	<i>Hayesomyia senata</i> or <i>Thienemannimyia norena</i>	89			
77800	<i>Helopelopia sp</i>	15			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
80350	<i>Corynoneura sp</i>	16			
80370	<i>Corynoneura lobata</i>	40			
80420	<i>Cricotopus (C.) bicinctus</i>	+			
80427	<i>Cricotopus (C.) politus</i>	+			
81259	<i>Nanocladius (N.) "rectinervis" (sensu Simpson and Bode, 1980)</i>	134			
81631	<i>Parakiefferiella n.sp 1</i>	59 +			
81650	<i>Parametriocnemus sp</i>	59 +			
83040	<i>Dicrotendipes neomodestus</i>	+			
83051	<i>Dicrotendipes simpsoni</i>	193 +			
83300	<i>Glyptotendipes (G.) sp</i>	15			
83840	<i>Microtendipes pedellus group</i>	104 +			
83900	<i>Nilothauma sp</i>	15			
84315	<i>Phaenopsectra flavipes</i>	+			
84470	<i>Polypedilum (P.) illinoense</i>	+			
85400	<i>Micropsectra sp</i>	15			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/22/2003 River Code: 03-120 RM: 9.80 Site: Mill Creek (Grand R. RM 41.28)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	+			
06201	<i>Hyalella azteca</i>	+			
07860	<i>Cambarus (Puncticambarus) robustus</i>	+			
08200	<i>Orconectes sp</i>	+			
11014	<i>Acentrella turbida</i>	+			
11120	<i>Baetis flavistriga</i>	+			
11130	<i>Baetis intercalaris</i>	+			
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+			
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+			
12200	<i>Isonychia sp</i>	+			
13400	<i>Stenacron sp</i>	+			
13521	<i>Stenonema femoratum</i>	+			
15000	<i>Paraleptophlebia sp</i>	+			
16200	<i>Eurylophella sp</i>	+			
22001	<i>Coenagrionidae</i>	+			
24107	<i>Nasiaeschna pentacantha</i>	+			
34100	<i>Acroneuria sp</i>	+			
45900	<i>Notonecta sp</i>	+			
47600	<i>Sialis sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50315	<i>Chimarra obscura</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59120	<i>Ceraclea flava complex</i>	+			
59970	<i>Petrophila sp</i>	+			
60300	<i>Dineutus sp</i>	+			
60900	<i>Peltodytes sp</i>	+			
63300	<i>Hydroporus sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68130	<i>Helichus sp</i>	+			
69200	<i>Optioservus sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	+			
80410	<i>Cricotopus (C.) sp</i>	+			
84470	<i>Polypedilum (P.) illinoense</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
85821	<i>Tanytarsus glabrescens group sp 7</i>	+			
95100	<i>Physella sp</i>	+			
98200	<i>Pisidium sp</i>	+			

No. Quantitative Taxa: 0 Total Taxa: 42
No. Qualitative Taxa: 42 ICI:
Number of Organisms: 0 Qual EPT: 17

Ohio EPA/DSW Ecological Assessment Section Macroinvertebrate Collection

Collection Date: 10/07/2003 River Code: 03-120 RM: 7.20

Site: Mill Creek (Grand R. RM 41.28) dst. Cemetery

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	40	68901	<i>Macronychus glabratus</i>	4 +
01801	<i>Turbellaria</i>	9 +	69400	<i>Stenelmis sp</i>	2 +
03040	<i>Fredericella sp</i>	+	70600	<i>Antocha sp</i>	+
03121	<i>Paludicella articulata</i>	+	71910	<i>Tipula abdominalis</i>	+
03600	<i>Oligochaeta</i>	4 +	74100	<i>Simulium sp</i>	134 +
04935	<i>Erpobdella punctata punctata</i>	+	77500	<i>Conchapelopia sp</i>	17
04960	<i>Mooreobdella sp</i>	+	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	17
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	77800	<i>Helopelopia sp</i>	+
08601	<i>Hydrachnidia</i>	28 +	80350	<i>Corynoneura sp</i>	8
11020	<i>Acerpenna pygmaea</i>	8 +	80351	<i>Corynoneura n.sp 1</i>	12
11125	<i>Pseudocloeon frondale</i>	+	80370	<i>Corynoneura lobata</i>	16
11130	<i>Baetis intercalaris</i>	1 +	80420	<i>Cricotopus (C.) bicinctus</i>	34 +
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	80425	<i>Cricotopus (C.) luciae</i>	+
12200	<i>Isonychia sp</i>	+	80430	<i>Cricotopus (C.) tremulus group</i>	17
13000	<i>Leucrocuta sp</i>	+	80440	<i>Cricotopus (C.) trifascia</i>	+
13400	<i>Stenacron sp</i>	6 +	80720	<i>Eukiefferiella brevicar group</i>	17 +
13521	<i>Stenonema femoratum</i>	+	81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	+
13561	<i>Maccaffertium pulchellum</i>	88 +	81650	<i>Parametriocnemus sp</i>	+
15000	<i>Paraleptophlebia sp</i>	+	82070	<i>Synorthocladius semivirens</i>	84
17200	<i>Caenis sp</i>	+	82101	<i>Thienemanniella taurocapita</i>	76
21200	<i>Calopteryx sp</i>	+	82121	<i>Thienemanniella lobapodema</i>	12
22001	<i>Coenagrionidae</i>	+	82141	<i>Thienemanniella xena</i>	4
22300	<i>Argia sp</i>	3 +	83040	<i>Dicrotendipes neomodestus</i>	34
34130	<i>Acroneuria frisoni</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	84
45300	<i>Sigara sp</i>	+	84470	<i>Polypedilum (P.) illinoense</i>	+
47600	<i>Sialis sp</i>	+	84700	<i>Stenochironomus sp</i>	+
49400	<i>Sisyra sp</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	34
50315	<i>Chimarra obscura</i>	3 +	85625	<i>Rheotanytarsus sp</i>	788 +
51600	<i>Polycentropus sp</i>	1 +	87510	<i>Chelifera sp</i>	4
52200	<i>Cheumatopsyche sp</i>	233 +	87540	<i>Hemerodromia sp</i>	52 +
52430	<i>Ceratopsyche morosa group</i>	18 +	94400	<i>Fossaria sp</i>	+
52530	<i>Hydropsyche depravata group</i>	3	95100	<i>Physella sp</i>	+
52540	<i>Hydropsyche dicantha</i>	20 +	96900	<i>Ferrissia sp</i>	14 +
53501	<i>Hydroptilidae</i>	+	98200	<i>Pisidium sp</i>	+
55300	<i>Ptilostomis sp</i>	+	98600	<i>Sphaerium sp</i>	+
57400	<i>Neophylax sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
59120	<i>Ceraclea flava complex</i>	+	No. Quantitative Taxa: 38	Total Taxa: 79	
59970	<i>Petrophila sp</i>	+	No. Qualitative Taxa: 63	ICI: 46	
60300	<i>Dineutus sp</i>	+	Number of Organisms: 1937	Qual EPT: 23	
63300	<i>Hydroporus sp</i>	+			
68025	<i>Ectopria sp</i>	+			
68075	<i>Psephenus herricki</i>	8 +			

Ohio EPA/DSW Ecological Assessment Section

Macroinvertebrate Collection

Collection Date: 10/08/2003 River Code: 03-120 RM: 2.90 Site: Mill Creek (Grand R. RM 41.28)

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01320	<i>Hydra sp</i>	32	63300	<i>Hydroporus sp</i>	+
01801	<i>Turbellaria</i>	+	63900	<i>Laccophilus sp</i>	+
01900	<i>Nemertea</i>	8	65800	<i>Berosus sp</i>	+
03360	<i>Plumatella sp</i>	+	68025	<i>Ectopria sp</i>	+
03600	<i>Oligochaeta</i>	72	68075	<i>Psephenus herricki</i>	5
08601	<i>Hydrachnidia</i>	64	68601	<i>Ancyronyx variegata</i>	2
11020	<i>Acerpenna pygmaea</i>	64	68708	<i>Dubiraphia vittata group</i>	16
11120	<i>Baetis flavistriga</i>	7	68901	<i>Macronychus glabratus</i>	10
11130	<i>Baetis intercalaris</i>	29	69400	<i>Stenelmis sp</i>	61
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+	70600	<i>Antocha sp</i>	9
11651	<i>Procloeon sp (w/o hindwing pads)</i>	+	71100	<i>Hexatoma sp</i>	+
12200	<i>Isonychia sp</i>	6	71910	<i>Tipula abdominalis</i>	2
13400	<i>Stenacron sp</i>	31	74100	<i>Simulium sp</i>	4
13521	<i>Stenonema femoratum</i>	41	77750	<i>Hayesomyia senata or Thienemannimyia norena</i>	72
13561	<i>Maccaffertium pulchellum</i>	175	77800	<i>Helopelopia sp</i>	36
14900	<i>Leptophlebia sp</i>	11	80360	<i>Corynoneura "celeripes" (sensu Simpson & Bode, 1980)</i>	40
16200	<i>Eurylophella sp</i>	+	80370	<i>Corynoneura lobata</i>	216
16324	<i>Serratella deficiens</i>	123	80420	<i>Cricotopus (C.) bicinctus</i>	+
16700	<i>Tricorythodes sp</i>	1	82070	<i>Synorthocladus semivirens</i>	36
17200	<i>Caenis sp</i>	75	82101	<i>Thienemanniella taurocapita</i>	40
18600	<i>Ephemera sp</i>	+	82121	<i>Thienemanniella lobapodema</i>	8
21200	<i>Calopteryx sp</i>	+	83300	<i>Glyptotendipes (G.) sp</i>	+
22001	<i>Coenagrionidae</i>	+	83590	<i>Kiefferulus sp</i>	18
22300	<i>Argia sp</i>	10	83820	<i>Microtendipes "caelum" (sensu Simpson & Bode, 1980)</i>	108
23804	<i>Basiaeschna janata</i>	+	83840	<i>Microtendipes pedellus group</i>	54
25010	<i>Hagenius brevistylus</i>	+	84315	<i>Phaenopsectra flavipes</i>	+
34130	<i>Acroneuria frisoni</i>	8	84450	<i>Polypedilum (Uresipedilum) flavum</i>	18
45300	<i>Sigara sp</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	18
47600	<i>Sialis sp</i>	+	84960	<i>Pseudochironomus sp</i>	+
48410	<i>Corydalus cornutus</i>	+	85500	<i>Paratanytarsus sp</i>	18
50315	<i>Chimarra obscura</i>	4	85625	<i>Rheotanytarsus sp</i>	666
51400	<i>Nyctiophylax sp</i>	1	85821	<i>Tanytarsus glabrescens group sp 7</i>	18
51600	<i>Polycentropus sp</i>	1	85840	<i>Tanytarsus sepp</i>	18
52200	<i>Cheumatopsyche sp</i>	213	86401	<i>Atherix lantha</i>	+
52430	<i>Ceratopsyche morosa group</i>	46	87540	<i>Hemerodromia sp</i>	112
52540	<i>Hydropsyche dicantha</i>	11	95100	<i>Physella sp</i>	1
55300	<i>Ptilostomis sp</i>	+	96900	<i>Ferrissia sp</i>	33
57200	<i>Limnephilus sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
58505	<i>Helicopsyche borealis</i>	9			
59510	<i>Oecetis avara</i>	24			
59970	<i>Petrophila sp</i>	10			
60300	<i>Dineutus sp</i>	+			
60900	<i>Peltodytes sp</i>	+			

No. Quantitative Taxa: 53 Total Taxa: 81
No. Qualitative Taxa: 54 ICI: 52
Number of Organisms: 2715 QualEPT: 22

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 10/07/2003 River Code: 03-121 RM: 3.50 Site: Griggs Creek Brown Rd.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03040	<i>Fredericella sp</i>	+	83040	<i>Dicrotendipes neomodestus</i>	2
03360	<i>Plumatella sp</i>	+	83051	<i>Dicrotendipes simpsoni</i>	2 +
03600	<i>Oligochaeta</i>	3 +	83300	<i>Glyptotendipes (G.) sp</i>	+
05800	<i>Caecidotea sp</i>	+	83840	<i>Microtendipes pedellus group</i>	2
06201	<i>Hyalella azteca</i>	+	84450	<i>Polypedilum (Uresipedilum) flavum</i>	2
08200	<i>Orconectes sp</i>	+	84460	<i>Polypedilum (P.) fallax group</i>	7
11130	<i>Baetis intercalaris</i>	+	84470	<i>Polypedilum (P.) illinoense</i>	2 +
13400	<i>Stenacron sp</i>	20 +	84700	<i>Stenochironomus sp</i>	2
13521	<i>Stenonema femoratum</i>	37 +	84750	<i>Stictochironomus sp</i>	+
15000	<i>Paraleptophlebia sp</i>	3 +	85615	<i>Rheotanytarsus pellucidus</i>	2 +
17200	<i>Caenis sp</i>	+	85625	<i>Rheotanytarsus sp</i>	22
22001	<i>Coenagrionidae</i>	+	87540	<i>Hemerodromia sp</i>	3 +
27500	<i>Somatochlora sp</i>	+	95100	<i>Physella sp</i>	2 +
30000	<i>Plecoptera</i>	1	96002	<i>Helisoma anceps anceps</i>	1 +
42700	<i>Belostoma sp</i>	+	96264	<i>Planorbella (Pierosoma) pilsbryi</i>	+
45100	<i>Palmacorixa sp</i>	+	96900	<i>Ferrissia sp</i>	134 +
45300	<i>Sigara sp</i>	+	98600	<i>Sphaerium sp</i>	+
45900	<i>Notonecta sp</i>	+			
47600	<i>Sialis sp</i>	+	No. Quantitative Taxa: 28		Total Taxa: 61
50315	<i>Chimarra obscura</i>	+	No. Qualitative Taxa: 48		ICI: 30
51100	<i>poss. Cernotina sp or Polycentropus sp</i>	+	Number of Organisms: 421		Qual EPT: 12
52200	<i>Cheumatopsyche sp</i>	17 +			
52530	<i>Hydropsyche depravata group</i>	+			
55300	<i>Ptilostomis sp</i>	+			
57200	<i>Limnephilus sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
60400	<i>Gyrinus sp</i>	+			
60900	<i>Peltodytes sp</i>	+			
63300	<i>Hydroporus sp</i>	+			
63700	<i>Ilybius sp</i>	+			
67800	<i>Tropisternus sp</i>	+			
69400	<i>Stenelmis sp</i>	1 +			
71900	<i>Tipula sp</i>	1 +			
71910	<i>Tipula abdominalis</i>	+			
74100	<i>Simulium sp</i>	35 +			
77500	<i>Conchapelopia sp</i>	+			
79400	<i>Zavrelimyia sp</i>	+			
80351	<i>Corynoneura n.sp 1</i>	2			
80370	<i>Corynoneura lobata</i>	1			
80420	<i>Cricotopus (C.) bicinctus</i>	11			
80720	<i>Eukiefferiella brevicar group</i>	102			
81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	2			
81465	<i>Orthocladius (O.) carlatus</i>	2			
81650	<i>Parametriocnemus sp</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/09/2004 River Code: 03-122 RM: 0.10 Site: Askue Run

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+	82820	<i>Cryptochironomus sp</i>	+
03360	<i>Plumatella sp</i>	+	83051	<i>Dicrotendipes simpsoni</i>	+
03600	<i>Oligochaeta</i>	+	83158	<i>Endochironomus nigricans</i>	+
04664	<i>Helobdella stagnalis</i>	+	83300	<i>Glyptotendipes (G.) sp</i>	+
06201	<i>Hyaella azteca</i>	+	83840	<i>Microtendipes pedellus group</i>	+
06700	<i>Crangonyx sp</i>	+	84040	<i>Parachironomus frequens</i>	+
08240	<i>Orconectes (Crockerinus) propinquus</i>	+	84210	<i>Paratendipes albimanus or P. duplicatus</i>	+
11020	<i>Acerpenna pygmaea</i>	+	84469	<i>Polypedilum (P.) illinoense group</i>	+
11120	<i>Baetis flavistriga</i>	+	84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+
11130	<i>Baetis intercalaris</i>	+	84700	<i>Stenochironomus sp</i>	+
11651	<i>Proclonia sp (w/o hindwing pads)</i>	+	85400	<i>Micropsectra sp</i>	+
12200	<i>Isonychia sp</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	+
13400	<i>Stenacron sp</i>	+	85625	<i>Rheotanytarsus sp</i>	+
13521	<i>Stenonema femoratum</i>	+	85800	<i>Tanytarsus sp</i>	+
14950	<i>Leptophlebia sp or Paraleptophlebia sp</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	+
17200	<i>Caenis sp</i>	+	85840	<i>Tanytarsus sepp</i>	+
21200	<i>Calopteryx sp</i>	+	87540	<i>Hemerodromia sp</i>	+
22001	<i>Coenagrionidae</i>	+	95100	<i>Physella sp</i>	+
22300	<i>Argia sp</i>	+	96900	<i>Ferrissia sp</i>	+
34130	<i>Acroneuria frisoni</i>	+	98600	<i>Sphaerium sp</i>	+
45300	<i>Sigara sp</i>	+			
47600	<i>Sialis sp</i>	+	No. Quantitative Taxa: 0		Total Taxa: 64
50315	<i>Chimarra obscura</i>	+	No. Qualitative Taxa: 64		ICI:
51400	<i>Nyctiophylax sp</i>	+	Number of Organisms: 0		Qual EPT: 17
51600	<i>Polycentropus sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
57400	<i>Neophylax sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
58505	<i>Helicopsyche borealis</i>	+			
68025	<i>Ectopria sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
69400	<i>Stenelmis sp</i>	+			
71100	<i>Hexatoma sp</i>	+			
74100	<i>Simulium sp</i>	+			
74501	<i>Ceratopogonidae</i>	+			
77800	<i>Helopelopia sp</i>	+			
78350	<i>Meropelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
79400	<i>Zavrelimyia sp</i>	+			
80370	<i>Corynoneura lobata</i>	+			
81231	<i>Nanocladius (N.) crassicornus or N. (N.) "rectinervis"</i>	+			
81650	<i>Parametriocnemus sp</i>	+			
82121	<i>Thienemanniella lobapodema</i>	+			
82730	<i>Chironomus (C.) decorus group</i>	+			

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/09/2004 River Code: 03-123 RM: 0.60 Site: Peters Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03360	<i>Plumatella sp</i>	+			
05800	<i>Caecidotea sp</i>	+			
06201	<i>Hyalella azteca</i>	+			
08240	<i>Orconectes (Crockerinus) propinquus</i>	+			
11130	<i>Baetis intercalaris</i>	+			
11250	<i>Centroptilum sp (w/o hindwing pads)</i>	+			
13521	<i>Stenonema femoratum</i>	+			
14600	<i>Choroterpes sp</i>	+			
17200	<i>Caenis sp</i>	+			
47600	<i>Sialis sp</i>	+			
51400	<i>Nyctiophylax sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
53501	<i>Hydroptilidae</i>	+			
57400	<i>Neophylax sp</i>	+			
57900	<i>Pycnopsyche sp</i>	+			
59100	<i>Ceraclea sp</i>	+			
61001	<i>Dytiscidae</i>	+			
69400	<i>Stenelmis sp</i>	+			
74100	<i>Simulium sp</i>	+			
77120	<i>Ablabesmyia mallochi</i>	+			
77500	<i>Conchapelopia sp</i>	+			
79400	<i>Zavrelimyia sp</i>	+			
83840	<i>Microtendipes pedellus group</i>	+			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	+			
84420	<i>Polypedilum (P.) n.sp 1</i>	+			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	+			
84480	<i>Polypedilum (P.) laetum group</i>	+			
84750	<i>Stictochironomus sp</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
85821	<i>Tanytarsus glabrescens group sp 7</i>	+			
95100	<i>Physella sp</i>	+			
96280	<i>Planorbella (Pierosoma) trivolvis</i>	+			
96900	<i>Ferrissia sp</i>	+			

No. Quantitative Taxa: 0	Total Taxa: 33
No. Qualitative Taxa: 33	ICI:
Number of Organisms: 0	Qual EPT: 11

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/03/2003 River Code: 03-124 RM: 2.40 Site: Cemetery Creek

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
03600	<i>Oligochaeta</i>	+			
04901	<i>Erpobdellidae</i>	+			
08250	<i>Orconectes (Procericambarus) rusticus</i>	+			
11120	<i>Baetis flavistriga</i>	+			
13521	<i>Stenonema femoratum</i>	+			
21200	<i>Calopteryx sp</i>	+			
23909	<i>Boyeria vinosa</i>	+			
47600	<i>Sialis sp</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
63300	<i>Hydroporus sp</i>	+			
66500	<i>Enochrus sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
71900	<i>Tipula sp</i>	+			
71910	<i>Tipula abdominalis</i>	+			
77500	<i>Conchapelopia sp</i>	+			
78350	<i>Meropelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
80351	<i>Corynoneura n.sp 1</i>	+			
80370	<i>Corynoneura lobata</i>	+			
81650	<i>Parametriocnemus sp</i>	+			
82730	<i>Chironomus (C.) decorus group</i>	+			
82820	<i>Cryptochironomus sp</i>	+			
84470	<i>Polypedilum (P.) illinoense</i>	+			
84540	<i>Polypedilum (Tripodura) scalaenum group</i>	+			
84750	<i>Stictochironomus sp</i>	+			
85800	<i>Tanytarsus sp</i>	+			
95100	<i>Physella sp</i>	+			
98600	<i>Sphaerium sp</i>	+			

No. Quantitative Taxa: 0	Total Taxa: 29
No. Qualitative Taxa: 29	ICI:
Number of Organisms: 0	Qual EPT: 3

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 09/03/2003 River Code: 03-124 RM: 1.20 Site: Cemetery Creek Poplar St.

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
01801	<i>Turbellaria</i>	+			
03600	<i>Oligochaeta</i>	+			
04964	<i>Mooreobdella microstoma</i>	+			
05800	<i>Caecidotea sp</i>	+			
07860	<i>Cambarus (Puncticambarus) robustus</i>	+			
11120	<i>Baetis flavistriga</i>	+			
13521	<i>Stenonema femoratum</i>	+			
21200	<i>Calopteryx sp</i>	+			
22300	<i>Argia sp</i>	+			
23909	<i>Boyeria vinosa</i>	+			
52200	<i>Cheumatopsyche sp</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
68075	<i>Psephenus herricki</i>	+			
69400	<i>Stenelmis sp</i>	+			
71900	<i>Tipula sp</i>	+			
74100	<i>Simulium sp</i>	+			
77800	<i>Helopelopia sp</i>	+			
78401	<i>Natarsia species A (sensu Roback, 1978)</i>	+			
82730	<i>Chironomus (C.) decorus group</i>	+			
84210	<i>Paratendipes albimanus</i> or <i>P. duplicatus</i>	+			
84450	<i>Polypedilum (Uresipedilum) flavum</i>	+			
84470	<i>Polypedilum (P.) illinoense</i>	+			
85500	<i>Paratanytarsus sp</i>	+			
85625	<i>Rheotanytarsus sp</i>	+			
87400	<i>Stratiomys sp</i>	+			
95100	<i>Physella sp</i>	+			

No. Quantitative Taxa: 0	Total Taxa: 26
No. Qualitative Taxa: 26	ICI:
Number of Organisms: 0	Qual EPT: 4

Ohio EPA/DSW Ecological Assessment Section
Macroinvertebrate Collection

Collection Date: 08/10/2004 River Code: 03-150 RM: 0.10 Site: Phelps Creek at mouth

Taxa Code	Taxa	Quant/Qual	Taxa Code	Taxa	Quant/Qual
03600	<i>Oligochaeta</i>	+	84440	<i>Polypedilum (Uresipedilum) aviceps</i>	+
07860	<i>Cambarus (Puncticambarus) robustus</i>	+	84480	<i>Polypedilum (P.) laetum group</i>	+
08601	<i>Hydrachnidia</i>	+	84750	<i>Stictochironomus sp</i>	+
11115	<i>Baetis tricaudatus</i>	+	85615	<i>Rheotanytarsus pellucidus</i>	+
11120	<i>Baetis flavistriga</i>	+	85625	<i>Rheotanytarsus sp</i>	+
11650	<i>Proclleon sp (w/ hindwing pads)</i>	+	85711	<i>Stempellinella poss. leptocelloides</i>	+
12200	<i>Isonychia sp</i>	+	85800	<i>Tanytarsus sp</i>	+
13000	<i>Leucrocuta sp</i>	+	85802	<i>Tanytarsus curticornis</i>	+
13400	<i>Stenacron sp</i>	+	85821	<i>Tanytarsus glabrescens group sp 7</i>	+
13521	<i>Stenonema femoratum</i>	+	85840	<i>Tanytarsus sepp</i>	+
13555	<i>Maccaffertium modestum</i>	+	86401	<i>Atherix lantha</i>	+
13590	<i>Maccaffertium vicarium</i>	+	95100	<i>Physella sp</i>	+
17200	<i>Caenis sp</i>	+	96900	<i>Ferrissia sp</i>	+
21200	<i>Calopteryx sp</i>	+			
23600	<i>Aeshna sp</i>	+	No. Quantitative Taxa: 0		Total Taxa: 57
23905	<i>Boyeria grafiana</i>	+	No. Qualitative Taxa: 57		ICI:
25510	<i>Stylogomphus albistylus</i>	+	Number of Organisms: 0		Qual EPT: 19
34130	<i>Acroneuria frisoni</i>	+			
34700	<i>Agnatina capitata complex</i>	+			
47600	<i>Sialis sp</i>	+			
48620	<i>Nigronia serricornis</i>	+			
50301	<i>Chimarra aterrima</i>	+			
51600	<i>Polycentropus sp</i>	+			
52440	<i>Ceratopsyche slossonae</i>	+			
52530	<i>Hydropsyche depravata group</i>	+			
54166	<i>Ochrotrichia confusa group</i>	+			
57400	<i>Neophylax sp</i>	+			
59400	<i>Nectopsyche sp</i>	+			
67500	<i>Laccobius sp</i>	+			
68075	<i>Psephenus herricki</i>	+			
68901	<i>Macronychus glabratus</i>	+			
69200	<i>Optioservus sp</i>	+			
69400	<i>Stenelmis sp</i>	+			
71800	<i>Pseudolimnophila sp</i>	+			
74100	<i>Simulium sp</i>	+			
74501	<i>Ceratopogonidae</i>	+			
77500	<i>Conchapelopia sp</i>	+			
77800	<i>Helopelopia sp</i>	+			
79400	<i>Zavreliomyia sp</i>	+			
79720	<i>Diamesa sp</i>	+			
81280	<i>Nanocladius (Plecopteracoluthus) downesi</i>	+			
81650	<i>Parametriocnemus sp</i>	+			
83840	<i>Microtendipes pedellus group</i>	+			
84210	<i>Paratendipes albimanus or P. duplicatus</i>	+			