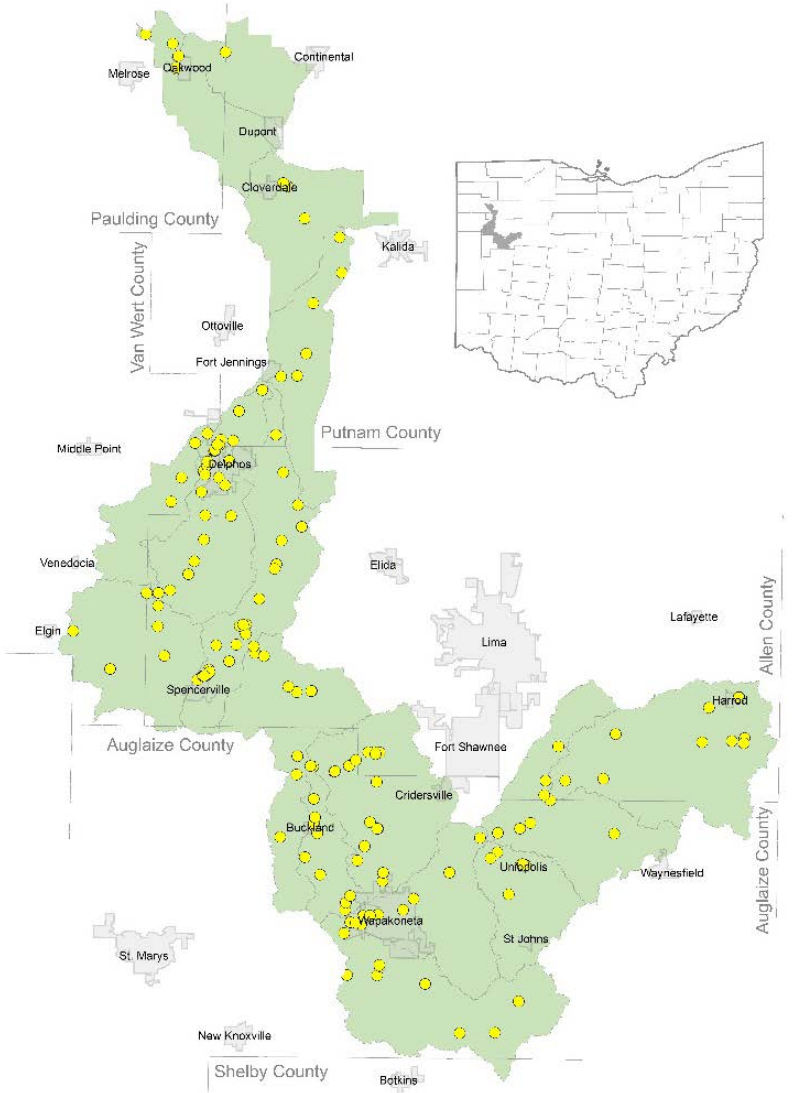
Ohio Environmental Protection Agency

Quality Assurance Project Plan for the Biological and Water Quality Study of the Upper Auglaize River Watershed, 2019



Ohio EPA Technical Report AMS/2019-UAUGL-2
Division of Surface Water
May 2019

TMDL DEVELOPMENT | ●○○○○

Quality Assurance Project Plan (QAPP) for the Biological and Water Quality Study of the Upper Auglaize River Watershed, 2019

Allen, Auglaize, Paulding, Putnam and Van Wert Counties

Version 2.0 May 2019

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A1 – Title and Approval

Quality Assurance Project Plan for the Biological and Water Quality Study of the Upper Auglaize River Watershed, 2019.

Brian W Hall — Date: 5/10/19
Brian Hall, Division Assistant Chief

Date: 5/8/19
Marianne Piekutowski, Assessment and Modeling Section Manager

Date: 5/9/19
Audrey Rush, Standards and Technical Support Section Manager

Ellie Hagen — Date: 5/07/2019
Ellie Hagen, Standards and Technical Support QAO

Daniel J. Glomski — Date: 5/7/2019
Dan Glomski, NWDO Water Quality Supervisor

Date:

A2 – Table of Contents

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A3 – Distribution List

This QAPP will be distributed to the following division management and staff, saved on the DSW collaboration site and posted on the DSW Biological and Water Quality Monitoring and Assessment webpage.

Table 1 — Distribution List.

Name/Title	Contact Email/Phone	
DSW Central Office		
Tiffani Kavalec, Environmental Administrator	*tiffani.kavalec@epa.ohio.gov*	(614) 644-3538
Brian Hall, Asst. Environmental Administrator	*brian.hall@epa.ohio.gov*	(614) 644-2033
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Chris Riddle, Environmental Specialist 2	*christopher.riddle@epa.ohio.gov*	(419) 373-3101
Ben Smith, Environmental Specialist 2	*benjamin.smith@epa.ohio.gov*	(419) 373-3027
DES		
Jennifer Kraft, Environmental Manager	*jennifer.kraft@epa.ohio.gov*	(614) 644-3020
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Heather Raymond, Geologist 4	*heather.raymond@epa.ohio.gov*	(614) 644-2911
Ruth Briland, Environmental Specialist 2	*ruth.briland@epa.ohio.gov*	(614) 369-4045

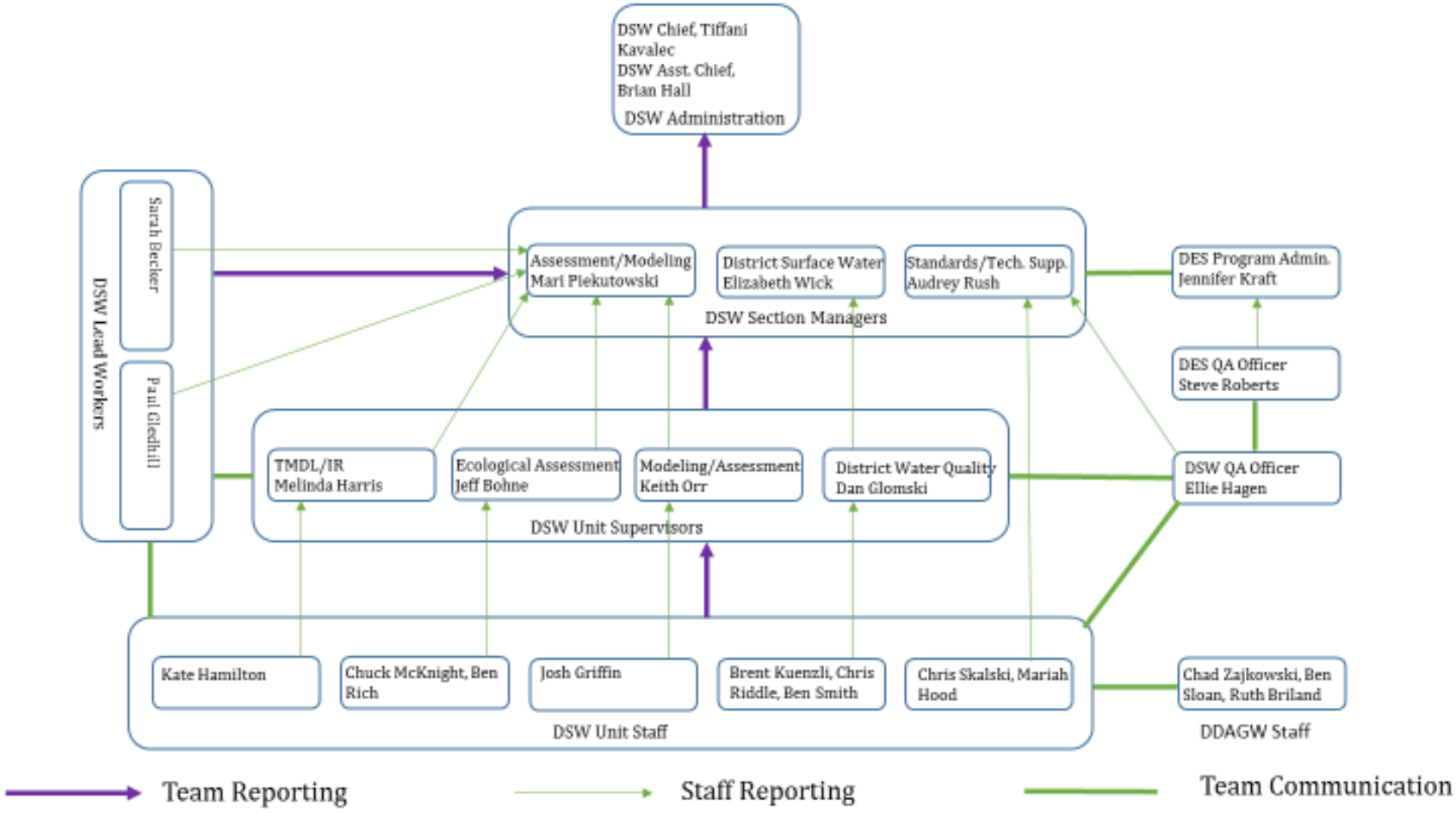
A4 – Project Organization and Communication

Table 2 — Roles and Responsibilities.

Individual(s) Assigned:	Responsible for:	Authorized to:
Division of Surface Water		
Tiffani Kavalec/Brian Hall DSW Chief/Assistant Chief	Overall administration of division.	Confirm project existence; approve staff and capital resources; approve plans; edit reports.
Mari Piekutowski Assessment & Modeling Section Manager	Overall management of monitoring section.	Assign staff; approve plans; edit reports.
Melinda Harris TMDL and IR Supervisor	Coordination of biennial Integrated Report update; TMDL program development.	Assign and support staff; edit reports.
Kate Hamilton TMDL Staff	Leading TMDL projects.	Write assigned TMDL sections.
Keith Orr Modeling & Assessment Unit Supervisor	Supporting modeling field crews with supplies, equipment and training.	Obtain approvals and signatures; develop budgets; conduct field audits; edit reports.
Paul Gledhill Modeling & Assessment Unit Lead Worker	Complex modeling issues. Integration of GLWQA and DAP commitments.	Review project actions and documents in relation to listed responsibilities.
Josh Griffin Modeling & Assessment Unit Staff	Dissolved oxygen surveys, stream flow measurements and chemistry sampling.	Help plan study. Schedule and complete assigned field activities. Tabulate data and write discussion for technical report.
Audrey Rush Standards and Tech Support Section Manager	Quality management (QAPPs, SOPs); staff training; water quality standard rules.	Approve plans and edit reports.
Ellie Hagen Standards and Tech Support QA Officer	DSWs quality management program.	Develop and implement field QA/QC guidelines. Track field QA/QC and staff training.
Chris Skalski Standards and Tech Support Lead Worker	Water quality standard criteria development and rule updates.	Help plan study. Make recommended beneficial use changes.
Mariah Hood Standards and Tech Support Staff	Representing agency in fish and wildlife consumption and contact advisory matters.	Help plan study. Make waterbody specific consumption and contact advisory recommendations.
Jeff Bohne Ecological Assessment Unit Supervisor	Supporting biological field crews with supplies, equipment and training.	Obtain approvals and signatures; develop budgets; conduct field audits; edit reports.
Sarah Becker Ecological Assessment Unit Lead Worker	Assist with property access, track project progress, managing data and compiling information for Integrated Report.	Provide landowner information for access consent. Upload fish, bug and chemistry data into EA3. Review and comment on reports. Write assigned Integrated Report sections.
Ben Rich Ecological Assessment Unit Fish Crew Leader	Fish population and stream habitat assessments.	Help plan study. Schedule and complete assigned field activities. Tabulate data and write discussion for technical report.
Chuck McKnight Ecological Assessment Unit Bug Crew Leader	Macroinvertebrate population assessments.	Help plan study. Schedule and complete assigned field activities. Tabulate data and write discussion for technical report.

Elizabeth Wick District Surface Water Section Manager	Implementing division goals at the district level.	Review documents and reports; suggest changes and edits; obtain approvals and signatures.
Ryan Gierhart Permits & Enforcement Lead Worker	NPDES permit related issues.	Obtain wastewater and storm water permit information needed for planning and reporting.
Dan Glomski District Water Quality Unit Supervisor	Supporting water quality field crews with supplies, equipment and training.	Obtain approvals and signatures; develop budgets; conduct field audits; edit reports.
Brent Kuenzli, Chris Riddle, Ben Smith District Water Quality Unit	Water and sediment data collection, validation and management.	Help plan study. Schedule and complete assigned field activities. Tabulate data and write discussion for technical report.
Division of Environmental Services		
Jennifer Kraft Program Administrator	Overall administration of lab activities.	Help solve lab information management system problems. Develop analytical methods and SOPs.
Steve Roberts QA Officer	DES quality management program.	Oversee data completeness, validation and delivery.
Division of Drinking and Ground Waters		
Ruth Briland (CO), Ben Sloan (NWDO)	Harmful Algae Bloom program implementation.	Coordinate with DSW on drinking water intake and inland lake monitoring.
Chad Zajkowski (NWDO)	Source Water Assessment and Protection plans.	Coordinate with DSW on water source protection issues.

Figure 1 — Organization Chart.



A5 – Background

A biological and water quality study (BWQS) was last done in the Upper Auglaize River watershed in 2000. Ambient biology, macro-habitat and water quality data were collected and evaluated. Results showed that both aquatic life and recreation beneficial uses were impaired at some locations. Causes and sources of impairment were identified and total maximum daily loads (TMDLs) were calculated for sedimentation, phosphorus, ammonia and bacteria to restore conditions. The restoration plan included a combination of practices to increase assimilation and reduce pollutant loads. Regulatory actions included phased permit limits for phosphorus and ammonia, combined sewer overflow (CSO) long term control plans (LTCP) and director's final findings and orders (DFFOs) to abate public health nuisances in unsewered areas. As part of Ohio's statewide monitoring strategy, a follow-up study will be done during the 2019 field season to evaluate effectiveness of the practices implemented.

Since the previous study was done Harmful Algae Blooms (HABs) have become a major problem in Western Lake Erie. Evidence shows that these blooms are partially caused by nutrient loadings from headwater areas. The State of Ohio has pledged to reduce total spring phosphorus loads from the Maumee River to 860 metric tons by the year 2025 and data from this study may be used to support that effort.

A6 – Project Description

The study area covers about 78 miles of the Auglaize River mainstem from its origin in Allen County to above the confluence of the Ottawa River and includes 24 streams listed as tributaries in the rules. A total of fourteen 12-digit hydrologic units (HUCs), known as watershed assessment units (WAU) for Integrated Report purposes, are covered. The Auglaize River below the confluence of the Ottawa River drains >500 mi^2 and is categorized as a large river assessment unit (LRAU). This section of the river was assessed in 2012 and is not a part of this project. From RM 77.32 to RM 47.02 the Auglaize River is designated a Superior High-Quality Water (ORC 3745-1-05, Table 5-4).

The following activities will be completed during the 2019 field season for this survey;

- Fish and macro-invertebrate populations will be sampled to generate biological index scores. These scores will be used to determine aquatic life use attainment status.
- Habitat, surface water, wastewater and sediment chemistry data will be gathered to help determine potential causes and sources of biological impairment. Habitat and biological index scores will also be used to validate or assign aquatic life uses where needed.
- Diel dissolved oxygen flux will be measured using water quality sondes.
- Primary productivity will be measured using a combination of benthic and sestonic chlorophyll-*a* data. These data will be used to build a weight of evidence to assess the impact of nutrients on the streams trophic condition.
- Recreation use status will be evaluated using *E. coli* as an indicator organism.
- Pesticide samples will be collected at select locations and submitted to US EPAs Chicago Regional Lab for analysis. Sample collection and shipment procedures are in Appendix 6.

A7 – Data Quality Objectives

Biological monitoring will be done June 15-October 15 during stable, baseflow conditions. Sites that drain <20 mi^2 will have qualitative (presence/absence) macroinvertebrate sampling and 1 fish pass done. Sites that drain ≥20 mi^2 will have both qualitative and quantitative (artificial substrate) macroinvertebrate sampling and 2 fish passes done. Specimens are identified to species level and the total number for each counted or estimated by sub-sample. Fish are identified in the field and macroinvertebrates are identified in the lab. Voucher specimens are collected if necessary, to verify identification.

When feasible, surface water physical and chemical testing will be done to coincide with biological monitoring. Ideally these samples will be collected across a variety of flow conditions. Six sets of samples will be collected at most sites. Sites where n<3 will be noted in data summaries to question the validity of any arithmetic or geometric mean calculated.

Lab reporting limits are adequate to evaluate most pollutants. Potential exceptions include nitrate-nitrite and ammonia. It is common for nitrogen to become depleted during the summer in aquatic environments. In instances where a value is needed to calculate a mean concentration and the result is below reporting limit (RL), 0.5RL will be used in the calculation.

Sonde surveys should be done during stable, baseflow conditions. Ideally, each site targeted will have 2 surveys done. The instruments will be deployed for about 48 hours. Benthic chlorophyll-*a* samples are to be collected at least once and should be timed to coincide with sonde deployment.

Bacteria sampling to evaluate recreation use will be done within a 90-day period that falls after Memorial Day and before Labor Day. Each site will have at least 5 sets of E. coli samples tested. Each WAU will have at least 1 site sampled. Most effort will focus on streams with public access that are more highly used for recreation.

A8 – Special Training/Certification

Staff involved in environmental monitoring must complete training specific to their area of expertise. Annual refresher training is mandatory, and all trainings are documented using a Microsoft® Access database. Supervisors should also conduct routine field audits.

A9 – Documents and Records

Microsoft® SharePoint is used as a document library. Access is through Ohio EPA's Intranet collaboration site.

https://epaportal.sp.ohio.gov/dsw/waterqual/SitePages/Home.aspx?RootFolder=%2Fdsw%2Fwaterqual%2FShared%20Documents%2FWater%20Quality%20Studies%2F2019%2FAuglaize%20River%20%28upper%29%2F1%20%2D%20Study%20Plan&FolderCTID=0x0120004B0C401D7828204DAEDD6A7ADA6DD1A4&View=%7bCBC22BD2-C45C-4217-A97E-2F1B5DFD3D34%7d

Examples of documents posted to this location include;

Pre-sampling documents:

- Preliminary information sheets
- Property access forms
- Draft and final QAPP versions

Project documents:

- All data files
- Draft report sections
- Changes to sites, staff, parameters, etc. should be filed in the project folder by the study team leader
- Project photos will be moved to and stored in the Lynx Photo System. All files will be retained by Ohio EPA in accordance with established retention schedules.

Changes in project leadership or major actions which might affect the DQOs require an updated QAPP and signoff sheet. The study team leader shall retain copies of all management reports, memoranda, and all correspondence between team members.

For analytical samples the original chain of custody form is delivered to DES along with the samples and retained by the lab. A copy of the form may be kept in a binder by the sample collector as well. After water samples are analyzed and the results are approved by the DES QA Officer the data will be released to Sample Master® and subsequently uploaded to DSW's Ecological Assessment and Analysis Application (EA3). The sample collector reviews lab sheets for completeness and accuracy, validates field QC, adds comments and completes edits if necessary and approves the sheet. All data approved in EA3 is sent to U.S. EPA's Water Quality Exchange.

Original fish and QHEI data sheets will be retained at the Groveport Field Office. Data from the field sheet is manually entered into the EA3 database using the appropriate data entry screen. The sheets are double entered to minimize mistakes.

Section B – Data Generation and Acquisition

B1 – Sampling Process and Design

The site selection process for aquatic life beneficial use is designed to systematically sample principal streams in the study area with enough locations to ensure a credible evaluation of potential beneficial use impairments. Principal streams are roughly defined as those that drain a surface area >8 mi^2. Multiple sites on a stream are typically added as drainage area doubles. Streams that drain >50 mi^2 are assessed in a linear fashion, with sites placed roughly every 5-7 river miles. A minimum of 2-3 sites per WAU (HUC 12) is desired, as are sites at HUC 12 outlets. Reference sites and sites with historical data are selected where practical. The previous study was done when Ohio EPA was using HUC 14's as WAU's and this will likely affect the selection of some historical sites. Sites are also selected to bracket known and suspected point and non-point sources. Available USGS gage sites are selected to obtain accurate stream flow data for load calculation purposes. The site selection process for recreation beneficial use is designed to obtain a representative picture of conditions in an assessment unit. A minimum of 1 site per assessment unit is desired.

A summary of the planned sampling effort is shown in Appendix 1. A detailed list of sampling sites and the type of sampling at each is shown in Appendix 2. A list of facilities regulated by individual NPDES permit is shown in Appendix 3.

B2 – Sampling Methods

Stream Habitat Evaluation

Physical habitat is evaluated based on methods described in Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Ohio EPA 1989b, 2006). Various attributes of the available habitat are scored based on their overall importance to the establishment of viable, diverse aquatic faunas. Habitat attributes scored include the type and quality of substrate, amount of instream cover, channel morphology, extent of riparian canopy, pool and riffle development and quality and gradient are among the metrics used to evaluate the characteristics of a stream segment, not just the characteristics of a single sampling site. As such, individual sites may have much poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with better habitat, provided water quality conditions are similar. QHEI scores from hundreds of segments around the state have indicated that values higher than 60 were generally conducive to the establishment of warmwater habitat faunas while those which scored more than 75-80 often typify habitat conditions which can support exceptional warmwater habitat faunas.

Biological Community Assessment

Fish and macroinvertebrate sampling protocols are detailed in Ohio EPA Biological Criteria for the Protection of Aquatic Life: Volume III. Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities (Ohio EPA 2015b).

A combination of quantitative and qualitative methods will be employed to monitor benthic macroinvertebrate communities. Quantitative collections are made using modified Hester-Dendy multiple plate artificial substrate samplers, deployed at all biomonitoring sites draining more than 20 mi^2, or at reference sites regardless of size. Once deployed, artificial substrates are left to colonize, in-stream, for a six-week period. Qualitative sampling will be conducted at all biomonitoring stations. This sampling method consists of a basic inventory of macroinvertebrate taxa from natural substrates, noting dominant taxa among major habitat types (for example, riffle, run, pool and margin.

Fish will be sampled at each sampling location using pulsed DC headwater, wading or boat electrofishing methods depending on watershed size at each sampling zone. Sites with drainage areas greater than 20 mi^2 or at reference site locations will be sampled twice during the sampling index period. The number of passes may be adjusted as necessary based on best professional judgment of the fish crew leader. Reasons for a single pass monitoring at sites otherwise identified as needing multiple passes may include extremely difficult and time-consuming access, work delays related to weather, or the emergence of alterations (natural or otherwise) at points of access or sampling reach, rendering replication of the initial effort hazardous or costly, or both. Fish are processed in the field, which includes identifying each specimen to species level, counting individuals at all sites, weighing individuals at wading and boat sites, and recording external abnormalities.

Attainment/non-attainment of aquatic life uses will be determined by using biological criteria codified in OAC 3745-1-07, Table 7-1. Numerical biological criteria are based on multi-metric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), indices measuring the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the macroinvertebrate community. Performance expectations for the basic aquatic life uses (Warmwater Habitat [WWH], Exceptional Warmwater Habitat [EWH], and Modified Warmwater Habitat [MWH]) were developed using the regional reference site approach (Hughes et al. 1986, Omernik 1987). This fits the practical definition of biological integrity as the biological performance of the natural habitats within a region (Karr and Dudley 1981). Attainment of an aquatic life use is FULL if all three indices (or those available) meet the applicable criteria, PARTIAL if at least one of the indices did not attain and performance did not fall below the fair category, and NON if all indices either fail to attain or any index indicates poor or very poor performance. The results will be compared to the appropriate tiered beneficial use biocriteria based on ecoregion.

Surface Water

Surface water grab samples will be collected and preserved using appropriate methods as outlined in the Surface Water Field Sampling Manual for water column chemistry, bacteria and flows (Ohio EPA 2019). This document is hereafter referred to as the Surface Water Field Sampling Manual. Samples are delivered via overnight courier to Ohio EPA's Division of Environmental Services (DES) for analyses. Field measurements of dissolved oxygen, pH, temperature and conductivity will be made using YSI Professional Plus meters along with all grab samples for surface water chemistry. Water quality sondes will be placed at select locations to evaluate diel measurements of dissolved oxygen, pH, temperature and conductivity.

Bacteria

Water samples will be collected into appropriate containers, cooled to 4°C, and transported to a contract lab within six hours of sample collection. All samples will be analyzed for *E. coli* bacteria using U.S. EPA-approved methods.

Attainment/non-attainment of recreational uses will be determined using *E. coli* criteria codified in OAC 3745-1-37, Table 37-2. Water quality must meet a 90-day geometric mean and a statistical threshold not to be exceeded more than 10 percent of the time.

Chlorophyll

Benthic and sestonic chlorophyll *a* will be collected and preserved using appropriate methods, as outlined in Appendix II of the Surface Water Field Sampling Manual (Ohio EPA 2019b) and delivered to Ohio EPA- DES for analyses. Alkalinity must be requested as a routine water quality parameter at all study sites along with the routine field parameters, especially temperature and pH.

Sediment

Fine grained multi-incremental sediment samples will be collected in the upper four inches of bottom material using either decontaminated stainless steel scoops or dredges. Collected sediment will be placed into appropriate containers, placed on ice (to maintain 4°C) and shipped to Ohio EPA-DES for analysis. Sampling and decontamination protocols will follow those listed in Appendix III of the Surface Water Field Sampling Manual (Ohio EPA 2019c).

Fish Tissue

Tissue fillet samples will be collected from fish of edible size and species preferred for analysis may include spotted bass, largemouth bass, smallmouth bass, flathead catfish, walleye, saugeye, white bass, common carp, freshwater drum, buffalo and channel catfish. When possible, composite samples (by species) should include a minimum of three fish, yielding at least 150 grams of tissue. At each sampling location, an attempt will be made to collect five fish species for analysis. Fish will be collected using standard electrofishing methods (Ohio EPA 1987). Sampling locations are listed in Table 2 and the parameters to be analyzed are listed in Table 4. Fish used for tissue analysis will be filleted in the field using decontaminated stainless-steel fillet knives. Samples will be wrapped in aluminum foil, placed in a sealed plastic bag, along with necessary site documentation. Temporary storage in the field may take one of two forms. Samples may be stored on wet ice for a period not exceeding 48 hours. For longer periods of field storage, samples must be placed on dry ice. Collection, decontamination and field processing of tissue samples will follow protocols listed in the Ohio EPA Fish Tissue Collection Guidance Manual (2012). From the field, fish tissue samples will be stored and inventoried in chest freezers at the Ohio EPA Groveport Field Office prior to delivery to DES.

Lake Sampling

Lake sampling will be done twice per month May-September for a total of 10 sampling events. Grab samples of lake water will be collected at 0.5m below the surface and 0.5m above the bottom from the deepest portion of the lake and analyzed for the list of the parameters in Appendix 4. Algal biomass, algal toxin and atrazine testing will only be done in the surface sample. Three sets of surface samples (spring, summer, fall) will also be submitted for species level phytoplankton cell counts and bio-volume estimates. Other pollutants outside the standard assessment (i.e. glyphosate, carbamates) will be done if historical data indicates a problem. A water column field reading profile (temperature, dissolved oxygen, pH and conductivity) will be done at the chemistry station starting at 0.5m below the surface and continuing at either 0.5m or 1.0m intervals, thereafter, being sure to include the depth of the bottom sample. A sediment sample will be collected if none has been done within the last 10 years. Fish tissue specimens will be collected only in lakes selected by a multi-agency committee with a priority given to those commonly used for sport fishing.

All field practices will follow guidelines in the Appendix I of the Surface Water Field Sampling Manual (Ohio EPA 2019e). This document is also known as the Inland Lakes Sampling Procedure Manual. Data will be used to assess use designations previewed in the Ohio 2012 Integrated Water Quality Monitoring and Assessment Report. The uses, criteria and assessment methods described are considered draft until they are adopted into the Ohio Water Quality Standards. The strategy generally focuses on water quality conditions in the epilimnion of lakes, although the entire water column is examined when the lake is un-stratified.

Bioassay

Bioassay samples will be collected and preserved using appropriate methods as outlined in the Surface Water Field Sampling Manual (Ohio EPA 2019). Bioassay samples are delivered same day to a contract laboratory. Associated chemistry samples are delivered via overnight courier to Ohio EPA's Division of Environmental Services (DES) for analyses. Field measurements of dissolved oxygen, pH, temperature and conductivity will be made using YSI Professional Plus meters along

with all grab samples. Two rounds of sampling, using a 24 hour time weighted auto-sampler, will be completed.

B3 – Sample Handling and Custody

Sample Master® software is used by DES to manage lab information. A guidance manual for use of the software is in Appendix IV of the Surface Water Field Manual (2019d). The sample collector logs into the system and places an order by selecting the appropriate project, stations to be sampled and test group(s) to be analyzed. The program creates a chain of custody form and container labels for each site.

B4 – Analytical Methods

The analytical methods to be used in this study are provided in Appendix 4 along with the preservatives, holding times, and reporting limits. SOPs for the analytical methods are available upon request.

B5 – Quality Control

Ten percent of the total water samples will be submitted to the lab as field quality control samples. About five percent will be duplicates, including replicates if natural variability is a concern, and about five percent will be blanks, including equipment blanks. Matrix spike duplicates will be collected for organic water samples at a minimum of five percent. Field instruments will be calibrated daily using manufacturer guidelines. One sonde recorder site will have two instruments placed in the river as a duplicate. All field quality control requirements and data validation methods are detailed in the Surface Water Field Sampling Manual.

B6 – Instrument/Equipment Testing, Inspection and Maintenance

All instruments/equipment will be inspected prior to each use. All field meters are service annually by the manufacturer to verify that they are operating within specifications. Parts are repaired or replaced at this time if necessary.

B7 – Instrument Calibration and Frequency

The appropriate calibration procedure, as specified in the instruments user manual, must be followed. All calibration solutions used will be checked for expiration dates before utilized. All equipment is assigned a log book that will detail the equipment's calibration and maintenance history. For more details see section D and Appendix II of the Surface Water Field Sampling Manual. Other equipment used will follow specifications provided in the biological and habitat methods cited.

B8 – Inspection/Acceptance of Supplies

Supplies and consumables will be inspected upon receipt by the field sampling teams. Nearly all supplies utilized for this project are maintained and used during Ohio EPA's normal business operations. The field team leaders will be responsible for ensuring that all sample containers and all needed supplies and consumables are available in advance of all field work. It will be their responsibility to maintain and replenish stock when needed. Consumable supplies include, but are not limited to: sample containers, acid preservatives, Lugol's iodine solution, ethyl alcohol, buffers,

filters and miscellaneous supplies such as distilled water, disposable gloves, and towels. Field personnel will confirm that all reagents are within applicable shelf life.

B9 – Data Acquisition

This project consists mainly of field sampling. Only Ohio EPA results will be used in data summaries.

B10 – Data Management

The data management process is shared by the Division of Surface Water (DSW) and Division of Environmental Services (DES). DES uses Sample Master® software to manage lab information and DSW uses the Ecological Assessment and Analysis Application (EA3) to manage data. These programs are linked together to allow the transfer of information between the two systems. EA3 software is used to assign a permanent six-digit station ID number to each sampling location and to create a project name to associate locations so data can subsequently be exported and assessed in groups. See Appendix IV, Section B of the Surface Water Field Manual for guidelines.

Field measurements are collected instantaneously using a multi-parameter meter and saved in an internal file storage system. These files are downloaded to the manufacturer's software, exported to Microsoft Excel® and then uploaded to Sample Master® so field data can be associated with chemistry data in the database.

Field and chemistry data tabulated in Sample Master® are eventually uploaded into EA3. Then, in EA3, the sample collector will review each data sheet for accuracy, validate field QC, add comments and complete edits if necessary before approving the sheet. This data is then available for use in IR reports. All agency files are ultimately backed up and housed in the State of Ohio Computer Center (SOCC).

The project leader will maintain the project file in a dedicated folder on SharePoint. The goal or objective is to have a complete record of all decisions about modifications of data collection, validation or interpretation between the QAPP signoff and project report completion. To achieve this, the project leader will need to be included on emails or otherwise receive summaries of all actions that meet the above description. Project photos should all be filed in the Lynx photo management system.

Section C – Assessment and Oversight of Data Collection

C1 – Assessment and Response Actions

C1.1 – Assessments

Periodic assessment of field sites, field equipment, and laboratory equipment is necessary to ensure that data obtained meets project needs. This is an ongoing process that continues every day during project implementation, as well as on larger scale assessments that take place less frequently (*e.g.*, annually). The assessments generally focus on readiness and consistency of implementation but also are looking for continual improvement opportunities.

Daily assessments (for each day of project activities, as applicable) include assessment of field equipment and supplies, laboratory equipment and supplies, completeness of the day's samples and associated field notes, future needs, etc.

C1.2 - Response Actions

Despite best preparations, assessments may find situations requiring corrective actions. Small day-to-day level assessment findings are often addressed by the individual doing the assessment in the field or in the lab and are common enough to the process, so as to not necessitate a formal response.

- Laboratory personnel are aware that response may be necessary. Many of these will result in changes to the analytical reporting via data qualifiers and comments, for more information see Appendix IV of the field manual if:
- QC data are outside the warning or acceptable windows for precision and accuracy
- Blanks contain target analytes above acceptable levels
- Undesirable trends are detected in spike recoveries or relative percent difference (RPD) between duplicates
- There are unusual changes in detection limits
- Deficiencies are detected by the laboratory and or project QA officers during any internal or external audits or from the results of performance evaluation samples
- Inquiries concerning data quality are received

Corrective action implementation will be determined by the likelihood that the situation may affect the quality of the data. Field corrective actions will be brought to the attention of the study team for consideration as to their impact on the data, their potential interest to other sampling teams/subcontractors, any future considerations for process improvement, and for their potential inclusion to the quarterly reports. Lab corrective actions will follow regular laboratory procedures and SOPs. Any lab corrective action with the potential to affect data quality will be conveyed to the study team leader by the laboratory.

C1.3 - Reporting and Resolution of Issues

Any audits or other assessments that reveal findings of practice or procedure that do not conform to the written QAPP will be corrected as soon as possible. The study team and QA coordinator will be notified regarding deviations.

C1.4 - Data Completeness

Success of the project will be judged by the resulting data fulfilling the needs outlined in the data objectives. Potential data gaps will be monitored as the project progresses and the project schedule will be revised to fill these gaps where they are determined to be significant or to potentially impact the fulfillment of project objectives.

C2 – Reports to Management

The project leader or district supervisor will receive regular updates from field staff throughout the sampling season and will report to division management during Senior Management Team

meetings. Any problems that jeopardize completion of the project will lead to memorandum and consultation with program management and quality assurance staff.

The final TSD will report all study results and findings. Aquatic life use attainment will be determined by biological criteria. Causes and sources of aquatic life use impairment will be identified and supported by water chemistry, sediment chemistry, and stream habitat evaluations. Public Water supply use will be determined on surface water chemistry and recreational use will be determined on bacteriological result.

Section D – Data Validation and Usability

D1 – Data Review, Validation and Verification Requirements

Data verification will be conducted by the study team with assistance from other DSW staff. This process will confirm that sample results received are congruent with samples submitted and parameters requested from the lab. The process will also result in summaries of any differences between initial sampling and methods planned in the QAPP and results reported and available. Differences may result from samples not being collected (due to weather, scheduling, etc.), samples not being submitted (due to accidents like broken containers, or delays resulting in being past holding times, etc.), problems at the lab (methods changing, containers or equipment breaking), or other reasons. It is also possible that additional sampling would take place because of field observations/conditions. Documenting deviations from the QAPP is the responsibility of the project leader.

The DES laboratory does the initial validation on all data and may qualify data based on laboratory QA/QC alone or with feedback from the sampler (regarding specific sampling procedures, variable sampling matrix, conditions, blank contamination, duplicate agreement, matrix spike recovery, etc.). The data user can evaluate the data given their knowledge of sampling conditions, expected variability given location and matrix, data uses, etc.

All fish, macroinvertebrate, and habitat data are hand-entered into the EA3 database using a double data entry method. This helps to minimize data entry errors. Final approval of data involves a reconciliation between the paper forms and the electronic data which is completed by the data collector or a database administrator in the Ecological Assessment Unit.

Upon approval in EA3, field and laboratory data cannot be revised without intervention from database administrators in the Agency's Office of Information Technology Services.

D2 – Validation and Verification Methods

Biological and habitat field sampling results will be verified and validated based on field staff experience and qualifications and adherence to training and QA/QC procedures for current and new field staff available in Subsection 1, Part A (macroinvertebrates) and Subsection 2, Part A (Fish and Habitat) in Biological Criteria for the Protection of Aquatic Life: Volume III. Standardized Biological Field Sampling and Laboratory Methods for Assessing Fish and Macroinvertebrate Communities.

In addition to verifying data completeness, the study team will oversee data validation for the project that will include confirmation of sample holding times, proper preservatives, sample containers, analysis methods, QA/QC results (including assessment of results for blanks, spikes, and duplicates), etc. This will be an ongoing effort, concluding in a data validation summary to be included in the final report.

The study team will make final decisions regarding validity and usability and will evaluate the sample collection, analysis, and data reporting processes to determine if the data is of sufficient quality to meet the project objectives. Data validation involves all procedures used to accept or reject data after collection and prior to use. These include screening, editing, verifying, and reviewing. Data validation procedures ensure that objectives for data precision and bias will be met, that data will be generated in accordance with the QAPP and SOPs, and that data are traceable and defensible. The process is both qualitative and quantitative and is used to evaluate the project.

The laboratory QA staff will conduct a systematic review of the analytical data for compliance with the established QC criteria using batch and sample QA/QC information including spike, duplicate, and blank results. All technical holding times will be reviewed, the laboratory analytical instrument performance will be evaluated, and results of initial and continuing calibration will be reviewed and evaluated.

Field QC sample results will be evaluated using recently clarified DSW procedures available in Section I of the Surface Water Field Sampling Manual. Much of this work is facilitated by a centralized automated QC data evaluation Excel file. Use of this file is explained in the document "QC Tracking and Data Qualification" available in SharePoint in DSW Quality Management/Documents/DSW Procedures.

For most DSW chemical water quality data, data validation is generally confined to evaluation of blank results, duplicate/replicate results, paired parameter results (defined below) and confirming that samples were properly preserved/prepared (including filtration, *etc*. - if indicated by the method). Standards for evaluation of analytical results of those QC sample types and general field samples are described in Appendix IV, Section D of the Surface Water Field Sampling Manual.

D3 – Reconciliation with Data Quality Objectives

Issues related to biological and habitat data uncertainty, including any patterns of analytical or field QC uncertainties, will be assessed by field staff and their management. For most situations, issues can be addressed with acknowledgement of factors captured in the sample metadata which can confirm, explain, and document the data quality concern. Significant, persistent, or unresolved issues will be brought to the attention of the project study team, division QC personnel, and Ecological Assessment Unit and/or DSW management for further evaluation. This combination of personnel will assess how to best label affected data for storage in the EA3 database and how to eliminate or limit any similar problems going forward. Consideration will also be given on how best to memorialize data limitations or anomalies as the data is transferred to other databases, including

the WQ Portal, so that future users of the sampling data are aware of any data quality issues or limitations.

Appendix 1 – Summary of Sampling Effort

Type of Sample	# of sites	# of passes	Total #
Biology			
Fish < 20 mi^2 (1 pass)	50	1	50
Fish > 20 mi^2 (2 pass)	27	2	54
Macroinvertebrate (HD)	50	1	50
Macroinvertebrate (Qualitative)	27	2	54
Water Quality			
Inorganic Samples	77	6	462
Chlorophyll-a	31	2	62
Semi-volatile Organic Samples (BNA)	3	1	3
Nutrient (Sonde deployment)	31	2	62
Pesticide	31	6	186
Sediment Quality			
Metals (Selected)	7	1	7
PCB's and Semi-volatiles (BNA)	7	1	7
Bacteria			
E. coli cultures	30	5	150

Appendix 2 – Streams, sampling locations and sampling types.

Station	Site Name	River Mile	Area (mi²)	HUC12	USGS Quad	Lat.	Lon.	(refer to key on page 11) Sampling
Auglaize River (04-100-000)								
P03K04	Napoleon Rd	109.1	2.6	04100007-01-01	Harrod	40.6842	-83.9083	F, Mq, CM.
P03G03	Faulkner Road	106.68	12.6	04100007-01-01	Harrod	40.6811	-83.9428	F, Mq, CM$^{D\,P}$, B, N.
P03G06	Osman Road	101.72	28	04100007-01-01	Lima	40.6854	-84.0132	F2, MQ, CM^{P}, N.
P03G08	Amherst Rd.	97.88	42	04100007-01-01	Lima	40.656	-84.0536	F2, MQ, CM^{D}, B.
P03S01**M**	Greely Chapel Road	96.68	61	04100007-01-03	Lima	40.6458	-84.0719	F2, MQ, CM^{P}, FT, N.
303999	Townline-Lima Road	93.58	72.5	04100007-01-03	Uniopolis	40.6229	-84.1077	F2, MQ, CM, B.
P03P02	Dixie Highway	87.34	103	04100007-01-05	Wapakoneta	40.5811	-84.175	F2, MQ, CM$^{D\,P}$, B, FT, N.
P03P17	Hamilton Street	85.33	112	04100007-01-05	Wapakoneta	40.5708	-84.2036	F2, MQ, CM^{P}, N.
P03S34	Wapakoneta WWTP	84.9		04100007-01-05	Wapakoneta	40.5703	-84.2106	WWTP CM, Bioassay.
P03P18	Greenlawn Cemetery	84.1	113	04100007-01-05	Wapakoneta	40.565	-84.2186	F2, MQ, CMO$^{D\,P}$, S, B, N.
P03P01	Glynwood Road	80.29	151	04100007-02-02	Wapakoneta	40.5822	-84.2269	F2, MQ, CM^{P}, FT, N.
P03G26^{S}	Buckland Holden Road	74.72	156	04100007-02-02	Spencerville	40.6305	-84.2565	F2, MQ, CM^{D}, B.
P03G31^{S}	Place Road (Co. Rd. 218)	71.1	197	04100007-02-03	Spencerville	40.6681	-84.2717	F2, MQ, CM, FT.
P03K03^{S}	State Route 117	67.3	209	04100007-02-03	Spencerville	40.7078	-84.2733	F2, MQ, CM, FT.
P03S33**R**^{S}	Conant Rd	66.84	210	04100007-02-03	Spencerville	40.7111	-84.2803	F2, MQ, CM^{P}, N.
P03K02^{S}	Agerter Road	64.57	215	04100007-02-03	Spencerville	40.7297	-84.3006	F2, MQ, CM, DW, B.
303350	*Williams Reservoir*					*40.7303*	*-84.2436*	*L*
204358	*Bresler Reservoir*					*40.7419*	*-84.2389*	*L*
P03S07^{S}	Shafer Road	62.84	219	04100007-02-04	Spencerville	40.7431	-84.3158	F2, MQ, CM^{D}.
P03S05^{S}	Piquad Road	58.2	231	04100007-02-04	Delphos	40.7867	-84.2919	F2, MQ, CM^{P}, S, FT, N.
P03S04^{S}	Lincoln Highway	52.68	244	04100007-02-04	Delphos	40.8436	-84.2878	F2, MQ, CM^{D}, B, FT.
P03S18	adjacent State Route 189	46.0	318	04100007-09-04	Ottoville	40.9025	-84.2897	F2, MQ, CM^{P}, B, FT, N.

Station	Site Name	River Mile	Area (mi²)	HUC12	USGS Quad	Lat.	Lon.	(refer to key on page 11) Sampling
P03S03**R**	US Route 224	39.57	327	04100007-09-04	Ottoville	40.9489	-84.2661	F2, MQ, CM$^{D\,P}$, B, FT, N.
500190	Putnam County Road M	33.93	338	04100007-09-04	Kalida	40.99	-84.2456	F2, MQ, CM$^{D\,P}$, B, N.
Prairie Creek (04-100-002)								
P03G44	County Line Road	3.04	9.8	04100007-09-06	Continental	41.1032	-84.3419	F, Mq, CM.
P03G45	State Route 66	0.33	14	04100007-09-06	Oakwood	41.1003	-84.3805	F, Mq, CM^{P}, B, N.
Auglaize River (30.53) Tributary (04-100-006)								
P03G42	Putnam County Road 22K	0.05	4.5	04100007-09-05	Continental	41.0012	-84.2745	F, Mq, CM, B.
Pigeon Run (04-100-007)								
P03G33	Good Road	0.23	5.4	04100007-02-04	Delphos	40.8102	-84.272	F, Mq, CM.
Buck Run (04-100-009)								
P03G32	Sunderland Road	0.57	4.0	04100007-02-03	Spencerville	40.7086	-84.2721	F, Mq, CM.
Sims Run (04-100-010)								
P03G29	Conant Rd	4.4	4.2	04100007-02-03	Moulton	40.6178	-84.2846	F, Mq, CM.
P03G30	National Road	0.82	7.8	04100007-02-03	Spencerville	40.6576	-84.2721	F, Mq, CM, B.
Auglaize River (99.78) Tributary (04-100-011)								
P03G07	Osman Road	0.6	6.7	04100007-01-01	Lima	40.6574	-84.0226	F, Mq, CM.
Manahan Ditch (04-100-013)								
P03G05	Phillips Road	1.75	3.7	04100007-01-01	Harrod	40.7027	-83.9377	F, Mq, CM^{P}, B, N.
Beaver Dam Branch (Auglaize River Trib @ 108.9) (04-100-015)								
P03G02	Faulkner Road	0.28	6.2	04100007-01-01	Harrod	40.681	-83.9088	F, Mq, CM.
Big Run (04-119-000)								
P03G41	Putnam County Road 70	0.34	4.4	04100007-09-04	Ottoville	40.9037	-84.2781	F, Mq, CM.
Auglaize River Tributary at RM 63.54 (Goecke Trib) (04-100-008)								
P03K05	Defiance Trail	0.5	2.5	04100007-02-03	Spencerville	40.7314	-84.3081	F, Mq, CM.
Sixmile Creek (04-128-000)								

Station	Site Name	River Mile	Area (mi²)	HUC12	USGS Quad	Lat.	Lon.	(refer to key on page 11) Sampling
P03S16	Bailey Rd	4.2	2.5	04100007-02-04	Spencerville	40.7142	-84.3542	F, Mq, CM.
304002	UST Spencerville WWTP	3.9	2.7	04100007-02-04	Spencerville	40.7165	-84.3491	F, Mq, CM^{P}, S, N.
P03S10	DST Spencerville WWTP	3.59	3	04100007-02-04	Spencerville	40.7192	-84.3447	F, Mq, CM$^{D\,P}$, S, N.
500280	St. Rt. 81	1.2	6.0	04100007-02-04	Spencerville	40.7364	-84.3233	F, Mq, CMO.
P03P09	Defiance Trail	0.19	8.7	04100007-02-04	Spencerville	40.7481	-84.3208	F, Mq, CM$^{D\,P}$, S, B, N.
Jennings Creek (04-230-000)								
P03G34	Purdy Road (Hoch Rd)	20.2	3.8	04100007-09-01	Elgin	40.7294	-84.3762	F, Mq, CM.
P03G35	Kill Road	17.6	7.5	04100007-09-01	Elgin	40.7467	-84.3876	F, Mq, CM.
P03G36	Kill Road, UST Jennings Prairie Ditch	16.08	12.9	04100007-09-01	Middle Point	40.7595	-84.3876	F, Mq, CM$^{D\,P}$, B, N.
P03G37	Kill Road, DST Jennings Prairie Ditch	15.0	27.8	04100007-09-01	Middle Point	40.7676	-84.3876	F2, MQ, CM.
P03P06	Landeck Road	10.4	35.3	04100007-09-03	Delphos	40.8011	-84.3514	F2, MQ, CM.
P03S26**R**	CR 244 / Upperman Road	7.6	40.0	04100007-09-03	Delphos	40.8306	-84.3542	F2, MQ, CM^{P}, N.
P03P08	Pohlman Rd (ust Delphos WWTP)	4.8	42.7	04100007-09-03	Delphos	40.8597	-84.3422	F2, MQ, CM^{P}, N.
P03W13	adjacent Pohlman Road	4.45	42.8	04100007-09-03	Delphos	40.8631	-84.3393	F2, MQ, CMO$^{D\,P}$, S, B, N.
P03W20	Putnam County Road 23-T	0.51	69	04100007-09-03	Ottoville	40.8944	-84.3064	F2, MQ, CM$^{D\,P}$, B, N.
Flat Fork (04-231-000)								
P03S27	Township Road 136	1.15	7.1	04100007-09-03	Delphos	40.8628	-84.3292	F, Mq, CM.
West Jennings Creek (04-232-000)								
P03W14	Brickner Road	4.93	8.6	04100007-09-02	Middle Point	40.8241	-84.3786	F, Mq, CM, B.
P03W16	State Route 66	0.86	13.2	04100007-09-02	Delphos	40.8669	-84.3503	F, Mq, CM^{P}, B, N.
Jennings Prairie Ditch (04-233-000)								
P03G38	Louth Road	8.11	3.4	04100007-09-01	Elgin	40.7197	-84.4256	F, Mq, CM.
P03G39	State Route 81	4.78	6.3	04100007-09-01	Elgin	40.7428	-84.4564	F, Mq, CM.

Station	Site Name	River Mile	Area (mi²)	HUC12	USGS Quad	Lat.	Lon.	(refer to key on page 11) Sampling
P03G40	County Line Road	0.3	13.1	04100007-09-01	Middle Point	40.7672	-84.3972	F, Mq, CM[P], B, N.
Two Mile Creek (04-234-000)								
P03S35	Holden Road	7.28	10.3	04100007-02-01	Cridersville	40.6281	-84.2117	F, Mq, CM[P], B, N.
P03G27	Bowsher Rd.	1.2	27.7	04100007-02-01	Cridersville	40.6593	-84.2398	F, Mq, CM[P], N.
P03G28	State Route 198	0.12	31.5	04100007-02-01	Spencerville	40.6618	-84.2589	F2, MQ, CM[D P], B, N.
Pusheta Creek (04-235-000)								
P03G18	Ashburn Road	12.4	4.1	04100007-01-04	Uniopolis	40.5188	-84.0884	F, Mq, CM.
P03G19	Townline Road	10.6	8.2	04100007-01-04	Jackson Center	40.4991	-84.1072	F, Mq, CM.
P03G20	Fryburg Shelby Road	8.58	12.5	04100007-01-04	Botkins	40.4984	-84.1358	F, Mq, CM[D].
304000	Cemetery Road	5.5	16.2	04100007-01-04	Wapakoneta	40.5284	-84.1646	F, Mq, CM[D P], S, N.
204318	Hardin Pike	3.0	19.0	04100007-01-04	Wapakoneta	40.5389	-84.2017	F, Mq, CM[P], B, N.
P03W08	West Auglaize Street	0.35	34.6	04100007-01-04	Wapakoneta	40.5658	-84.2261	F2, MQ, CM[D P], B, N.
Pusheta Creek Tributary at RM 4.30 (04-235-001)								
P03G22	Owl Creek Road	0.5	3.8	04100007-01-04	Wapakoneta	40.5333	-84.2035	F, Mq, CM.
Owl Creek (04-236-000)								
P03G23	Owl Creek Road	3.0	4.4	04100007-01-04	Wapakoneta	40.5331	-84.2281	F, Mq, CM.
P03G24	Kohler Road	0.4	5.8	04100007-01-04	Wapakoneta	40.5628	-84.2261	F, Mq, CM.
Quaker Run (04-237-000)								
P03P16	State Route 67	0.08	4.4	04100007-01-05	Wapakoneta	40.5742	-84.1836	F, Mq, CM.
Dry Run (04-238-000)								
P03G17	State Route 67	0.27	5.8	04100007-01-05	Wapakoneta	40.5978	-84.1464	F, Mq, CM.
Blackhoof Creek (04-239-000)								
P03G14	Blank Pike	3.3	10.1	04100007-01-02	Uniopolis	40.5850	-84.0980	F, Mq, CM.
P03G15	Hengstler Road	0.78	12.7	04100007-01-02	Uniopolis	40.607	-84.1131	F, Mq, CM, B.

Station	Site Name	River Mile	Area (mi²)	HUC12	USGS Quad	Lat.	Lon.	(refer to key on page 11) Sampling
Huffman Creek (04-240-000)								
P03S23**R**	SR 65	1.63	2.7	04100007-01-02	Uniopolis	40.6039	-84.0872	F, Mq, CM[P], N.
P03S22	Townline Lima Road	0.33	3.3	04100007-01-02	Uniopolis	40.6108	-84.1078	F, Mq, CM, B.
Virginia Creek (04-241-000)								
204319	State Route 65	0.9	5.5	04100007-01-03	Uniopolis	40.6258	-84.0897	F, Mq, CM.
Camp Creek (04-242-000)								
P03G09	Yonder Rd	2.3	3.1	04100007-01-03	Lima	40.6770	-84.0597	F, Mq, CM.
P03G10	Amherst Road	0.6	5.8	04100007-01-03	Lima	40.6558	-84.0697	F, Mq, CM.
Wrestle Creek (04-243-000)								
P03G11	Graham Road	4.69	3.7	04100007-01-03	Uniopolis	40.6234	-84.0131	F, Mq, CM.
P03G12	River Road	0.34	11.9	04100007-01-03	Lima	40.6437	-84.0654	F, Mq, CM[D], B.

[S] – Superior High Quality Water. **M** – modified reference site. **R** – reference site.

F- one pass fish. F2 – two pass fish. MQ – macroinvertebrate (HD). Mq – macroinvertebrate (qualitative). CM – chemistry metals. CMO – Chemistry metals with organics. S – sediment. DW – drinking water. L – lake. WWTP CM – wastewater treatment plant outfall chemistry metals. B – E. coli bacteria. [D] – Dissolved Organic Carbon sample site. [P] – Pesticide Site. N – nutrient site. FT – fish tissue.

Appendix 3 – NPDES permitted facilities

Nested Sub-watershed (04100007-)	Ohio Permit Number	Facility Name	Design Flow[1] (MGD)	Average Flow[2] (MGD)	Type of Waste[3]	Stream and River Mile at Discharge	County
01-01	2IH00112	Rudolph Foods Inc		0.003	Storm water	UT to Auglaize River	Allen
09-03	2IJ00010	National Lime and Stone Co- Bloomlock	1.0		Industrial	Jennings Creek	Allen
01-01	2PA00023	Harrod WWTP	0.09	0.0327	Public	UT to Manahan Ditch, 0.5	Allen
01-01	2PA00100	Westminster WWTP	0.06	0.02234	Public	Auglaize River, 103.42	Allen
02-04	2PC00000	Spencerville WWTP	0.45	0.4928	Public	Sixmile Creek, 3.6 (via UT)	Allen
09-03	2PD00029	Delphos WWTP	3.83	1.055	Public	Jennings Creek, 4.8	Allen
02-02	2IJ00019	National Lime & Stone Co- Buckland	1.625	1.6	Industrial	Auglaize River	Auglaize
01-04	2IJ00086	Quality Ready Mix Inc		0.0072	Storm water	Pusheta Creek	Auglaize
01-04	2IK00002	G.A. Wintzer and Son Co	0.250	0.198	Industrial	Pusheta Creek, 3.74	Auglaize
01-05	2IN00039	TA Travel Center of America			Industrial	Quaker Run, 1.17	Auglaize
01-05	2IN00212	Koneta Rubber Co		0.006	Industrial	Quaker Run, 1.17	Auglaize
01-02	2PA00054	Uniopolis WWTP	0.04	0.01	Public	Huffman Creek, 1.7	Auglaize
02-02	2PA00103	Buckland WWTP	0.0271	0.1237	Public	Auglaize River	Auglaize
01-05	2PD00019	Wapakoneta WWTP	4.0	2.624	Public	Auglaize River, 84.9	Auglaize
02-01	2PG00013	Sherwood Forest Subdivision	0.01	0.008	Public	Auglaize River	Auglaize
02-02	2PG00073	Beverly Hills Subdivision	0.02	0.009	Public	Auglaize River, 82.27	Auglaize
01-02	2PG00090	Arrowhead Estates WWTP	0.012	0.007	Public	Blackhoof Creek	Auglaize
01-05	2PP00025	ODOT Rest Area 7-26	0.028	0.004	Public	Auglaize River	Auglaize
02-01	2PR00126	Wapakoneta Country Club	0.002	0.0001	Public	Hauss Ditch, 0.14	Auglaize
01-05	2PR00256	Wapakoneta Lima South KOA	0.015	0.002	Public	Quaker Run, 1.3	Auglaize
01-04	2PR00262	Glacier Hill Lakes No 1	0.03	0.006	Public	Pusheta Creek, 6.38	Auglaize
02-01	2PW00006	K/Z Sewer District	0.01	0.0034	Public	Sherer Ditch	Auglaize
02-01	2PW00007	Country Club Hills WWTP	0.002	0.0016	Public	Shipline Ditch #51	Auglaize
01-05	2PY00076	Lakeside Estates MHP	0.009	0.0039	Public	Quaker Run	Auglaize
09-07	2PB00031	Oakwood WWTP	0.150	NA[4]	Public	Auglaize River, 19.82	Paulding
09-04	2PA00052	Fort Jennings WWTP	0.055	NA[4]	Public	Auglaize River, 44.18	Putnam
09-05	2PR00288	Oak Haven Residential Care Center	0.00265	0.0046	Public	Lapp Ditch	Putnam
09-03	2IH00113	Bunge North America East		0.027	Industrial	Jennings Creek	Van Wert
09-03	2IJ00103	National Lime and Stone Co- Delphos	1.2	1	Industrial	Jennings Creek, 6.56	Van Wert

1 Design flows that are greater than 1.0 million gallons per day (MGD) classify a facility as a major discharger.
2 Average flows are displayed for September 2017 through August 2018 unless otherwise noted.
3 Storm water indicates that this facility is only designed to treat storm water associated with an industrial activity and therefore does not have a design flow rate.
4 Controlled discharge

Appendix 4 – List of physical/chemical parameters

Parameter	Method	Stream	Lake	Sediment	Fish Tissue
Oxygen Demand					
BOD, 5 day	SM 5210B	2 mg/L			
cBOD, 20 day	OEPA 310.2	2 mg/L			
COD	SM 5220D	20 mg/L			
Physical Properties					
Alkalinity	USEPA 310.1	5 mg/L	5 mg/L		
Hardness	USEPA 200.7	10 mg/L	10 mg/L		
Specific Conductance	SM 2510B	1 µS/cm	1 µS/cm		
Total Dissolved Solids	SM 2540C	10 mg/L	10 mg/L		
Total Suspended Solids	SM 2540D	5 mg/L	5 mg/L		
Turbidity	OEPA 180.1		2 NTU		
% Solids	SM 2540G			0%	
% Lipids	OEPA 581.5				0%
Nutrients					
Ammonia	USEPA 350.1	0.05 mg/L	0.05 mg/L		
Nitrate-Nitrite	USEPA 350.1	0.5 mg/L	0.5 mg/L		
Nitrite	USEPA 353.2	0.02 mg/L	0.02 mg/L		
Total Kjeldahl Nitrogen	USEPA 351.2	0.2 mg/L	0.2 mg/L		
Total Phosphorus	USEPA 365.4	0.01 mg/L	0.01 mg/L	50 mg/kg	
Orthophosphate	USEPA 365.4	0.01 mg/L	0.01 mg/L		
Total Organic Carbon	SM 5310B	2 mg/L	2 mg/L	0.1%	
Dissolved Organic Carbon	SM 5310C	2 mg/L			
Anions					
Carbonate/Bicarbonate	SM 2320B		5 mg/L		
Chloride	USEPA 325.1	5 mg/L	5 mg/L		
Sulfate	USEPA 375.2	10 mg/L	10 mg/L		
Cations					
Aluminum	USEPA 200.7	200 µg/L	200 µg/L		
Barium	USEPA 200.7	15 µg/L	15 µg/L		
Calcium	USEPA 200.7	2 mg/L	2 mg/L		
Iron	USEPA 200.7	50 µg/L	50 µg/L		
Magnesium	USEPA 200.7	1 mg/L	1 mg/L		
Manganese	USEPA 200.7	10 µg/L	10 µg/L		
Potassium	USEPA 200.7	2 mg/L	2 mg/L		
Sodium	USEPA 200.7	5 mg/L	5 mg/L		
Strontium	USEPA 200.7	30 µg/L	30 µg/L		
Metals					
Zinc	USEPA 200.7	10 µg/L	10 µg/L	8 mg/kg	
Arsenic	USEPA 200.8/SM 3113B	2 µg/L	2 µg/L	0.8 mg/kg	0.05mg/kg
Cadmium	USEPA 200.8/SM 3113B	0.2 µg/L	0.2 µg/L	0.08 mg/kg	.004 mg/kg
Chromium	USEPA 200.8	2 µg/L	2 µg/L	0.8 mg/kg	

Parameter	Method	Stream	Lake	Sediment	Fish Tissue
Copper	USEPA 200.8	2 µg/L	2 µg/L	0.8 mg/kg	
Lead	USEPA 200.8/SM 3113B	2 µg/L	2 µg/L	0.8 mg/kg	0.04 mg/kg
Nickel	USEPA 200.8	2 µg/L	2 µg/L	0.8 mg/kg	
Selenium	USEPA 200.8/SM 3113B	2 µg/L	2 µg/L	0.8 mg/kg	0.05 mg/kg
Silver	USEPA 200.8			0.08 mg/kg	
Mercury	USEPA 245.1/SM 3113B			0.02 mg/kg	0.02 mg/kg
Bacteria					
Escherichia coliform	USEPA 1603	2 CFU			
Algal Biomass/Toxins					
Chlorophyll a	USEPA 445.0	0.3 µg/L	0.3 µg/L		
Microcystins	OEPA 701.0		0.3 µg/L		
Saxitoxin	OEPA 702.0		0.022 µg/L		
Cylindrospermopsin	OEPA 703.0		0.05 µg/L		
Organic Compounds					
Atrazine	OEPA 704.0	0.2 µg/L	0.2 µg/L		
Semi-volatile organics	USEPA 625	2-20 µg/L			
Semi-volatile organics	USEPA 8270C			.4-2 mg/kg	
Aldrin	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
a-BHC	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
b-BHC	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
d-BHC	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
y-BHC	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
4,4'-DDD	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
4,4'-DDE	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
4,4'-DDT	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Dieldrin	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Endosulfan I	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Endosulfan II	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Endosulfan Sulfate	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Endrin	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Endrin Aldehyde	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Heptachlor	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Heptachlor Epoxide	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Methoxychlor	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Mirex	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
Hexachlorobenzene	USEPA 8082A/OEPA 590.1			4 µg/kg	10 µg/kg
PCB-1016	USEPA 8082A/OEPA 590.1			20 µg/kg	50 µg/kg
PCB-1221	USEPA 8082A/OEPA 590.1			20 µg/kg	50 µg/kg
PCB-1232	USEPA 8082A/OEPA 590.1			20 µg/kg	50 µg/kg
PCB-1242	USEPA 8082A/OEPA 590.1			20 µg/kg	50 µg/kg
PCB-1248	USEPA 8082A/OEPA 590.1			20 µg/kg	50 µg/kg
PCB-1254	USEPA 8082A/OEPA 590.1			20 µg/kg	50 µg/kg
PCB-1260	USEPA 8082A/OEPA 590.1			20 µg/kg	50 µg/kg

Appendix 5 – Safety contacts and hospital locations

Safety:	
County Wildlife Officers:	**County Sheriff:**
Allen County – (419) 429-8379 Auglaize County – (937) 372-5639 Paulding County – (419) 429-8390 Putnam County – (419) 429-8391 Van Wert County – (419) 429-8395	Allen County – (419) 227-3535 Auglaize County – (419) 739-6565 Paulding County – (419) 399-3791 Putnam County – (419) 523-3208 Van Wert County – (419) 238-3866
OEMA:	**State Highway Patrol:**
Allen County – (419) 993-1404 Auglaize County – (419) 739-6725 Paulding County – (419) 399-3500 Putnam County – (419) 538-7315 Van Wert County – (419) 238-1300	Allen/Putnam County – (419) 228-2421 Auglaize County – (419) 738-8010 Van Wert/Paulding County – (419) 238-3055
Hospitals:	
St. Rita's 730 W. Market Street Lima, OH (419) 227-3361	Memorial 1001 Bellefontaine Ave Lima, OH (419) 228-3335
Mercy 1404 E. 2nd Street Defiance, OH (419) 782-8444	

Appendix 6 – US EPA, CRL pesticide sample collection procedures

Standard Operating Procedure for collection of water samples for pesticide analysis

1. Collect one grab sample/site in a glass container (pesticide samples cannot be collected in plastic containers). Rinse container with water from the collection site before collecting the sample.
2. Apply labels to 40 ml amber vials before filling. Label each vial with the site number, collection date, and collection time. Use a Sharpie to fill in the labels. The labels will be included with the vial shipment.
3. Fill 2 vials/site. Collect two QC samples of an additional 6 vials each from two randomly selected sites/round of sampling. Each QC site will have a total of 8 vials collected from it.
4. Fill each vial almost to the top leaving a small air gap. Store standing up on ice or reusable ice substitute freeze packs in the coolers provided.
5. Record collection information on CRL chain of custody forms (will be shipped with vial shipment).
6. Pack 10 vials/Ziploc bag in cooler.

CRL SAMPLE SHIPMENT REQUIREMENTS

Before collecting samples, please refer to the attached table for sample sizes, containers, and preservatives. Notify the CRL Sample Custodian (312.353.9083, Snyder.robert@epa.gov) and the CRL Sample Coordinator (312.353.9078, Thompson.robert@epa.gov) before shipping any samples and to arrange for sample receipt.

When packing samples for shipment:

- Seal individual samples in plastic bags, preferably Ziploc bags.
- The temperature of samples requiring refrigeration during transport MUST be maintained at or below 6° C.
- Ice in a sealed plastic bag or reusable ice substitute freeze packs are acceptable cooling media.
- Chain of custody forms MUST be sealed in a large Ziploc bag and taped to the inside of the cooler lid.
- Include the address to which the cooler should be returned.

After items are packed for shipment, secure the cooler with tape and attach a custody seal across the seam of the cooler lid. All samples MUST be shipped overnight to arrive Monday thru Friday or hand-delivered. No deliveries are accepted on weekends or Federal holidays. Exceptions may be made on a case by case basis depending on sampling priority/emergency status.

Send all samples to:
Robert Snyder
US EPA Region 5
Chicago Regional Laboratory
536 S. Clark Street, 10th Floor
Chicago, IL 60605

Appendix 7 Addition – Approval

Appendix 7 was added on May 29, 2019, after original approval. The purpose of appendix 7 is to explain the prioritization strategy for fish tissue collection for the 2019 fish consumption advisory. In addition a tentative list of sites for fish tissue collection is included.

Audrey Rush, Standards and Technical Support Manager — Date: 06/02/2019

Daniel J. Glomski

Dan Glomski, NWDO Water Quality Supervisor — Date: 5/29/2019

Mariah Hood

Mariah Hood, Ohio EPA Fish Tissue Coordinator — Date: 5/29/2019

Ellie Hagen

Ellie Hagen, Division of Surface Water QAO — Date: 5/29/2019

Benjamin A. Rich

Ben Rich, Fish Tissue Field Team Leader — Date: 5/29/2019

Appendix 7 – Fish Tissue Special Survey Prioritization Process

Separate from the Upper Auglaize River survey, special surveys for fish tissue collection will also be conducted. These special surveys keep data current for the fish consumption advisory (***https://epa.ohio.gov/dsw/fishadvisory/index***). The same methods used for tissue collection and processing from the Upper Auglaize watershed survey will be used for the special survey.

The fish tissue program only analyzes data collected within the last ten years, meaning that data from several waterbodies become historic every year. Because it's not possible to collect fish tissue from all waterbodies every ten years, a prioritization system was devised to understand what waterbodies needed current data and how to rank the need. Six levels were developed, detailed in the list below and in Table 1:

- **Priority 1**: Waterbodies with existing DNE advisories with data suggesting possible downgrading
- **Priority 2:** Waterbodies with existing advisories and data more than ten years old
- **Priority 3:** Waterbodies with no existing advisories (due to insufficient sample size), data more than ten years old, and existing data has concentrations within 1/month advisory range or greater
- **Priority 4:** Waterbodies with no existing advisories (due to insufficient sample size), data within 10-year window, and existing data has concentrations within 1/month advisory range
- **Priority 5:** Waterbodies with no existing advisories (due to insufficient sample size), existing data more than ten years old, all existing data have concentrations within state-wide advisory
- **Priority 6:** Waterbodies with existing data within 10-year window, otherwise flagged for follow up
- **No priority:** Waterbodies with existing data within 10-year window, either in the state-wide or a waterbody-specific advisory

Table 3. Explanation of six tissue collection priority levels, which incorporates age of data, existing contaminant concentrations, and sample number. Please note that prioritization is based by waterbody, not individual fish species; the highest rank found within the waterbody is applied to all species.

Priority	DNE advisory	Existing advisory	Data older than 2010	Insufficient sample size		Other reasons for follow-up
				Data suggests advisory needed	Data suggests no advisory needed	
1	X					
2		X	X			
3			X	X		
4				X		
5			X		X	
6						X
no priority						

Fish tissue will be collected from waterbodies within Priority 1 first, then descending through the priorities as time and resources allow. This prioritization system will be updated every year to evaluate collection needs for the upcoming field season.

For the 2019 field season, sampling sites were selected for Priorities 1 and 2 from existing stations (see Table 2); because of the numerous waterbodies and species within these two levels, sampling sites were not selected for waterbodies in Priorities 3 through 6.

Table 4. List of sites for fish tissue special survey. Please note that only Priority 1 and 2 locations were selected due to the large volume of sites; field crews will collect as many samples as possible as weather and time permit.

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
1	Dicks Creek	Dst AK Steel 002/Upst Monro Ditch	H09P26	2.82	14-018-000	42	39.4739	-84.39	Carp, White sucker, creek chub, green sunfish, longear sunfish, golden redhorse, yellow bullhead, smallmouth, largemouth, white crappie, and channel catfish	3/per species	Do not eat
1	Dicks Creek	At AK Steel 002 outfall	H09P25	2.92	14-018-000	42	39.4736	-84.3878			
1	Dicks Creek	0.5 Mi upst yankee rd, dst AK 003/015, Upst 002	H09W90	3	14-018-000	41	39.4731	-84.3861			
1	Dicks Creek	Dst AK Steel 003 and 015	H09S18	3.62	14-018-000	41	39.4733	-84.3756			
1	Dicks Creek	Dst AK Steel 003 Upst AK Steek 002	H09G03	3.7	14-018-000	41	39.4736	-84.3733			
1	Dicks Creek	At AK Steel 003 outfall	H09P24	3.8	14-018-000	40	39.47379	-84.372958			
1	Dicks Creek	AK Steel 015, Upst AK Steel 003	H09G02	3.9	14-018-000	40	39.4744	-84.3703			
1	Dicks Creek	AK Steel 015 Mixing Zone	H09P23	4.04	14-018-000	39	39.4741083	-84.3679278			
1	Dicks Creek	High Tension Wires Upst AK Steel 015	H09S22	4.11	14-018-000	39	39.4736	-84.3667			
1	Dicks Creek	0.1 Mi Upst AK Steel 015, Shaker Creek	H09P22	4.14	14-018-000	39	39.4735028	-84.3662806			
1	Great Miami River	At Dayton, upst Chessie RR	201907	84.6	14-001-000	1172	39.8183	-84.1564	**Channel Cat, Carp (priority**). If you get any rock bass, largemouth, smallmouth, or Flatheads fillet them as well.	3/per species	**Do not eat for Channel cat and carp.** 1/month for rock bass, largemouth, smallmouth, and flatheads
1	Great Miami River	Dst Stillwater R @ island park	300713	82.49	14-001-000	1851	39.77708	-84.1981908			
1	Great Miami River	Dst Dayton WWTP	H09W55	75.31	14-001-000	2595	39.7093	-84.2318			

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	Duck Creek	At Stanleyville at Co Rd 42	C01G04	11.2	06-300-000	267	39.4705	-81.4116	Carp, sauger, saugeye, black crappie, drum	3/per species	1/month
2	Duck Creek	NE of Marietta @ end of TWP rd 343	C01G03	5.5	06-300-000	278	39.4491	-81.4197			
2	Duck Creek	Near Marietta @ SR 26	609180	1.77	06-300-000	284	39.4264	-81.4217			
2	Duck Creek	Near Marietta at SR 7	C01S15	0.43	06-300-000	286	39.4089	-81.4228			
2	Licking River	At Newark, Dst. Quarry Run	R13W06	29.8	17-200-000	530	40.0503	-82.3855	Channel Catfish	3/per species	1/month
2	Licking River	Upst Stadden Bridge	R13W12	27	17-200-000	536	40.0609	-82.3422			
2	Licking River	Near Claylick co rd 668	R13P03	23.35	17-200-000	550	40.0606	-82.2889			
2	Licking River	SE of Nashport, Adj Old RR grade	201149	14.8	17-200-000	685	40.0625	-82.1714			
2	Licking River	At Dillon Falls at Dillion Falls Rd	R13S27	3.68	17-200-000	753	39.9707	-82.0565			
2	Ottawa R	NW of Lafayette @Cool Rd	P04K05	47.13	04-200-000	97	40.7733	-83.9933	Rock bass, smallmouth bass	3/per species	1/month
2	Ottawa R	Upst Lima @Thayer Rd	500270	45.97	04-200-000	99	40.7656	-84.0131			
2	Ottawa R	E of Lima @Fetter Rd	500230	44.3	04-200-000	102	40.7569	-84.0372			
2	Ottawa R	Roush Rd	P04S26	42.61	04-200-000	122	40.7486	-84.0658			
2	Ottawa R	At Lima @Schoonover Park	P04S15	40.9	04-200-000	125	40.7497	-84.0939			
2	Ottawa R	At St Rt 309	P04S40	25.4	04-200-000	167	40.7919	-84.2153			
2	Ottawa R	At Rimer @St Rt 189	P04P15	15.9	04-200-000	217	40.8842	-84.2131			

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	Sandusky R	At Upper Sandusky @ US Rt 30	U02W02	82.07	05-001-000	292	40.827556	-83.27102	Channel Catfish 16" and over, Rock bass, smallmouth bass	3/per species	1/month
2	Sandusky R	At Upper Sandusky @ Elliot St	U02P36	81.23	05-001-000	293	40.833956	-83.27022			
2	Sandusky R	Dst Upper Sandusky @TWP Rd 121	500860	78.09	05-001-000	298	40.8506	-83.2564			
2	Sandusky R	0.35 Mi Upst Heck Bridge	201323	54.7	05-001-000	769	41.006456	-83.189319			
2	Sandusky R	Former St Johns Dam Pool RL Bank	300548	50.2	05-001-000	772	41.0299861	-83.2159222			
2	Sandusky R	Upst Tiffin @ US RT 224, upst Dam	500940	42.92	05-001-000	960	41.095655	-83.19882			
2	Sandusky R	upst Fremont, Upst Wolf Creek	U4Q06	23	05-001-000	1073	41.2779583	-83.1647306			
2	Sandusky R	Upst Ballville Dam, Adj S River Rd	300830	19	05-001-000	1255	41.325422	-83.152611	Common Carp, smallmouth buffalo **(the prescribed target species from the upst sites also qualify all the way to the mouth, so do dnst sites first and try to collect everything on the list to hopefully reduce effort upst)**	3/per species	1/month
2	Sandusky R	upst Fremont WWTP	U04Q03	14.2	05-001-000	1262	41.359252	-83.100718			

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	Wheeling Creek	At Blaine @Pease Rd	C03S18	5.05	06-800-000	97.6	40.0669	-80.8086	Smallmouth bass	3/per species	1/month
2	Wheeling Creek	Near Bridgeport @co rd 24	609230	1.9	06-800-000	104	40.0669	-80.7672			
2	Wolf Creek	At Dayton, upst Dayton Tire	H09W97	1.6	14-037-000	69	39.7653	-84.2339	Common carp	3/per species	1/month
2	Wolf Creek	At Dayton @Rosedale Ave	H09W99	1.05	14-037-000	70	39.7606	-84.2258			
2	Wolf Creek	At Dayton @ Summit St	203508	0.8	14-037-000	70	39.7597	-84.2208			
2	Wolf Creek	At Dayton @Sunrise Ave	H09W01	0.04	14-037-000	70.4	39.7586	-84.2078			
2	Mohican R	At Greer @st Rt. 514	601870	16.92	17-700-000	948	40.5222	-82.1958	Common Carp and Rock Bass	3/per species	1/month
2	Mohican R	At Brinkhaven, Upst US Rt 62	200636	11.5	17-700-000	967	40.4664	-82.1944			
2	Mohican R	Near mouth @St. Rt 715	200634	0.5	17-700-000	998	40.3658	-82.1575			
2	Portage R	Upst Oak Habrnor, Adju St Rt 105	201088	13.8	16-001-000	498	41.5011	-83.1644	Channel cat and Common Carp	3/per species	1/month
2	Portage R	Upst. Port Clinton WWTP	S99Q02	13.3	16-001-000	511	41.50363	-83.156997			
2	Portage R	At Oak Harbor @ St Rt 19	S02P06	12.55	16-001-000	516	41.504796	-83.145214			
2	Toussaint R	At St Rt 19	S03G01	4.65	16-213-000	122	41.5785	-83.1449	Common Carp	3/per species	1/month

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	Clear Creek	SE of Revenge, Adj Lake Romonat	J01W13	5.9	01-400-000	78	39.5978	-82.6383	Common carp	3/per species	1/month
2	Clear Creek	Dst Metro Park office	201756	4.8	01-400-000	85	39.5917	-82.6227			
2	Clear Creek	At USGS gage @Camp Wyandot Bridge	J01S01	2.03	01-400-000	89	39.5883	-82.5783			
2	Clear Creek	S of Sugar Grove @US Rt 33	601620	0.09	01-400-000	91.8	39.5969	-82.5467			
2	L Miami R	At South Lebanon @old St Rt 48	M05S25	33.57	11-001-000	969	39.3683	-84.2175	Common Carp 24" and over, Freshwater Drum 16" and over, Sauger, Silver Redhorse, Smallmouth Bass	3/per species	1/month
2	L Miami R	S of Loveland, Just upst I-275	M05W39	20.9	11-001-000	1160	39.2387	-84.2967			
2	L Miami R	At Beechmont Ave	600580	3.5	11-001-000	1744	39.109	-84.4015			
2	Mill Creek	At Doyle Rd	G02S05	9.69	03-120-000	80	41.7619	-80.7903	Largemouth bass and rock bass	3/per species	1/month
2	Salt Creek	NE of Richmond Dale @W Junction Rd	V11S03	5.95	02-600-000	292	39.2308	-82.7789	Channel Catfish ≥18", sauger, smallmouth bass, spotted bass and flathead catfish	3/per species	1/month
2	Salt Creek	SW of Richmond Dale, near mouth (Boat)	200214	0.3	02-600-000	555	39.1914	-82.8281			
2	Salt Lick Creek	At Twp Rd 216	606120	7.25	02-610-000	100	39.1678	-82.7542	Spotted Bass	3/per species	1/month
2	Salt Lick Creek	2Mi NE of Richmond Dale @Mouth	V12P01	0.01	02-610-000	247	39.217263	-82.775991			

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	Ohio Brush Creek	At US 52	300290	0.5	10-200-000	435	38.6758	-83.4481	Spotted Bass	3/per species	1/month
2	Yellow Creek	Dst confluence of North Fork	C04K60	3.3	06-900-000	224	40.5511	-80.7022	Freshwater Drum	3/per species	1/month
2	Yellow Creek	Upst Hollow Rock Run, Adj St Rt 213	200252	1.4	06-900-000	226	40.5625	-80.6758			
2	Paint Creek	Upst Washington Court House WWTP @Elm St	V01S34	69.7	02-500-000	67	39.5347	-83.4253	Largemouth Bass	3/per species	1/month
2	Paint Creek	Dst Paint Creek Dam	300053	39.14	02-500-000	570	39.2515	-83.3524			
2	Paint Creek	0.8 Mi Upst N FK Adj Polk Hollow Rd @ Bend in Rd	V10K17	8.9	02-500-000	895	39.3053	-83.0356			
2	Paint Creek	At Chillicothe @St Rt 772	V10P06	3.8	02-500-000	1138	39.32	-82.9789	Largemouth Bass and Common Carp	3/per species	1/month
2	Paint Creek	Dst Mead Paper @ St Rt 104	6000990	1.89	2-500-000	1142	39.3072	-82.96			
2	Paint Creek	Near Chillicothe @ mouth	V1S08	0.1	02-500-000	1144	39.2944	-82.9336			
2	Chagrin R	At Willoughby @ Ridge Rd (St Rt84)	31394	4.8	15-001-000	246	41.63	-81.4003	Smallmouth Bass and Rock Bass	3/per species	1/month
2	Chagrin R	At Willoughby @ Todd Field Restoration	302247	4.2	15-001-000	246	41.639443	-81.402087			
2	Chagrin R	At Willoughby, Dst Mentor Ave (US RT 20)	D01Q04	3.9	15-001-000	246	41.642847	-81.402934			
2	Chagrin R	At Park off Reeves Rd	D01G06	2.72	15-001-000	250	41.658047	-81.408234			
2	Fourmile Creek	Near Darrtown @ St Rt 177	H10S02	11.01	14-400-000	137	39.4875	-84.6529	Smallmouth Bass 17" and over	3/per species	1/month
2	Fourmile Creek	Near Darrtown @Darrtown Rd	H10S21	11.75	14-400-000	136	39.4881	-84.6667			
2	Fourmile Creek	At Eaton Rd	H10S01	5.39	14-400-000	163	39.4631	-84.5828			

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	L. Beaver Creek	Upst Sprucevale Rd	201504	11	08-001-000	266	40.705663	-80.579793	Channel Catfish, Common Carp, Sauger, Smallmouth Bass 12" and over	3/per species	1/month
2	L. Beaver Creek	Near Fredericktown @St Rt 170	L01P26	7.95	08-001-000	294	40.712863	-80.546491			
2	L. Beaver Creek	Near East Liverpool @ Grimms Bridge Rd	602000	4.5	08-001-000	496	40.6758	-80.5408			
2	M. Fk. L. Beaver Creek	Dst Lisbon Dam @ US Rt 30	201487	12.4	08-200-000	103	40.772187	-80.77887	Freshwater Drum, Smallmouth Bass, Smallmouth Buffalo, Common Carp, Flathead Catfish, and Sauger	3/per species	1/month
2	M. Fk. L. Beaver Creek	At Lisdon @SR45/US 30	19251	10.9	08-200-000	105	40.77066	-80.7567			
2	M. Fk. L. Beaver Creek	0.63 mi Dst Lisbon WWTP	L01K10	10	08-200-000	112	40.76756	-80.739799			
2	M. Fk. L. Beaver Creek	Dst Lisbon @Hutton Rd	302100	8.97	08-200-000	114	40.765171	-80.72298			
2	M. Fk. L. Beaver Creek	Elkton WWTP	302586	8.42	08-200-000	125	40.76642	-80.7133			
2	M. Fk. L. Beaver Creek	Beaver Creek State Park Canoe Livery	L01K09	4.8	08-200-000	137	40.743661	-80.670596			
2	M. Fk. L. Beaver Creek	At Bear Hollow Rd	L01S43	1.85	08-200-000	141	40.733962	-80.641195			
2	M. Fk. L. Beaver Creek	NW of E Liverpool @ ST RT 7	L01P22	0.52	08-200-000	149	40.722862	-80.633995			
2	Sevemile Creek	Upst Eaton @ Washington-Jackson Rd	H10S29	28.15	14-410-000	21.2	39.7658	-84.6536	Rock bass	3/per species	1/month
2	Sevemile Creek	Dst Eaton WWTP Outfall	H10W02	25.12	14-410-000	31	39.7303	-84.6347			
2	Sevemile Creek	Dst Somerville @A. Wayne Pkwy	H10S22	9.28	14-410-000	9.28	39.5528	-84.6372			

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	Twin Creek	N of New Lexington, Dst. Price Creek	200244	29.7	14-500-000	131	39.7792	-84.5242	Smallmouth Bass	3/per species	1/month
2	Twin Creek	Dst West Alexandria WWTP	H08W20	26.7	14-500-000	143	39.7408	-84.5211			
2	Twin Creek	Upst Gratis WWTP @Enterprise Rd	H08S16	19.26	14-500-000	225	39.6561	-84.5119			
2	Twin Creek	Dst. Germantown Dam @USGS gage	H08W16	9.72	14-500-000	275	39.6381	-84.3994			
2	Twin Creek	NW of Franklin @Chamberlain Rd	H08W15	3.3	14-500-000	312	39.5858	-84.3442			
2	Tymochtee Creek	At St Rt 37, Adj. Cemetery	U01Q02	41.4	05-300-000	131	40.691956	-83.397423	Channel Catfish	3/per species	1/month
2	Tymochtee Creek	Near Upper Sandusky @TWP Rd 49	U02P44	19.6	05-300-000	200	40.846756	-83.361322			
2	Tymochtee Creek	Dst. L Tymochtee Creek @ St Rt 103	U01G01	4.7	05-300-000	264	40.941656	-83.309322			
2	Wakatomika Creek	At Hamby Hill Rd (Lower)	R11G09	18.73	17-960-000	120	40.1616	-82.165	Rock bass, Smallmouth Bass	3/per species	1/month
2	Wakatomika Creek	Upst Frazysburg WWTP @Co Rd 82	R11S07	12.43	17-960-000	155	40.1081	-82.1272			
2	Wakatomika Creek	Dst Frazysburg WWTP	R11S05	11.65	17-960-000	156	40.1086	-82.1167			
2	Wakatomika Creek	NW of Dresden @ St Rt 60	R11P09	1.9	17-960-000	231	40.1325	-82.025			
2	Wakatomika Creek	At Dresden @N Dresden Rd	R11S01	1.26	17-960-000	234	40.1292	-82.0153			
2	Scioto River	At Greenlawn Ave	600860	129.5	02-001-000	1617	39.9389	-83	Smallmouth Buffalo	3/per species	1/month
2	Scioto River	At Circleville, Upst US Rt 22, Upst Hargus Cr	V07K03	100.1	02-001-000	3197	39.6052778	-82.95611			
2	Scioto River	Scioto R, Near Chillicothe @US Rt 35	600920	64.46	02-001-000	3865	39.3056	-82.9203			

Table 2, continued

Priority	Stream	Location	Station ID	RM	River Code	DA	Lat	Long	Species to Target	Cumulative no. samples	Existing advisories
2	Stillwater River	Near Pleasant Hill @ Lauver Rd	H06P03	27.86	14-200-000	503	40.0578	-84.3558	White Crappie	3/per species	1/month
2	Stillwater River	Near Union @Old Springfield Rd	H06P18	12.23	14-200-000	641	39.9094	-84.2978			
2	Stillwater River	At Roadside Park Just Upst Englewood Dam	H06W28	9.1	14-200-000	650	39.8703	-84.2864			
2	Stillwater River	Dst Englewood WWTP	H06S19	8.6	14-200-000	652	39.8681	-84.2781			
2	E. Fk. L. Miami R.	Upst. Williamsburg @Blue Sky Park Rd	M04S11	44.1	11-100-000	195	39.1144	-84.0247	Flathead Catfish	3/per species	1/month
2	E. Fk. L. Miami R.	Just Upst East Fork Lake	M99Q07	30.4	11-100-000	249	39.0336	-84.0647			
2	E. Fk. L. Miami R.	Dst Lower East Fork Regional WWTP	M04S30	4.7	11-100-000	491	39.1483	-84.2581			
2	Olentangy River	At USGS Gage, Dst Delaware Reservior	V04P01	32.1	02-400-000	393	40.355361	-83.06771	Smallmouth Bass	3/per species	1/month
2	Olentangy River	0.3 mi, Dst Delaware Reservior @Main Rd	V04P39	32	02-400-000	393	40.353961	-83.06801			
2	Olentangy River	E of Powell @Powell Rd	V04G24	15	02-400-000	483	40.1572	-83.0453			
2	W. BR. Black R.	E of Oberlin @ metro park ford	B01K19	13.5	20-020-000	131	41.2808	-82.1503	White Sucker	3/per species	1/month
2	W. BR. Black R.	At Metroparks Equestrian Area	30934	10.2	20-020-000	132	41.29502	-82.1486			
2	Whitewater R.	At Harrison @Ohio/Indiana state line	H11S27	8.28	14-300-000	1369	39.2489	-84.8197	Sauger	3/per species	1/month
2	Whitewater R.	At Lane off Lawrenceburg Rd, 1.8mi N of I-275	H11W65	3.8	14-300-000	1384	39.2094	-84.7931			
2	Whitewater R.	W of Hooven @Suspension Bridge Rd	H22S26	1.5	14-300-000	1469	39.1831	-84.7928			

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