



Quality Assurance Project Plan (QAPP) for Maumee River AOC BUI Evaluation, 2021



Ohio EPA
Division of Surface Water
April 2021

Quality Assurance Project Plan (QAPP) for Maumee River AOC BUI Evaluation, 2021

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Prepared by:

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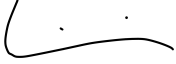
Mike DeWine
Governor, State of Ohio

Laurie A. Stevenson
Director, Ohio Environmental Protection Agency

A1 – Title and Approval

Quality Assurance Project Plan for Maumee River AOC BUI Evaluation – 2021.

Brian W Hall Date: 5/26/21
Brian Hall, Assistant Chief

 Date: 05/26/21
Mari Piekutowski, AMS Manager

Audrey Rush Date: 05/26/21
DSW Quality Assurance Coordinator (vacant)

_____ Date: _____
Cherie Blair, Maumee AOC Coordinator

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A3 – Distribution List

This QAPP will be distributed to the following division management and staff and saved on the Division of Surface Water (DSW) collaboration site.

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
Mari Piekutowski, Environmental Manager	marianne.mansfield@epa.ohio.gov	(614) 644-2876
Audrey Rush, Environmental Manager	audrey.rush@epa.ohio.gov	(614) 644-2035
Sarah Becker, Environmental Specialist 3	sarah.becker@epa.ohio.gov	(614) 728-2385
DSW Northwest District Office		
Vacant, Environmental Supervisor		
Cherie Blair, Environmental Specialist 3	Cherie.blair@epa.ohio.gov	(419) 373-3010
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
Steve Roberts, Environmental Supervisor	steven.roberts@epa.ohio.gov	(614) 644-4225

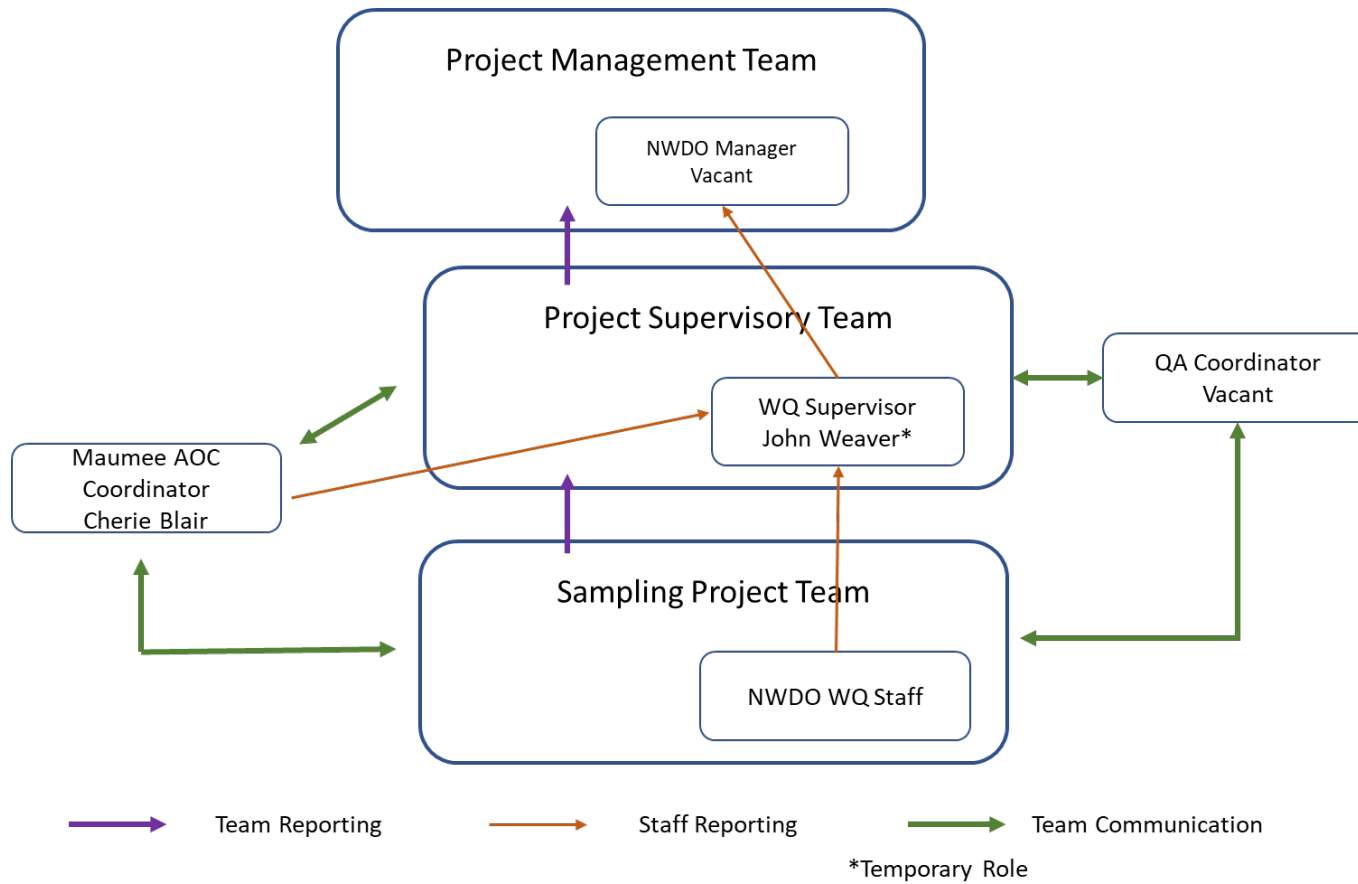
A4 – Project Organization and Communication

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.
(vacant) Standards and Tech Support QA Officer	DSWs quality management program.	Develop and implement field QA/QC guidelines. Track field QA/QC and staff training. Review and approve QAPP.
(vacant) District Section Manager District Surface Water	Implementing division goals at the district level.	Review documents and reports; suggest changes and edits; obtain approvals and signatures.
(vacant) Northwest 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.
Northwest District Water Quality Unit	Water data collection, validation and management.	Help plan study. Schedule and complete assigned field activities. Tabulate data.
Cherie Blair Maumee AOC Coordinator	Confirming data needs for AOC program to evaluate BUIs	Help plan study. Suggest changes and edits. Utilize data for BUI evaluation once verified.

Individual(s) Assigned:	Responsible for:	Authorized to:
Sarah Becker Ecological Assessment Unit Lead Worker	Track project progress, managing data and compiling information.	Provide assistance with data management. Review and comment on reports.
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.

Figure 1 — Organization Chart



A5 – Background

In the *Maumee AOC Eutrophication or Undesirable Algae (BUI #8) Data Summary* (October 30, 2020) some of the data needed for determination of the status of BUI #8 in the Maumee AOC is approaching 10 years old. Newer data is preferred for the removal of a beneficial use impairment (BUI).

A6 – Project Description

The study area includes near shore sites in Maumee Bay and in the Maumee River downstream of river mile 15. The intention of the project under this QAPP is to collect current water quality data necessary to make an updated determination of the status of BUI #8 in the Maumee AOC based on current data.

A7 – Data Quality Objectives

The intention of the project under this QAPP is to collect current water quality data necessary to make an updated determination of the status of BUI #8 in the Maumee AOC.

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 internally documented. 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.

Examples of documents posted to this location include:

Pre-sampling documents:

- Property access forms
- Draft and final QAPP versions

Project documents:

- Data files
- Project photos will be moved to and stored in the Lynx® Photo Manager®. 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 data quality objectives 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.

Samples will be delivered to Ohio EPA DES or an approved contract laboratory. The original chain of custody form is delivered along with the samples. An electronic copy of the form is kept by sampling staff. Sample runs are released from 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 quality control (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.

Section B – Data Generation and Acquisition

B1 – Sampling Process and Design

Sampling will occur after June 1, 2021. Ohio EPA field staff will attempt to sample each site a minimum of 5 times before September 30, 2021. Additional runs may be collected as determined by staff availability.

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.

B2 – Sampling Methods

Sites will be sampled according to protocol detailed in the Quality Assurance Project Plan for Lake Erie Monitoring (Ohio EPA 2021) or Appendix II of the *Surface Water Field Sampling Manual for Water Quality Parameters and Flows* (or updated) as applicable (Ohio EPA 2019). Sites above river mile 5.0 should be surface grabs. Sites below river mile 5.0 should be collected at 0.5m depth. Samples are delivered to Ohio EPA - DES for analyses within the applicable holding time.

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 Sampling Manual for Water Quality Parameters and Flows* (2019b). 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 3 along with the preservatives, holding times, and reporting limits. SOPs for the analytical methods are available upon request.

B5 – Quality Control

Surface Water Chemistry

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. Data will be validated based on the results of the field quality control samples as outlined in Appendix IV in the *Surface Water Field Sampling Manual* (2019). The laboratory will validate data according to the requirements defined in the applicable analytical method (see Appendix 3). Field instruments will be calibrated according to manufacturer guidelines.

B6 – Instrument/Equipment Testing, Inspection and Maintenance

All instruments/equipment will be inspected prior to each use. All field meters are serviced annually 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 instrument's user manual, must be followed. All calibration solutions used will be checked for expiration dates before utilized. All equipment is assigned a logbook that will detail the equipment's calibration and maintenance history. For more details, see Appendix II of the *Surface Water Field Sampling Manual for Water Quality Parameters and Flows*.

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, 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 solely of field sampling. Only Ohio EPA results will be used in project 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-character station ID 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 Sampling Manual for Water Quality Parameters and Flows* 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, 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 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 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 intention of the project under this QAPP is to collect current water quality data necessary to make an updated determination of the status of BUI #8 in the Maumee AOC. A table of data will be provided to the AOC Coordinator and the management team at the conclusion of the project.

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.

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

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.

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. 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 for Water Quality Parameters and Flows*. 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 for Water Quality Parameters and Flows*.

D3 – Reconciliation with Data Quality Objectives

Significant, persistent, or unresolved issues will be brought to the attention of the project study team, division QC personnel 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 #
<u>Water Quality</u>			
Chemistry	12	5	60

Appendix 2 – Streams, sampling locations and sampling types.

Station	Location	Ecoregion	River Mile	Drain (mi ²)	Latitude	Longitude	District	Sampling
Maumee Bay & Maumee River downstream River Mile 5.0								
P11S32	Maumee River near Mouth*	Huron/Erie Lake Plains	0.5	6606	41.6942	-83.4667	NWDO	C
301641	Maumee River at I-280*	Huron/Erie Lake Plains	3.6	6602	41.6603	-83.5078	NWDO	C
302142	Maumee Bay at Maumee Bay State Park*	-	-	-	41.7016	-83.3741	NWDO	C
301788	Maumee Bay at Woodtick*	-	-	-	41.7328	-83.4161	NWDO	C
S03K12	Maumee Bay at Cedar Point NWR	-	-	-	41.7008	-83.3378	NWDO	C
P11K51	Maumee Bay @ Grassy Island, West Shoreline	-	-	-	41.7042	-83.4686	NWDO	C
204188	Maumee Bay at Immergrun	-	-	-	41.6900	-83.4194	NWDO	C
201838	Maumee River at Anthony Wayne Bridge	Huron/Erie Lake Plains	5.8	6397	41.6389	-83.5344	NWDO	C
P11S39	Maumee River near Eagle Point Colony	Huron/Erie Lake Plains	9.4	6389	41.6089	-83.5794	NWDO	C
301644	Maumee River dst. Ewing Island	Huron/Erie Lake Plains	13.3	6367	41.5717	-83.6247	NWDO	C
302431	Maumee River dst Perrysburg WWTP – Mixing Zone	Huron/Erie Lake Plains	14.4	6365	41.5589	-83.6408	NWDO	C
P11K28	Maumee River ust Perrysburg WWTP, ust Ewing Island	Huron/Erie Lake Plains	14.6	6365	41.5611	-83.6439	NWDO	C

*sites are collected as a part of the Lake Erie ambient monitoring program. This project will use the data generated from that effort, and reflects those station locations, but does not change the sampling design or protocols for those sites.

Appendix 3 – List of physical/chemical parameters

Parameter	PCS#	Method	RL	Units	Container	Preservative	Hold	Sample Type
Nitrite	00615	US EPA 353.2	0.02	mg/L	1L LDPE	cool ≤6°C	48 hr.	C
Ammonia	00610	US EPA 350.1	0.05	mg/L	1L LDPE	2 mL H ₂ SO ₄ to pH<2, cool ≤6°C	28d	C
Nitrate-Nitrite	00630	US EPA 350.1	0.5	mg/L			28d	C
Total Kjeldahl Nitrogen	00625	US EPA 351.2	0.2	mg/L			28d	C
Phosphorus, Total	00665	US EPA 365.4	1	µg/L	125ml jar	½ mL H ₂ SO ₄ to pH<2, cool ≤6°C	28d	C
Temperature, Conductivity, Dissolved Oxygen, and pH						Collected on site with field meter.		

Appendix 4 – Safety contacts and hospital locations

COUNTY SHERIFF OFFICES	
COUNTY	PHONE NUMBER
Lucas	(419) 213-4900

COUNTY HOSPITAL LOCATIONS			
COUNTY	HOSPITAL NAME	ADDRESS	PHONE NUMBER
Lucas	Mercy Health St. Anne Hospital	3404 W. Sylvania Avenue, Toledo, OH 43623	(419) 407-2663

References

Ohio Environmental Protection Agency. 2019. Surface Water Field Sampling Manual for water quality parameters and flows. Division of Surface Water. Columbus, Ohio. Version 7.0, April 22, 2019.

____. 2019a. Surface Water Field Sampling Manual Appendix II

____. 2019b. Surface Water Field Sampling Manual Appendix IV, Data Management