



Environmental Protection Agency

Quality Assurance Project Plan (QAPP) for the Bacteria and Public Drinking Water Supply (PDWS) Water Quality Study of Paint Creek and Moxahala Creek Watersheds, 2025 -2026



Ohio EPA Technical Report AMS/2025-PAIMO-1
Division of Surface Water
May 2025

Group A: Project Management and Information/Data Quality Objectives

A1. Title Page

Quality Assurance Project Plan (QAPP) for the Bacteria and PDWS Water Quality Study of Paint Creek and Moxahala Creek Watersheds, 2025-2026

Clark, Clinton, Greene, Fayette, Highland, Licking, Madison, Morgan, Muskingum, Perry, Pickaway, Pike, and
Ross Counties

May 2025

Version 1.0 - Effective 2025-2026

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A2. Approval Page

Quality Assurance Project Plan for the Bacteria and PDWS Water Quality Study of Paint Creek and Moxahala Creek Watersheds, 2025.

	Date:	
Erin Sherer, Division Assistant Chief		
	Date:	
Katherine Harris, DSW Quality Assurance Coordinator		
	Date:	
Michelle Waller, DSW SWDO/Study Coordinator		

List of Acronyms - (Glossary of Terms can be found [here](#))

C	Celsius
CWA	Clean Water Act
DDAGW	Division of Drinking and Ground Waters
DES	Division of Environmental Services
DQO	Data Quality Objective
DSW	Division of Surface Water
DO	Dissolved Oxygen
EA3	Ecological Assessment and Analysis Application
EPA	Environmental Protection Agency
H₂SO₄	Sulfuric Acid
HUC	Hydrologic Unit Code
IR	Integrated Report
ITS	Information Technology Services
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NPS-IS	Nonpoint Source-Implementation Strategy
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QAM	Quality Assurance Manager
QHEI	Qualitative Habitat Evaluation Index
pH	Potential Hydrogen
PWS	Public Water Supply
RL	Reporting Limit
RM	River Mile
UAA	Use Attainability Analysis
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
SM	Standard Method
SOP	Standard Operating Procedure
SOCC	State of Ohio Computer Center
TMDL	Total Maximum Daily Load
TSD	Technical Support Document
Washington CH	Washington Court House
WAU	Watershed Assessment Unit
WQ	Water Quality
WQS	Water Quality Standards
WWTP	Waste Water Treatment Plant

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Document Format

This Quality Assurance Project Plan follows the Quality Assurance Project Plan Standard, Directive Number **CIO 2105-S-02.0**, effective July 18, 2023.

A4. Project Purpose, Problem Definition, and Background

Watershed Monitoring and Assessment History

As part of Ohio's statewide monitoring strategy, recreation and public drinking water supply use assessments will be performed during the 2025 field season in the Paint Creek and Moxahala Creek watersheds. The two study areas encompass Clark, Clinton, Greene, Fayette, Highland, Licking, Madison, Morgan, Muskingum, Perry, Pickaway, Pike, and Ross counties, span one 8-digit Hydrologic Unit Code (HUC) unit (Paint Creek) and two 10-digit HUC units (Moxahala Creek). Paint Creek is comprised of forty-one 12-digit HUC watershed assessment units (WAUs). Moxahala Creek is comprised of eleven 12-digit WAUs. The WAUs and their descriptions are listed in Table 1 and Table 2 and Figures 2 and 3 are maps of the watershed sampling locations. Information collected as part of this survey will support the Data Quality Objectives (DQOs) listed in A7.

The Paint Creek mainstem is 94.7 miles long and combined with its tributaries drains 1144 mi². The biological, chemical, and physical water quality of this study area was last assessed by Ohio EPA in 2006. Results of that study indicated 40% of the sites assessed were meeting Ohio's standard for recreational use. Impairments were due to various causes associated with urban development, rural land use practices, and other site-specific factors. There was insufficient data available from the 2006 survey to determine public water supply use designations in the Paint Creek watershed.

As a result of the 2006 Paint Creek survey, recommendations were made to improve water quality for recreational use including reducing overflows and bypasses of raw/partially treated sewage, technical assistance and regular inspections to ensure home sewage treatment systems (HSTS) are properly treating wastes, and reducing livestock access to streams. Additional recommendations were made to improve water quality for public drinking water supply use, including: nutrient management techniques such as cover crops, reduced tillage on crop fields, buffer strips and strategically placed land set-asides, repairing or improving wastewater collection systems, assuring HSTS are properly treating wastes, and implementing more controls for reducing nutrients in treated wastewater. For more information, please see the [2006 report](#).

Nine-Element Nonpoint Source Implementation Plans (NPS-IS) have been approved for the City of Washington C.H. - Paint Creek (05060003-01-03), for Camp Run – Sugar Creek (05060003-02-02) and Waddle Ditch–Rattlesnake Creek (05060003-03-05) WAUs. Since the 2006 survey the Village of Bainbridge constructed a wastewater treatment plant (WWTP) that now serves the community.

Moxahala Creek is 29.2 miles long and it and its tributaries drain 302 mi². The biological, chemical, and physical water quality of this study area was last assessed by Ohio EPA in 2008. Results of that study indicated over 25% of the sites assessed were meeting recreational use. One public drinking water supply exists in the Moxahala Creek Watershed. The Maysville Regional Water District uses an old quarry as a public drinking water supply. The water district is scheduled to connect to the Muskingum County Water District public drinking water supply in 2025-early 2026 and discontinuing use of this surface water source.

In the previous Moxahala Creek survey, recommendations were made to improve water quality for recreational use including implementing agricultural best management practices by limiting livestock access to streams, eliminating sanitary sewer overflows in the South Zanesville collection system, and repairing or

replacing failing HSTS. Since the 2008 survey, the Villages of Glenford, Fultonham and Moore's Junction were sewerred. For more information, please see the [2008 report](#).

More information on previous studies done in the Paint Creek and Moxahala Creek watersheds can also be found at [Ohio EPA's Total Maximum Daily Load \(TMDL\) Program](#) page.

A5. Project Task Description

During the 2025 sampling year, the recreational use and the public drinking water supply use of the Paint Creek watershed will be assessed at 60 locations (Figure 1; Appendix 2). The Paint Creek mainstem begins at RM 108.5 in Madison County southwest of London just north of State Route 42 and extends to its mouth south of Chillicothe at the Scioto River (RM 63.50). The study area encompasses the entire 1144 mi² Paint Creek watershed.

The recreational use of the Moxahala Creek watershed will be assessed at 12 locations (Figure 2; Appendix 2). The Moxahala Creek mainstem begins at RM 31.94 in Perry County south of New Lexington at the intersection of State Route 93 and Marietta Road and extends to its mouth at the Muskingum River (RM 73.8) south of Zanesville. The study area encompasses the entire 302 mi² Moxahala Creek watershed.

Sampling will be focused entirely on bacteriological monitoring and public drinking water supply stream intake monitoring to determine achievement of the designated recreation and public drinking water supply uses. Two public water supply intakes that exist on streams in Hillsboro and Washington C.H. will be assessed for the public drinking water supply use. Bacteriological monitoring (*Escherichia coli*, or *E. coli*) will be conducted in various streams to determine achievement of recreational use criteria.

Following the survey, the results of the survey will be synthesized into a Technical Support Document (TSD). While the TSD is the primary support document for the TMDL program, the TSD also supports numerous additional Ohio EPA programs and regulatory actions including but not limited to Director's Orders, National Pollutant Discharge Elimination System (NPDES), Water Quality Standards (WQS), Public Water Supply (PWS), Ohio Nonpoint Source Assessment, and the biennial Integrated Water Quality Monitoring and Assessment Report (The 305 [b] and 303[d] report).

Depending on the sampling type, the field sampling season will run from April 1 to October 31, 2025. Bacteria sampling to evaluate recreation use will be conducted within a 90-day period during the recreation season, May 1 to October 31. Public drinking water supply sampling can be conducted during the spring rain/runoff period.

Table 1 – List of Watershed Assessment Units (WAU) in the Paint Creek Study Area

HUC8	HUC10	HUC12	
05060003	Paint Creek		
	05060003 01	Headwaters Paint Creek	
		05060003 01 01	Headwaters Paint Creek
		05060003 01 02	East Fork Paint Creek
		05060003 01 03	Washington CH Reservoir – Paint Creek
	05060003 02	Sugar Creek	
		05060003 02 01	Headwaters Sugar Creek
		05060003 02 02	Camp Run – Sugar Creek
	05060003 03	Headwaters Rattlesnake Creek	
		05060003 03 01	Wilson Creek
		05060003 03 02	Grassy Branch
		05060003 03 03	West Branch Rattlesnake Creek
		05060003 03 04	Headwaters Rattlesnake Creek
		05060003 03 05	Waddle Ditch – Rattlesnake Creek
	05060003 04	Lees Creek - Rattlesnake Creek	
		05060003 04 01	South Fork Lees Creek
		05060003 04 02	Middle Fork Lees Creek
		05060003 04 03	Lees Creek
		05060003 04 04	Walnut Creek
		05060003 04 05	Hardin Creek
		05060003 04 06	Falls Creek
		05060003 04 07	Big Branch – Rattlesnake Creek

HUC8	HUC10	HUC12
	05060003 05	Rocky Fork
		05060003 05 01 South Fork – Rocky Fork
		05060003 05 02 Clear Creek
		05060003 05 03 Headwaters Rocky Fork
		05060003 05 04 Rocky Fork Lake – Rocky Fork
		05060003 05 05 Franklin Branch – Rocky Fork
	05060003 06	Indian Creek – Paint Creek
		05060003 06 01 Indian Creek – Paint Creek
		05060003 06 02 Farmer Run - Paint Creek
		05060003 06 03 Cliff Creek – Paint Creek
	05060003 07	Buckskin Creek – Paint Creek
		05060003 07 01 Buckskin Creek
		05060003 07 02 Upper Twin Creek
		05060003 07 03 Lower Twin Creek
		05060003 07 04 Sulphur Lick – Paint Creek
	05060003 08	Headwaters North Fork Paint Creek
		05060003 08 01 Thompson Creek
		05060003 08 02 Headwaters North Fork Paint Creek
		05060003 08 03 Headwaters Compton Creek
		05060003 08 04 Mills Branch - Compton Creek
		05060003 08 05 Mud Run – North Fork Paint Creek

HUC8	HUC10	HUC12
	05060003 09	Little Creek – North Fork Paint Creek
		05060003 09 01 Harrod Creek
		05060003 09 02 Little Creek
		05060003 09 03 Oldtown Run – North Fork Paint Creek
		05060003 09 04 Biers Run – North Fork Paint Creek
	05060003 10	Ralston Run – Paint Creek
		05060003 10 01 Black Rn
		05060003 10 02 Ralston Run
		05060003 10 03 Outlet Paint Creek

Table 2 – List of Watershed Assessment Units (WAU) in the Moxahala Creek Study Area

HUC8	HUC10	HUC12	
05040004	Moxahala Creek		
	05040004 04	Jonathon Creek	
		05040004 04 01	Valley Run
		05040004 04 02	Headwaters Jonathon Creek
		05040004 04 03	Turkey Run
		05040004 04 04	Buckeye Fork
		05040004 04 05	Kent Run
		05040004 04 06	Thompson Run
		05040004 04 07	Painter Creek
	05040004 05	Moxahala Creek	
		05040004 05 01	Black Fork
		05040004 05 02	Upper Moxahala Creek
		05060003 03 03	Middle Moxahala Creek
		05060003 03 04	Lower Moxahala Creek

Paint Creek Watershed Sampling Locations, 2025



Figure 1 - Sampling Locations Map, Paint Creek Watershed

Moxahala Creek Watershed Sampling Locations, 2025

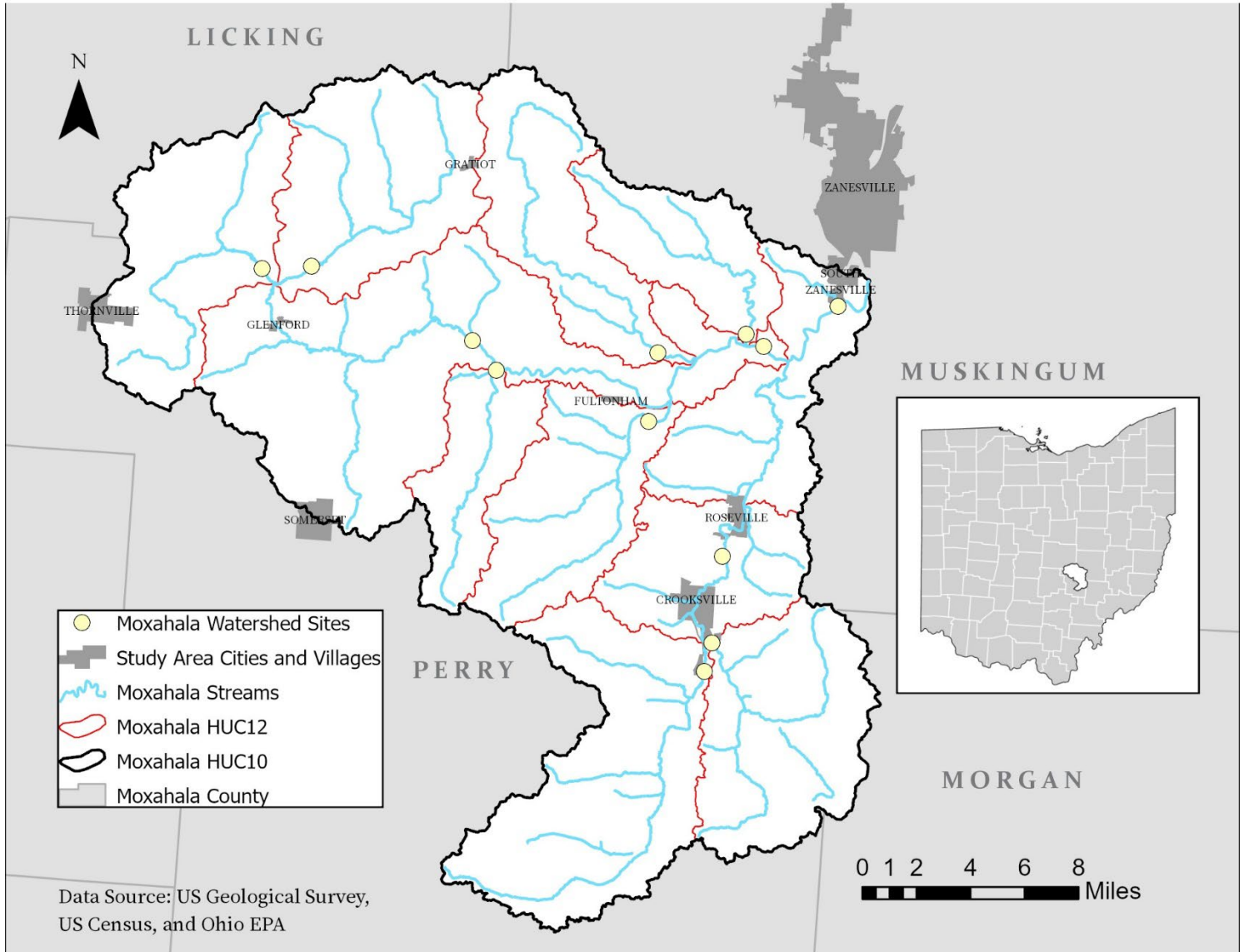


Figure 2 - Sampling Locations Map, Moxahala Creek Watershed

A6. Information/Data Quality Objectives and Performance/Acceptance Criteria

The data collected during this watershed survey fulfills multiple objectives:

- Assess and report on the status of WAUs as required by the Clean Water Act (CWA) 305(b) and 303(d)
- Assess causes and sources of impairment
- Support water quality standards development
- TMDL development and implementation
- Determine and evaluate water quality trends at watershed, stream, and site level scales.

Water Quality-Based Approach of the Clean Water Act

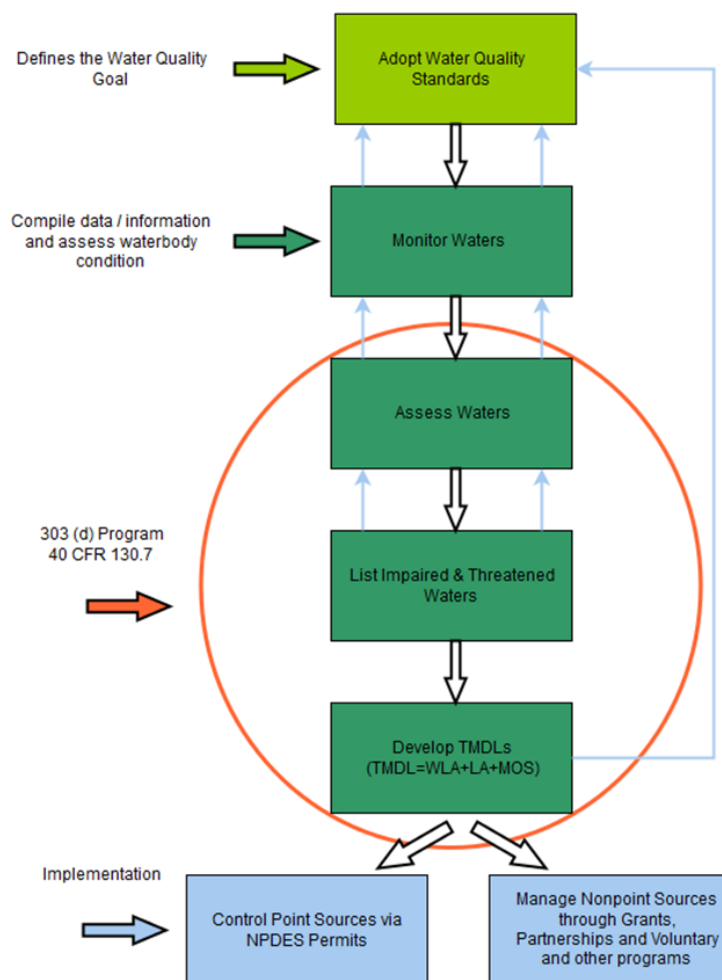


Figure 3 - Water Quality-Based Approach of the Clean Water Act

Source: <https://www.epa.gov/tmdl/overview-identifying-and-restoring-impaired-waters-under-section-303d-cwa>

Monitor and Assess Ohio's Waters

Under Section 305(b) of the Clean Water Act (CWA), Ohio EPA is required to assess and report on the quality of Ohio's waters. Ohio EPA determines attainment/non-attainment status of recreational water quality standards in this way:

Recreational Use

E. coli is used as an indicator to determine attainment/non-attainment of recreational uses as codified in OAC 3745-1-07. Water quality must meet a 90-day geometric mean and a statistical threshold not to be exceeded more than 10% of the time. Each WAU will have at least one site sampled with focus on streams with public access that are more highly used for recreation.

Public Drinking Water Supply Use

All publicly owned lakes and reservoirs, with the exception of Piedmont Lake, are designated as public drinking water supplies (PDWS). Lake samples collected within 500 yards of public water supply intakes will be used to determine attainment with the human health criteria set forth in OAC 3745-1-33. Additionally, in 2002, Ohio EPA initiated development of an assessment methodology for the PWS beneficial use required under Section 305(b) of the CWA. The methodology for assessing the PDWS beneficial use was first presented in the 2006 Integrated Water Quality Monitoring and Assessment Report, and updates have been included in subsequent reports. The 2024 Integrated Report (IR) is the ninth reporting cycle to include assessment of PDWS beneficial use.

PDWS use attainment will be assessed using numeric chemical water quality criteria for the core indicators: nitrate, pesticides and other contaminants, and cyanotoxins. Methodology established to assess PWS attainment is detailed in **Section H of the Integrated Report** (Ohio EPA, 2024). Data collected by Ohio EPA's Division of Drinking and Ground Waters (DDAGW) and Division of Surface Water (DSW) are used for this assessment. Since the rejuvenation of the DSW inland lakes program in 2007, assessment of the water quality within public water supply sources (lakes and reservoirs) has been a priority at Ohio EPA. There have been numerous incidents of cyanotoxins detected in both raw and (in some cases) finished drinking water. In response to this, a Harmful Algal Bloom (HAB) section was formed within DDAGW to monitor water quality of all PWS intake sources more closely. Since 2016 and under OAC Rule 3745-90-03, routine microcystin monitoring and cyanobacteria screening are required to be conducted by all public water systems using surface water sources. More details on guidelines for HAB monitoring at public water systems including sampling protocols, analytical methods, and cyanotoxin thresholds for drinking water advisories are provided in Ohio's **Public Water System HAB Response Strategy** (Ohio EPA, 2022).

Streams and lakes utilized as a PDWS will be sampled for ammonia, nitrite, nitrates, total phosphorus, TKN, atrazine and cyanotoxins as described in Appendix 5 – Public Drinking Water Supply Lakes Sampling. Results from DSW's efforts will be used to assess PDWS impairment and will be reported in Section H of the IR. When impairment is observed through sampling, potential causes and sources will be evaluated in individual lake reports. Data results will be provided to DDAGW as the results become available for time sensitive analytes. All data will be available to the public, regulated communities and interested parties once the assessment is complete.

Under Section 303(d) of the CWA, Ohio EPA is federally obligated to list impaired and threatened waters by determining attainment/non-attainment status of water quality standards. To support this objective, parameters listed in Appendix 3 are planned to be collected.

Assess Causes and Sources of Impairment

Chemical and physical monitoring is a direct measure of the CWA goal and can be used to determine the factors that limit recreation or public drinking water attainment. Specific objectives for each planned measurement are included below:

- **Inorganic Surface Water Chemistry:** A standard public drinking water supply suite of inorganic surface water chemical parameters will be collected at the sites listed in Appendix 2. Impairment due to chemical contaminants in the water column can be assessed by comparing water column chemical concentrations to numeric criteria in Ohio EPA's rules: recreation/aesthetics (Table 37-1) and water supply (Table 33-1).
- **Organic Surface Water Chemistry:** Water column samples for atrazine will be collected a minimum of five times for two years at sites listed in Appendix 2.

Support Water Quality Standards Development

All data collected as part of this survey will form the basis of use attainability analyses (UAAs) for unassessed waters, verify or reaffirm existing beneficial uses, or readjust the current recreation and public water supply use designations as appropriate for updates to the WQS.

TMDL Implementation

The Total Maximum Daily Load (TMDL) program, established under Section 303(d) of the Clean Water Act, focuses on identifying and restoring polluted rivers, streams, lakes, and other surface water bodies. TMDLs are prepared for waters identified as impaired on the 303(d) list in the IR. A TMDL is a written, quantitative assessment of water quality problems in a water body and contributing sources of pollution. It specifies the amount a pollutant needs to be reduced to meet WQS, allocates pollutant load reductions, and provides the basis for taking actions needed to restore a water body. The objectives of the TMDL process are to estimate pollutant loads from the various sources within the basin, define or characterize allowable loads to support the various beneficial uses, and to allocate pollutant loads among different pollutant sources through appropriate controls (e.g., NPDES permitting, storm water management, 319 proposals, nonpoint source (NPS) controls or other abatement strategies). The components of the TMDL process supported by this survey are primarily the identification of impaired waters, verification (and re-designation if necessary) of beneficial use designations, gathering ambient information that will factor into the wasteload allocation, and ascribing causes and sources of use impairment. These data are necessary precursors to the development of effective control or abatement strategies.

A7. 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 3 – Distribution List

Name/Title	Contact Email/Phone	
DSW Central Office		
Mark Johnson, Environmental Administrator	mark.johnson@epa.ohio.gov	614.644.2274
Erin Sherer, Asst. Environmental Administrator	erin.sherer@epa.ohio.gov	614.644.2018
Ashley Ward, Asst. Environmental Administrator	ashley.ward@epa.ohio.gov	614.644.4852
Joby Jackson, Asst. Environmental Administrator	joby.jackson@epa.ohio.gov	937.285.6029
Standards and Technical Support		
Melinda Harris, Environmental Manager	melinda.harris@epa.ohio.gov	614.728.1357
Mariah Hood, Environmental Specialist 3	mariah.hood@epa.ohio.gov	614.644.2865
Bob Miltner, Environmental Specialist 3	robert.miltner@epa.ohio.gov	614.836.8796
Katherine Harris (QA/QC Officer)	katherine.harris@epa.ohio.gov	614.644.2014
Bridget McGovern, Environmental Specialist 2	bridget.mcgovern@epa.ohio.gov	614.448.1410
Assessment and Modeling		
Mari Piekutowski, Environmental Manager	marianne.mansfield@epa.ohio.gov	614.644.2876
James Kiourtsis, Environmental Supervisor	james.kiourtsis@epa.ohio.gov	614.644.2148
Ruth Briland, Environmental Specialist 3	ruth.briland@epa.ohio.gov	614.644.2046
Paul Gledhill, Environmental Specialist 3	paul.gledhill@epa.ohio.gov	614.644.2881
Water Quality		
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Matt Walbridge, Environmental Specialist 2	matt.walbridge@epa.ohio.gov	937.285.6095
Michelle Waller, Environmental Specialist 2	michelle.waller@epa.ohio.gov	937.285.6028
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Shante Eisele, Environmental Specialist 2	shante.eisele@epa.ohio.gov	614.644.2001
Division of Environmental Services		
Jennifer Kraft, Environmental Manager	jennifer.kraft@epa.ohio.gov	614.644.3020
Steve Roberts, Environmental Supervisor	steven.roberts@epa.ohio.gov	614.644.4225
Kristin Sowards, Sample Receiving Coordinator	kristin.sowards@epa.ohio.gov	614.644.4243
DDAGW Central Office		
Allison Reed, Environmental Manager	allison.reed@epa.ohio.gov	937.285.6447
Callie Nauman, Environmental Specialist 2	callie.nauman@epa.ohio.gov	614.644.2752

A8. Project Organization

Table 4 – Roles and Responsibilities.

Individual(s) Assigned:	Responsible for:	Authorized to:
DSW Central Office Administration		
Mark Johnson DSW Chief	Overall administration of division.	Confirm project existence; approve staff and capital resources; approve plans; edit reports.
Erin Sherer Assistant Chief	Overall administration of division.	Confirm project existence; approve staff and capital resources; approve plans; edit reports.
Ashley Ward Assistant Chief	Overall administration of division.	Confirm project existence; approve staff and capital resources; approve plans; edit reports.
Joby Jackson Assistant Chief	Overall administration of division.	Confirm project existence; approve staff and capital resources; approve plans; edit reports.
Standards and Technical Support		
Melinda Harris Standards and Tech Support Section Manager	Quality management (QAPPs, SOPs); staff training; water quality standard rules.	Approve plans and edit reports.
Mariah Hood Standards and Tech Support Lead Worker	Water quality standard criteria development and rule updates.	Help plan study. Make recommended beneficial use changes.
Bob Miltner Standards and Tech Support Lead Worker	Water quality standard criteria development and rule updates.	Help plan study. Review project actions and documents in relation to listed responsibilities.
Bridget McGovern Standards and Tech Support Staff	Represent agency in fish and wildlife consumption and contact advisory matters.	Help plan study. Make waterbody specific consumption and contact advisory recommendations.
Katherine Harris Standards and Tech Support Staff	DSWs quality management program.	Develop and implement field QA/QC guidelines. Track field QA/QC and staff training.
Assessment, Modeling, and TMDL		
Mari Piekutowski Assessment & Modeling Section Manager	Overall management of monitoring section.	Assign staff; approve plans; edit reports.
Ruth Briland 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.
Paul Gledhill Modeling and Assessment Unit Lead Worker	Modeling and assessment technical guidance and review. 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.
Josh Griffin TMDL and IR Unit Manager	Coordination of biennial Integrated Report update; TMDL program development.	Assign and support staff; edit reports.
Shante Eisele TMDL & IR Unit Staff	Develop TMDL reports. Oversee data collection and management.	Write assigned TMDL sections. Complete technical data management tasks associated with QA spreadsheet and EA3.

James Kiourtsis Modeling & Assessment Unit Supervisor	Support modeling field crews with supplies, equipment, and training.	Obtain approvals and signatures; develop budgets; conduct field audits; edit reports.
Water Quality		
Chloe Welch Statewide Water Quality Manager	Implement division goals. Support water quality field crews with supplies, equipment, and training.	Review documents and reports; suggest changes and edits; obtain approvals and signatures; develop budgets; conduct field audits.
Kelly Capuzzi Statewide Water Quality Supervisor	Support water quality field crews with supplies, equipment, and training.	Obtain approvals and signatures; develop budgets; conduct field audits; edit reports.
Matt Walbridge Southwest District Water Quality Unit	Water data collection, validation, and management.	Help plan study. Schedule and complete assigned field activities. Tabulate data and write discussion for technical report.
Michelle Waller Southwest District Water Quality Unit	Water data collection, validation, and management.	Help plan study. Schedule and complete assigned field activities. Tabulate data and write discussion for technical report.
Emily Keil-Loudner Southeast District Water Quality Unit	Water data collection, validation, and management.	Help plan study. Schedule and complete assigned field activities. Tabulate data and write discussion for technical report.
Randy Spencer Southeast District Water Quality Unit	Water 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 laboratory activities.	Help solve laboratory information management system problems. Develop analytical methods and SOPs.
Steve Roberts QA Officer	DES quality management program.	Oversee data completeness, validation, and delivery.
Kristin Sowards Sample Receiving Coord.	Intake of laboratory samples, coordination with field staff	Help solve daily sample scheduling and sample submission issues.
Division of Drinking and Ground Waters		
Allison Reed Source Water Characterization and Protection Manager	Management of source water characterization and protection section.	Coordinate with DSW on drinking water intake and inland lake monitoring. Assign staff, approve plans, and edit reports.
Callie Nauman Central Office Emerging Contaminants	Harmful Algal Bloom program implementation	Coordinate with DSW on drinking water intake and inland lake monitoring.

A9. Project Quality Assurance Manager Independence

The Project Quality Assurance Manager (QAM) shall be independent of environmental information operations. The Project QAM's independence is ensured through separation of sections and reporting chains within Ohio EPA's DSW. The Project QAM has oversight authority and responsibilities for planning, documenting, coordinating, and assessing effectiveness of the QAPP. The QAM has authority to access and discuss quality-related issues with senior management outside of the direct supervisory chain as necessary.

A10. Project Organization Chart and Communications – Organization Chart.

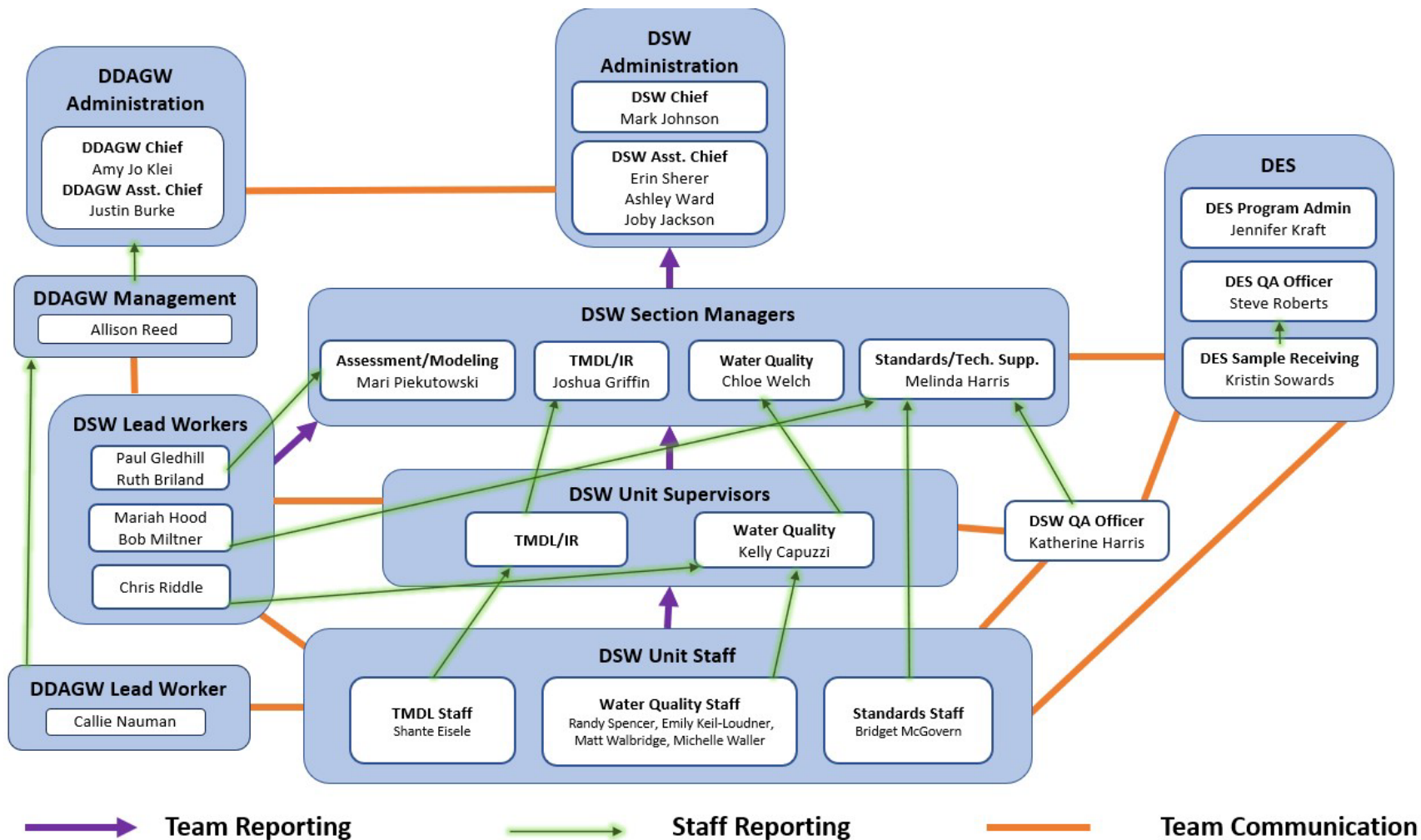


Figure 4 - Organization Chart

A11. Personnel Training/Certification

All staff who conduct surface water sampling, whether from streams or lakes, receive initial training by someone experienced in the proper techniques required, usually a supervisor or veteran employee.

Mandatory refresher training is done on an annual basis for all Agency surface water samplers. Annual boating safety refresher training is required by internal safety policy SP 10-12. Employees who operate watercraft must also demonstrate proficiency in boat operation to their supervisor on an annual basis. Supervisors should also conduct an annual field audit to verify standard operating procedures are followed.

A12. Documents and Records

Microsoft® SharePoint is used as a document library. Access is through Ohio EPA's [*SharePoint collaboration site*](#).

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 and original data sheets will be initially retained by Ohio EPA the sampling District Office while the survey report is being finalized in accordance with established retention schedules.
- Long term survey information and data storage will take place at the State's Storage Facility 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 the Division of Environmental Services (DES) along with the samples and retained by the Laboratory. 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 laboratory 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.

Group B: Implementing Environmental Information Operations

B1. Identification of Project Environmental Information Operations

The site selection process for recreational and public drinking water supply uses is designed to systematically sample principal streams in the targeted study area with enough locations to ensure alignment with the DQOs listed in Section A7. Each WAU (HUC 12) is independently evaluated to determine its existing, relevant characteristics that contribute to the fulfillment of study objectives. These characteristics include, but are not limited to historical active watershed TMDLs, known and suspected point and nonpoint discharges, known

restoration activities, and other miscellaneous local impacts that may contribute to recreational and public water supply use impairment.

The site selection process for the recreation beneficial use is designed to obtain a representative picture of conditions in an assessment unit as well as to evaluate areas of significant stream recreation. A minimum of one site per WAU will be placed at or near the HUC outlet, though more sites may be included as recreation uses deem necessary. Available USGS gage sites may be selected to obtain accurate stream flow data for load calculation purposes.

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. Methods for Environmental Information Acquisition

The version 10.0 of the *Surface Water Field Sampling Manual* can be found at: ***DSW Water Quality - Field Manual 2025 Main Document***

Ohio EPA (Ohio Environmental Protection Agency – Division of Surface Water). 2025. *Surface Water Field Sampling Manual - Appendix II: Detailed Field Sampling Protocols*. Published at: ***Field Manual 2025 Appendix II - Detailed Field Sampling Protocols***

Ohio EPA (Ohio Environmental Protection Agency – Division of Surface Water). 2025. *Surface Water Field Sampling Manual - Appendix IV: Data Management*. Published at: ***Field Manual 2025 Appendix VI - Data Management***

Surface Water Sampling

Inorganic, organic, and cyanotoxin surface water chemical parameters will be collected at PWS stream intakes listed in Appendix 2. Ideally these samples will be collected at flow reflective of normal recreational use conditions. A minimum of ten sets of samples will be collected. Physical water quality measurements will be taken with a multimeter probe each time a grab sample is collected at an intake. Analytical methods and laboratory reporting levels for chemical and physical parameters samples collected within the study are listed in Appendix 3.

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 and bacteria. This document is hereafter referred to as the *Surface Water Field Sampling Manual*. Samples are delivered via overnight or next day courier to DES or by sampling staff for analysis. Field measurements of dissolved oxygen (DO), pH, temperature and conductivity will be made using YSI Professional Plus or ProDSS meters.

Bacteria

Attainment/non-attainment of recreational uses will be determined using *E. coli* criteria codified in OAC 3745-1-37, Table 37-2. Each WAU will have at least 1 site sampled. To meet water quality criteria, the 90-day geometric mean of measurements is not to exceed 126 cfu/100 ml and the statistical threshold value (STV) of 410 cfu/100 ml is not to be exceeded by more than 10 percent of individual samples. Bacteria sampling to evaluate recreation use will be done within a 90-day period that falls from May 1 to October 31. Each site will have at least five sets of *E. coli* samples tested. Ideally, these samples will be collected during normal

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

B3. Integrity of Environmental Information

Sample Master® software is used by DES to manage laboratory information. 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.

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.

B4. Quality Control

Surface Water Chemistry

Ten percent of the total number of water chemistry samples should be targeted for submittal to the laboratory as field quality control samples. About 5% will be duplicates, including replicates if natural variability is a concern, and about 5% will be blanks, including field blanks and equipment blanks. Bacteria samples do not require a quality control sample. Data will be validated based on the results of the field quality control samples as outlined in Appendix VI in the Surface Water Field Sampling Manual. 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. Field instruments utilizing electrochemical sensors must be calibrated daily.

B5. Instruments/Equipment Calibration, Testing, Inspection, and Maintenance

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

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 Section D of the Surface Water Field Sampling Manual. Other equipment used will follow specifications provided in the biological and habitat methods cited.

B6. Inspection/Acceptance of Supplies and Services

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.

B7. Environmental Information Management

Data collected for this project and other data previously collected by Ohio EPA will be used to develop data summaries for each waterbody.

The data management process is shared by the DSW and DES. DES uses Sample Master[®] software to manage laboratory 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.

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 IRs. Once data sheets are approved in EA3, they are batch queried and imported into WQX (Water Quality Exchange) by the Assessment and Modeling Lead Worker. Imported data is exported to the Water Quality Portal (WQP) by WQX and made available to the public. All agency files are ultimately backed up and housed in the State of Ohio Computer Center (SOCC).

The study team 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 study team leader will need to be included in 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.

Group C: Assessment, Response Actions and Oversight

C1. Assessment and Response Actions

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.

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 laboratory 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 VI of the *Surface Water Field Sampling 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, or
- 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. Laboratory corrective actions will follow regular laboratory procedures and SOPs. Any laboratory corrective action with the potential to affect data quality will be conveyed to the sample collector by the laboratory.

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.

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. Oversight and Reports to Management

The study team 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. Recreation use and public water supply use attainment will be determined using collected data. Causes and sources of impairment will be identified and supported by data evaluation. Public water supply use will be determined on surface water chemistry and recreational use will be determined on bacteriological results.

Group D: Environmental Information Review and Usability Determination

D1. Environmental Information Review

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 laboratory. 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 laboratory (methods changing, containers or equipment breaking), or other reasons. It is also possible additional sampling would take place because of field observations/conditions. Documenting deviations from the QAPP is the responsibility of the study team 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 (ITS).

D2. Useability Determination

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 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 procedures available in 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, 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 VI of the *Surface Water Field Sampling Manual*.

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 #
Water Quality			
Drinking Water Stream Intake	2	5	10
Bacteria			
<i>E. coli</i> Cultures	55	5	275

Appendix 2. Streams, Sampling Locations, and Sampling Types

Station	Site Name	River Mile	Area (mi ²)	HUC12	County	Lat.	Long.	Sampling Type
Paint Creek Watershed (05060003)								
V10W19	Paint Creek northeast of Jeffersonville @ Hidy Rd.	88.57	43.00	050600030101	Fayette	39.6700	-83.5222	B
300055	E. Fork Paint Creek at Washington C.H. @ U.S. Rt. 22	0.72	50.00	050600030102	Fayette	39.5406	-83.4147	B
V10S34	Paint Creek upst Washington C.H. WWTP @ Elm St.	69.52	67.00	050600030103	Fayette	39.5347	-83.4253	B
304628	Paint Creek at Washington C.H. @PWS Intake Structure	71.52	61.50	050600030103	Fayette	39.5438	-83.4479	PWS
200432	Sugar Creek upst Parrot Station Rd., adj Creamer Rd.	23.20	30.00	050600030201	Fayette	39.6142	-83.5456	B
V10W31	Sugar Creek near mouth @ SR 41	1.51	78.00	050600030202	Fayette	39.4694	-83.4347	B
NEW	Wilson Creek dwst Sabina @ Borum Rd.	0.13	16.10	050600030301	Clinton	39.5176	-83.6047	B
300147	Grassy Branch@ Marchant-Luttrell Rd. (Lower crossing)	6.90	7.40	050600030302	Fayette	39.5815	-83.6461	B
601220	West Branch Rattlesnake Creek near Jasper @ CR 61	0.32	59.90	050600030303	Fayette	39.5111	-83.5650	B
V10W37	South of Milledgeville @ SR 729	31.48	40.80	050600030304	Fayette	39.5578	-83.5908	B
300092	Rattlesnake Creek dst East Monroe	11.14	131.00	050600030305	Fayette	39.3568	-83.4958	B
V10K63	South Fork Lees Creek at Highland adj Creek Rd.	1.60	15.90	050600030401	Highland	39.3418	-83.6035	B
300388	Middle Fork Lees Creek at Leesburg @ High St.	0.85	36.20	050600030402	Highland	39.3489	-83.5561	B
V10W45	Lees Creek east of Leesburg @ Monroe Rd.	1.16	73.00	050600030403	Highland	39.3442	-83.5092	B
V10K58	Walnut Creek NE OF Centerfield @ Centerfield Rd.	0.60	13.40	050600030404	Highland	39.3358	-83.4675	B
300387	Hardin Creek @ Cope Rd.	0.30	21.40	050600030405	Highland	39.2992	-83.4632	B
V10K47	Fall Creek @ Bectal Rd.	1.60	13.30	050600030406	Highland	39.2689	-83.4585	B
V10P03	Rattlesnake Creek southwest of Greenfield @ SR 138	4.13	255.00	050600030407	Highland	39.2903	-83.4567	B
V10K43	South Fork Rocky Fork dst SR 247	3.30	7.20	050600030501	Highland	39.1496	-83.6039	B
V10K38	Clear Creek upst Hillsboro WTP Intake, dst culvert river rt	7.40	21.00	050600030502	Highland	39.2349	-83.6090	PWS
V10P15	Clear Creek east of Hillsboro	2.70	36.00	050600030502	Highland	39.2117	-83.5450	B

Station	Site Name	River Mile	Area (mi ²)	HUC12	County	Lat.	Long.	Sampling Type
V10P02	Rocky Fork upst Rocky Fork Lake, dst WWTP @ SR 124	17.53	39.00	050600030503	Highland	39.1783	-83.5439	B
303690	Blinco Branch dst U.S. Rt. 50	1.85	3.10	050600030504	Highland	39.2163	-83.4731	B
V10W43	Rocky Fork near mouth, adj SR 50	0.20	144.00	050600030505	Highland	39.2311	-83.3464	B
V10S31	Paint Creek at Rock Mills @ Miami Trace Rd.	58.75	224.00	050600030601	Fayette	39.4425	-83.4106	B
V10S29	Paint Creek dst Greenfield WWTP, adj Washington St.	48.70	261.00	050600030602	Ross	39.3303	-83.3836	B
300053	Paint Creek dst Paint Creek Dam	39.14	570.00	050600030603	Highland	39.2515	-83.3524	B
V10K05	Buckskin Creek upst Falls Rd.	0.40	39.70	050600030701	Ross	39.2369	-83.2767	B
V10K12	Upper Twin Creek west of Bourneville @ Upper Twin Cr. Rd.	2.00	12.20	050600030702	Ross	39.2850	-83.1822	B
V10K07	Lower Twin Creek @ farm lane off Lower Twin Rd.	2.20	15.00	050600030703	Ross	39.3006	-83.1722	B
V10K08	Massie Run west of Bainbridge @ US 50	0.1	4.9	050600030704	Ross	39.2208	-83.3086	B
V10K51	Thompson Creek @ Wissler Rd. - AFO	3.30	8.00	050600030801	Madison	39.6832	-83.3871	B
V10K52	N. Fork Paint Creek @ Yankeetown-Chenoweth Rd.	42.00	11.00	050600030802	Madison	39.7003	-83.3556	B
V10K26	Compton Creek @ Washington Waterloo Rd.	11.20	19.90	050600030803	Fayette	39.5898	-83.3370	B
V10S02	Compton Creek @ Dogtown Rd.	1.10	59.00	050600030804	Ross	39.4950	-83.2822	B
300046	N. Fork Paint Creek @ Good Hope-New Holland Rd.	26.67	51.00	050600030805	Fayette	39.5236	-83.2809	B
NEW	Herrod Creek @ Plano Rd.	0.01	24.50	050600030901	Ross	39.4533	-83.2334	B
V10K13	Little Creek @ Little Creek RD, near Rogers RD	1.00	22.70	050600030902	Ross	39.3799	-83.1738	B
V10K23	N. Fork Paint Creek dst Frankfort WWTP	14.10	164.00	050600030903	Ross	39.3978	-83.1778	B
300047	N. Fork Paint Creek @ Polk Hollow Rd.	2.28	232.00	050600030904	Ross	39.3368	-83.0366	B
V10K16	Black Run @ Shoemaker Lane (Spruce Hill)	1.00	8.60	050600031001	Ross	39.2903	-83.1288	B
V10K19	Ralston Run @ Turner Rd.	2.80	5.20	050600031002	Ross	39.2588	-83.0513	B
V10K22	Owl Creek upst US 50	0.35	6.5	05060003103	Ross	39.3145	-83.1175	B

Station	Site Name	River Mile	Area (mi ²)	HUC12	County	Lat.	Long.	Sampling Type
Moxahala Creek Watershed (0504004 04)								
300363	Valley Run @ Hopewell Indian Rd.	1.28	26.40	050400040401	Perry	39.9100	-82.3015	B
300464	Jonathan Creek @ Hopewell Indian Rd.	22.32	27.40	050400040402	Perry	39.9091	-82.3280	B
300478	Turkey Run near mouth @ RR bridge	0.25	14.20	050400040403	Perry	39.8674	-82.2028	B
201235	Buckeye Fork at East Fultonham adj TR 88	1.20	22.70	050400040404	Muskingum	39.8464	-82.1214	B
300422	Kent Run @ Lower Kroft Rd. at the Maysville WTP Intake	1.35	22.30	050400040405	Muskingum	39.8746	-82.1163	B
300471	Thompson Run @ U.S. Rt. 22	0.39	15.30	050400040406	Muskingum	39.8822	-82.0692	B
300461	Jonathan Creek dst SR 93 dam pool @ Powell Rd.	0.90	193.00	050400040407	Muskingum	39.8771	-82.0600	B
R99Q35	Black Fork just south of Crooksville @ Ceramic Rd.	0.10	29.30	050400040501	Perry	39.7556	-82.0876	B
R15P03	Moxahala Creek near Stringtown	17.94	37.00	050400040502	Perry	39.7439	-82.0914	B
300440	Moxahala Creek dst Roseville WWTP	13.40	75.00	050400040503	Perry	39.7910	-82.0818	B
201217	Moxahala Creek at South Zanesville @ Darlington Rd.	1.80	301.00	050400040504	Muskingum	39.8936	-82.0200	B

Code	Sample Type
B	<i>E. coli</i> bacteria
PWS	Public Water Supply

Appendix 3. List of Physical/Chemical Parameters and Reporting Limits

Parameter	Method	Water (RL)	Container	Preservative*	Holding Time (Max.)
Dissolved Oxygen (mg/l and % saturation)	Field Meter	0 mg/L 0% sat	NA	NA	15 minutes
pH		0-14 s.u.			
Specific Conductance		1 µS/cm			
Temperature		0 °C			
Specific Conductance (lab)	SM 2510B	1 µmhos/cm			
Nutrients					
Nitrite	SM 250.5 (353.2)	0.02 mg/L	1 quart LDPE	Non-preserved	48 hours
Nitrate+Nitrite	SM250.8 (US EPA Reductase)	0.5 mg/L	1 quart LDPE	2 ml H ₂ SO ₄	28 days
Ammonia	SM 250.4 (350.1)	0.05 mg/L			
Total Kjeldahl Nitrogen	SM 250.6 (351.2)	0.2 mg/L			
Total Phosphorus	SM 260.8 (365.4)	0.01 mg/L			
Bacteria					
<i>Escherichia coliform</i> (Q-tray)	U.S. EPA 1603	2 CFU	Sterile specimen cup	Non-preserved	6 hours
Algal Biomass					
Anatoxin	OHIO EPA 706.0	0.4 µg/L	60 mL vial	ascorbic/sodium bisulfate	5 days
Cylindrospermopsin	OHIO EPA 703.0	0.05 µg/L	250 mL PETG	Non-preserved	5 days
Microcystin	OHIO EPA 701.0	0.24 µg/L			
Saxitoxin	OHIO EPA 702.0	0.022 µg/L	60 mL vial	proprietary	5 days
Organic Compounds					
Atrazine-ELISA	Ohio EPA 704.0	0.2 ug/L	40 mL vial	Non-preserved	14 days
Herbicide-Atrazine	US EPA 525.2	0.2 µg/L	2 – 1 liter amber jars	**6 mL of 6N HCl	14 days

* All sampled to be preserved on ice, cool to <6°C.

** If chlorine is suspected present in sample, then first preserve with 50 mg Na₂SO₃

Appendix 4. Public Drinking Water Supply Sampling

Public drinking water supply samples are to be collected 5 times each year for 2 years. The samples can be collected from a boat or from the shoreline. For more information, see the *Surface Water Field Sampling Manual: Appendix IV – Inland Lakes Manual*.

Shoreline reservoir PDWS samples (Field Manual Section J) should occur as close to the intake as possible. If access is available to the drinking water intake standpipe, a beta bottle can be used to collect the sample at the depth of the intake being used. Samples collected from the shoreline can be collected using a telescopic sampler with glass bottle or a rope and stainless steel bucket. Instream intake samples should follow the same approach as the shoreline reservoir sampling. If a stream intake is not approachable, samples should be collected as close to the intake – upstream – as possible. For public drinking water system samples, these are the specific minimum parameter requirements from DDAGW:

CYANOTOXINS*:

- Collect samples during all 10 sampling events.
- Collect at least 50% of samples from May through November.
- Samples should be collected 30 days apart in order to capture separate or extended source water quality events, if possible.
- Parameters and sampling containers:
 - Sample for microcystin and cylindrospermopsin (1- 250 ml PETG bottle, no preservative, remove from sunlight and cool immediately).
 - Sample for saxitoxin (60 mL glass vial, pre-preserved, remove from sunlight and cool immediately).
 - Sample for anatoxin-a (60 mL amber glass vial, pre-preserved, remove from sunlight and cool immediately). If a surface accumulation or scum is visible, try to collect sample below the scum if possible.
- Use a separate sample submission sheet for cyanotoxins. Specify sampling point in field comments.
- Holding time is 5 days for cyanotoxins; samples must be filtered within 48 hours of collection.

ATRAZINE:

- Collect samples during all 10 sampling events.
- Collect at least 50% of samples from March through August.
- Herbicides-Atrazine USEPA Method 525.2 is used as the primary analysis method seasonally (March – mid-July) in streams where atrazine application is more common and where turnover rate is faster (i.e. streams and impounded reservoirs). Staff should use best professional judgement when choosing a method to help meet the dual goals of collecting useful and accurate data in an efficient manner and minimizing unnecessary use of the more expensive analysis method. Alternatively, the ELISA-Atrazine method can be used when Herbicides-Atrazine USEPA Method 525.2 is not used. WQ staff may use the ELISA method in areas with limited atrazine application and in waterbodies with slower turnover (i.e.

upground reservoirs). If a value above 1.5 µg/L is found, follow-up sampling is completed with Herbicides-Atrazine USEPA Method 525.2.

- Herbicides-Atrazine USEPA Method 525.2: Collect in 2 – 1 L glass amber jars for all Herbicide-Atrazine sampling events (Herbicides USEPA Method 525.2). The filled jar is first preserved with 50 mg sodium sulfite (Na₂SO₃) if chlorine is suspected to be present, thoroughly mixed and then preserved with 6 mL of 6N HCl. If chlorine is not suspected to be present, then preserve with HCl only.
- ELISA-Atrazine: Collect in a 40 mL glass vial for all ELISA-Atrazine sampling events (ELISA method: no preservative).
- If a result of ELISA method sample result is above 1.5 µg/L, collect next possible sample using method 525.2 (2 amber glass jars) as stated above.

Nutrients/NITRATE:

- Collect at least 50% of samples from March through August.
- Collect ammonia, TKN, total phosphorus and nitrate+nitrite during all 10 sampling events.
- Collect one 1-quart cubitainer preserved with 2 ml H₂SO₄ (28 day holding time).
- Samples should be collected 30 days apart in order to capture separate or extended source water quality events, if possible.

Nutrients/NITRITE:

- Collect at least 50% of samples from March through August.
- Collect nitrite during all 10 sampling events.
- Collect one 1-quart cubitainer, non-preserved (48 hours holding time).
- Samples should be collected 30 days apart in order to capture separate or extended source water quality events, if possible.

Field Chemistry Measurements:

- Collect chemistry measurements during all 10 sampling events.
- Collect pH, temperature, dissolved oxygen, percent saturation dissolved oxygen, and specific conductance from grab sample.

* Cyanotoxins should be put on a second Chain of Custody using Test Groups listed for faster result turnaround times for DDAGW.

Appendix 5. Safety Contacts and Hospital Locations

Safety:	
County Wildlife Officer:	County Sheriff:
Clark County – Mathew Bourne (937) 206-9321 Fayette County – John Coffman (614) 565-2538 Greene County – Alex Almeter (937) 545-6327 Highland County – Matt Roberts (937) 205-3020 Licking County – (614) 400-0744 Madison County – Matt Teders (614) 309-3465 Morgan County – Ben Smith (614) 563-5338 Muskingum County – (740) 589-9991 Perry County – (614) 565-0137 Pickaway County – Josh Elster (614) 203-3406 Pike County – Matt Van Cleve (740) 589-9994 Ross County - Bob Nelson (614-565-9754	Clark County - (937) 521-2050 Fayette County - (740) 335-6170 Greene County - (937) 562-5220 Highland County - (937) 840-6240 Licking County – (740) 670-5555 Madison County - (740) 852-1212 Morgan County - (740) 962-4044 Muskingum County – (740) 452-3637 Perry County – (740) 342-4123 Pickaway County - (740) 474-2176 Pike County - (740) 947-2111 Ross County - (740) 773-1186
OEMA: Ohio EPA Spills Hotline - (800) 282-9378	State Highway Patrol:
Clark County - (937) 521-2175 Fayette County - (740) 335-8264 Greene County - (937) 562-5994 Highland County - (937) 393 5880 Licking County – (740) 522-9031 Madison County - (740) 852-4200 Morgan County - (740) 962-3901 Muskingum County – (740) 453-1655 Perry County – (740) 342-1141 Pickaway County - (740) 477-1165 Pike County - (740) 947-7346 Ross County - (740) 773-1700	Clark County - (937) 323-9781 Fayette/ Clinton County - (937) 382-2551 Greene County - (937) 372-7671 Highland/ Clinton County - (937) 382-2551 Licking County – (740) 927-0065 Madison County - (614) 879-7626 Morgan/Washington County - (740) 374-6616 Muskingum County – (740) 453-0541 Pickaway County - (740) 983-2538 Pike/Scioto County - (740) 354-2888 Ross County - (740) 775-7770
Hospitals:	
Clinton County – Clinton Memorial Hospital 610 West Main Street, Wilmington OH 45177 (937) 382-6611	Greene County – Kettering Health Greene Memorial 1141 North Monroe Drive, Xenia, OH 45385 (937) 352-2000
Fayette County – Adena Fayette Medical Center 14300 Columbus Ave. Washington CH, OH 43160 (740) 335-1210	Fairfield Medical Center 401 N Ewing Street, Lancaster, OH 43130 (800) 548-2627

Highland County – Adena Greenfield Medical Center 5500 Mirabeau Street, Greenfield, OH 45123 (937) 981-9400	Highland County – Highland District Hospital 1275 North High Street, Hillsboro, OH 45133 (937) 393-6100
Madison County – Madison Health 210 North Main Street, OH 43140 (740) 845-7000	Muskingum County - Genesis Hospital 2951 Maple Ave, Zanesville, OH 43701 (740) 454-5000
Perry County - Genesis Perry County Medical Center 301 Dr Mike Clouse Dr Suite 2, Somerset, OH 43783 (740) 743-3800	Ross County – Adena Regional Medical Center 272 Hospital Road, Chillicothe, OH 45601 (740) 779-7500

References

Ohio EPA (Ohio Environmental Protection Agency – Division of Surface Water). 2025. *Surface Water Field Sampling Manual*. Published at:

https://epa.ohio.gov/static/Portals/35/guidance/1_Field_Manual_2025_Main_Doc_FINAL.pdf

Ohio EPA (Ohio Environmental Protection Agency – Division of Surface Water). 2025. *Surface Water Field Sampling Manual: Appendix II – Detailed Field Sampling Protocols*. Published at:

https://epa.ohio.gov/static/Portals/35/guidance/2_Field_Manual_2025_App_II_-_Procedures_FINAL.pdf

Ohio EPA (Ohio Environmental Protection Agency – Division of Surface Water). 2025. *Surface Water Field Sampling Manual: Appendix VI – Data Management*. Published at:

https://epa.ohio.gov/static/Portals/35/guidance/6_Field_Manual_2025_App_VI_-_Data_Mgmt_FINAL.pdf

Other Resources

Omernik, J.M. and A.L. Gallant, 1988. Ecoregions of the upper Midwest states. EPA/600/3-88/037. U. S. Environmental Protection Agency, Environmental Research Laboratory, Corvallis, Oregon. 56 pp.