Midwest Biodiversity Institute
Center for Applied Bioassessment & Biocriteria
P.O. Box 21561
Columbus, OH 43221-0561

Watershed Monitoring and Bioassessment Plan for the Central Ohio Watersheds

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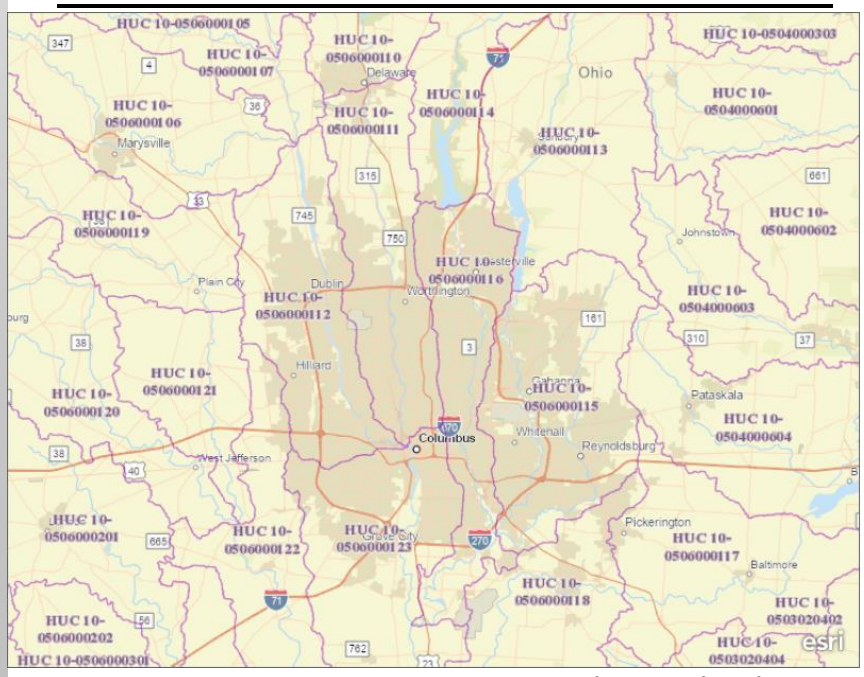
Center for Applied Bioassessment & Biocriteria
P.O. Box 21561
Columbus, OH 43221-0561
Chris O. Yoder, Project Manager
www.midwestbiodiversityinst.org



Peter A. Precario, Executive Director
Dr. David J. Horn, Board President

Central Ohio Watersheds Biological and Water Quality Assessment Plan Development

Scope of Work for 2023

Submitted to:

City of Columbus
Division of Sewers and Drains (DOSD)
1250 Fairwood Ave # 20
Columbus, OH 43206
Tim Evans, Project Manager

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Submitted by:

Midwest Biodiversity Institute
P.O. Box 21561
Columbus, OH 43221-0561
Chris O. Yoder, Project Manager
www.midwestbiodiversity.org

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Introduction

In August 2019 the Midwest Biodiversity Institute (MBI) proposed to perform tasks in support of a biological and water quality assessment of the Middle Scioto and Lower Olentangy Rivers in Franklin and Pickaway Counties Ohio beginning in 2020 and as supported by the City of Columbus Division of Sewers and Drains (DOSD). A Scope of Work (SOW) based on meeting a schedule of tasks within a project period of May 2020 through mid-June 2021 was developed. In March 2020 MBI was requested to expand the original SOW to include river and stream reaches in the Project Blueprint area tributary to the Olentangy River in the Clintonville and Beechwold areas and other tributaries within Columbus MS4 subwatersheds. A follow-up survey of the same scope is underway in 2022.

Periodic discussions took place with the MS4 program beginning in June 2020 to discuss the merits and scope of implementing a watershed based approach to assessing the quality and status of streams within the DOSD MS4 area. These discussions have focused on the development of a watershed monitoring program and development of assessments that would directly support the MS4 program from a holistic perspective (Appendix A). What is being proposed herein mirrors similarly scoped programs that have been underway since 2010 in the Greater Cincinnati area on behalf of the Metropolitan Sewer District of Great Cincinnati (MSDGC) and since 2006 across Northeastern Illinois and on behalf of five independent watershed groups. Both efforts have served municipal wastewater and MS4 stormwater management goals and objectives on addition to enhanced watershed planning that are of interest to local stakeholders. Both of these multiyear efforts were initially supported by the development of a similarly scoped Watershed Monitoring and Assessment Plans (MBI 2006; MBI 2010). One of the NE Illinois groups was the subject of a U.S. EPA case study that detailed the need for and uses of the data and information generated by the watershed assessments (U.S. EPA 2007).

Ohio EPA is proposing monitoring under their newly adopted Two-Pronged Approach within the Columbus DOSD service and MS4 areas in 2023. However, this new approach results in a reduction in spatial coverage by at least 60-75% which is a significant change in coverage compared to the watershed focused program that had existed for 40 years prior to 2020 when that approach was implemented. While the historical database remains useful for conducting

planning and supporting regionalized analyses of watershed characteristics and trends, the new approach will not be of sufficient spatial intensity to support the types of watershed based data analysis that are needed to develop more effective and informative assessment, planning, and forecasting tools going forward. Hence a longer term approach to monitoring the DOSD service and MS4 areas will be needed while also taking advantage of the comparatively limited monitoring that Ohio EPA will provide. A detailed monitoring plan can serve as a guide for this level of cooperation and coordination with Ohio EPA and other entities with interests in watershed quality across the Central Ohio region.

An Integrated Prioritization System (IPS) model as developed for both MSDGC and NE Illinois and as supported by regularly scheduled watershed monitoring following a rotating basin approach is proposed herein as one of the future outcomes. The purposes of the IPS sponsored by MSDGC and the NE Illinois groups are to serve their immediate priorities related to CWA management objectives with the common thread being the attainment of the biological goals established for rivers and streams by each state. However, in both cases other uses were anticipated as those respective organizations and their stakeholders have learned how to comprehend and use the IPS outputs. Some examples include addressing implementation of the Wet Weather Implementation Plan (WWIP) and stormwater impacts in the MSDGC service area, supporting the assessment of nutrient enrichment effects in NE Illinois, and stream crediting in support of enhanced trading in NE Illinois. None of these outcomes would have been possible by relying on a more traditional stormwater modeling approach alone, but the value added by the watershed assessment tools can certainly enhance the application of such models.

A. Central Ohio Watersheds Assessment Plan Project Scope of Work (SOW)

The Central Ohio Watersheds Biological and Water Quality Assessment Plan scope of work includes four major tasks:

Task 1 – Project Management

This task involves managing the project from both an administrative and technical aspect. The latter would involve periodic meetings with the DOSD project manager, MS4 program representatives, and other entities as appropriate.

Task 2 – Inventory Existing Sites and Assessments

This task involves determining the locations of monitoring and assessment that meets the data quality objectives of this level of watershed assessment. For central Ohio this will

predominantly include Ohio EPA biological and water quality sampling sites and other organization data that meets the above expectations for quality and completeness specifically Level 3 data collected in accordance with the Ohio Credible Data Law (ORC 6111.5) and Regulations (OAC 3745-4). Ohio EPA has published numerous reports that will also be inventoried along with the resulting lists of impaired waters via the Ohio EPA Integrated Report (2022). This will be compiled in a database format and ready for mapping via GIS. This fulfills an important need to locate future Central Ohio Watershed monitoring locations at historically sampled locations to document existing impairments, identify high quality waters, support the development of pollution effect thresholds, fill both spatial and temporal gaps, and support valid trend assessments. Another important outcome is that DOSD and other stakeholders will be better prepared to deal with and respond to the challenges posed by an anticipated rapid growth of population in Central Ohio and the demands that will place on existing infrastructure and watershed integrity.

Task 3 – Watershed Bioassessment Design

This task involves determining monitoring and assessment locations utilizing an intensive pollution survey and geometric site selection process. This design assures that watersheds are equitably assessed, data gaps are filled, and important pollution sources are considered. Based on our experiences with MSDGC, we expect that new sites will be added beyond those historically sampled by Ohio EPA especially in the smaller, headwater streams that drain less than 5 square miles. Some are likely to be undesignated in the Ohio WQS, thus the first objective of a watershed bioassessment to evaluate the appropriateness of the existing designated use can be fulfilled prior to making determinations about impairments, their causes and sources, and developing management responses. This approach generally results in 12-15 sites per HUC12 watershed, but it can be higher in complex settings. The Plan will develop the parameters and indicators to be sampled at each site in addition to providing a schedule of rotation through subbasins in accordance with the resources allocated for monitoring in each year. Some aspects of the data analysis needed to develop an IPS for Central Ohio can be initiated once the existing data is identified and compiled. An IPS is continuously updated with new data and information as it is developed and produced.

Task 4 – Watershed Plan

This task involves the development and publishing of the Watershed Based Bioassessment Plan including the major goals and objectives, the rationale for the selection of indicators, and the template for a rotating watershed approach. It will also detail the annual schedule for watershed assessments including mobilization, Level 3 Project Study Plan (PSP) development, field sampling, demobilization, data reduction and management, laboratory analysis, data

analysis, and report production. The general outputs of the IPS framework will also be described.

Proposed Budget

A budget for developing the scoping and planning document described above appears in Table 1.

References

Midwest Biodiversity Institute (MBI). 2011. Watershed Monitoring and Bioassessment Plan for the MSD Greater Cincinnati Service Area. Hamilton County, Ohio. Technical Report MBI/05-11-3. 30 pp. + appendices.

Midwest Biodiversity Institute (MBI). 2006. Bioassessment Plan for the DuPage and Salt Creek Watersheds. DuPage and Cook Counties, Illinois. Technical Report MBI/03-06-1. 45 pp. + appendices.

Ohio Environmental Protection Agency (EPA). 2022. Ohio 2022 Integrated Water Quality Monitoring and Assessment Report. Division of Surface Water, Columbus, OH. 359 pp. + appendices.

U.S. Environmental Protection Agency. 2007. APPENDIX C: The DuPage River and Salt Creek (IL) Case Study. *in* Total Maximum Daily Loads and National Pollutant Discharge Elimination System Stormwater Permits for Impaired Waterbodies: A Summary of State Practices. USEPA Region 5, Chicago, IL. 45 pp. + appendices.

***Table 1**. Proposed budget for development of the Central Ohio Watershed Monitoring and Assessment Plan.*

Task	Unit Cost	Project Units	Cost	Subtotal	Scope of Activity
Task 1 - Project Management					
Project Manager	$66.91	80	$5,352.80		Project management; coordinate/meet with DOSD and other regional stakeholders.
Direct Labor Costs		80	$5,352.80		
Task 1 Labor Fee (OM 1.65 applied)			**$8,832.12**		
Task 1 Subtotal				**$8,832.12**	
Task 2 - Inventory Exisiting Sites & Reports					
Project Manager	$66.91	32	$2,141.12		Inventory existing bioassessments & TMDLs in the Central Scioto River watershed area.
Senior Research Associate	$59.78	80	$4,782.40		Account for exisiting sites in Ohio ECOS/EA3 and other data sources (e.g., Columbus DOW).
Direct Labor Costs		112	$6,923.52		
Task 2 Labor Fee (OM 1.65 applied)			**$11,423.81**		
Task 2 Subtotal				**$11,423.81**	
Task 3 - Watershed Bioassessment Design					
Project Manager	$66.91	40	$2,676.40		Assess and develop site coverage for HUC12 watersheds and Large River Assessment Units.
Senior Research Associate	$59.78	120	$7,173.60		Perform geometric & pollution survey design including existing and new sites in GIS.
Direct Labor Costs		160	$9,850.00		
Task 3 Labor Fee (OM 1.65 applied)			**$16,252.50**		
Task 3 Subtotal				**$16,252.50**	
Task 4 - Watershed Plan					
Project Manager	$66.91	80	$5,352.80		Develop draft and final plan for DOSD approval - long term schedule for rotating watershed approach.
Senior Research Associate	$59.78	60	$3,586.80		Provide technical support for Plan development.
Direct Labor Costs		140	$8,939.60		
Task 3 Labor Fee (OM 1.65 applied)			**$14,750.34**		
Task 4 Subtotal				**$14,750.34**	
Task 5 - Access Existing Regional Data					
Project Manager	$66.91	40	$2,676.40		Identfy suitable sources of data and generate requests.
Senior Research Associate	$59.78	120	$7,173.60		Provide technical support for accessing exsiting regional data and download into MBI ECOS
Direct Labor Costs		160	$9,850.00		
Task 3 Labor Fee (OM 1.65 applied)			**$16,252.50**		
Task 5 Subtotal				**$16,252.50**	
PROJECT TOTAL		**652**		**$67,511.27**	

Appendix A: Central Ohio Watersheds Columbus DOSD Focused Framework Discussion Outcomes

Conceptual

1. CWA is the guiding theme including WQS (uses and criteria), NPDES permitting (major and minor point sources), TMDLs, stormwater (MS4 and other), grants, and planning.
2. Ohio Credible Data Law and Regulations – Level 3 specifications for all data collection and analysis.
3. Emphasis on aquatic life use due to its breadth of influence on CWA programs and its application to all water bodies – biocriteria based assessment of status with chemical/physical and habitat data sufficient to support assignment of predominant causes to be addressed via management and/or restoration practices.
4. Recreational use assessment via *E. coli* in chemical sample collection and lab analyses.
5. Drinking water and human and wildlife health uses can be addressed by adding chemical lab analytes and tissue analysis.
6. Historical data will be assessed for trends whenever available (~720 sites since 1979).
7. Collaborate with existing monitoring programs (e.g., Franklin Co. SWCD, Columbus AWPD), emerging watershed management initiatives (e.g., MORPC), and other stakeholders with overlapping interests in stream and watershed quality.

DOSD and MS4 Project Site-Reach Approach

1. Scioto River mainstem – extend the 37 year (1979-2015) Scioto River mainstem bioassessment into 2020-21 (completed) and 2022-23 (underway) with periodic surveys to track trends and support DOSDS NPDES permitting and related needs.
2. Assess rivers and streams directly and indirectly impacted by Project Blueprint to track any changes resulting from that program and other Wet Weather Management Program (WWMP) actions.
3. Current and future MS4 wet weather monitoring locations as a demonstration about how watershed based monitoring and assessment can benefit that program.

4. Use major river mainstems and a HUC12 watershed scale as the basis of the spatial sampling design.

Proposed MS4 Watershed Approach

1. Greater Central Ohio 12-digit HUCs; essentially the Upper and Central Scioto River Basin and adjacent watersheds that flow into the MS4 area.

2. Execute a rotating basin approach ideally over a 10 year cycle sampling ~1000 sites or 100 sites/year.

3. Development of a regional IPS model will be the ultimate outcome and tool to support NPDES and MS4 permitting and watershed management including the interests of other governmental agencies (Franklin Co. SWCD) and nongovernmental organizations (e.g., COWC, FLOW, MORPC, etc.).

Regional Watershed Approach

1. Provides a consistently developed and managed database and supporting model and tool development that will benefit different organizations each of which have their own goals and objectives and expectations.

2. M&A would be across all Central Ohio subbasins and utilizing the historical database from Ohio EPA both within and adjacent to the Columbus DOSD service and MS4 areas (~750 sites), which appears to be sufficient for the initial exploratory analyses required for IPS development.

3. Provides an ideal and data driven framework of coordination between different entities and stakeholders that have the attainment of CWA goals and the Ohio WQS as either an explicit or indirect requirement.

4. Development of a Central Ohio IPS framework and model that provides a standardized "toolset" based on a robust monitoring and assessment framework to the benefit of all organizations and stakeholders resulting in a greater assurance that planning and abatement efforts will conform to the Ohio WQS.

Appendix B

Total Maximum Daily Loads and National Pollutant Discharge Elimination System Stormwater Permits for Impaired Waterbodies: A Summary of State Practices. APPENDIX C: The DuPage River and Salt Creek (IL) Case Study.

Appendix C: General stressor categories and examples of specific stressors

Table 3. IPS General Stressor Categories	
Physical Habitat	QHEI and metrics, HydroQHEI, watershed scale habitat
Nutrients	TP, nitrate, Max. DO, DO Flux,
Organic Enrichment	DO, BOD, total ammonia, TKN
Dissolved Materials	Chloride, sulfate, conductivity, TDS
Suspended Materials	TSS, VSS, Turbidity
Water Column Toxics	Metals, organics
Sediment Contaminants	PAHs, Metals, PCBs
Catchment Landuse	Impervious surface, Developed land uses, road density
Buffer Landuse	Impervious surface, Developed land uses, road density

Why IPS? What Does it Additionally Provide For?

- **A direct focus on WQS use attainment end points, e.g., biocriteria.**
- **Includes a wider array of both pollutants and non-pollutants (~100 variables)**
- **Regionally developed stressor thresholds.**
- **Considers needs for both impaired and attaining sites, reaches, and subwatersheds.**
- **Dashboard allows users to use and explore IPS data, assessments, and outputs**
- **Provides sufficient information to plan ahead and avoid actions that lead to long term declines.**