



GLWA
Great Lakes Water Authority

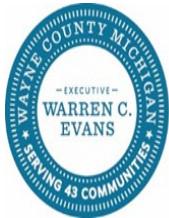
Watershed Hub Work Group Annual Monitoring Report

February 2024





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Public Services

Environmental Services Division



**Water & Sewerage
Department**



Alliance
of Rouge
Communities

Working together, restoring the river



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Introduction

The following is the first annual report of the Watershed Hub Work Group which captures the status of multiple water quality initiatives that the group leads or supports. These initiatives pertain to both immediate challenges such as identifying and mitigating illicit discharges and combined sewer overflows (CSO), and big-picture goals like building a baseline understanding of regional water quality to assess past investment outcomes and inform future decisions. In addition to the specific goals of Great Lakes Water Authority (GLWA) and other Work Group members, we anticipate that the data being collected and compiled in the Rouge, Clinton, and Detroit River watersheds may be useful for a variety of purposes to municipal managers, researchers, modelers, NPDES and MS4 permit holders, watershed groups, and more. Ultimately, it is the Watershed Hub's vision that this work will be leveraged by regional stakeholders to better understand and mitigate the myriad impacts of ever-changing natural conditions and anthropogenic pressures on southeast Michigan's watersheds. Significant deliverables detailed in this report include:

- Development and ongoing pilot of an Investigational *E. coli* Water Quality Sampling Program (Investigational Sampling Program) for Southeast Michigan
- Advancement of GLWA's Regional Water Quality Monitoring Plan (RWQMP) in partnership with the United States Geological Survey (USGS)
- Launching of the Watershed Hub GIS Mapper.

Watershed Hub Work Group Background

In 2020 GLWA published the Wastewater Master Plan (WWMP) laying out a 40-year vision for regional wastewater operations and calling for a holistic and collaborative approach to regional water quality management. By design, the WWMP appreciates that waterways are not constrained by jurisdictional boundaries and that downstream waterbodies should be considered in developing sustainable long-term strategies for the region. In addition to addressing widely discussed wet weather challenges such as CSOs, the WWMP includes initiatives geared towards gaining an understanding of baseline water quality under different weather conditions in Southeast Michigan's watersheds. The WWMP outlines the high-level plan to create the RWQMP and calls for the creation of focused work groups to ensure the advancement of this and other features of the WWMP. The WWMP is an adaptive management document intended to evolve with regional needs during its 40-year horizon; the work groups ensure that GLWA remains in tune with stakeholders and that we continue to address the current top priority challenges of the region.

As a direct outcome of the WWMP, the Watershed Hub Work Group was formed to convene stakeholders with an interest in improving regional water quality through decision-making that prioritizes shared objectives and integrates stormwater and sanitary programs. The group comprises representatives from GLWA, local counties, communities, governmental councils, watershed and planning groups, and foundations focused on environmental sustainability. Since the spring of 2020 the group has met monthly to share best practices and collaboratively approach the investigation of regional waterways. In addition to monthly meetings, the group has hosted several public webinars inviting diverse voices to learn about and inform the work.

Initially, the Work Group was asked to help GLWA develop the details of the RWQMP. While it did take a lead role in this task, the group also quickly identified other water quality monitoring needs related to Illicit Discharge Elimination Program (IDEP) requirements that were not being addressed by the proposed

sampling schedule. As a result, the group collaboratively developed and launched the Investigational Sampling Program. Although this differs significantly from the RWQMP in terms of scope and immediate purpose, the two monitoring programs complement each other to help fill in the big picture of baseline water quality in Southeast Michigan. This holistic approach is supported by the Watershed Hub GIS mapper, a protected-access website where data from these two programs and other stakeholders' monitoring efforts is compiled in a central location.

By establishing a baseline for watershed-scale water quality, carrying out consistent data collection over several years, and housing the data in an accessible format, GLWA seeks to create a more complete than ever before view of regional water quality. It is our long-term vision that resource managers will build on these efforts to better assess the outcomes of past investments (e.g. green and grey infrastructure projects, policy or operational changes, capital improvements, maintenance activities, etc.) and improve decision making going forward.

GLWA encourages stakeholders to engage with GLWA on how our efforts can better serve Members and to take advantage of these resources to advance local water quality management goals and the stewardship of regional water resources.

Investigational *E. coli* Water Quality Sampling Program for Southeast Michigan

Project Background

While CSOs have been significantly diminished in recent years, fewer resources have been available to mitigate dry weather impairments like illicit discharges. In part, this is due to a lack of high-resolution sampling data required to pinpoint the source of impairment and determine the responsible party. After multiple work group members shared information about individual county-level *E. coli* monitoring programs, the group began to explore options for cooperation that may yield a more holistic and detailed view of the status of local watersheds. This began the process of developing a collaborative approach to conducting investigational sampling in the Rouge and Clinton River watersheds to identify stream segments that are being impacted by untreated sewage discharges and nonpoint sources of pollution.

To advance this issue, the work group received a \$40,000 grant from the Michigan Department of Environment, Great Lakes, and Energy (EGLE) in the spring of 2021. The group spent the next year developing a work plan to investigate regional *E. coli* levels in the Clinton and Rouge River Watersheds. The outcome was an implementable work plan for the Investigational Sampling Program that was received enthusiastically by key decision makers representing local counties and municipalities, and others whose support is crucial for its implementation. The work plan details routine instream water quality sampling at strategic locations throughout the GLWA service area, partnered with targeted outfall sampling, to locate sources of illicit sanitary discharges into waters of the state. The plan relies on routine sampling to assess both dry and wet weather conditions, as opposed to more costly and less reliable "storm chasing". The program is envisioned as the first of its kind for southeast Michigan that can serve as a progressive model for others interested in collaborative management.

The program runs on a five-year cycle as follows:

- **Year 1:** Weekly sampling and analysis for *E. coli* in over 200 locations in the Rouge and Clinton River watersheds during the May-to-October recreational season.
- **Year 2:** Sampling outfalls within priority stream segments to discern if they may be carrying illicit discharges from sanitary sources, using microbial source tracking (MST).
- **Years 3-5:** Working with communities to investigate upstream of priority outfalls, as discerned by information gathered during the first two years of the cycle.
- **Year 6:** Begin repeating the cycle, starting back at year 1 activities.

Year 1 Implementation Retrospective

Having now completed one year of this cycle, implementation has followed an adaptive approach and accomplished many of the program's goals, while differing from the proposed plan in important ways. Initially, the work plan called for participants to contribute money and/or resources towards a centralized program where sampling and analysis were carried out uniformly by one third-party entity across municipal boundaries. After meeting with key stakeholders, several issues remained unresolved related to cost allocations, administrative roles, and funding mechanisms that would be required for the centralized approach. In addition, different work group members' jurisdictions had different baselines in terms of their current local sampling programs, which made it difficult to find a single starting point for the region. Despite these challenges, work group members agreed that they still had strong overlapping goals and continued to forge a path toward fulfilling the greater purpose of the program.

To keep moving forward, the plan pivoted so that the full slate of sampling was carried out independently by multiple parties in the spring and summer of 2023. This included Oakland County Water Resources Commission (OCWRC), Macomb County Public Works Office (MCPWO), Macomb County Health Department (MCHD), Wayne County Department of Public Services (WCDPS), and Alliance of Rouge Communities (ARC) on behalf of OCWRC. Despite the deviation from the centralized approach, the sampling work was still completed in a highly collaborative environment. Work group members regularly shared experiences and best practices related to field work and analytical methods and discussed the interpretation of preliminary results at work group meetings. They also voluntarily shared all data collected with one another through the Watershed Hub GIS mapper.

Between May and October 2023, 600 grab samples were collected and analyzed for *E. coli* from 226 locations in the Clinton and Rouge Rivers. A total of 251 samples were collected from 15 locations in the Rouge River and 349 samples were collected from 211 locations in the Clinton River. These sampling locations are depicted below in Figure 1.

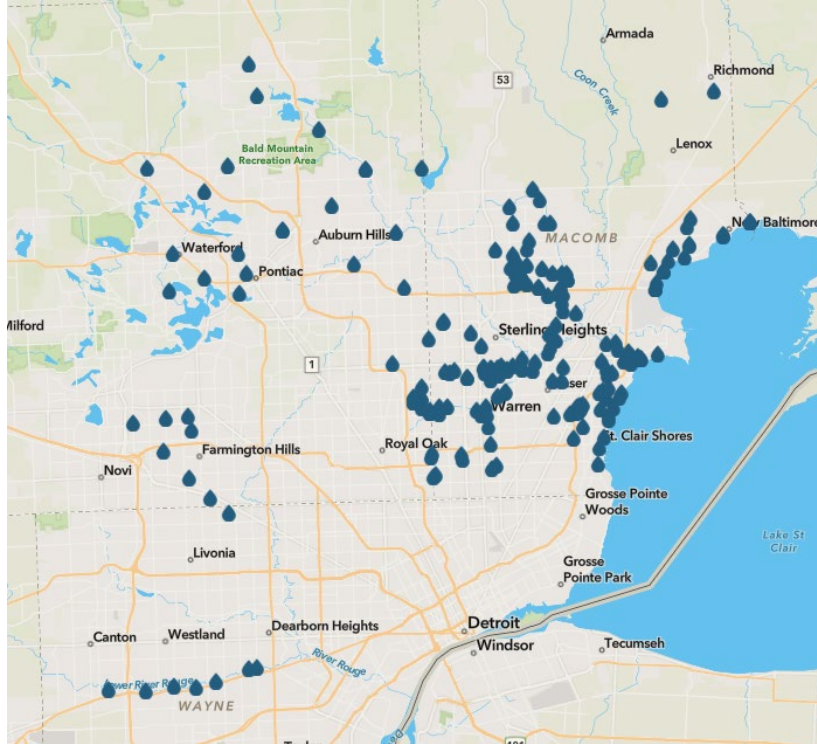


Figure 1: Investigational *E. coli* Water Quality Sampling Program 2023 sampling locations

The following individual reports on 2023 sampling activities from OCWRC, MCPW, and WCDPS, have been submitted and compiled for inclusion in this annual report:

[OCWRC Water Quality Sampling Report 2023](#)

[OCWRC Sampling Background](#)

OCWRC is required to comply with EGLE’s NPDES MS4 Phase II permit by implementing an IDEP program. WRC developed an alternative procedure for ongoing monitoring of all open and enclosed County drains for illicit discharges. This procedure covers all County drains in both MS4 and non-MS4 areas. All County drains and structures are currently inspected on a 4-year rotating cycle under WRC’s Construction Drain Maintenance (CDM) Program. The Environmental team follows this same cycle for sampling the outfalls of each County drain to confirm current *E. coli* levels within the system.

A process for prioritizing the drains for illicit discharge investigation was previously developed and approved. The criteria used for evaluating and prioritizing County drains are as follows:

Priority 1 – Evidence of pollutants and/or *E. coli* values $\geq 10,000$ cfu/100 ml

Immediate follow-up to verify illicit discharge. Initiate upstream IDEP investigation to identify pollutant source(s) and coordinate additional activities as needed.

Priority 2 – No evidence of pollutants and *E. coli* values ≥ 5001 and $< 10,000$ cfu/100 ml

Schedule additional dry weather sampling within one (1) year for further evaluation. Schedule upstream dry weather sampling or initiate IDEP investigation to identify pollutant sources(s) as needed.

Priority 3 – No evidence of pollutants and *E. coli* values \leq 5,000 cfu/100 ml

Continue dry weather sampling of outfalls and discharge points per 4-year drain maintenance inspection cycle. Review results and reprioritize as needed.

OCWRC contracts with Oakland University to perform Microbial source tracking (MST) sampling. With MST, human-associated pollution markers are detected by looking for *Bacteroides* HF183. Consecutive results over 10,000 cfu/100 ml will trigger a lab test for HF183 to be conducted. HF183 markers are measured in GC (Gene Copies) / 100 ml with priority designation given to results of 1,000 GC/100 ml in enclosed systems and 500 GC/100 ml in open water courses or drains with regular flow.

Water quality samples for *E. coli* analysis were completed by either the Walled Lake-Novu WWTP or Paragon Laboratories Inc. Samples for HF183 analysis were completed by Oakland University.

OCWRC Projects and Results

Sample locations were proposed to support the following initiatives:

1. Priority 1 Drain Follow-up
2. Ongoing Outfall Sampling Program
3. Watershed Hub Investigational *E. coli* Water Quality Sampling Program for Southeast Michigan

A total of 315 samples were taken and analyzed for *E. coli* from these initiatives as follows:

- 10.16% (32 samples) were Priority 1
- 5.08% (16 samples) were Priority 2
- 84.76% (267 samples) were Priority 3

OCWRC Priority 1 Follow-up

Austin Drain

The Austin Drain, located in the City of Southfield, is a continued Priority 1 drain from previous years. After elevated *E. coli* results were narrowed down to a couple of segments of pipe, The Construction Drain Maintenance (CDM) Unit walked the drain and sampled each tap throughout the identified pipe segments. An illicit discharge was identified from a building located on the 1800 block of W. 10 Mile Road. Follow-up dye testing of the building confirmed the illicit connection at a Road Commission for Oakland County catch basin along the north side of 10 Mile Road and ultimately into the Austin Drain. Work is currently being completed to fix the illicit connection.

Sample Results:

<u>Structure Location</u>	<u><i>E. coli</i> GEO MEAN cfu/100ml</u>	<u>Structure Location</u>	<u><i>E. coli</i> GEO MEAN cfu/100ml</u>
SOT105001	692	SOT092016B	340
SOT101001	10,998	SOT092020	284
SOT101005	915	SOT092026	353
SOT092014	72	10 Mile Local	35
SOT092016	78		

August 3rd CDM Walk (Sampling of Each Drain Tap)

<u>Structure Location</u>	<u>E. coli GEO MEAN</u> cfu/100ml	<u>Structure Location</u>	<u>E. coli GEO MEAN</u> cfu/100ml
SOT101001 – 66’, 12” RCP	1,070	SOT101003 – 87’, 12” RCP	221
SOT101001 – 141’, 10” VCP	67	SOT101003 – 116’, 10” VCP	4
SOT101001 - 369’, 12” RCP	43	SOT101003 – 447’, 10” VCP	26
SOT101001 - 468’, 10” PCP	139	SOT101003 – 596’, 10” VCP	87
SOT101001 – 669’, 12” RCP	>1,209,800		
SOT101001 – 758’, 10” VCP	239		

Next Steps: Follow-up in 2024 is required to confirm the illicit discharge has been resolved and if the drain can be removed from the Priority 1 list.

Owens Drain

The Owens Drain, located in the City of Southfield, is a continued Priority 1 drain from the previous year. In 2022, an illicit discharge was discovered along 9 Mile Road. This work was still being completed in 2023 and the downstream manhole (SOT103060) still has elevated *E. coli* levels. Follow-up sampling results are as follows:

Sample Results (*single sample):

<u>Structure Location</u>	<u>E. coli GEO MEAN</u> cfu/100ml	<u>Structure Location</u>	<u>E. coli GEO MEAN</u> cfu/100ml
SOT103060	17,329*	SOT139005	2,934
SOT135005	3,448*	SOT139011	1,086*
SOT136026	21,328*	SOT139013	4,376*
SOT137014	3,315	SOT139050	1,027*
SOT137018	9,453		

<u>Structure Location</u>	<u>HF183 Marker</u> GC/100 ml	<u>Structure Location</u>	<u>HF183 Marker</u> GC/100 ml
SOT137018	944	SOT13060	1,102

Next Steps: The work to remove the illicit discharge along 9 Mile Rd. is still being resolved. Once complete, sampling downstream will confirm the fix. Continued high *E. coli* levels along other segments require further sampling investigation which will include HF183 sampling and possibly CCTV and/or dye testing.

Flannery Drain

The Flannery Drain, located in the City of Southfield, is a continued Priority 1 drain from previous years. A sample of the Flannery Drain outfall to the Owens Drain showed continued elevated *E. coli* levels.

Results:

<u>Structure Location</u>	<u>E. coli GEO MEAN (cfu/100ml)</u>
SOT139028	1,231

Next Steps: Follow-up sampling to confirm lower *E. coli* levels, possible HF183 sampling, and wet weather nutrient sampling from multiple storage facilities in the area.

Fracassi Drain

The Fracassi Drain, located in the City of Southfield, has been a Priority 1 drain for previous years.

Sample Results (*single sample):

<u>Structure Location</u>	<u>E. coli GEO MEAN</u> cfu/100ml	<u>Structure Location</u>	<u>E. coli GEO MEAN</u> cfu/100ml
SOT123016*	35	SOT123057*	706
SOT123053	1,333	SOT123351*	2

Next Steps: Follow up sampling in 2024 to confirm *E. coli* levels are still low.

Clarenceville Drain

The Clarenceville Drain, located in the City of Farmington Hills, was removed from the Priority 1 list, but still required follow-up sampling.

Sample Results:

<u>Structure Location</u>	<u>E. coli GEO MEAN</u> cfu/100ml
FAT144053	4,059

<u>Structure Location</u>	<u>HF183 Marker</u> GC/100 ml
FAT144053	800

Next Steps: Follow-up sampling in both the Clarenceville Drain and Hazel Drain, which outlet into the Clarenceville Drain. The outfall of the Clarenceville Drain needed repair so sampling wasn't completed in 2023; a sample will be taken at the outfall in 2024 and follow-up samples will be taken upstream as needed.

US-16 Drain

The US-16 Drain, located in the City of Farmington, was previously a Priority 1 drain. Multiple illicit connections were corrected throughout the year; however, elevated *E. coli* results persisted in 2023. There is currently no cost estimate for the work.

Next Steps: Continue to coordinate with the City of Farmington to perform CCTV work and smoke test suspected properties and possibly faulty bulkheads throughout the rest of 2023 and 2024.

OCWRC Outfall and Investigational *E. coli* Sampling

A new outfall sampling program was initiated in 2023. Drain outfalls will be sampled in accordance with CDM’s four-year inspection cycle. This program will ensure that any possible new pollutant sources are identified and investigated in a timely manner. In 2023, the cost for this work was allocated to the Watershed Hub Work Group’s Investigational *E. coli* Water Quality Sampling Program for Southeast Michigan, marking OCWRC’s participation in a long-term project with GLWA and surrounding communities to sample and share IDEP investigation data throughout the GLWA service area as part of a collaborative effort to regionally track and eliminate illicit discharges.

Clinton-Oakland Sewage Disposal System (SDS) Area

Sample Results (*single sample):

<u>Drain Name</u>	<u><i>E. coli</i> GEO MEAN cfu/100 ml</u>	<u>Drain Name</u>	<u><i>E. coli</i> GEO MEAN cfu/100 ml</u>
Augusta Drain (Osmun)*	18	Helaine Zack Drain	469
Augusta Drain (Lakes)	332	Ireland Drain	792
August Drain (Norton)	559	Karas Drain	297
Brooklyn Drain	264	Ladd Drain	189
Clinton River Clarkston	222	McClure Drain	681
Clinton River Cooley	186	Nelson Drain (Dequindre)	1,034
Clinton River M59	194	Nelson Drain (Long Lk)	680
Clinton River Hamlin	144	Otter Drain	558
Dutton Drain	841	Paint Creek (Clarkston)	157
Ferry Drain	411	Paint Creek (Seymour Lk)	199
Galloway Drain	335	Paint Creek (Stanton)	166
Paint Creek (Rochester)	235	Sashabaw Creek (Orion)	67
Paint Creek (Gallagher)	182	Sturgis Drain (Hartland)	2,512
Rewold Drain	423	Sturgis Drain (Colebrook)	1,237
Sashabaw Creek (Ind Twp)	198	West End Drain	244

<u>Drain Name</u>	<u>HF 183 Marker GC/100 ml</u>	<u>Drain Name</u>	<u>HF 183 Marker GC/100 ml</u>
Nelson Drain (Dequindre)	371	Sturgis Drain (Hartland)	474

Next Steps: Follow-up samples on Nelson Drain and Sturgis Drain and continue investigation as needed. New locations will be selected for sampling which will correspond with the 2024 drain inspection cycle.

GWK SDS Area

Sample Results (* single sample):

<u>Drain Name</u>	<u><i>E. coli</i> GEO MEAN cfu/100 ml</u>	<u>Drain Name</u>	<u><i>E. coli</i> GEO MEAN cfu/100 ml</u>
Barnard Drain	3,982	Hazel Park Local (Elza)	>12,098,000
George W. Kuhn Dr North	486	Hazel Park Local (Maple Ln)	415
George W. Kuhn Dr South	307	Hazel Park Local (Vance)	744
Dunleavy (ROT093003)	7,955	Hazel Park Local (Tucker)	544
Dunleavy (ROT093015) *	9,060	Henry Graham (Executive)	1,109
Dunleavy (ROT093009) *	8,010	Henry Graham (14 Mile)	4,644
Dunleavy (ROT093025) *	8,200	Henry Graham (Whitcomb)	218
Dunleavy (ROT093035)	17,210	Henry Graham (ROT002016) *	200
Dunleavy (ROT093037)	4,061	Henry Graham (Groveland local) *	410
Dunleavy (ROT094004)	49,799	Henry Graham (Milverton)	1,384
Dunleavy (ROT094006)	72,013	Henry Graham (TRT143013)	11,484
Dunleavy (ROT094008)	127,018	Henry Graham (TRT143017) *	410
Dunleavy (ROT094010) *	2,688	Henry Graham (Taco Bell Tap) *	1,210
Dunleavy (ROT094018) *	133	Henry Graham (ROT002013) *	1,210
Dunleavy (ROT094022) *	100	Henry Graham (John R LS) *	2,090
Dunleavy (ROT094109) *	27,833	Henry Graham (ROT005014)	177,335
Dunleavy (ROT094135) *	31	Henry Graham (ROT005016) *	85
Henry Graham (ROT005019) *	10	Henry Graham (ROT005026) *	241,960
Henry Graham (ROT005021)	64,216	Henry Graham (ROT005027) *	109,350
Henry Graham (Brush Local)	200	Kaczmar Drain	2,686
Henry Graham (ROT005015) *	155,310	Kutchey Drain (Stephens)	1,581
Henry Graham (ROT005022) *	29	Kutchey Drain (Kathleen)	224
Henry Graham (ROT005023) *	166	Sharkey Drain (Lincoln)	1,287
Henry Graham (ROT005024) *	49	Sharkey Drain (Dequindre)	4,953

<u>Drain Name</u>	<u>HF 183 Marker GC/100 ml</u>	<u>Drain Name</u>	<u>HF 183 Marker GC/100 ml</u>
George W Kuhn North	95	Henry Graham (TRT143013)	13,120
George W Kuhn South	95	Henry Graham (John R LS)	629
Sharkey Drain (Dequindre)	99	Henry Graham (ROT005014)	2292
Henry Graham (Executive)	625	Dunleavy Drain (ROT093003)	10,667
Henry Graham (14 Mile)	8,674		

Next Steps: 2023 sampling results have shown elevated levels of *E. coli* on the Henry Graham Drain and Dunleavy Drain. On The Henry Graham Drain, elevated levels have been narrowed down to a tap at ROT005026. Investigation in the local system, which will include dye testing, in 2024. On the Dunleavy Drain, continued investigation of multiple intersections will continue. The Barnard Drain also had an elevated level of *E. coli* which will require resampling. The City of Hazel Park staff are investigating elevated levels of *E. coli* at the intersection of Elza and Dequindre; WRC staff will assist as needed in 2024.

Evergreen-Farmington SDS Area

OCWRC contracted with the ARC to initiate investigational *E. coli* sampling within the Evergreen-Farmington SDS in 2023. Consistent with the regional work plan, the goals were to identify impaired reaches based on *E. coli* concentrations and identify priority outfalls that may be contributing to the impaired reaches. Instream grab samples were collected weekly for 20 weeks at 8 locations and analyzed for *E. coli* at Paragon Laboratories (12649 Richfield Ct, Livonia, MI 48150) (Figure 2). Samples were taken within the Evergreen-Farmington SDS service area regardless of weather conditions.

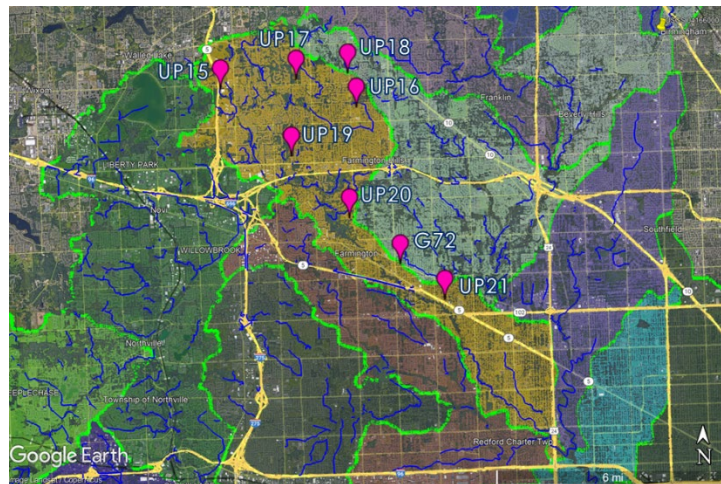


Figure 2: Sampling locations in the Evergreen-Farmington SDS.

Geometric means were calculated from sampling data across each site and partitioned based on dry and wet-weather conditions. Dry-weather samples were defined as samples taken when there was ≤ 0.05 inches of rainfall over the previous 48 hours. Wet-weather samples were defined as samples taken when there was ≥ 0.25 inches of rainfall over 24 hours and preceded by a 48-hour dry period. Samples that did not meet these criteria were defined as inter-weather samples, where there was ≥ 0.05 inches of rainfall within 48 hours and ≤ 0.25 inches within 24 hours.

Three of the eight sampling locations were identified as high priority due to consistently elevated *E. coli* levels: UP17, G72, and UP21. These 3 sites had the greatest average *E. coli* concentrations over the 20 weeks. Consistent with the regional work plan, follow-up recommendations are to sample clusters of known MS4 outfalls upstream from each high-priority location for *E. coli*. Samples that exceed 1,000 mpn/100ml should be analyzed for human-specific HF183 Bacteriodes genetic marker. HF183 values that exceed 300 GC/100ml should be prioritized for further investigation.

See the table below for *E. coli* results and descriptive statistics for all samples at each site over the 20-week sampling period. Red cells indicate samples above 1,000 MPN/100ml.

Weeks	Sites							
	UP15	UP16	UP17	UP18	UP19	UP20	G72	UP21
1	41	241	663	20	120	218	98	373
2	201	203	620	842	96	86	256	388
3	122	450	9208	171	84	908	373	464
4	243	201	1137	31	771	132	399	650
5	697	364	495	10	733	583	631	836
6	404	345	1187	2495	703	309	738	583
7	389	350	2247	15531	404	794	987	1274
8	298	657	987	529	320	473	1043	1112
9	243	631	631	422	520	683	1014	1616
*10	2247	12033	9208	3448	4106	15531	24196	24196
11	576	305	2755	41	521	448	809	4352
*12	1333	4352	3448	1333	959	1789	4884	4106
13	295	813	1119	62	262	2755	1483	1616
14	345	269	683	41	368	556	1236	1153
15	563	323	341	52	327	404	697	880
*16	7701	24196	11199	11199	9804	12033	14136	10462
17	1106	594	345	20	1017	733	703	1017
*18	1211	1850	1376	31	2603	5172	11199	4352
19	199	602	602	63	2909	1137	990	1296
20	1565	350	265	10	185	473	813	1274
GeoMean	489	684	1235	176	587	822	1161	1483
Min	41	201	265	10	84	86	98	373
Max	7701	24196	11199	15531	9804	15531	24196	24196

NOTES

* Wet Weather Event (> 0.25" in the preceeding 24 hrs of sampling)

Samples greater than 1000 MPN/100ml

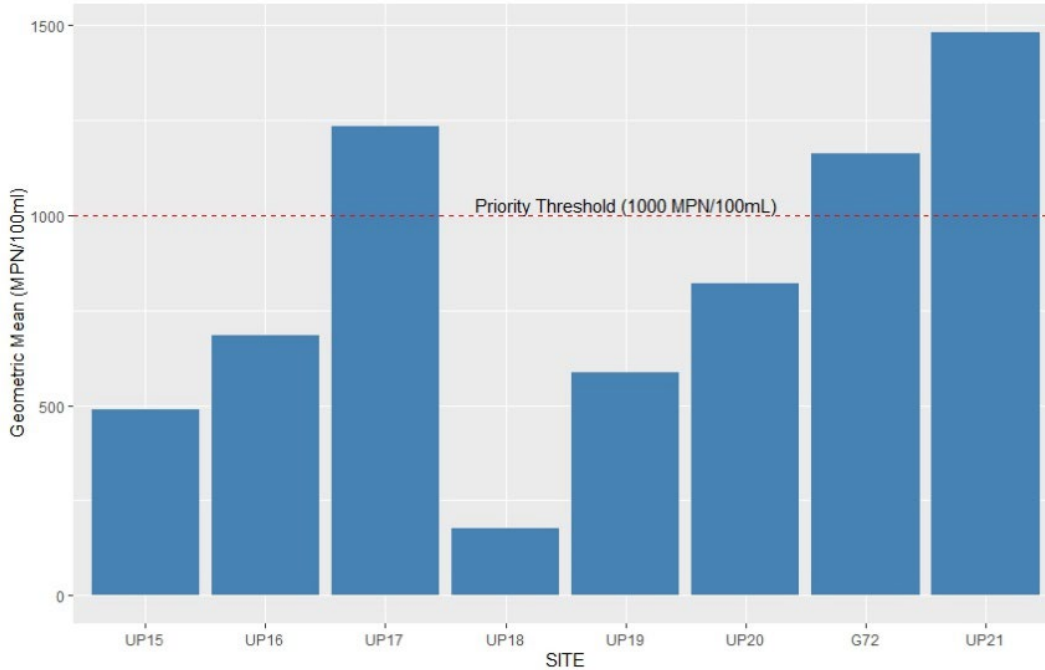


Figure 3: Geometric means of *E. coli* concentrations per site across all samples. A threshold of 1,000 MPN/100ml is also shown and may be used to help prioritize municipal separate storm sewer system outfalls that require additional investigations.

MCPWO Investigational Sampling Report 2023

As previously mentioned, not all communities participating in this program were at the same starting point when this work began. For example, during the development of the Investigational Sampling Program, MCPWO was already engaged in extensive *E. coli* sampling in the Clinton River watershed. Their programming at that time largely informed the details of the collaborative sampling plan. By the time the work group began to pilot the Investigational Sampling Program in the spring of 2023, MCPWO was already working on what the plan describes as year two activities, which involves the further investigation of priority stream segments, and the use of MST analysis to determine if the source was human sewage.

In this second year of their local IDEP program, MCPWO focused on sites where high levels of *E. coli* were detected the previous year. Testing was expanded to include new outfall locations as directed in the County’s MS4 permit. These included the Red Run and Sterling Relief drains, and the outfalls into Lake St. Clair and the Clinton River.

At each site, comprehensive assessments were conducted including checking for water flow, noting any odors, and observing the water's color, turbidity, and any floating materials. An inspection was completed for the physical condition of the outfalls, noting signs of damage, staining, abnormal vegetation growth, benthic organisms in pooled areas, and any unusual odors.

In 2023, MCPWO’s sampling efforts resulted in 156 samples collected from 126 sites, with 24 of these taken during wet weather conditions.

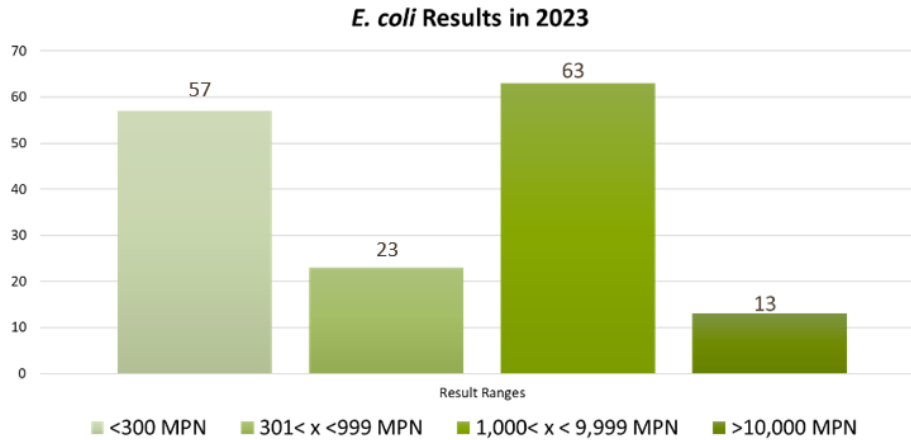


Figure 4: Breakdown of 156 sample site results for 2023

13 of these samples had *E. coli* levels exceeding 10,000 MPN, which necessitated further investigation through MST to ascertain whether the *E. coli* originated from human or animal sources.

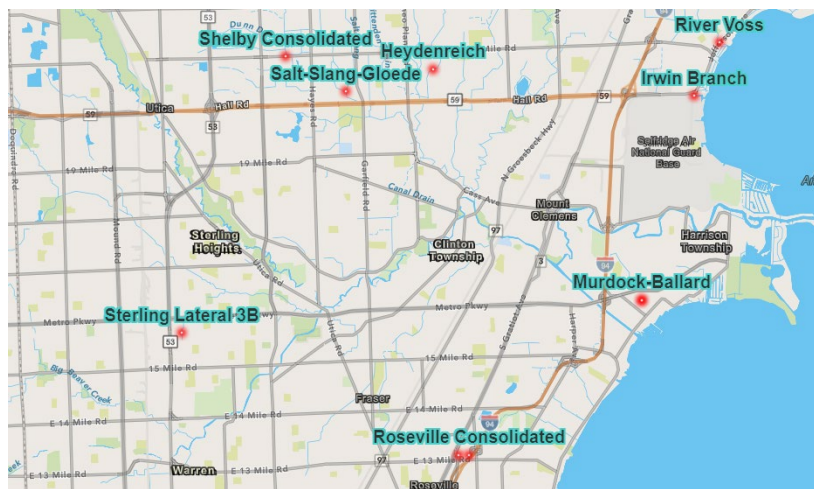


Figure 5: Sample sites with greater than 10,000 MPN

The MST analysis revealed the presence of low levels of markers that may indicate the presence of human waste in three of the 13 samples. These findings were in the Heydenreich, Salt-Slang-Gloede, and Shelby Consolidated SE drains and will be the focus of follow-up testing in the upcoming year. Additionally, the Roseville Consolidated, Pingel, and Crittenden drains approached the actionable threshold marker, warranting closer monitoring for next year.

MCPWO’s primary objective in 2024 will be to continue to monitor and conduct follow-up testing at sites that exhibited high levels of *E. coli* contamination in 2023. A key focus will be on prioritizing sampling during wet weather conditions when runoff levels are elevated and continuing to adhere to the testing parameters as outlined in the county’s approved MS4 permit.

WCDPS Investigational Sampling Report 2023

Background

The Lower Rouge River Water Trail is a 27-mile inland paddling trail connecting people to the river's natural environment, its history, and the communities it touches in Michigan's Rouge Watershed. The vision of establishing a water trail on the Lower Rouge River moved closer to reality with the formation of the Lower Rouge Water Trail Leadership committee in 2019. The Committee brought Friends of the Rouge (FOTR), Wayne County, and 10 communities along the Lower Rouge together to develop a water trail spanning from Canton Township to the Detroit River.

WCDPS began *E. coli* monitoring of sites on the Lower Rouge River water trail route in 2019. The samples are collected to gather more data about water quality along the Lower Rouge water trail route. A single grab sample is collected center stream at each site. The water samples are analyzed for *E. coli* by an EGLE-certified contract laboratory.

The Water Trail monitoring serves multiple purposes: protecting public health, supporting recreational uses of the Lower Rouge River, and supplementing Illicit Discharge Elimination Plan (IDEP) investigation efforts. WCDPS provides regular reports on the Lower Rouge water quality monitoring and IDEP investigation efforts to the Lower Rouge Water Trail Leadership Committee. 2023 was the fifth year of the WCDPS water trail monitoring effort.

Seven Lower Rouge Water Trail sites are monitored for *E. coli* during the recreational season, which is May through October. The furthest upstream sample site is at Morton Taylor Road in Canton Township and the furthest downstream is Beech Daly Road in the City of Inkster. Figure 1 Lower Rouge Water Trail monitoring sites 2023 is a map of the sampling locations.

Results

A total of 91 *E. coli* samples were collected at seven sites during 13 events in the 2023 monitoring season, May 1, 2023, through October 3, 2023. The samples were collected under dry weather conditions (less than 0.10 inches of rain 48 hours prior to sampling), except where noted. Table 1 2023 Lower Rouge Water Trail Monitoring Data contains the sample results. The laboratory results are reported by estimating the number of viable *E. coli* that are present in a water sample. The values are reported as colony-forming units/100 milliliters of water (CFU/100mL). The results of the single sample/event are compared to the State of Michigan water quality standards for *E. coli*; which are: Total Body Contact (May 1- October 31) Daily Maximum: 300 *E. coli* per 100 mL; 30-day geometric mean 130 *E. coli*/100mL; Partial Body Contact (all year): Daily Maximum 1000 *E. coli* per 100mL.

Below are the results of the monitoring data analysis:

- 26 percent of the samples (24) met the Daily Maximum Total Body Contact Standard of 300 CFU/100mL
- 95 percent of the samples (84) met the Partial Body Contact Standard Daily Maximum of 1000 CFU/100mL
- 4 percent of the samples (4) exceeded the Partial Body Contact Daily Standard Maximum of 1000 CFU/100mL

- All the sites met the Partial Body Contact Standard of 1000 CFU/100mL for 10 out of 13 (77%) monitoring events
- During two of the monitoring events, all the samples met or were below the Daily Maximum Total Body Contact Standard of 300 CFU/100mL: May 11, 2023, and June 29, 2023
- The Beech Daly site exceeded the Partial Body Contact Standard on two occasions 1095 CFU/100mL on August 3, 2023, and 1200 CFU/100mL on September 21, 2023
- The highest *E. coli* concentration in a single sample was 1500 CFU/100mL; LR-02 John Hix Rd on September 25, 2023
- Two other sample sites had *E. coli* concentrations more than the Partial Body Contact Standard: LR-02 John Hix Rd, and LR-04 Venoy Rd, on September 25, 2023

Next Steps

The Lower Rouge Water Trail monitoring will continue for the 2024 season and the results reported to the Lower Rouge Water Trail Leadership Committee and utilized for IDEP investigations.

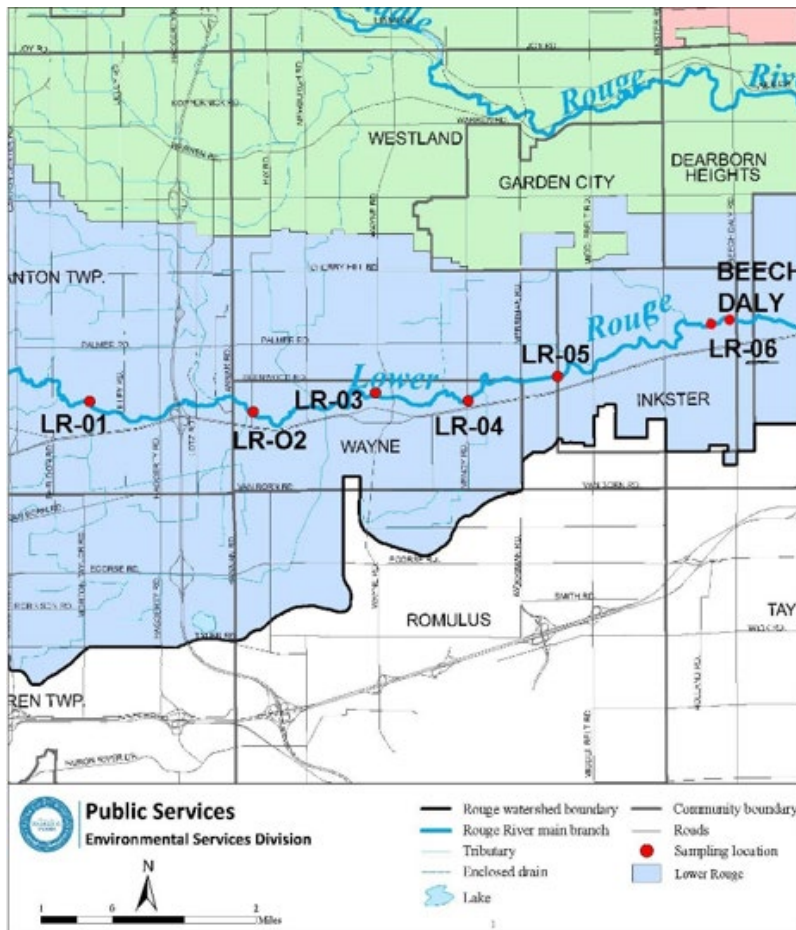


Figure 6: Lower Rouge River Water Trail Monitoring Sites 2023

Sample Date/Location	LR-01 Morton Taylor Rd Canton	LR-02 John Hix Rd Wayne	LR-03 Elizabeth St Wayne	LR-04 Venoy Rd Wayne	LR-05 Henry Ruff Rd Westland	LR-06 John Daly Rd Inkster	Beech Daly Inkster	48-hour rainfall total prior to sampling (inches)
5/11/2023	110	130	130	170	200	120	200	0.02
5/24/2023	340	360	400	260	410	230	120	0.00
6/1/2023	300	400	770	580	560	540	660	0.00
6/20/2023	220	640	710	480	750	490	680	0.00
6/29/2023	58	68	63	70	73	22	28	0.07*
7/5/2023	594	700	521	531	536	420	583	0.03**
7/19/2023	270	320	420	520	490	500	460	0.00
8/3/2023	309	228	389	399	504	613	1095	0.00
8/10/2023	170	320	380	460	410	250	470	0.00
8/21/2023	192	365	517	727	866	461	517	0.00
9/21/2023	300	460	520	260	460	860	1200	T
9/25/2023	300	1500	1000	1200	910	740	880	0.00
10/3/2023	171	364	393	359	780	985	605	0.00

*Samples collected at LR-01 and LR-02 after start of the 6/29/2023 rainfall. Dry conditions present at other sites

**1.19 inches of rain was recorded at DTW on July 2, 2023

T-Trace of Precipitation recorded at DTW

*Samples greater than 1000 MPN/100 ml

Regional Water Quality Monitoring Program (RWQMP)

Originally scoped as part of the WWMP, Phase I of the Regional Water Quality Monitoring Program was launched in the spring of 2022 in partnership with the USGS. This includes eight permanent monitoring locations with parameters varying from stage and discharge, to periodic grab samples, to continuous monitoring. Phase I sites are located in the Clinton (x2), Rouge (x3), and Detroit River (x3) watersheds. All data collected through this program is available to the public through USGS's website; see the table and map below with sampling locations, and links to data collected at each.

GLWA Site Name	Watershed	USGS Site Name	USGS Site Number & Link to Data
CR3	Clinton River	Clinton River at Moravian Drive at Mt. Clemens	USGS 04165500
CR4	Clinton River	Clinton River at Sterling Heights	USGS 04161820
RR1	Rouge River	River Rouge at Allen Park	USGS 04168530
RR3	Rouge River	River Rouge at Detroit	USGS 04166500
RR7	Rouge River	Lower River Rouge at Dearborn	USGS 04168400
DR1	Detroit River	Detroit River 1,250' DS R. River at River Rouge	USGS 04168557
DR2	Detroit River	Detroit River at Fort Wayne at Detroit	USGS 04165710
DR3	Detroit River	Detroit River at Ralph Wilson Park	USGS 04165705

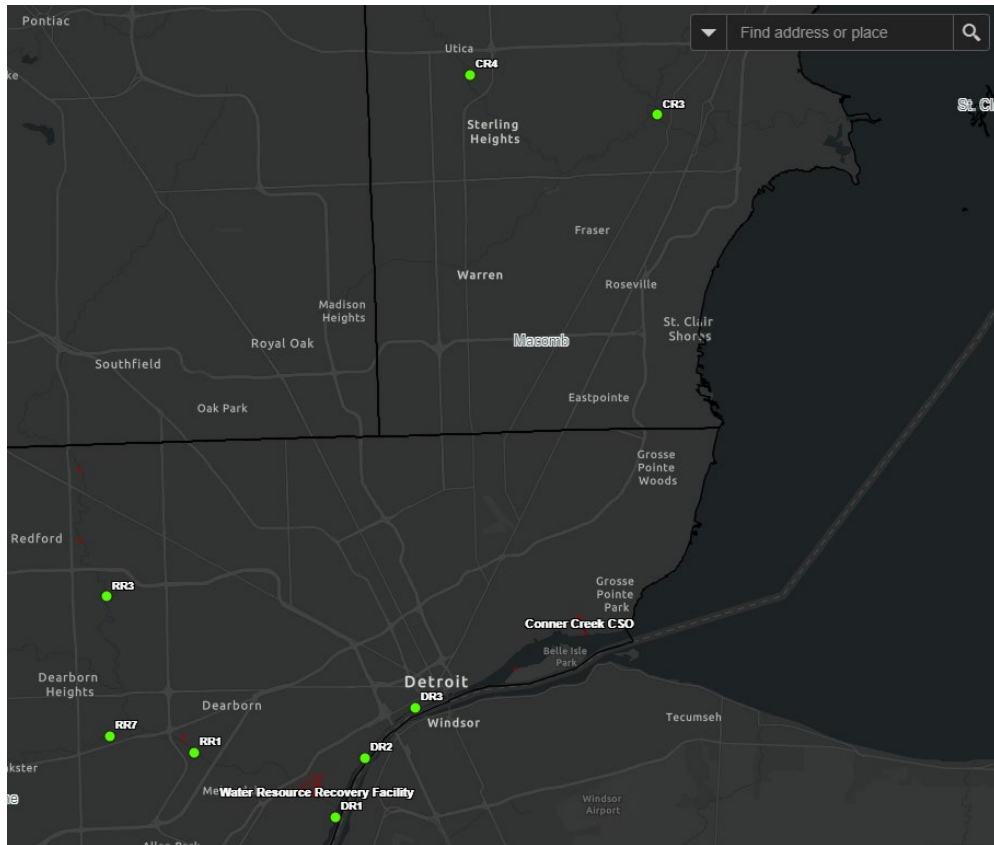


Figure 7: USGS-GLWA RWQMP Phase I monitoring site locations

Data collected from this program will improve the understanding of long-term surface water quality and flow and be used to guide GLWA and member community decision-making and efforts around capital projects, ongoing inspections, maintenance, capacity management, and rehabilitation of combined and separated sanitary sewers and storm drainage systems. All RWQMP data is currently available through the Watershed Hub GIS Mapper and USGS’s online data portal.

Phase II of this program calls for the installation of 14 additional monitoring stations. The locations of these stations were selected following a multi-year collaborative process that included work group members and many other regional stakeholders. The proposal for a contract amendment with USGS to administer Phase II of the RWQMP is in the GLWA procurement process at the time of this report.

Since this recently implemented program is designed to help understand long-term trends, and the majority of monitoring sites will be installed as part of Phase II as prescribed in the WWMP, the Watershed Hub does not have significant conclusions to share at the time of this report.

Watershed Hub GIS Mapper

The Watershed Hub GIS Mapper is a GIS-based website that was developed to aggregate, store, and share regional water quality data, and other data related to investments in watershed health. It directly houses or links to multiple datasets, including data sourced from USGS, EGLE, the Southeast Michigan Council of Governments, the City of Detroit, ARC, Macomb, Oakland, and Wayne Counties, and GLWA. Datasets currently include water quality monitoring results, locations of green infrastructure and stormwater

investments, regional rain gauge locations, habitat restoration sites, and more. These datasets can be downloaded by the user or further explored in a series of applications designed to view respective datasets. In addition to data collected as a part of the RWQMP and Investigational Sampling Program, the work group is continuously working to identify and add new relevant data into the mapper.

The mapper has been a key planning tool for the work group, allowing for the visualization of different sampling scenarios, and bringing geographical context to how they relate to parallel or related initiatives and key watershed features. This tool allows the user to see beyond municipal boundaries for a holistic view of the state of watershed monitoring and investments in southeast Michigan. In the future, it is the Watershed Hub's vision that a user will be able to compare long-term water quality and rainfall trends to past or proposed investments within a given watershed to ensure the best return on investments. GLWA Member Partners with a professional interest and knowledge of database navigation and watershed monitoring are invited to request access to this tool.

Recommendations & Next Steps

The Watershed Hub Work Group made great strides in 2023 towards multiple goals, focusing on refining the RWQMP, launching the pilot of the Investigational Sampling Program, and developing the Watershed Hub GIS Mapper. Through this work, a strong foundation has been created for both the continued advancement of these initiatives, as well as future collaborative endeavors. An unparalleled annual water quality dataset for Southeast Michigan watersheds has been produced and compiled on the GIS mapper.

The work group will continue to build on these efforts in 2024 by advancing onto year two activities of the Investigational Sampling Program work plan, continuing to work with GLWA and USGS on the RWQMP, and uploading additional datasets into the GIS mapper. The work group will also continue to discuss methods for MST analysis. Currently, MST analysis is not widely used in water quality monitoring, and testing standards are not well defined, making it an exciting area of opportunity for the work group to focus on going forward. In addition, the 2024 sampling season may include a significant expansion of additional investigational *E. coli* sampling sites in the Rouge Valley Sewage Disposal System (RVSDS) area. Furthermore, when the anticipated Capacity, Management, Operations, and Maintenance (CMOM) permits for MS4s are issued by EGLE, there may be opportunities to further support another NPDES permit program by coordinating efforts leading to efficiencies in identifying and eliminating illicit discharges, while also identifying areas of excess stormwater contributing to sanitary systems.

Apart from concrete deliverables, consistent participation and the vibrant exchange of ideas at Watershed Hub meetings is a key outcome for the work group. GLWA strives to provide the leadership necessary to realize the power of overlapping priorities while providing a space to enrich the relationships between key stakeholders that are foundational to all successful collaborations. As southeast Michigan communities continue to invest in water quality and watershed protection efforts, the Watershed Hub will continue to support initiatives and conversations that help communities consider the outcomes of their decisions holistically and on a watershed scale.

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