Chapter 5: Evaluation and Conclusions

5.1 Evaluation Methods for Measuring Success

Objective markers or milestones will be used to track the progress and effectiveness of the 10-Year Watershed Improvement Strategy in reducing pollutants to the maximum extent possible (see Table 4.2). Evaluating the management practices that are implemented helps establish a baseline against which future progress at reducing pollutants can be measured. The U.S. EPA identifies the following general categories for measuring progress:

1. **Tracking implementation over time.** Where a BMP is continually implemented over the permit term, a measurable goal can be developed to track how often, or where, this BMP is implemented.
2. **Measuring progress in implementing the BMP.** Some BMPs are developed over time, and a measurable goal can be used to track this progress until BMP implementation is completed.
3. **Tracking total numbers of BMPs implemented.** Measurable goals also can be used to track BMP implementation numerically, e.g., the number of wet detention basins in place or the number of people changing their behavior due to the receipt of educational materials.
4. **Tracking program/BMP effectiveness.** The goal of BMP effectiveness monitoring is to demonstrate if a specific BMP was successful in improving water quality in a specific location. Measurable goals can be developed to evaluate BMP effectiveness, for example, by evaluating a structural BMP's effectiveness at reducing pollutant loadings. A public education campaign's effectiveness can be measured with social indicators as from a Social Indicators Data Management and Analysis (SIDMA) survey which quantifiably addresses how the campaign reached the target audience. A measurable goal can also be a BMP design objective or a performance standard.
5. **Tracking environmental improvement.** The ultimate goal of the NPDES storm water program is environmental improvement, which can be a measurable goal. Achievement of environmental improvement can be assessed and documented by ascertaining whether state water quality standards are being met for the receiving water body or by tracking trends or improvements in water quality (chemical, physical, and biological) and other indicators, such as the hydrologic or habitat condition of the water body or watershed.

Although achievement of water quality standards is the goal of plan implementation, the Steering Committee members need to use other means to ascertain what effects individual and collective BMPs have on water quality and associated indicators. In-stream monitoring, such as physical, chemical, and biological monitoring, is ideal because it allows direct measurement of environmental improvements resulting from management efforts. Targeted monitoring to evaluate BMP-specific effectiveness is another option, whereas ambient monitoring can be used to determine overall program effectiveness. Alternatives to monitoring include using programmatic, social, physical, and hydrological indicators. Finally, environmental indicators can be used to quantify the effectiveness of BMPs.

Environmental indicators are relatively easy-to-measure surrogates that can be used to demonstrate the actual health of the environment based on the implementation of various programs or individual program elements. Some indicators are more useful than others in providing assessments of individual program areas or insight into overall program success. Useful indicators are often indirect or surrogate measurements where the presence of the indicator points to likelihood that the activity was successful. Indicators can be a cost-effective method of assessing the effectiveness of a program because direct measurements sometimes can be too costly or time-consuming to be practical. A well-known example is the use of fecal coliform bacteria as an indicator of the presence of human pathogens in drinking water. While *E. coli* is now the preferred indicator of bacterial contamination, fecal coliform has been successfully used for more than a century and is still in widespread use for the protection of public health from waterborne, disease-causing organisms.

Table 5.1 presents environmental indicators that have been developed specifically for assessing stormwater programs.[[1]](#endnote-2) Water quality indicators 1 through 16—physical, hydrological, and biological indicators—can be integrated into an overall assessment of the program and used as a basis for the long-term evaluation of program success. Indicators 17 through 26 correspond more closely to the administrative and programmatic indicators and practice-specific indicators.

*Table 5.1. Environmental Indicators for Assessing Project Success*

|  |  |  |
| --- | --- | --- |
| **Category** | **#** | **Indicator Name** |
| Chemical IndicatorsThis group of indicators measures specific water quality or chemistry parameters. | 1 | Water quality pollutant constituent monitoring |
| 2 | Toxicity testing |
| 3 | Loadings |
| 4 | Exceedance frequencies of water quality standards |
| 5 | Sediment contamination |
|   6   | Human health criteria |
| Physical and Hydrological IndicatorsThis group of indicators measures changes to or impacts on the physical environment. | 7 | Stream widening/downcutting (Hydromorphology) |
| 8 | Erosion Rates (BANCs), Bank Erosion Hazard Index (BEHI) |
| 9 | Instream habitat monitoring |
|   10   | Impacted dry weather flows (Flashiness Index) |
| 11 | Increased flooding frequency |
| 12 | Percent impervious surface of watershed area |
| 13 | Stream temperature monitoring |
| Biological IndicatorsThis group of indicators uses biological communities to measure changes to or impacts on biological parameters. | 14  | Fish assemblage |
| 15  | Macroinvertebrate assemblage |
| 16  | Single species indicator |
| 17  | Composite indicator |
| 18  | Other biological indicators |
| Social IndicatorsThis group of indicators uses responses to surveys, questionnaires, and the like to assess various parameters. | 19  | Public attitude surveys |
| 20  | Public involvement and monitoring |
| 21  | User perception |
| Programmatic IndicatorsThis group of indicators quantifies various non-aquatic parameters for measuring program activities. | 22  | Number of illicit connections identified/corrected |
| 23  | Number of BMPs installed, inspected and maintained |
| 24  | Permitting and compliance |
| 25  | Growth and development |
| Site IndicatorsThis group of indicators assesses specific conditions at the site level. | 26  | BMP performance monitoring |
| 27  | Industrial site compliance monitoring |

Measurement and evaluation are important parts of planning because they can indicate whether or not efforts are successful, and they also provide a feedback loop for improving project implementation as new information is gathered. If the watershed partners are able to show results, then the plan likely will gain more support from the partnering communities and agencies, as well as local decision makers, and increase the likelihood of project sustainability and success. Monitoring and measuring progress in the watershed necessarily will be conducted at the local level by individual agencies and communities, as well as at the watershed level, in order to assess the ecological effects of the collective entity actions on the health of the Huron River and its tributaries in the Middle Huron Watershed.

Monitoring and measuring progress in the Watershed will be two-tiered. First, individual agencies and communities will monitor certain projects and programs on the agency and community levels to establish effectiveness. For example, a community-based lawn fertilizer education workshop will be assessed and evaluated by that community. Also, with the implementation of a community project such as the retrofitting of detention ponds, the individual community responsible for the implementation of that task may monitor water quality/quantity parameters before and after the retrofit in order to measure the improvements.

Secondly, there will be a need to monitor progress and effectiveness on a regional – subwatershed or watershed – level in order to assess the ecological effects of the collective community and agency actions on the health of the river and its tributaries.

The watershed partners recognize the importance of a long-term water quality, water quantity, social, hydromorphology, and biological monitoring programs to determine where to focus resources as they progress toward meeting collective goals. These parameters will reflect improvements on a regional scale. The monitoring program should be established on a watershed scale since this approach is the most cost effective and consistent if sampling is done by one entity for an entire region.

5.2 Qualitative Evaluation Techniques

As seen in the Action Plan presented in Chapter 4, there are and will be a range of programs and projects implemented—ranging from stream bank stabilization projects to public education—to improve water quality, water quantity and habitat in the Middle Huron Watershed, Section 3. Finding creative ways to measure the effectiveness of each of these individual programs is a challenge.

A set of qualitative evaluation criteria can be used to determine whether pollutant loading reductions are being achieved over time and whether substantial progress is being made toward attaining water quality standards in the Watershed. Conversely, the criteria can be used for determining whether the Plan needs to be revised at a future time in order to meet standards. A summary of the methods provides an indication of how these programs might be measured and monitored to evaluate success in both the short and the long term (Table 5.2).

Some of these evaluations may be implemented on a watershed basis, such as a public awareness survey to evaluate public education efforts, but most of these activities will be measured at the local level. By evaluating the effectiveness of these programs, communities and agencies will be better informed about public response and success of the programs, how to improve the programs, and which programs to continue. Although many of these methods of measuring progress are not direct measures of environmental impact, it is fair to assume that successful implementation of these actions and programs, collectively and over time, will have a positive impact on in-stream conditions.

*Table 5.2. Summary of qualitative evaluation techniques for the Middle Huron Watershed*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Evaluation Method** | **Program/Project** | **What is Measured** | **Pros and Cons** | **Implementation** |
| **Public Surveys** | Public education or involvement program/project | Awareness; Knowledge; Behaviors; Attitudes; Concerns | Pro: Moderate cost. Con: Low response rate. | Pre- and post- surveys recommended. By mail, telephone, online, or group setting. Repetition on regular basis can show trends. Appropriate for local or watershed basis. |
| **Written Evaluations** | Public meeting or group education or involvement project | Awareness;Knowledge | Pro: Good response rate. Low cost. Con: No measure of change in behavior or retention of knowledge | Post-event participants complete brief evaluations that ask what was learned, what was missing, what could be done better. Evaluations completed on-site. |
| **Stream and Lake Surveys** | Identify riparian and aquatic improvements.  | Habitat; Flow; Erosion; Recreation potential; Impacts | Pro: Current and first-hand information. Con: Time-consuming. Expertise and some cost involved. | Identify parameters to evaluate. Use form, such as Stream Crossing Inventory or MiCorps Score the Shore, to record observations. Summarize findings to identify sites needing observation. |
| **Visual Documentation** | Structural and vegetative BMP installations, retrofits | Aesthetics. Pre- and post- conditions. | Pro: Easy to implement. Low cost. Con: Can be subjective. | Provides visual evidence. Photographs can be used in public communication materials. |
| **Phone call/ Complaint records** | Education efforts, advertising of contact number for complaints/ concerns | Number and types of concerns of public. Location of problem areas. | Con: Subjective information from limited number of people. | Answer phone, letter, emails and track nature of calls and concerns. |
| **Participation Tracking** | Public involvement and education projects | Number of people participating. Geographic distribution of participants. Amount of waste collected, e.g. hazardous waste collection | Pro: Low cost. Easy to track and understand. | Track participation by counting people, materials collected and having sign-in/evaluation sheets. |
| **Focus Groups** | Information and education programs | Awareness;Knowledge; Perceptions; Behaviors | Pro: Instant identification of motivators and barriers to behavior change.Con: Medium to high cost and expertise to do well. | Select random sample of population as participants. 6-8 people per group. Plan questions, facilitate. Record and transcribe discussion. Analyze results. |

*Adapted from: Lower One SWAG, 2001*

5.3 Quantitative Evaluation Techniques

In addition to measuring the effectiveness of certain specific programs and projects within communities or agencies, it is beneficial to monitor the long-term progress and effectiveness of the cumulative watershed efforts in terms of water quality, water quantity and biological health. Watershed-wide long-term monitoring will address many objectives established for the Middle Huron Watershed, Section 3, and monitoring also can show localized, small-scale success which are important for proving incremental improvement and morale boosts of partnerships. A monitoring program at the watershed level will require a regional perspective and county or state support. Wet and dry weather water quality, stream flow, biological and other monitoring will afford communities and agencies better decision-making abilities as implementation of this plan continues.

**Parameters and Establishing Targets for River Monitoring**

Beyond the data collected for the original Watershed Management Plan and its updates, it was recognized that there is a need to augment the type of parameters monitored, the number of locations in the watershed, and the frequency of wet weather monitoring. A holistic monitoring program has been established to help communities and agencies to identify more accurately water quality and water quantity impairments and their sources, as well as how these impairments are impacting the biological communities that serve as indicators of improvements.

**HRWC Monitoring**

The long-term monitoring program has been established so that progress can be measured over time. The program includes the following components:

* Stream flow monitoring to determine baseflows and track preservation and restoration activities upstream. Additionally, physical and hydrological indicators such as stream widening/downcutting, physical habitat, stream temperature, and a variety of geomorphology measures are collected at HRWC Adopt-a-Stream sites throughout the Watershed. Adopt-A-Stream began in 1992 and the Chemistry and Flow Program began in 2002. The BANCs assessment was conducted in 2021-2022 and could be repeated again when this plan needs to be updated again.
* Wet and dry weather water quality data are being collected in the watershed to identify specific pollution source areas within the watershed, and measure impacts of preservation and restoration activities upstream. Included as water quality indicators are water quality pollutant monitoring and loadings. However, due to limited funding, only limited collection of this data has been performed. More regular collection of these parameters along with exceedence frequencies of water quality standards, sediment contamination, and human health criteria need to be added to complete the program.
* Biological monitoring of macroinvertebrates is conducted regularly at sites throughout the watershed. Additional monitoring of fish and mussels would improve the scope of biological knowledge. These indicators are used as measures of the potential quality and health of the stream ecosystem. Include as biological indicators: fish assemblage; macroinvertebrate assemblage; single species indicators; composite indicators; and other biological indicators.
* Identification of major riparian corridors and other natural areas is being conducted via HRWC’s Natural Areas Program in order to plan for recreational opportunities, restoration, preservation, and linkages. The Natural Areas Program began in 2000.
* HRWC could better promote and facilitate lake monitoring on Ford and Belleville through the Cooperative Lakes Monitoring Program (CLMP) of the MiCorps program. [[2]](#endnote-3) The CLMP provides training and equipment for volunteers to measure transparency, chlorophyll, dissolved oxygen, total phosphorus, shoreline habitat and erosion, and aquatic plants.
* The monitoring within the watershed maximizes the use of volunteers to encourage involvement and stewardship.

**Establishing Targets**

Measuring parameters to evaluate progress toward a goal requires the establishment of targets against which observed measurements are compared. These targets are not necessarily goals themselves, because some of them may not be obtainable realistically. However, the targets do define either Water Quality Standards, as set forth by the State of Michigan, or scientifically-supported numbers that suggest measurements for achieving water quality, water quantity and biological parameters to support state designated uses such as partial or total body contact, and fisheries and wildlife. Using these scientifically-based numbers as targets for success will assist the advisory bodies in deciding how to improve programs to reach both restoration and preservation goals and know when these goals have been achieved. These targets are described below.

**Dissolved Oxygen**: The Michigan Department of Environment, Great Lakes and Energy (EGLE) has established state standards for Dissolved Oxygen (DO). The requirement is no less than 5.0 mg/l as a daily average for all warm water fisheries. The Administrative Rules state:

. . . for waters of the state designated for use for warmwater fish and other aquatic life, except for inland lakes as prescribed in R 323.1065, the dissolved oxygen shall not be lowered below a minimum of 4 milligrams per liter, or below 5 milligrams per liter as a daily average, at the design flow during the warm weather season in accordance with R 323.1090(3) and (4). At the design flows during other seasonal periods as provided in R 323.1090(4), a minimum of 5 milligrams per liter shall be maintained. At flows greater than the design flows, dissolved oxygen shall be higher than the respective minimum values specified in this subdivision.

(Michigan State Legislature. 1999)

**Bacteria**: State standards are established for Bacteria (*E. coli*) by EGLE. For the designated use of total body contact (swimming), the state requires measurements of no more than 130 *E. coli* per 100 milliliters as a 30-day geometric mean during 5 or more sampling events representatively spread over a 30-day period. For partial body contact (wading, fishing, and canoeing) the state requires measurements of no more than 1000 *E. coli* per 100 milliliters based on the geometric mean of 3 or more samples, taken during the same sampling event. These uses and standards will be appropriate for and applied to the creek and those tributaries with a base flow of at least 2 cubic feet per second.

**Phosphorus**: State water quality standards for phosphorus require that “phosphorus which is or may readily become available as a plant nutrient shall be controlled from point source discharges to achieve 1 mg/l of total phosphorus as a maximum monthly average effluent concentration unless other limits, either higher or lower, are deemed necessary and appropriate.” In the case of the Middle Huron Watershed, the Ford and Belleville Lakes TMDL defines effluent standards for point sources and establishes an environmental standard of 30 µg/L at Ford Lake and Belleville Lake (Appendix A). The State also requires that “nutrients shall be limited to the extent necessary to prevent stimulation of growths of aquatic rooted, attached, suspended, and floating plants, fungi or bacteria which are or may become injurious to the designated uses of the waters of the state.” Monitoring frequency and number of sites for phosphorus and nitrogen needs to be increased to capture seasonal variation and dry and wet weather conditions, and effectively estimate changes in loading of these nutrients.

**Total Suspended Solids/Sediment**: No numerical standard has been set by the state for Total Suspended Solids (TSS) for surface waters. However, the state requires that “the addition of any dissolved solids shall not exceed concentrations which are or may become injurious to any designated use.” To protect the designated uses of fisheries and wildlife habitat, as well as the desired recreational and aesthetic uses of the surface waters in the watershed, there are recommended targets established on a scientific basis. From an aesthetics standpoint, it is recommended that TSS less than 25 mg/l is “good”, TSS 25-80 mg/l is “fair” and TSS greater than 80 mg/l is “poor.”[[3]](#endnote-4) The TSS target, therefore, will be to maintain TSS below 80 mg/l in dry weather conditions. Another measurement that can be used to determine the impacts of sediment loading is to determine the extent of embeddedness of the substrate (how much of the stream bottom is covered with fine silts) and the bottom deposition (what percentage of the bottom is covered with soft muck, indicating deposition of fine silts). These are measurements taken by the Surface Water Assessment Section (SWAS) protocol habitat assessment conducted by EGLE every five years, and by HRWC more frequently. Rating categories are from “poor” to “excellent.” The target should be to maintain SWAS “excellent” and “good” designations at sites where they currently exist, and to improve “fair” and “poor” sites to “good.”

**Stream Discharge**: Stream flow, or discharge, for surface waters do not have a numerical standard set by the state. Using the health of the fish and macroinvertebrate communities as the ultimate indicators of stream and river health is most useful in assessing appropriate flow. That being said, EGLE recommends using the Richard-Baker Flashiness Index as a way of understanding flow and interpreting other data, such as watershed development trends, stream bank erosion rates, or biological survey data.[[4]](#endnote-5)

**Conductivity**: Conductivity measures the amount of dissolved ions in the water column and is considered an indicator for the relative amount of some types of suspended material in the stream. The scientifically-established standard for conductivity in a healthy Michigan stream is 800 microSiemens (S), which should be the goal for the Huron River and its tributaries.[[5]](#endnote-6) Levels higher than the standard may indicate the presence of suspended materials from stormwater runoff, failing septics, illicit connections, ground water seeps or other sources.

**Fisheries**: Numerical or fish community standards have not been set by the state. However, EGLE has developed a system to estimate the health of the predicted fish communities through the SWAS 51 sampling protocol. This method collects fish at various sites and is based on whether or not certain expected fish species are present, as well as other habitat parameters; fish communities are assessed as poor, fair, good, or excellent. The state conducts this protocol every five years in the Huron River Watershed. The target should be to maintain SWAS 51 scores of “excellent” and “good” at sites where they currently exist, and to improve “fair” and “poor” sites to “good.” The SWAS 51 protocol also identifies whether or not there are sensitive species present in the Huron River and its tributaries, which would indicate a healthy ecosystem. Certain species are especially useful for demonstrating improving conditions. These species tend to be sensitive to turbidity, prefer cleaner, cooler water, and their distribution in the Huron Watershed is currently limited. The target is to continue to find species currently found in self-sustaining population numbers, at a minimum. Improvements in habitat and water quality should also result in the expansion or recruitment of additional species. In addition to EGLE, The DNR Fisheries Division also does fisheries assessments on both lakes and streams.

**Benthic Macroinvertebrates**: Similar to the assessment of fish communities, the state employs the SWAS protocol for assessing macroinvertebrate communities on a five-year cycle for the Huron River Watershed. HRWC monitors macroinvertebrate health and physical habitat at sites in the Watershed using a volunteer friendly adaptation of the SWAS procedure. The sites are monitored for macroinvertebrates two or three times each year and periodically for physical habitat health. The monitoring target for macroinvertebrate communities will be to increase scores of EGLE and HRWC monitoring to improve “poor” and “fair” communities to “good” while maintaining the “good” and “excellent” conditions at the remaining sites.

**Temperature**: The state lists temperature standards only for point source discharges and mixing zones – not ambient water temperatures in surface water. However, recommendations for water temperature can be generated by assessing fish species’ tolerance to temperature change and these guidelines are found within the statute. Although some temperature data have been collected in the Middle Huron system by the HRWC program and as part of the monitoring for the Middle Huron Partnership Initiative, additional studies are needed to establish average monthly temperatures and whether increased temperatures are limiting biota habitat.

**Wetlands**: An annual review should be done of EGLE wetland permit information and local records in order to track wetland fills, mitigations, restoration and protection to establish net loss or gain in wetlands in the watershed. The Landscape Level Wetland Functional Assessment (LLWFA) should assist with tracking. The target for this parameter is to track the net acres of wetland in the watershed to determine action for further protection or restoration activities. In addition, the Natural Areas Program evaluates small, non-regulated wetlands. Once identified, these should also be tracked as above.

**Reporting:** Details regarding responsible parties, monitoring standards, sampling sites, and frequency of monitoring for qualitative and quantitative evaluation techniques need to be periodically reviewed by the Middle Huron Partners and subwatershed groups. Results from monitoring and progress evaluation are reported through a variety of mechanisms. The Middle Huron Partnership Initiative reports on progress toward the Ford and Belleville Lakes TMDL every two years, on average. Many of the communities and other responsible agencies in the Middle Huron submit periodic reports (approximately every 2 years) as part of Phase II stormwater compliance. HRWC produces a summary of results on the Adopt-a-Stream and Chemistry/Flow program once per year.

5.4 Evaluation Monitoring for the Middle Huron Watershed

Based on an evaluation of the above information, the goals and objectives of this plan, and the causes and sources of water quality impairments in critical areas, the monitoring plan detailed in Table 5.3 has been established. This plan is contingent upon funding and participation of community partners and monitoring agencies.

The monitoring plan is based around programs administered by HRWC and EGLE.

First, through its Adopt-a-Stream/BioMonitoring program, HRWC collects data on benthic macroinvertebrates three times a year, including a special collection of winter stoneflies. HRWC also samples for water conductivity at each macroinvertebrate event. HRWC also does a complete stream habitat assessment of each site every 4-5 years, which includes a number of geomorphic characteristics along with general habitat characteristics. Summer temperatures are also documented every 5 years. HRWC uses volunteers to collect the vast majority of the data. Results from this program are included in section 2.4. The wadable portion of the Huron River in Section 3 is rather short and there is only 1 evaluated site along this stretch (Huron River at Riverside Park in Ypsilanti).

HRWC also administers the Chemistry/Flow Program on behalf of the Middle Huron Partnership. HRWC uses volunteers and staff to collect water samples and deliver to the Ann Arbor Water Treatment Plant and the YCUA Wastewater Treatment Plant for analysis. Analytes include total phosphorus, nitrates, nitrites, total suspended solids and *E. coli*. Volunteers also collect stream discharge data from all sites to allow for the calculation of pollutant loads. Currently, data is collected once or twice per month (depending on site) with additional storm event and high flow samples collected opportunistically during the April to September growing season.

EGLE conducts rotational watershed assessments every five years to collect benthic macroinvertebrates, habitat assessment data and, in some cases, a suite of water chemistry parameters. Site selection varies each year. EGLE most recently sampled in 2022 with the next rotation set for 2027. Specific locations and data can be found online: [https://www.michigan.gov/egle/0,9429,7-135-3313\_3681\_3686\_3728-32369--,00.html](https://www.michigan.gov/egle/0%2C9429%2C7-135-3313_3681_3686_3728-32369--%2C00.html)

EGLE welcomes suggestions for monitoring sites outside of the basin year through the targeted monitoring process if there is a specific need identified.

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| *Table 5.3 HRWC Middle Huron River (Section 3) Watershed Monitoring and Evaluation**Locations can be seen at:* [*https://www.hrwc.org/our-watershed/maps/*](https://www.hrwc.org/our-watershed/maps/) *and then pick the “Macroinvertebrate” card.* |
|  |  |  |  |  |  |
| **Adopt-a-Stream Monitoring Site** | **Parameter Target**2 | **Type of Analysis** | **Protocol** | **Frequency** | **Test Agent** |
|   |   |   |   |   |   |
|  | T, I, Bio, S | Stream Habitat Assessment | HRWC Protocol | 3- 5 yr interval | HRWC  |
| *Huron River*A24 |  | Temperature | Multi-Meter | 3-5 yr interval | HRWC |
|  |  | Benthic Macroinvertebrates | HRWC Protocol | 2-3x/year | HRWC |
|  |  | Conductivity | Multi-Meter | 2-3x/year | HRWC |

*Locations can be seen at:* [*https://www.hrwc.org/our-watershed/maps/*](https://www.hrwc.org/our-watershed/maps/) *and then pick the “Chemistry of Local Water” card.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **MHP Monitoring Site** | **Parameter Target**2 | **Type of Analysis** | **Protocol** | **Frequency** | **Test Agent** |
| *Huron River*MH11, HR11, HR13 |  | Total Suspended Solids | SM20 2540 D3 | 2x/Mo Apr-Sept | HRWC |
| *Snidecar Drain*SD01 | S,N,DO,T,I, B | Total Phosphorus, Nitrates, Nitrites | SM20 4500 | 2x/Mo Apr-Sept | HRWC  |
| *Superior Drain #1*SD01 |  | Temp, DO, pH, Conductivity | Multi-Meter | 2x/Mo Apr-Sept | HRWC |
| *Willow Run*WR01 |  | E. coli | SM20 9213 D | 2x/Mo Apr-Sept | HRWC |
|  |  |  |  |  |  |

2 S= Sediment; N= Nutrients; DO= Dissolved Oxygen; T= Temperature; I= Ions; B= Bacteria; Bio= Biota

3 Analytical protocols follow “Standard Methods for the Examination of Water and Wastewater”, 20th edition, by the American Waterworks Association

5.5 Parting Words

The Middle Huron River Watershed Management Plan: Section 3 was created to provide a strong foundation and framework for improving water quality in the Middle Huron Watershed and protecting its valuable natural resources for future generations. The authors hope that choosing a consensus-based approach to developing the Plan will pay off in the form of a strong sense of ownership and unanimous support for the Plan in the years to come.

The task ahead—continued implementation of this watershed management plan—demands patience, persistence, determination, and cooperation of many partners and stakeholders at all levels. No matter how much effort and dedication was put into the Plan, it is of little value if the Plan itself remains the primary end-point. Fortunately, the partners who contributed to the Plan over the past nearly three decades have been implementing many of its remedial activities, started many ongoing programs, and plan to do much more. The partners have put in a great effort to date and progress is obvious.

Yet our concerted efforts can’t slack or wane. This 2024 Watershed Management Plan provides plenty more possibilities to continue efforts toward water quality, reduced erosion, and better habitat. Each community in the watershed continues to have a choice. It can regard the Plan as merely another plan required for state funding or regulation and move on to the next requirement, or it can use the Plan as it is intended: to guide each community not only in fulfilling its own requirements, but also in partnering with other stakeholders throughout the watershed to protect the land and water that connects us all.

1. Claytor, R. in Schueler, T. R. and H. K. Holland. 2000. The Practice of Watershed Protection. Ellicott City, MD: The Center for Watershed Protection. [↑](#endnote-ref-2)
2. Cooperative Lakes Monitoring Program. <https://micorps.net/lake-monitoring/>. Accessed September 2023. [↑](#endnote-ref-3)
3. 2 Riggs, E. H.W. 2003. Mill Creek Subwatershed Management Plan. Ann Arbor, MI: Huron River

Watershed Council for the Michigan Department of Environmental Quality. [↑](#endnote-ref-4)
4. EGLE. 2012. Application of the Richards-Baker Flashiness Index to Gaged Michigan Rivers and Streams. <https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/WRD/NPS/Tech/hsdsu-flashiness.pdf?rev=813d4ad07fd24d29b2757b7dc5a75845>. Accessed June 2022. [↑](#endnote-ref-5)
5. Dakin, T. and Martin, J. 2003a. Monitoring Gazette, Winter-Spring 2003. Ann Arbor, MI: Huron River Watershed Council. [↑](#endnote-ref-6)