CHAPTER 9 – EVALUATION PROCESS

A process for evaluating the effectiveness of implementation efforts of the Belle River Watershed Management Plan (WMP) is essential because evaluation provides a means of assessing progress towards achieving water quality improvement and natural resource protection goals. In addition, tracking management practices and monitoring water quality changes provides a means to adapt goals and priorities.

The US EPA identifies the following general categories for measuring progress:

1. **Tracking implementation over time.** Where a BMP is continually implemented, 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.** Measurable goals can be developed to evaluate BMP effectiveness, for example, by evaluating a structural BMP's effectiveness at reducing pollutant loadings, or evaluating a public education campaign's effectiveness at reaching and informing the target audience to determine whether it reduces pollutants to the maximum extent practicable. 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 waterbody 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 waterbody or watershed.

Funding to implement the many activities is always an obstacle, and not all activities will benefit all communities, so a consensus will need to be achieved on which actions are specifically undertaken and adopted by all watershed partners as part of the coordinated implementation strategy. For instance, development and adoption of a storm water management ordinance would benefit all communities; however, implementing agricultural BMPs in urban areas is not appropriate when there is little agricultural land use in that community.

9.1 Methods of Evaluation

Although achievement of water quality standards is the goal of plan implementation, Belle River Watershed communities need to use other means to ascertain what effects individual and collective BMPs have on water quality and associated indicators. Instream 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. Alternatives to monitoring include using programmatic, social, physical, and hydrological indicators. Finally, environmental indicators can be used to quantify the effectiveness of BMPs. Evaluation methods include:

1. Programmatic Indicators/BMP Results,
2. Photographic Surveys,
3. Stakeholder Surveys/Social Indicators,
4. Water Quality Indicators, and
5. Biological Indicators.

Each of the specific evaluation measures is further defined below.

9.1.1 Programmatic Indicators/BMP Results

One of the primary means to measuring progress towards the achievement of the long-term goals and short-term measurable objectives will be through the compilation of the total number of BMPs that are implemented. This evaluation will be completed by tallying up the BMPs that are completed annually. The most efficient way to track BMPs will be to compile reports completed by individual communities at the end of each year. Local organizations and agencies, such as agricultural extensions or conservation districts, will reach out to farmers to track BMPs implemented on an annual basis on agricultural land.

Programmatic indicators, for example the number of people contacted or the number of ordinances developed, will also be recorded by the responsible organizations, agencies, or governments implementing each priority project.

9.1.2 Photographic Surveys

As project are implemented and BMPs are installed, photographs will be taken to illustrate "before" and "after" results that may indicate improved aesthetics or provide visual indicators of reduced pollutant loading. Examples include clear water (reduced sediment inputs), reduced algae blooms (reduced nutrient inputs), and/or improved habitat (increased instream vegetation and riparian vegetation). This type of media is useful to provide the public a means of visually understanding the improvements that can result from BMP installation. These photographs will be included within the communities' Annual Progress Reports as part of the BMP implementation evaluation (9.2.1).

9.1.3 Stakeholder Surveys/Social Indicators

Surveys similar to those implemented during the watershed management planning process will be continued into the future in order to track changes in public awareness and opinion. The baseline survey in 2014 (Section 8.4) collected information on resident's watershed knowledge and opinion about conditions in the watershed and willingness or impediments to adopting BMPs. The results of future surveys will be compared against the baseline awareness and opinion levels compiled in 2014. The results

of the survey will also be used in future revisions of this WMP to reflect the changes in behavior and attitudes towards water quality and BMPs over the course of several years.

9.1.4 Water Quality Indicators

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 Belle River Watershed in deciding how to improve programs to reach both restoration and preservation goals and know when these goals have been achieved. A Quality Assurance Project Plan (QAPP) will be developed for any water quality parameters not covered under the QAPPs prepared for this WMP. Water quality targets are described in Table 9.1.

Table 9.1 Water quality standards associated with water quality parameters

Parameter	Water Quality Standard
pH	Rule 53 states that pH shall be maintained within a range of 6.5 to 9.0 in all waters of the state.
Dissolved Oxygen (DO)	The WQS is greater than 5mg DO/liter (R 323.1064 Rule 64 (2b)) for the protection of warm water fish.
Temperature	The Great Lakes and connecting waters and inland lakes shall not receive a heat load which increases the temperature of the receiving water more than 3 degrees Fahrenheit above the existing natural water temperature (after mixing with the receiving water). Rivers, streams, and impoundments shall not receive a heat load which increases the temperature of the receiving water more than 5 degrees Fahrenheit for warmwater fisheries. Rule 72 inland lakes, Rule 75 Rivers streams and impoundments.
Nutrients – Total Phosphorus	Total phosphorus: point source discharges limited to 1 mg/L of total phosphorus as a monthly average. In general, nutrients are to be limited as necessary to prevent excessive growth of aquatic plants, fungi or bacteria, which could impair designated uses of the surface water. (Rule 60). The EPA criteria for stream aesthetics is 0.1 mg/L of total phosphorus.
E. coli/fecal coliform	Rule 62 of the Michigan Water Quality Standards for surface waters and surface water discharges: Partial Body Contact: 1,000 *E. coli* per 100 milliliters of water at any time; Total Body Contact: 130 *E. coli* per 100 milliliters of water as a 30-day geometric mean, and 300 *E. coli* per 100 milliliters of water at any time. Bacteria Effluent Limitations in NPDES Permits: WWTPs must conform to the following standards for point source discharges of water: 200 fecal coliform bacteria per 100 ml water as a monthly geometric mean and 400 fecal coliform bacteria per 100 ml water as a 7-day geometric mean.
Total Suspended Solids	The criteria for addressing TSS (50 percent reduction) was established by the TMDL for DO. The annual TSS load numeric target is 2,506,000 lbs. per year. The LA numeric target is 1,731,000 lbs. per year. Rule 50 states “Waters of the

Parameter	Water Quality Standard
	state shall not have any of the following unnatural physical properties in quantities which are or may become injurious to any designated use; turbidity, color, oil films, floating solids, foam, settle able solids, suspended solids and deposits."
Total Dissolved Solids	In no instance shall total dissolved solids in the waters of the state exceed a concentration of 500 mg/L as a monthly average nor more than 750 mg/L at any time, as a result of controllable point sources (Rule 51(1)). The waters of the state designated as a public water supply source shall not exceed 125 mg/L of chlorides as a monthly average, except for the Great Lakes and connecting waters, where chlorides shall not exceed 50 mg/L as a monthly average(Rule 51(2)) .
Conductivity	Measurement of the amount of dissolved ions in water (i.e. salt, metals, toxins, etc.): ≤ 800µS is considered natural for stream water; ≥ 800µS is considered excessive and may indicate the presence of toxins in the water.

9.1.5 Biological Indicators

Bioassessments are useful for detecting aquatic life impairments and identifying the causes for impairment and possible mitigation strategies. Evaluating changes in assessments over time in similar locations or in-stream conditions provides a means to assess the effectiveness of management measures implemented in a watershed.

The primary means to assess the biological indicators throughout the Belle River Watershed will be to review information obtained through a variety of assessments, including MDNR fish surveys and macroinvertebrate surveys conducted by volunteers and non-profit groups. Fish and macroinvertebrate surveys should continue on a regular basis into the future. The rating targets outlined in Table 9.2 will be evaluated to assess progress in attaining the goals and objectives for the Belle River Watershed as it pertains to assessment of fish and macroinvertebrate assemblages.

Table 9.2 Targets for assessment of fish and macroinvertebrate assemblages

Biological Indicator	GLEAS Rating Target	Measure of Indicator
Fish Assemblages	• Maintain "Good" to "Excellent" scores • Improve "Poor" ratings to "Fair" ratings or better	Status of fish diversity, species richness, species pollutant tolerance, disease prevalence, and other metrics that can be used to identify the nature and extent of a pollution or habitat problem.
Macroinvertebrate Assemblages		Macroinvertebrates are good indicators of short-term stress since their life cycles are short. Presence of absence of particular species (i.e. EPT index) indicates pollution tolerance.

9.2 Monitoring Strategy

To determine the overall effectiveness of this WMP to address the DO TMDL, specific monitoring sites will be established. Monitoring to assess DO levels and sediment loading will occur in and downstream of the TMDL area. For the North Branch Belle River, monitoring will occur upstream of the confluence with the main branch of the Belle River near Blacks Corners Road. To quantify improved conditions in the entire TMDL area, water quality samples will be collected downstream of the end reach of the TMDL area near Blacks Corners Road.

As individual priority projects are implemented, data will be collected downstream of the project sites. These evaluation measures will include water quality data, and possibly macroinvertebrate and fish assemblage data, dependent on the project type. Additionally, photographic surveys will be utilized to capture pre-project and post-project conditions.

To address the WQ listing for *E. coli*, sampling will occur during the summer months at locations throughout the Belle River Watershed, dependent on funding availability.

Additional monitoring sites will continue to be sampled throughout the Belle River Watershed for all of the evaluation metrics. Existing monitoring locations, responsible organizations, and previous dates for data collection are listed in Table 9.5.

9.3 Adaptive Management

Adaptive management will be an important component to maintain the effectiveness of the Belle River WMP. The US EPA document *Watershed Analysis and Management Guide* describes the concept as follows: "Adaptive management is a process by which new information about the health of the watershed is incorporated into the watershed management plan" (Jensen et al., 1996). Adaptive management is a challenging blend of scientific research, monitoring, and practical management that allows for experimentation and provides the opportunity to "learn by doing." It is a necessary and useful tool because of the uncertainty about how ecosystems function and how management affects ecosystems.

If the results from evaluation indicate that the short-term objectives and long-term goals of the WMP are not being met, then the prioritized BMPs and/or implementation timeline will be adjusted. The WAG will establish criteria for modifying the WMP based on monitoring results. A process for incorporating new information into the WMP will be outlined in an adaptive management plan. Specific time frames for reevaluation and adjustment in the watershed management plan will be established. Reevaluation of the management plan will likely occur at 5-, or 10-year intervals to allow for implementation and monitoring of projects and programs.

A major goal of this WMP is to meet the targets for TSS indicated in the DO TMDL, as described in Section 3.2.2. As indicated in Table 9.1, the evaluation metric for TSS will determine whether sediment reductions are being met as BMPs are installed and programs are implemented. If TSS reductions are not being met, the implementation plan and schedule will be revised to ensure that the TMDL requirements are obtained in order to improve dissolved oxygen levels.

Additionally, in order to address the non-attainment for the Designated Uses of Total Body Contact Recreation and Partial Body Contact Recreation, *E. coli* concentrations will continue to be monitored throughout the watershed. If the priority actions are not leading to reductions in *E. coli* levels, the WMP will be assessed to determine how best to meet this goal. Changes to the WMP will occur as needed to ensure that *E. coli* levels are reduced below the WQS.

9.4 Summary of Methods for Evaluating Progress and Measurable Goals

Table 9.3, 9.4, and 9.5 outline the evaluation methods, measurable goals, and evaluation schedule that will be used to gauge progress and achieve the goals and objectives of the WMP over time. Table 9.3 provides a summary of the evaluation measures and possible evaluation schedule for each method.
Table 9.4 provides a summary of the evaluation methods for each priority project to determine the effectiveness in meeting the milestones. Table 9.5 provides the measurable objectives for each management alternative that may be used during priority project implementation.

Table 9.3 Methods of evaluation and evaluation schedule for each method

Evaluation Method	Evaluation Measure	Interim Goals and Measurable Goals	Evaluation Schedule	Responsible Party
Programmatic Indicators/ BMP Results	Report on the number, type, and frequency of BMPs implemented	Implement BMPs in critical areas in the headwaters (Zone 1) to decrease sediment loading in TMDL area to meet TMDL target loads	Compile results on an annual basis	• Municipalities/Townships • WAG
Stakeholder Surveys/ Social Indicators	Redistribute public education surveys every 3-5 years to determine behavior changes and changes in watershed awareness measures over time	Attain improved awareness and actions taken to protect water quality and improve watershed awareness levels	Distribute public education survey in the next 3-5 years and after, as needed	• WAG to distribute surveys and evaluate results
Photographic Surveys	Provide photographic evidence of before and after of local projects that are implemented	Photographs that reflect improved aesthetic and stabilized riparian and in-stream riparian conditions	Pre- and post-construction surveys will be provided as projects are completed	• Project managers to coordinate with WAG
Water Quality Indicators	Evaluate frequency of Water Quality Standard exceedances & calculate nonpoint source pollutant loading reductions based on number and type of BMPs implemented	Eliminate state water quality standard exceedances for: • pH, DO, temperature, nutrients, bacteria (*E. coli*), total suspended and dissolved solids, metals, conductivity	Compile available monitoring information annually evaluate results every 5 years. Information may include: • Adopt-A-Stream results • MDEQ GLEAS Reports	• WAG to compile and evaluate results
Biological Indicators	Evaluate fish and macroinvertebrate assemblage scores. Complete additional fish and macroinvertebrate assessments as needed to determine if MWP goals are being met.	Attain improved or maintained fish and macroinvertebrate assemblage scores	Evaluate available monitoring information annually, including: • Adopt-A-Stream results • MDEQ GLEAS Reports	• MDEQ/MDNR to produce reports • MSU-Extension and volunteers to conduct Adopt-A-Stream monitoring • Watershed advisory group to compile and evaluate results

Table 9.4 Evaluation methods to address goals and priority projects

Goal Addressed	Priority Projects to Achieve Goals	Milestones & Timeline	Evaluation Methods
1. Restore dissolved oxygen levels to remove TMDL	1. Decrease sediment and nutrient loading in the TMDL area by implementing BMPs at critical source areas	Short-term: Reduce 1,000,000 pounds per year of sediment loading in the headwaters to meet LA requirements in TMDL; obtain and maintain DO levels above 5mg/L Long-term: Reduce an additional 731,000 pounds per year of sediment loading in the headwaters to meet LA requirements in TMDL; obtain and maintain DO levels above 5mg/L	1. BMPs implemented • Acres of riparian buffer • Number of farms with conservation tillage • Acres of riparian bank stabilization 2. Photographic surveys 3. Water quality indicators • Estimated pounds of sediment load reductions • DO levels 4. Biological indicators
2. Restore hydrologic stability	1. Restore wetlands in critical areas in the TMDL reach area to decrease sediment and nutrient loading	Short-term: Restore approximately 1% (300-500 acres) of lost wetlands in the priority watersheds to improve hydrologic stability and decrease sediment loading and *E. coli* concentrations Long-term: Restore an additional 1-2% of lost wetlands	1. BMPs implemented • Acres of restored wetland 2. Photographic surveys 3. Water quality indicators 4. Biological indicators 5. Other indicators • R-B flashiness index
	2. Restore floodplain connectivity by utilizing two-stage drains in the headwaters	Short-term: Work with county drain commissions to identify priority drains; implement projects at priority drains Long-term: Continue to implement two-stage drain projects in county drains; work with agricultural producers on similar projects	1. BMPs implemented • Feet of two-stage drains constructed 2. Photographic surveys 3. Water quality indicators • Estimated pounds of sediment and nutrient load reductions 4. Biological indicators 5. Other indicators • R-B flashiness index

Goal Addressed	Priority Projects to Achieve Goals	Milestones & Timeline	Evaluation Methods
3. Protect critical ecosystems	1. Protect priority parcels identified by Six Rivers Land Conservancy	Short-term: Outreach to 25-50 landowners in the focal areas already surveyed Long-term: Identify additional sites for preservation in focal areas not surveyed in 2013-2014; outreach to landowners identified in secondary assessment	1. Programmatic indicators • Number of landowners contacted • Acres of land preserved • Number of additional properties identified for preservation 2. Stakeholder surveys
	2. Develop and implement wetland protection ordinances throughout the watershed	Short-term: Implement 2-3 wetland protection ordinances in communities throughout the watershed Long-term: Implement additional wetland protection ordinances in other communities	1. Programmatic indicators • Number of ordinances developed
	3. Develop an invasive species management program	Short-term: Develop subcommittee or organizational structure; begin landowner outreach Long-term: Develop a watershed-wide database or mapping system	1. Programmatic indicators • Number of people contacted • Number of invasive species mapped, removed, etc. 2. Photographic surveys 3. Stakeholder surveys
4. Improve water quality knowledge and engagement of residents	1. Promote stormwater education materials (e.g. SEMCOG Seven Simple Steps to Clean Water)	Short-term: Provide education and outreach materials and identify ways to distribute these materials to watershed residents; install 6-10 watershed road signs Long-term: Distribute a public survey to determine if local watershed knowledge has increased; acquire storm drain marking materials	1. Programmatic indicators • Number of people contacted • Number of communities participating in outreach • Number of signs installed 2. Stakeholder surveys/social indicators

Goal Addressed	Priority Projects to Achieve Goals	Milestones & Timeline	Evaluation Methods
4. Improve water quality knowledge and engagement of residents	2. Develop education and outreach materials about large woody material management	Short-term: Complete research on large woody material campaigns and develop new or utilize existing campaign materials Long-term: Distribute a public participation survey to determine if local watershed knowledge has increased	1. Programmatic indicators • Number of people contacted 2. Stakeholder surveys/social indicators
	3. Promote NRCS programs to agricultural community	Short-term: Provide communities with outreach tools to target agricultural producers in Zone 1 communities	1. Programmatic indicators • Number of agricultural producers contacted 2. Stakeholder surveys/social indicators
5. Implement a sustainable large woody material management program	1. Implement a program to identify large woody material issues and to coordinate river clean-up days	Short-term: Organize a committee or identify local organizations responsible for river clean-up days and create a system for tracking large wood problems; organize at least one clean up event per year Long-term: Continue to track and prioritize management of LWM	1. Programmatic indicators • Implementation of program for tracking large wood • Number of clean-up days implemented 2. Photographic surveys
	2. Prioritize and complete removal efforts at logjam sites identified in 2013 and in the 14.5-mile Blueway Trail	Short-term: Survey existing log jam sites and prioritize management efforts; obtain funding and implement management projects that require heavy equipment at least one site per year Long-term: Manage logjams at lower priority sites	1. Programmatic indicators • Number of logjam management projects completed 2. Photographic surveys
6. Improve recreational opportunities	1. Install appropriate access points for recreationists	Short-term: Identify sites and install 2-3 new fishing and/or canoe/kayak access points Long-term: Continue to identify and install new access points and identify land acquisition properties	1. Programmatic indicators • Number of new potential access points identified • Number of new access points installed

Goal Addressed	Priority Projects to Achieve Goals	Milestones & Timeline	Evaluation Methods
6. Improve recreational opportunities	2. Organize and promote recreational events that promote recreation on local waterways and stewardship of the river	Short-term: Organize and implement one recreation event per year	1. Programmatic indicators • Number of events completed 3. Stakeholder surveys/social indicators
	3. Implement river restoration projects that increase aesthetics and water quality	Short-term: Select 1-2 sites and implement restoration projects Long-term: Implement additional restoration projects	1. Programmatic indicators • Number of restoration projects implemented 2. Photographic surveys 3. Water quality indicators 4. Biological indicators
	4. Support and promote Blueways Trail and Greenways Trail Routes	Short-term: Promote materials and events about the existing trails; research opportunities for expansion of Greenways Trails Long-term: Identify additional sites for Blueways Trails in the watershed	1. Programmatic indicators • Number of people contacted about trails • Number of additional sites identified to improve trails
7. Reduce *E. coli* levels	1. Detect and correct illicit discharges and failed and high risk septic systems	Short-term: Eliminate failing septic systems and illicit discharges; monitor *E. coli* levels at recreation areas	1. Programmatic indicators • Number of septic systems and illicit discharges identified and corrected 2. Water quality indicators • *E. coli* levels below state WQ standards

Table 9.5 Monitoring and evaluation sites from current and previous monitoring efforts

Organization	Monitoring Site(s)	Parameter	Type of Analysis	Protocol	Status	Frequency
St. Clair County Health Department	• Capac Road – Site M4 • Masters Rd. – Site M2 • Kronner Rd. – Site M41 • Columbus Twp. Roadside Park – Site M5 • Indian Trail Rd. – Site M5 • Meisner Rd. – Site M43 • St. Clair River – Site M7	*E. coli*	*E. coli* count/100 ml	MDEQ protocol	2008 – 2011	May-August, annually (dependent on funding)
MDNR	• N. Branch Belle River – Summer Rd. • Weston Drain – Summer Rd. • Jerome Creek – Hessen rd. • Bishop Rd. • Schultz Rd. • Downtown Memphis • Kroner Rd. • Gratiot Rd. • Westrick Rd. • Indian Trail Rd. • King Rd. • Meisner Rd.	Fish diversity & abundance	Fish surveys	MDNR Protocol	2008	Every 5 years
Friends of the St. Clair River Watershed	• Riley Township Hall (13016 Belle River Rd.) • Memphis City Park (Downtown M-19) • Columbus County Park (Gratiot & Bauman Rd.) • China Township Hall (4560 Indian Trail Rd. Bridge)	Macroinvertebrate diversity & abundance	Macroinvertebrate survey	MiCorps Stream Monitoring Protocol	2009-2014	Annually

Organization	Monitoring Site(s)	Parameter	Type of Analysis	Protocol	Status	Frequency
MDEQ, Surface Water Assessment Section (SWAS)	• Puttygut Rd. (27) • St. Clair Hwy. (28) • Kronner Rd. (29) • End of Meskill Rd. (30) • Weber Rd. (31) • Newark Rd. downstream of Pinnacle Foods outfall (32) • Newark Rd. upstream of Pinnacle Foods outfall (33) • Upstream of Glover Rd. (34) • Sperry Rd. (35) • Riley Center Rd. (36) • E. China Township Park (NW-3)	Macroinvertebrate diversity & abundance	Macroinvertebrate survey	MDEQ Procedure 51	2002, 2007, 2012 (poor-to-acceptable macroinvertebrate communities; marginal-to-excellent habitat)	Every 5 years
		Substrate, vegetation, flow and bank stability	Stream habitat assessment			
MDEQ, Surface Water Assessment Section (SWAS)	• North Branch Belle River – Newark Rd. downstream of Pinnacle foods outfall • North Branch Belle River – Newark Rd. upstream of Pinnacle Foods outfall	pH Nutrients Chloride Sulfate Alkalinity Total suspended solids Total dissolved solids Conductivity	Water chemistry analysis	Water chemistry analysis	2013	As needed

Table 9.6 Methods of evaluating progress for the watershed management alternatives for the Belle River Watershed

BMP #	Management Alternative	Measurable Goals
1. Managerial & Structural Actions: Agricultural Runoff Controls		
1	Encourage use of GAAMPs	• Track mode of encouragement • Track # and types of GAAMPS implemented • Estimate sediment and nutrient loading reductions based on BMPs in use
2	Encourage conservation crop rotation with cover crop	• Track mode of encouragement • Track amount of land under cover crop • Estimate sediment and nutrient loading reductions based on BMPs in use
3	Develop manure management plans	• Track # and location of manure management plans
4	Install exclusion fencing	• Track # and location of exclusion fences constructed
5	Promote conservation tillage practices and appropriate nutrient management practices (Crop*A*Syst)	• Track mode of encouragement • Track # and types of conservation tillage practices implemented
6	Restore historic wetlands	• Track location and acreage of restored wetlands • Calculate reduction in sediment and nutrient load
2. Managerial & Structural Actions: Stream and Drain Runoff Controls		
7	Continue stream/drain inventories throughout watershed	• Track # and location of stream/drain inventories
8	Implement tile drain controls	• Track # of tile drain controls implemented
9	Prevent and remove streamflow obstructions	• Track actions taken to remove stream flow obstructions • Track amount and types of obstructions removed
10	Utilize instream habitat restoration techniques	• Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Evaluate MDEQ GLEAS monitoring reports for water quality/habitat improvement
11	Implement alternative (two-stage) drain practices and rehabilitation	• Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre)
12	Install and maintain streambank stabilization measures	• Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading • Photographic surveys • Evaluate MDEQ GLEAS monitoring reports for water quality/habitat improvement

Table 9.6 Methods of evaluating progress for the watershed management alternatives for the Belle River Watershed

BMP #	Management Alternative	Measurable Goals
13	Install and maintain gauge stations	• Track efforts to obtain funding for gauge station establishment • Track flow monitoring and evaluate changes in hydrological conditions
3. Structural & Vegetative Actions: Post-Construction Stormwater Management		
14	Replace undersized culverts/ repair misaligned or obstructed culverts	• Track # and type of BMPs implemented • Photographic surveys • Evaluate MDEQ GLEAS monitoring reports for water quality/habitat improvement
15	Install and maintain storm water management structures	• Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Track operation and maintenance actions
16	Install and maintain detention/retention systems	• Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Track operation and maintenance actions
17	Install and maintain storm water infiltration practices	• Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Track operation and maintenance actions
18	Stabilize eroding road and bridge surfaces	• # of stabilization projects completed • Track # and type of BMPs implemented • Photographic surveys of remediated road/stream crossings • Calculate reduction in sediment loading (lb/acre)
19	Install and maintain native landscaping	• Track projects and types of native landscaping planted • Photographic surveys • Track maintenance activities
20	Install and maintain riparian buffers	• Track acreage of riparian buffer installed and/or maintained • Track maintenance activities • Photographic surveys • Evaluate MDEQ GLEAS monitoring reports for water quality/habitat improvement • Calculate reduction in sediment and nutrient loading (lb/acre)

Table 9.6 Methods of evaluating progress for the watershed management alternatives for the Belle River Watershed

BMP #	Management Alternative	Measurable Goals
21	Implement invasive species control program	• Track existing invasive species populations • Track invasive species removal efforts
22	Perform curb/street sweeping	• Track street sweeping schedules • Track amount of material collected and disposal procedures • Track operation and maintenance actions
23	Perform retrofitting of stormwater management facilities	• Track retrofit projects implemented • Photographic surveys
24	Implement catch basin cleaning program	• Track catch basin cleaning schedules • Track amount of material collected and disposal procedures
25	Perform storm sewer system maintenance and drain cleaning	• Track storm sewer maintenance and drain cleaning schedules • Track maintenance procedures • Track amount of material collected and disposal procedures
26	Manage public facilities	• Track management activities of public facilities • Track operation and maintenance actions
27	Maintain sanitary sewer infrastructure	• Track sanitary sewer system maintenance schedules • Track repairs made and upgrades to infrastructure
4. Managerial Actions: Illicit Discharge Elimination		
28	Implement employee training programs	• Track # of municipal employees and contractors trained • Track type of training municipal employees and contractors receive
29	Sanitary system planning	• Report # of workshops/ WAG meeting discussions on this topic. • Track # of new developments with these systems
30	Implement Illicit Discharge Elimination Plan (IDEP)	• Track # of outfalls/stream miles inventoried • Track sampling data • Track # of illicit connections identified and corrected (failing OSDS, outfalls, etc.)
31	Eliminate sanitary sewer overflow events	• Track actions taken to eliminate sanitary sewer overflow events • Track amount of sewage eliminated from waterways
32	Implement St. Clair County public beach water quality monitoring program	• Track sampling results • Track # of beach closings • Track # of water quality standard exceedances for bacteria

Table 9.6 Methods of evaluating progress for the watershed management alternatives for the Belle River Watershed

BMP #	Management Alternative	Measurable Goals
5. Managerial Actions: Public Education, Outreach, and Participation		
33	Distribute outreach materials on watershed awareness and storm water management	• Track # and types of materials distributed • Topics included in material • Track # of website hits
34	Promote the "Seven Simple Steps to Clean Water" campaign materials	• Track # of brochures distributed • Track # of website hits • Track dates and locations of poster displays (municipal offices, pet stores, businesses, etc.) • Track # of storm water-related press releases • Track # of storm water-related articles published
35	Encourage reduced fertilizer, herbicide, pesticide use	• Track mode of encouragement
36	Encourage use of household hazardous waste disposal	• Track modes of advertisement of HHW Disposal and Recycling Programs • Track amount of material disposed/recycled
37	Install watershed signage	• Track # and location of watershed signs installed
38	Promote the county's Adopt-A-Stream and Stream Leaders programs	• Track modes of advertisement of the Adopt-A-Stream and Stream Leaders Programs • Track # of volunteers and locations in program • Report stream survey results
39	Promote Adopt-A-County Road program	• Track modes of advertisement of the Adopt-A-County Road Program • Track # of volunteer groups in program • Track amount and types of waste collected
40	Provide information on soil testing program	• Track # of requests for soil testing
41	Encourage participation in citizen planner program	• Track methods of advertisement of Citizen Planner Program • Track # of staff that attend Citizen Planner Program
42	Provide education on failing on-site septic disposal systems	• Track # and content of brochures, magnets distributed, and hotline complaints received
43	Encourage reduced use of road salt and promote alternative deicers	• Track distribution of educational brochures • Track water quality data for chloride
44	Encourage golf course nutrient management	• Track modes of encouraging golf course nutrient management • Track changes in management practices at local golf courses
45	Encourage the use of conservation easements	• Track acreage of land protected in conservation easements

Table 9.6 Methods of evaluating progress for the watershed management alternatives for the Belle River Watershed

BMP #	Management Alternative	Measurable Goals
46	Perform storm drain/catch basin marking	• Track # and location of markers installed • Track # of volunteers to place markers
47	Seek input from public on development of water quality ordinances	• Track # of attendees at public hearings for ordinance development/adoption
48	Seek participation from public at WAG meetings	• Track mode of encouraging public input • Track input from the public
49	Promote the county's 24-hour water quality pollution reporting hotline	• Track mode of encouraging public input • Track number of calls and content of calls
50	Seek participation from the public for St. Clair County's Earth Fair and River Day events	• Track mode of encouraging public input • Track number of participants at events
51	Seek participation from the public in river clean-up events	• Track mode of encouraging public input • Track number of participants at events
6. Managerial Actions: Ordinances and Policies		
52	Develop aquatic (riparian) buffer ordinance	• Report on ordinance(s) development and adoption • Track amount of acreage protected by buffer ordinance
53	Develop floodplain management ordinance	• Report on ordinance(s) development and adoption • Track amount of acreage protected by floodplain management ordinance
54	Implement wetland protection ordinance	• Report on ordinance(s) development and adoption • Track amount of acreage protected by wetland ordinance
55	Implement woodlands/tree protection ordinance	• Report on ordinance(s) development and adoption • Track amount of acreage protected by woodland/tree protection ordinance
56	Develop agricultural buffer zoning ordinance	• Report on ordinance(s) development and adoption • Track amount of acreage protected by agricultural buffering ordinance
57	Develop rural clustering ordinance	• Track development/ adoption of ordinance
58	Develop mixed-use zoning ordinance	• Track development/ adoption of ordinance
59	Develop private road ordinance	• Track development/ adoption of ordinance
60	Develop illegal dumping ordinance	• Track development/ adoption of ordinance • Track # of clean-ups completed
61	Develop illicit discharge elimination ordinance	• Track development/ adoption of ordinance
62	Support county-wide onsite septic disposal system ordinance	• Report on development and adoption of an ordinance • Track # of OSDS failures and corrections

Table 9.6 Methods of evaluating progress for the watershed management alternatives for the Belle River Watershed

BMP #	Management Alternative	Measurable Goals
63	Develop post-construction stormwater management ordinance	• Report on ordinance(s) /design standards development and adoption
64	Implement and enforce soil erosion and sedimentation control ordinance	• Track # of SESC permits issued • Track violations • Track enforcement actions
65	Encourage participation in purchase of development rights programs	• Track acreage of farm land active in PDR program
66	Encourage participation in Farmland Preservation Program	• Track acreage of farm land enrolled in P.A. 116 Program • Track # of P.A. 116 Contracts
7. Managerial Actions: Studies and Plans		
67	Update master plan to incorporate watershed management plan goals	• Report on updates to Master Plans
68	Perform high-quality natural features inventories	• Track location of inventories conducted and the results of the inventories
69	Incorporate natural features inventory into Master Plan	• Track actions taken to incorporate inventories into Master Plan
70	Develop Resource Protection Overlay District Standards	• Track development and implementation of overlay district standards
71	Develop/update Natural Areas Plan	• Track development/update of natural areas plan
72	Identify areas for recreation enhancement	• Track identification activities
73	Develop/update recreation plans	• Track development/update of Recreation Plans • Track funding received for acquisition of park land
74	Implement Greenway Corridor Vision Plans	• Track acreage of greenways in community and associated recreational amenities
75	Implement Blueways Trail Vision Plans	• Track mileage of Blueways Trails in communities • Track number of participants at organized Blueways events • Quantify and assess number of existing river access points
8. Watershed Plan Implementation		
76	Implement financial solutions	• Track funding sources utilized to implement BMPs
77	Provide sufficient enforcement capacity	• Report on # of staff allocated to enforcement of ordinances and regulations

Table 9.6 Methods of evaluating progress for the watershed management alternatives for the Belle River Watershed

BMP #	Management Alternative	Measurable Goals
78	Implement institutional framework for watershed-wide actions	• Report on framework developed • Track # of meetings held • Track updates made to WMP