

Chapter 9 – Evaluation Process

A process for evaluating the effectiveness of implementation efforts of St. Clair County's Northeastern Watersheds (NEW) Watershed Management Plan (WMP) over time is important because it provides a means to assess progress towards achieving the water quality and natural resource protection and improvement goals. In addition, tracking management practices and monitoring water quality changes provides a means to redefine goals and priorities. Monitoring also has a host of other benefits for watershed management by:

- Enabling water quality managers to further identify existing or emerging water quality issues and concerns.
- Facilitating responses to emergencies such as spills and floods and helps water quality managers target specific pollution prevention or remediation programs to address these problems.
- Determining whether program goals, such as compliance with pollution regulations or implementation of effective pollution control actions, are being met.

Several factors will determine the effectiveness of implementation of this watershed plan, including:

- Agreement on actions to implement this plan,
- Agreement on the indicators that will measure progress of this plan,
- Allocation of the actions taken among the various stakeholders,
- Allocation of the costs of implementation , and
- Agreement on how often and who will conduct periodic review of, and revisions to, the information outlined in this plan.

The reality is that some permittees will be directing actions geared towards their specific land use issues, some being rural and some being more urbanized areas, so many of the proposed BMP activities may not be implemented across the board.

Funding to implement the many activities is always an obstacle, and not all activities will benefit all permittees, 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 permittees, however, implementing agricultural BMPs in urban areas isn't appropriate when there is very little to no agricultural land use in that community.

Several methods on how to approach the implementation and evaluation process are outlined below and likely will not be set in stone at the time of completion and submittal of this plan, but will likely continue to be formulated and formalized upon the beginning stages of this plan's implementation.

9.1 Watershed Plan Implementation

Each Phase II permittee must submit a Storm Water Pollution Prevention Initiative (SWPPI) by May 1, 2007 that details the specific actions (BMPs) that will be implemented to meet the goals and objectives of the NEW WMP. The MDEQ will review these SWPPI's to ensure that the selected actions meet the Phase II permit requirements. The MDEQ will also review the annual reports that the permittees will submit to report on progress towards meeting the goals and objectives of this WMP, as well as the

activities related to their Illicit Discharge Elimination Program (IDEP) and Public Education Program (PEP). These annual reports will help to ensure that compliance is being met for the objectives of the Phase II program, while at the same time keeping the NEW WAG on track to achieving the broad goals of water quality and natural resource protection and improvement.

To ensure a successful implementation strategy of the actions outlined in this WMP, there are nine (9) key elements that should be utilized (Heathcote, 1998), as summarized in Table 9.1.

Table 9.1 Nine Key Elements of Successful Watershed Plan Implementation

1. Appoint a single lead agency to act as an advocate and facilitator for the plan with the community and with political representatives.
2. Strong linkages to existing programs, including local and regional land use planning processes, water quality and flow monitoring programs, and similar programs, to optimize use of available information and minimize duplication of effort.
3. Clear designation of responsibilities, timetables, and anticipated costs for project actions.
4. Effective laws, regulations, and policies to provide a framework for the tasks identified in Element 3.
5. Ongoing tracking of the degree of implementation of management actions and of the success of those actions once implemented.
6. Ongoing monitoring and reporting of progress, both to assess the effectiveness of individual actions and to sustain public and political interest in and enthusiasm for the plan.
7. Ongoing public education and communication programs to consolidate and enhance the social consensus achieved in the planning process.
8. Periodic review and revision of the plan.
9. Adequate funding for these activities.

Each element is further defined below.

Element 1: A Single Lead Agency

Throughout the watershed planning process, the SCCHD was the lead agency that facilitated the monthly watershed group meetings, with the help of the county's two consultants, Carlisle/Wortman and Hubbell, Roth, and Clark, Inc. The SCCHD has indicated that they do not anticipate being able to continue as the sole lead facilitator of the NEW once the watershed plan is complete. In order to address this loss of leadership from a single agency and address the need for a future joint projects fiduciary, the WAG has discussed the possibility of forming a "Watershed Alliance" in accordance with Section 31202 of Part 312 of the Natural Resources and Environmental Protection Act, PA 451 of 1994, as amended, or a Storm Water Authority, under PA 233 of 1955. Details on these regulations can be found at:

<http://www.deq.state.mi.us/lawsandrules/>

Through this possible alliance or authority, an administrative framework would be established that would essentially form a lead agency to act as the advocate and facilitator for implementing the plan, coordinating evaluation of progress, and coordinating updates/revisions to this WMP. In the alliance or authority, the lead agency could be made up of the current participating WAG members, or the group may decide to hire a consultant to act as the lead facilitator. Either way, the success of the plan will not be met if there is not a leader to drive the watershed planning process, keep the efforts organized, lead updates/ revisions of the plan that are required by the MDEQ very two years, and provide a fiduciary for joint projects.

Since the Watershed Alliance legislation was basically mirrored off of the legislation that is used to develop an authority, a summary of the elements incorporated into the establishment of a watershed alliance are provided in Table 9.2. The primary difference in an alliance versus an authority is that an alliance allows for participation by entities other than a municipality, such as a school district.

Table 9.2 Elements of a Watershed Alliance

Purpose	To study problems, and plan and implement activities designed to address surface water quality or water flow issues of mutual concern within the watershed boundary
Requirements	<p>Must adopt a resolution establishing a watershed alliance and shall include bylaws that identify the following:</p> <ul style="list-style-type: none"> ○ Structure of the organization and decision-making process ○ Geographic boundaries of the watershed ○ Municipalities, counties, county agencies, public school districts, and other local or regional public agencies eligible for membership ○ Basis for assessing costs to members ○ Mechanism to be used for adoption of an annual budget to support projects and activities ○ Provide an equitable basis for voluntary membership
Authority	A watershed alliance is a body corporate with power to sue and be sued in any court of the state and with the authority to carry out its responsibilities under Part 312, Section 324.31203 of PA 451 of 1994
Activities	<p>A watershed alliance may do one or more of the following according to its bylaws:</p> <ul style="list-style-type: none"> ○ Employ personnel to coordinate and implement actions ○ Enter into agreements or contracts with public or private entities to coordinate or implement actions ○ Assess and collect fees from members with approval of the governing bodies of the members. ○ Solicit grants, gifts, and contributions from federal, state, regional, or local public agencies and from private sources. ○ Expend funds provided by members, or through grants, gifts, and contributions. ○ Represent members of the alliance before other bodies considering issues affection water quality or flow management issues within the designated watershed, including obtaining local, state, or federal permits or authorizations that may be required to carry out activities as may be authorized by its members ○ Prepare and deliver a report to its members on or before April 1 of each year detailing the revenue received and expenditures by the alliance during the immediately prior January 1 through December 31 period. ○ Alliance shall have no independent authority to assess or collect any fees or taxes directly from individuals or property owners. An alliance member may allocate the use of public funds from fees, taxes, or assessments generated under the provisions of other state laws for use by a watershed alliance.
Audit	<ul style="list-style-type: none"> ● The alliance must obtain an audit of its financial records, accounts, and procedures at least every other year. ● The results of the audit must be submitted to the governing bodies of its members and to the state treasurer. ● The audit shall satisfy all audit requirements set under the uniform budgeting and accounting act, 1968 P.A. 2, MCL 141.421 to 141.440a.
Example Activities	<ul style="list-style-type: none"> ● Water Quality Monitoring ● Public Education

Table 9.2 Elements of a Watershed Alliance

supported by Budget	<ul style="list-style-type: none"> • Illicit Discharge Elimination • Facilitation and technical assistance to watershed advisory group and/or subcommittees • Operation of the Alliance itself
Reference Resources	<ul style="list-style-type: none"> • General Alliance Information: <ul style="list-style-type: none"> ○ http://rougeriver.com/alliance/index.html • Example Alliance Bylaws: <ul style="list-style-type: none"> ○ http://rougeriver.com/alliance/AllianceofRougeCommunitiesByLaws.pdf • Example Authority Bylaws: <ul style="list-style-type: none"> ○ http://www.saswa.org/bylaws_articles.php

Existing water quality activist groups, such as the St. Clair County Water Quality Board, and the Binational Public Advisory Council (BPAC), could also provide a means to assess the effectiveness of actions taken in the NEW. This would involve the review of progress reports associated with these two groups.

Element 2: Strong Linkages to Existing Programs

The WAG will continue to coordinate implementation actions with existing agencies and groups that have similar missions and goals as those in this WMP, such as the Metropolitan Planning Commission, Natural Resources Conservation Service, St. Clair Conservation District, and the Michigan Department of Environmental Quality. A comprehensive list of coordinating agencies and groups are outlined in Table 8.4 of Chapter 8.

Element 3: Clear Designation of Responsibilities, Timetables, and Anticipated Costs

Given the size of the NEW and the large gaps in specific water quality and quantity sources of impairment and concern, it is difficult to pinpoint specific projects that will take place once implementation of the plan begins. The WAG envisions that as the group moves forward with implementation and additional information on the watershed is gathered, more specific projects and their associated costs, timeline for completion, and responsible parties will be determined at that time. Estimated costs for each recommended BMP to achieve the goals and objectives of this WMP are outlined in Table 6.2 of Chapter 6, and the costs for implementation of the evaluation mechanisms is provided in Table 9.10 in Section 9.3 of this Chapter. A prioritized list of BMPs and their general locations for implementation in those areas known to be actively threatening or impairing the watershed are outlined in Chapter 3, Table 3.4.

Element 4: Effective Water Management Laws, Regulations, and Policies

As discussed in Element #1, the WAG will likely set up a structure for implementation by forming a watershed alliance or storm water authority.

Element 5: Ongoing Tracking of the Degree of Success of Implementation

It is anticipated that a consultant will be hired to compile and evaluate the effectiveness of the BMPs that are implemented throughout the NEW on a scheduled basis. The evaluation strategy is further outlined in Table 9.7. Estimated costs associated with the evaluation strategy are presented in Table 9.10.

Element 6: Ongoing Monitoring and Reporting of Progress

The public and other stakeholders in the watershed will be updated annually as to the successes of implementation actions derived from the development of this WMP primarily through the County's Storm Water Website and the Blue Watershed Newsletter. Permittees should aim to report the activities conducted as part of the WMP on an annual basis to the following groups:

- local community boards,
- the St. Clair County Board of Commissioners,
- the St. Clair County Water Quality Board, and
- the St. Clair River BPAC.

Each permittee is required to submit an annual report of SWPPI implementation activities to the MDEQ by November 1st of each year in accordance with their Certificate of Coverage (COC). As part of evaluation efforts the information from each permittee's annual reports will be compiled and analyzed in conjunction with any other evaluation activities to provide an overview of progress in the watershed. This evaluation overview should be presented to the aforementioned groups.

Element 7: Ongoing Public Education and Communication Programs

Public education and involvement will be a key element of the implementation phase of this WMP through new and existing programs. The SCCHD already has a host of programs that they provide to the public in the watershed, and the WAG will continue to coordinate with other agencies and groups in the watershed to achieve the goals of public education and involvement. The Information and Education campaign that will be used is outlined in Chapter 8.

Element 8: Periodic Review and Revision of the Plan

The NEW WAG is required to submit a joint revised WMP by November 1, 2008, or a written determination not to revise the plan, as required by each participant's Certificate of Coverage (COC). The NEW WAG anticipates continuing to meet on a regular basis (likely quarterly) to share progress on the actions taken to meet the goals and objectives of the WMP, and ensure that the WMP is being implemented on a watershed-wide basis to the maximum extent practicable (MEP) through coordinated implementation efforts. Watershed planning documents reflecting updated efforts will be posted on the county's storm water website at:

<http://www.stclaircountystormwater.org>.

There may be several reasons for updating the WMP, including but not limited to:

- If additional watershed concerns are identified,
- If different objectives to achieve the watershed goals are identified, or
- If additional practices to achieve the designated and desired uses in the watershed are delineated.

It is anticipated that the implementation phase of the watershed planning effort will be structured so that the WAG, or a hired consultant, compiles and evaluates the BMPs that are implemented throughout the watershed on an annual basis, as well as, a compilation and analysis of pertinent water quality, quantity, and biological indicator studies that are completed over time. The water quality and biological indicators will be evaluated every five (5) years. All of the information

gleaned from these evaluation measures will be used to measure progress towards attaining the goals and objectives of this WMP, and will help the WAG determine if revisions/ updates are needed to the WMP. Cost estimates for this type of evaluation are summarized in Table 9.10.

Element 9: Adequate Funding

Funding to sustain implementation of this WMP over time will always be a challenge. With current budget cuts and constraints, the pot of money available through grants or even general funds continues to diminish. The continuation of the WAG and maintaining an agreement to work together to share costs for actions would help to stretch the funding available for implementation projects that will benefit the watershed as a whole. An important component of this idea is ensuring the group's facilitation by a designated leader. This lead facilitator should research funding options on a regular basis to ensure that available options are taken advantage of, propose annual budgets and allocation formulas for the group's anticipated expenditures, and provide a fiduciary for the collection and expenditure of joint funds. Annual budgets and allocations will need to be approved by local boards. These actions are anticipated to be completed by a consultant and the cost estimate is provided in Table 9.10.

9.2 Methods of Evaluation

Since there will be quite an array of BMPs implemented, the methods of evaluating progress towards the goals and objectives of this WMP will have to be grouped into categories that can be applied to multiple BMPs. A summary of the evaluation methods for each group of BMPs that aim to meet the goals and objectives of this plan are outlined in Table 9.8 and include:

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

Each specific evaluation measure is further defined below.

9.2.1 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 of this WMP will be through the compilation of the total number of BMPs that are implemented by permittees throughout the watershed. This will be accomplished by tallying up the BMPs that are completed annually. The most efficient way to compile this evaluation will be through the review of each permittees annual report that will be submitted to the MDEQ by November 1st of each year. For simplicity, only BMPs that have been "completed", meaning that they have been installed or implemented during that review period, will be tallied. The recommended BMPs described in the "Best Management Practices" chapter and outlined in the "Action Plan Matrix" have already been grouped into the six minimum measures (Public Education, Public Involvement, Illicit Discharge Elimination, Construction Runoff Control, Post-Construction Runoff Control, and Pollution Prevention/Good Housekeeping). These BMPs will continue to be grouped in this manner for tallying and overall evaluation purposes.

❖ Review of Annual Reports/SWPPI Annual Reports

Each permittee's annual report will be reviewed and BMPs will be tabulated to assess progress towards meeting the goals and objectives of this WMP.

The second programmatic option to evaluate change in the watershed over time is to conduct an impervious surface analysis based on land use types throughout the watershed. A baseline analysis of current impervious cover is anticipated to occur in 2007 (dependent on the receipt of land cover information from SEMCOG) with follow-up analysis every five years thereafter. The goal will be to show minimal increases in impervious surfaces, and no newly developed areas of more than 25% imperviousness. Table 9.3 provides a summary of all the possible impacts to aquatic resources from addition of impervious cover.

Table 9.3 Impacts to Aquatic Resources Due to Impervious Cover (CWP, 1998)

1. Higher peak discharge rates and greater flooding	10. Degradation of stream habitat structure
2. More frequent bank-full conditions	11. Decline in stream bed quality (embedding, sediment deposition, turnover)
3. Lower stream flow during dry weather	12. Fragmentation of the riparian forest corridor
4. Enlargement of the stream channel	13. Warmer stream temperatures
5. Greater streambank erosion	14. Greater loads of storm water pollutants
6. Increased alteration of natural stream channels	15. Bacterial levels that exceed recreational contact standards
7. Less large woody debris in streams	16. Lower diversity of aquatic insects and freshwater mussels
8. Loss of pool and riffle structure	17. Lower diversity of native fish species
9. Increased number of stream crossings, with greater potential to affect fish passage	18. Decline in wetland plant and animal diversity

The relationship between water quality and levels of imperviousness has been researched by the Center for Watershed Protection (CWP). The model they've developed shows that water quality tends to decrease as the amount of impervious surfaces increases. Figure 9.1 below expresses this relationship.

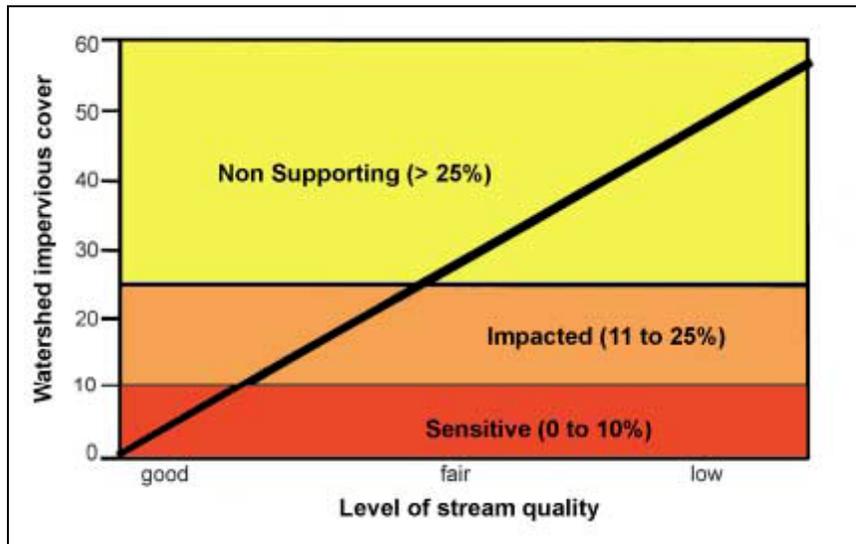


Figure 9.1 Relationship between Impervious Surfaces and Water Quality Impacts to Streams (CWP, 2003)

The illustration expresses that at a level of imperviousness that falls between 0 and 10% there is minimal impact to the quality of surface waters and wetlands in the watershed and are termed “sensitive streams”. These streams have stable channels with good to excellent water quality and biodiversity.

At a level of imperviousness at or beyond 11%, negative impacts on water quality and aquatic systems can begin to occur. Impervious levels between 11 and 25% are termed “impacted streams” and have unstable channels with fair to good water quality and biodiversity. Impervious levels above 25% are termed “non-supporting streams” and have highly unstable channels with fair to poor water quality and poor biodiversity. Studies done by the Huron River Watershed Council (HRWC) and others have shown that impervious surfaces as little as 8 – 10% in a watershed causes receiving streams to lose their ability to support aquatic life (Manning, et al., 2003).

9.2.2 Photographic Surveys

As projects are implemented and BMPs installed, photographs should be taken to illustrate the “before” and “after” results that may indicate improved aesthetics, or provide visual indicators of reduced pollutant loadings, such as clear water (reduced sediment inputs), reduced algae blooms (reduced nutrient inputs), and/or improved habitat (increased in-stream vegetation or riparian vegetation). This type of media is useful to provide the public a means of visually understanding the aesthetic and water quality improvements that can come from the installation of BMPs. These photographs will be included with the communities’ Annual Progress Reports as part of BMP implementation evaluation.

9.2.3 Stakeholder Surveys/Social Indicators

The Southeast Michigan Council of Governments (SEMCOG) plans to distribute their Public Education/Awareness Survey just as they did in 2004 (baseline results that are statistically significant for the NEW are presented in Section 8.3 of Chapter 8). SEMCOG plans to redistribute the survey by 2010, if not before. The results of this next survey will be compared against the baseline awareness levels compiled from the 2004 survey and included in the evaluation of public education activities annual report for that year. 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 over the course of several years.

9.2.4 Water Quality Indicators

The ultimate goal of the NPDES storm water program is water resource improvement. Achievement of this 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. The challenges associated with such monitoring strategies are that collecting useful data requires a commitment of resources to collect adequate information on baseline conditions, as well as consistently collecting more information over time. Although there has been extensive data generated at the USGS Station on the Black River, long term monitoring data or even baseline conditions of the majority of the NEW does not exist. The need for additional monitoring data throughout the subwatersheds, and especially in the headwater areas, became very apparent during field work conducted for this watershed plan.

Monitoring stations surveyed by the MDEQ and MDNR in the NEW have primarily only been in the LBR subwatershed, and the one remaining USGS Gauge Station is in the upstream portion of the LBR subwatershed near Jeddo, MI. In order to get a better handle on the current and future conditions throughout the NEW, there needs to be additional sites monitored as resources become available. The

WAG is encouraged to request additional monitoring locations be evaluated by the MDEQ as part of the 5-year basin monitoring cycle.

The NEW WAG understands the importance and necessity of water quality and quantity monitoring throughout the watershed to gain a better understanding of where BMPs could best be implemented, but this can not be done without adequate funding to support these types of programs. Funding to support monitoring strategies will be an ongoing priority for the NEW WAG, as well as to continue to evaluate the results of existing monitoring programs such as the SCCHD's beach monitoring program, the MDEQ's Great Lakes Environmental Assessment Section (GLEAS) assessments, and the Adopt-A-Stream Program.

For the water quality data that is conducted over time throughout the watershed, it will be evaluated for compliance with applicable state Water Quality Standards (WQS) and other minimum criteria, as outlined in Table 9.4 below:

Table 9.4 Water Quality Standards associated with Water Quality Parameters

Parameter	Water Quality Standard
pH	6.5 – 9.0
Dissolved Oxygen (DO)	> 5 mg/L for surface waters designated for warmwater fishery and aquatic life
Temperature	<ul style="list-style-type: none"> • 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.
Nutrients	<ul style="list-style-type: none"> • Total phosphorus: point source discharges limited to 1 mg/L of total phosphorus as a monthly average. <ul style="list-style-type: none"> ○ 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. The EPA criteria for stream aesthetics is 0.1 mg/L of total phosphorus.
<i>E. coli</i> /fecal coliform	<ul style="list-style-type: none"> • <i>Surface Waters and Surface Water Discharges:</i> <ul style="list-style-type: none"> ○ Partial Body Contact: 1,000 <i>E. coli</i> per 100 milliliters of water at any time; ○ Total Body Contact: 130 <i>E. coli</i> per 100 milliliters of water as a 30-day average and 300 <i>E. coli</i> per 100 milliliters of water at any time. • <i>Bacteria Effluent Limitations in NPDES Permits:</i> <ul style="list-style-type: none"> ○ WWTPs must conform to the following standards for point source discharges of water: <ul style="list-style-type: none"> ▪ 200 fecal coliform bacteria per 100 ml water as a monthly average and 400 fecal coliform bacteria per 100 ml water as a 7-day average.
Total Suspended Solids (TSS)	<ul style="list-style-type: none"> • Municipal wastewater treatment plants must provide treatment to meet TSS limits of 30 mg/L as a monthly average and 45 mg/L as a 7-day average. • Waters of the 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, settleable solids, suspended solids, and deposits. This kind of rule, which does not establish a numeric level, is known as a "narrative standard." <ul style="list-style-type: none"> ○ Typically, water with a TSS concentration less than 20 mg/L is considered to be

Table 9.4 Water Quality Standards associated with Water Quality Parameters

Parameter	Water Quality Standard
	clear. Water with TSS levels between 40 and 80 mg/L tends to appear cloudy, while water with concentrations over 150 mg/L usually appears dirty. The nature of the particles that comprise the suspended solids may cause these numbers to vary.
Total Dissolved Solids (TDS)	<ul style="list-style-type: none"> • 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. • 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.
Conductivity	<ul style="list-style-type: none"> • Measurement of the amount of dissolved ions in water (i.e. salt, metals, toxins, etc.) <ul style="list-style-type: none"> ○ $\leq 800 \mu\text{S}$ is considered natural for stream water ○ $\geq 800 \mu\text{S}$ is considered excessive and may indicate the presence of toxins in the water (<i>Source:</i> Southeast Michigan Environmental Monitor website at : http://empact.co.washtenaw.mi.us/water/waterframe.htm).

The Michigan Department of Natural Resources' (MDNR) Black River Fisheries Assessment (anticipated in 2008) and the next MDEQ GLEAS Report for St. Clair County watersheds (also anticipated in 2008) will provide additional insight into the following physical conditions in the watershed:

- Changes in geology and hydrology
- Changes in physical habitat: In-stream and Riparian Habitat Conditions
 - Parameters such as stream type and origin, land use, erosion, reach width and depth, canopy, proportion of stream morphological type (riffle, pool, run), and presence or absence of large woody debris and aquatic vegetation.
 - Measurements over time will help to reflect overall changes in channel morphology.

The MSU-Extension's Adopt-A-Stream program currently conducts monitoring at two (2) sites in the NEW:

1. The Black River in the Port Huron State Game Area, and
2. The Black River from Holland Avenue to Pine Grove Avenue.

Another means of evaluating progress is based on the types of BMPs implemented and the estimated amount of pollutant loading reductions achieved. Several methods are available to calculate estimated pollutant load reductions including: the "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual", the use of the STEPL model, the use of the Watershed Treatment Model, or other models that may be developed. One or a combination of, these methods will be used every five (5) years to estimate load reductions in the NEW. Each of these evaluation measures is outlined below.

❖ *Calculation of Sediment and Nutrient Loading Reductions*

A guidance document entitled, "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual" (MDEQ, June 1999), provides a means to calculate the sediment and nutrients loading reductions for the use of particular BMPs throughout the watershed. The purpose of the document's guidance is to standardize the progress reporting in order that water quality impacts and statewide achievements can be systematically represented.

This document is online at: <http://www.deq.state.mi.us/documents/deq-swq-nps-POLCNTRL.pdf>

Utilizing this exercise provides a uniform means to estimating relative pollutant loads to the watershed for the following pollutants:

1. sediment (typically reported in tons/yr), and
2. sediment-borne phosphorus and nitrogen (typically reported in lb/yr).

This exercise can only be used by the implementation of particular types of BMPs including the installation of those indicated in Table 9.5 below:

Table 9.5 Example Practices and BMPs to Reduce Pollutant Loadings	
General Practice	Applicable BMPs
1. Conservation practices to control gully erosion, and sheet and rill erosion from riparian fields	<ul style="list-style-type: none"> ❖ Grade Stabilization Structure ❖ Grassed Waterway ❖ Critical Area Planting ❖ Water and Sediment Control Basin
Table 9.5 Example Practices and BMPs to Reduce Pollutant Loadings	
General Practice	Applicable BMPs
2. Streambank/ditchbank/roadbank treatment and livestock access	<ul style="list-style-type: none"> ❖ Animal trails and walkways ❖ Stream Channel Stabilization ❖ Streambank Protection
3. Riparian buffer/filter strips	<ul style="list-style-type: none"> ❖ Filter strips

***Note:** It should be kept in mind that field measurements (such as width and length of gully formed from erosion, or slope height and length of eroding streambanks) typically need to be taken when the particular BMP(s) is(are) installed as base-line conditions factor into the equations used to determine the sediment and nutrient loading reductions.

❖ *STEPL Model Calculations*

The US EPA, in conjunction with Tetra Tech, Inc., has developed the “Spreadsheet Tool for Estimating Pollutant Load” (STEPL Version 3.0) and it can be used to quantify the estimated nonpoint source nutrient loadings [phosphorus (P), nitrogen (N), and Biological Oxygen Demand (BOD)] and sediment loadings on both a subwatershed and watershed-wide basis. It is based on the previously described manual, but does not consider channel erosion (only upland sources). The baseline pollutant loadings in the NEW, and for each subwatershed, assuming the use of no BMPs, are presented in Section 2.3.10 of Chapter 2. A suite of BMPs that have been implemented by permittees can be input into this model and can be used to estimate the reduced pollutant loadings achieved. The STEPL model program and instructions for its use are available on the US EPA’s website at: <http://it.tetratech-ffx.com/stepl/models/docs.htm>.

❖ *Watershed Treatment Model*

Developed by the Center for Watershed Protection, the Watershed Treatment Model (WTM) is a simple Excel spreadsheet-based model that can be a useful tool to estimate the effectiveness of various BMPs on water quality. The model can be used to quantify pollutant load reductions for sediment, nutrient and bacteria. The spreadsheet program and instructions for its use are available online at:

http://www.stormwatercenter.net/monitoring%20and%20assessment/watershed_treatment_model.htm.

Baseline data for the NEW of available water quality data is included in Chapter 2, Appendix D, and in the Resource Directory (CD). Baseline data for habitat conditions as reflected in the 2004/2005 Road/Stream Crossing Inventory is provided in the Resource Directory.

9.2.5 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 NEW will be to review information obtained as part of the MSU-Extension's Adopt-A-Stream program, through the MDEQ's GLEAS assessments that are conducted on a five-year rotating cycle (the next monitoring year for the NEW is in 2007), and other monitoring strategies, such as the Black River Fisheries Assessment that is currently being conducted by the MDNR (anticipated to be published in 2008). These data sources will typically provide the following types of information:

- Fish Assemblages
- Macroinvertebrate Assemblages
- Populations of amphibians, reptiles, birds, and mammals
- Natural Features Assessments
- Presence of Pest Species

The following rating targets outlined in Table 9.6 will be evaluated to assess progress in attaining the goals and objectives for the NEW as it pertains to assessment of fish and macroinvertebrate assemblages.

Table 9.6 Targets for Assessment of Fish and Macroinvertebrate Assemblages

Biological Indicator	GLEAS Rating Target	Measure of Indicator
Fish Assemblages	○ Maintain "Good" to "Excellent" scores	-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	○ Improve "Poor" ratings to "Fair" ratings or better	-Good indicators of site-specific effects from water quality conditions and good indicators of short-term stress since their life cycle is short. -Presence or absence of particular species (i.e. EPT Richness) indicates pollution tolerance.

Baseline data for the NEW of available biological indicator data is included in Chapter 2, Appendix D, and in the Resource Directory.

There is very limited biological monitoring currently conducted by the MDEQ and MDNR in the NEW. Monitoring stations have primarily only been in the LBR subwatershed. In order to get a better handle on the current and future conditions throughout the NEW, there needs to be additional sites monitored as resources become available. The WAG is encouraged to request additional monitoring locations be evaluated by the MDEQ as part of the 5-year basin monitoring cycle.

9.3 Summary of the Evaluation Methods, Measurable Goals, Evaluation Schedule and the Estimated Costs for Evaluating Watershed Plan Implementation

Tables 9.7 and 9.8 outline the evaluation methods, measurable goals, and evaluation schedule that will be used to gauge progress on achieving the goals and objectives of the WMP over time. Table 9.9 provides a summary of the measurable goals associated with each recommended BMP that a permittee may choose to implement or may already be implementing. Table 9.10 provides a summary of the cost estimates for each type of evaluation measure. More detailed cost information based on monitoring strategies that may be conducted by permittees in the future, if funding becomes available, is available on the Center for Watershed Protection's Stormwater Manager's Resource Center website at: <http://www.stormwatercenter.net/>, then click on "Indicator Profile Sheets".

Table 9.7 Methods of Evaluation and Measurable Goals for St. Clair County’s Northeastern Watersheds Watershed Management Plan

Method ID	Evaluation Method	Evaluation Measure	Interim Milestones and Measurable Goals	Evaluation Schedule	Responsible Party
A	Programmatic Indicators/BMP Results	1. Report on the number, type, and frequency of Public Education BMPs implemented	See Table 9.8	1.-6. Compile results of annual progress reports annually: • First review to begin after Nov. 1, 2007, and every year thereafter. 1.-6. Summarize progress on watershed improvements annually and publish results on County storm water website: • Complete by March 1, 2008, and every year thereafter.	<ul style="list-style-type: none"> • Each permittee to complete Annual Report by November 1st of each year • Compilation of Annual Report Results by Watershed Advisory Group
		2. Report on the number, type, and location of Public Involvement BMPs implemented			
		3. Report on the number, type, frequency, and location of BMPs implemented for Illicit Discharge Elimination			
		4. Report on the number, type, and location of Construction Site Runoff Control BMPs implemented			
		5. Report on the number, type, and location of Post-Construction Runoff Control BMPs implemented			
		6. Report on the number, type, and location of Pollution Prevention/Good Housekeeping BMPs implemented for Municipal Properties			
		7. Land Use/Impervious Cover Analysis	7. Minimize increases in % impervious surface for each subwatershed in the NEW: <ul style="list-style-type: none"> • 25% of regulated entities adopt mechanisms to encourage reduced imperviousness by 2012 • 50% of regulated entities adopt mechanisms to encourage reduced imperviousness by 2017 	7. Baseline evaluation to be completed in 2007(dependent on the receipt of land cover data from SEMCOG) and every five years thereafter.	<ul style="list-style-type: none"> • St. Clair County Metropolitan Planning Commission or GIS • Watershed Advisory Group to compile and evaluate results
B	Stakeholder Surveys/Social Indicators	1. Redistribute SEMCOG’s Public Education Survey (or an appropriate substitution) during every permit cycle in order to realize behavior changes and changes in watershed awareness over time.	1. Attain improved awareness and actions taken to protect water quality and improve watershed awareness levels	1. Distribution of SEMCOG Public Education Survey by next permit cycle (anticipated by 2010), and likely an additional survey in each subsequent permit cycle thereafter 2.	<ul style="list-style-type: none"> • SEMCOG to distribute and analyze results of survey • Permittees to contribute funds to support survey
C	Photographic Surveys	1. Provide photographic evidence of before and after of local projects that are implemented.	1. and 2. Photographs that reflect improved aesthetic and stabilized riparian conditions, including improved riparian habitat conditions	1. and 2. Pre- and Post-Construction Photographic Surveys will be provided with Annual Progress Reports.	<ul style="list-style-type: none"> • Project managers to coordinate results with Watershed Advisory Group
		2. Provide photographic evidence of road/stream crossing stabilization projects.			
D	Water Quality Indicators	1. Evaluate Chronic Toxicity Reports produced by MDEQ	1. Attain compliance of effluent limits	1. Evaluate MDEQ Chronic Toxicity Reports as available	<ul style="list-style-type: none"> • MDEQ to produce reports • Watershed Advisory Group to evaluate reports
		2. Evaluate frequency of Water Quality Standard exceedances	2. Eliminate state water quality standard exceedances for: <ul style="list-style-type: none"> o pH, DO, temperature, nutrients, bacteria (<i>E. coli</i> and/or fecal coliform), total suspended and dissolved solids, metals, conductivity 	2. Compile available monitoring information annually and evaluate results every five (5) years. Information may include review and evaluation of: <ul style="list-style-type: none"> o Adopt-A-Stream Results o MDEQ GLEAS Reports (next round of reports anticipated in 2008, and every 5 years thereafter) o STORET Database Information o MDNR Black River Assessment (anticipated in 2008) 	<ul style="list-style-type: none"> • MDEQ/MDNR to produce reports • MSU-Extension and volunteers to conduct Adopt-A-Stream monitoring • Watershed Advisory Group to compile and evaluate results
		3. Evaluate SCCHD’s monitoring results for <i>E. coli</i> at select beaches and tributaries	3. Attain reduced number of colony forming units reported and reduced number of beach closures	3. Evaluate monitoring results annually	<ul style="list-style-type: none"> • St. Clair County Health Department to conduct monitoring. • Watershed Advisory Group to compile/evaluate results

Table 9.7 Methods of Evaluation and Measurable Goals for St. Clair County’s Northeastern Watersheds Watershed Management Plan

Method ID	Evaluation Method	Evaluation Measure	Interim Milestones and Measurable Goals	Evaluation Schedule	Responsible Party
D	Water Quality Indicators	4. Track number of SSO/CSO events annually	4. Attain reduced number of SSO events and elimination of CSO systems in the City of Port Huron by 2012	4. Evaluate overflow events annually	<ul style="list-style-type: none"> Watershed Advisory Group to compile and evaluate results
		5. Calculate nonpoint source pollutant loading reductions based on number and type of BMPs implemented	5. Minimize increases in pollutant loadings <ul style="list-style-type: none"> Less than 10 % net increase in loadings for sediment and nutrients through 2012 	5. Evaluate pollutant loadings every five (5) years	<ul style="list-style-type: none"> Watershed Advisory Group to compile and evaluate results
		6. Evaluate Physical Habitat Scores	6. Attain improved or maintained habitat scores	6. Evaluate available monitoring information annually including: <ul style="list-style-type: none"> Adopt-A-Stream Results MDEQ GLEAS Reports (next round of reports anticipated in 2008, and every 5 years thereafter) MDNR Black River Assessment (anticipated in 2008) 	<ul style="list-style-type: none"> MDEQ/MDNR to produce reports MSU-Extension and volunteers to conduct Adopt-A-Stream monitoring Watershed Advisory Group to compile and evaluate results
E	Biological Indicators	2. Evaluate Fish and Macroinvertebrate Assemblage Scores	1. Attain improved or maintained fish and macroinvertebrate assemblage scores	1. Evaluate available monitoring information annually including: <ul style="list-style-type: none"> Adopt-A-Stream Results MDEQ GLEAS Reports (next round of reports anticipated in 2008, and every 5 years thereafter) MDNR Black River Assessment (anticipated in 2008) 	<ul style="list-style-type: none"> MDEQ/MDNR to produce reports MSU-Extension and volunteers to conduct Adopt-A-Stream monitoring Watershed Advisory Group to compile and evaluate results

Table 9.8 Recommended Best Management Practices and Methods for Measuring Progress for the Long-Term Goals and Short-Term Measurable Objectives for St. Clair County’s Northeastern Watersheds

Long-Term Goal	Short-Term Measurable Objective	Recommended Suite of BMPs	Evaluation Method (see Table 9.7)
1. Identify and protect high-quality natural features including forested areas, floodplains, riparian buffers, wetlands, and contiguous greenways.	2.1 Identify high-quality natural features, map them, and include them in planning documents.	31, 32, 37, 38, 40, 79, 81	A
	2.2 Protect high-quality natural features (high-quality woodlands, wetlands, floodplains, riparian corridors, areas with endangered/threatened species, etc.).	31, 32, 33, 34, 35, 36, 38, 39, 40, 79, 81	A
	2.3 Identify and protect greenway corridors.	32, 44, 79, 81	A
1. Ensure sustainable growth and development.	2.5 Implement coordinated and uniform land use planning codes, ordinances, and design standards throughout the watershed.	6, 14, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 46, 50, 51, 52, 53, 55, 57, 59, 60, 62, 67, 79, 81	A
	2.6 Implement coordinated enforcement of land use planning codes, ordinances, and design standards throughout the watershed.	6, 14, 29, 30, 31, 32, 33, 34, 35, 36, 38, 57, 70, 79, 80, 81	A
	2.7 Educate land use managers and developers on sustainable growth and development practices.	1, 5, 6, 8, 14, 19, 20, 29, 30, 31, 32, 59, 60, 67, 79, 81	A, B
2. Protect and improve water related recreation.	8.1 Reduce sediment loading and associated turbidity.	2, 3, 7, 11, 21, 26, 29, 30, 31, 32, 33, 34, 35, 36, 40, 58, 59, 60, 61, 62, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 79, 80, 81	A, B, C, D, E
	8.2 Reduce nutrient loading.	2, 3, 4, 7, 11, 13, 15, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 40, 55, 58, 59, 60, 61, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 79, 80, 81	A, B, C, D, E
	8.3 Identify and eliminate sources of pathogens (bacteria).	2, 3, 7, 15, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 33, 35, 36, 40, 41, 58, 60, 61, 63, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 79, 80, 81, 82	A, B, D
	8.4 Ensure attainment of TMDLs to be developed for pathogens.	21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 58, 63, 67, 69, 70, 71, 72, 74, 77, 79, 81, 82	A, D
	8.5 Increase public awareness of pollution issues that impact partial and total body contact recreation.	1, 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 25, 32, 42, 43, 79, 81	A, B
	8.6 Increase knowledge of existing physical and chemical conditions in the watershed through monitoring strategies.	11, 21, 25, 32, 37, 38, 41, 45, 66, 79, 81	A, C, D, E
	8.7 Minimize chemical spills and ensure proper notification of spills.	7, 9, 21, 26, 32, 57, 73, 75, 79, 80, 81	A, D
3. Protect and improve the warmwater and coolwater fishery	12.1 Reduce sediment loading and associated turbidity.	<i>Same as Objective 3.1:</i> 2, 3, 7, 11, 21, 26, 29, 30, 31, 32, 33, 34, 35, 36, 40,	A, B, C, D, E

Table 9.8 Recommended Best Management Practices and Methods for Measuring Progress for the Long-Term Goals and Short-Term Measurable Objectives for St. Clair County’s Northeastern Watersheds

Long-Term Goal	Short-Term Measurable Objective	Recommended Suite of BMPs	Evaluation Method (see Table 9.7)
and conditions for other indigenous aquatic life and wildlife.		58, 59, 60, 61, 62, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 79, 80, 81	
	12.2 Reduce nutrient loading.	<i>Same as Objective 3.2:</i> 2, 3, 4, 7, 11, 13, 15, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 40, 55, 58, 59, 60, 61, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 79, 80, 81	A, B, C, D, E
	12.3 Stabilize hydrologic flows.	3, 30, 31, 32, 33, 34, 35, 36, 40, 53, 54, 55, 56, 59, 60, 61, 62, 63, 67, 68, 69, 70, 79, 81	A, C, D
	12.4 Enhance and protect riparian areas and in-stream habitat.	2, 3, 4, 7, 9, 11, 12, 13, 15, 16, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 39, 40, 42, 43, 44, 54, 55, 56, 57, 58, 59, 60, 62, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81	A, B, C, D, E
	12.5 Increase public awareness of pollution issues that impact the fishery and other indigenous aquatic life and wildlife.	1, 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 29, 32, 42, 43, 79, 81	A, B, C, D, E
	12.6 Ensure attainment of TMDLs to be developed for PCBs and mercury.	32, 79, 81, 82	A, D
	12.7 Increase knowledge of existing aquatic populations and physical and chemical conditions in the watershed through monitoring strategies.	11, 21, 25, 32, 37, 38, 41, 45, 66, 79, 81	A, C, D, E
	12.8 Minimize chemical spills and ensure proper notification of spills.	<i>Same as Objective 3.7:</i> 7, 9, 21, 26, 32, 57, 73, 75, 79, 80, 81	A, D
4. Protect public health and the drinking water supply (public and private).	1.1 Increase public awareness of pollution issues that impact public health and drinking water supplies (public and private).	1, 2, 3, 5, 6, 7, 9, 11, 12, 14, 15, 18, 19, 20, 25, 32, 42, 43, 79, 81	A, B, C, D
	1.2 Identify and eliminate sources of pathogens (bacteria).	<i>Same as Objective 3.3:</i> 2, 3, 7, 15, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 33, 35, 36, 40, 41, 58, 60, 61, 63, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 79, 80, 81, 82	A, D
	1.3 Identify and eliminate sources of nutrients.	3, 4, 7, 11, 15, 21, 22, 23, 24, 26, 27, 28, 29, 30, 32, 41, 55, 58, 61, 63, 67, 69, 70, 71, 72, 73, 74, 75, 76, 77, 79, 80, 81	A, C, D, E
	1.4 Ensure attainment of TMDLs to be developed for	<i>Same as Objectives 3.4 and 4.6:</i>	A, D

Table 9.8 Recommended Best Management Practices and Methods for Measuring Progress for the Long-Term Goals and Short-Term Measurable Objectives for St. Clair County’s Northeastern Watersheds

Long-Term Goal	Short-Term Measurable Objective	Recommended Suite of BMPs	Evaluation Method (see Table 9.7)
	pathogens, PCBs, and mercury.	21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 58, 63, 67, 69, 70, 71, 72, 74, 77, 79, 81, 82	
	1.5 Minimize chemical spills and ensure proper notification of spills.	<i>Same as Objective 3.7:</i> 7, 9, 21, 26, 32, 57, 73, 75, 79, 80, 81	A, D
	1.6 Protect groundwater supplies from over-withdrawal.	32, 46, 79	A
5. Preserve the rural character (farmland and open space) of the area.	7.1 Preserve prime agricultural land.	32, 47, 48, 50, 79, 81	A
	7.2 Preserve open space.	31, 32, 33, 36, 39, 40, 44, 47, 48, 49, 51, 53, 79, 81	A
6. Increase recreational opportunities (parks and other facilities), including public access to Lake Huron, the Black River, and the St. Clair River.	1.1 Work with regional, county, and local governments, and other agencies and organizations to increase water-related recreational opportunities throughout the watershed while protecting water resources from degradation.	32, 42, 43, 61, 79, 81	A
	1.2 Seek out and act on opportunities for additional parks and recreational spaces, with priority along stream and riparian corridors, and greenway corridors.	32, 40, 42, 43, 44, 79, 81	A
	1.3 Provide additional public access to water resources.	32, 42, 43, 79, 81	A
	1.4 Stabilize waterway shorelines in a manner that increases public access to waterways.	32, 61, 63, 67, 79, 81	A, C
7. Maintain and/or increase the aesthetics of the water resources.	1.1 Reduce sediment loading and associated turbidity.	<i>Same as Objective 3.1:</i> 2, 3, 7, 11, 21, 26, 29, 30, 31, 32, 33, 34, 35, 36, 40, 58, 59, 60, 61, 62, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 79, 80, 81	A, B, C, D, E
	1.2 Reduce nutrient loading.	<i>Same as Objective 3.2:</i> 2, 3, 4, 7, 11, 13, 15, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 40, 55, 58, 59, 60, 61, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 79, 80, 81	A, B, C, D, E
	1.3 Stabilize hydrologic flows.	<i>Same as Objective 4.3:</i> 3, 30, 31, 32, 33, 34, 35, 36, 40, 53, 54, 55, 56, 59, 60, 61, 62, 63, 67, 68, 69, 70, 79, 81	A, C, D
	1.4 Enhance and protect riparian areas and in-stream habitat.	<i>Same as Objective 4.4:</i> 2, 3, 4, 7, 9, 11, 12, 13, 15, 16, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 39, 40, 42, 43, 44,	A, B, C, D, E

Table 9.8 Recommended Best Management Practices and Methods for Measuring Progress for the Long-Term Goals and Short-Term Measurable Objectives for St. Clair County’s Northeastern Watersheds

Long-Term Goal	Short-Term Measurable Objective	Recommended Suite of BMPs	Evaluation Method (see Table 9.7)
		54, 55, 56, 57, 58, 59, 60, 62, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81	
	1.5 Minimize chemical spills and ensure proper notification of spills.	<i>Same as Objective 3.7:</i> 7, 9, 21, 26, 32, 57, 73, 75, 79, 80, 81	A, D

Table 9.9 Measurable Goals for Each Recommended Best Management Practice for St. Clair County’s Northeastern Watersheds

BMP No.	Action (BMP Strategy)	Measurable Goals
Public Education and Outreach		
1	Develop and Distribute Outreach Materials on Watershed Awareness and Storm Water Management	<ul style="list-style-type: none"> • Track # and types of materials distributed • Topics included in material • Track # of website hits
2	Utilize the “Seven Simple Steps to Clean Water” Campaign Materials and Mass Media Efforts	<ul style="list-style-type: none"> • Track # of brochures distributed • Track dates and locations of use of Water Quality Display • Track # of website hits • Track location of poster displays (municipal offices, pet stores, businesses, etc.) • Track # and types of public service announcements aired • Track # of storm water-related press releases • Track # of storm water-related articles published
3	Encourage the Use of Generally Accepted Agricultural Management Practices (GAAMPs)	<ul style="list-style-type: none"> • Track mode of encouragement • Track # and types of GAAMPs implemented • Estimate sediment and nutrient loading reductions based on BMPs in use
4	Encourage Reduced Fertilizer, Pesticide and Herbicide Usage	<ul style="list-style-type: none"> • Track mode of encouragement
5	Seek Participation from the Public during Earth Fair and River Day	<ul style="list-style-type: none"> • Track promotion activities and attendance for Earth Fair and River Day events • Track # of events at River Day and # of vendors at Earth Fair
6	Implement Employee Training Programs	<ul style="list-style-type: none"> • Track # of municipal employees and contractors trained • Track type of training municipal employees and contractors receive.
7	Promote St. Clair County’s 24-Hour Water Quality Hotline	<ul style="list-style-type: none"> • Track promotional mechanisms • Track # of calls to hotline • Track follow-up actions
8	Develop and Distribute Outreach Materials on Low-Impact Design	<ul style="list-style-type: none"> • Track # and types of workshops/ outreach to educate citizens and developers about low-impact development
9	Encourage the Use of Household Hazardous Waste Disposal and Electronics Recycling Programs	<ul style="list-style-type: none"> • Track modes of advertisement of HHW Disposal and Recycling Programs • Track amount of material disposed/recycled
10	Install Watershed Signage	<ul style="list-style-type: none"> • Track # and location of watershed signs erected • Evaluate watershed awareness surveys for increased awareness
11	Promote the Adopt-A-Stream Program	<ul style="list-style-type: none"> • Track modes of advertisement of the Adopt-A-Stream Program

Table 9.9 Measurable Goals for Each Recommended Best Management Practice for St. Clair County’s Northeastern Watersheds

BMP No.	Action (BMP Strategy)	Measurable Goals
		<ul style="list-style-type: none"> Track # of monitoring groups and locations in program
12	Promote the Adopt-A-County Road Program	<ul style="list-style-type: none"> Track modes of advertisement of the Adopt-A-County Road Program Track # of volunteer groups in program
13	Provide Information on the Soil Testing Program	<ul style="list-style-type: none"> Track # of requests for soil testing
14	Encourage Participation in the Citizen Planner Program	<ul style="list-style-type: none"> Track methods of advertisement of Citizen Planner Program Track # of staff that attend Citizen Planner Program
15	Provide Education on the Identification of Failing On-Site Septic Disposal Systems	<ul style="list-style-type: none"> Track # and content of brochures, magnets distributed, and hotline complaints received.
16	Encourage Reduced Use of Road Salt and Promote Alternative Deicing Chemicals	<ul style="list-style-type: none"> Track distribution of Seven Simple step brochures
17	Encourage Golf Course Nutrient Management	<ul style="list-style-type: none"> Track modes of encouraging golf course nutrient management Track changes in management practices at local golf courses
Public Involvement and Participation		
5	Seek Participation from the Public during Earth Fair and River Day	<ul style="list-style-type: none"> Track promotion activities and attendance for Earth Fair and River Day events Track # of events at River Day and # of vendors at Earth Fair
11	Promote the Adopt-a-Stream Program	<ul style="list-style-type: none"> Track modes of advertisement of the Adopt-A-Stream Program Track # of monitoring groups and locations in program
12	Promote the Adopt-a-County Road Program	<ul style="list-style-type: none"> Track modes of advertisement of the Adopt-A-County Road Program Track # of volunteer groups in program
18	Perform Storm Drain/Catch Basin Marking	<ul style="list-style-type: none"> Track # and location of markers installed Track # of volunteers to place markers
19	Seek Input from the Public on Development of Ordinances for Water Quality and Quantity Protection	<ul style="list-style-type: none"> Track # of attendees at public hearings for ordinance development/adoption
20	Seek Participation from the Public at St. Clair County’s NEW Watershed Advisory Group Meetings	<ul style="list-style-type: none"> Track mode of encouraging public input Track input from the public
Illicit Discharge/Connection Elimination		
6	Implement Employee Training Programs	<ul style="list-style-type: none"> Track # of municipal employees and contractors trained Track type of training municipal employees and contractors receive.
7	Promote St. Clair County’s 24-Hour Water Quality Hotline	<ul style="list-style-type: none"> Track promotional mechanisms Track # of calls to hotline Track follow-up actions

Table 9.9 Measurable Goals for Each Recommended Best Management Practice for St. Clair County’s Northeastern Watersheds

BMP No.	Action (BMP Strategy)	Measurable Goals
21	Implement Illicit Discharge Elimination Plan (IDEP)	<ul style="list-style-type: none"> • Track # of outfalls/stream miles inventoried • Track sampling data • Track # of illicit connections identified and corrected (failing OSDS, outfalls, etc.)
22	Sanitary System Planning—Manage Lagoon Systems and Package Wastewater Treatment Plants	<ul style="list-style-type: none"> • Report # of workshops/ WAG meeting discussions on this topic. • Track # of new developments with these systems
23	Eliminate Sanitary Sewer Overflow Events	<ul style="list-style-type: none"> • Track actions taken to eliminate sanitary sewer overflow events • Track amount of sewage eliminated from waterways
24	Eliminate Combined Sewer Overflow Systems	<ul style="list-style-type: none"> • Track actions taken to eliminate combined sewer overflow events • Track amount of sewage eliminated from waterways
25	Implement St. Clair County Public Bathing Beach Water Quality Monitoring Program	<ul style="list-style-type: none"> • Track sampling results • Track # of beach closings • Track # of water quality standard exceedances for bacteria
26	Study, Develop, Adopt and Enforce an Illegal Dumping Ordinance	<ul style="list-style-type: none"> • Report on development and adoption of ordinance(s) • Track # of clean-ups completed
27	Study, Develop, Adopt and Implement Illicit Discharge/Connection Elimination Ordinance	<ul style="list-style-type: none"> • Report on development and adoption of ordinance(s) • Track # of enforcement cases/ year
28	Support County-wide Onsite Septic Disposal System (OSDS) Ordinance	<ul style="list-style-type: none"> • Report on development and adoption of an ordinance • Track # of OSDS failures and corrections
Construction Site Storm Water Runoff Control		
6	Implement Employee Training Programs	<ul style="list-style-type: none"> • Track # of municipal employees and contractors trained • Track type of training municipal employees and contractors receive.
7	Promote St. Clair County’s 24-Hour Water Quality Hotline	<ul style="list-style-type: none"> • Track promotional mechanisms • Track # of calls to hotline • Track follow-up actions
29	Implement and Enforce the Soil Erosion and Sedimentation Control (SESC) Ordinance and the SESC Program	<ul style="list-style-type: none"> • Track # of SESC permits issued • Track violations • Track enforcement actions
Post-Construction Storm Water Management in New Development and Redevelopment		
Managerial Storm Water Management Controls		
6	Implement Employee Training Programs	<ul style="list-style-type: none"> • Track # of municipal employees and contractors trained

Table 9.9 Measurable Goals for Each Recommended Best Management Practice for St. Clair County’s Northeastern Watersheds

BMP No.	Action (BMP Strategy)	Measurable Goals
		<ul style="list-style-type: none"> Track type of training municipal employees and contractors receive.
30	Study, Develop, Adopt and Implement Storm Water Management Ordinance/Design Standards for Storm Water Management Systems	<ul style="list-style-type: none"> Report on ordinance(s) /design standards development and adoption
31	Study, Develop and Adopt Development Standards for Water Quality and Quantity Protection	<ul style="list-style-type: none"> Report on development of standards for water quality and quantity protection for new development/redevelopment
32	Update Master Plan to Incorporate Watershed Management Plan Goals and Objectives	<ul style="list-style-type: none"> Report on updates to Master Plan
33	Study, Develop, Adopt and Implement Aquatic (Riparian) Buffer Ordinance	<ul style="list-style-type: none"> Report on ordinance(s) development and adoption Track amount of acreage protected by buffer ordinance
34	Study, Develop, Adopt and Implement Floodplain Management Ordinance	<ul style="list-style-type: none"> Report on ordinance(s) development and adoption Track amount of acreage protected by floodplain management ordinance
35	Study, Develop, Adopt and Implement Wetland Protection Ordinance	<ul style="list-style-type: none"> Report on ordinance(s) development and adoption Track amount of acreage protected by wetland ordinance
36	Study, Develop, Adopt and Implement a Woodlands/Tree Protection Ordinance	<ul style="list-style-type: none"> Report on ordinance(s) development and adoption Track amount of acreage protected by woodland/tree protection ordinance
37	Perform High-Quality Natural Features Inventories throughout the Watershed	<ul style="list-style-type: none"> Track location of inventories conducted and the results of the inventories
38	Incorporate High-Quality Natural Features Inventories into Master Plan	<ul style="list-style-type: none"> Track actions taken to incorporate inventories into Master Plan
39	Study, Develop, Adopt and Implement Resource Protection Overlay District Standards	<ul style="list-style-type: none"> Track development and implementation of overlay district standards
40	Develop/Update Natural Areas Plan	<ul style="list-style-type: none"> Track development/update of natural areas plan
41	Perform Stream/Drain Inventories and Water Quality Monitoring throughout the Watershed	<ul style="list-style-type: none"> Track # and location of stream/drain inventories
42	Identify Areas for Recreation Enhancement	<ul style="list-style-type: none"> Track identification activities
43	Develop/Update Recreation Plans	<ul style="list-style-type: none"> Track development/update of Recreation Plans Track funding received for acquisition of park land
44	Implement Greenway Corridor Vision Plans	<ul style="list-style-type: none"> Track acreage of greenways in community and associated recreational amenities
45	Initiate Hydrologic and Hydraulic Studies	<ul style="list-style-type: none"> Track efforts to acquire funding for Hydrologic and hydraulic studies
46	Study, Develop and Update Site Plan Review Process to Require Hydrogeological Investigations	<ul style="list-style-type: none"> Track updates to site plan review process and actions taken to address new requirements
47	Encourage Participation in the Purchase of Development Rights Program	<ul style="list-style-type: none"> Track acreage of farm land active in PDR program
48	Encourage Participation in the Farmland Preservation Program (P.A. 116 Program)	<ul style="list-style-type: none"> Track acreage of farm land enrolled in P.A. 116 Program Track # of P.A. 116 Contracts

Table 9.9 Measurable Goals for Each Recommended Best Management Practice for St. Clair County’s Northeastern Watersheds

BMP No.	Action (BMP Strategy)	Measurable Goals
49	Encourage the Use of Conservation Easements	<ul style="list-style-type: none"> • Track acreage of land protected in conservation easements
50	Study, Develop, Adopt and Implement Agricultural Buffer Zoning Ordinance	<ul style="list-style-type: none"> • Track development/ adoption of ordinance
51	Study, Develop, Adopt and Implement Rural Clustering Ordinance	<ul style="list-style-type: none"> • Track development/ adoption of ordinance
52	Study, Develop, Adopt and Implement Mixed Use Zoning Ordinance	<ul style="list-style-type: none"> • Track development/ adoption of ordinance
53	Study, Develop, Adopt and Implement Private Road Ordinance	<ul style="list-style-type: none"> • Track development/ adoption of ordinance
54	Minimize Directly Connected Impervious Areas	<ul style="list-style-type: none"> • Track actions taken to reduce directly connected impervious areas
55	Study, Develop, Adopt and Implement Yard Waste Composting Facility Ordinance	<ul style="list-style-type: none"> • Track development/ adoption of ordinance
56	Prevent and Remove Stream Flow Obstructions	<ul style="list-style-type: none"> • Track actions taken to remove stream flow obstructions
57	Study, Develop, Adopt and Implement Hazardous Materials Cleanup Ordinance	<ul style="list-style-type: none"> • Track development / adoption of ordinance and enforcement actions
Structural and Vegetative Storm Water Management Controls		
58	Install and Maintain Storm Water Management Structures	<ul style="list-style-type: none"> • Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Track operation and maintenance actions
59	Install and Maintain Infiltration Practices	<ul style="list-style-type: none"> • Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Track operation and maintenance actions
60	Install and Maintain Detention/Retention Systems	<ul style="list-style-type: none"> • Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Track operation and maintenance actions
61	Utilize In-Stream/Shoreline Habitat Restoration Techniques	<ul style="list-style-type: none"> • Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre)
62	Implement Alternative Drain Practices and Rehabilitation	<ul style="list-style-type: none"> • Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre)
63	Install and Maintain Streambank Stabilization Measures	<ul style="list-style-type: none"> • Track # and type of BMPs implemented • Calculate reduction in sediment and nutrient loading (lb/acre) • Photographic surveys • Evaluate MDEQ GLEAS monitoring reports for water quality/habitat improvement
64	Replace Undersized Culverts/Repair Misaligned or Obstructed Culverts	<ul style="list-style-type: none"> • Track # and type of BMPs implemented • Photographic surveys • Evaluate MDEQ GLEAS monitoring reports for water quality/habitat

Table 9.9 Measurable Goals for Each Recommended Best Management Practice for St. Clair County’s Northeastern Watersheds

BMP No.	Action (BMP Strategy)	Measurable Goals
		improvement
65	Stabilize Eroding Road and Bridge Surfaces	<ul style="list-style-type: none"> • # of stabilization projects completed • Track # and type of BMPs implemented • Photographic surveys of remediated road/stream crossings • Calculate reduction in sediment loading (lb/acre)
66	Install and Maintain Gauge Stations	<ul style="list-style-type: none"> • Track efforts to obtain funding for gauge station establishment • Track flow monitoring and evaluate changes in hydrological conditions
Pollution Prevention/Good Housekeeping for Municipal Operations		
4	Implement Reduced Fertilizer, Pesticide and Herbicide Usage	<ul style="list-style-type: none"> • Track actions taken to reduce fertilizer and pesticide/herbicide usage
6	Implement Employee Training Programs	<ul style="list-style-type: none"> • Track # of municipal employees and contractors trained <ul style="list-style-type: none"> ○ Track type of training municipal employees and contractors receive.
9	Utilize Household Hazardous Waste Disposal and Electronics Recycling Programs	<ul style="list-style-type: none"> • Track modes of advertisement of HHW Disposal and Recycling Programs • Track amount of material disposed/recycled
13	Utilize Soil Testing Program	<ul style="list-style-type: none"> • Track # of requests for soil testing
16	Implement Reduced Use of Road Salt and Consider Alternative Deicing Chemicals	<ul style="list-style-type: none"> • Track distribution of Seven Simple step brochures
29	Implement Soil Erosion and Sedimentation Control Ordinance and SESC Program	<ul style="list-style-type: none"> • Track # of SESC permits issued • Track violations • Track enforcement actions
30	Implement Storm Water Management Ordinance/Design Standards for Storm Water Management Systems on Permittee-Owned Properties	<ul style="list-style-type: none"> • Report on ordinance(s) /design standards development and adoption
67	Install and Maintain Native Landscaping	<ul style="list-style-type: none"> • Track projects and types of native landscaping planted • Photographic surveys • Track maintenance activities
68	Install and Maintain Riparian Buffers	<ul style="list-style-type: none"> • 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)
69	Implement and Maintain No-Mow Buffer Zones	<ul style="list-style-type: none"> • Track acreage of “no-mow zones”

Table 9.9 Measurable Goals for Each Recommended Best Management Practice for St. Clair County’s Northeastern Watersheds

BMP No.	Action (BMP Strategy)	Measurable Goals
70	Perform Retrofitting of Storm Water Management Facilities	<ul style="list-style-type: none"> • Track retrofit projects implemented • Photographic surveys
71	Perform Curb/Street Sweeping	<ul style="list-style-type: none"> • Track street sweeping schedules • Track amount of material collected and disposal procedures • Track operation and maintenance actions
72	Implement Catch Basin Cleaning Program	<ul style="list-style-type: none"> • Track catch basin cleaning schedules • Track amount of material collected and disposal procedures
73	Utilize Retired Engineer Technical Assistance Program (RETAP) to Identify Improvements to Municipal Housekeeping Practices	<ul style="list-style-type: none"> • Report on use of RETAP program • Track actions taken as a result of RETAP recommendations
74	Perform Storm Sewer System Maintenance and Drain Cleaning	<ul style="list-style-type: none"> • Track storm sewer maintenance and drain cleaning schedules • Track maintenance procedures • Track amount of material collected and disposal procedures
75	Manage Public Facilities	<ul style="list-style-type: none"> • Track management activities of public facilities • Track operation and maintenance actions
76	Develop and Implement Procedures for Disposal of Operation and Maintenance Wastes	<ul style="list-style-type: none"> • Track procedures used for disposal of operation and maintenance wastes
77	Maintain Sanitary Sewer System Infrastructure	<ul style="list-style-type: none"> • Track sanitary sewer system maintenance schedules • Track repairs made and upgrades to infrastructure
78	Develop and Implement Pollution Incident Prevention Plan (PIPP)	<ul style="list-style-type: none"> • Track development of PIPP(s)
Watershed Plan Implementation		
79	Implement Financial Solutions	<ul style="list-style-type: none"> • Track funding sources utilized to implement BMPs
80	Provide Sufficient Enforcement Capability	<ul style="list-style-type: none"> • Report on # of staff allocated to enforcement of ordinances and regulations
81	Implement Institutional Framework for Watershed-Wide Actions	<ul style="list-style-type: none"> • Report on framework developed • Track # of meetings held • Track updates made to WMP
Other Applicable BMPs		
82	Meet Established Total Maximum Daily Loads (TMDLs) in the NEW (once developed)	<ul style="list-style-type: none"> • Track # of BMPs implemented to achieve TMDL(s)

For an exhaustive list of measurable goals as it applies to each of the six minimum measures of a storm water management program, go online to: www.epa.gov/npdes/stormwater/measurablegoals/.

Table 9.10 Estimated Costs for Evaluation Measures

Evaluation Method	Indicator/Basis for Cost	Implementation Costs	Notes
Programmatic Indicators/ BMP Results	Review of Annual Report Documents	4 hours of review per Phase II Annual Report 4 hours x 12 annual reports = 48 hours annually Typical Consultant Fee = \$100/hour Total cost of maintaining database annually = \$4,800/year	All permittees will need to submit their Annual Report to the consultant/lead coordinator of database
	Land Use/Impervious Cover Analysis	CWP Estimate: \$26,000 per subwatershed (based on 5 mi ² subwatershed) ¹	LBR subwatershed = 151 mi ² SRD subwatershed = 25 mi ² LHD subwatershed = 48 mi ²
Stakeholder Surveys/ Social Indicators	SEMCOG Public Education Survey	Total cost of regional survey approximately \$50,000. The cost to obtain statistical data from the survey is broken down by subwatershed or county of interest and the cost per subwatershed would be \$2,000 - \$3,000 every 5 years (this amount would then be divided up between the participating communities) ² .	Next survey anticipated by 2010; potential to be distributed every 5 years, given enough interest
Photographic Surveys	Photographs taken “before” and “after” implementation projects	Little or no cost, except for administrative costs to print, post, and distribute information	
	Photographs taken of road/stream crossing improvement projects		
Water Quality Indicators	Review of Water Quality Data/Reports	40 hours annually to research and compile results into database x \$100/hr typical consultant fee = \$4,000 annually for data review and compilation	
	Calculation of estimated sediment and nutrient loading reductions (lb/acre)	40 hours x \$100/hr typical consultant fee = \$4,000 every 5 years	Based on applicable BMPs implemented throughout the NEW
Biological Indicators	Review of Biological Monitoring Data/Reports	Cost would be incorporated into water quality data/report review noted above	

References: Center for Watershed Protection, 1995¹
Southeast Michigan Council of Governments, 2004²