

Huron Chain of Lakes Stormwater Plan for Addressing Total Maximum Daily Loads (TMDLs)

The following plan was developed by the Livingston County Watershed Advisory Group (WAG) – a collaboration between communities and agencies with a general stormwater Phase II permit for the Huron Chain of Lakes in Livingston County. This plan serves to define the elective approach to steps prescribed under the Storm Water Pollution Prevention Plan (SWPPI) requirement of the Watershed General Permit (MIG610000) for addressing limits imposed by Total Maximum Daily Load (TMDL) documents. The WAG developed this alternative because its members have already made significant progress toward addressing the TMDLs in the Huron Chain of Lakes, a monitoring plan has already been developed and implemented, and implementation plans already exist for two of the five TMDLs.

Participating Permittees

The permitted entities, who comprise the WAG, that are participating in this alternative approach to addressing TMDL requirements include the following:

- Livingston County Drain Commissioner
- Livingston County Road Commission
- City of Brighton
- Village of Pinckney
- Brighton Township

Other entities may hold stormwater permits within the Livingston County portion of the Huron River Watershed, but they have not chosen to participate in this plan at this time.

Monitoring Coverage

This plan specifies methods and implementation activities that will be employed within TMDL contributing areas within the Huron Chain of Lakes Watershed (HCOL). In most cases the geographical extent of activities is included; if it is not, it should be assumed that the activity will apply across the entire TMDL area. The TMDLs addressed by this plan include all those in the HCOL that are due to stormwater sources. That includes the TMDLs listed in Table 1 below.

Table 1: Waterbodies requiring TMDLs for Stormwater Related Impairments in the HCOL Watershed

(Source: MDEQ 2008 303(d) list of nonattaining waterbodies)

Waterbody	Pollutant or Problem	TMDL Status	Location/Area
Brighton Lake	Nutrient enrichment (phosphorus)	Established in 2000	158 acre impoundment of South Ore Creek, downstream of City of Brighton
Ore Lake	Nutrient enrichment (phosphorus)	Established in 2000	192 acre impoundment of South Ore Creek, downstream of Brighton Lake near Huron River
Strawberry Lake	Nutrient enrichment (phosphorus)	Established in 2000	Hamburg Twp. 247 acre lake on Huron River just downstream of M-36.

General Approach

The WAG is taking the general approach that, in order to reduce the sources of TMDL pollutants, individual sources should be identified as specifically as possible through monitoring, then a set of well-targeted implementation activities should be developed to eliminate or reduce the pollutant contribution from each source. Thus, this plan is divided into two sections: a monitoring and source identification section and a pollutant reduction implementation plan section. The monitoring and source identification section describes the data collection and analysis strategy and methods that will be employed in detail. The implementation section describes the steps that will be taken to establish and prioritize implementation activities for each TMDL. For each, an existing plan will be updated or refined, or a new plan will be developed. In addition to these TMDL-specific plans, several watershed management plans have been developed for the HCOL. The most recent of these, *The Huron Chain of Lakes Watershed Management Plan*, serves as an umbrella for all of these plans. That plan may be downloaded at <http://www.hrwc.org/publications/watershed-management-plans/>.

The Livingston County Drain Commissioner has been awarded a grant from DEQ to develop many of these elements for the WAG. The grant project work plan and schedule is included in Appendix B. The project began in August 2010 and will be completed by the end of September 2011.

Monitoring and Source Identification

The Chain of Lakes region has had HRWC’s Adopt-A-Stream monitoring in the past, along with periodic water quality sampling done by MDNRE, HRWC, and Green Oak Township. A volunteer-based water quality monitoring program, analogous to that implemented by HRWC in the Middle Huron Watershed, will be implemented throughout the upper Huron watershed between the Kent Lake Spillway and Strawberry Lake. This will be done primarily to establish baseline measures, identify pollutant hot spots and track progress toward achieving the TMDLs for phosphorus in the aforementioned lakes, and to gain an understanding of nutrient dynamics from tributaries to the Huron River. Monitoring protocols and site selection, including a map of current sites are included in the program’s Quality Assurance Project Plan (QAPP) (Appendix A).

The monitoring plan is based around four programs administered by three organizations. First, the Huron River Watershed Council's Adopt-A-Stream Program collects data on benthic macroinvertebrates three times a year, including a special collection of winter stoneflies. Adopt also does a complete stream habitat assessment of each site every 4-5 years, which includes a number of geomorphic characteristics along with general habitat characteristics, which is consistent with the MDNRE protocol. Adopt collectors also sample for water conductivity at each macroinvertebrate event. In addition, summer temperatures are documented every 5 years. The Adopt program uses volunteers to collect the vast majority of the data.

Secondly, MDNRE collects data through its rotational watershed assessments. MDNRE returns to the watershed every five years to collect benthic macroinvertebrates, habitat assessment data and, in some cases, a suite of water chemistry parameters. Site selection varies each year.

Third, the Cooperative Lakes Monitoring Program (CLMP) monitors Strawberry and Ore Lakes twice a year for phosphorus, as well as periodically monitoring water clarity and chlorophyll-a levels. Brighton Lake is similarly monitored using a private contractor.

Finally, Green Oaks Township samples a set of sites in Davis Creek for phosphorus and other water quality parameters. This data can supplement those collected through the new nutrient monitoring program.

While this data collection is a good start, the monitoring plan must be updated with specifics that relate directly to stormwater related impairments – namely phosphorus. Beginning in 2010, the Livingston WAG will analyze all of the existing data from these programs and, in addition, data from Illicit Discharge Elimination Programs (IDEP) to identify “hot spots” for TMDL pollutants. A plan will help the WAG gain a better understanding of watershed conditions, pollutants, sources, and causes – especially those related to 303(d) listed impairments. A desktop analysis was performed to evaluate the frequency and type of monitoring needed to characterize critical drainages. Initial monitoring of potential “hot spots” may lead the investigators to conclude that some areas are not impairing the system as originally thought. Further monitoring is needed to determine overall loading from critical areas at various flow levels during dry weather and across storm events.

This information will help to better characterize the sources and dynamics of phosphorus loading into the system. For example, does the majority of phosphorus loading come from channel cutting and other erosive processes, or from stormwater runoff? If from stormwater runoff, then is most of the loading from near sources or is it accumulated across the drainage? Answers to these and other questions will help to refine management targets. The monitoring plan will be updated with these questions in mind (and in consultation with WAG and MDRE), and will comprehensively examine the system of discharge points to determine the critical pollutant loading areas.

The Huron River Watershed Council (HRWC) currently administers the Water Quality Monitoring Program on behalf of the Middle Huron Partnership, a group formed in 1996 to address the nutrient TMDL for Ford and Belleville Lakes. This program is being expanded to add sites in Livingston County TMDL areas. HRWC will use volunteers and staff to collect water samples and deliver to the Brighton Water Treatment Plant for analysis. Analytes include total phosphorus and total suspended solids. Staff and volunteers also collect stream discharge data from all ten sites to allow for the calculation of pollutant loads.

Sampling will consist of grab samples collected in conjunction with discharge measurements or estimates (from gage rating curves) taken twice per month, April through September at eight long-term sites. In addition, investigative sampling will be conducted upstream of sites that exhibit the highest concentrations or loads. Upstream sites will be selected strategically to segment drainages and isolate areas with different potential sources. Storm samples will be collected opportunistically from hot spot sites where water level sensors are installed. A minimum of 4 samples will be collected from each storm event. Resulting concentrations will be compiled into event mean concentrations (EMC). EMCs will be compared with predicted concentrations from long-term monitoring to determine if storm event loading is significant. Further methodological details can be reviewed in the program's Quality Assurance Project Plan (QAPP) (Appendix A).

Priority Project Implementation

Targeted monitoring of potential hot spots will help confirm and better define critical areas. The associated loadings of phosphorus will be quantified with initial monitoring. The data also will help to obtain better projections for the likely impact (i.e. loading reductions) of potential projects. The monitoring plan and the monitoring itself also will address the need to establish a better baseline for evaluating the success of future implementation projects, as well as progress toward load reduction targets. Once we have obtained measures of phosphorus concentrations and loading, both during various dry weather flow and during storm events, a baseline will be established that can be used to determine the nature and degree of reductions (or increases) from future projects. This approach has been utilized with great success broadly in the HCOL, where geographically specific phosphorus reductions were measured following the implementation of a phosphorus fertilizer ordinance.

Once sources or hot spots are identified, TMDL Implementation Plans can be developed or updated. Implementation plans have already been developed and partially implemented for one of the three approved TMDLs in the HCOL – Brighton Lake. Implementation plans to be developed include Strawberry Lake TMDL for Phosphorus and Ore Lake TMDL for Phosphorus.

The Brighton Lake plan contains a number of recommended activities as part of an "Action Plan." However, many of these activities are broadly defined and lack specificity in location, responsible agency, timeline and cost. The proposed project will address some of these deficiencies by providing monitoring information that will narrow critical area definitions and target areas for employing BMPs. Among other items, these plans will be updated with information on the following:

- completed and ongoing activities to date to reduce TMDL pollutants from point and nonpoint sources;
- measurement data and information to evaluate the success of completed projects;
- assessment of new priority targets for project implementation, including source identification;
- an updated list of prioritized projects and activities complete with information on the party responsible, milestones, timelines, costs and estimated TMDL pollutant load reductions; and
- a map (and associated GIS with attribute information) of location-specific completed, ongoing, and planned activities.

All three TMDL Implementation Plans are scheduled to be finalized, in consultation with MDNRE staff, by September 2011, well ahead of the schedule prescribed by TMDL guidance documents.

Work Plan and Schedule

A complete work plan and schedule for implementation of this plan, which is based on a DNRE-funded grant project is included in Appendix B.

Permittee Responsibilities, Reporting and Progress Evaluation

HRWC will have primary responsibility for developing and implementing the monitoring plan, TMDL Implementation Plans and Progress Evaluation reports for this alternative approach. All permittees listed in “Participating Permittees” will be responsible for the following tasks:

- contribute relevant data and information upon request from HRWC;
- review the monitoring plan and assist in potential site selection;
- approve and support the monitoring plan and its implementation;
- provide past and ongoing project information and evaluation data for projects within their jurisdiction;
- assist with project identification and site selection for activities to address TMDL pollutant sources or hot spots within their jurisdiction;
- provide reasonable and accurate information about potential project commitments, milestones, timelines, costs and pollutant reduction estimates;
- review and approve final TMDL implementation plans;
- review and approve a monitoring report; and
- submit a progress report on TMDL activities according to timelines established in each permittee’s COC.

All activities under this plan will be tracked and reported within progress reports as defined in Part I.B.1 of the watershed permit. Watershed monitoring data will be included and evaluated to indicate success or failure of activities under this plan. Activities to develop and implement TMDL Implementation Plans will be reported for both watershed-wide activities and within each permittee’s regulated area.

Benefits, Drawbacks and Effectiveness of This Alternative Approach

The approach toward TMDL Implementation outlined in this plan will be more effective than the standard permit requirements specified in Part I.A.4.b.1 of the watershed permit for several reasons. First, this approach will be more cost-effective because it takes advantage of an existing TMDL Implementation Plans, thus eliminating a duplication of effort. Second, the monitoring plan goes broader (to more locations) and deeper (across more parameters) than what is required under the permit. Third, the monitoring plan will result in a more effective targeting of monitoring locations. Rather than focusing on a limited number of discharge points somewhat randomly, this plan’s approach targets monitoring based on existing and ongoing data from ambient sites upstream to discharge points. This approach is far more likely to result in a definition of TMDL pollutant sources. Fourth, the monitoring approach reduces the need for wet weather monitoring by sampling in free-flowing channels across a variety of flow conditions. This approach is easier to implement and will result in a greater number of useful data points. Finally, the monitoring approach will result in the implementation of activities to reduce TMDL pollutants much earlier than the approach prescribed by the permit since it builds upon information gathered through existing monitoring efforts.

The main potential drawback of this approach is that it will likely result in fewer wet weather data points from large discharge points. However, large discharge points would only be left unmonitored if existing data suggests that they are unlikely to be contributing significantly to TMDL pollutant loads.

In the unlikely event that the alternative approach described in this plan is determined, through the assessment of evaluation data, to be ineffective at discovering TMDL pollutant hot spots or sources, the watershed partners will revise the plan or revert to a plan that is more directly consistent with the permit prescriptions. Such a decision will be made following the completion of the evaluation report in September 2011.