

# Lake Ontario Basin TMDL Planning (Phase I)

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## *Final Report*

December 2011

Prepared by the Great Lakes Commission

For the New York State Department of Environmental Conservation

# American Recovery and Reinvestment Act (ARRA) Clean Water Act Section 604(b)



## Final Report

Prepared for the New York State Department of Environmental Conservation

## Project/Organization Information

### Project Information

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| Project Name          | Lake Ontario Basin TMDL Planning (Phase I) |                    |                   |
| Primary Project Type  | Total Maximum Daily Loads (TMDL) Elements  |                    |                   |
| State Contract Number | C304260                                    |                    |                   |
| Project Start Date    | November 1, 2009                           | Project End Date   | December 31, 2011 |
| ARRA Award Amount     | \$254,695.00                               | Total Project Cost | \$254,695.00      |

### Organization Information

|           |                         |         |              |              |            |
|-----------|-------------------------|---------|--------------|--------------|------------|
| Name      | Great Lakes Commission  |         |              |              |            |
| Address 1 | 2805 S. Industrial Hwy. |         |              |              |            |
| Address 2 |                         |         |              |              |            |
| City      | Ann Arbor               | State   | Michigan     | Zip Code + 4 | 48104-6791 |
| Telephone | 734-971-9135            | Fax     | 734-971-9150 |              |            |
| E-mail    |                         | Website | www.glc.org  |              |            |

### Report Preparer

|           |                        |        |               |  |
|-----------|------------------------|--------|---------------|--|
| Name      | Gary Overmier          |        |               |  |
| Job Title | Senior Project Manager |        |               |  |
| Telephone | 734-971-9135           | E-mail | garyo@glc.org |  |

# Introduction

## Project Introduction & Description

The primary purpose of the project should be described, along with a general overview of major project goals and outcomes. Affected bodies of water and project locations should also be noted.

Introduction: The U.S. portion of Lake Ontario's shoreline and watershed, which lies wholly in New York State, is a valuable resource for drinking water, recreational boating, fishing and swimming, tourism, and waste water processing, and a key asset in the economic revitalization of upstate New York. However, rivers, creeks and embayments to Lake Ontario suffer many impairments that limit their recreational use and affect aquatic life. Results from the regional embayments and streams tested indicate that ambient phosphorus levels in the coastal region are elevated and that abundance of nuisance algae are significantly higher than offshore regions of Lake Ontario. Preliminary study provides scientific evidence that the shoreline, creeks and embayments of Lake Ontario are plagued by summer nuisance algae blooms limiting the use of cottages, offending recreational users and detrimentally affecting tourism. Reducing phosphorus loads to these tributaries will restore these streams to support aquatic life and reduce phosphorus in the coastal areas of Lake Ontario as well. The principal nutrient of concern, phosphorus, comes from a variety of point and non-point sources, including domestic animal waste, fertilizers (from lawn, garden, and agriculture), soil loss, combined sewer effluent, leaky septic systems, and sewage treatment plant effluent.

Goals: Enable NYSDEC and local watershed/waterbody stakeholders to identify water quality issues that act as barriers and threats to the environmental health, beauty and economic prosperity of the valuable North Coast of New York State, the south shore of Lake Ontario. Develop Water Quality Restoration Strategies (WQRSs) in support of watershed planning to drive comprehensive ecosystem management and ensure public participation and review. Promote regional comprehensive water quality management planning activities.

Project Description: The project was intended to provide watershed planning that supports NYS DEC development of TMDLs for waters impaired by phosphorus as listed on the 303(d) list. But since neither the NYSDEC nor USEPA were able to set an appropriate target criterion for phosphorous in flowing waters, full TMDLs could not be established for the project streams. Instead this project consisted of preliminary TMDL planning steps and the development of several WQRSs.

This project adopted a watershed management approach to protecting and improving the water quality of tributaries to Lake Ontario. Point and non-point sources of nutrients within a watershed were identified through a search of existing data and limited environmental testing. The project used an established watershed model to quantify the source of watershed loads of phosphorus and to test potential improvement scenarios. WQRSs were developed for the watersheds, incorporating stakeholder input, to provide guidance on the most cost-effective Best Management Practices that can be implemented to promote achieving phosphorus reduction and meeting water quality standards.

Target Watersheds: The waterbodies/watersheds in the Rochester/Western NY region listed below were studied as part of this project:

- Black Creek, Lower
- Black Creek, Upper
- Mill Creek and Tribs
- Shipbuilders Creek and Tribs
- Oak Orchard Creek, Upper and Tribs

# Summary of Activity

## Objectives, Tasks, & Outcomes

Work plan objectives should be clearly linked to final project outcomes. For each objective listed on the work plan, a brief summary of the tasks and activities should demonstrate how project deliverables and outcomes have accomplished that objective.

### Objective

#### **Develop a modeling quality assurance project plan (QAPP) that describes the technical work to be performed to develop the WQRSs**

### Task Summary & Project Outcomes

A Modeling QAPP was drafted in support of the technical work to be done in developing the TMDLs. But when the project was redirected to develop WQRSs instead, further work on revising and finalizing the QAPP was abandoned in favor of additional watershed planning work.

### Objective

#### **Evaluate all available data and prepare technical approach**

### Task Summary & Project Outcomes

A comprehensive survey was conducted for relevant watershed data in each of the project watersheds. Collected data was reviewed and verified to the extent possible. Data Reports for the following watersheds were produced as a way of memorializing the compendium of watershed data identified: Upper Black Creek, Lower Black Creek, Upper Oak Orchard Creek, Shipbuilders Creek and Mill Creek.

Publicly available watershed models were evaluated against the criteria set for model selection in this project's Work Plan. A Model Evaluation Report was developed to recommend the best available model to use.

Watershed monitoring needed to support the proposed modeling activity was evaluated and documented in a Monitoring Technical Brief.

Sampling plans and Monitoring Quality Assurance Project Plans (QAPPs) were developed to support planned watershed monitoring in the Black Creek watershed during the Summer of 2010 and the Shipbuilders and Mill Creek watersheds in the Summer of 2011.

An overall Plan and Schedule was developed and presented to the NYSDEC for the TMDL Planning project.

Each of these tasks supported the overall outcome of doing the watershed modeling and creating the WQRS documents.

### Objective

#### **Carry out stream measurement and limited water quality measurements**

### Task Summary & Project Outcomes

Watershed monitoring was conducted in the Black Creek watershed during the Summer of 2010 and the Shipbuilders and Mill Creek watersheds in the Summer of 2011. The data generated was incorporated in the Data Reports for the respective watersheds and utilized for calibrating the watershed models created. Summaries of the data collected were also provided to the NYSDEC in support of broader statewide watershed assessment work.

### Objective

#### **Prepare WQRS reports and administrative record**

### Task

Once the initial watershed data was collected, and water quality measurement work was contracted, project watersheds

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| Summary & Project Outcomes | <p>were grouped into prioritized buckets to create the sequencing of the overall project Plan and Schedule (noted above).</p> <p>Watershed models for Upper Black Creek, Lower Black Creek and Upper Oak Orchard Creek were created and calibrated using the AVGWLF software. These models were used to identify existing sources of phosphorus to the streams, and to test the effectiveness of scenarios implementing various Best Management Practices.</p> <p>Partial Draft and Draft WQRSs were developed for the Upper Black Creek, Lower Black Creek and Upper Oak Orchard Creek watersheds. These drafts were reviewed and edited in an iterative fashion with the NYSDEC, and then ultimately published for public review and comment.</p> <p>Once final public comment was received and assessed for key points, the modeling was adjusted and Final WQRSs were created for Upper Black Creek, Lower Black Creek and Upper Oak Orchard Creek as directed by NYSDEC staff.</p> <p>All modeling and scenario evaluation work was documented for future reference.</p> |
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| Objective                       | <p><b>Provide training to NYSDEC (technology transfer)</b></p>   |
| Task Summary & Project Outcomes | <p>A one-day modeling seminar and watershed driving tour was provided for NYSDEC staff to acquaint them with key project issues/decisions. A corresponding notebook of reference materials was provided as well.</p> <p>This all served to transfer the technology developed for modeling the project watersheds to the NYSDEC for any follow-on work. It also familiarized NYSDEC staff with local issues that would need to be factored into any future TMDLs.</p> |

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| Objective                       | <p><b>Support public involvement and comment on proposed WQRSs</b></p>  |
| Task Summary & Project Outcomes | <p>Initiated participation in the Black Creek Watershed Coalition and the Oak Orchard Watershed Protection Alliance to begin to develop a dialogue on watershed planning.</p> <p>Once preliminary watershed models were created, public informational meetings were planned and held in April 2011 at Churchville, NY for the Upper and Lower Black Creek and at Albion, NY for Upper Oak Orchard Creek. These meetings introduced the modeling effort to the public, shared watershed data collected, provided preliminary recommendations and solicited data/input. Meeting summaries were created to document these meetings.</p> <p>Once the Draft WQRSs were public noticed, public informational meetings were planned and held in October 2011 at Churchville, NY for the Upper and Lower Black Creek and at Albion, NY for Upper Oak Orchard Creek. These meetings summarized the modeling effort to the public, explained the recommendations in the WQRSs and solicited additional data/comments. Meeting summaries were created to document these meetings.</p> <p>During the public comment period, comments were received, reviewed and catalogued. Response to Comment documents were created for the Upper Black Creek WQRS, the Lower Black Creek WQRS, and the Upper Oak Orchard Creek WQRS.</p> |

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| Objective                       | <p><b>Manage and report task and financial progress including quarterly reports, reimbursement requests, and final report</b></p>   |
| Task Summary & Project Outcomes | <p>All NYSDEC and ARRA administrative requirements were completed on time throughout the life of the project. This included:</p> <ul style="list-style-type: none"> <li>- Monthly Project Progress Reports for the NYSDEC Project Manager,</li> <li>- Quarterly Task Reports,</li> <li>- Quarterly MWBE Reports,</li> <li>- Periodic reimbursement requests, and</li> <li>- the Final Report</li> </ul> |

A revised project Work Plan was also developed about halfway through the project to document the change from TMDLs to WQRs, and to update the watersheds to be worked on.

## Problems Encountered/How Solved

A comprehensive summary of any problems encountered during the life of the project and how those problems were resolved should be listed. The list should include any information reported in the "Problems Encountered/How Solved" box on the Quarterly Report Cover Pages throughout the project.

Model Availability: At the initiation of the project either MapShed or the SWAT model were the preferred watershed modeling tools of the NYSDEC. Very shortly thereafter the developers of MapShed decided to abandon the public version and write a new version, and it was determined that the SWAT model had not yet been calibrated for phosphorus. This caused the project to divert to use the older AVGWLF model and have to acquire an expensive software package to support it.

Water Quality Criteria: At the initiation of the project there was no agreed-upon New York State water quality criteria for phosphorus in flowing waters. A NYSDEC team was working on this criteria and it was expected to be available soon. However reaching consensus proved difficult so by the half-way point of the project there was still no indication that the criteria would be available. Consequently the project was redirected from developing TMDLs to developing WQRs, and a revised Work Plan was created.

Watershed Data: Upon searching for available point-source wastewater quality data it was determined that there was no phosphorus data available for any of the permitted point-sources in the 303(d) watersheds being studied. Either the NYSDEC or the project contractor had to research potential wastewater phosphorus concentrations for use in the watershed models.

As noted in the Quarterly Reports, several other smaller issues did arise during the project as a result of delays in NYSDEC input.

## Changes to Project Work Plan

Any changes that were made to the project work plan during the life of the project should be noted, including a brief description of why the changes were necessary.

Change from TMDLs to WQRs: Approximately one year into the project it became clear that no NYSDEC water quality criteria would be available for phosphorus in flowing waters. Without these, calculating TMDLs would not be possible. The project's Work Plan was revised to require that Water Quality Restoration Strategies (WQRs) be produced instead of TMDLs.