Michigan's Nonpoint Source Program

Federal Clean Water Act Section 319
2011-0013

Muskegon River Watershed Assembly
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Houghton Lake *E.coli* Reduction Project

December 1, 2011 through August 31, 2015

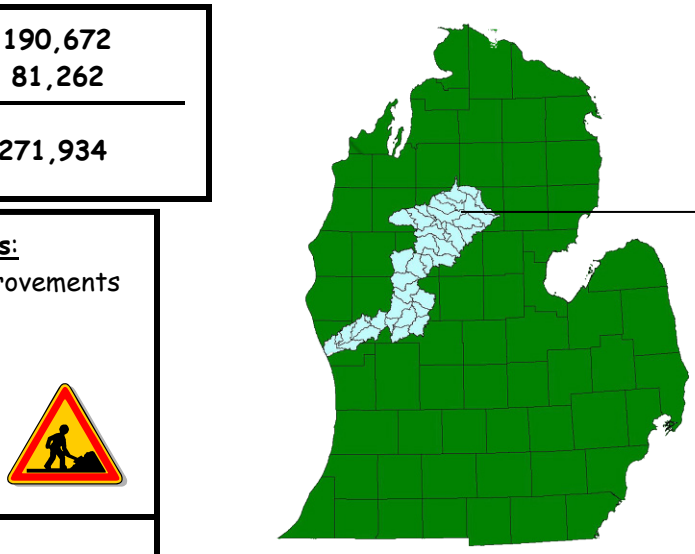
The Upper Muskegon River Watershed (MRW) is in Missaukee and Roscommon counties and contains the largest acreage of biodiversity priority areas in the watershed, particularly for aquatic species, as identified by the Nature Conservancy. It also contains Michigan's largest lake, Houghton Lake, and seventh largest lake, Higgins Lake. Houghton Lake is listed on the state's impaired list due to *Escherichia coli* (E.coli). This project's goals were to: create a comprehensive watershed management plan which integrates concerns for Houghton Lake and the Upper MRW; complete implementation activities as outlined in the MRW Plan; and identify sources of the E.coli in Houghton Lake.

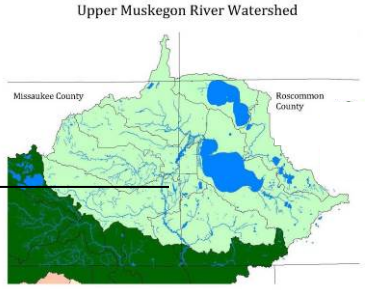
Grant Amount: $ 190,672
Match Funds: $ 81,262

Total Amount: $ 271,934

Best Management Practices:
- Devonshire Road End Improvements
- Trestle Park Rain Garden

Annual Load Reductions:
- .45 tons sediment
- 8.8 pounds nitrogen
- 8 pounds phosphorous





The Muskegon River is the second largest Michigan river and contains one of Michigan's largest watersheds, encompassing over 2700 square miles.

Project Tasks:
- Upper watershed management plan
- Environmental monitoring for *E.coli*
  - Canine Detection Event
  - DNA identification of *E.coli*
- Social survey and profile
- Steering Committee formation

I&E Activities:
- Local government & natural shoreline workshops
- Educational signage
- Local media and newsletter articles
- Meeting presentations
- Website page

Partners involved:

- Grand Valley State University Annis Water Resources Institute
- Central MI District Health Dept.
- Roscommon Co. Road Commission
- Missaukee Conservation District
- Denton Township
- Steering Committee
- Friends of Trestle Park
- Kirtland Garden Club

A canine was used to detect human sewage in Houghton Lake.

August 31, 2015

Houghton Lake E.coli Reduction Project BMPs

Devonshire Road End Before:
Broken concrete and failing seawalls highlighted this road end. Loose sand was also transported to the lake during rain events.

Devonshire Road End After:
Broken concrete was removed and replaced with concrete road plank. Waffle concrete and gravel (upper middle) replaced the loose sand. A detention area was created at one side. Failing seawalls were removed and replaced with large boulders.

Beach Signs (right):
This beach sign was installed at three Houghton Lake beaches through this project.

Trestle Park Before (above):
Storm water flowed down First Street into the lake, carrying contaminants and warming Houghton Lake.

Trestle Park Rain Garden After:
A rain garden was constructed next to First Street in Trestle Park (above). The road end was bermed so storm water would flow down the street and into the garden (left).

August 31, 2015