Michigan's Nonpoint Source Program

Federal Clean Water Act Section 319 Grant
2010-0013

Muskegon River Watershed Assembly
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BEAR CREEK/BEAR LAKE (MUSKEGON COUNTY) IMPLEMENTATION 2

October 1, 2010 – March 31, 2014

The Bear Creek/Lake Watershed, located in Muskegon County, is part of the Muskegon River Watershed. Bear Creek flows into Bear Lake which feeds into Muskegon Lake and eventually Lake Michigan. A Bear Creek/Lake Watershed Management Plan was completed in 2004 to address nonpoint source water quality concerns. This grant allowed the Muskegon River Watershed Assembly and partners to: 1) involve watershed stakeholders in the project; 2) update the watershed management plan; 3) address external nutrient loading; and 4) study internal phosphorus loading. As part of this project, Best Management Practices were installed at the West Michigan Equestrian Center. A local government workshop was conducted to gather land use ordinance recommendations and to encourage municipalities to adopt them.

Grant Amount: $ 185,749.84
Match Funds: $ 80,866.36

Total Amount: $ 266,616.20

Partners involved:
- GVSU Annis Water Resources Institute (AWRI)
- Fishbeck, Thompson, Carr & Huber Inc.
- Muskegon Conservation District
- West MI Shoreline Regional Development Com.
- Muskegon Lake Watershed Partnership
- Cedar Creek, Dalton, Laketon, & Muskegon Townships
- Muskegon Co. Drain & Road Commissions
- City of North Muskegon

Watershed Management Plan Update:

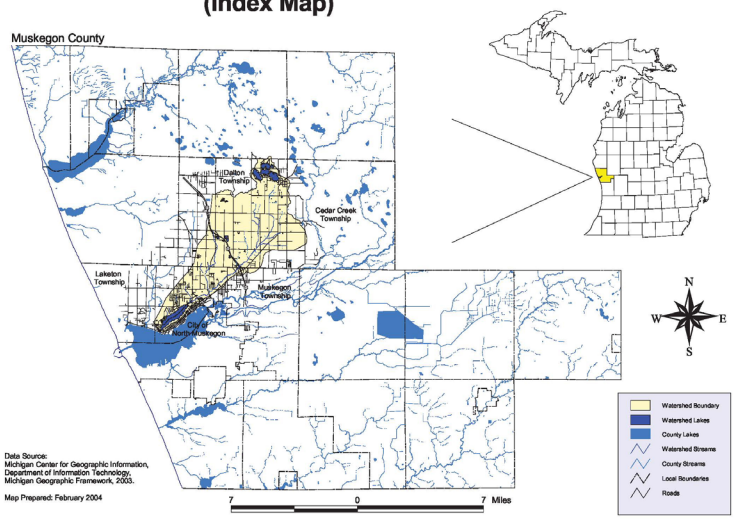
Additions:
- Internal Phosphorous Study conducted by AWRI
- Updated Information & Education plan
- Review of phosphorous-related policies and zoning ordinances
- Implementation schedule

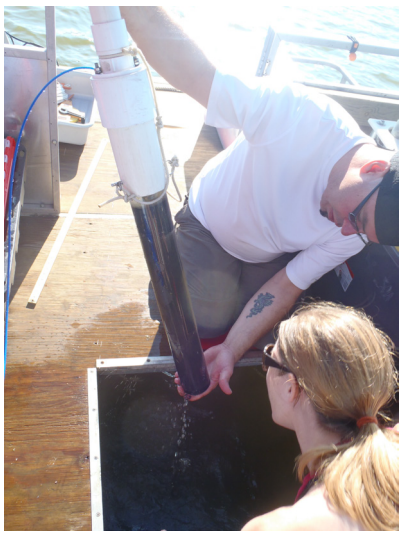
Best Management Practices:

370 linear feet converted to filter strip
1 animal waste facility
790 linear feet of exclusion fencing
1 livestock crossing installed

Annual Load Reductions:
- Sediment: 5.78 tons/year
- Phosphorus: 30.22 pounds/year
- Nitrogen: 225.4 pounds/year

Figure 1. Bear Creek & Bear Lake Watershed (Index Map)





AWRI investigated internal phosphorus loading in Bear Lake.

Muskegon River Watershed

March 31, 2014

Horse Crossing Before: Horses had unlimited access to Staples Drain, allowing sediment and phosphorus to directly enter stream.

Manure Shed Before: Pile of horse manure was exposed to rain and snow, allowing nutrients to flow into the nearby ditch.

Horse Crossing Construction: Area was cleared to install exclusion fencing and the crossing stabilized with mulch blankets. Construction took place during dry weather when no water was present in stream.

Manure Shed After: Extension to manure shed allows all manure to be covered and a concrete pad to store it on and scoop to transfer.

Horse Crossing After: Stabilized crossing with fencing and vegetation.

Filter Strip After: Vegetation has been established on both sides of Staples Drain.