Bear Creek / Bear Lake Upper Watershed Information and Education Plan

Addressing Stormwater Pollution Prevention and the Muskegon Lake Area of Concern Eutrophication Beneficial Use Impairment (BUI)

2010

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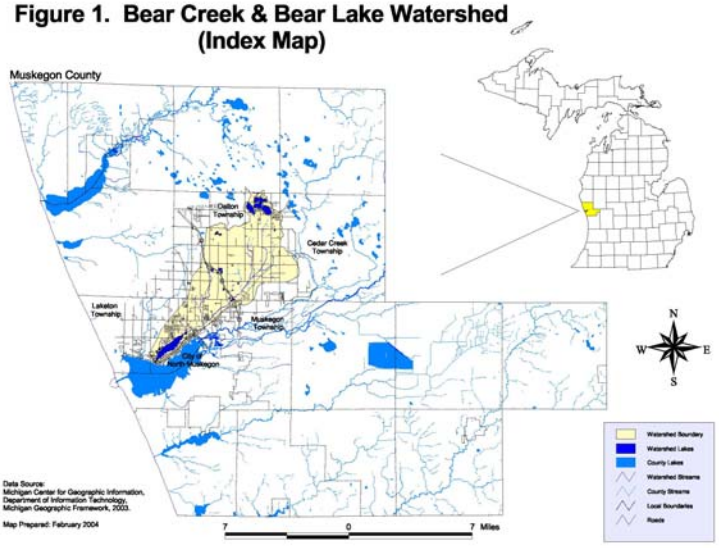
1. Introduction

Bear Creek is part of the Lake Michigan watershed. It flows in a southwesterly direction, draining approximately 39 square miles of land, before emptying into Bear Lake, a shallow 415 acre lake. Most of the Bear Creek watershed is located within Cedar Creek, Laketon, Dalton and Muskegon Charter Townships and the city of North Muskegon. Bear Lake empties into the Bear Lake channel where it enters Muskegon Lake and eventually Lake Michigan.

Bear Creek was included on the State of Michigan's 2008 Section 303(d) list of water bodies that do not meet water quality standards due to excess algal growths and elevated nutrients. Bear Lake is undergoing accelerated aging (hypereutrophic) as evidenced by elevated levels of phosphorous and chlorophyll a, along with heavy summer blooms of cyanobacteria (Cadmus and AWRI, 2007). In 2008, the Michigan Department of Natural Resources and Environment (MDNRE) determined that phosphorous, from external sources (tributaries) and internal sources (lake sediment), are responsible for water quality problems in Bear Lake and the resulting algal blooms. According to the 2008 Total Maximum Daily Load (TMDL) Report, the current annual total phosphorus load to Bear Lake is estimated at 3,387 pounds per year, which includes both external (54%) and internal (46%) loadings. The majority of external nutrient loads originated from residential and agricultural land uses within the Bear Creek Watershed. A total reduction of 1,458 pounds of phosphorus per year is needed to restore all 415 acres of Bear Lake.

Muskegon Lake and its surrounding watershed, including Bear Lake, is one of 42 internationally designated Areas of Concern (AOC) within the Great Lakes. The Eutrophication Beneficial Use Impairment (BUI) pertains to excessive nutrients and algal growths occurring within the Bear Lake portion of the watershed. The AOC designation will not be removed until Bear Lake shows improvement in water quality related to nutrient loadings, such as phosphorous.

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



The land within the watershed and the sediment in the lake bottom are both sources of nutrients. The

phosphorus problem in Bear Lake involves both internal (from sediment) and external (from watershed) phosphorus loading. Therefore, long-term solutions require dealing with both, and will require changes in structural and non-structural practices throughout the entire watershed. Solving just the internal loading problem (e.g., through dredging or chemical inactivation) will treat only the symptom, as the disease (of continuing to pump more phosphorus into the lake from the watershed) goes untreated.

Beginning in 2011, the Muskegon River Watershed Assembly (MRWA), Muskegon Lake Watershed Partnership (MLWP), WMSRDC and Grand Valley State University Annis Water Resources Institute (GVSU-AWRI) will partner on a watershed project that will include sampling of lake sediments. The project is part of a MRWA / MDNRE Section 319 Watershed Implementation grant. The results will give more information on ways to improve water quality. Proposed Best Management Practices that will be implemented will include riparian forest buffers, filter strips, restored wetlands or storm water infiltration, and will address 25% of the remaining nonpoint source sites contributing excessive nutrients to the watershed.

However, much of the phosphorus in the Bear Lake sediments likely originated from the upper watershed, and continues to do so today. We can begin taking action to curtail nutrients being deposited into Bear Creek and Bear Lake now.

This Information and Education Plan targets stakeholders located within the upper Bear Creek watershed, in order to provide information that can improve water quality in Bear Creek, Bear Lake, Muskegon Lake and Lake Michigan.

2. Goals and Objectives of Information and Education Strategy

a. Educate commercial property owners along M-120 / Holton Road and Whitehall Road Corridor on Best Management Practices (BMPs) that will improve water quality and aquatic habitat in Bear Creek and Bear Lake.
b. Increase public awareness and understanding of water quality issues concerning the Muskegon Lake Area of Concern (AOC) and the Eutrophication Beneficial Use Impairment (BUI).
c. Encourage residents' stewardship and sense of responsibility by educating them on natural resource protection.
d. Create a partnership between residents and local governments by promoting activities to increase knowledge of natural resource protection.
e. Encourage community leaders in Muskegon County, Dalton, Laketon and Muskegon Townships, to collaborate on projects that effectively manage storm water and the quality of surface waters in Bear Creek and Bear Lake.

3. Bear Creek/Lake Sub-watershed Partnership Group

Muskegon Lake Watershed Partnership (MLWP)
West Michigan Shoreline Regional Development Commission (WMSRDC)
Grand Valley State University Annis Water Resources Institute (GVSU-AWRI)
Muskegon River Watershed Assembly (MRWA)
Muskegon Conservation District (MCD)
Muskegon County Drain Commissioner
Muskegon County Road Commission

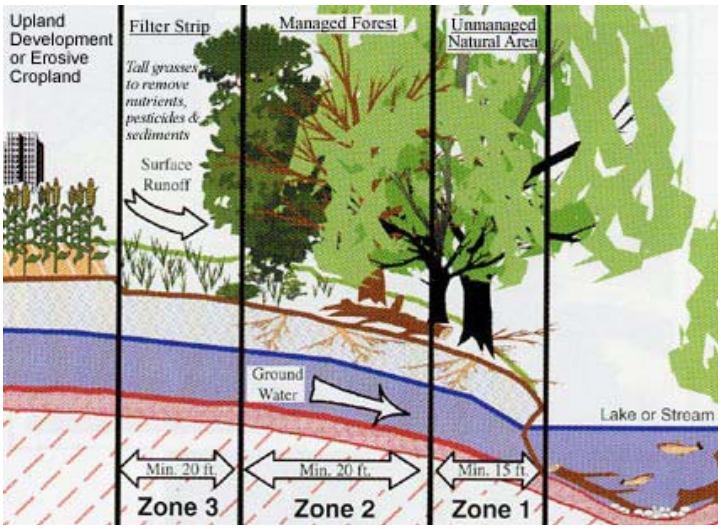
4. Target Audiences

(The upper Bear Creek watershed is contained in Cedar Creek, Dalton, Laketon and Muskegon Charter Townships).

a. Riparian Commercial Businesses along M-120 and Whitehall Road Corridors
b. Residential/rural
c. Local officials

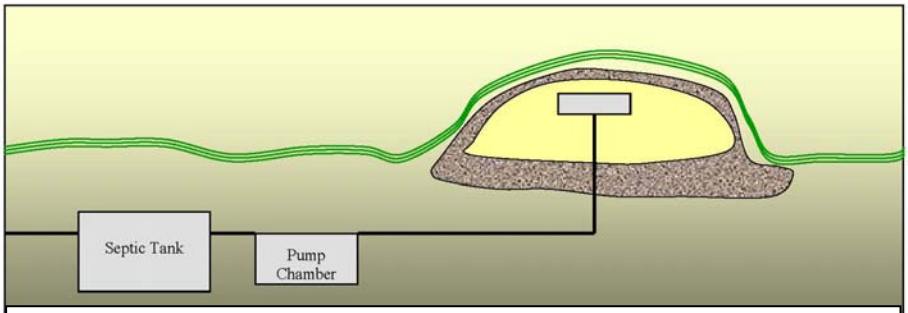
5. Information and Education Recommended Activities

a. Commercial Businesses along M-120 Corridor and Whitehall Road Corridors
    i. Concerns
        1. Stormwater runoff volumes from impervious surfaces
        2. Fertilizers and pesticides entering waterways
        3. Removal of vegetation during construction
        4. Removal of vegetation and mowing along riparian areas
    ii. Activities
        1. Provide watershed education to local businesses using newsletters, brochures and other handouts to make them aware of the problems of phosphorus in Bear Lake/Creek.
        2. Seek sponsorship for local events to increase public awareness.
        3. Provide education and awareness of best management practices (BMPs) including buffer strips and construction site management techniques.
        4. Promote Retention/detention basins
        5. Encourage Rain garden, buffer information and installations



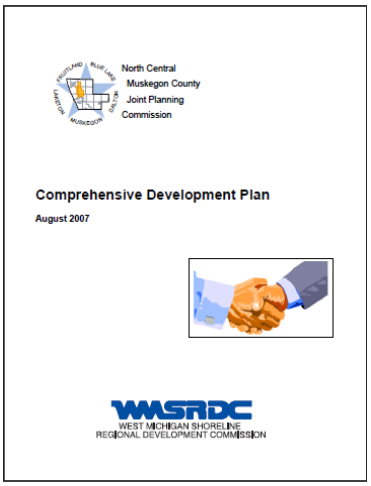
Drawing above courtesy of Southeast Michigan RC&D

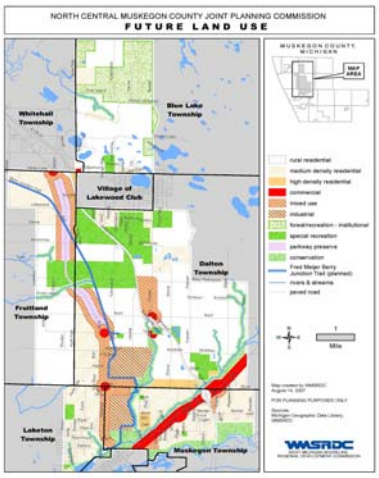
b. Rural and Agricultural Residents
   i. Concerns
      1. Nutrients from failing septic systems
      2. Nutrients from agricultural practices
      3. Lawn/garden fertilizers and pesticides entering waterways
      4. Removal of native vegetation and mowing along riparian areas and drains
   ii. Activities
      1. Educational brochures and newsletters distributed in tax bills or other communication medium
         a. Septic systems – maintenance and placement
         b. Use of buffers, rain gardens and rain barrels
         c. Proper use of fertilizer and pesticides
         d. Nutrient management
         e. Attributes of native vegetation and buffers along riparian areas
         f. Home-a-Syst Program and Eco-Friendly Neighbor tools
         g. Street drains drain directly to water bodies
         h. Proper yard and animal waste disposal
      2. Public meetings
      3. Riparian cleanups



Mound Septic Systems raise the drain field in areas with high water tables.

c. Local government officials
    i. Cedar Creek, Dalton, Laketon and Muskegon Charter Townships
        1. Concerns
            a. Master Plan and Ordinances needed to protect natural resources
            b. Decisions by township officials affect water quality
            c. Implementation of Best Management Practices (BMPs)
        2. Activities
            a. Master Plan and Ordinance review and recommendations
            b. Encourage officials to conduct a natural features inventory
            c. Make township officials aware that their natural resource decisions have impacts on water quality
            d. Workshops for local boards and planning commissions
            e. Involve officials in watershed meetings and activities





6. Web Links for Assistance

a. Organizations
   i. West Michigan Shoreline Regional Development Commission www.wmsrdc.org/
   ii. Muskegon Lake Watershed Partnership www.muskegonlake.org/
   iii. Grand Valley State University Annis Water Resources Institute www.gvsu.edu/wri/
   iv. Muskegon River Watershed Assembly www.mrwa.org/
   v. Muskegon Conservation District www.muskegoncd.org/
   vi. Muskegon County Drain Commission http://www.co.muskegon.mi.us/drain/
   vii. Muskegon County Road Commission www.muskegoncountyroads.org/
b. Local Watershed and Land Use Management Plans
   i. Bear Creek/Lake Watershed Management Plan http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3714_31581-104267--,00.html
   ii. Muskegon Areawide Plan (MAP) – Land Use Plan http://www.wmsrdc.org/reports&publications.html
   iii. North Central Muskegon County Joint Planning Commission Comprehensive Development Plan, August 2007 http://www.wmsrdc.org/Download/NCMC%20JPC%20plan%202007.pdf
   iv. Muskegon County Phosphorus Ordinance http://www.co.muskegon.mi.us/boardofcommissioners/ordinances/phosphorus_ordinance.pdf
c. Publications
   i. Buffers: Common Sense Conservation http://www.nrcs.usda.gov/feature/buffers/BufrsPub.html
   ii. Filling the Gaps: Environmental Protection Options for Local Governments http://www.michigan.gov/deq/0,1607,7-135-3313_3677_3696-73358--,00.html
   iii. Home a Syst Tools http://mwsp.msu.edu/mwsp/homeasyst_tools
   iv. Life at the Water's Edge http://www.epa.gov/grtlakes/ecopage/aquatic/lifedge.pdf
   v. Local Tools for Smart Growth: Practical Strategies and Techniques to Improve our Communities http://www.naco.org/Content/ContentGroups/Programs_and_Projects/Environmental1/Sources/1528LocalTools.pdf
   vi. Model Ordinances – LID Manual for Michigan http://www.semcog.org/uploadedfiles/Programs_and_Projects/Water/Stormwater/LID/LID_Manual_appendixH.pdf
   vii. Northern Initiatives Lakes and Shorelines http://www.epa.gov/glnpo/ecopage/aquatic/north.pdf
   viii. Stormwater Management Guidebook http://www.michigan.gov/documents/deq/lwm-smg-all_202833_7.pdf
   ix. Phosphorus and Home Lawns http://www.turf.msu.edu/phosphorus-and-home-lawns
   x. West Michigan Took Kit for Local Green Inventories http://www.gvmc.org/naturalresources/wmi_toolkit.shtml

Muskegon Lake Watershed Partnership (MLWP)
316 Morris Avenue Suite 340 – P.O. Box 387
Muskegon, MI 49443-0387
Phone: 231-722-7878 x 17 Website: www.muskegonlake.org

West Michigan Shoreline Regional Development Commission (WMSRDC)
316 Morris Avenue Suite 340 – P.O. Box 387
Muskegon, MI 49443-0387
Phone: 231-722-7878 x 17 Website: www.wmsrdc.org

Muskegon River Watershed Assembly (MRWA)
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1009 Campus Drive JOH303
Big Rapids, MI 49307-2280
Phone: 231-591-2324 Website: www.mrwa.org

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