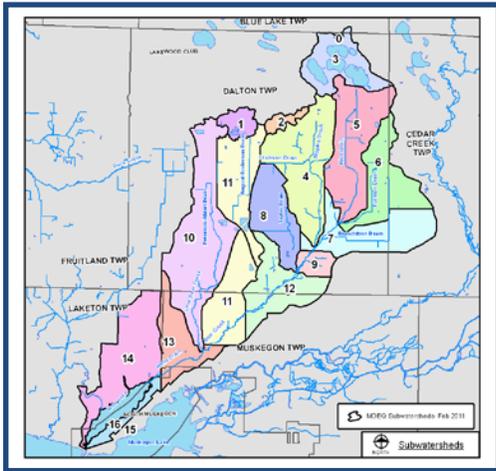


Bear Creek/Bear Lake 319 Watershed Implementation II



Review of Non Point Source, Phosphorus- Related Policies and Zoning Ordinances in the Bear Creek Watershed

October 28, 2013

Prepared by
West Michigan Shoreline Regional Development Commission
in collaboration with Dalton Township, Laketon Township, Muskegon Township and the
City of North Muskegon



**WEST MICHIGAN SHORELINE
REGIONAL DEVELOPMENT COMMISSION
(WMSRDC)**

The WMSRDC is a regional council of governments representing 127 local governments in the West Michigan counties of Lake, Mason, Muskegon, Newaygo, Oceana, and northern Ottawa.

The mission of WMSRDC is to promote and foster regional development in West Michigan... through cooperation amongst local governments.



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1) Introduction and Background

The 2004 *Bear Creek 319 Watershed Management Plan* was updated in 2013. Support for the project was provided by a US Environmental Protection Agency Section 319 grant through the Michigan Department of Environmental Quality Non Point Source (NPS) Program and the Muskegon River Watershed Assembly. Other project partners included Grand Valley State University Annis Water Resources Institute , Fishbeck, Thompson, Carr & Huber, Muskegon Conservation District, and the West Michigan Shoreline Regional Development Commission (WMSRDC). A variety of tasks were completed, including a study of the internal phosphorous load from Bear Lake and the installation of landowner Best Management Practices (BMP).

The West Michigan Shoreline Regional Development Commission (WMSRDC) worked in partnership with local governments and the Muskegon Lake Watershed Partnership to host quarterly public information meetings with the general public, the City of North Muskegon, Cedar Creek Township, Dalton Township, Laketon Township and Muskegon Township. Public meetings were held quarterly throughout the three-year project. Each meeting featured educational presentations by project partners about water quality in the Bear Creek Watershed. Participants asked questions and discussed the types of BMPs that are available to improve NPS water quality and to prevent the negative impacts of phosphorous, in particular.

In addition, WMSRDC worked with four of the local governments to identify the status of water quality measures in their existing master plans and ordinances. As a result, a set of recommendations was developed. They are contained in this document. As part of the policy review process with the local governments, two public meetings and seven one-on-one meetings were held. The local government participants reviewed existing policies and, along with WMSRDC, identified a set of feasible land use decision-making opportunities with the potential to improve water quality into the future. This document summarizes the current status of water quality-related land use policies, and provides recommendations that local decision-makers may choose to implement in order to improve water quality within their communities and throughout the watershed.

A previous Bear Creek 319 Watershed Management Plan Implementation Project included the development of a Site Plan Review Guide and recommendations for water quality related zoning ordinance amendments for Cedar Creek, Dalton and Muskegon Townships. Copies of that document were re-distributed and reviewed as part of the current Bear Creek 319 Watershed Implementation II Project. This project focused on a review of current policies with the City of North Muskegon, Laketon, Dalton and Muskegon Townships and the development of water quality-related recommendations to help to reduce phosphorous loadings from external, watershed sources.

Watershed Background

The *Bear Creek and Bear Lake Watershed Management Plan* identifies, documents, and prioritizes Non Point Source (NPS) pollutants and recommends measures to address watershed concerns. The known and suspected watershed pollutants and impairments identified in the plan include, in order of rank:

- | | |
|---------------------|-------------------------------------|
| 1) sediment | 4) invasive species |
| 2) toxic substances | 5) thermal pollution |
| 3) nutrients | 6) fecal coliform/ <i>E. coli</i> . |

The management plan notes the following sources of these pollutants:

- | | |
|------------------------------|------------------------------------|
| ○ Construction sites | ○ Streambank Erosion |
| ○ Road/stream crossings | ○ Animal waste |
| ○ Residential fertilizer use | ○ Impervious surfaces |
| ○ Agricultural runoff | ○ Removal of shoreline vegetation |
| ○ Failing septic systems | ○ Introduction of invasive species |
| ○ Storm water runoff | |

An information and education strategy was developed to educate residents on ways they can reduce pollutant sources within the Watershed. Key audiences, messages, and delivery mechanisms were identified. Best Management Practices (BMPs) were recommended to address these concerns. They included:

- | | |
|-----------------------------------|--------------------------|
| ○ fertilizer/pesticide management | ○ riparian buffer strips |
| ○ streambank stabilization | ○ sediment basins |
| ○ grade stabilization structures | ○ watercourse crossings |
| ○ vegetated filter strips | |

The management plan states that the overall goal of the Watershed is to improve water quality and to restore, improve, and protect the designated uses of the Watershed.

Designated uses considered impaired include:

- | | |
|-----------------------------|-----------------------------------|
| ○ coldwater fishery | ○ partial body contact recreation |
| ○ aquatic life and wildlife | ○ total body contact recreation |

Threatened uses include:

- | | |
|--------------|---------------------|
| ○ navigation | ○ warmwater fishery |
|--------------|---------------------|

During the development of the 2004 Bear Creek 319 Watershed Management Plan, a 2003 Hydrologic Model of the Bear Creek Watershed was completed by the Hydrologic Studies Unit (HSU) of the MDEQ. The study helped determine how future land-use changes in the Bear Creek Watershed would impact Bear Creek and its tributaries. The model considered "build-out" land-use data and predicted increases in stormwater runoff volumes and peak flows. The report states that the projected runoff volume and peak flow increases from the 10-year, 25-year, and 50-year, 24-hour design storms would aggravate flooding problems unless mitigated

through the use of effective storm water management techniques. The report also suggests that the projected increases in runoff volumes and peak flows from the 2-year, 24-hour storm would increase channel-forming flows and have more effect on the channel than extreme flood flows due to their higher frequency. The report notes that watershed activities that increase this flow will cause Bear Creek and its tributaries to become unstable and will result in excessive erosion throughout the stream stretch. Therefore, BMPs designed to address flooding should be designed to address the 2-year storm.

2) Existing Policies and Ordinances for Phosphorus Reduction in the Bear Creek Watershed

Five local governments have jurisdiction over land use and development in the Bear Creek watershed. They are Cedar Creek Township, Dalton Township, Laketon Township, Muskegon Township and the City of North Muskegon. Other entities with jurisdiction over watercourses, wetlands, county drains, roads, culverts, bridges and roadside drainage ditches are the Michigan Department of Environmental Quality, Muskegon County Drain Commissioner and the Muskegon County Drain Commission.

A. Michigan Fertilizer Law

The Michigan State Legislature adopted the Michigan Fertilizer Law (1994 PA 451, Part 85, Fertilizers) in 2012 to prevent phosphorous from degrading water quality in Michigan surface waters. The law restricts the use of phosphorous fertilizers on residential and commercial lawns, including athletic fields and golf courses statewide. The law does not prevent the sale of phosphorous fertilizers. The Bear Creek Watershed local government 319 project participants expressed interest in adopting local policy to provide residents with awareness about the state law and to provide landowners with related educational information. They also noted the lack of local capacity to monitor or enforce the Michigan Fertilizer Law or a local fertilizer ordinance.

B. MS4 Phase II Stormwater Program

The Muskegon Area Municipal Stormwater Committee (MAMSC) formed in 2004 to address EPA Phase II stormwater requirements under the MDEQ Voluntary Stormwater Permit Program. Within Muskegon County, the program addresses urbanized areas within the Muskegon Lake and Mona Lake Watersheds. Within Muskegon Lake's Bear Creek watershed, the Phase II permittees are the City of North Muskegon, Muskegon County Road Commission and the Muskegon County Drain Commissioner. The MAMSC is currently developing a Post Construction Stormwater Ordinance as a means to address the long-term need to monitor the effectiveness of stormwater BMPs. There is potential for this program to become a Muskegon Countywide program. If so, it will provide a structure for regularly monitoring the long-term effectiveness of BMPs that are installed as a result of local site plan approvals. It will provide local governments with the information they need to encourage and enforce maintenance and repairs of BMPs. Muskegon County Public Works, Drain Commissioner and Soil Erosion Control staff and Legal Counsel have reviewed the draft document and it is under revision. It is anticipated that the other local governments throughout Muskegon County, including those within the Bear Creek Watershed, will have the opportunity to consider adopting the ordinance under a potential, future Muskegon County Post-Construction Stormwater Program.

C. Muskegon County North Central Joint Planning Commission - Future Land Use Plan

In 2006, three Bear Creek watershed communities, Dalton, Laketon and Muskegon Townships (along with Fruitland and Blue Lake Townships) worked with WMSRDC to form the Muskegon County North Central Joint Planning Commission (JPC). In 2007, the JPC developed a Future Land Use Plan. The plan focuses on development in two growth corridors located within the Bear Creek Watershed: The Holton Road/M-120 corridor and the Whitehall Road/Old US 31 corridor. The Holton Road/M-120 corridor runs parallel and immediately adjacent to Bear Creek, from the headwaters in Dalton Township's Twin Lake area, south to the mouth of Bear Lake in the City of North Muskegon. The Whitehall Road/Old US 31 corridor transects the lower end of Bear Creek just above Bear Lake and runs north, west of Little Bear Creek, in a developed area of residential, commercial and industrial uses. The former Ott/Story/Cordova National Priority List site, now home to the Muskegon County Business Park North, is also within this area. The JPC has expressed an interest in working together to coordinate stormwater control and management within its designated boundary. The WMSRDC provides staff support for the JPC and will continue to encourage a coordinated approach to stormwater management within the JPC boundary and the Bear Creek Watershed, including exploration of the Michigan DEQ State Revolving Fund opportunities for development of a NPS Project Plan.

D. Public Health Muskegon County - On Site Septic Systems

Public Health Muskegon County is obligated to implement and enforce the Public Health Code of the State of Michigan, PA 368 of 1978. The Code requires PHMC to maintain, implement and enforce an up to date Onsite Sewage Disposal regulation. In addition, subdivision plan review and permitting are mandated by reference. Act 368 defines onsite sewage discharges as Public Health nuisances and hazards, depending on the severity of the discharge. PHMC investigates all allegations of improper sewage disposal in Muskegon County. When illicit discharges are identified, PHMC ensures remedies are implemented, up to and including court ordered correction. In the past 20 years, PHMC has incorporated numerous practices to reduce nutrient infiltration stemming from onsite sewage disposal systems. These include mandatory setbacks to surface water, increased lot density, increased isolation to surface water, increased isolation to ground water, mandatory wetland evaluations when groundwater is less than 18" below ground, enforcing setbacks to flowing ditches, requiring nutrient removal technologies in some situations on lakefront property and use of iron rich soil horizons for phosphorous binding. The PHMC Sanitary Regulation has a stricter standard for new and replacement systems installed within 400 feet of a surface water body than the State of Michigan Subdivision Regulation. PHMC continues to work on record and aerial photograph review to identify and investigate high risk sewage disposal systems in the Bear Creek watershed.

E. Status of Local Government Water Quality Policies and Ordinances

The identification of water-quality related measures in existing ordinances was completed through a process of 1) quarterly public education watershed meetings hosted by the Bear Creek Watershed communities, 2) the use of a self-assessment ordinance check lists by each

community, 3) one-on-one meetings with WMSRDC, and 4) a final public meeting to discuss water quality priorities, BMPs, and the feasibility of policy recommendations.

All of the communities agreed that the master plans in the watershed should be amended to call for the protection of watershed resources to protect the health, safety and welfare of residents.

Through one-on-one meetings with zoning administrators, supervisors and planning commission members, it was clear that each community used the site plan review process to provide for the protection of surface water quality. The communities were also well aware of county and state programs that regulate soil erosion and sedimentation control, wetlands and on-site septic systems. During the policy review process, it also became clear that some of the ordinance language that was protective of water quality was initially crafted to protect some aspect of the public's health, safety and welfare, but it did not necessarily link the quality of surface water to those protections. Often, the language that was supportive of surface water quality protection, was found under several different ordinance sections. In addition, language that specified the use of BMPs to protect water quality were often stated as alternatives or encouragements, not requirements. Overall, there is a lack of language that would specifically require Best Management Practices for water quality protection.

The communities determined a common need to identify high quality natural areas for preservation throughout the watershed. Most participants also acknowledged that local wetlands ordinances should be developed to protect wetlands less than five acres in size and that it was important for communities to prohibit direct discharge of stormwater into lakes, streams and wetlands without some type of on-site pre-treatment or filtration.

Overall, the local governments acknowledged that there is room for improvement in the way that stormwater is either managed or regulated, and that stormwater management should be an important community goal or policy in community master plans.

When asked about the level of interest each community has in working across jurisdictional boundaries to protect water resources, there was a high level of interest

Overall, the local government project participants for each of the communities believed that phosphorous is causing water quality problems by accelerating the growth of algae and aquatic plants in the lakes; degrading water quality aesthetics; and by limiting human contact with the water, resulting in reduced recreational opportunities.

3) Recommendations for Adoption and Enforcement of Water Quality Policies and Ordinances

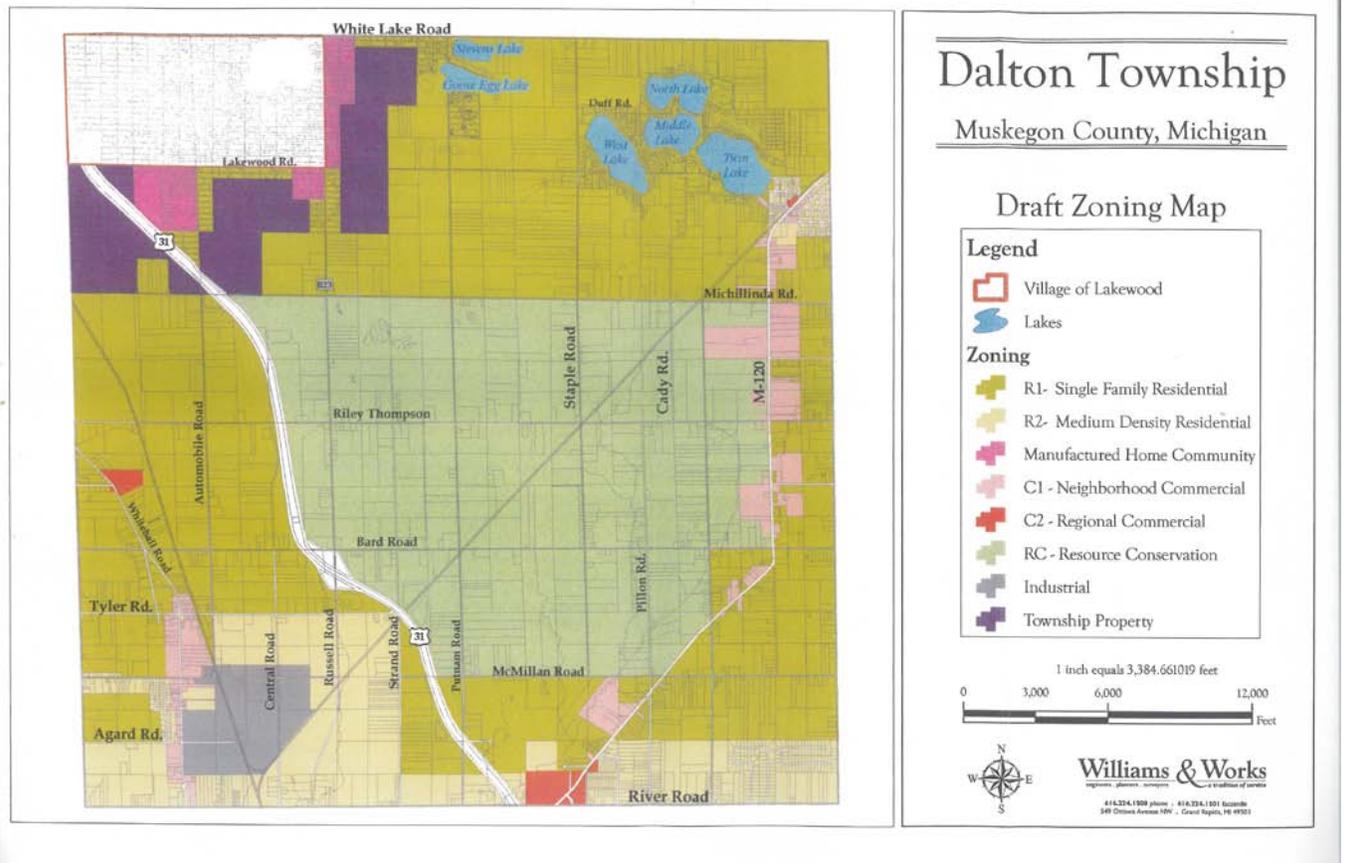
Watershed-Wide Recommendations

The following are recommendations to be considered by all of the communities within the Bear Creek watershed. Please note that they are recommendations and prior to formal adoption by a governing body, they should go through review by legal counsel.

1. Include a statement in the Master Plan to protect water quality *explicitly* for the protection of health, safety and welfare of residents.
2. Include a statement in the Master Plan to identify all of the *watersheds* in which the community lies.
3. Include a Master Plan goal of reducing impervious surface *tied to* protecting the health, safety and welfare of residents through protection of water quality, natural features and open space. (Related ordinance language could call for this to be for new construction and redevelopment projects and parking lots that exceed a certain number of spaces.)
4. Include a statement in the Master Plan calling for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and to improve infiltration.
5. Include a statement in the Master Plan to state that protection of stream corridors is important in promoting the health, safety and welfare of residents through flood control, and water quality and riparian corridor preservation.
6. Consider an ordinance *requirement* for stormwater treatment of parking lot runoff in landscaped areas.
7. Consider adoption of a local wetlands ordinance that protects wetlands less than five acres in size, and coordinate it with the State's wetlands regulations.
8. Consider ordinance language to restrict development adjacent to stream corridors to those which offer no danger from *topographical* disturbance to the corridor that could result in degradation to water quality by increased runoff, sedimentation, stream channel alterations, or degradation of dependent flora and fauna.
9. Consider a local policy to prevent the use of phosphorous fertilizers as a measure to *encourage education, awareness and compliance* with the State Fertilizer Law.
10. Include a statement in the Master Plan that identifies blueways, greenways and green infrastructure as important for the protection of water quality, wildlife and other natural resources.
11. Include a statement in the Master Plan that identifies groundwater recharge areas as important for the protection of water quality and the health, safety and welfare of residents.
12. Consider an independent evaluation and comparison of local government policies, programs and procedures to identify where opportunities for additional water quality benefits could be realized through coordination, adjustments or alignment with the policies and procedures of the Muskegon County Road Commission, Muskegon County Drain Commissioner, Public Health Muskegon County, and the Muskegon County Public Works Soil Erosion and Sedimentation Control programs.

Community-Based Recommendations

A. Dalton Township



Dalton Township

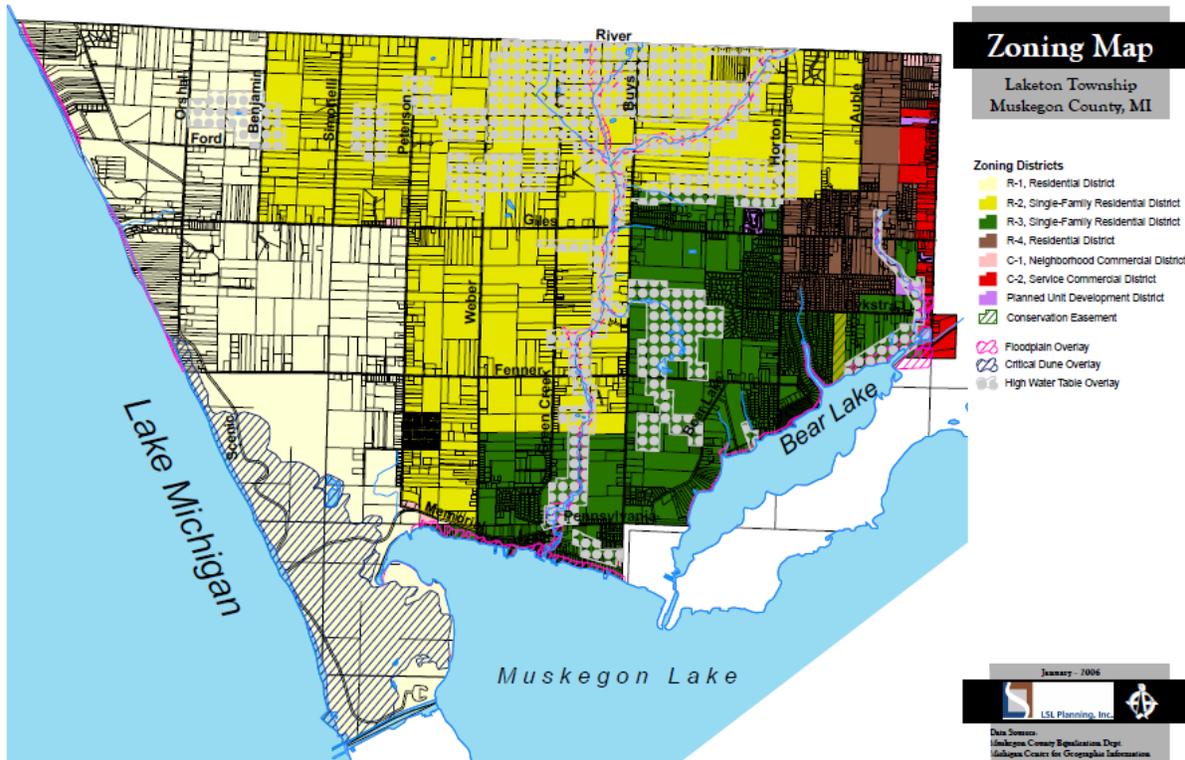
Dalton Township is home to the headwaters of the Bear Creek watershed. It is primarily a rural residential community, with a commercial growth corridor along M-120/Holton Road. Holton Road is immediately adjacent to and parallel with the main branch of Bear Creek. The township's high water table sandy soils makes septic suitability technically challenging. There is no public sewer or public water supply available to the densely populated residential areas, including those surrounding Twin Lake, Middle Lake, North Lake and West Lake. Because of the high groundwater table, the community has experienced a historic pattern of residential pond digging as a means to alleviate high water problems. Roadside drainage ditches and county drains discharge to Bear Creek through a complex system of sub-basin drainage areas. Dalton Township does not participate in the National Flood Insurance Program because problems related to high water and flooding are a result of the groundwater, not surface water. Dalton Township is an active member of the North Central Muskegon County Joint Planning Commission.

The following are recommendations to be considered by Dalton Township. Please note that they are recommendations and prior to formal adoption by a governing body, they should go through review by legal counsel.

- 1) Dalton Township should consider updating the Master Plan to state that protection of stream corridors is important in promoting the health, safety and welfare of residents through flood control, and water quality and riparian corridor preservation.
- 2) Dalton Township should consider development and redevelopment ordinance language that coordinates with the regulations protecting County drains.
- 3) Dalton Township should consider ordinance language that requires developers to evaluate the use of parking lot islands as stormwater infiltration areas.
- 4) Dalton Township should recognize the importance of wetlands, and the functions they play in protecting residents' health, safety and welfare from problems such as flooding and poor water quality in its Master Plan.
- 5) Dalton Township should include a statement in its Master Plan to recognize the importance of woodlands to protect any water and any of the following: air and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitat, and to preserve aesthetic values and community beauty.
- 6) Dalton Township should consider a statement in the Master Plan to recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution.
- 7) Dalton Township should consider ordinance language to restrict development adjacent to stream corridors to those which offer no danger from topographical disturbance to the corridor, degradation to water quality, increased runoff, sedimentation, stream channel alterations, or degradation of dependent, non-hydrologic resources (i.e. flora and fauna).
- 8) Dalton Township should consider an ordinance that requires the replacement of trees that are removed.
- 9) Dalton Township should consider development of a greenway plan or support greenways/green infrastructure through its Master Plan or Recreation Master Plan.
- 10) When the Master Plan is updated, consideration should be given to including a goal of reducing impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space.

- 11) When the Master Plan is updated, consideration should be given to calling for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and to improve infiltration.
- 12) The community should consider a requirement for stormwater treatment of parking lot runoff in landscaped areas.
- 13) Where appropriate for site conditions, the community should consider an amendment to the Zoning Ordinance to allow for the relaxation of side yard setbacks and narrower frontages to reduce the total road length (and overall site imperviousness). Related to this, the Zoning Ordinance could consider the relaxation of front yard setbacks to reduce driveway lengths (and overall site imperviousness).
- 14) When considering clustering and open space developments or redevelopments, the community should consider a requirement that open spaces be consolidated into larger units (contiguous), or required to be a minimum size or width.
- 15) The community should consider adoption of a local wetlands ordinance that protects wetlands less than five acres in size, and coordinate it with the State's wetlands regulations.
- 16) As part of its construction development and redevelopment regulations, the community should consider the requirement for an on-site, pre-winter meeting to assess whether existing soil cover will provide adequate soil erosion and sedimentation control during winter months.
- 17) The community should develop design standards that specify the use of native plant species in storm water management systems and best management practices to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat.
- 18) The community should consider adoption of a local woodlands or tree protection ordinance to help reduce stormwater runoff and to provide additional community benefits

B. Laketon Township



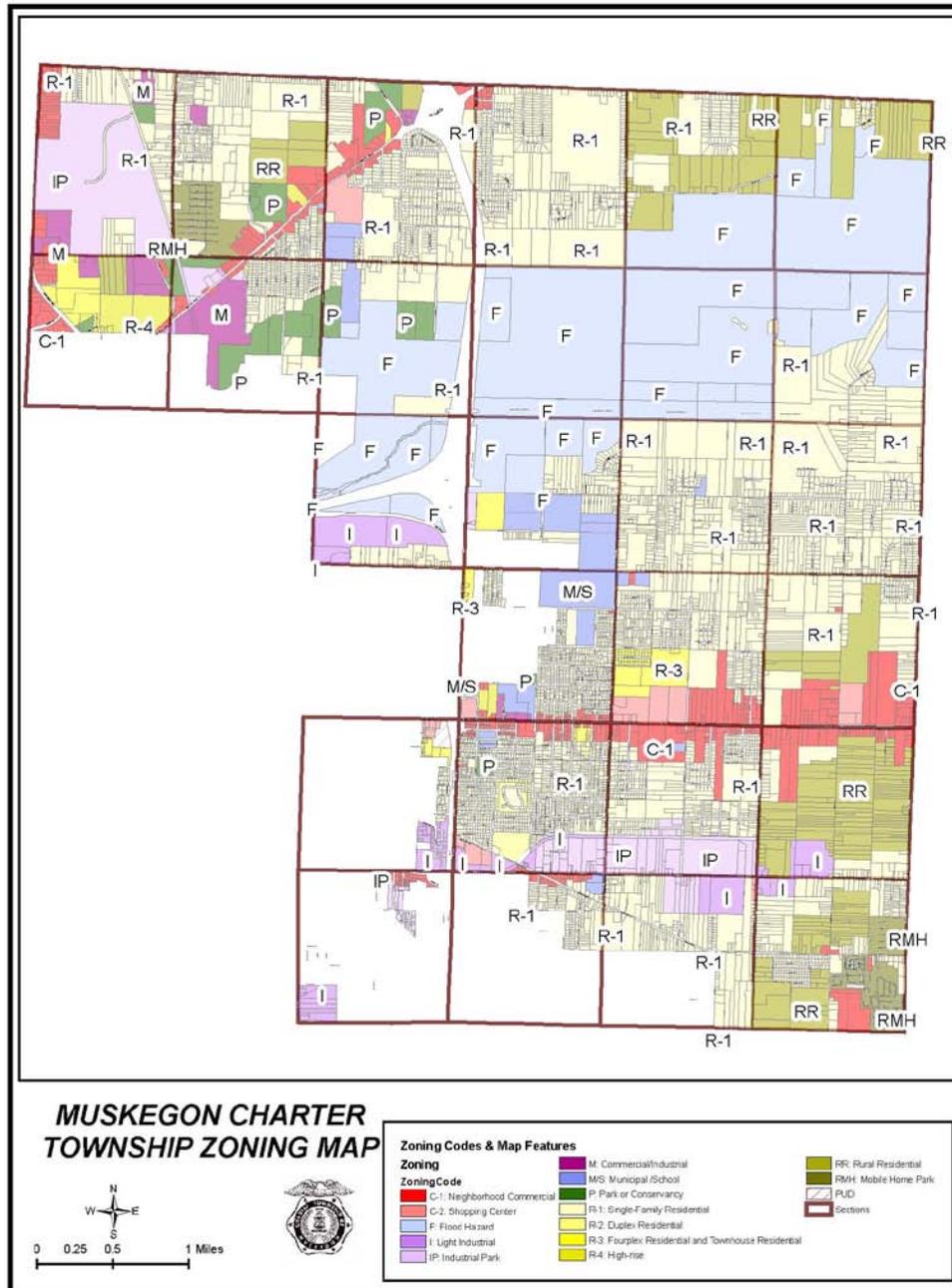
Laketon Township

Laketon Township includes a portion of Bear Creek and the northern shoreline of Bear Lake. The community is primarily residential and forested, with land use jurisdiction along a portion of the Whitehall Road/Old US 31 growth corridor. Laketon Township's quality of life is greatly enhanced by its plentiful lakes and streams and its numerous natural resource-based recreational features, including the amenities available at Muskegon State Park and the scenic Lake Michigan shoreline. The majority of residents rely on groundwater for their drinking water supply and on private septic systems for waste treatment. In 2011, public water and sewer lines were extended along the north shoreline of Bear Lake. The community has identified high quality natural areas for preservation through a Laketon Township Opinion Survey. Laketon Township is an active member of the North Central Muskegon County Joint Planning Commission (JPC). The community does not have a storm water management ordinance, but as members of the JPC they have stated goals and objectives to develop a regional stormwater management plan for the JPC growth area.

The following are recommendations to be considered by Laketon Township. Please note that they are recommendations and prior to formal adoption by a governing body, they should go through review by legal counsel.

- 1) Laketon Township should consider Master Plan language that calls for the protection of wetlands within an ecosystem context, potentially in coordination with the Muskegon County North Central Joint Planning Commission (protecting adjacent uplands, waterways, and vegetated buffers as well).
- 2) Add ordinance language that requires the replacement of trees that are removed on developed properties. This would not apply to agricultural operations
- 3) When the Master Plan is updated, include a goal to reduce impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space.
- 4) When the Master Plan is updated, call for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and to improve infiltration.
- 5) Consider a requirement for stormwater treatment of parking lot runoff in landscaped areas. See Zoning Ordinance Section 15.06 (D) 3 & 4.
- 6) Where appropriate for site conditions, consider an amendment to the Zoning Ordinance to allow for the relaxation of side yard setbacks and narrower frontages to reduce the total road length (and overall site imperviousness). Related to this, the Zoning Ordinance could consider the relaxation of front yard setbacks to reduce driveway lengths (and overall site imperviousness). This would involve major zoning changes.
- 7) When considering clustering and open space developments or redevelopments, the community should consider a requirement that open spaces be consolidated into larger units (contiguous), or required to be a minimum size or width. See Zoning Ordinance Sections 17.05 (Y) 7 Open Space Requirements (A through J).
- 8) Consider adoption of a local wetlands ordinance that protects wetlands less than five acres in size, and coordinate it with the State's wetlands regulations.
- 9) Develop design standards that specify the use of native plant species in storm water management systems and best management practices to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat. Add to Master plan as a goal (see Zoning Ordinance Section 2.15 (N) definitions - Natural Features and Vegetation).
- 10) Consider adoption of a local woodlands or tree protection ordinance to help reduce stormwater runoff and to provide additional community benefits. Language could be added to Zoning Ordinance 3.08 (A) Clearing and Filling of Land; 3.23 (A, B, C, D) Landscaping and Screening; 15.03 Preliminary Site Plan Review.

C. Muskegon Township



Muskegon Township

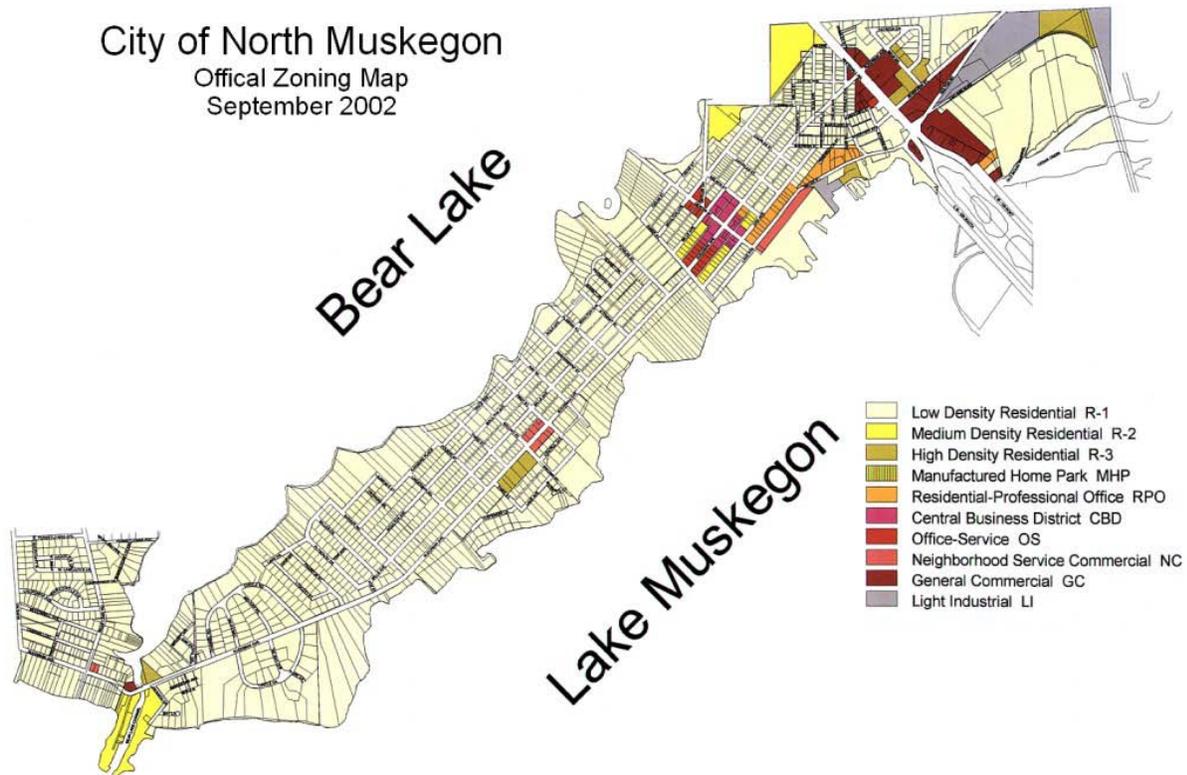
The Muskegon River acts as a divide within Muskegon Township, creating two distinct "local communities." The Bear Creek watershed is located within the Reeths Puffer School District within the community's northeastern-most quadrant. This area includes a portion of the commercially developed M-120/Holton Road growth corridor, adjacent to Bear Creek, between US 31 and the City of North Muskegon. Muskegon Township is an active member of the North Central Muskegon County Joint Planning Commission.

The following are recommendations to be considered by Muskegon Township. Please note that they are recommendations and prior to formal adoption by a governing body, they should go through review by legal counsel.

- 1) Muskegon Township should consider ordinance language that requires developers to evaluate the use of parking lot islands as stormwater infiltration areas.
- 2) Muskegon Township should require that site plans include water quality-related BMPs that are labeled and shown, in detail, so that they can be reviewed for effectiveness during the site plan review process.
- 3) Muskegon Township should consider a statement in the Master Plan to recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution.
- 4) Muskegon Township should consider adding ordinance language that minimizes the clearing of trees and native vegetation from a site.
- 5) Muskegon Township should consider adding ordinance language that requires the replacement of trees that are removed.
- 6) Muskegon Township should consider requiring permits to clear trees from a site.
- 7) Muskegon Township should consider development of a greenway plan or support greenways/green infrastructure through its Master Plan or Recreation Master Plan.
- 8) When the Master Plan is updated, consideration should be given to including a goal of reducing impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space.
- 9) When the Master Plan is updated, consideration should be given to calling for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and to improve infiltration.
- 10) The community should consider a requirement for stormwater treatment of parking lot runoff in landscaped areas
- 11) Where appropriate for site conditions, the community should consider an amendment to the Zoning Ordinance to allow for the relaxation of side yard setbacks and narrower frontages to reduce the total road length (and overall site imperviousness). Related to this, the Zoning Ordinance could consider the relaxation of front yard setbacks to reduce driveway lengths (and overall site imperviousness).

- 12) When considering clustering and open space developments or redevelopments, the community should consider a requirement that open spaces be consolidated into larger units (contiguous), or required to be a minimum size or width.
- 13) As part of its construction development and redevelopment regulations, the community should consider the requirement for an on-site, pre-winter meeting to assess whether existing soil cover will provide adequate soil erosion and sedimentation control during winter months.
- 14) The community should consider adoption of a local wetlands ordinance that protects wetlands less than five acres in size, and coordinate it with the State's wetlands regulations.
- 15) The community should develop design standards that specify the use of native plant species in storm water management systems and best management practices to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat.
- 16) The community should consider adoption of a local woodlands or tree protection ordinance to help reduce stormwater runoff and to provide additional community benefits.

D. City of North Muskegon



City of North Muskegon

The City of North Muskegon is located on a peninsula between Bear Lake and Muskegon Lake, with frontage on its south east end along the Muskegon River. Bear Lake discharges into Muskegon Lake at a channel located within the City of North Muskegon. North Muskegon is the only community within the Bear Creek Watershed that falls under Phase II Stormwater Permit Regulations. The City's Stormwater Ordinance regulates stormwater management for the virtually "built out" community. A storm drainage system and public water and sewer have been in place for many decades. Although the community is already densely developed, the City and many private landowners own large lots along Bear Lake and there are opportunities for the installation of structural BMPs to filter stormwater discharges at storm drain outlets. There are also opportunities to encourage improved stormwater filtration through the redirection of downspouts, rain gardens and managerial practices associated with landscaped areas. The City of North Muskegon provides leaf collection services for its residents.

The following are recommendations to be considered by the City of North Muskegon. Please note that they are recommendations and prior to formal adoption by a governing body, they should go through review by legal counsel.

- 1) The City of North Muskegon should consider updating the Master Plan to state that protection of shoreline and stream corridors is important in promoting the health,

safety and welfare of residents through flood control, and water quality and riparian corridor preservation.

- 2) The City of North Muskegon should consider development and redevelopment ordinance language that coordinates with the regulations protecting County drains.
- 3) The City of North Muskegon should consider ordinance language that requires developers to evaluate the use of parking lot islands as stormwater infiltration areas.
- 4) The City of North Muskegon should require that site plans include water quality-related BMPs that are labeled and shown, in detail, so that they can be reviewed for effectiveness during the site plan review process.
- 5) The City of North Muskegon should include a map of wetlands in its Master Plan.
- 6) The City of North Muskegon should recognize the importance of wetlands, and the functions they play in protecting residents' health, safety and welfare from problems such as flooding and poor water quality in its Master Plan.
- 7) The City of North Muskegon should consider Master Plan language that calls for the protection of wetlands within an ecosystem context (protecting adjacent uplands, waterways, and vegetated buffers as well).
- 8) The City of North Muskegon should amend its ordinance language to require building and no-disturbance setback requirements from wetland areas to at least 30 feet.
- 9) The City of North Muskegon should include a statement in its Master Plan to recognize the importance of woodlands to protect any water and any of the following: air and soil quality, to buffer air and noise pollution, to moderate local climate and storm hazards, to preserve wildlife habitat, and to preserve aesthetic values and community beauty.
- 10) The City of North Muskegon should consider a statement in the Master Plan to recognize the importance of woodlands for storm water infiltration, thus reducing flooding and minimizing water pollution.
- 11) The City of North Muskegon should consider adding ordinance language that minimizes the clearing of trees and native vegetation from a site.
- 12) The City of North Muskegon should consider adding ordinance language that requires the replacement of trees that are removed.
- 13) The City of North Muskegon should consider requiring permits to clear trees from a site.

- 14) The City of North Muskegon should consider development of a greenway plan or support greenways/green infrastructure through its Master Plan or Recreation Master Plan.
- 15) When the Master Plan is updated, consideration should be given to including a goal of reducing impervious surface tied to protecting the health, safety and welfare of residents through protection of water quality, natural features and open space.
- 16) When the Master Plan is updated, consideration should be given to calling for minimizing impervious surfaces in new construction and redevelopment projects to reduce the amount of runoff and to improve infiltration.
- 17) The community should consider a requirement for stormwater treatment of parking lot runoff in landscaped areas
- 18) When considering clustering and open space developments or redevelopments, the community should consider a requirement that open spaces be consolidated into larger units (contiguous), or required to be a minimum size or width.
- 19) As part of its construction development and redevelopment regulations, the community should consider the requirement for an on-site, pre-winter meeting to assess whether existing soil cover will provide adequate soil erosion and sedimentation control during winter months.
- 20) The community should consider adoption of a local wetlands ordinance that protects wetlands less than five acres in size, and coordinate it with the State's wetlands regulations.
- 21) The community should develop design standards that specify the use of native plant species in storm water management systems and best management practices to help reduce storm water velocities, filter runoff and provide additional opportunities for wildlife habitat.
- 22) The community should consider adoption of a local woodlands or tree protection ordinance to help reduce stormwater runoff and to provide additional community benefits

4) Current Progress Toward Completing Recommended Steps

The Bear Creek 319 Watershed Implementation II Project renewed awareness about the important connections between land use decision-making and surface water quality. During the one-on-one meetings, local government participants indicated that they are willing to recommend that master plan and zoning ordinance language be updated to better protect water quality. Participants stated that the preferred timing for this will be when they are in the process of updating master plans and ordinances.

Upon completion of the individual master plan and zoning ordinance reviews, the communities participated in a local government workshop to learn more about priority BMPs including septic system management, agricultural BMPs, commercial landscape BMPs and Low Impact Development (LID) practices that can help to reduce phosphorous inputs.

As follow up to that workshop, participants gave WMSRDC feedback on the feasibility of the recommendations that were developed through the previous policy reviews. Those recommendations will be reviewed by local government planning commissions and boards during master plan updates and planning commission meetings.

Overall, the communities all agreed that the following activities were important for the health of water quality throughout the Bear Creek Watershed:

- All of the local government project participants acknowledged that the master plans of the watershed communities should call for the protection of watershed resources to protect the health, safety and welfare of residents.
- The more rural and suburban watershed communities expressed interest in identifying high quality natural areas for preservation (with the exception of the City of North Muskegon because it is virtually "built out").
- Participants acknowledged that local wetlands ordinances should be developed to protect wetlands less than five acres in size.
- Participants acknowledged that it is important for communities to prohibit direct discharge of stormwater into lakes, streams and wetlands without some type of on-site pre-treatment or filtration.
- The City of North Muskegon has chosen the Jurisdictional Permit to meet requirements of Phase II Stormwater Regulations. The program requires Post-Construction Storm Water Controls.

5) Sustainability and Coordination with Local Watershed Programs

There is a great deal of coordination among natural resource managers, watershed groups, local governments and other stakeholders in the Bear Creek watershed.



The West Michigan Shoreline Regional Development Commission (WMSRDC) provides staff support and project coordination for the North Central Muskegon County Joint Planning Commission and for the Muskegon Lake Watershed Partnership (MLWP). The MLWP is “a coalition of community interests dedicated to working cooperatively for the improvement of the Muskegon Lake ecosystem.” It is a coalition of many partner organizations and individuals, including the Bear Creek 319 project partners, volunteers and the general public. The WMSRDC is currently developing an engineered design to remediate the source of available phosphorous to Bear Lake from a former celery farm, including restoration of the former floodplain wetland and the hydrologic reconnection of Bear Creek with the restored wetland. This fish and wildlife habitat restoration engineering and design project is being funded by a National Oceanic and Atmospheric Administration grant to WMSRDC. WMSRDC has applied for Great Lakes Restoration Initiative (GLRI) grant funds for implementation. Muskegon County is in the process of acquiring the property through a separate GLRI NOAA/DEQ AOC Land Acquisition grant to ensure that the restored area remains protected for water quality and wildlife benefits into the future.



The Muskegon Conservation District (MCD) provides landowners with information, education and technical assistance to implement Best Management Practices that improve water quality. The MCD provides staff support for the Muskegon Area Municipal Storm Water Committee (MAMSC). In 2011, the MAMSC began developing a Post Construction Stormwater Program and Ordinance to meet Phase II goals under the MDEQ Phase II Voluntary Permit Program. There is potential for this program to be adopted by communities outside of the Phase II urban areas, such as those within the Bear Creek Watershed. At this time, Muskegon County is reviewing the draft ordinance and will consider administration and management of the program through its Department of Public Works or Soil Erosion Control offices.



Muskegon Lake Watershed Partnership

The Muskegon Lake Watershed Partnership is a coalition of community interests dedicated to working cooperatively for the improvement of the Muskegon Lake ecosystem, and for the delisting of Muskegon Lake as an Area of Concern. The MLWP voluntarily addresses the quality of Muskegon Lake and its affiliated watersheds with activities that local, state and federal advise agencies, form partnerships and express local community views and public input for the restoration and protection of the Muskegon Lake Watershed. The MLWP began coordinating with the MAMSC in 2004 and assisted Fishbeck, Thompson Carr & Huber with the development of the Muskegon Lake Watershed Management Plan (WLWMP). The MLWMP was designed to meet the requirements of the Phase II Storm

Water Program. The MLWMP is not a 319 Watershed Management Plan. The MLWP meets monthly to inform the public, receive public input, set goals and prioritize watershed needs for the Lower Muskegon River and Muskegon Lake watershed, including the Bear Creek Watershed. Originally formed in 1993 to advance remedial efforts within the Area of Concern (AOC), the MLWP also promotes habitat restoration and surface water quality improvements through educational programs and implementation of NPS BMPs. Additional information about the MLWP is available at www.muskegonlake.org.



The Muskegon River Watershed Assembly (MRWA) has worked in partnership with local groups to advance water quality improvements in the Bear Creek Watershed through 319 grant projects. The MRWA and the MLWP maintain data repositories of studies have been completed in the Muskegon River and Muskegon Lake Watershed, including water quality information for Bear Creek, Little Bear Creek and Bear Lake. Many of these studies are available electronically at www.mrwa.org or www.muskegonlake.org. The MRWA and MLWP maintain Facebook Groups and Pages to share information and to promote public involvement in volunteer events and watershed improvement activities.



The Annis Water Resources Institute of Grand Valley State University is a MLWP member and partner in the Bear Creek Watershed. AWRI develops and carries out sampling plans and public involvement activities that assist with the development of NPS projects to improve water quality. As part of the Bear Creek 319 Implementation II project, AWRI conducted the internal phosphorous loading analyses of the sediment in Bear Lake and developed a feasibility report for treatment of problem.



Public Health
Prevent. Promote. Protect.
Muskegon County

Public Health Muskegon County

Public Health Muskegon County is obligated to implement and enforce the Public Health Code of the State of Michigan, PA 368 of 1978. The Code requires PHMC to maintain, implement and enforce an up to date Onsite Sewage Disposal regulation. In addition, subdivision plan review and permitting are mandated by reference. Act 368 defines onsite sewage discharges as Public Health nuisances and hazards, depending on the severity of the discharge. PHMC investigates all allegations of improper sewage disposal in Muskegon County. When illicit discharges are identified, PHMC ensures remedies are implemented, up to and including court ordered correction. In the past 20 years, PHMC has incorporated numerous practices to reduce nutrient infiltration stemming from onsite sewage disposal systems. These include mandatory setbacks to surface water, increased lot density, increased isolation to surface water, increased isolation to ground water, mandatory wetland evaluations when groundwater is less than 18" below ground, enforcing setbacks to flowing ditches, requiring nutrient removal technologies in some situations on lakefront property and use of iron rich soil horizons for phosphorous binding. The PHMC Sanitary Regulation has a stricter standard for new and replacement systems installed within

400 feet of a surface water body than the State of Michigan Subdivision Regulation. PHMC continues to work on record and aerial photograph review to identify and investigate high risk sewage disposal systems in the Bear Creek watershed.



Muskegon County Road Commission

The Muskegon County Road Commission (MCRC) fulfills a number of roles with respect to protecting water quality within its service area. As a NPDES Phase II Storm Water Discharge Program permittee, the MCRC has an obligation to conduct its day to day business operations using accepted Best Management Practices (BMP). Stabilization of slopes near watercourses; street sweeping to reduce suspended solid discharges from storm sewers; catch basin maintenance to remove trapped sediments from storm sewers; cleaning of bridge decks; and maintenance of stockpile areas are some examples. Under the storm water program, the MCRC is also required to detect and work towards elimination of illicit substance discharges into its drainage systems; educate employees on proper practices; provide outreach and education to the public; and identify and implement projects to improve the quality of the water discharged from roads to waters of the state. The Muskegon County Road Commission trains its staff in proper soil erosion and sedimentation control practices and operates its own program under an Authorized Public Agency policy agreement with the State of Michigan. The Muskegon County Road Commission designs and builds road, bridge, and culvert rehabilitation and reconstruction projects to make a positive improvement in the interaction of the constructed facility and the adjacent surface water. This includes rerouting of surface water discharges from roads and bridges to upland locations, away from surface waters; providing stabilized vegetated or rip rap slopes at structures; and a reduction in chemical fertilizer usage. Stream crossing replacements are designed to reduce the net impact on the stream to benefit both water quality and habitat for aquatic organisms in keeping with MDEQ rules and Michigan law. In conjunction with other agencies such as the 16 townships, Muskegon County Drain Commission, Muskegon Conservation District and Michigan Department of Transportation, the MCRC seeks partnerships to achieve complete water quality improvement projects that it could not otherwise deliver on its own. For more information, contact Paul Bouman, County Highway Engineer, Muskegon County Road Commission, Phone: (231) 788-7240 | Fax: (231) 788-5793

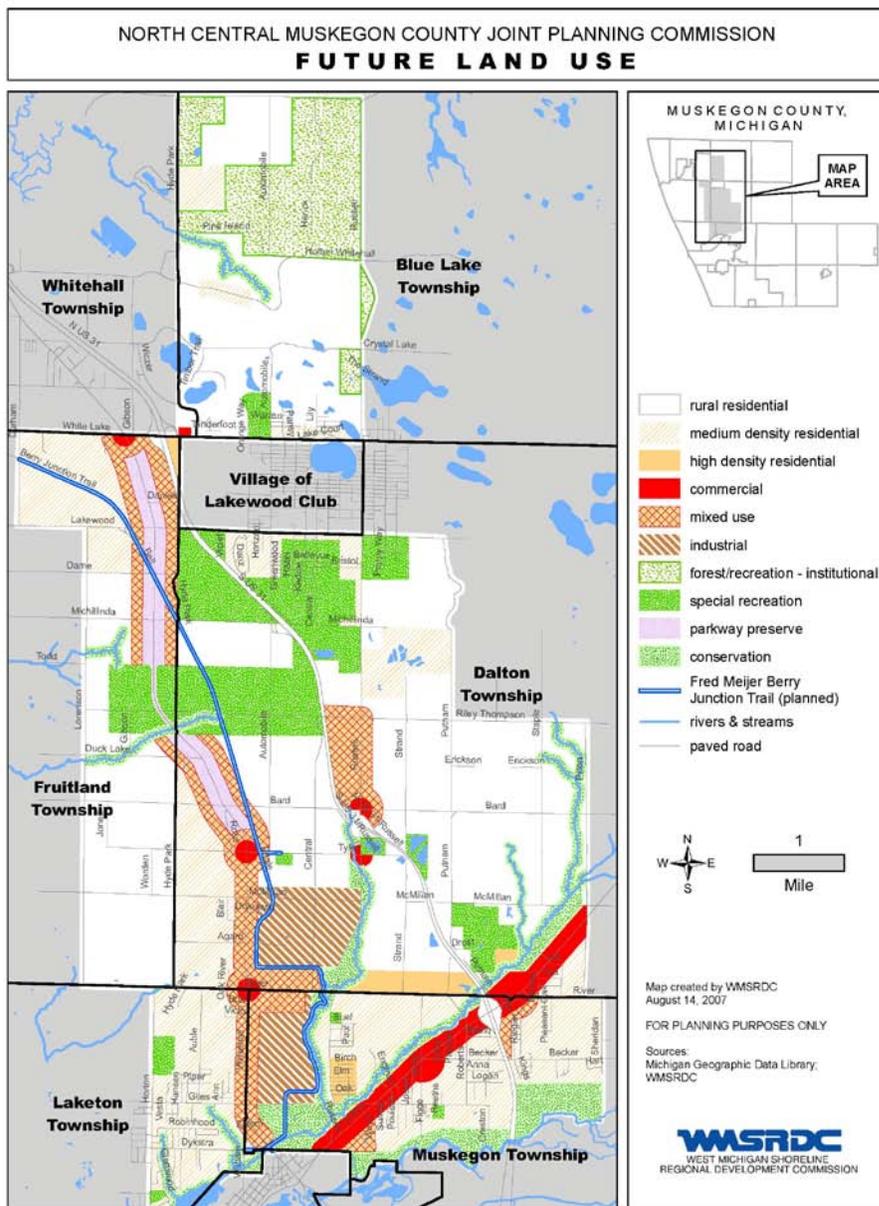


Muskegon County Drain Commissioner

The mission of the Muskegon County Drain Commissioner: Dedicated to provide for the health, safety, and welfare of the residents of Muskegon County; to protect their lands and quality of life; to develop watershed management practices that address storm water runoff while promoting protection and restoration of our Great Lakes water resources. The Muskegon County Drain Commissioner's office is responsible for the operation and maintenance of over 215 miles of waterways throughout the county. Its goal is to develop a watershed management approach to provide for the health, safety, and welfare of the residents, while protecting and restoring water resources. This is done through partnerships with watershed groups, municipalities, and

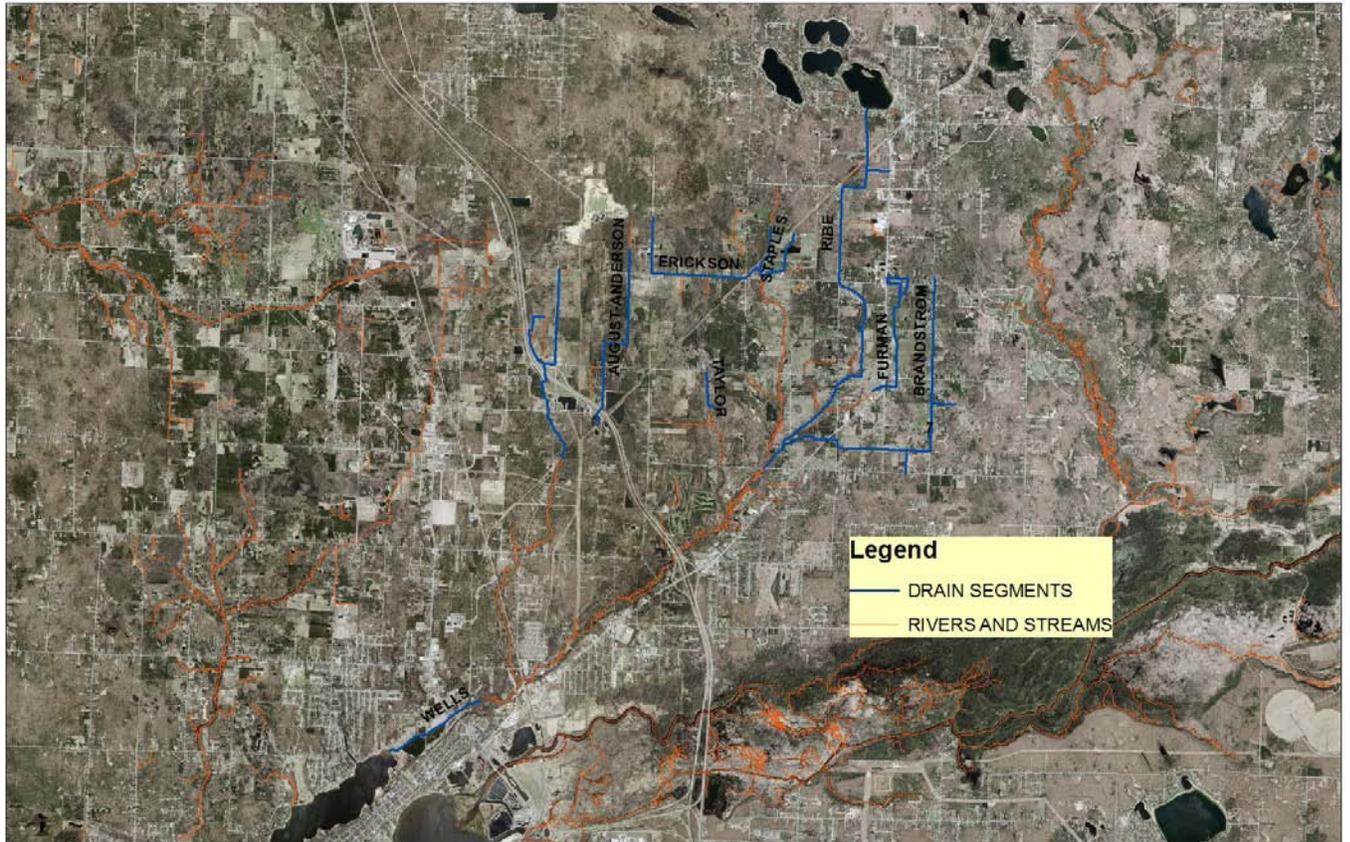
agricultural communities, providing education and outreach to the users of the county drain system, and the review of major developments to ensure that their storm water design has a minimum impact on water quality. Furthermore, the Drain Commissioner's office is part of the Muskegon Area Storm Water Committee, which works together to fulfill EPA Phase II stormwater permit requirements. Through this committee the Drain office works on limiting the impact that county drains have on water quality by implementing a public education plan, eliminating illicit discharges to county drains, incorporating best management practices into maintenance plans, and requiring low impact designs on future business and subdivision developments.

B. Future Land Use Map - Muskegon County North Central Joint Planning Commission.



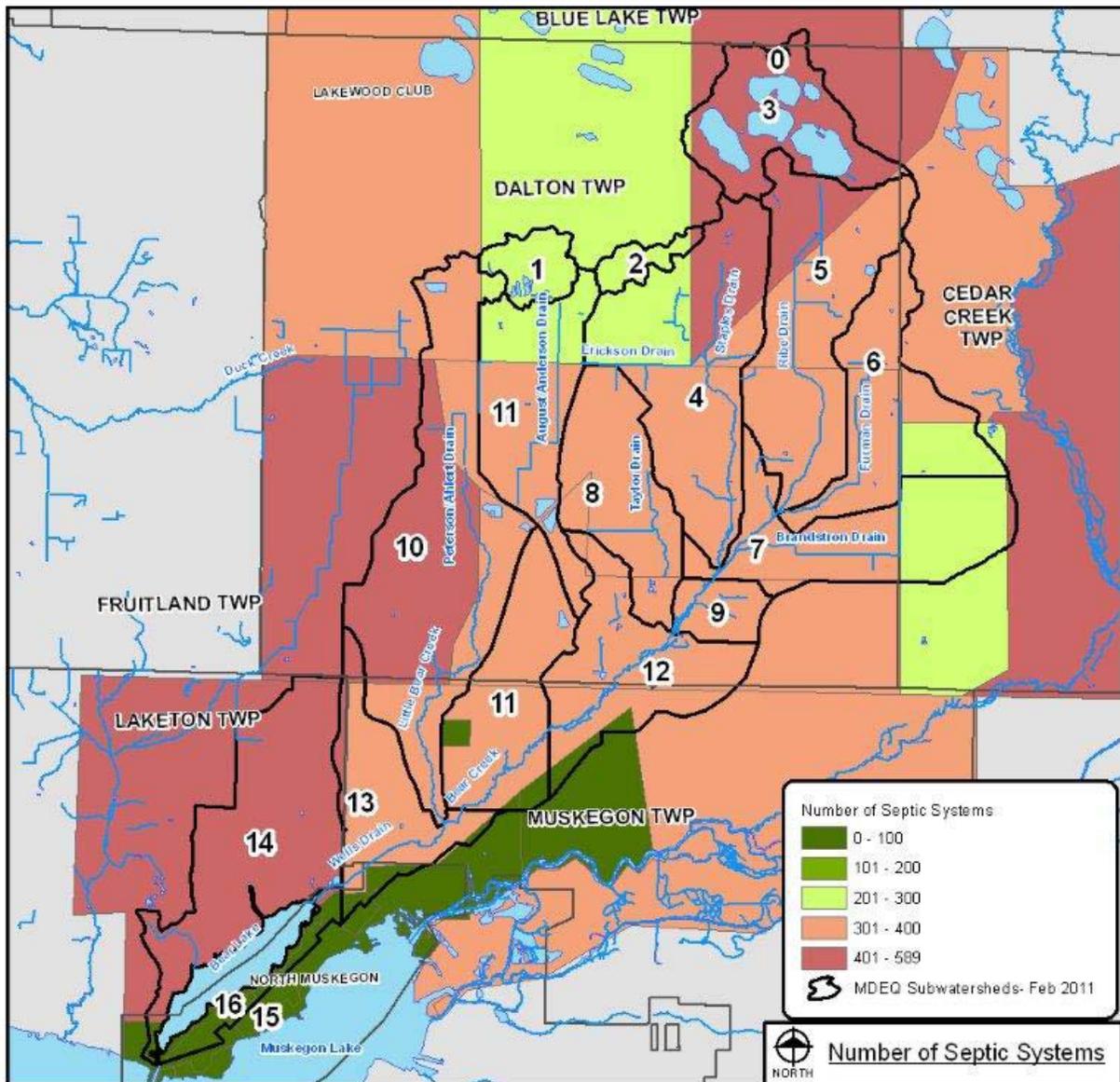
The Muskegon County North Central Joint Planning Commission formed to coordinate growth and development along the growth corridors, as indicated by its future land use map. The JPC is discussing the development of a stormwater management plan for the Whitehall Road and Holton Road/M-120 Growth Corridors.

C. Muskegon County Drain Map - Bear Creek Watershed



The Muskegon County Drain Commissioner is discussing the concept of consolidating drains on a watershed basis with Bear Creek local government officials, for the purpose of advancing future NPS project implementation and financing for improved water quality into the future.

E. Septic Suitability Map - Bear Creek Watershed



Public Health Muskegon County implements and enforces the Public Health Code of the State of Michigan, PA 368 of 1978. The Code requires PHMC to maintain, implement and enforce an up to date Onsite Sewage Disposal regulation. Practices include mandatory setbacks to surface water, increased lot density, increased isolation to surface water, increased isolation to ground water, mandatory wetland evaluations when groundwater is less than 18" below ground, and enforcement of setbacks to flowing ditches

Appendices

- A. Summary Spreadsheet of Local Government Ordinance Review Check Lists for Water Quality Measures
- B. Feasibility Feedback from Local Government Workshop

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