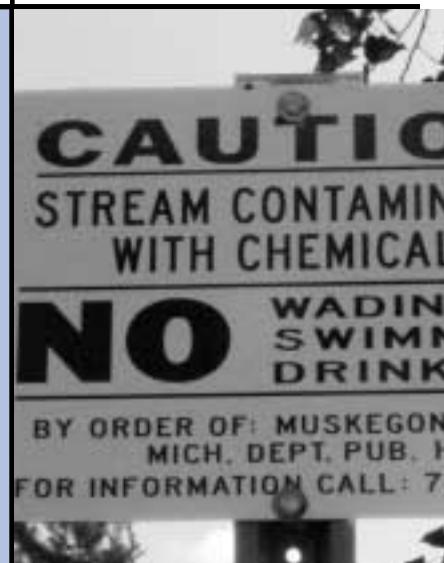




Mona Lake Watershed Stewardship Assessment



Lake
Michigan
Forum
October
2003



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The following people participated in the assessment:

Troy D. Abel	Dave Fisher	Jane E. Pater
Donald Adams	Andrew Frank	Dave Peden
Reatha Anderson	Tim Hall	Mary Powers
Ronald K. Baba	Vicky Harris	Laura Rauwerda
Sharon Baker	Gary Hasper	Jill Ryan
Jerry Bartoszek	Brian Hill	Rick Sietsema
Judy Beck	T.J. Holsen	Lee Slaughter
Al Bell	Martin Hulka	Connie Smith
Tom Berdinski	Martin Jaffe	Larry Smith
Arnold Boezaart	Abigail Jarka	Lyle Smith
Anne Braisie	Tony Jarvis	Billy Stancroft
Timothy H. Brown	Jerry Jones	Al Steinman
Elizabeth Browne	Keith Kantola	Annoesjka Steinman
Barry Burns	Bill Kelley	Cynthia J. Sullivan
Erin Busscher	Dave Kendrick	Janet Vail
Thad Cleary	Kate Kremmel	Alexander Vasiliev
Kathe Corson	Cindy Larsen	John Warner
Nancy Crandall	Jill Montgomery	Vicki Webster
Rol Crummel	Brenda Moore	Sue Weirengo
John Day	Jamie Morton	Bob Whiteman
Kathy Evans	Greg Mund	Rillastine R. Wilkins
Ed Field	Patty O'Donnell	Steven Wilson
Mark Fife	Tom Occhipinti	Cindy Winsemius

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Executive Summary

During the spring and summer of 2003, the Lake Michigan Forum, a committee of public stakeholders providing input to USEPA on the Lake Michigan Lakewide Management Plan (LaMP), conducted an assessment of environmental stewardship in Michigan's Mona Lake watershed. The Mona Lake Watershed Stewardship Assessment process was aimed at identifying opportunities for creating a permanent ethic of environmental stewardship among leaders and the general public in the local watershed. The Lake Michigan Forum



Mona Lake Shoreline

sees this ethic of stewardship - a commitment by government, businesses, other organizations, and individuals to restore and protect the ecosystem into the future - as essential in watersheds at the local level, in order to establish the sustained health of the Lake Michigan basin as a whole. The Forum hopes to conduct similar assessments in other watersheds around the basin in coming years, as a means of enhancing stewardship activities in local communities and focusing broader regional policy and resources in order to build stewardship capacity at the watershed level.

Working closely with many local partners in this small watershed located almost entirely within Muskegon County in western Michigan, the Lake Michigan Forum gathered existing environmental information and interviewed individuals living and working in the Mona Lake watershed. Using the resulting information, the Forum characterized existing stewardship activities in the watershed and compared these against a set of elements that, if in place, would represent a "best-case stewardship scenario" for any watershed. The Forum explored those elements that seemed not to be in place in the Mona Lake watershed and developed an initial set of strategic opportunities for enhancing stewardship. This set of opportunities was further refined and developed through focus groups and additional analysis on the part of the Forum.

The stewardship opportunities are presented by the Lake Michigan Forum in this report as clusters of recommendations organized under the following categories:

- ◆ Existing Laws and Planning Efforts
- ◆ Legacy Pollution and Remediation Efforts
- ◆ Pollution Prevention and Waste Minimization
- ◆ Stormwater Management and Non-Point Source Pollution
- ◆ Conservation and Biodiversity
- ◆ Community Engagement

These recommendations are targeted toward leaders and decision-makers in the Mona Lake watershed's local governments, as well as non-government organizations such as the new Mona Lake Watershed Council. State and federal agencies might also play a role in implementing the recommendations presented here. The recommendations are not listed in order of priority, and many of them will not be easily or quickly achieved. A valuable first step might be for local stakeholders to come together to review and discuss the Forum's

assessment results and engage in a process of prioritizing them for action, creating an implementation plan for those deemed most important. In any case, it is the Forum's belief that a diverse constituency of interested parties with a willingness to work across political and social boundaries within the watershed, is critical to successfully implementing any of the following recommendations for increasing environmental stewardship in Michigan's Mona Lake Watershed:

Recommendations

◆ Existing Laws and Planning Efforts

- Convene units of government to consider a set of model ordinances and work through a process that will lead to widespread adoption.
- Train on how enforcement and implementation of these ordinances can impact the environmental health of the watershed.
- Integrate stormwater and soil erosion and sedimentation control programs into construction site inspections.
- Establish a framework for implementation that goes beyond the planning process.
- Use tax incentives and other policy tools to encourage local business owners to integrate environmental considerations into their regular decision-making processes.

◆ Legacy Pollution and Remediation Efforts

- Continue to monitor existing remediation efforts and consent decrees for effectiveness.
- Identify remediation, restoration or pollution prevention opportunities eligible for funding through Supplemental Environmental Projects (SEPs).

◆ Pollution Prevention and Waste Minimization

- Establish a Good Neighbor Dialogue with companies and community groups to address pollution prevention and other watershed-related issues.
- Encourage existing groups to incorporate pollution prevention outreach into ongoing activities.
- Promote the adoption of environmental management systems (EMSs) that include provisions for pollution prevention among area businesses and agriculture.
- Encourage employees to identify opportunities for pollution prevention and reduced costs within their company.
- Assess the potential constraints to and opportunities created by organizing a waste exchange.
- Enable government units to fill leadership roles in pollution prevention.
- Develop a 'scorecard' of toxic releases within the Mona Lake watershed to distribute annually.



Black Creek

Executive Summary

◆ Stormwater Management and Non-Point Source Pollution

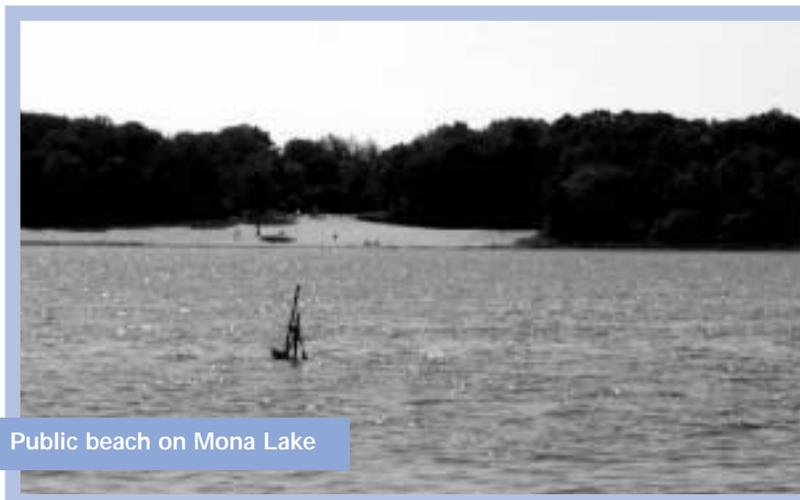
- Develop a Mona Lake watershed plan.
- Train those involved in the watershed plan on using watersheds as a unit of planning.
- Provide information on the full range of environmental issues within the watershed under the Phase II Public Education Program requirements.
- Encourage agricultural producers and other riparian landowners (e.g., drain commissioners, road commissions) to implement best management practices (BMPs) to reduce the impacts of erosion, nutrient and pest management, and stormwater runoff on water quality.

◆ Conservation and Biodiversity

- Develop an inventory of terrestrial and aquatic biodiversity hot spots and conservation needs and use it to evaluate protections in place.
- Utilize federal and state programs for conservation and habitat protection.

◆ Community Engagement

- The Mona Lake Watershed Council (MLWC) should continue its efforts to ensure broad-based representation from throughout the watershed
- The watershed council, together with local government, should develop stewardship projects that can quickly unite interests and build a constituency for the watershed.
- MLWC should request to receive MDEQ permit notices for the Mona Lake watershed.
- Hold an annual Mona Lake watershed event that incorporates a wide range of interests to celebrate the watershed and discuss priority issues.
- Develop a newsletter and other educational tools (e.g., maps) to create watershed awareness and to disseminate information on the wide range of issues that affect the watershed.
- Focus on the human health impacts of environmental degradation in order to build support for efforts to improve the watershed.
- Look for ways to sustain engagement in issues affecting the watershed after mandates expire.



Public beach on Mona Lake



I. Introduction

The Lake Michigan Forum is a group of scientists, community leaders, policy makers and implementers, and concerned conservationists from around Lake Michigan that came together to discuss the emerging bodies of work in their areas of expertise that relate to the third largest of the Great Lakes. The Lake Michigan Forum is a link between the government agencies involved in the Lake Michigan Lakewide Management Plan (LaMP) and the diverse stakeholders throughout the basin.

The LaMP is designed to guide the continuing process of collaborative ecosystem management and the partnership activities aimed at identifying the stressors to the ecosystem and the problems that result in beneficial use impairments, and selecting remedial measures. It serves as the centerpiece for an ecosystem approach to managing the lake and as the basis for an ongoing dialogue about prioritizing and addressing threats within the basin.¹

The Lake Michigan LaMP 2000 uses the definition of *ecosystem* established by the Federal Interagency Ecosystem Management Task Force:

“...an interconnected community of living things, including humans, and the physical environment with which they interact. As such, ecosystems are the cornerstones of sustainable economies. The goal of the ecosystem approach is to restore and maintain the health and sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities. Based on a collaboratively developed vision of desired future conditions, the ecosystem approach integrates ecological, economic and social factors that affect a management unit defined by ecological – not political – boundaries.”²

The Forum recognizes that the health of Lake Michigan depends on the health of its individual ecosystems, namely watersheds. Who is ultimately responsible for ensuring that the natural resources of the Lake Michigan basin are protected for future generations? The Lake Michigan LaMP 2002 offers the answer: “no single government, institution, organization, or individual has the capacity to implement stewardship and achieve sustainability in the basin as a unilateral action.”³ In practice, the ongoing local commitment within each watershed to protect and restore natural resources forms the foundation for the long-term sustainability of Lake Michigan; local supporters can monitor cleanup efforts, address ecosystem impairments, and develop an appreciation for the impacts of human activities on the local watershed.

¹ U.S. EPA. 2000. *Lake Michigan Lakewide Management Plan (LaMP) 2000*, Preface. Washington, D.C.: Environmental Protection Agency.

² Federal Interagency Ecosystem Management Task Force. November 1995. *The Ecosystem Approach: Healthy Ecosystems and Sustainable Economies*, Volume II, Implementation Issues.

³ U.S. EPA. 2002. *Lake Michigan Lakewide Management Plan (LaMP) 2002*. Washington, D.C.: Environmental Protection Agency, P-2.

I. Introduction

On the watershed scale, individuals can appreciate their roles in an ecosystem and begin to take ownership over its condition. As their awareness grows, they begin to realize that their watershed is connected to others, helping them to further appreciate the impacts of their decisions on environmental quality on a broader regional basis. Current residents must act now to ensure that the watershed will be able to provide a stable ecosystem and steady supply of natural resources for generations to come.

The Forum believes that building a constituency for each watershed based on stewardship efforts is the best strategy for ensuring long-term environmental protection for Lake Michigan. These community-based efforts are the best hope for ensuring that the degradation of the past will not be repeated and for ensuring the long-term environmental, economic and socio-cultural sustainability of the watershed.

Stewardship Assessments

In order to determine the level of commitment to restoring and protecting environmental quality around the Lake Michigan Basin, the Forum is conducting a series of stewardship assessments. Characterizing existing stewardship efforts will help to identify leverage points that can be utilized at the local level to trigger increased stewardship efforts. These strategic opportunities might involve accessing funding, technical assistance, information, training, organizing, networking, or policy development resources. In addition, the assessments will enable the Forum to better advise state and federal agencies on policies to improve the ability of communities around Lake Michigan to address environmental problems in their watersheds.

The Forum hopes that the assessment process, along with its results, will provide local stakeholders with valuable insight about each community's unique strengths and assets and that the recommendations will spur increased commitment to environmental stewardship.



Black Creek

Mona Lake Watershed

The Lake Michigan Forum selected the Mona Lake watershed in Western Michigan as the setting to conduct this stewardship assessment because of the prevalence of local partners and their willingness to participate. In addition to several Forum members who live and work in and around the watershed, a local foundation had partnered with several local agencies and research institutes to form a watershed organization.

Located in western Michigan, the Mona Lake watershed lies almost entirely within Muskegon County, except for a small piece that is located in Newaygo County. Communities within the watershed include Norton Shores, Muskegon, Muskegon Heights, Roosevelt Park, Muskegon Township, Fruitport Township, Egelston Township, Sullivan Township, Casnovia Township, Moorland Township, Bridgeton Township and Ashland Township. Encompassing only 48,000 acres, the watershed consists of three major hydrographic features: Mona Lake, Black Creek, and Little Black Creek. In addition, there are a number of smaller tributaries that enter Mona Lake. Land uses in the watershed include forest (35 percent), urban/developed (32 percent), agriculture (17 percent), and open field.⁴

Today, the Mona Lake watershed is a dichotomous mix of scenic and biologically productive areas and locations that reveal the impacts of human interaction with the resource. The continued development of the riparian zone plus the uncontrolled input of nutrients, hazardous contaminants, and sediment have resulted in significant degradation of this valuable resource and impeded restoration efforts. In these parts, the watershed faces a variety of challenges: adverse impacts of excessive sedimentation and nutrient loading, restrictions on human contact with the water, aging sanitary sewer infrastructure, the continued release of hazardous materials from abandoned industrial sites, sediment contamination, and pressures related to population expansion.

Efforts are underway, however, to address problems in the Mona Lake watershed. In addition to ongoing educational efforts and technical assistance within the watershed, Mona Lake watershed initiatives are being undertaken by the Community Foundation for Muskegon County (CFMC), the Muskegon Conservation District, and the Annis Water Resources Institute (AWRI) at Grand Valley State University. The combination of historical information about land use in the Mona Lake watershed and sampling of local water bodies for water quality, fish, and invertebrates provided by AWRI creates a more comprehensive understanding of the current state of the watershed and potential origins of its problems. Linking this information to the Mona Lake Watershed Council can help target stewardship efforts within the Mona Lake watershed to focus on the most critical issues.

Further details about the status of the ecosystem can be found in Appendix F in the “Mona Lake Ecosystem Impairment Matrix.”

⁴ Muskegon Conservation District and Muskegon County Health Department. Spring 2003. *Living in the Mona Lake, Black Creek, and Little Black Creek Watershed*, Muskegon Conservation District.

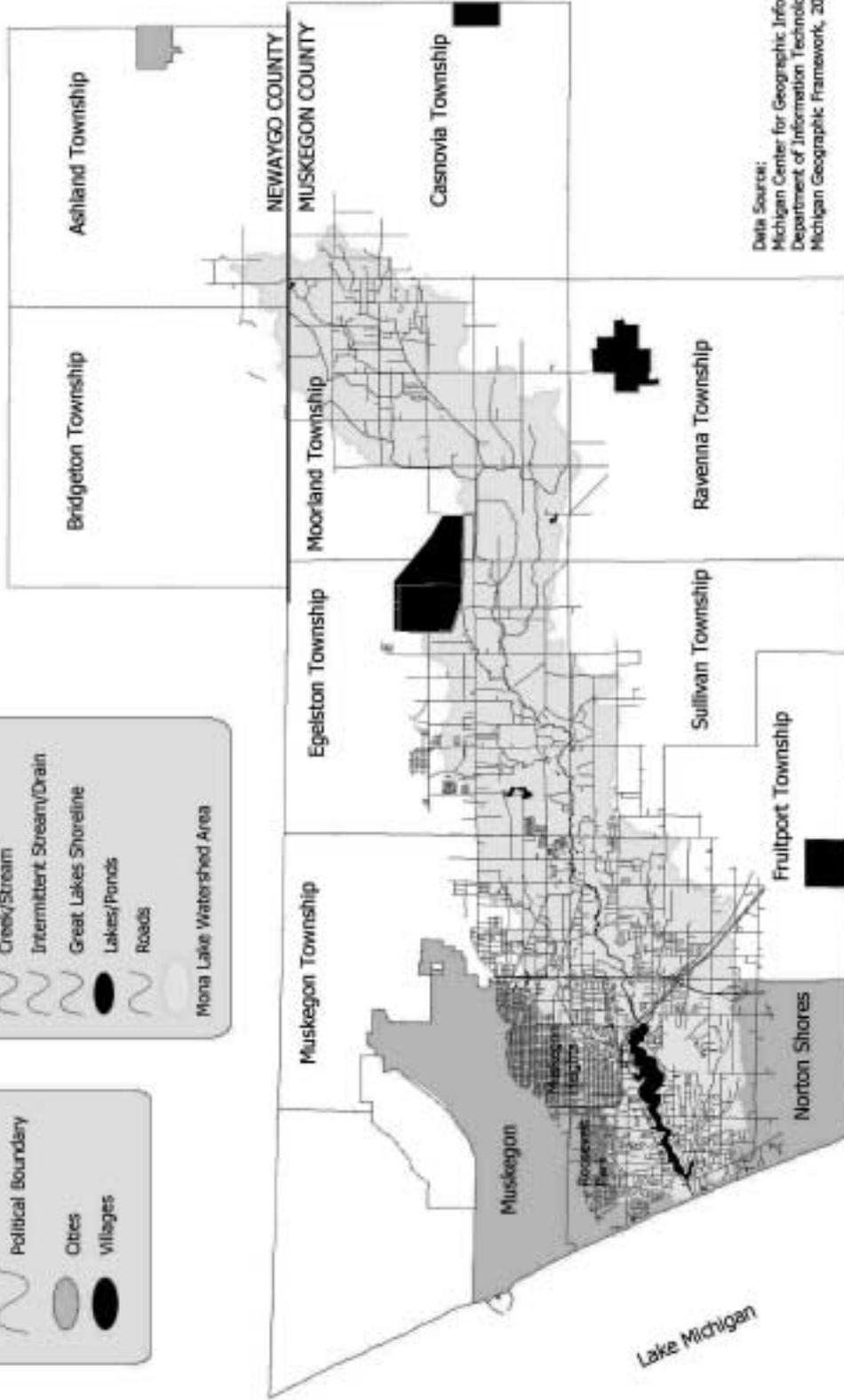
Mona Lake Watershed

Base Information

- Creek/Stream
- Intermittent Stream/Drain
- Great Lakes Shoreline
- Lakes/Ponds
- Roads
- Mona Lake Watershed Area

Political Limits

- Political Boundary
- Cities
- Villages



Data Source:
Michigan Center for Geographic Information,
Department of Information Technology,
Michigan Geographic Framework, 2003.

Information Services Center
Annis Water Resources Institute
Grand Valley State University
Map Prepared: February 2003



II. Methodology

In order to evaluate the level of stewardship in the Mona Lake watershed, the Lake Michigan Forum developed a set of elements that, if in place, would represent a “best-case stewardship scenario.” Based on the Forum’s experience around the basin, communities that fulfill all of the elements to the fullest extent are in a better position to ensure adequate protection and restoration of their local watersheds. The best-case stewardship scenario consists of the following 15 elements:

Best-case stewardship scenario

The first six elements deal with planning, implementation and enforcement issues:

- 1) Plans should be in place to address ecosystem impairments. There should be funding and sufficient stakeholder commitment to implement the identified plans. Plans may include remediation plans, Total Maximum Daily Loads (TMDLs), watershed plans, stormwater, farm and nutrient management plans, biodiversity recovery plans, habitat protection, and other related management plans.
- 2) Municipalities and other units of government should have adopted and be implementing ordinances for land use, soil erosion, habitat, pollution prevention, stormwater management and water resource protection, and be collecting associated fees.
- 3) Permits should be issued on a timely basis and not after the fact.
- 4) Permits should be issued on a watershed basis.
- 5) State and federal laws should be actively enforced in the watershed.
- 6) Ecosystem management should be integrated into all local government decision making, e.g., through the addition of an ecosystem manager to county staff.

Elements seven through nine are concerned with business and industry:

- 7) Business, industry, agriculture, and municipalities should actively practice pollution prevention.
- 8) Business, industry, agriculture, and municipalities should have adopted environmental management systems that address known and documented ecosystem impairments and protection.
- 9) There should be a proliferation of sustainable enterprises and green consumerism in the watershed.

The next four elements address community engagement:

- 10) Stakeholders should be involved in decision-making with state, tribal, and federal agencies as well as natural resource trustees.
- 11) The community should possess the capacity to engage in a collaborative process that brings about a sustained effort of deliberation.
- 12) There should be viable community-based organizations in the watershed that are effective through voluntary efforts and/or through funded staff.
- 13) Education and outreach should be occurring to engage the public, build a constituency for the watershed, and cultivate the next generation of decision-makers.

The last two elements deal with resource allocation concerns:

- 14) Private and community foundations should be aware and supportive of community-based stewardship efforts.

II. Methodology

- 15) Local, state, tribal, and federal agencies should be coordinated in their programs related to the watershed and their collective resources should be sufficiently leveraged.

Information collection

To determine the extent to which stewardship in the Mona Lake watershed matched up with the best-case scenario, the Assessment Team – comprised of local representatives and a subset of Forum members – collected information about the watershed through document review, interviews and a focus group. The Forum began the assessment of the Mona Lake watershed in mid-April 2003 and presented the results in late October 2003.

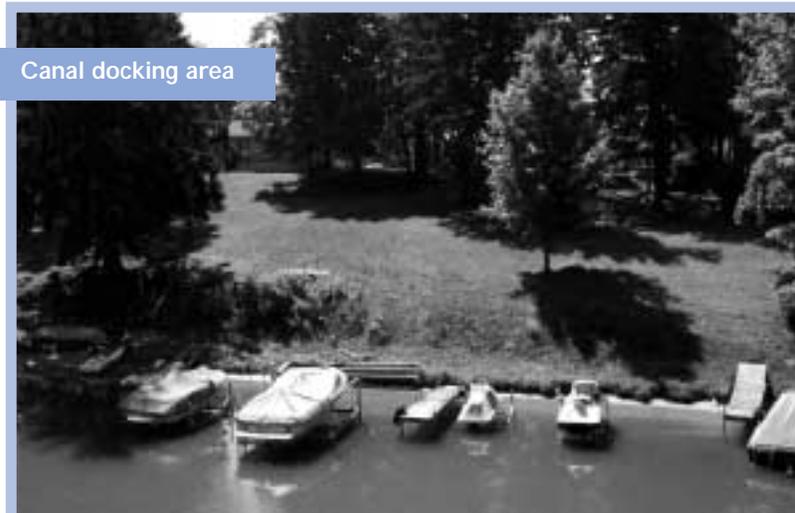


Trail near Mona Lake

Initially, the Assessment Team collected published information from internet sites of federal, state and local agencies and organizations. This involved both primary sources of information, e.g., information from the Toxics Release Inventory (TRI) and CERCLIS databases, as well as secondary sources that had already compiled information from earlier studies, e.g., the *Living in the Mona Lake, Black Creek, and Little Black Creek Watershed* fact

sheet prepared by the Muskegon Conservation District. Information about active groups in the watershed that address environmental issues, e.g., the West Michigan Shoreline Regional Development Commission, was also collected, usually from the websites of these organizations. Sources of specific statistics and information are cited throughout the body of this document and the appendices.

At the same time that the internet and other available reports were being mined for information about the environmental status of the watershed, members of the Assessment Team conducted interviews with local officials, scientists, and agency personnel. These local authorities provided direction in identifying pertinent local ordinances, insight into local attitudes towards environmental issues, and suggestions about additional sources of information about the watershed.



Canal docking area

Based on an analysis of the information gathered during the initial phases, the Assessment Team outlined a set of preliminary findings that summarized the information collected during that research phase in very general terms and identified opportunities to enhance stewardship in the Mona Lake watershed.

These findings were presented to focus groups held in Egelston Township on July 30, 2003, with thirty stakeholders present who represented a diversity of interests. The focus group discussions sparked additional questions about issues facing the communities in the watershed and the identification of additional strategies for enhancing stewardship. Thus, an additional phase of information gathering – including both literature review and interviews – was conducted to follow up on ideas generated during the focus group meeting. These results were combined with all of the existing information compiled for this assessment, and a second, more comprehensive and in-depth document was prepared. After another iteration of Forum review, a draft final document was distributed to members of the Mona Lake Watershed Council for comment. The watershed council's input was taken into consideration in compiling this final report on the stewardship in the Mona Lake watershed.

The following section of this document provides the results of the Lake Michigan Forum's stewardship assessment in the Mona Lake watershed. Without the cooperation and collaboration of scores of local stakeholders, this assessment would not be as comprehensive as it is. The Lake Michigan Forum respectfully offers the recommendations presented in this stewardship assessment as strategic opportunities for restoration and protection of the Mona Lake watershed ecosystem.

III. Results of the Mona Lake Watershed Stewardship Assessment

This section of the report presents the results of the stewardship assessment conducted in the Mona Lake watershed by the Lake Michigan Forum. In addition to providing some background information about local environmental conditions, the observations evaluate the extent to which stewardship in the Mona Lake watershed matches up with the Best-Case Stewardship Scenario presented in Part II of this report. The recommendations highlight opportunities for aligning stewardship in the Mona Lake watershed with the elements of the Best-Case Stewardship Scenario.

The findings are organized into the following sections according to six broad subject areas:

- ◆ Existing Laws and Planning Efforts
- ◆ Legacy Pollution and Remediation Efforts
- ◆ Pollution Prevention and Waste Minimization
- ◆ Stormwater Management and Non-Point Source Pollution
- ◆ Conservation and Biodiversity, and
- ◆ Community Engagement

These categories differ from the categories of elements in the Best-Case Stewardship Scenario in order to better organize the observations and recommendations.

Using this report

While preparing this report, the Forum attempted to make the body of the report – Section III – accessible for the general public. Thus, the information collected under each of the broad headings is explained in the Observations subsection for each of the six subject areas in very general language. The Recommendations subsection for each subject area highlights possible actions that stakeholders can take to enhance stewardship in the Mona Lake watershed.

The corresponding appendix for each section is directly correlated to the content of the Observations and Recommendations subsections. In order to make the document as

readable as possible, specific details about the programs, companies, and resources described in the main body of the document are supplied in the appendices. Reading the body of the document alone will give a broad overview of the stewardship in the Mona Lake watershed; consulting the appendices will better define the challenges and opportunities that the Forum identified in the watershed.



◆ Existing Laws and Planning Efforts - Observations

- In order to evaluate the extent to which local governments have already integrated watershed issues into existing legal instruments, the Assessment Team looked for ordinances and laws within each jurisdiction that addressed the following issues: land use, soil erosion, habitat, pollution prevention, stormwater management and water resources protection. On the whole, land use, stormwater management and soil erosion are either addressed in municipal ordinances or through state and county laws that apply to the government units in the watershed. In most cases, laws addressing broader topics, such as zoning, include provisions related to these issues. Few units of government address habitat protection, water resource protection or pollution prevention in their policies or ordinances.
- Historically, the responsibilities for land use planning and erosion control have been handed down to local governments; up to this point, these individual units of government have not coordinated their efforts. With increasing population density, the effects of this lack of coordination are becoming progressively more obvious.
- There is not an extensive inspection force in place for most permit programs administered by local governments. Only a few programs provide for regular inspections (e.g., soil erosion and sedimentation control). In most cases, local governments only visit a site to assess compliance after receiving notice of a violation from the public. Since many citizens do not fully understand the laws that protect the environment in their watershed, they often do not know when to report a violation. Thus, problem sites may not be identified.
- Coordinated planning processes that involve constituents of the Mona Lake watershed exist, but the units of planning extend beyond the borders of the watershed. The Muskegon Areawide Planning (MAP) process and the West Michigan Strategic Alliance (WMSA), for example, address environmental concerns in different capacities, but they are concerned with issues affecting broader geographic areas, not those unique to the Mona Lake watershed. As a result, plans to resolve the specific impairments to the Mona Lake watershed may not be incorporated into the plans created by these groups.

In both the MAP and the WMSA, one subgroup focuses on broad environmental issues. Whereas the WMSA focuses on the longer-term planning of conservation efforts, the MAP's efforts look at the more immediate need for conservation; no formal coordination is happening at this time. The specific planning efforts underway in each process that address watershed concerns are as follows:

- WMSA's Green Infrastructure Task Force recently called for a report, "Analysis of Initiatives and Best Practices for Regional Green Infrastructure Visioning and Policy Setting," as part of a process to develop a comprehensive approach to land conservation efforts throughout the West Michigan region.
- Participants in the MAP process formed the Farmland and Open Space (FLOS) committee with the intent of drafting a recommendation for a conservation ordinance within six to 12 months of the completion of the MAP. This recommendation

III. Results: Existing Laws and Planning Efforts

will supplement the general recommendation by the MAP that the county adopt a measure to conserve farmland and open space.

- Despite these examples of coordinated planning efforts, local government units do not intentionally coordinate ordinance development or enforcement. This is especially true among municipalities within the watershed located in different counties.
- Furthermore, units of government utilize separate regulatory programs to monitor interrelated environmental threats. Specifically, the stormwater management requirements, non-point source runoff, and soil erosion and sedimentation programs are designed to mitigate similar environmental impacts, the risks for which are highest at the same types of locations, especially construction sites. Despite the fact that the causes and effects of these issues are closely linked, permits are issued for each activity individually.
- On the whole, local elected officials do not appear to support mandated uniform ordinances. Most leaders give priority to the maintenance of local authority but would consider the voluntary adoption of model ordinances that protect the environment in the watershed.
- The U.S. Department of Agriculture (USDA) requires users of federally designated Restricted Use Pesticides to keep records for two years after the year of application, and includes seven elements on the application. These records must be available to authorized representatives of USDA and Michigan Department of Agriculture (MDA) or attending health professionals treating exposed individuals.
- All USDA program participants are to meet specific requirements if they farm highly erodible land (HEL) and/or convert non-crop bearing land; if the requirements are not met, the farmer forfeits all eligibility for assistance or benefits from USDA programs. Each program includes different provisions for reducing the impacts of agriculture on the environment, including crop residue management, grassed waterways, buffer strips, and restrictions on farming wetlands. Since the initial adoption of these regulations in 1985, however, the requirements have been weakened.
- The Michigan Department of Agriculture and DEQ have programs to assist – and in some case require – farms to lessen the impact of their agricultural operations on the environment. The Right To Farm law affords liability protection from nuisance lawsuits for normal farming operations if those operations meet Generally Accepted Agricultural Management Practices (GAAMPs). A second program requires large animal feeding operations (1,000 animal units or more) to either obtain a permit under the DEQ's NPDES program requirements, or meet the Michigan Agricultural Environmental Assurance Program (MAEAP) requirements. Operations with 5,000 animal units or more must also obtain a ground water discharge permit from the MDEQ under the NPDES program processes.



Sign posted in Johnny O. Harris Park in Muskegon Heights

◆ Existing Laws and Planning Efforts – Recommendations

- ~ Convene units of government to consider a set of model ordinances and work through a process that will lead to widespread adoption.
- ~ Train on how enforcement and implementation of these ordinances can impact environmental health of the watershed.
- ~ Integrate stormwater and soil erosion and sedimentation control programs into construction site inspections.
- ~ Establish a framework for implementation that goes beyond the planning process.
- ~ Use tax incentives and other policy tools to encourage local business owners to integrate environmental considerations into their regular decision-making processes.

- ~ **Convene units of government to consider a set of model ordinances and work through a process that will lead to widespread adoption.** The group would first identify areas in which existing laws successfully protect the environment through active implementation and enforcement. If each local government is already proficient in even one area and other local governments want to learn from that example, they will make significant progress towards improving the condition of the Mona Lake watershed.

After recognizing these successes, the group would work towards selecting a set of model ordinances to address watershed issues that all units in the watershed would adopt. Sets of model ordinances already exist that address these types of issues; this group would need to identify which ones fit the local situation and then modify them as appropriate. The rewritten ordinances would include enforcement guidelines.

It is vital that stakeholders not currently engaged in Mona Lake watershed issues become involved in order to make this a truly watershed-wide effort. Representatives of the government units from Newaygo County that are located in the watershed need to enter the discussion in order to share their success stories as well as to coordinate with the other communities in the watershed. The Muskegon County Stormwater Committee, the Mayors and Managers group, MAP or FLOS might provide venues for pursuing this type of partnership. After creating the ordinances, implementation will require active public participation and education, which are beginning to materialize through the Mona Lake Watershed Council and other activities throughout the watershed. The success of the watershed approach to coordinating ordinances will depend on the levels of involvement of new partners.

- ~ **Train on how enforcement and implementation of these ordinances can impact the environmental health of the watershed.** Representatives of local government as well as of the public should seek training on the relationship between public decisions and investments and the overall environmental quality in the watershed. Representatives of government will benefit from understanding how to analyze possible policies and laws to determine their environmental impacts, whether intentional or incidental. With the same training, members of the public can hold local governments accountable for the effects of their decisions, leading to a better-informed dialogue and decision-making process. The EPA and Michigan Department of Environmental Quality have resources on topic. (See Appendix A.)

III. Results: Existing Laws and Planning Efforts

- ~ **Integrate stormwater and soil erosion and sedimentation control programs into construction site inspections.** Since the causes of these environmental problems are all related, integrating the permitting and monitoring of these programs would enable the regulatory agencies to maximize their capacity. At the same time that inspectors regularly visit construction sites to ensure that the proper soil erosion and sedimentation control permits have been obtained, they have the opportunity to assess the site's compliance with other requirements, such as stormwater management.
- ~ **Establish a framework for implementation that goes beyond the planning process.** The process of collaborative planning is vital, but the collaboration must not stop after agreements are made about how to proceed. In order to ensure implementation, a plan should provide for a framework of cooperation and accountability so that contributors stay focused on the goals set forth in the planning documents when the next planning effort begins. Identifying potential resources for implementing the plan is one important aspect of this framework. Investigating how the identified goals might fit into existing state funding programs or practices – or pre-existing regional or local programs can help identify prospects for future funding.



Sign posted on Peerless Plating property

- ~ **Use tax incentives and other policy tools to encourage local business owners to integrate environmental considerations into their regular decision-making processes.** By making use of tools already in place, leaders in the Mona Lake watershed can facilitate the implementation of their ideas. As a condition of receiving tax breaks for maintaining open space or farmland, landowners would have to implement measures to protect local groundwater and surface water quality. By adding such criteria to existing local or county assessments, policy makers can guarantee that real environmental benefits materialize from leaving land undeveloped.

◆ Legacy Pollution and Remediation Efforts – Observations

The observations included in this section are intended to give the reader a very general sense of the status of the environmental condition of the watershed and the extent to which companies/organizations are complying with state and federal laws intended to protect the watershed. Explanations of some of the terms used in this section as well as specific details about the nature of site contamination, the laws that have been violated, impairments to area water bodies, and other issues discussed in this section can be found in Appendix B.

- There are four Superfund sites listed on the National Priorities List (NPL) in the Mona Lake watershed, three of them within one-half mile of Black Creek: Bofors Nobel, SCA Independent Landfill, and Thermo-Chem/Thomas Solvent. The fourth site, Peerless Plating, is located northwest of Little Black Creek and one mile north of Mona Lake.
- Some regulated companies in the Mona Lake area have had significant contamination problems and have been cited for violating existing statutes. Other companies subject to federal regulation continue to fulfill reporting requirements and have not been cited for violations of these or any other laws. Details about state consent decrees, violations cited, and companies subject to federal regulation are included in Appendix B.
- Information, monitoring data, or reports that determine the extent to which remedial actions undertaken at the sites listed above have succeeded in addressing environmental problems were not identified. Monitoring done by the Annis Water Resources Institute at Grand Valley State University, however, indicates that at least one remedy (Peerless Plating) may be failing; cadmium levels in Little Black Creek just downstream of the Peerless Plating Superfund facility are the highest in the Great Lakes region.
- In 2003, DEQ issued fish consumption advisories because of the risk of human exposure to PCBs in the fish from Mona Lake and Black Creek.
- Impairments to the beneficial uses of three water bodies in the Mona Lake watershed were identified by DEQ. For Mona Lake, EPA found high levels of mercury and PCBs. Impairments to Little Black Creek included high levels of phosphorus, pathogens, and algae; a poor fish community; and a poor macroinvertebrate community. Black Creek is listed for not supporting a coldwater fishery (loss of habitat) and high levels of PCBs, which is to be addressed with the Mona Lake TMDL.
- Muskegon Heights identified approximately 100 brownfields sites in 1999 through a grant from the U.S. EPA's Brownfield Pilot Program. Because the state of Michigan defines the term 'brownfields' differently than the EPA, however, not all of the sites identified need remediation; fifteen of these brownfield sites were identified as priorities for remediation by Muskegon Heights. Of those sites, two have already been redeveloped: the Wagner Property and the ML Houston site. One additional site, the Bennett Pump site, is scheduled for remediation.

III. Results: Legacy Pollution and Remediation Efforts

◆ Legacy Pollution and Remediation Efforts – Recommendations

- ~ Continue to monitor existing remediation efforts and consent decrees for effectiveness.
- ~ Identify remediation, restoration or pollution prevention opportunities eligible for funding through Supplemental Environmental Projects (SEPs).

~ **Continue to monitor existing remediation efforts and consent decrees for effectiveness.** In many cases, the regulatory agencies outlined the remedies for contamination of sites within the Mona Lake watershed nearly a decade ago. Given the cadmium levels detected near the Peerless Plating site, the DEQ should publicly re-evaluate the ongoing efficacy of remediation projects for the Superfund sites in the watershed.

- **Ensure that the monitoring data is available to the public.**

Since the organizations responsible for cleaning up Superfund sites submit regular reports to the regulatory agencies that include both monitoring data and updates on remedial activities, DEQ and EPA

should provide this information to the public on a more regular basis. While the CERCLIS online database provides historic documentation about the Superfund sites, the public can only obtain the most recent data by directly contacting the EPA or DEQ; most often, acquiring the data requires the interested party to submit a Freedom of Information Act (FOIA) request, which takes approximately four weeks to process. DEQ and EPA should communicate the availability of new data to the public on a regular basis.



SmartZone Center

~ **Identify remediation, restoration or pollution prevention opportunities eligible for funding through Supplemental Environmental Projects (SEPs).** The community should prepare project ideas to present when agencies pursue enforcement actions against local facilities. For example, the Muskegon County Health Department secured funding for beach monitoring through a SEP with the Muskegon County Wastewater Management System (MCWMS). In this arrangement, the local facility had the opportunity to help fund the implementation of a local project rather than sending fines to the state or federal regulatory agency. Once the projects have been conceived, they must be communicated to the relevant local, state, and federal authorities, namely, those who would be involved in crafting consent decrees or enforcement actions.

◆ Pollution Prevention and Waste Minimization - Observations

- Companies, agencies, organizations and individuals practice pollution prevention within the Mona Lake watershed, but only to a limited extent.
- Thirty facilities within the Mona Lake watershed must report their releases and handling of hazardous pollutants to regulatory authorities. This means that the agencies maintain records of the amounts of contaminants that these facilities emit to the air, water or soil, presenting an opportunity to track companies' commitments to pollution prevention.
- Five companies in the watershed participate in either the Michigan Business Pollution Prevention Program (MBP3), the Michigan Clean Corporate Citizens program, or have adopted environmental management systems (EMS). It is unclear, however, whether or not the companies that have adopted EMSs have incorporated pollution prevention practices into their plans.
- Other organizations in the watershed encourage pollution prevention and recycling efforts, although the levels of success are unclear.
- The Muskegon Conservation District and USDA-NRCS work with farmers to develop conservation plans aimed at minimizing the detrimental environmental impacts of farming. Approximately 80 percent of the farms in the watershed have conservation plans. There is a need, however, to update the majority of these plans.
 - The City of Muskegon is one of 11 SmartZone Districts designated by the state; the designated area is intended to act as an incubator for technologies by attracting entrepreneurial intellectuals to spur research and economic development around the designated area. Muskegon is trying to maximize the resources available from the state by combining the SmartZone program with NextEnergy, a Detroit-based organization that promotes alternative energy technologies.
 - The Muskegon County Department of Public Works coordinates many of the ongoing recycling efforts throughout the county. The county website outlines many of these efforts in detail. Services include drop-off recycling, household hazardous waste collections, used oil recycling, and plastic grocery bag recycling.



Signs posted on Sun Chemical property

III. Results: Pollution Prevention and Waste Minimization

- The West Michigan Shoreline Regional Development Commission is involved in the development of an ecoindustrial park within the watershed.
- The West Michigan Sustainable Business Forum coordinates a recycling program for electronic devices and used tires.
- Several working groups throughout the area are considered to have the potential to promote pollution prevention to stakeholders:
 - Muskegon County Environmental Coordinating Committee (MCECC)
 - West Michigan Sustainable Business Forum (WMSBF)
 - West Michigan Strategic Alliance (WMSA)
 - Muskegon Chemistry Council
 - Air and Waste Management Association, West Michigan Chapter
 - Regional Office of DEQ – Pollution Prevention Division



◆ Pollution Prevention and Waste Minimization Recommendations

- ~ Establish a Good Neighbor Dialogue with companies and community groups to address pollution prevention and other watershed-related issues.
- ~ Encourage existing groups to incorporate pollution prevention outreach into ongoing activities.
- ~ Promote the adoption of environmental management systems (EMSs) that include provisions for pollution prevention among area businesses and agriculture.
- ~ Encourage employees to identify opportunities for pollution prevention and reduced costs within their company.
- ~ Assess the potential constraints to and opportunities created by organizing a waste exchange.
- ~ Enable government units to fill leadership roles in pollution prevention.
- ~ Develop a 'scorecard' of toxic releases within the Mona Lake watershed to distribute annually.
- ~ Identify funding opportunities to implement pollution prevention strategies.

- ~ **Establish a Good Neighbor Dialogue with companies and community groups to address pollution prevention and other watershed-related issues.** Engaging local industry in a dialogue can facilitate mutual understanding of the company's impacts on both the environment and the community and the company's

III. Results: Pollution Prevention and Waste Minimization

efforts to address these impacts. This type of process can be used to facilitate the adoption of pollution prevention measures. Such an effort could build on the efforts of the Egelston Citizens Safety Awareness Committee in developing relationships with area businesses.

~**Encourage existing groups to incorporate pollution prevention outreach into ongoing activities.** Since some groups already meet regularly to discuss issues related to general business practices or to a specific industry, venues already exist in which to introduce relevant pollution prevention activities. Some examples of this strategy include the following:

- Encourage the Muskegon County Chamber of Commerce to introduce a Green Business Committee for businesses in the watershed.
- Promote the development of eco-industrial parks where waste exchanges can take place, reducing the total amount of waste disposed.
- Take advantage of the pollution prevention expertise in the Department of Environmental Quality, including the services offered by the District Pollution Prevention Coordinator and waste assessments by the Retired Engineers Technical Assistance Program (RETAP).

~**Promote the adoption of environmental management systems (EMSs) that include provisions for pollution prevention among area businesses and agriculture.** EMSs provide for the adoption of a framework within organizations to identify environmental impacts and address them. Since one of the members of the Muskegon Chemistry Council has already adopted an EMS, this working group might present an opportunity for proliferating these strategies among industries in the Mona Lake area. On the agricultural side, the Muskegon Conservation District develops Farm Conservation Plans in cooperation with area farmers, which could serve as foundations for developing agricultural EMSs. In this context, area producers could track agricultural chemical use and management.

In both the agricultural and industrial settings, the organizations conducting EMSs should be encouraged to look beyond their property line to examine the impacts of their operations on local ecological systems. By recognizing the effects of their operations on the surrounding ecosystems, organizations can select strategies to address their environmental impacts that will yield the most significant improvements in overall environmental quality. An ecosystem-based EMS would enable these organizations to identify the full range of the environmental impacts of their operations and then prioritize them in the context of the condition of the local environment. Involving the public in the development of EMSs is another strategy to ensure that the maximum environmental benefits are gained through this systematic approach.

~**Encourage employees to identify opportunities for pollution prevention and reduced costs within their company.** Employees can often identify opportunities for pollution prevention that managers or ownership misses, simply because they encounter the opportunities on a day-to-day basis. Often, these pollution prevention opportunities would reduce costs by reducing waste or improving efficiency. To encourage employees to share their ideas, companies could design incentive systems, e.g., annual recognition of employees who identify potential pollution-saving practices.

III. Results: Stormwater Management and Non-Point Source Pollution

~**Assess the potential constraints to and opportunities created by organizing a waste exchange.** Waste exchanges enable a company to use another company's waste in their production process. In doing so, the amount of landfilled waste is reduced, and the amount of energy required to produce fresh raw materials is also reduced, creating environmental benefits. Conducting a feasibility study within the Mona Lake watershed would require an assessment of the waste produced by area businesses as well as their needs for production materials.

~**Enable government units to fill leadership roles in pollution prevention.** To build credibility in the community and prove that organizations can practice pollution prevention within a budget and without completely overhauling an entire management structure, local government can integrate examples of pollution prevention practices into regular operating protocols and share these developments with the public.

Homes built along
Mona Lake shoreline



~**Develop a 'scorecard' of toxic releases within the Mona Lake watershed to distribute annually.** Keeping residents aware of the sources of pollutants within their community will help them to recognize the need for pollution prevention activities. Calculating the total amount of toxic releases, air emissions, and/or hazardous waste produced by facilities in the watershed, or other locally-relevant metrics might be used as part of the

scorecard. Appendix D outlines several of the reporting mechanisms that might prove valuable in putting together such a scorecard.

Stormwater Management and Non-Point Source Pollution - Observations

- Based on estimates from a land transformation model developed by researchers at Michigan State University, the state of Michigan will lose 1.9 million acres of farmland and 25 percent of its orchard land in the next 40 years. "Built" land will increase by 4.1 million acres, which will more than triple the amount of built land in the state of Michigan.⁵

As quoted in the Lake Michigan LaMP 2002, the EPA's Office of Environmental Information affirms, "the construction of impervious surfaces such as roads and rooftops leads to the degradation of water quality by increasing runoff volume, altering regular stream and watershed hydrology, reducing groundwater recharge and increasing stream sedimentation and water acidity."⁶ In response to the likely intensification of these threats in the Mona Lake watershed, local efforts to effectively manage stormwater and non-point source runoff will be vital to the sustainability of the watershed.

⁵ Public Sector Consultants. November 2001. "Michigan Land Resource Project." East Lansing, MI: Michigan Economic and Environmental Roundtable. Available:

<http://www.publicsectorconsultants.com/Documents/lbilu/index.htm>

⁶ EPA. 2002, p. 48.

III. Results: Stormwater Management and Non-Point Source Pollution

- New federal policies that require municipalities and other dischargers to meet six minimum measures of stormwater management have served as a unifying force throughout most of the watershed. These requirements led to a countywide effort to organize the Muskegon County Stormwater Committee (MCSC). In early 2002, Laketon, Muskegon and Dalton townships initiated an effort to coordinate the municipalities' applications for Phase II Stormwater Management permits through the MCSC. Membership includes representatives from around Muskegon County:

Dalton Township	Muskegon County Drain Commissioner*
Fruitport Township*	Muskegon County Road Commission*
Laketon Township	City of Muskegon Heights*
City of Muskegon*	Norton Shores*
Muskegon Township*	Roosevelt Park*
	Sullivan Township*

* Indicates a jurisdiction that is at least partially located in the Mona Lake watershed.

- Every unit of government in the watershed required to apply for a Phase II permit, with the exception of Egelston Township, is participating in the MCSC. Like the rest of the municipalities in the watershed, Egelston Township is not required to submit a permit application until March 2004. Unlike its neighbors, however, Egelston Township chose not to participate in the initial collaborative effort and will have to submit an application independently.
- A total of five units of government in watershed are not participating in MCSC: Casnovia, Egelston, Moorland, Ashland and Bridgeton townships. With the exception of Egelston Township, none of these townships are required to obtain a Phase II permit. Casnovia, Egelston and Moorland townships are located in Muskegon County, while Ashland and Bridgeton townships are located in Newaygo County.

Ryesbol Dairy farm



III. Results: Stormwater Management and Non-Point Source Pollution

- The federal mandate to develop stormwater management plans has forced municipalities to allocate time and resources to the completion of required tasks. Because a collaborative effort provided the most cost-effective approach for preparing the applications, each member contributes some of the funds required to maintain the MCSC's efforts.
- The MCSC has undertaken a variety of activities that will be useful in addressing watershed issues. In addition to submitting completed applications for the permits in March 2003 (one year ahead of the deadline set by DEQ), the committee is creating a map of the Mona Lake watershed and developing an illicit discharge elimination plan (IDEP). The committee continues to discuss how to implement the Phase II requirements at the local level, whether each municipality will adopt an individual ordinance or whether the MCSC will approve a collective rule.

As one of its six minimum measures of stormwater management, the Phase II watershed-based permit requires the development and implementation of a Public Education Plan (PEP). Generally, the PEP "shall promote, publicize and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in stormwater to the maximum extent practicable."⁷ The PEP must address six minimum requirements established by the EPA. Jurisdictions may add additional goals as they see fit, however. The Muskegon Conservation District, Muskegon County Health Department and several watershed groups formed partnerships to design the PEP. Prior to submitting the permits, these groups agreed to implement the education and outreach portion of the requirements (the PEP), and the MCSC will rely upon these groups to ensure that the PEP requirements are fulfilled.

- The state may allocate additional resources to the Phase II program if the Michigan House of Representatives approves a bill recently passed by the Senate. SB510 authorizes the Michigan Department of Environmental Quality (DEQ) to raise prices for stormwater discharge permits in order to help fund the implementation of the program. It does not appear that any of this money would reach the municipalities directly, but it would enable the DEQ to dedicate additional resources and personnel to the timely implementation of the Phase II program.
- The USDA-Natural Resources Conservation Service (NRCS), the Muskegon Conservation District, and the Muskegon County Drain Commissioner work with agricultural producers to reduce the impact of stormwater runoff from farmland. Agricultural Best Management Practices (BMPs) are planned and implemented through the voluntary actions of each producer, with these agencies providing financial and technical services for implementation.
- The Assessment Team did not examine the impacts of agricultural drainage on stormwater management in the Mona Lake watershed. Nutrient loading is a significant impairment in the watershed, however. Further investigation into this area is needed.

⁷ Michigan Department of Environmental Quality. "NPDES Wastewater Discharge General Permit for Watershed-Based Permitting." East Lansing, MI: Department of Environmental Quality. Available: www.michigan.gov/deq Follow the links: Water/Surface Water/Storm Water/Watershed-Based General MS4 Stormwater Permit and Application/Watershed-Based General Permit.

Stormwater Management and Non-Point Source Pollution - Recommendations

- ~ Develop a Mona Lake watershed plan.
- ~ Train those involved in the watershed plan on using watersheds as a unit of planning.
- ~ Provide information on the full range of environmental issues within the watershed under the Phase II PEP.
- ~ Encourage agricultural producers and other riparian landowners (e.g., drain commissioners, road commissions) to implement best management practices (BMPs) to reduce the impacts of erosion, nutrient and pest management, and stormwater runoff on water quality.

- ~ **Develop a Mona Lake watershed plan.** The mandate within Phase II stormwater requirements to develop a watershed plan presents an opportunity for government units and other stakeholders to work together. Similar to the basis for launching the Muskegon County Stormwater Committee (MCSC), state and federal regulations require the development of a watershed plan, and therefore it should receive priority funding from local governments. With funding in place and many of the relevant connections among leaders already made, a comprehensive watershed plan could be developed.

In order to design such a plan, the MCSC must establish a forum for its development and review. In one scenario, Ashland and Bridgeton townships in Newaygo County could join government units located within the Mona Lake watershed from the MCSC in forming a subgroup of the MCSC to focus on watershed planning and the PEP within the Mona Lake watershed. Alternatively, the Mona Lake Watershed Council could take the lead in coordinating this effort. As a 501(c)3 corporation, the council could seek government or foundation/grant funding to develop a Mona Lake Watershed Plan. In any case, the Information Services Center at the Annis Water Resources Institute could serve as a resource for providing some of the background information necessary for the planning process.

- ~ **Train those involved in the watershed plan on using watersheds as a unit of planning.** Because watersheds do not fit neatly into municipal boundaries, agencies and groups involved in watershed planning must be aware of additional peripheral considerations not present in traditional planning. Some of the following groups might be able to facilitate such assistance:

- Lake Michigan Watershed Academy
- Michigan Municipal League
- Michigan Townships Association
- Michigan Association of Counties
- Michigan Society of Planning Officials
- Michigan Land Use Planning Council
- Michigan Association of Local Public Health
- Grand Valley State University – Annis Water Resources Institute
- Michigan State University Extension web-based planning and watershed training

III. Results: Stormwater Management and Non-Point Source Pollution

- ~ **Provide information on the full range of environmental issues within the watershed under the Phase II PEP requirements.** The Phase II stormwater permit explains the first educational goal of the PEP as follows: “Education of the public about their responsibility and stewardship in their watershed.”⁸ In order for the public to truly understand their responsibility within the watershed, they must understand the current condition of the watershed, be conscious of the watershed’s boundaries, and recognize that everyday actions can impact environmental quality throughout the watershed. By capitalizing on the Phase II PEP requirements, the groups involved in this effort could secure needed funds and resources from local governments that facilitate the incorporation of all of the above elements into the PEP. With this strategy, the PEP will ensure that the public grasps the concept of connectivity throughout the watershed.

If it has not yet joined these efforts, the MLWC should involve itself in the formation of the PEP through its newly-formed Education and Outreach subcommittee. Grants from the EPA or foundations may provide some financial support for this effort, but the MCSC may be another source.

- ~ **Encourage agricultural producers and other riparian landowners (e.g., drain commissioners, road commissions) to implement best management practices (BMPs) to reduce the impacts of erosion, nutrient and pest management, and stormwater runoff on water quality.** Available BMPs include riparian forest buffers, windbreaks, and erosion control structures. To identify sites where the implementation of these BMPs would yield the most significant results, the Mona Lake Watershed Council (MLWC) could work with local agencies (e.g., Muskegon Conservation District, USDA-NRCS, drain commissioners) to conduct an inventory of the streams and county drains. Local agricultural producers and other landowners can take advantage of a number of USDA Farm Bill programs and other financial assistance programs to pursue these goals. The following assistance programs could be considered:

- Environmental Quality Incentives Program
- Wetland Reserve Program
- Wildlife Habitat Incentives Program
- Farmland and Ranchland Preservation Program
- Conservation Reserve Program
- Conservation Security Program

⁸ *Ibid.*, p. 5.

Conservation and Biodiversity – Observations

- The Muskegon County Wastewater Management System's (MCWMS) 11,000-acre facility provides an excellent habitat for birds and water fowl. Among the more than 250 species documented on the grounds are some of the most rare species ever seen in Michigan. Up to 40,000 Canadian geese spend the winter at MCWMS, and dozens of other species use the facility as a rest area on their semi-annual migration between North and South America.⁹

- Overall, this assessment did not focus on conservation and biodiversity issues to a great extent. Some conservation issues were identified through the Existing Laws and Planning Efforts section of this report, such as the WMSA Green Infrastructure Task Force and the MAP's Farm Land and Open Space committee, however.



Conservation and Biodiversity – Recommendations

- ~ Develop an inventory of terrestrial and aquatic biodiversity hot spots and conservation needs and use it to evaluate protections in place.
- ~ Utilize federal and state programs for conservation and habitat protection
- ~ **Develop an inventory of terrestrial and aquatic biodiversity hot spots and conservation needs and use it to evaluate protections in place.** This type of activity could serve as one example of a 'quick win' for the Mona Lake Watershed Council. Engaging stakeholders in different parts of the watershed to take the inventory in their own communities and then combining the localized inventories into a comprehensive report would demonstrate the interconnections inherent in the watershed. The mapping capabilities already available in the watershed (e.g., through the Muskegon County Stormwater Committee) would be valuable assets. After project completion, policy makers could employ the product of such an inventory to inform decisions made within the watershed.

⁹ Porter, Jim. 2000. "Muskegon Wastewater Management System," adapted from an article by Jeff Alexander in the *Ann Arbor News*, March 18, 2000. Cited at http://www-personal.umich.edu/~bbowman/birds/al_brushaber/directions/muskegon.txt

III. Results: Community Engagement

- ~ **Utilize federal and state programs for conservation and habitat protection.** The Natural Resource Conservation Service, county conservation districts, and the U.S. Fish and Wildlife Service are just a few of the agencies that have programs in place to promote the protection and conservation of habitats for wildlife. Drawing on the policies already in place and resources available will facilitate the protection of critical local habitats. The Nature Conservancy's report entitled Biological Diversity in the Great Lakes Ecosystem may provide background information on local impairments.



Muddied waters in Black Creek

Community Engagement – Observations

- The communities in the watershed are significantly different in terms of their economic, social and educational characteristics. This diversity presents challenges in creating a watershed-based constituency by impeding communication about the watershed. Hence, residents as well as local governments do not always realize the impacts of their own actions on neighboring communities.
- In general, the public could do more to contribute to the planning of remediation and pollution prevention efforts that impact the environmental quality of the watershed (e.g. remediation of brownfields and Superfund sites, TMDL development, local ordinance processes, business and industrial environmental programs, etc.) Members of the affected communities have taken ownership over these efforts and engaged those involved in the cleanup efforts in a limited way.
- Some community members have expressed concern that the process of decision-making in the political arena is entrenched and reactive, and it is unclear to what extent decision makers will consider new information on environmental health as it emerges on a national and global scale. Since many people have long viewed environmental quality as a 'luxury' rather than a basic need, it is unknown how local leaders will react to evidence that environmental contamination can cause a host of negative health impacts, a shift that demonstrates the fundamental need for environmental protection.

III. Community Engagement

- As part of a broader set of activities sponsored by the Community Foundation for Muskegon County (CFMC), the Mona Lake Watershed Council (MLWC) has formed to include community stakeholders throughout the watershed. Those involved in its formation have attempted to ensure participation by a wide range of constituents. The group currently possesses limited capacity, however, because of limited funding and experience. The community foundation has served as a catalyst for the watershed council, but long-term financial support is not planned.
- Leaders can access a wide array of technical resources within and around the watershed to inform the community and lead to informed prioritization of actions:
 - Annis Water Resources Institute water quality monitoring and watershed plan development
 - Mapping done for the Muskegon County Stormwater Committee
 - Data collection associated with planning processes (e.g., MAP, WMSA)
 - Environmental education at Hoffmaster State Park and other parks
 - Public databases
 - Technical services provided by the Muskegon Conservation District, Timberland RC&D Council and the USDA-NRCS
 - Lake Michigan Watershed Lakewide Management Plan (LaMP) and the Watershed Academy
 - Model ordinances
 - Other watershed organizations
- Environmental education initiatives targeted at or available to school-age children in the Mona Lake watershed abound:
 - Classroom watershed education in elementary, middle and high schools
 - Muskegon Conservation District programs
 - Hoffmaster State Park programs
 - Annis Water Resources Institute (Grand Valley State University) outreach programs and the “floating classroom,” the W.G. Jackson
 - Water quality testing in Ruddiman Creek (Muskegon Lake watershed) and Little Black Creek by elementary and middle school students
 - Volunteer speakers in the schools – e.g., members of the Muskegon Chemistry Council
 - Clean Air Coalition curriculum packets for K-12
 - Muskegon County Wastewater Management System tours and curriculum
 - Muskegon County Drain Commissioner’s annual urban planning project with high school students

Equipment from Black Creek Clean-Up project



III. Results: Community Engagement

Community Engagement – Recommendations

- ~ The Mona Lake Watershed Council (MLWC) should continue its efforts to ensure broad-based representation from throughout the watershed
- ~ The watershed council, together with local government, should develop stewardship projects that can quickly unite interests and build a constituency for the watershed.
- ~ MLWC should request to receive MDEQ permit notices for the Mona Lake watershed.
- ~ Hold an annual Mona Lake watershed event that incorporates a wide range of interests to celebrate the watershed and discuss priority issues.
- ~ Develop a newsletter and other educational tools (e.g., maps) to create watershed awareness and to disseminate information on the wide range of issues that affect the watershed.
- ~ Focus on the human health impacts of environmental degradation in order to build support for efforts to improve the watershed.
- ~ Look for ways to sustain engagement in issues affecting the watershed after mandates expire.

~ **The Mona Lake Watershed Council (MLWC) should continue its efforts to ensure broad-based representation from throughout the watershed.** Continuing community partnership efforts when the community foundation reduces its role as catalyst will depend upon the ability of the watershed's diverse communities to work together and to welcome both the challenges and opportunities that their differences bring. If the council desires to become a watershed organization, it must ensure that all communities participate in its activities.

~ **The watershed council, together with local government, should develop stewardship projects that can quickly unite interests and build a constituency for the watershed.** In order to encourage local residents to realize their place in the watershed, they must begin to identify with the watershed. Basing the early activities in constituents' local communities can help them to make the initial, local, identification with the watershed. Once residents begin to realize that the watershed extends beyond their own community's borders, leaders can begin to make connections among groups from different parts of the watershed. The key is to achieve some 'quick wins' in the early stages to energize stakeholders.

~ **MLWC should request to receive DEQ permit notices for the Mona Lake watershed.** By finding out when organizations are applying for new permits, area residents can find out about discharges to air or water within the watershed and determine when it is in their best interests to comment on the applications. By proactively participating in the permitting process, area residents can have a bigger stake in the type and amount of pollution that enter the watershed.



Bison wandering in local fields

III. Results: Community Engagement

- ~ **Hold an annual Mona Lake watershed event that incorporates a wide range of interests to celebrate the watershed and discuss priority issues.** The 2003 Mona Lake Watershed Week and community event can provide a good basis for starting such a tradition in the watershed. A regular forum for discussing community priorities can also expedite the community's progress towards developing a vision for the future of the watershed and keep them on track towards the established goals. Area businesses may be sought out as sponsors for the event.
- ~ **Develop a newsletter and other educational tools (e.g., maps) to create watershed awareness and to disseminate information on the wide range of issues that affect the watershed.** The Muskegon Conservation District already includes updates on the watershed council's activities in its regular newsletters, but a newsletter should be developed that is devoted to the issues affecting the Mona Lake watershed, such as the ongoing development of Total Maximum Daily Loads (TMDLs) for area water bodies. This tool can raise public awareness about the actual status of remediation activities and the progress of other cleanup efforts and alert stakeholders to changes in regulations that affect watershed protection. It could be disseminated through email, distributed to employees by area businesses, or posted at various local community centers.
- ~ **Focus on the human health impacts of environmental degradation in order to build support for efforts to improve the watershed.** In order to debunk the theory that environmental protection and remediation is a goal to pursue after fulfilling so-called "basic" needs, watershed efforts could focus on the links between watershed health and public health. The signs that warn people not to touch the water at Johnny O. Harris Park could be used as tangible evidence in support of studies linking human health effects to certain chemicals. Helping residents and officials recognize that issues like groundwater quality (which is used for drinking in parts of the watershed) and long-term water loss pose serious challenges to human health may help to highlight the critical nature of watershed protection and restoration.
- ~ **Look for ways to sustain engagement in issues affecting the watershed after mandates expire.** Municipalities formed the Muskegon County Stormwater Committee, for example, only in response to the demands of the Phase II stormwater management requirements but has made giant strides in the way of bringing together colleagues from different parts of the watershed to address watershed issues. When the group has fulfilled this mission, it may dissolve, reversing some of its most important gains. In order to prevent this from happening here and in similar circumstances, leaders of the watershed must forge new avenues for cooperation and identify funding sources to ensure that engagement in watershed issues continues.

IV. Conclusion

The Lake Michigan Forum respectfully offers the recommendations presented in this stewardship assessment as possible strategic opportunities for restoration and protection of the Mona Lake watershed ecosystem. The list is by no means comprehensive, as the stewardship assessment process is meant to be a rapid and relatively simple means for identifying specific actions for increasing watershed stewardship.

Some of the recommendations are targeted toward the new Mona Lake Watershed Council and other non-government organizations focused on environmental issues in the community. The Forum also sees local government, as well as state and federal agencies, as key implementers of the recommendations outlined in this report. A valuable first step might be for stakeholders from the above-mentioned organizations to come together to discuss the results of this stewardship assessment.

The Forum believes that a diverse constituency of individuals and organizations, with a willingness to work across jurisdictions and social boundaries within the watershed, is critical to successfully taking advantage of the opportunities spelled out in this assessment. Given the many knowledgeable and dedicated people in the Mona Lake watershed that participated in the assessment process, the Forum has little doubt that building such a constituency for watershed stewardship is possible.

As the Lake Michigan Forum continues to pursue opportunities for increasing environmental stewardship in local watersheds as the most effective means of achieving sustained ecosystem health on a basin-wide scale, we take inspiration from the many rich opportunities we find in the Mona Lake watershed.

Trail in Mona Lake watershed



Existing Laws and Planning Efforts

Ordinances

The following chart indicates whether or not each unit of government addresses the following watershed issues through their own ordinances or through county regulations.

Table A-1: Adoption and implementation of ordinances addressing watershed issues

Municipality	Land Use	Soil Erosion	Habitat	Pollution Prevention	Phase II Stormwater Management application	Water Resources Protection
Ashland Township	–	–	–	–	n/a	–
Bridgeton Township	–	–	–	–	n/a	–
Egelston Township	yes	County	yes	no	no	no
Fruitport Township	plan	County	plan	no	applied	no
Moorland Township	yes	County	yes	yes	n/a	yes
Muskegon, City of	yes	yes	no	no	applied	no
Muskegon County	no	County	no	no	applied	no
Muskegon Heights	yes	County	no	no	applied	no
Muskegon Township	–	–	–	–	applied	–
Newaygo County	no	yes	no	no	n/a	no
Norton Shores	yes	County	no	no	applied	DEQ
Sullivan Township	–	County	–	–	applied	–

Muskegon Area-wide Plan (MAP)¹⁰

The Muskegon Area-wide Plan (MAP) is a coordinated effort to devise a vision and plan for Muskegon County for the next 20 years. The process is led by a 40-member council made up of officials of local governments, citizens, business leaders, and policymakers. The entire effort, however, includes a much larger and more diverse group of stakeholders. The MAP, which obtains 84 percent of its funding from federal, state and local governments, was designed to last about 15 months and is now more than halfway done.

The MAP's stated goals are to make strategic plans, promote intergovernmental cooperation, and provide information pertinent to the county's quality of life. In addition, there is a Farmland and Open Space (FLOS) committee being formed that will make recommendations for relevant ordinances approximately six months after completion of the MAP.

¹⁰ West Michigan Shoreline Regional Development Commission. "Muskegon Areawide Plan Mission Statement." Available: <http://www.wmsrdc.org/map-m.html>

Appendix A

West Michigan Strategic Alliance (WMSA)¹¹

The WMSA, created in 2000, is an organization consisting of business as well as community leaders from Western Michigan. The vision of the WMSA is to make West Michigan “the best place to live, work, and play in the Midwest.” The WMSA released a sourcebook entitled “The Common Framework” and is now focusing efforts on six priorities for regional collaboration: regional mindset, prosperous economy, community through diversity, sustainable environment, urban center, and tri-plex growth.

The WMSA has formed a Green Infrastructure Task Force, which consists of senior level corporate officers and local governmental officials and is dedicated to developing regional collaboration on the environment. WMSA defines green infrastructure as, “An interconnected network of green space and other environmental assets that conserves the functions of the natural ecosystem and provides associated benefits to human populations.”

Agricultural focus

Highly Erodible Land (HEL) requirements – Fields with HEL must develop a conservation plan that commits the farmer to manage and farm the fields so that predicted soil losses fall below tolerable soil loss limits for the soils on those fields established by NRCS soil scientists. The types of practices planned and implemented on HEL fields include crop rotations, crop residue management, grassed waterways, buffers and filter strips. These practices may not, and quite often are not, applied to the whole farm; in many cases, it is only required in the steep or hilly fields. In the Mona Lake watershed, there is a small amount of HEL in the upper watershed.

Wetland restrictions – Agricultural producers cannot drain or alter wetlands or permanently remove wetland vegetation. If a producer violates this rule, it may be possible to mitigate the destruction of the wetland, but the mitigating activity must be completed in the same watershed area (generally in an area that has the same soil type and is located in an area as close as possible to the removed wetland) and be functionally equivalent to the altered wetland. In most cases, however, this mitigation option is not available, and the land is converted back to wetland at the landowner’s expense.

Generally Accepted Agricultural Management Practices (GAAMPs) – In order to enjoy the immunity from nuisance lawsuits that Michigan’s Right to Farm Bill provides, farmers must follow the Generally Accepted Agricultural Management Practices (GAAMPs) outlined by the Michigan Commission of Agriculture. The objective of this requirement is for farmers to implement practices that reduce the impacts of agriculture on the environment by capitalizing on available technology and scientific research.

GAAMPs were developed to address irrigation water use, site selection, manure management/utilization, pesticide utilization/pest control, nutrient utilization, care of farm animals, and cranberry production.¹²

¹¹ West Michigan Strategic Alliance. “Who is the West Michigan Strategic Alliance?” Available: <http://www.wm-alliance.org/Brix?pageID=2>

¹² Michigan Department of Agriculture. “GAAMPs.” Available: www.michigan.gov/mda. Follow the links: Farming/Environment/GAAMPs.

Michigan Agricultural Environmental Assurance Program (MAEAP) – Begun in 1998 in response to the Michigan Agricultural Pollution Prevention Strategy, the Michigan Agricultural Environmental Assurance Program was designed to be a voluntary, education-based program to mitigate the impacts of agriculture on the environment and reduce pollution.¹³ Today, the program's mission statement is as follows:

“To develop and promote a recognized, voluntary, proactive environmental assurance program, targeted to the agriculture industry, which ensures that producers are engaging in cost-effective pollution prevention practices and are in compliance with environmental regulations.”¹⁴

The main tool used by the MAEAP is the Comprehensive Nutrient Management Plan (CNMP). Although the plan could, in theory, be developed by any agricultural producer, it is almost exclusively prepared for large animal feeding operations (with 1,000 animal units or more), which are required either to complete a CNMP or apply for an NPDES permit. There are three livestock operations within the Mona Lake watershed; the only producer with more than 1,000 animal units has completed a CNMP. The other two farms are small swine operations with existing nutrient and waste management plans.

Reference materials on ordinances that address environmental issues:

The EPA and Michigan Department of Environmental Quality (DEQ) have developed resources to help local governments develop ordinances that incorporate provisions for assessing the environmental impacts of certain activities. These resources may help the general public understand the policy formation process better as well:

DEQ, through the Coastal Management Program with the National Oceanic and Atmospheric Administration, the Department of Natural Resources, and the Planning and Zoning Center, Inc. “Filling the Gaps: Environmental Protection Options for Local Government,” September 2003. Contact: Kathy Cunningham-Ballard, DEQ. Available online: www.michigan.gov/deq. Follow the links: Water/Great Lakes/Coastal Management/Filling the Gaps.

The U.S. EPA Office of Water's website includes a page with links to several sets of model ordinances as well as some real-life examples of ordinances that protect natural resources. It is available at <http://www.epa.gov/owow/nps/ordinance/links.htm>.

¹³ Michigan Agriculture Environmental Assurance Program. “Background.” Available: <http://www.maeap.org/background.htm>

¹⁴ Michigan Agriculture Environmental Assurance Program. “Mission Statement.” Available: <http://www.maeap.org/index.html>.

Legacy Pollution and Remediation Efforts

Superfund Terminology

To understand the status of Superfund sites in the community, it is necessary to be familiar with a couple of terms:

National Priorities List – a list of Superfund sites that meet specific criteria listed in the Hazard Ranking System that EPA has identified as sites whose threats to human and environmental health warrant further investigation.¹⁵

Records of Decision (RODs) – prepared by the EPA to describe alternative remediation strategies for Superfund sites and to explain why a specific remedial strategy is chosen. For sites listed on the National Priorities List (NPL), the remedial alternatives discussed in the RODs are influenced by data collected at the site; a final remedial action is selected based on site conditions as well as through cost-benefit analyses. RODs are publicly available documents, available through the CERCLIS database.¹⁶

Superfund Sites in the Mona Lake watershed

Information about the four Superfund sites in the Mona Lake watershed is summarized in Table B-1. Additional details about site remediation and financing are provided in the paragraphs below the table.

Table B–1: Superfund Sites in Mona Lake Watershed

Site Name	Year listed on Final NPL	Year of ROD	Location	Contaminants of concern
Bofors Nobel	1989	1999	Egelston Township	Pesticides, VOCs, Metals, Inorganics, Base Neutral Acids
Peerless Plating	1990	1992	Muskegon Heights	VOCs, Metals, Inorganics
SCA Independent Landfill	1983	None	Egelston Township	Not Available
Thermo-Chem/Thomas Solvents	1986	1991	Egelston Township	VOCs, PAHs, Base Neutral Acids, Metals, Inorganics, Pesticides

¹⁵ EPA. "NPL Site Listing Process." Available: http://www.epa.gov/superfund/sites/npl/npl_hrs.htm

¹⁶ EPA. "Superfund Acronyms." Available: <http://www.epa.gov/superfund/> (Follow link to Acronyms.)

Bofors Nobel: This site, discovered in 1971, is contaminated with pesticides, VOCs, metals, inorganics, and base neutral acids. A consultant hired by the responsible parties performs the site monitoring and then submits monthly and annual reports to the EPA. So far, the EPA has spent \$16 million of its own funds, including about \$7 million in 2003 for remedial action. However, the agency will pay nothing further because Bofors Nobel set aside an \$11 million fund for site cleanup as part of its bankruptcy settlement.¹⁷

Peerless Plating: Site remediation began in the 1970s and has targeted contaminants such as VOCs, metals, and inorganics, mostly because of groundwater contamination. The EPA collects data from the site biannually. EPA and the Michigan DEQ cover all cleanup and monitoring costs; overall costs are difficult to measure, but approximately \$1.6 million was spent in the past year (August 2002-August 2003) on the site.¹⁸

SCA Independent Landfill: The remediation of this site, discovered in 1980, is overseen by the Michigan DEQ. While no direct cleanup actions have yet occurred, monitoring is being done by the responsible parties, who submit a report to the EPA approximately every six months. The responsible parties are incurring all of the costs associated with the site.¹⁹

Thermo-Chem/Thomas Solvent: This site, discovered in 1979, was put on the NPL due to contamination by VOCs, PAHs, base neutral acids, metals, inorganics, and pesticides. As of now, little or no remedial action has been taken. Kerrigan & Associates, a consultant hired by the responsible parties, conducts site monitoring and then submits a report to the EPA approximately every three months. The expenses for cleanup and monitoring are borne entirely by the responsible parties and not by the EPA or Michigan DEQ.²⁰

State Consent Decrees

Consent decrees are legal documents that outline agreements reached between a regulatory agency and parties that have violated environmental statutes. In these agreements, the parties in violation agree to undertake specific actions to comply with agency-initiated enforcement actions, which may involve paying fines, remediating a site, initiating a community participation process, or ceasing illegal practices. Consent decrees do not necessarily require the party in violation to admit any wrongdoing. Once signed, these agreements are legally binding.

The Michigan Department of Environmental Quality has entered into consent agreements with six companies (four of them Superfund sites) in the Mona Lake watershed and terminated negotiations with a seventh when the company voluntarily initiated some of the action items outlined in the proposed agreement. Following is a summary of the agreements signed with companies not cited as Superfund sites in the preceding section:

Cloverville Pumphouse: This consent decree was signed in 1993, with Cloverville Pumphouse and eight individual defendants, under the authority of several Michigan laws, including the Underground Storage Tank Regulatory Act, the Leaking Underground Storage Tank Act, the Water Resources Commission Act, the Michigan Environmental Protection Act, and the Michigan Environmental Response Act. A leaking underground storage tank was removed and the defendants were required to pay a total of \$75,000.

¹⁷ EPA. CERCLIS database: Bofors Nobel. Available: <http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0502372>

¹⁸ EPA. CERCLIS Database: Peerless Plating. Available: <http://cfpub.epa.gov/supercpad/cursites/ccontinfo.cfm?id=0502373>

¹⁹ EPA. CERCLIS database: SCA Independent Landfill. Available: <http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0502201>

²⁰ EPA. CERCLIS database: Thermo-Chem. Available: <http://cfpub.epa.gov/supercpad/cursites/csitinfo.cfm?id=0502486>

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Nordco Drum: This consent decree was issued in 1994 for the illegal release of lead; mercury; zinc; polychlorinated biphenyls (PCBs); ethylbenzene; methylene chloride; tetrachloroethylene; toluene; 1,1,1-trichloroethene; xylene; and styrene. These chemicals were found in the site's soil and groundwater in 1986. There are 13 defendants, all corporations. Collectively, they are required to pay \$540,000 to the Environmental Response Fund under the authority of the Michigan Environmental Response Act. The DEQ admitted that this "is not 100 percent" of the remedial costs but chose not to engage in further litigation because of time and resource issues. The Remediation Action Plan (RAP) was submitted on April 3, 1995.

Marathon Oil Company: DEQ and Marathon Oil never actually signed a consent decree for this site, but one was proposed. The proposed consent decree was written in 1992 for groundwater and sediment contamination by petroleum hydrocarbons and "contaminants associated with petroleum refining." Negotiations were terminated when Marathon Oil began to undertake some of the measures included in the consent agreement on a voluntary basis. However, MDEQ needs to reopen this case file to evaluate if current restoration activities are meeting water quality standards.

Federally regulated facilities

Facilities are required to report the release and/or storage of specified substances in certain circumstances. Usually, reporting is required if a certain amount of the substance is stored on site or released, or if the site is extremely contaminated. These requirements are spelled out in a series of laws designed to regulate companies' environmental impacts. A summary of the facilities subject to federal regulation under any of the following programs is included in Table B-2:

Resource Conservation and Recovery Act (RCRA) – cites facilities involved in corrective action under RCRA, usually related to hazardous waste. For more information: http://www.epa.gov/enviro/html/rcris/rcris_query_java.html;

Permit Compliance System (PCS) – identifies companies with permits to discharge wastewater to surface water bodies. For more information: http://www.epa.gov/enviro/html/pcs/pcs_query_java.html;

Aerometric Information Retrieval System (AIRS) – tracks air pollution data. For more information: http://www.epa.gov/enviro/html/airs/airs_query_java.html;

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) – includes hazardous waste sites and sites being assessed under the Superfund program. For more information: http://www.epa.gov/enviro/html/cerclis/cerclis_query.html; and/or

Toxics Release Inventory (TRI) – catalogs releases of toxic chemicals. For more information: http://www.epa.gov/enviro/html/tris/tris_query.html.

Table B-2 Industrial facilities subject to federal regulations in the Mona Lake watershed

NAME	RCRA	PCS	AIRS	CERCLIS	TRI	CITY	ADDRESS	ZIP
Adac Plastics Incorporated	Y		Y		Y	Muskegon	2050 Port City Blvd.	49442
Almond Corporation	Y		Y		Y	Muskegon	1239 E. Broadway	49444
American Porcelain Enamel	Y	Y	Y		Y	Muskegon	1285 E. Keating	49442
Amstore Corporation	Y		Y		Y	Muskegon	1221 E. Keating	49443
Asphalt Paving Incorporated			Y			Muskegon	1000 E. Sherman	49444
Bekaert Corporation	Y		Y		Y	Muskegon	2121 Latimer Dr.	49442
Bennett Pump Company			Y			Muskegon Hts	2740 Wood St.	49444
Betten Friendly Motors	Y		Y			Muskegon	3146 Henry St.	49441
Blarney Castle Oil-Norton St.		Y				Norton Shores	3416 Norton St.	49441
Burnside Manufacturing	Y					Spring Lake	6830 Grand Haven Rd.	49456
Dana Corporation Perfect Circle Sealed Power Division	Y	Y	Y		Y	Muskegon	2051 S. Harvey St.	49443
East Shore Chemical Company	Y		Y		Y	Muskegon	1221 E. Barney Ave.	49443
Ermanco Incorporated	Y		Y			Spring Lake	6870 Grand Haven Rd.	49456
Hy Lift LLC Muskegon	Y	Y	Y		Y	Muskegon	1185 E. Keating Ave.	49442
K L Industries			Y			Muskegon	1790 Sun Dolphin Dr.	49444
L G Bacon Company			Y			Muskegon	1045 Mt. Garfield Rd.	49441
Lift Tech International Inc.	Y	Y	Y		Y	Muskegon Hts	414 W. Broadway Ave.	49444
Lomac Inc.	Y		Y		Y	Muskegon	5025 Evanston Ave.	49442
Lorin Industries			Y		Y	Muskegon	1960 S. Roberts	49443
MDEQ-ERD-Cloverville Pump		Y				Muskegon	3165 Heights Ravenna	49444
Mobil Oil Corporation			Y			Muskegon	Muskegon Terminal	49441
Muskegon Brake Distributing			Y			Muskegon	848 E. Broadway	49444
Muskegon Public Services Bldg.		Y				Muskegon	1350 E. Keating Ave.	49442
Newy Anchorlok International	Y		Y		Y	Muskegon	1950 Indl. Blvd.	49443
Port City Die Cast			Y			Muskegon	1985 E. Laketon	49442
Sun Chemical Corp. Muskegon Plant	Y		Y		Y	Muskegon	4925 Evanston Ave.	49443
The Griffon Inc.	Y		Y			Muskegon	820 Broton Rd.	49442
Thermo Disc Midwest Components Products Group	Y		Y		Y	Muskegon	1981 Port City Blvd.	49442
Thermo Chem Inc.	Y			Y		Muskegon	4331 Evanston Ave.	49443
Tricil Environmental Services	Y		Y			Muskegon Hts	3030 Wood St.	49444
Webb Chemical Service Corp.	Y	Y	Y		Y	Muskegon Hts	2708 Jarman	49444
Westgate Oil Co-Muskegon		Y				Muskegon	1819 Apple Ave.	49442

Appendix B

Federal enforcement actions

The following table summarizes the facilities that have been cited for violations of environmental regulations during the period 2001-2003:

Table B-3: Recent enforcement actions²¹

Facility	Violations within past 2 years	Current Significant Violations	Enforcement Actions within last 2 years
Almond Products Incorporated	yes	no	no
Bekaert Corporation	yes	no	no
Cannon Muskegon Corporation	yes	no	no
Dana Corporation Perfect Circle	yes	yes	yes
Honeywell Int. Burdick & Jackson	yes	no	no
Lomac Incorporated	yes	no	no
Quality Plating Company Inc.	yes	no	no

Dana Corporation: MDEQ issued a Consent Order for the Dana Corporation's facility in Muskegon Heights in February 2003 to remedy the company's violation of Michigan law. The agency concluded that the company had violated the Clean Air Act and portions of the Michigan Administrative Code relating to air pollution. These violations ranged from basic reporting and record keeping violations, to operating without proper air pollution control equipment, to issues with dust and odors, to failing to obtain a permit to install. DEQ discovered the violations while responding to complaints by local residents regarding dust and odors. Penalties included fines totaling over \$122,000 in addition to providing staff training and repairing dysfunctional equipment.²²

Lomac Incorporated: EPA sought enforcement action against Lomac Incorporated, which is part of the Bofors Nobel Superfund site, for two separate issues. A 1999 multi-media inspection showed 10 violations of state law; one additional violation was identified in an inspection in 2000, at which time the state turned the matter over to the U.S. EPA. Under the Resource Conservation and Restoration Act (RCRA), EPA was prepared to fine Lomac over \$350,000, but Lomac entered into a consent agreement and paid a \$75,000 fine instead.

In 2000, EPA filed a complaint against Lomac under Clean Water Act Section 301/307, which addresses the pretreatment program. When the case was settled in 2001, Lomac was fined \$55,000 for releasing high levels of chlorobenzene and toluene in their wastewater.²³

Quality Plating Company, Inc.: Records indicate that Quality Plating Company was in violation of RCRA during the last quarter of 2001. No enforcement action was undertaken, however.

²¹ Environmental Protection Agency. Environmental Compliance History Online (ECHO) database. Available: http://oaspub.epa.gov/enviro/ef_home2.compliance

²² Michigan Department of Environmental Quality Staff Activity Report, submitted February 10, 2003, by Eric Grinstern and Kimberly Nault.

²³ Environmental Protection Agency. Environmental Compliance History Online (ECHO) database. Available: http://oaspub.epa.gov/enviro/ef_home2.compliance

Impairments to area water bodies

Under Section 303(d) of the federal Clean Water Act, states, territories, and authorized tribes must create lists of water bodies that are unable to meet water quality standards, even after point sources of pollution have fulfilled minimum pollution control requirements. These waters are *listed as impaired water bodies* if they are unable to provide an adequate environment for the “beneficial uses” set for them by the responsible state, territory, or authorized tribe. Section 303(d) of the Clean Water Act requires the responsible authority to prioritize the impaired waters and create a schedule for preparing *total maximum daily loads* (TMDLs) for them.

The TMDL establishes the amount of each pollutant that may be added to the water body on a daily basis if the water body is still to meet water quality standards. Once that *total* amount is determined, it must be allocated to sources that discharge to the impaired water body. Once the local authority establishes these loads, the EPA is required to review and approve them.²⁴

Further information about the TMDL program can be found at the EPA's TMDL website: <http://www.epa.gov/owow/tmdl/>

Table B-4: Impairments of water bodies in Mona Lake watershed ²⁵

Water Body	Impairments	Anticipated TMDL Submittal
Black Creek	Fish Consumption Advisory (PCBs)	12/31/2010
	Fish Community Rated Poor (Biological)	12/31/2003
Little Black Creek	Nutrients	12/31/2003
	Pathogens	12/31/2003
	Algae (Algal growth/Chlorophyll A)	12/31/2003
	Fish Community Rated Poor (Biological)	12/31/2003
	Macroinvertebrate Community Rated Poor (General WQS, Benthic)	12/31/2003
Mona Lake	Mercury	12/31/2011
	Fish Consumption Advisory (PCBs)	12/31/2009

Source: TMDL Program website, Section 303(d) List Fact Sheet for Watershed: Pere-Marquette/White.²⁵

Although not cited for an impairment due to cadmium, levels of cadmium in Little Black Creek just downstream of the Peerless Plating Superfund site were as high as 900 mg/kg, the highest recorded level in the Great Lakes. PAH levels are as high as 80 mg/kg in some areas of the watershed.²⁶

²⁴ Environmental Protection Agency. “Overview of Current Total Maximum Daily Load – TMDL – Program and Regulations.” Available: <http://www.epa.gov/owow/tmdl/overviewfs.html>

²⁵ Environmental Protection Agency. “Section 303(d) list for Watershed – Pere Marquette-White.” Available: http://oaspub.epa.gov/pls/tmdl/huc_rept.control?p_huc=04060101&p_huc_desc=PERE%20MARQUETTE-WHITE

²⁶ Annis Water Resources Institute monitoring data presented in a talk by Dr. Alan Steinman to the Lake Michigan Forum on June 12, 2003.

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Brownfields

General Information: Brownfield data is compiled by the EPA from required environmental reports submitted by businesses and government; a useful online database for brownfield information is EPA's Envirofacts database http://www.epa.gov/enviro/index_java.html. Envirofacts provides basic site information and may include accomplishments and future plans. For more detailed information, however, it is usually necessary to file a FOIA request or to meet with local officials.

Redeveloped Brownfields in Mona Lake Watershed: In 1999, Muskegon Heights received a U.S. EPA Brownfield Pilot Program grant to identify 30 Brownfield Sites and then target 15 for cleanup. They ended up identifying 100 sites, with 15 of those being marked as high priority for remediation. There have only been two sites cleaned up so far, however, and there are only plans to clean up one more. This is due primarily to a lack of funding for the cleanups and redevelopment. The federal government will not contribute money for cleanup because these sites are not designated Superfund sites; the state government is not projected to get out of its budget woes until 2005, which eliminates another potential source of funding. The county and municipal governments also do not have the necessary tax revenue, as they are facing budget shortfalls as well.

Wagner Property: The eight-acre Wagner Property site was cleaned up at a cost of \$200,000, the funding for which came out of the Clean Michigan Initiative. The area will become a \$3 million medical center.

ML Houston: The ML Houston site is 300 ft. X 300 ft. and will be a \$10 million Senior Citizens High Rise.

Bennett Pump: This site is 12 acres and has not yet been remediated, but the cleanup is estimated at \$1 million. The site is a former industrial area and is located near Little Black Creek.

The reason Muskegon Heights originally identified so many brownfield sites is that Michigan has a more liberal definition of brownfield than the U.S. EPA. Michigan considers non-contaminant factors when designating a brownfield, while the EPA does not. Brief summaries of the definitions are as follows:

EPA Definition: With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.²⁷

MDEQ Definition: Brownfields are defined as "abandoned, idle, or under-used industrial and commercial properties, often in urban areas, where expansion or redevelopment is hindered or complicated by real or perceived environmental conditions."²⁸ Brownfields can also be what are called "blighted" properties, which means that they meet at least one of the following criteria:

- "Has been declared a public nuisance in accordance with a local housing, building, plumbing, fire, or other related code or ordinance.
 - Is an attractive nuisance to children because of physical condition, use, or occupancy.
 - Is a fire hazard or is otherwise dangerous to the safety of persons or property.
- (continued next page)

²⁷ Environmental Protection Agency. "Brownfields Glossary of Terms." Available: <http://www.epa.gov/swerosps/bf/glossary.htm#brow>

²⁸ Michigan Department of Environmental Quality. "Agency." Available: <http://www.michigan.gov/deg> Follow the links: Land/Land Redevelopment/Brownfield Redevelopment Overview

- Has had the utilities, plumbing, heating, or sewerage permanently disconnected, destroyed, removed, or rendered ineffective so that the property is unfit for its intended use.
- Is tax-reverted property owned by a qualified local governmental unit, by a county, or by this state. The sale, lease, or transfer of tax-reverted property by a qualified local governmental unit, county, or this state after the property's inclusion in a brownfield plan shall not result in the loss to the property of the status as blighted property for purposes of this act.²⁹

Business/Economic

Supplemental Environmental Project (SEP) – An environmentally beneficial project that a violator of environmental regulation agrees to undertake in settlement of an enforcement action, but which the violator is not otherwise legally required to perform.³⁰

Pollution Prevention and Waste Minimization

Clean Corporate Citizens³¹

The Clean Corporate Citizen (C3) program was established to reward companies that demonstrated a substantial commitment to the environment. C3 companies “receive public recognition and are entitled to certain regulatory benefits, including expedited permits.” To qualify, a company must have an environmental management system (EMS) in place and have a pollution prevention policy audited by a state official.

ESCO Company is the only C3 in the watershed, but two other C3 companies are located in Muskegon County in close proximity to the watershed - Consumers Energy and Hazekamp Meats.

Michigan Business Pollution Prevention Partnership (MBP3)³²

MBP3 is a program that aims to promote source reduction, waste minimization, and technology transfer. It encourages businesses to engage in pollution prevention practices and to disseminate such practices throughout the business community. Participants in the MBP3 program are recognized in an annual report published by the Michigan DEQ Environmental Assistance Division. In order to be eligible, companies must meet specific reporting requirements, have a pollution prevention strategy, and disseminate information about any successful pollution prevention efforts.

ESCO Company and Knoll, Inc. are the only MBP3 participants in the watershed, but two other companies are located in Muskegon County in close proximity to the watershed - Consumers Energy and Hazekamp Meats.

²⁹ Michigan Legislature. “Brownfield Redevelopment Financing Act (Excerpt) Act 381 of 1996.” Available: <http://www.michiganlegislature.org/law/mileg.asp?page=getObject&objName=mcl-125-2652&highlight=>

³⁰ Environmental Protection Agency Region V Office of Regional Counsel. “Supplemental Environmental Projects.” Available: <http://www.epa.gov/region5/orc/annualreports/sepdescr.htm>

³¹ Michigan Department of Environmental Quality. “Clean Corporate Citizen.” Available: <http://www.michigan.gov/deq> Follow the links: Assistance & Support Services/Environmental Incentives/Clean Corporate Citizen

³² Michigan Department of Environmental Quality. “Michigan Business Pollution Prevention Partnership: Program Document.” Available: www.michigan.gov/deq Follow the links: Pollution Prevention/Business Partnerships/MBP3 Publications/MBP3 Program Document

Appendix C

Farm Conservation

The Muskegon Conservation District helps farmers write conservation plans that reduce the environmental impacts of agriculture while maintaining farm profitability. Each conservation plan is tailored to the unique situation of each farm, but some criteria are common to many of them. The following is a list of conservation treatments that at least some farmers in the Mona Lake watershed have adopted, along with a brief description of each one's goals.³³

Nutrient Management: "Manage the amount, form, placement, and timing of plant nutrient application."

Waste Utilization: Apply animal waste "in a manner that will best utilize the nutrients for plant growth."

Agrichemical Containment Facility: "Prevent degradation of surface water, groundwater, and soil from the unintentional release of agrichemicals."

Filter Strip: "Establish a strip of perennial vegetation for trapping sediment and other pollutants from runoff or waste water."

Waste Management System: "Prevent or minimize the degradation of air, soil, and water resources and [to] protect public health and safety."

Economic Revitalization

Smartzone: Muskegon County is one of 11 "Smartzone Districts" designated by the state. A Smartzone District is aimed at providing a distinct area where technological entrepreneurs can access business resources that they might not otherwise have. In Muskegon County, the SmartZone District is intended to spur research, development, and the implementation of emerging energy technologies.

Within the Smartzone District, Grand Valley State University built the Michigan Alternative and Renewable Energy Center, financed through the SmartZone Tax Increment Financing (TIF) program. Business leaders, researchers and investors use this state-of-the-art office building as a meeting place. As part of this program, the Muskegon Public Service Commission awarded a \$3 million grant to Grand Valley State University to build a photovoltaic roof on the Energy Center facility that integrates stationary fuel cell, heat recovery, and energy storage technologies. This will be the first demonstration project within the SmartZone.³⁴

The photovoltaic roof will be only one product of a partnership between GVSU and FuelCell Energy, Inc., which will result in the development of a fuel cell power plant for the Energy Center. The Center, anticipated to be completed in Fall 2003, will use the technology to provide electricity and a heat recovery system for the facility's heating and cooling systems. This will be the "first commercial project in the world to integrate fuel cell technology, a heat recovery system for heating and air conditioning, photovoltaics and a nickel metal hydride battery storage system to store excess energy."³⁵

³³ U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)

³⁴ Muskegon Area First. "Smartzone." Available: <http://www.muskegonareafirst.org/Smartzone/SmartZoneIntro.html> Also see sublinks to University, Energy Center, Business Park and Energy Initiatives.

³⁵ Grand Valley State University. "Going Green." Available: http://gynow.gvsu.edu/show_article.cfm?id=6049

NextEnergy: NextEnergy is a business consortium dedicated to a “comprehensive set of actions to advance the understanding, research, development, commercialization, and manufacturing of alternative energy technologies for Michigan and the nation.” NextEnergy promotes alternative energy technologies through industrial consortiums, educational programs aimed at groups from grade school to corporate executives, and through tax incentives for organizations that develop or implement alternative energy technologies. Through the Michigan NextEnergy Authority, there is an opportunity in the Mona Lake watershed to obtain tax incentives to facilitate any future development based on alternative energy technologies.³⁶

West Michigan Shoreline Regional Development Commission: The West Michigan Shoreline Regional Development Commission (WMSRDC) is funded under a state mandate to coordinate and address regional issues in Lake, Mason, Muskegon, Newaygo, and Oceana counties. There are nineteen members of the commission, including locally elected and appointed officials as well as a paid staff.

The WMSRDC works on planning issues that link the region and focuses on issues that cross jurisdictional lines, such as “coastal zones, highways, public transportation, and job markets,” as well as issues such as air and water pollution, waste disposal, affordable housing, and industrial zoning. Currently, the WMSRDC is overseeing the development of the Muskegon Areawide Plan (MAP).³⁷

Environmental Management System (EMS)

Environmental management systems (EMSs) provide a way for organizations to consider their environmental performance. Each company develops its own EMS and selects how it will measure environmental performance (e.g., staying in compliance, meeting reporting deadlines, reducing waste, or making proactive improvements). Although the specific content of each EMS is different, the International Organization for Standardization (ISO) developed a voluntary standard for companies that want to have their EMS certified, called ISO 14001. Companies certified under ISO 14001 must pass an annual audit to verify that they are implementing their EMS as it is written. Through a system of planning, implementation, performance measurement, and regular management reviews, EMSs establish a regular schedule for internal discussions about a company's environmental performance. Although the ISO standard does not require companies to address issues beyond compliance, it helps them establish a system for doing so if they choose.

Other Possible Collaborators

Muskegon County Environmental Coordinating Council (MCECC): The purpose of this network is to advance the environmental well being of the Muskegon region by providing opportunities for collaboration, education and stewardship. It includes representatives of environmental interest groups, business, industry, government, law firms, health groups, and educational establishments.³⁸

West Michigan Sustainable Business Forum (WMSBF): The West Michigan Sustainable Business Forum is an offshoot of the West Michigan Environmental Action Council (WMEAC). The Forum's membership is open to any business that subscribes to the Forum's principles. Most members are representatives of the environmental divisions of West Michigan companies.

³⁶ Next Energy Alternative Energy Technology. “Next Energy.” Available: <http://www.nextenergy.org/>

³⁷ West Michigan Shoreline Regional Development Commission. “West Michigan Shoreline Regional Development Commission.” Available: <http://www.wmsrdc.org>

³⁸ Muskegon County Environmental Coordinating Council. “Our Mission.” Available: <http://www.mcecc.org/>

Appendix C

Members of its committees author and release publications and best management practices that promote environmentally and economically sustainable commerce. The WMSBF has monthly meetings and hosts an annual conference, providing networking opportunities for the further dissemination of sustainable business practices.³⁹

Muskegon Chemistry Council: The Muskegon Chemistry Council is an association of chemical companies in and around Muskegon that meets regularly to discuss developments in the industry.

Air and Waste Management Association, West Michigan Chapter: The Air and Waste Management Association is a non-profit, membership-based organization comprised of environmental professionals in the West Michigan area from both the public and private sectors. The organization's goal is to develop a better understanding and awareness of the challenges to air pollution control, proper waste handling and management, and environmental management among its members as well as the general public. A&WMA provides a neutral forum for environmental managers and regulators to discuss critical issues. Its annual conference, monthly meetings, newsletter, and networking opportunities keep members apprised developments related to environmental regulations.⁴⁰

Pollution Prevention Retired Engineers Technical Assistance Program (RETAP): The Pollution Prevention RETAP Internship Program is a collaboration between the MI DEQ, Michigan universities, RETAP, and various businesses.

Students in university engineering programs are paid by DEQ and gain valuable experience and hands-on training on how to integrate pollution prevention practices in the workplace. The interns assist the businesses in reducing their pollution and submit written reports to RETAP about pollution prevention opportunities.⁴¹

Additionally, retired engineers with 30-40 years of experience with Michigan industries volunteer to provide free waste assessments to small companies to help identify pollution prevention and waste reduction opportunities. All assessments are conducted on a confidential basis without any accompanying regulatory requirements.⁴²

Sample "Scorecard"

Indicators for the watershed's scorecard could include measures of progress towards cleaner production. One measure could be the change in the amount of toxics released by companies that report to the Toxics Release Inventory (TRI). Another possible measure would be Production Related Waste (PRW): the sum of all toxic wastes generated across production processes that a facility reports as recycled, recovered for energy, treated on- or off-site, or released on- or off-site.

Stakeholders could also explore new measures of pollution risk that have been developed by the EPA's Office of Pollution Prevention and Toxics (OPPT). In 1999, OPPT released the Risk Screening Environmental Indicators (RSEI) tool that allows users to calculate the relative risk of a air emissions

³⁹ West Michigan Sustainable Business Forum. "An Introduction." Available: <http://www.sustainable-busforum.org/intro.html>

⁴⁰ Air and Water Management Association – West Michigan Chapter. "Mission Statement." Available: <http://www.wmawma.org/mission.htm>

⁴¹ Michigan Department of Environmental Quality. "Pollution Prevention Retired Engineers Technical Assistance Program (RETAP) Student Internship Program." Available: www.michigan.gov/deq Follow the links: Pollution Prevention/Initiatives for Business/RETAP Internship Program

⁴² Michigan Department of Environmental Quality. "Retired Engineers Technical Assistance Program." Available: <http://www.michigan.gov/deq/> Follow the links: Assistance and Support Services/Technical Assistance/RETAP

reported by a TRI facility. Based on a fate and transport simulation, RSEI estimates surrogate doses among surrounding census populations that allow the ranking of the toxicity of different chemical air releases. Future versions will also allow for relative-risk estimates of TRI water releases. Further information is available at EPA's RSEI Web site: www.epa.gov/opptintr/rsei.⁴³

⁴³ Abel, Troy D. and Michael E. Kraft. "Information Disclosure and Decisionmaking in Environmental Policy." Prepared for delivery at the 2003 Annual Meeting of the American Political Science Association, August 28-August 31, 2003. Washington, D.C.: American Political Science Association. Available: http://archive.allacademic.com/publication/docs/apsa_proceeding/2003-08-15/6/apsa_proceeding_6.PDF

Stormwater and Non-Point Source Pollution

Phase II Stormwater and Watershed Management Plan (WMP)⁴⁴

Phase II Stormwater regulations are the second step in the EPA's initiative to improve water quality in the United States through a focus on stormwater under the Clean Water Act. Phase I targeted large municipalities and construction sites. Phase II targets moderately-sized communities and construction sites.

Under Phase II, municipalities can submit permit applications individually or as a group to receive a stormwater management permit on a watershed basis. In order to qualify for the watershed-based permit, the applicants must devise a Watershed Management Plan (WMP). The purpose of the WMP is to foster cooperation among various public and private entities in the watershed in order to identify and execute the actions needed to resolve water quality and water quantity concerns.

The WMP must be a comprehensive plan that focuses on watershed health and outlines short-term as well as long-term goals and the actions needed to achieve these goals. It must also include best management practices (BMPs) that "prevent or minimize the impacts on water quality."

The watershed-based Phase II permit also requires the creation of a Public Education Plan (PEP), which is intended to address human impacts on water quality. The goal of the PEP is to "promote, publicize, and facilitate watershed education for the purpose of encouraging the public to reduce the discharge of pollutants in stormwater to the maximum extent practicable."⁴⁵ There is significant opportunity to address watershed issues beyond stormwater in the PEP because the watershed permit requires the applicants to focus on overall ecosystem health and not merely stormwater. The philosophy adopted by the DEQ is that watershed health is synonymous with water health. Therefore, anything that improves water quality would qualify as an appropriate component of the PEP and is encouraged under the permit.

Senate Bill 510⁴⁶

If adopted, Senate Bill 510 would amend the structure of fees assessed under state stormwater regulations in order to meet the federal Phase II standards. Specifically, the bill would raise fees for permits issued through the National Pollution Discharge Elimination System (NPDES) – a \$275 increase for one-time construction permits and a \$60 increase in annual renewal of industrial and commercial permits.

In addition, annual fees for municipalities covered under Phase II will range from \$500 to \$7000, depending on population; counties will pay \$3000 annually. This new revenue would increase the appropriation for storm water permitting by \$1,162,000 and enable the DEQ to dedicate the equivalent of five full time employees to the program.

⁴⁴ Michigan Department of Environmental Quality. "NPDES Wastewater Discharge General Permit for Watershed-Based Permitting." Available: Michigan Department of Environmental Quality. "NPDES Wastewater Discharge General Permit for Watershed-Based Permitting." East Lansing, MI: Department of Environmental Quality. Available: www.michigan.gov/deg Follow the links: Water/Surface Water/Storm Water/Watershed-Based General MS4 Stormwater Permit and Application/Watershed-Based General Permit.

⁴⁵ *Ibid.*

⁴⁶ Michigan Legislature. "Senate Bill 0510." Available: <http://www.michiganlegislature.org/mileg.asp?page=getObject&objName=2003-SB-0510&queryid=4519992&highlight=storm%20water>

The bill passed through the Senate by a vote of 37-1, and it is now in the House Committee on Government Operations. The overwhelming support in the Senate is probably due to the implicit threat of the EPA to take over stormwater permitting if additional funding is not allocated. According to the fiscal analysis by the Michigan Legislature, if the state cannot handle the new influx of permitting responsibilities due to a lack of funds, then “the EPA will be required to establish an stormwater discharge permit program in Michigan.”⁴⁷

Agricultural Runoff

Phosphorus, a common agricultural pollutant, inhibits the development of life in water bodies and encourages the growth of algae, which removes oxygen from the water that fish and other aquatic organisms need to survive; thus, agricultural runoff directly impacts water quality. According to the Lake Michigan LaMP 2002, EPA recognized non-point source runoff as “the most important remaining source of water pollution.”⁴⁸

Assistance Programs

There are a number of USDA Farm Bill Programs that local agricultural producers and other landowners can utilize to reduce water quality impacts of runoff. These programs provide financial and technical assistance to eligible landowners:

Environmental Quality Incentives Program (EQIP): Focuses on issues with erosion (water and wind sources); livestock operations (storage, access, and land application of manure); and nutrient and pest management.

Wetland Reserve Program (WRP): Focuses on the restoration of wetland hydrology to benefit wildlife, ground water recharge, and diversity of habitat.

Wildlife Habitat Incentives Program (WHIP): Assists landowners in establishing upland habitat by planting native plant species for cover, food sources, corridors, and the management of existing forests.

Farmland & Ranchland Preservation Program (FRPP): Unavailable to Muskegon County agricultural landowners until a county ordinance is passed (see FLOS effort described in Existing Laws and Planning Efforts section). If available, this program would purchase the development rights from farms with prime, unique and locally important soils.

Conservation Reserve Program (CRP): Assists landowners in the establishment of plant cover on whole fields or riparian corridors for periods of 10-15 years. Also provides annual rental payments to landowners to continue practices that benefit erosion control, wildlife and water quality.

Conservation Security Program (CSP): Expected to be available in 2004 to reimburse agricultural producers for practicing overall conservation that benefits water, plant, soil, air, and animals on their lands.

⁴⁷ Michigan Senate Fiscal Agency. “Stormwater Discharge Permit Fees: Fiscal Analysis.” June 9, 2003. Available: <http://www.michiganlegislature.org/documents/2003-2004/billanalysis/senate/pdf/2003-SFA-0510-S.pdf>

⁴⁸ Environmental Protection Agency. 2002, Subgoal 7, 62.

Appendix D

Other Organizations

Michigan Municipal League: The League is the state's association for cities and villages. It is nonpartisan and aims to create a network of municipalities throughout the state. It helps to educate its members through nearly 200 training programs for locally-elected officials throughout the state. The League holds an annual legislative conference as well as regional meetings. The organization's website provides additional material to educate officials about practical matters of government.⁴⁹

Michigan Townships Association: The Michigan Townships Association is a nonprofit organization focused on providing information and skills for around 6,500 township officials throughout the state. The Association holds an annual conference, in addition to 50-60 workshops throughout the state each year. They can also disseminate information through their website, their monthly magazine, and personal communications such as fax, phone calls, and letters. Brian Hill, the Treasurer of Egelston Township, is a member of the Townships Association's Board of Trustees.⁵⁰

Michigan Society of Planning: This nonprofit organization seeks to network and educate planners around the state. It claims over 5,000 members, 80 percent of whom are citizens on community planning and zoning boards. The Society provides educational opportunities through an annual conference, regional workshops (about once a month), as well as a website, a newsletter, and publications produced by the Society.⁵¹

Michigan Land Use Leadership Council: The governor set up this 26-member council in order to address the "trends, causes, and consequences of unmanaged growth and development in Michigan." The council was made up of current and former government officials, and it recently released a report on land use in Michigan. Although the council has been dissolved, its website provides links to many references that formed the basis of its report.⁵²

Michigan State University Extension: Michigan State University Extension has several web-based courses and resources available that address planning issues. One document in particular, called "Better Designs for Development in Michigan: Putting Conservation into Local Land Use Regulations," may be specifically applicable to those involved in watershed planning. Courses are listed on the MSUE website and can generally be accessed by any member of the general public.⁵³

⁴⁹ Michigan Municipal League. "About MML." Available: <http://www.mml.org/aboutmml/aboutmml.htm>

⁵⁰ Michigan Townships Association. "About the MTA." Available: http://www.michigantownships.org/about_mta.htm

⁵¹ Michigan Society of Planning. "Organizational Information: Membership." Available: <http://www.planningmi.org/info/membership.htm>

⁵² Michigan Land Use Leadership Council. "On February 5, 2003, Governor Jennifer Granholm Announced the Formation of a Bipartisan Michigan Land Use Leadership Council." Available: <http://www.michiganlanduse.org/>

⁵³ Michigan State University Extension – Land Use Area of Expertise Team. Reports can be accessed by following the link to Resources. A listing of available courses is available by following the links Activities/Training. Available: <http://ntweb11b.ais.msu.edu/luaoe/index.asp?menuname=Home>

Community Engagement

Watershed Organizations

The following watersheds in West Michigan have established watershed organizations that coordinate environmental efforts:

Allegan/Kalamazoo River Watershed,	Muskegon River Watershed,
Bear Creek Watershed,	Pentwater River Watershed,
Bear Lake/Creek Watershed,	Pere Marquette River Watershed,
Black River Watershed,	Pigeon River Watershed,
Coldwater River Watershed,	Rabbit River Watershed,
Duck Creek Watershed,	Rogue River Watershed,
Gun River Watershed,	Sand Creek Watershed,
Kalamazoo River Watershed,	Stony Lake/Creek Watershed,
Lower Grand River Watershed,	Thornapple River Watershed,
Macatawa River Watershed,	White Lake Public Advisory Council,
Mona Lake Watershed,	White River Watershed,
Muskegon Lk. Public Advisory Council,	York Creek Watershed

Education/Outreach

Nature Activities:

Students participate in Muskegon Conservation District hikes and other programs at Hoffmaster State Park that encourage good stewardship of natural resources. On a smaller scale, some students carry out water quality testing on Ruddiman Creek (Lake Muskegon watershed), and a few schools in Muskegon Heights have adopted portions of Little Black Creek.

Speakers:

Volunteer speakers visit the schools to share their expertise with the next generation. A “Phantom of the Aquifer” presentation features aerial photographs of what Muskegon County used to look like. Additionally, the Muskegon Chemistry Council visits schools and offers tours of local chemical plants to increase public awareness of environmental issues.

Education:

The Muskegon Conservation District offers classes and workshops for students. Staff members are also involved in providing science education to teachers and working with K-12 students on drain stenciling and shoreline cleanups, among other programs.

The Clean Air Coalition provides curriculum packets for grades K-5, 6-8 and 9-12 through the Ozone Action! outreach program. As part of the process to design the Muskegon Areawide Plan (MAP), ‘ambassadors’ are scheduling times to present information about the project to local residents and organizations in an effort to keep the public informed about the project.⁵⁴

⁵⁴ West Michigan Shoreline Regional Development Commission. Muskegon Areawide Plan Project News, January 2003. Available: <http://www.wmsrdc.org/map%20downloads/Issue%202%20Newsletter.pdf>

Appendix F

The Muskegon County Wastewater Management System reaches out to a variety of stakeholders, both local and global. At the foundation of all of MCWMS's outreach efforts is the "systemic interaction of humans, land use and water." Visitors can tour the MCWMS facilities. Like the Muskegon Conservation District, MCWMS operates a 'train the trainer' program, educating instructors who can then share their knowledge with schoolteachers in the community. Second and third grade students learn the fundamentals of designing wastewater solutions, and Muskegon County Drain Commissioner Martin Hulka also participates in an annual urban planning project with high school students.

The Annis Water Resources Institute is the coordinator for the State of Michigan for Project WET (Water Education for Teachers). It is also a training site for the Global Learning and Observations to Benefit the Environment (GLOBE) program, a student environmental monitoring program. Students from the Mona Lake watershed also participate in hands-on science/water quality monitoring on board the research vessel W.G. Jackson.



Mona Lake Ecosystem Impairment Matrix

The Ecosystem Impairment Matrix for the Mona Lake watershed provides a broad view of the environmental situation in the community. The matrix is designed to capture a snapshot of the impairments in the Mona Lake watershed and to list some of the factors contributing to those impairments.

The ecosystem impairment matrix provides information about the levels of contaminants in the air, water and soil; hazardous waste releases; and other measures of environmental quality. For the most part, EPA databases supplied the information for the Mona Lake Ecosystem Impairment Matrix. These publicly available databases track information by county, however, and not by watershed. Consequently, the Matrix presents the impairments in the watershed as equivalent to the impairments in Muskegon County. Newaygo County information is not included in the Matrix because such a small fraction of the watershed is located in Newaygo County.

The table on the following pages (Table F-1) summarizes the information included in the rest of this document. The Matrix correlates the chemicals present in the watershed with resulting impairments to the watershed and identifies sources that contribute to these problems. The review in the following pages further explains the causes of the impairments and quantifies the impairments where possible.

Table F-1: Mona Lake Ecosystem Impairment Matrix

	Water			Air			Land		Other	
	Sediment Toxicity	Total Maximum Daily Load (TMDL)	Fish Consumption Advisories	Ambient Air Quality	Air Concentration of Toxic Compounds (1)	Greenhouse Gas	Reportable Spills	Hazardous Waste/Material	Lake Michigan LAMP Priority Pollutants (2)	Binational Toxic Strategy Level I and Level II Pollutants (3)
Source Contributors										
Industrial Source Emissions	X	X	X	X	X	X	X	X	X	X
Area Source Emissions	X	X	X	X	X	X	X	X	X	X
Mobile Source Emissions	X	X		X	X	X			X	X
Sewerage Systems	X	X			X			X	X	X
Stormwater Runoff	X	X	X						X	X
Local Land Use(non-point source polluton; soil erosion; etc.)	X	X	X						X	X
Priority Pollutants										
1,1,2,2-tetrachloroethane					X	X				
1,4-dichlorobenzene									X	X
16-PAHs	X								X	X
3,3'-dichlorobenzidine										X
4,4'-isopropylidenedeiphenol								X		
4,4'-methylenebis(2-chloroaniline)										X
Acrylonitrile					X					
Aldrin/dieldrin									X	X
Alkyl-lead										X
Ammonia							X			
Arsenic									X	
Atrazine									X	X
Barium compounds								X		
Benzo(a)pyrene										X
Cadmium	X									
Carbon Dioxide (CO2)						X				
Carbon Monoxide (CO)						X				
Chlordane									X	X
Chlorophyll a		X								

	Water			Air			Land		Other	
	Sediment Toxicity	Total Maximum Daily Load (TMDL)	Fish Consumption Advisories	Ambient Air Quality	Concentration of Toxic Compounds (1)	Greenhouse Gas	Reportable Spills	Hazardous Waste/Material	Lake Michigan LAMP Priority Pollutants (2)	Binational Toxic Strategy Level I and Level II Pollutants (3)
Chromium					X			X	X	
Cobalt compounds								X		
Copper								X	X	
Cyanide									X	
DDT (+DDD+DDE)									X	X
Dimethyl phthalate								X		
Dinitropyrene										X
Dioxins and Furans									X	X
Endrin										X
Ethylene Dibromide					X					
Ethylene Dichloride					X					
Heptachlor										X
Hexachlorobenzene (HCB)									X	X
Hexachlorobutadiene										X
Hexachlorocyclohexane										X
Hydrazine					X					
Hydrochloric acid							X			
Hydrofluoric acid							X		X	
Lead (1)								X		
Manganese compounds					X			X	X	
Mercury (1)			X							X
Mirex										X
Nickel compounds					X			X		
Nitrates		X								
NOx				X		X				
Octachlorostyrene										X
Ozone				X						
Particulate Matter (PM)				X						

	Water			Air			Land		Other	
	Sediment Toxicity	Total Maximum Daily Load (TMDL)	Fish Consumption Advisories	Ambient Air Quality	Concentration of Toxic Compounds (1)	Greenhouse Gas	Reportable Spills	Hazardous Waste/Material	Lake Michigan LAMP Priority Pollutants (2)	Binational Toxic Strategy Level I and Level II Pollutants (3)
Pentachlorobenzene										X
Pentachlorophenol										X
Petroleum Hydrocarbons (e.g. oil, grease, gasoline)							X			
Phosphorous		X								
Polychlorinated Biphenyls (PCBs)		X	X						X	X
Propylene dichloride					X					
Quinoline					X					
Selenium									X	
Sodium Hypochlorite							X			
Sulfure Dioxide (SO2)						X				
Tetrachlorobenzene										X
Tributyl tin										X
Trichloroethylene					X					
Vinyl Chloride					X					
Volatile Organic Compounds (VOCs)				X						
Zinc									X	

(1) The US EPA National Air Toxics Assessment put these compounds in the 90th-95th, or 95th-100th percentiles in terms of their concentrations in the atmosphere in Muskegon County, MI, relative to all the other counties nationwide.

(2) The Lake Michigan Lakewide Management Plan (LaMP) identified these pollutants that were "of concern", "critical," or "watch listed" in the Lake Michigan area.

(3) The Great Lakes Binational Toxics Strategy (BTS) identifies these pollutants on their Level I and II lists of chemicals considered to be persistent, toxic, and bioaccumulative.

The Mona Lake watershed is located in western Michigan, and lies almost entirely within Muskegon County, except for a small piece that is located in Newaygo County. The watershed encompasses 48,000 acres and three major water bodies: Mona Lake, Black Creek, and Little Black Creek.

Land uses in the watershed include forest (35 percent), urban/developed (32 percent), agriculture (17 percent), and open field. Forests and agriculture take up less space than they did 20 years ago. In their place, more land is being dedicated to low-density residential development, urban development and open fields.

On a larger scale, the Mona Lake watershed is part of the Lake Michigan direct discharge watershed flowing from Muskegon and Newaygo Counties. All three major water bodies located within the Mona Lake watershed are included on the U.S. EPA 303(d) list of impaired water bodies that need remediation. The pollution that causes these impairments comes from many sources, the most important of which are outlined in the following sections.

Nutrient enrichment

Phosphorous inhibits the development of life in water bodies. It encourages the growth of algae, which removes the oxygen from the water that fish and other aquatic organisms need. The levels of phosphorus have decreased dramatically in the tributaries to Mona Lake since 1973. The condition of Little Black Creek was considered poor in 1973 due to phosphorus levels near 755 parts per billion (ppb); today, levels have dropped to 40 ppb. In 1995, levels of phosphorus in Black Creek were very high under wet conditions: 790 ppb; since then, levels have dropped to 60 ppb. Although the current levels still exceed the “excessive” level of 25 ppb, signs of improvement have been seen.⁵⁵

Fish kills, presumably due to low dissolved oxygen concentrations, were reported in 1956. A 1971 fish survey reported few game fish present in the lake. Benthic macroinvertebrate data collected in the 1970s indicated degraded water quality by the low diversity of animals, an absence of mollusks, and very sparse amphipod populations. All of these signs can be related back to high levels of phosphorus.⁵⁶

Sediment toxicity⁵⁷

The highest level of cadmium found in sediments throughout the Great Lakes is found in Little Black Creek. Just downstream from the Peerless Plating Superfund site, the concentration of cadmium exceeds 900 mg/kg. Comparatively, the concentration at which adverse ecological effects are anticipated in 75 out of 100 cases (the Probable Effects Concentration) is less than 20 mg/kg. Despite these high levels, cadmium is not one of the impairments listed for Little Black Creek.

⁵⁵ Annis Water Resources Institute monitoring data presented in a talk by Dr. Alan Steinman to the Lake Michigan Forum on June 12, 2003. “Mona Lake Watershed Assessment: Annis Water Resources Institute – Grand Valley State University.”

⁵⁶ Annis Water Resources Institute, Grand Valley State University. Undated. Preliminary Watershed Assessment, Mona Lake Watershed, Annis Water Resources Institute, Grand Valley State University.

⁵⁷ *Ibid.*

Polycyclic aromatic hydrocarbons (PAHs) are found at elevated levels in sediments throughout Little Black Creek. Most PAHs enter water bodies after release from industrial and wastewater treatment plants; some PAHs can be reasonably suspected to cause cancer. The Probable Effects Concentration (PEC) for PAHs is 24 mg/kg, and monitoring data showed levels of PAHs in sediments exceeded that concentration in six of eight cases. The highest reading was more than three times the PEC: 80 mg/kg.

e. Coli

Within the Mona Lake watershed itself, no violations of the Michigan Water Quality standard for *E. coli* were recorded in 2003. The water quality standard requires levels of *E. coli* to remain below 300 *E. coli* per 100 mL. At two Lake Michigan beaches very close to the mouth of Mona Lake, however, high levels of *E. coli* were noted in 2003 on three occasions, although only one violation of the standard occurred. At the Lake Harbor Park testing site, reports indicated one violation as well as one reading in excess of 200 *E. coli* per 100 milliliters. The P.J. Hoffmaster State Park testing site had no violations but reported one reading in excess of 200 *E. coli* per 100 milliliters.⁵⁸ A direct relationship has been demonstrated between the concentration of *E. coli* in fresh water beaches and the occurrence of associated gastroenteritis.

Fish Consumption Advisories

The Michigan Department of Community Health issued fish consumption advisories for carp and white suckerfish in Black Creek for PCBs; advisories were also issued for PCBs in carp, small mouth bass and walleye in Mona Lake. A statewide advisory for mercury also affects all of the water bodies in the watershed.⁵⁹

Total Maximum Daily Load (TMDL)

For sites that are included in the list of impaired waters under Clean Water Act Section 303(d), states and local partners must calculate the maximum amount of each impairment-causing pollutant that a water body can receive and still meet water quality standards. Then, that amount must be allocated to the sources of that pollutant in the watershed to ensure that that loading is not exceeded. The combination of the calculation and the allocation is called a Total Maximum Daily Load (TMDL). Table F-2 summarizes the list of impairments for each area water body and the date by which a TMDL is expected to be submitted.

⁵⁸ The violation occurred on July 15, 2003, with a reading of 300.53 *E. coli* per 100 ml. Reference: Michigan Department of Environmental Quality. "Michigan Public Beach and Waterway Information." Available: <http://www.deq.state.mi.us/beach/default.asp?County=61>

⁵⁹ Michigan Department of Community Health. "2003 Michigan Family Fish Consumption Guide." Available: http://www.michigan.gov/documents/FishAdvisory03_67354_7.pdf

Table F-2: Impairments of water bodies in Mona Lake watershed⁶⁰

Water Body	Impairments	Anticipated TMDL Submittal
Black Creek	Fish Consumption Advisory (PCBs)	12/31/2010
	Fish Community Rated Poor (Biological)	12/31/2003
Little Black Creek	Nutrients	12/31/2003
	Pathogens	12/31/2003
	Algae (Algal growth/Chlorophyll A)	12/31/2003
	Fish Community Rated Poor (Biological)	12/31/2003
	Macroinvertebrate Community Rated Poor (General WQS, Benthic)	12/31/2003
Mona Lake	Mercury	12/31/2011
	Fish Consumption Advisory (PCBs)	12/31/2009

Other contaminated waters

- Nearby Chippewa Creek, Mill Pond Creek, Pere Marquette River, Pere Marquette Lake, and White Lake are also included on the 303(d) list of impaired water bodies. Impairments include nutrients, chlordane and mercury. TMDLs for these impairments have yet to be submitted.

Non-Point Source Pollution (pesticide use)

- Although no specific information about pesticide use in the study area was located, there are many pesticides that are of concern in the Lake Michigan and Great Lakes region. With approximately 17 percent of the land in the Mona Lake watershed being used for agriculture in 1997-98, it is likely that at least some of these pesticides are in use within the watershed.⁶¹

Air

Air quality is impaired by the numerous point and area sources in Muskegon County.

Ambient Air Quality: Ozone

Ozone is one of six pollutants that are used to evaluate air quality by the EPA. On a local level, it contributes to smog. It can activate a variety of health problems, from aggravating asthma to increasing susceptibility to respiratory illness, even at very low levels. Young children and senior citizens are at highest risk. Long-term exposure to ozone in the atmosphere can cause lung damage.

Ground-level ozone, the toxic form, is created when a reaction takes place in the atmosphere between NO_x, VOCs and sunlight. Ozone levels are usually highest in the summertime, when the warm atmosphere increases the rate of the reaction. The U.S. EPA has established safe levels of ozone, based on an eight-hour average concentration and a one-hour average concentration.

⁶⁰ Environmental Protection Agency. "TMDL Program website, Section 303(d) List Fact Sheet for Watershed: Pere-Marquette/White." Available: http://oaspub.epa.gov/pls/tmdl/huc_rept.control?p_huc=04060101&p_huc_desc=PERE%20MARQUETTE-WHITE

⁶¹ Annis Water Resources Institute, Grand Valley State University. Preliminary Watershed Assessment, Mona Lake Watershed.

If the average concentration of ozone exceeds the eight-hour standard more than three times or the one-hour standard more than once during the course of a year, the area is considered to be in non-attainment.⁶²

The table below shows the monitoring data that were used to determine compliance for Muskegon County during the year 2002. Although the population of Muskegon County is not among the highest in the state, the county ranked fifth statewide for the concentration of ozone used to determine compliance with the eight-hour standard. Muskegon County was responsible for two violations of the one-hour standard, but an increase in the number of violations can be expected when the new eight-hour standard is implemented.

Table F-3: Ozone levels in Muskegon County, 2002 ⁶³

Metric	Standard	Muskegon County
Population		171,361
Measure for 1-hr ozone compliance	0.12 ppm	0.128 ppm
Measure for 8-hr ozone compliance	0.08 ppm	0.096 ppm (5 th highest among counties in MI)
Number of violations of 1-hr standard	N/A	2
Number of violations of 8-hr standard	N/A	7

Ambient Air Quality: Criteria pollutants

The levels of five pollutants in addition to ozone are used to determine compliance with the National Ambient Air Quality Standards (NAAQS): particulate matter (PM₁₀), nitrogen oxides (NO_x), carbon monoxide (CO), lead (Pb), and sulfur dioxide (SO₂). Besides creating local environmental problems, NO_x, SO₂, CO and carbon dioxide (CO₂) act as greenhouse gases, contributing to the global problem of climate change.

As of 2001, Muskegon County was in attainment for levels of PM₁₀, NO_x, CO, lead and SO₂. The amount of pollution released in Muskegon County relative to the rest of the state, however, was not proportional to its share of the statewide population; in 2000, Muskegon County accounted for only 1.7 percent of Michigan's residents. As shown in the table below, the county's share of statewide emissions by point sources exceeded that ratio for each criteria pollutant with the exception of VOCs.

⁶² Currently, attainment is based on the one-hour standard. EPA issued the tighter eight-hour standard, which will soon be the prevailing benchmark

⁶³ EPA AirData.

Table F-4: Muskegon County Emissions of Criteria Pollutants by Point Sources, 2000 (ktons/year) ⁶⁴

Pollutant	Muskegon County Emissions	Percent of statewide emissions
CO	5.21	5.8%
NO _x	8.80	2.9%
VOC	0.65	0.9%
SO ₂	16.02	3.3%
PM ₁₀	0.79	3.2%

Air Toxics

Toxic pollutants are those pollutants that are suspected to cause serious human health effects. If exposed to these chemicals at sufficiently high levels over time, an individual may develop a myriad of health effects, including cancer and damage to the immune system, as well as neurological, reproductive (e.g., reduced fertility), developmental, respiratory and other health problems. Most air toxics are generated by human-induced activity, including transportation, industry and household activities such as cleaning.

People can be exposed to toxic chemicals in a variety of ways:

- breathing contaminated air;
- eating contaminated food (e.g., fish from contaminated waterways);
- ingesting water contaminated by toxic air pollutants (through air deposition);
- ingesting contaminated soil;
- touching contaminated soil, dust or water. ⁶⁵

Among more than 3,200 counties nationwide, Muskegon County ranks 350th for air releases of chemicals included in the 1996 National Toxics Inventory.⁶⁶ The following chart summarizes the releases of several hazardous air pollutants in Muskegon County, several of which are listed as pollutants of concern by the Binational Toxics Strategy and the Lake Michigan Lakewide Management Plan. (See "Priority Pollutants" section for more details.)

⁶⁴ Environmental Protection Agency. "AirData." Available: <http://www.epa.gov/air/data/emisumry.html?st=MI~Michigan>

⁶⁵ Environmental Protection Agency. "Air Toxics." Available: <http://www.epa.gov/ttn/atw/allabout.html>

⁶⁶ Environmental Protection Agency. "AirData." Available: <http://oaspub.epa.gov/pls/airsdata/adnti.summary?geotype=us&geocode=USA&geoinfo=%3Fus%7EUSA%7EUnited+States&pol=H000&year=&fld=state&fld=county&fld=urb&fld=percent&rpp=25&page=3&sort=d4&fmt=&emis=A>.

Table F-5: Muskegon County Emissions of Select Hazardous Air Pollutants (HAPs), 1996 (pounds/year)⁶⁷

Pollutant	Muskegon County Emissions	Percent of statewide emissions
Arsenic compounds	461	0.96%
Benzene	458,740	1.23%
Cadmium compounds	70.4	1.72%
Chromium compounds	4,538	6.59%
Hydrazine	0.131	3.19%
Lead compounds	935	1.06%
Manganese compounds	3,451	2.40%
Mercury compounds	176	1.56%
Nickel compounds	2,562	3.84%
Trichloroethylene (TCE)	152,485	9.45%
Total HAPs	6,595,178	1.45%

Atmospheric Concentration of Toxics

The information provided in this section provides another basis for evaluating the quality of air in an area. In the previous section, emissions of some air pollutants were given by volume released; this section ranks the concentration of hazardous pollutants in the air in Muskegon County, as it compares to the concentrations in counties throughout the United States. A ranking in the 90th percentile would indicate that the concentration of that specific pollutant in Muskegon County was higher than its concentration in 90 percent of the counties sampled nationwide.

Not all of the pollution that contributes to the atmospheric concentration of hazardous pollutants was emitted by sources within the county; some of these emissions originate in other parts of the state or the country and are transported to Muskegon County. Regardless of their origin, elevated levels of these contaminants in the air can contribute to a range of adverse health effects, depending on the chemical.⁶⁸

Although EPA maintains records of the ambient concentrations of over 30 different compounds, not all of them are included here. The levels of the chemicals that are listed on the following page as air pollutants of concern are among the highest in the country, most often falling in the 90th-95th percentile for all counties nationwide.

⁶⁷ Environmental Protection Agency. "AirData." Available: <http://www.epa.gov/air/data/ntisumm.html?st~MI~Michigan>

⁶⁸ Environmental Protection Agency. "National Air Toxics Assessment." Based on 1996 data. Available: <http://www.epa.gov/ttn/atw/nata/natsa2.html>

Air Pollutants of Concern (1996 EPA data)

- o Cadmium Compounds (50-75 percentile)
- o Chromium Compounds (90-95 percentile)
- o Ethylene Dibromide (90-95 percentile)
- o Ethylene Dichloride (90-95 percentile);
- o Hydrazine (90-95 percentile)
- o Lead Compounds (50-75 percentile)
- o Manganese Compounds (90-95 percentile)
- o Mercury Compounds (75-90 percentile)
- o Nickel Compounds (95-100 percentile)
- o Propylene dichloride (95-100 percentile)
- o Quinoline (90-95 percentile)
- o Trichloroethylene (TCE) (90-95 percentile)
- o Vinyl chloride (90-95 percentile)

Land

Reportable Spills

- In 1997, more than 11,029 pounds of hazardous waste spilled from a total of 11 facilities in Muskegon County. Sodium hydroxide and sodium hypochlorite were spilled most often.⁶⁹

Hazardous Waste

- Muskegon County contains 422 facilities that handle Resource Conservation Recovery Act (RCRA) hazardous waste materials.⁷⁰
- According to the Toxics Release Inventory, more than 10,000 pounds of the following compounds were hauled off-site for disposal in 2001: barium compounds; 4,4'-isopropylidene diphenol; nickel; copper; chromium; chromium compounds; manganese compounds; dimethyl phthalate; lead; manganese and cobalt compounds.⁷¹
- There are 17 hazardous waste sites in Muskegon County. Nine of these are on the Superfund National Priority List: Cordova Chemical, Duell and Gardner Landfill, Kaydon Corporation, Koch Chemical Company, Lomac Incorporated, Peerless Plating Company Incorporated, SCA Serv of Michigan-Independent Collection, Thermo-Chem Inc., and Thomas Solvent Company of Muskegon Incorporated.

Priority Pollutants

Lists of priority pollutants for the region have been drawn up by two entities: the Great Lakes Binational Toxics Strategy, and the Lake Michigan Lakewide Management Plan (LaMP). These pollutants are included in this impairment matrix because they are priority pollutants affecting the entire Great Lakes region and therefore of concern to the Mona Lake watershed as it relates to Lake Michigan.

⁶⁹ Environmental Protection Agency. Emergency Response and Notification System (ERNS) database. Available: <http://d1.rtknet.org/ern/area.php>

⁷⁰ Environmental Protection Agency. Envirofacts database. Available: http://oaspub.epa.gov/enviro/ef_home2.waste

⁷¹ Environmental Protection Agency. TRI Explorer. Available: www.epa.gov/triexplorer

⁷² Environmental Protection Agency. Envirofacts database. Available: http://oaspub.epa.gov/enviro/ef_home2.waste

The Great Lakes Binational Toxics Strategy also assembled a list of persistent toxic substances in the Great Lakes. These pollutants are targeted for virtual elimination.⁷³

Table F-6: Great Lakes Binational Toxics Strategy – Persistent Toxic Substances

Level I Substances	Level II Substances
Aldrin/dieldrin	Cadmium and cadmium compounds
Benzo(a)pyrene {B(a)P}	1,4-dichlorobenzene
Chlordane	3,3'-dichlorobenzidine
DDT (+DDD+DDE)	Dinitropyrene
Hexachlorobenzene (HCB)	Endrin
Alkyl-lead	Heptachlor (+Heptachlor epoxide)
Mercury and mercury compounds	Hexachlorobutadiene (+Hexachloro-1,3-butadiene)
Mirex	Hexachlorocyclohexane
Octachlorostyrene	4,4'-methylenebis(2-chloroaniline)
PCBs	Pentachlorobenzene
PCDD (Dioxins) and PCDF (Furans)	Pentachlorophenol
Toxaphene	Tetrachlorobenzene (1,2,3,4- and 1,2,4,5-)
	Tributyl tin
	PAHs

The Lake Michigan Lakewide Management Plan (LaMP) identified certain pollutants that were either “of concern,” “critical,” or “watch listed.”

- Critical Pollutants: PCBs, Dieldrin, Chlordane, DDT and metabolites, Mercury, Dioxin/Furans
- Pollutants of Concern: Lead, Cadmium, Copper, Zinc, Chromium, Arsenic, Cyanide, Hexachlorobenzene (HCB), PAHs
- Watch Listed Pollutants: Atrazine, Selenium, PCB substitute compounds⁷⁴

⁷³ Environmental Protection Agency. “The Great Lakes Binational Toxics Strategy Persistent Toxic Substances.” Available: <http://www.epa.gov/glnpo/p2/bns.html#Level%20I>.

⁷⁴ Environmental Protection Agency. 2000. “Lake Michigan LaMP Pollutants.” Available: <http://www.epa.gov/glnpo/lakemich/lmlamp2000/LM%20chapter%205.pdf>

Acronyms



BMP	Best Management Practice
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFMC	Community Foundation for Muskegon County
DEQ	Department of Environmental Quality
EMS	Environmental Management System
EPA	Environmental Protection Agency
FLOS	Farmland and Open Space
FOIA	Freedom of Information Act
GAAMP	Generally Accepted Agricultural Management Practices
GVSU	Grand Valley State University
HEL	Highly Erodible Land
IDEP	Illicit Discharge Elimination Plan
LaMP	Lakewide Management Plan
MAEAP	Michigan Agricultural Environmental Assurance Program
MAP	Muskegon Areawide Plan
MBP3	Michigan Business Pollution Prevention Program
MCECC	Muskegon County Environmental Coordinating Committee
MCSC	Muskegon County Stormwater Committee
MCWMS	Muskegon County Wastewater Management System
MDA	Michigan Department of Agriculture
MLWC	Mona Lake Watershed Council
MSU	Michigan State University
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCS	Permit Compliance System
PEP	Public Education Plan
RC&D	Resource Conservation and Development
RCRA	Resource Conservation and Recovery Act
RETAP	Retired Engineers Technical Assistance Program
ROD	Record of Decision
SEP	Supplemental Environmental Project
TMDL	Total Maximum Daily Load
TRI	Toxics Release Inventory
USDA	U.S. Department of Agriculture
VOC	Volatile Organic Compounds
WMP	Watershed Management Plan
WMSA	West Michigan Strategic Alliance
WMSBF	West Michigan Sustainable Business Forum
WMSRDC	West Michigan Shoreline Regional Development Commission



Glossary for Mona Lake Stewardship Assessment

303(d)-section of the Clean Water Act specifying that states should designate all appropriate waters as impaired. These waters showcase “evidence that a pollution source or combination of sources (including moving sources) is presenting an imminent and substantial risk of harm”

Clean Water Act Section 319 – federal legislation that authorized States, Territories, and Indian Tribes to apply for and receive grants which support a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring of the success of specific nonpoint source implementation projects.⁷⁹

Eco-Industrial Park - a group of businesses that work together and with the community to efficiently share resources (materials, water, energy, infrastructure, natural habitat and information), enhance economic prosperity and improve the environment.⁸⁰

⁷⁵ EPA Memorandum on guidance of 303(d)

<http://www.epa.gov/compliance/resources/policies/civil/caa/stationary/guide-sec303-rpt.pdf>

⁷⁶ EPA Region V Brownfields website: <http://www.epa.gov/R5Brownfields/>

⁷⁷ EPA <http://www.epa.gov/swerosps/bf/glossary.htm#brow>

⁷⁸ Michigan DEQ, http://www.michigan.gov/deq/0,1607,7-135-3311_4110_4220-9051--,00.html

⁷⁹ Clean Water Act Section 319 website: <http://www.epa.gov/owow/nps/cwact.html>

⁸⁰ US EPA, <http://www.epa.gov/epaoswer/non-hw/recycle/jtr/topics/liss.htm>

Glossary

Environmental management system (EMS) - a framework that helps a company achieve its environmental goals through consistent control of its operations and a system of identifying environmental impacts, setting priorities, establishing environmental goals, designing implementation plans to meet those goals, and regular monitoring.⁸¹

Muskegon Areawide Plan (MAP) – a planning process aimed at creating a vision and strategy to guide future growth in Muskegon County that is directed by a unique partnership of local governments, citizens, business leaders and policy makers.⁸²

Part 201 – the Environmental Remediation part of Michigan's 1994 Natural Resources and Environmental Protection Act; governs the cleanup of state-designated contaminated sites.⁸³

Pollution prevention – source reduction and other practices that reduce or eliminate the creation of pollutants through increased efficiency in the use of raw materials, energy, water, or other resources, or protection of natural resources by conservation.⁸⁴

Stewardship – an ethic of respect for the inherent value of healthy and natural systems and the practices that sustain those benefits for current and future generations.⁸⁵

Superfund – a federal government program that regulates the management of any land in the United States that has been contaminated by hazardous waste and identified by the Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health and/or the environment.⁸⁶

Supplemental Environmental Project (SEP) – an environmentally beneficial project that a violator of environmental regulation agrees to undertake in settlement of an enforcement action but which the violator is not otherwise legally required to perform.⁸⁷

Total Maximum Daily Load (TMDL) - a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standard, and an allocation of that amount to the pollutant's sources.⁸⁸

West Michigan Shoreline Regional Development Commission (WMSRDC) – the body responsible for developing regional plans and development programs in West Michigan.

⁸¹ EPA EMS site: <http://www.epa.gov/dfe/pubs/iems/bulletins/bullet01/whatem.html>

⁸² Muskegon Areawide Plan Fact Sheet (Fall 2002): <http://www.wmsrdc.org/>

⁸³ Michigan DEQ Part 201 website: http://www.michigan.gov/deq/0,1607,7-135-3311_4109-18202--00.html

⁸⁴ EPA Pollution Prevention website: <http://www.epa.gov/oppt/p2home/p2policy/definitions.htm>

⁸⁵ Environmental Financial Advisory Board. "Protecting America's Land Legacy," February 2003:

http://www.epa.gov/efinpage/efab/stewardship_2003.pdf

⁸⁶ EPA Superfund website:

http://cfpub.epa.gov/superapps/index.cfm/fuseaction/faqs.viewAnswer/question_id/111/category_id/7/faqanswr.cfmA

⁸⁷ EPA SEP website: <http://www.epa.gov/Region5/orc/sepdscr.htm>

⁸⁸ EPA TMDL site: <http://www.epa.gov/owow/tmdl/intro.html>

Contact Us:
Lake Michigan Forum
c/o Delta Institute
53 W. Jackson Blvd., Ste. 230
Chicago, IL 60604
Telephone: 312-554-0900
Fax: 312-554-0193
E-mail: [delta@
delta-institute.org](mailto:delta@delta-institute.org)