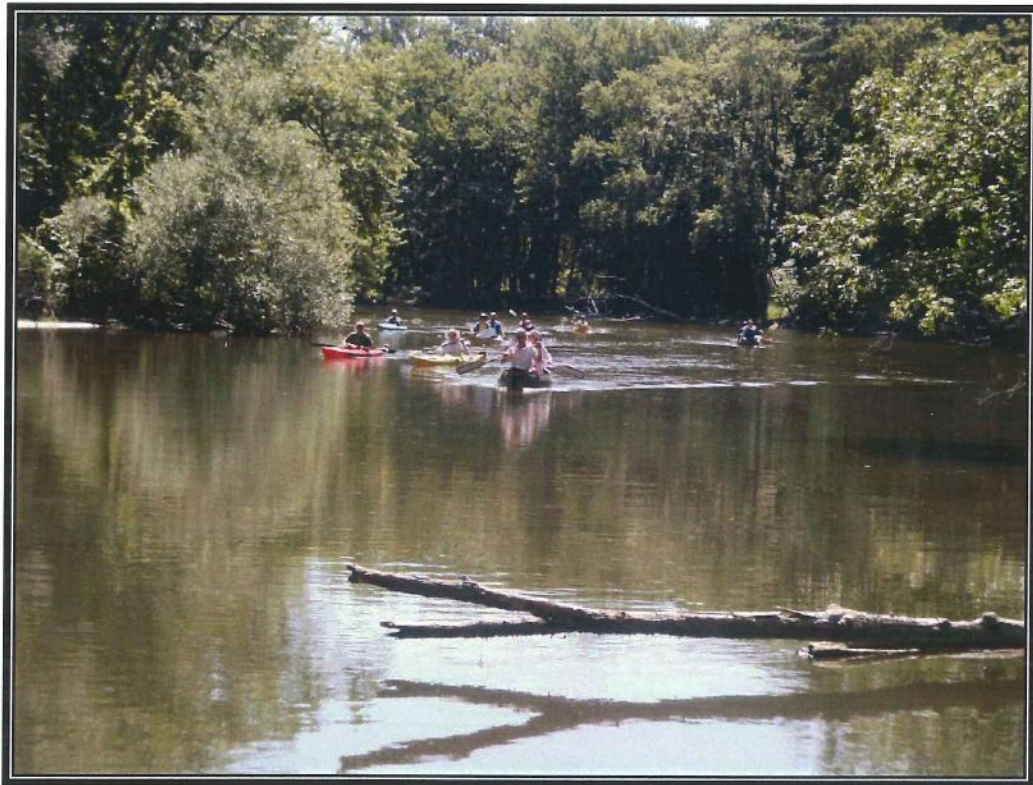


Capstone Report to Stakeholders 2005



**Kalamazoo River/
Lake Allegan
Phosphorus TMDL**

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Lake Allegan
Phosphorus TMDL**

**CAPSTONE REPORT
TO STAKEHOLDERS
MARCH 2005**

**EXTENSION LAND AND WATER PROGRAM
Kellogg Biological Station
Michigan State University**

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**MICHIGAN STATE
UNIVERSITY
EXTENSION**

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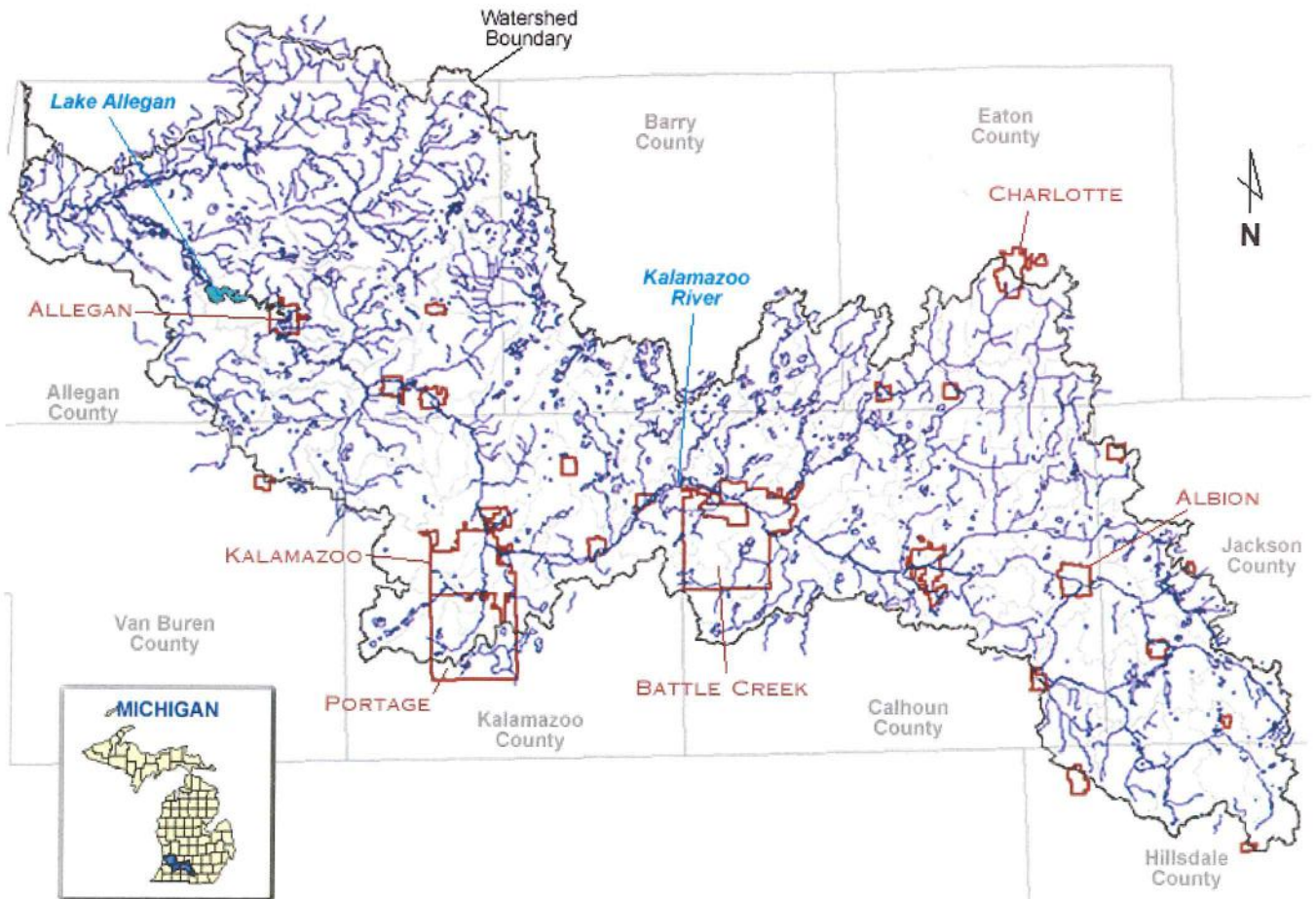
INTRODUCTION

Nutrient enrichment, or *eutrophication*, is threatening public recreation, fishing and other designated uses of southwest Michigan's Lake Allegan. Lake Allegan is a 1,587 acre impoundment on the Kalamazoo River mainstream approximately 22 miles upstream of Lake Michigan. Its eutrophication is a symptom of significant land use impacts, primarily caused by phosphorus. Because phosphorus adheres easily to soil, the use and management of land throughout the watershed affects the quality of the river, streams, lakes and wetlands, and ultimately Lake Michigan.

The Michigan Department of Environmental Quality (MDEQ) and US Environmental Protection Agency (EPA) approved a Total Maximum Daily Load (TMDL), which specifies the maximum amount of phosphorus the Kalamazoo River system can receive and still meet water quality standards in Lake Allegan. From its inception in the fall of 1998, the Kalamazoo River/Lake Allegan TMDL effort has been a community-based project. During this time, landowners, industry, government, community organizations and citizens from all facets of community life have participated in developing the TMDL and its Implementation Plan.

This plan outlines a vast array of land use strategies to reduce inputs of phosphorus into the river system, and was developed by stakeholder groups most directly affected by the proposals. An Implementation

Kalamazoo River Watershed



kalamazoosriver.net 2001

Committee, made up of local citizens, is presently overseeing the TMDL. This TMDL effort program has gained national recognition for its watershed-wide, community based approach, and if successful will result in improved water quality with less direct regulation by state and federal agencies.

After five years of developing an organization and implementing the plans, it is appropriate to take stock of the course of this diverse and energetic project. The report will touch on the history of this TMDL process, describe the various strategies used to address the many sources of phosphorus loading, and indicate the progress made in addressing phosphorus reduction. In assessing this project, Michigan State University Extension (MSUE) sought candid input from partners and stakeholders. From the beginning, this was intended to be a long-term undertaking. At this time, the leadership is considering organizational changes that will sustainably facilitate phosphorus reduction in the future.

BACKGROUND

The Watershed: The Kalamazoo River Watershed is a major geographic feature of southwest Michigan. It drains some 2,020 square miles of land in Allegan, Van Buren, Kalamazoo, Calhoun, Barry, Eaton, Hillsdale and Jackson Counties. The watershed is largely rural. Its principal land uses include agriculture (44 percent), forest and open space (41 percent), and water and wetlands (7 percent). The river has a legacy of serious industrial and nutrient pollution. Many water quality problems have been and continue to be addressed, including PCB contamination. Today, nutrient enrichment of Lake Allegan is a symptom of significant non-point source problems in a watershed diverse in land use and experiencing development pressures. While not a large part of the watershed, urban land uses account for approximately 40 percent of the non-point source load.

Lake Allegan, as an impoundment in the lower part of the watershed, serves as a collection point for sediments and nutrients delivered by the river and its tributaries. Excess nutrients in the lake contribute to algal blooms, low oxygen levels, poor water clarity and a fish community dominated by carp. Characterized as *hypereutrophic*, Lake Allegan does not meet designated use and water quality standards.

The Phosphorus Problem: Phosphorus is a common element in our environment and is important for seed development and root growth for new plantings. However, as is often the case, too much of a good thing can cause problems. While a variety of factors can lead to water quality problems, scientists have determined that phosphorus is the primary cause of eutrophication. It has been shown that one pound of phosphorus in the water can generate growth of more than 500 pounds of algae. Animal waste and fertilizers are common sources of phosphorus, which then can be carried to the river by stormwater runoff and soil erosion.

In the Kalamazoo River Watershed, industrial and municipal discharges (wastewater and cooling water) account for approximately one-third of the total load of phosphorus from April through September (the growing season). The remaining two-thirds comes from runoff (from roads, parking lots, lawns, farms, industry and commercial activities); poorly functioning septic systems; livestock, pets and wildlife; and improper and illicit connections of sanitary discharges to storm sewers.

Because of its excessive phosphorus, Lake Allegan is on Michigan's list of impaired waters. The State of Michigan therefore was mandated by the Federal Clean Water Act to develop a TMDL for the Kalamazoo River Watershed, which would limit the amount of phosphorus entering Lake Allegan in order to meet water quality standards there. The phosphorus TMDL also was to specify that the limited total acceptable phosphorus loadings would be shared among all categories of dischargers in the watershed, point and non-point alike.

Other Resource Concerns: Although elevated phosphorus levels have impaired Lake Allegan, the following are serious concerns that are also present within the watershed.

Kalamazoo River Area of Concern (AOC)—A thirty-five mile stretch of the Kalamazoo River from Morrow Pond to the City of Allegan and its tributary Portage Creek were identified as a Great Lakes Area of Concern because of the presence of polychlorinated biphenyls (PCBs). These were discharged primarily from historical operations at local paper mills. A Public Advisory Council was established in 1993 to implement a Remedial Action Plan for restoration of the Kalamazoo River aquatic ecosystem and protection of public health. To date, there has been some progress made, but significant controversy remains over the next steps to clean up PCB contamination and restore the river system.

Fish and wildlife, including habitat destruction and fragmentation—Dams and other in-stream alterations, as well as inappropriate land use practices on riparian and upland areas, have impacted habitat and wildlife populations in addition to the direct harm caused by the numerous water quality impairments. Dams, wetland fills, de-vegetation of riverbanks, erosion and sedimentation, agricultural and urban drainage, untreated and accelerated stormwater runoff and urbanization all contribute to resource degradation. These impairments include alteration of flow regimes; flooding; temperature changes; reduction of structural and vegetative diversity; sediment transport; loss of breeding, nursery and resting areas; and fragmentation of transportation routes for fish and wildlife populations alike.

Invasive species— Either intentionally or inadvertently, numerous non-native biological species have been introduced into the Kalamazoo River Watershed. These species often compete with or prey on native species, with resulting negative impacts on the natural ecosystem, fish and wildlife populations, community and industrial facilities and human quality of life.

Overall public image of the River—A famous 1953 *Life* magazine photograph depicts a portion of Dumont Creek (a tributary downstream of Kalamazoo) covered with a solid four-acre mat of dead carp, killed by contamination-induced oxygen depletion from industrial and municipal discharges. While significant pollution reduction efforts have greatly improved the river, many still think of the Kalamazoo River as a polluted, spoiled resource possessing no fisheries, wildlife or aesthetic value, and not fit for recreation or human enjoyment. Some residents consider the river a liability, rather than an untapped public resource. The Kalamazoo River is, in fact, an important regional resource, offering great natural and aesthetic value, and presenting significant recreational, tourism and economic potential.

THE COMMUNITY RESPONDS



Beginning in late 1998, the watershed community responded to a call from MDEQ to come together to discuss the TMDL and the watershed's future. During dozens of meetings and hundreds of volunteer hours over the next three years, representatives of business and industry, local units of government, community organizations and educational institutions cooperatively investigated and analyzed the phosphorus problem, and agreed upon goals for restoration. The TMDL produced by this process was the result of positive and progressive dialogue, during which a feeling of trust developed among the many diverse stakeholders and MDEQ. That spirit of trust and cooperation continues today.

Setting the Technical Goal: Specialists from industry, private business, WMU and MSU worked in partnership with MDEQ as a technical committee to study the scientific aspects of the phosphorus problem and to propose solutions to meet the restoration goals. Morrow Pond, an impoundment

approximately 44 miles upstream from Lake Allegan, seemed to be a resource very similar to it in size, depth, and configuration. Morrow Pond, however, is not classed as hypereutrophic. The group felt that an appropriate goal was to restore Lake Allegan to the water quality condition of Morrow Pond, as measured by various indicators.

The TMDL was derived using 1998 data (both ambient water quality and discharge monitoring) as the baseline. All increases and decreases in phosphorus loading to the watershed will be tracked in relationship to 1998 levels. The TMDL is apportioned into 1) Waste Load Allocation, from industrial and municipal point sources, 2) Load Allocation, from all other (non-point) sources, and 3) a Margin of Safety. Because the symptoms and effects of nutrient enrichment primarily manifest themselves in the spring and summer, the TMDL is seasonal (April through September). These wasteload allocations require a 23 percent reduction in phosphorus loads from municipal and industrial point sources throughout the watershed, with the target for non-point sources being an ambitious 50 percent reduction. Proposed water quality goals for Lake Allegan also include improved water clarity, increased oxygen levels, a more balanced fish community and the absence of significant blue-green algae blooms (which cause taste and odor problems as well as fish kills). These goals must be accomplished by 2012.

Cooperative Agreement: One of the unique elements of the TMDL approach within the Kalamazoo River Watershed is the Cooperative Agreement between municipal and industrial dischargers and MDEQ. The United States Environmental Protection Agency (EPA) and MDEQ directly regulate these entities by permit under the National Pollutant Discharge Elimination System (NPDES). Drafted and entered into in 2001, the Cooperative Agreement (Appendix A) states as its primary purpose “to create the process to cooperatively reduce phosphorus loading” in the watershed to meet TMDL goals.

One of the purposes of the Cooperative Agreement was to allow the NPDES permitted industries and municipal wastewater dischargers to manage discharges of phosphorus between and amongst themselves, meeting overall wasteload allocation goals without additional permit limitations. This approach was unprecedented.

Impressed with the local initiative and commitment, the EPA gave approval in 2001 to the group’s conceptual plan, opening the door for a more “voluntary” approach than normally allowed. This effort includes reliance on local and regional efforts for watershed restoration and emphasis on voluntary land and water management changes. Under the Cooperative Agreement, the NPDES signatories are obligated to provide support to the non-point phosphorus reduction efforts in the watershed. These point source dischargers continue to be an integral part of the TMDL Implementation Committee, which provides overall leadership, oversight and coordination of the phosphorus reduction efforts. Because of this unusual voluntary, cooperative agreement with the EPA and the number and diversity of participating entities, this TMDL has received notice on a national level.

TMDL IMPLEMENTATION PLAN

Since its formation in 2000, the TMDL Implementation Committee held more than 100 public meetings to prepare the plan setting in motion the wide-ranging initiatives to restore Lake Allegan.

The TMDL sets phosphorus reduction targets of 23 percent for point sources, and up to 50 percent for all non-point sources during the growing season. The plan outlines desired phosphorus reduction strategies and goals in each of the following areas: agriculture, construction activities, greenhouse nutrient management, in-lake and in-stream processes, industrial stormwater, land use, municipal stormwater, point sources, septic and on-site sanitation systems, transportation systems, turf management and alternative landscaping. Local stakeholders from each category developed the strategies.

The plan also contains recommendations on monitoring, reporting and tracking, public involvement, information and education, program sustainability and sub-basin management systems. All of these facilitate and support the phosphorus reduction strategies, and are described in detail in the plan. A stakeholder-led implementation committee (Appendix B) was formed to provide leadership, oversight and coordination for the implementation plan.

Although the federal TMDL mandate requires that Lake Allegan be the focal point of phosphorus reduction efforts, the opportunity exists for improving water quality throughout the watershed. Implementing the proposed reductions will reduce other pollutants as well, including sediment, oil, metals, salt, nitrogen, bacteria, and other substances that contribute to water quality degradation. The framework and resources provided by this TMDL process will help communities throughout the Kalamazoo River Watershed achieve their water quality goals.

Due to the large size of the watershed and the diffuse nature of phosphorus sources, significant improvements in the water quality of Lake Allegan will not likely be measurable for at least several years. However, progress has already been made through numerous efforts within the watershed to reduce phosphorus loads to the river. These efforts are highlighted in the plan.

Targeted Sources and Objectives to Reduce Phosphorus

Below is a brief description of phosphorus contributions and general recommendations on how to reduce such contributions. For each category, the plan contains a detailed description of the recommendations, as well as of affected stakeholders, the regulatory environment and current efforts, contingency plans, funding and program resources, and suggestions for accountability, cost optimization, reporting, tracking and monitoring. Progress and status regarding each strategy will be discussed later in the report.

Agriculture: Because agriculture represents about 44 percent of land use within the watershed, in some areas it is a significant contributor of phosphorus. Phosphorus is not the only environmental concern on farms, however. It is strongly recommended that a “whole farm” or systems approach be taken in analyzing and taking action to control pollutants. Within that context, priority should be given to the following: nutrient management (including feed, manure, fertilizers and crops), conservation practices to prevent soil erosion (including no-till practices and limiting livestock access), and manure and fertilizer storage and handling.



erosion enforcing agencies.

Construction Activities: Many types of construction projects can potentially cause significant contributions of phosphorus from site disturbance and inappropriate management. Most critical are sites with direct surface runoff to the river, a tributary or storm sewer, or where soil is easily transported to such areas. Suggestions include site designs with less potential for runoff to water bodies, increased use of certified stormwater operators, education of excavators and on-site construction managers (including the homeowner), logical timing of inspections, well-planned staging of construction activities and coordination of soil

Greenhouse Nutrient Management: Floriculture is a major industry within the watershed, with 40-50 commercial greenhouses currently in operation. This industry uses pesticides and fertilizer, and has the potential to affect ground and surface water resources. The use of the new Greenhouse*A*Syst program, offered by MSUE and the Michigan Groundwater Stewardship Program, is recommended. This consists of an assisted, confidential and comprehensive audit of a greenhouse operation to evaluate site, cultural and management practices and impacts on water quality. It also advises growers of applicable federal, state and local environmental quality regulations.

Industrial Stormwater: NPDES permits are required for facilities that discharge stormwater directly to the river or its tributaries. There is a need to identify non-permitted facilities and otherwise improve compliance. Phosphorus should specifically be targeted for control, and industries should be encouraged to prepare or upgrade Stormwater Pollution Prevention Initiatives and to seek training and certification for all of their operators.

In-Lake, In-Stream Processes: Data from study of these processes recognizes there is a certain background level of phosphorus within sediments, in suspension in the water column, and from fish and other aquatic life that can be released to move downstream, thereby increasing nutrient enrichment of Lake Allegan. Kieser & Associates, a local environmental engineering and consulting firm, is pursuing efforts to identify and stabilize eroded riverbanks, establish buffer zones, native plantings, and removal of carp in Lake Allegan.

Land Use: Increasing population in a watershed has been associated with increased municipal and industrial wastewater and greater runoff from impervious surfaces, all sources of phosphorus loading to the river. To address these harmful effects, the TMDL Implementation Plan aims for the adoption of "Smart Growth" and Conservation Development concepts, and calls for establishing economic incentives, expanding educational outreach and working with regional engineering consultants to develop demonstration sites. An important technical strategy is designing user-friendly tools to relate phosphorus loading with watershed land use decisions and water quality goals. The organizational challenge will be to maintain strong and diverse partnerships for consistency across the political boundaries of the watershed.

Municipal Stormwater: Twenty-three communities within the watershed are affected by the new federal Phase II Stormwater regulations. This presents a great opportunity to encourage neighbors to get together through the "watershed approach" to stormwater management, and share resources to provide enhanced public involvement and public education for area citizens and agencies. In fact, these communities, along with their "nested jurisdictions," have come together in two working groups centered around the Greater Battle Creek area and the Greater Kalamazoo area. Other suggestions include identifying phosphorus reduction as a specific target, searching for and removing illicit discharges to stormwater facilities, and improving housekeeping practices such as street sweeping and catch basin clean-out.

Point Sources: Thirty-one permitted dischargers, representing municipal and industrial wastewater treatment plants, lagoons and cooling water facilities initially were involved. Most signed the Voluntary Agreement and are working cooperatively to reduce phosphorus by 23 percent from July through September, and maintain or reduce inputs from 1998 levels the rest of the year; assist and support non-point reduction efforts; and pursue innovative handling, treatment and funding approaches.

Septic Systems and On-Site Wastewater Treatment Systems: Widespread, significant levels of phosphorus are not likely to come from these facilities, but poorly maintained and/or sited facilities immediately adjacent to a lake or stream are a problem. Suggestions include performance based sanitary codes, alternate residential treatment systems (low- or no-water), expanded educational efforts and

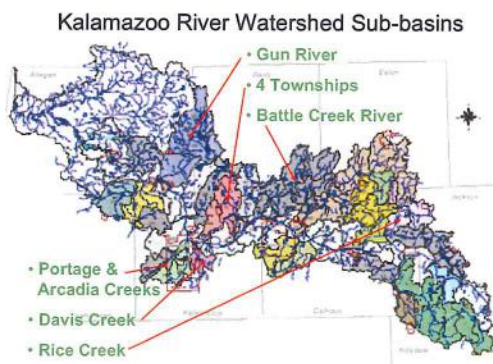
incentives to property owners for more frequent maintenance, and establishment of watershed-wide inspection requirements and protocols.

Transportation Systems: Roads, highways and other corridors often serve as a ready and efficient delivery system for pollutants generated by other land uses. The goals of this effort include improving techniques to reduce sediment on and from roads, raising standards for employee training and developing watershed-wide standards and procedures for maintenance and retrofit of older facilities. "One-stop shopping" for permits is desirable, as are a concise field reference guide for road crew needs and numerous identified training and education programs.

Turf Management: It is well documented that turfgrass from lawns, golf courses, park and recreation areas, campuses and other areas can add significant levels of phosphorus to local waters. The plan calls for soil testing prior to fertilization, use of no phosphorus fertilizer when appropriate, planting of buffers along lakes and streams, reducing the size of lawns by planting of native species requiring no fertilization and less maintenance, and directed educational programs. MSU will pursue expansion of its Turfgrass Environmental Stewardship Program by offering its services to golf courses, lawn care providers, turf managers, and retailers throughout the watershed.

Support Strategies

All of the following serve to facilitate and support the phosphorus reduction strategies, and are described in detail in the Plan.



Sub-Basin Planning and Management: Watershed management at the sub-basin level provides a chance for stakeholders to balance diverse goals and phosphorus reduction strategies, and to consider how their cumulative actions may affect long-term sustainability of these resources. The TMDL will support existing sub-basin efforts, which have been funded by Section 319 of the Federal Clean Water Act. Additional funding should be pursued for these sub-watersheds: 1) Lake Allegan immediate drainage area and 2) Schnable Brook, Minges Brook/Harper Creek, Comstock Creek, Spring Valley Creek, Pine Creek, and the drains and creeks in Comstock draining the greenhouse areas.

Public Involvement: Careful facilitation efforts have developed a diverse group of point and non-point source representatives into cohesive and committed working groups. The process of building trust has been a key to this success and as such, continuity in facilitation of these groups is seen as a critical asset in convening and expanding stakeholder involvement and in developing new stakeholder initiatives. Such active public involvement and interaction must continue in order to ensure long-term implementation success.

Information and Education: Each individual phosphorus reduction strategy outlined in this Implementation Plan has an information/education component. Many of those have identified and described their targeted stakeholders, the desired messages and recommended delivery mechanisms. However, there is also an important and critical need for a watershed-wide, and TMDL issue-wide, educational program.

The MSUE Land and Water Program has received funding to serve as a clearinghouse for phosphorus reduction activity, information and events in the watershed on behalf of the Implementation Committee. The program will communicate the benefits of phosphorus reduction, advertise related activities and educational opportunities and highlight progress towards the TMDL to a variety of audiences and partners. Communication tools developed specifically for use with the Kalamazoo River/Lake Allegan watershed phosphorus reduction effort will be utilized, including the website www.kbs.msu.edu/kzoonps. The consulting firm Kieser & Associates of Kalamazoo has also developed and maintains the website www.kalamazooriver.net. Besides the text of the TMDL Implementation Plan, this site contains significant background material on the watershed, the planning effort and related material.

Reporting and Tracking: The TMDL Implementation Plan requires the design, development, implementation, and maintenance of a system to monitor the progress of phosphorus reduction activities in achieving water quality goals. This system needs to support the storage, retrieval, and consolidation of data for tracking, reporting, and modeling important watershed parameters and activities. The database should be spatial in structure to allow for the incorporation of that data into geographical representations for reporting, analysis, and education.

Monitoring: MDEQ has committed to regular and continuing monitoring of Lake Allegan water quality, and also plans periodic monitoring of the Kalamazoo River and tributaries. A detailed monitoring plan is available within the TMDL Implementation Plan, and can be viewed at www.kalamazooriver.net.

Sustainability: Project sustainability has been considered from the beginning. The process of implementing the TMDL in this watershed will continue to be an iterative one where goals, strategies, partners and progress will be revisited regularly. As such, there is a need for a watershed-wide organization, network or system that can provide facilitation, coordination, communication and tracking of phosphorus reduction activities across the watershed. Currently, no such entity exists.

The overriding precepts of this program include a reliance on local and regional efforts as the keystone of watershed restoration, and emphasis on voluntary changes in the activities we conduct and the way we manage our lands and waters. A major challenge will be to identify, then nurture and support, watershed based organization(s) that will be able to sustain the momentum gained over recent years and provide the necessary leadership for the future.

PUTTING THE PLAN TO WORK

Organization: In late 2002, the Kalamazoo River/Lake Allegan TMDL Implementation Committee adopted a charter, established eleven standing and three ad-hoc sub-committees and began in earnest the task of implementing recommended phosphorus reduction strategies.

Public Events and Activities: The committee recognized early on that a major challenge to meeting TMDL goals was public apathy about the river and watershed, or worse. This was particularly troubling to the committee because of their belief that success in the TMDL process would depend on changes in behavior and participation by individual citizens, companies, organizations and communities. It was clear that citizens and officials should be involved in activities to let them rediscover and appreciate the Kalamazoo River, understand the phosphorus problem and learn what they themselves can do about it.

The committee planned and conducted the following activities during 2003 and 2004. Many of these are annual events that will continue on into the future.



Kanoe the Kazoo— During the summer of 2003, the Implementation Committee conducted an 11-day float trip on the Kalamazoo River in an effort to raise public awareness of this important regional resource and to promote individual and collective stewardship for its many values. Some 65 partners, representing local communities, businesses, industry, agencies and citizen groups, provided financial and logistical support as well as volunteers to help conduct each daily river segment. There were approximately 700 participants.

Following this success, in 2004, *Kanoe the Kazoo* focused on the watershed, with numerous tributary trips and lake/wetland events scheduled. Bad weather and dangerously high water levels required the cancellation of many of the trips. Still, some 250-300 people came out to learn more about their river and watershed.

Super Soils Test Saturday— At this event, conducted at area retailers throughout the watershed each April since 2002, volunteers have performed nearly 1,500 free tests of lawn soils and provided public information on water quality, turf management and the phosphorus TMDL. Home soil test kits were used, and those results have shown there is adequate phosphorus already in the soil to support a healthy green lawn. As a part of their participation, retailers are required to stock phosphorus-free fertilizer.



Lake Allegan Carp Derby— In 2003 and 2004, some 75-100 area fishers (some from as far away as Pennsylvania), came out to try and harvest carp from Lake Allegan. Over 600 pounds of carp were removed, and participants and interested viewers were given information about the phosphorus problem in Lake Allegan and about the efforts to restore the watershed.



Watershed Management Short Courses— In 2003, two six-week week courses, one in Albion and one in Allegan, offered locally relevant watershed education for some 80 area citizens and officials. A majority of participants indicated they gained knowledge about the resources and problems in their area. A vast majority of attendees indicated they have greater confidence and commitment to get involved in local discussion and decision-making on land use and water quality issues. Detailed program evaluation results can be viewed at: www.kbs.msu.edu/Extension/Programefforts.htm.

Kalamazoo River Watershed Public Policy Forum— In October 2003, the TMDL Group assisted the Kalamazoo River Watershed Council in conducting a half-day Public Forum in Comstock. The Forum focused on the Phosphorus TMDL and the PCB Area of Concern. Some 130 persons attended, with MDEQ Director Steve Chester as the keynote speaker.

Kalamazoo River Clean Sweep— This was a watershed-wide river clean-up and beautification day organized as part of *Kanoe the Kazoo* 2004. Under leadership of the City of Battle Creek and the Kalamazoo River Watershed Council, this effort built upon the success of previous clean-up efforts in Battle Creek and Marshall. Some 900 volunteers came out on October 2, 2004 within nine communities to help clean up the river and conduct related conservation projects such as removal of invasive species, pruning, planting of flowers and erecting birdhouses. The event will continue in future years throughout the watershed under the name "River Conservation Day."

Workshop on Watershed Sustainability— In December 2004, the TMDL Group invited some twenty community leaders from around the watershed to begin a discussion about the opportunity to organize on a watershed basis. Intense interest and participation have grown out of this workshop, and three committees are presently looking into establishing a watershed-wide organization, creating a positive identity for the river, and presenting a watershed-wide public forum.

Specific Phosphorus Reduction Strategies

Each of the sub-committees of the TMDL Implementation Committee has recommended strategies to accomplish the goal of reducing phosphorus inputs to the Kalamazoo River Watershed. The strategies are listed below under their respective sub-committees, followed by a discussion of progress between 2001 and 2004. The TMDL Implementation Committee's Leadership Team, composed of the officers and sub-committee chairs and largely responsible for overseeing the development and execution of these strategies, are listed in Appendix C.

Agriculture: The Agricultural Sub-committee is made up of representatives of the conservation districts, Natural Resource and Conservation Service (NRCS), Kalamazoo Environmental Council, MDEQ and MSUE staff from county offices in the watershed as well as from KBS. Based on recommendations in the Plan, this sub-committee identified the following strategies:

- expand and target installation of Farm Bill BMPs through the DEQ's NPS/319 program network and DEQ's NPS/319 Program
- recognize farms that are successfully managing phosphorus, and incorporate them into peer educational efforts
- educate agribusiness and crop consultants on TMDL and phosphorus reduction strategies
- continue with groundwater and nutrient management education programs
- reduce direct discharge violations thru education and/or enforcement
- work to gain compliance by large animal feeding operations (CAFOs) with Clean Water Act NPDES permits or the MI Ag Environmental Assurance (MAEAP) alternative (includes development of a comprehensive nutrient management plan (CNMP))
- apply for NRCS Conservation Reserve Enhancement Program Watershed Initiative

Through this sub-committee and direct contacts, area personnel from federal, state and local agency and other members of the agricultural community have become more aware of the concern for phosphorus within the watershed. The TMDL group organized and hosted a meeting about the Michigan Agricultural Environmental Assurance Program (MAEAP), integrating the phosphorus reduction message and offered tour of a point source facility. The sub-committee produced three fact sheets explaining phosphorus reduction through new technologies for managing manure. These were distributed through county Extension offices and agents, at various workshops and meetings throughout the watershed and are available on the web at www.kbs.msu.edu/kzoonps/. A special tour of point source wastewater treatment facilities gave farmers access to treatment professionals and a chance to view processes and better understand NPDES permitting.

To date, the sub-committee has not had participation from farmers or agribusiness on a regular basis, but is aware that agricultural producers are implementing a wide variety of best management practices (BMPs) such as grassed waterways, vegetative filter strips, no till practices, cover crops, comprehensive nutrient management planning, pasture management and livestock access improvements. A survey of livestock producers indicated that conservation tillage was common, and that phosphorus feeding rates for dairy cattle was slightly lower than those reported five years previously. Another survey of the two largest farm fertilizer suppliers in the lower part of the watershed indicated their phosphate fertilizer sales

have declined by about half from 1998 to 2003. This is primarily due to sustained education efforts on farmer management of phosphorus by MSU Extension livestock and crop agents. As of March 25, 2005 there have been 14 MMSPs developed for farmers in the lower Kalamazoo River watershed. Three CAFOs in Allegan County that farm in the TMDL watershed have developed CNMPs. One has an NPDES permit, one has been MAEAP verified and one is in the process of verification.

Michigan Farm Bureau and the Implementation Committee agreed to pilot a more locally driven, stepwise approach for expediting MAEAP certification within the Kalamazoo River Watershed. In 2004 the Progressive Planning option for MAEAP participation was introduced. Partners from agency and industry groups were trained to work with farmers interested in making incremental improvement to their operations that will eventually lead to MAEAP verification.

Construction Activities: This sub-committee consisted of representatives of homebuilder and realtor associations, county drain commissions, MDEQ, several municipalities, Kalamazoo Conservation District and the Forum of Greater Kalamazoo. At their initial meeting, they identified the following as specific approaches to take:

- develop education and training for the on-site construction site manager, which often is the landowner
- develop training sessions for certifying stormwater inspectors and stormwater operators
- seek more efficient and effective methods of improving on-site work and streamlining the permit and inspection process
- investigate applying the "Green Building" guidelines of the National Homebuilder's Association to construction sites within the watershed as demonstration projects, and a model for future designs and activities

The sub-committee felt strongly that the identified strategies needed to be funded by grants, increased fees and/or penalties assessed to related violators. Three funding proposals were developed and submitted without success. Other than a seminar for MDEQ certification of stormwater operators and other soil erosion training, no additional work was undertaken. The *Guide for Environmental Permit Coordination in Kalamazoo County* (produced independently of this sub-committee) is available at www.theforum.org/kcd/soileros.htm.

Greenhouse Nutrient Management: A specific sub-committee has not formed for this activity. However, the TMDL Implementation Committee has established a positive dialogue with the Kalamazoo Valley Plant Growers Association, resulting in the following:

- Four greenhouse operators agreed to have water quality samples collected by MDEQ researchers and analyzed at independent local laboratories in order to assess the extent and nature of greenhouse runoff to local water bodies. The specific greenhouses were kept anonymous and results specific to each greenhouse kept confidential. Results indicate there are significant amounts of nutrients, including phosphorus, leaving greenhouse operations. A specific strategy for addressing these concerns will be the focus of a future stakeholder sub-committee.
- Several greenhouses will participate in the Greenhouse*A*Syst program. The number is low, due in part to the capacity of staff to conduct the systematic and confidential assessment of facilities and operations. Also, greenhouse operators are reluctant to undertake the assessment, as it currently does not include criteria for MAEAP certification. That discrepancy is being corrected.

Formation of a Greenhouse Sub-committee is expected during 2005. Exploration of potential research opportunities, identification of key data gaps, outside funding sources for assistance, cost sharing through member associations and a determination of potential individual savings/revenue enhancements will play

important roles in gaining participants and moving this program forward. Reporting the results of these activities, for other growers and for public understanding, will be a significant milestone for this approach. Tracking and monitoring will accompany efforts brought on line to evaluate efficacy. Should targeted approaches not yield the desired results, contingency plans include the potential for direct regulation of greenhouse operations as “significant contributors” via Michigan PA 451, Phase II Stormwater Regulations and/or industrial stormwater provisions. MDEQ compliance and enforcement efforts can be used to address discharges contributing to violations of water quality standards

In-Lake, In-Stream Processes: This sub-committee involves representatives of numerous cities, industry, NRCS, MDEQ and Kieser & Associates, a local engineering/consulting firm. It identified the following as priorities:



- support the Lake Allegan Carp Derby
- collect additional sampling data
- undertake an erosion site inventory of the river, starting with the mainstream, which will be accomplished during the Kalamazoo River Expedition
- complete a demonstration project of erosion sites BMPs

Lake Allegan Carp Derbies were organized and conducted in 2003 and 2004. Over 600 pounds of carp were removed, and participants and interested viewers were given information about the phosphorus problem in Lake Allegan and about the efforts to restore the watershed.

Riverbank stabilization and restoration on the Kalamazoo River mainstream is continuing through a partnership of Kieser & Associates, the conservation districts and the county road commissions. These projects include inventorying and assigning priority to erosion sites, and will result in an annual reduction of over 160 pounds of phosphorus from nine treated sites. Related to this effort, the sub-committee helped develop and institutionalize a stream bank/stream crossing quantification protocol for use within Michigan.

At its Fort Custer Training Facility, the Michigan Department of Military Affairs stabilized some ten miles of roadway. This work included improving road crossings at streams and controlling and treating drainage to keep phosphorus and other contaminants from entering surface waters of the watershed.

Industrial Stormwater: Because NPDES permits are required for facilities that discharge stormwater directly to the river or its tributaries, industrial stormwater concerns are handled routinely by MDEQ regulatory staff. However, the following have been identified as important to this effort:

- improve compliance, and periodically remind the public that suspected violations must be reported on a timely basis
- specifically target phosphorus for control
- encourage industries to prepare or upgrade Stormwater Pollution Prevention Initiatives, which specifically targets phosphorus
- seek additional training and certification for all industrial operators
- work with the technical committee to develop methods of measuring phosphorus reduced through housekeeping practices
- develop a program to enhance education/training of local planning and zoning volunteers who review site plans

Land Use: This sub-committee includes representatives from Kieser & Associates, conservation districts, and city and township planners. They identified as priority actions the following:

- maintain strong and diverse partnerships
- continue participation in Kalamazoo Area Land Use working group
- promote all successes
- continue conservation development efforts with CH2MHill (a nationally recognized consulting firm)
- develop user-friendly tools for site-specific relationship of phosphorus loading to minimum performance goals
- attempt consistency for approaches across political boundaries within the watershed
- provide and utilize demonstration projects that employ Conservation Development techniques with Kieser & Associates and CH2MHill
- pursue “Smart Growth” concepts for adoption by stakeholders
- prepare a white paper evaluating various “Green” and Low Impact Development approaches
- pursue Water Quality Trading: identify possible demonstration sites, run EPA approved models utilizing Kalamazoo River/Portage Creek data, conduct trading feasibility studies, and complete case studies documenting how conservation development credits/trading/banking could have been applied to already completed developments

Kieser & Associates teamed with the Kalamazoo Nature Center and successfully obtained a Clean Michigan Initiative grant for low-level, hyper-spectral imagery that will be used to update and estimate urban land cover impacts on water quality. This information will also be integrated with urban and drain commission applications in Kalamazoo County. Data will be collected in July 2005.



Municipal Stormwater: This sub-committee consists of municipal officials working within the twenty-three Phase II communities, the conservation districts, consultants, MDEQ and MSUE. Many members are active also in the two stormwater management working groups operating within the watershed. It operates largely in concert with the two working groups to develop joint watershed plans and public information and education programs. In addition, it has also indicate the need to:

- pursue adoption of appropriate stormwater practices within watershed communities not currently affected by Phase II stormwater regulations
- work with Technical Sub-committee to measure the phosphorus reduced through housekeeping practices
- develop a program to enhance training of local planning and zoning volunteers who review site plans
- encourage and assist installation of rain gardens, green roofs and other innovative stormwater measures

The two watershed working groups have completed their respective watershed plans and education plans. Both are implementing housekeeping and best management practices, as well as strategies for identifying and removing illicit connections of sanitary sewers to storm drains.

In Battle Creek, the La Vista Storm Drain project will reduce the volume and loading of phosphorus and other nutrients to Goguc Lake by at least 50 percent and the City of Battle Creek will begin installation of a green roof on its police station in the spring of 2005. The City of Portage’s Consolidated Drain Project is an innovative regional stormwater treatment system consisting of wet detention, constructed wetlands, public railways, educational features and habitat enhancements. Numerous rain garden

workshops have been offered to landowners and developers, and demonstration rain gardens have been installed at Maple Street School in Kalamazoo and at the Kellogg Biological Station.

Point Sources: This sub-committee is made up of the NPDES permittees, MDEQ, MSUE and Kieser & Associates. It has been meeting consistently twice a year, and continues to pursue the following objectives:

- reduce P contributions in accordance with the cooperative agreement
- participate in TMDL Implementation Committee
- support non-point P reduction efforts
- prepare and submit an annual report to MDEQ as well as monthly tracking for website

The Point Source sub-committee is meeting its goals (see table) and provides support for non-point activities.

**Lake Allegan/Kalamazoo River
Phosphorous TMDL
Point Source Status 2004**

	APR	MAY	JUNE	JULY	AUG	SEPT
Point source total pounds	4852	6053	5088	5541	4480	4375
Waste-load allocation	8700	8700	8700	6700	6700	6700
1998 baseline	8700	8700	8700	8700	8700	8700
% reduced from 1998	44.2%	30.4%	41.5%	36.3%	48.5%	49.7%
Goal attained	yes	yes	yes	yes	yes	yes

Septic and On-Site Wastewater Treatment Systems: Composed of representatives of county community health departments, MDEQ, and MSUE, this sub-committee has met numerous times and identified a vigorous long-term agenda regarding:

- regulatory requirements
- coordination and tracking
- new or enhanced technology
- incentives
- education

There has been significant turnover in county health departments, and progress on these objectives has suffered. The following have been agreed upon as realistic short-term objectives:

- Assemble and analyze the “On-Site” chapter from each of the county annual reports, with a view towards consistencies, identified problems, and opportunities
- Work with the Technical Sub-committee to document the amount of phosphorus coming from septic and on-site systems, and to estimate phosphorus reductions as a result of implemented actions.
- Acquire and analyze a copy of the MWEA working draft on performance based systems.
- Monitor draft legislation which would establish a state wide sanitary code.
- Design and conduct a multi-faceted educational program targeting homeowners, local governments and MDEQ.

Transportation Systems: A sub-committee representing county road commissions, city and village street departments, MDOT, MDEQ, Trout Unlimited and Western Michigan University have identified the following specific objectives:

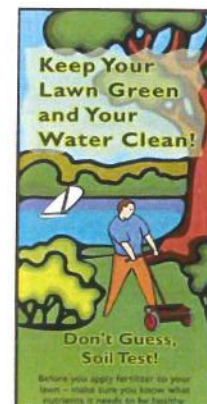
- Complete an inventory of all stream crossings in the watershed, including those over drains and intermittent streams. Establish priorities using consistent criteria
- eliminate direct discharges to the river and all streams, as opportunities arise
- develop watershed-wide techniques for retrofits and maintenance practices
- develop consistent design and construction criteria and ensure timely and appropriate inspection and enforcement
- provide comprehensive training for all employees and decision makers/managers



The sub-committee has developed a training program which will be presented to county road commission employees over spring/summer 2005. MDOT has agreed to incorporate the Kalamazoo River Watershed phosphorus message into its employee training program. Plans are also underway to develop a consistent field operations and maintenance manual. Western Michigan University's Engineering Department has a contract with the American Public Works association to review and revise the national operator certification program, including standards, review criteria, and policies and procedures. WMU is working with the Transportation Sub-committee to include planning and management measures for phosphorus and other nutrients in this program, which will be piloted in the Kalamazoo River Watershed.

Turf Management and Alternative Landscapes: This sub-committee consists of members of the turfgrass industry in the watershed, municipal officials, conservation districts, environmental consultants, Master Gardeners, Kalamazoo Environmental Council, Albion College, Kalamazoo Nature Center, MDEQ and MSUE. The group has worked in partnership to accomplish a great number of successful efforts in a few short years:

- The brochure entitled *Keep Your Lawn Green and Your Water Clean* is widely distributed throughout the watershed, and has been used as a model for other watershed.
- On Super Soils Test Saturday, held in April for three consecutive years, some 1,500 free residential soil tests were done. During the testing, landowners were given water quality and turf management assistance from local retailers, Master Gardener volunteers and TMDL committee members. Tests were done utilizing home soil test kits. More than 99 percent of the tests revealed there was sufficient phosphorus already in the soil to support healthy, green lawns, and no additional phosphorus was needed. Retailers are now routinely stocking phosphorus-free fertilizer.
- During the Landowner Turfgrass Field Day, held at Kalamazoo Valley Community College in June, 2003, over 200 area citizens viewed demonstrations of proper procedures for lawn care.
- The Turfgrass Sub-committee presented at a statewide landowner field day at MSU in June, 2004.
- A professional field day, conducted in the summer of 2003 at Western Michigan University, was targeted to lawn care providers, turf managers and point-of-sale retailers.
- Kalamazoo Nature Center's Community Wildlife Program continues to provide assistance to golf course managers and industry on turf management and alternative landscaping.
- Workshops on Rain Gardens alternately targeted landowners and landscapers.
- Rain Garden demonstration projects were installed at Maple Street School for the Arts in Kalamazoo and at the Kellogg Bird Sanctuary in the Gull Lake area.



The TMDL group is also deeply involved in discussions on statewide legislation addressing phosphorus in lawn fertilizers, and in the design of a statewide environmental stewardship program for the turfgrass industry. It is likely that a program for lawn care providers will be piloted in the Kalamazoo River Watershed.

Support Systems – Strategies

The following outlines the progress made by the sub-committees working to support the specific phosphorus reduction efforts.

Sub-Basin Planning and Management: The Kalamazoo River Watershed boasts seven active, successful small watershed projects funded under Section 319 of the Federal Clean Water Act. Each of these groups has undertaken detailed studies and discussions on future protection and enhancement of the sub-watersheds, including identifying and prioritizing projects that will reduce phosphorus and other contaminants. The Portage/Arcadia 319 project is recognized for its full public disclosure through the first of its kind, web-based watershed management plan.

This sub-committee met a few times, and agreed to review results of past sub-basin sampling for comparison with the current priority list for new sub-basin efforts. The committee also suggested completing a survey of sub-basin projects, asking coordinators to identify their priority items of “un-met needs” related to phosphorus. Attempts have been made to generate local community support and funding for a new sub-basin effort focusing on the immediate drainage area of Lake Allegan. Those efforts will continue in the future.

Reporting, Tracking, and Monitoring: An ad-hoc sub-committee on GIS System Development completed development of the website www.kbs.msu.edu/kzoonps, including links, mapping and the non-point tracking database. After review by Implementation Committee members and MSU peers, the site became fully functional, and are being used to track non-point P reductions, volunteer stream monitoring results and activities and events. It is used also to announce events, workshops, training opportunities and other items of interest to the public.

The Technical Sub-committee addresses overall TMDL Implementation Committee technical issues and data needs, and provides support to other sub-committee efforts.

Public Involvement: The TMDL Implementation Committee meets quarterly, and the meetings are well attended by active committee members and the general public. In December 2004, the TMDL Implementation Committee held its quarterly meeting, where a public open house followed the regular business meeting. At that time, committee members met informally with the public to explain the phosphorus reduction program, seek their input and share with them the report *Kalamazoo River Watershed Phosphorus Reduction: Five Years of Progress*, which is the executive summary of this report.

Large public events such as Kanoë the Kazoo, Super Soils Test Saturday, river clean-ups and workshops have been very successful in getting people more involved in protection of their watershed. Each sub-committee has actively recruited participation from its stakeholders.

Information and Education: The Education and Outreach Sub-committee continues to provide support and assistance to the other sub-committees in their educational efforts. In addition, they have been able to produce the following:

- a generic PowerPoint slide presentation for use by TMDL Committee members, stakeholders, local officials and others

- an informative promotional brochure
- a generic display for use at schools, fairs, field days, etc.
- the Capstone Report and Executive Summary
- two Watershed Short Courses, conducted with the assistance of MSUE staff, which addressed the phosphorus program specifically

HOW ARE WE DOING? WHAT DOES THE DATA SAY?

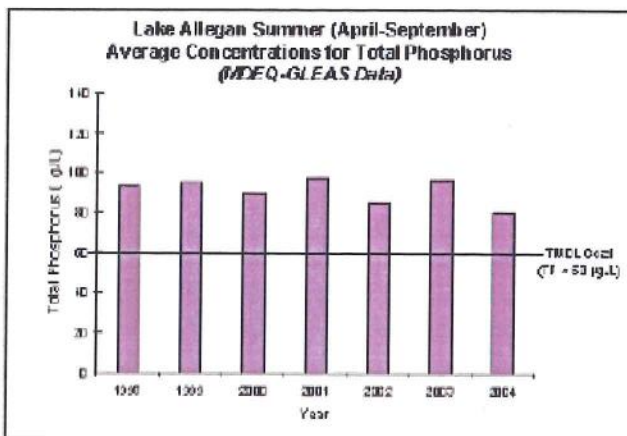
Point Source Contributions: The “point source” contributors are already meeting their target of reducing inputs by 23 percent (please see graph on page 12).

Non-point Source Contributions: Reductions in the “non-point source” category are more difficult to quantify.

One reason for this is the voluntary nature of the TMDL: reporting information for the TMDL database is not subject to regulation, requires additional time and work, and therefore may not be done. In addition, data trackers have not made clear what should be reported and why.

The timing of several watershed projects has also impacted the availability of data. Three Section 319 projects (Gun River, Battle Creek River and Rice Creek) are just about to enter their implementation phase. Although little work has been done to date, many projects resulting in reductions of phosphorus will be completed within the next several years. This will yield especially meaningful data since it will

include calculated amounts of phosphorus as worked out in the planning phase of the projects.



Graph courtesy of Keiser and Associates

Lake Allegan Monitoring: Annual monitoring during the growing season (April through September) shows that Lake Allegan appears to be “moving in the right direction.” In-lake phosphorus concentrations have dropped approximately 12 µg/l since 1998 and 1999, when most point and non-point reductions began. Even though algal blooms still occur during the summer season, the frequency of blooms is less than those observed in previous years. Carp populations continue to dominate,

however, a delay in the response of the fish community to improved water quality conditions is expected.

Kalamazoo River Monitoring: MSU and MSUE were awarded a United States Department of Agriculture Cooperative States Research, Education and Extension Services grant to study phosphorus loading in the TMDL watershed. Phosphorus monitoring was initiated in June, 2004. Five auto-samplers were installed on the mainstream, which take daily average water samples. These samples and an additional 13 “grab” samples are collected weekly, then analyzed for total phosphorus at MSU’s Kellogg Biological Station (KBS). For the period from June 16 through December 14, the Kalamazoo River at the inlet to Lake Allegan was below the TMDL target (70 µg/l) for 101 of the 166 days, or 61 percent of the time. The daily phosphorus level at this site averaged 63 µg/l over the 166-day period. Monitoring will continue through 2006 as this research endeavors to identify the factors influencing the sources and transport of phosphorus in the watershed.

THE COMMUNITY SPEAKS – OBSERVATIONS AND RECOMMENDATIONS

In an attempt to assess the five years of community efforts, KBS sought an independent objective evaluation. A systematic, professional assessment process resulted in 22 personal interviews and a facilitated focus group with 11 participants. All of these individuals were from within the Kalamazoo River Watershed and either involved with, or knowledgeable about, the TMDL. The results centered around observations and suggestions on eight general topics: organization, sustainability, public education and awareness, regulatory concerns, point source reductions, non-point source reductions, reporting and tracking and scientific basis.

Organization:

Observations: The majority of the interview and focus group subjects feel that the Kalamazoo River/Lake Allegan TMDL is an organizational success. General and committee meetings are well attended, and the TMDL has successfully established a plan which it is now implementing on a watershed basis through projects, events and public education. Many participants enjoy the process and feel it is successful, with good people, good attitudes and good leadership.

The TMDL process has been a mechanism in building active partnerships for river improvement, and has focused attention and funding for phosphorus reduction that spills over to related water quality issues and projects. As with every organization, this one has had some challenges with getting full participation. For instance, the long drive to meetings in this large watershed makes attendance impractical for some.

Suggestions: For consistency and structure, some partners feel the sub-committee work should remain centered on the original objectives and milestones of the Implementation Plan.

The TMDL should be tied in with related efforts. To avoid duplication, for example, public education for the TMDL could be shared by partners in meeting their Section 319 or Phase II requirements. Also, sub-committees should collaborate when possible for efficiency of time and resources. Other collaborations would increase the effectiveness of the TMDL as well. A total watershed approach, changing the focus from Lake Allegan to the entire watershed, would better address interrelated, complex watershed problems. This might more successfully involve partners in communities upstream of Battle Creek, who perceive their river as clean and feel on the periphery of the TMDL process. In addition, combining phosphorus reduction with other river initiatives can reinforce the message for multiple purposes.

Some partners feel the TMDL needs more aggressive, energizing and enthusiastic leadership, and think better communication of sub-committee responsibilities would increase participation and keep implementation on schedule. In this diverse and geographically widespread group, effective communication within sub-committees and among individual partners is crucial.

TMDL meetings should be efficient and without off-task diversions. Placing more action and discussion items on meeting agendas, and communicating committee reports by email, might encourage participants to play a more active part in meetings.

Sustainability:

Observations: At this point, the energy driving the TMDL process comes from MSUE's role in coordinating and communication and from the contributions of point source partners through their voluntary agreement— and the knowledge that MDEQ regulations may follow if they fail.

Significant challenges lie in the decrease of state funding and cutbacks in municipal and nonprofit budgets, which mean less time to spend on the TMDL.

Suggestions: Options for administration and structure of the TMDL were seen as the following: First, continue with basically the same structure, with at least one staff person to coordinate and communicate the work of all sub-committees. The leadership structure, diversity and inclusiveness of the present Implementation Committee should be preserved, and the regulated point sources would continue as the driver until something more permanent replaces them. Funding could be by grants or from by the various partners and stakeholders.

Another structure for ensuring the sustainability of the TMDL would be to transfer to an existing nonprofit organization, such as the Kalamazoo River Watershed Council or the Kalamazoo Nature Center, as one of its ongoing programs. Alternatively, as a municipal program (especially with the proposed fee structure for administrating Phase II stormwater requirements) the TMDL would be eligible for funding.

A third option is to establish a new watershed-wide entity. The TMDL would be one program of this new umbrella organization, which would prepare a coordinated, specific but concise MDEQ-approved watershed management plan for the whole river. Each section of the river would have its own concerns in addition to phosphorus. This scenario would require programs to be more diversified, but would encourage efficient sharing of education materials, events and other efforts for related contaminant/pollution issues in local sections of the river, streams and lakes.

Education and Public Awareness:



Observations: Kanoes on the Kalamazoo, river cleanup/conservation events and other community-based education initiatives have been successful in raising public awareness about the river and its issues, and communication of the TMDL messages has not required extensive fund-raising. However, public education must continue. Business interests have diluted the message about not using phosphorus fertilizer, and targeting phosphorus is seen by some sectors as anti-growth and damaging to the economy. Although surveys have been done, there is no

significant documentation showing whether public behaviors have changed.

Suggestions: Throughout the entire watershed, the TMDL should promote a cohesive, exciting public message. Since the phosphorus issue does not seem to excite the public, and some seem to lack awareness of problems with water quality, creative strategies are needed for non-point source education. Public education is a long-term task and needs to start with children as future homeowners and decision-makers.

Another important education goal may be to engage decision makers in point-source industries and municipalities. Although the "front-line" technical-level staff may be strong advocates, higher administration often wants involvement only to the extent of regulation, and may not be aware of phosphorus as a problem. Policy level as well as technical level people both need to be involved. In local government, engaging decision makers is a challenge that can be addressed by specifically directing more education to city managers, planners, etc. as well as the general public.

Construction, transportation and municipal operators must understand the reasons as well as the right ways to install and maintain BMPs through attending regular training sessions. For other industries,

such as lawn care companies, additional contacts and methods should be sought to gain support in phosphorus reduction.

Regulatory Concerns:

Observations: This TMDL has been successful in satisfying regulatory personnel. The EPA affirmed this by recognizing it as the only watershed authorized to practice Water Quality Trading.

Suggestions: A minority of point source partners would like to see more direct EPA involvement. Some say the TMDL could be cancelled, the MDEQ permit levels set lower in order to obtain the desired reductions.

Point Source Reductions:

Observations:

Point sources have been very successful in making reductions in phosphorus contribution. The river actually is not far from the target phosphorus concentration, although the phosphorus reductions seen so far are not all due to TMDL activities. Closure of paper plants may have been a significant factor.

Participation from industry and municipalities is good, and point sources have been helpful in working with non-point sources. Point sources may opt out of the voluntary agreement as their circumstances change. The new NPDES permits coming due, management changes at companies and financial pressures may rework their priorities.

Non-point Source Reductions:

Observations: There is a perception of poor success on the non-point source side, although there is no metric of success and there has been little time to see changes. Getting more involvement and participation from non-point source groups, without regulatory teeth, is a continuing issue. Organizations, municipalities and businesses have many concerns they must address besides phosphorus, and the current economic situation limits their choices.

Suggestions: Receiving incentives would reward non-point sources for making reductions. Developing measurable objectives and documenting progress toward the goal, however, will require funding.

Reporting and Tracking:

Observations: Point source data tracking is going well, although minorities of point sources view the fee for posting phosphorus reductions on the Keiser & Associates website as a hardship and are not doing it. Non-point sources have not been reliable in reporting reductions or related activities.

Suggestions:

Some participants felt that the non-point source groups needed an explanation of which reports are expected.

Scientific Basis:

Observations: Some partners feel that the baseline data used to establish the TMDL is questionable, and that not enough science went into the process early on. They question if the measurement at Lake Allegan is truly relevant.

Phosphorus residing in riverbank and floodplain sediments does pose a concern, because this may become resuspended through natural processes or during future dam removal.

Suggestions: Several partners knowledgeable about river quality feel that more scientific studies should be conducted in order to understand behavior of phosphorus in a watershed, and if it is truly more important than other factors in the impairment of Lake Allegan.

If research were available on the watershed impact of some activities of the agriculture, lawn care and homebuilder industries, it would be easier to get participation from these groups. MSUE Land and Water Program's water quality project will begin to address this need by characterizing phosphorus in the watershed as related to general land uses.

LESSONS LEARNED

The Kalamazoo River /Lake Allegan Watershed Phosphorus TMDL is recognized for its watershed-wide, community based approach, and is viewed by EPA and others as a unique demonstration of successful stakeholder driven watershed management. The effort is generally considered successful to date, due in large part to the passionate and continuing dedication of a myriad of volunteers and dozens of partners. The Implementation Committee, working these many years with its numerous partners, has learned quite a bit.

A Big Program in a Large Watershed: This watershed covers 2,020 square miles, and is located over ten counties. A brief look at the watershed partners which have been working on various aspects of the TMDL program includes 10 counties and 24 cities and villages, each with numerous agencies and elected officials; approximately 100 townships; dozens of state and federal personnel from a broad range of agencies; more than three dozen non-profit organizations dedicated to environmental, natural resource or watershed issues; ten colleges and universities and dozens of school systems; and numerous businesses and industries. Of all of these, four deserve special mention.

Kieser & Associates, provided a great deal of the initial research and modeling, and developed and maintains the website www.kalamazooriver.net. This site hosts the point source tracking system and includes the final TMDL Implementation Plan, as well as pertinent background information on TMDLs, phosphorus and the Kalamazoo River Watershed. This group continues to provide significant leadership and support to the TMDL, much of it on a pro bono basis.

The Forum for Greater Kalamazoo was an early leader in hosting community discussions and in providing fiduciary capability in the absence of a legally established non-profit organization to deal with TMDL issues.

The Kalamazoo District Office of MDEQ's Water Bureau continues to provide valued leadership to this locally based, citizen driven effort. They were the champion before the EPA and others within their agency for this type of voluntary approach.

The MSUE Land and Water Program has been involved since the early days of this TMDL, facilitating activities, serving as a source of research-based educational programming and integrating TMDL educational messages throughout the watershed.

Program Run by Volunteers - Sustainability: The Lake Allegan/Kalamazoo River Watershed Phosphorus TMDL Program is essentially a volunteer effort. While many of those actively involved are full-time employees of government or industry, they work for the TMDL in addition to their normal duties. As such, the obstacles and difficulties are the same as with any volunteer program:

- How do you keep people energized, invigorated, committed and productive?
- How do you avoid burnout?
- How can you keep people involved after reaching a milestone, such as completion of a plan?

- Recognizing that “busy people get busier,” how do you get others to step up?
- How do you maintain the leadership in the organization, as well as identify, recruit and cultivate new leaders?

Some of the sub-committees are busy and generating constant activity. The most effective chairpersons are empowered within their “day” jobs to take on this role in the TMDL. Many committee members are doing things they might also do for their own agency, municipal or nonprofit job—such as Phase II compliance or promoting Farm Bill programs. Doing it through the TMDL allows the synergy of working with others for sharing of assistance and ideas, and for more effectively covering a larger area.

Other sub-committees, however, perhaps because their objectives are not as closely aligned with the field of work of the members, have a more laid-back agenda or may be nonfunctional. Understandably, the TMDL has a lower priority than their work for their actual employer. Because of the “part time” or voluntary nature of this TMDL, implementation can proceed very slowly and have an indefinite time scale. Some sub-committees have not functioned well because their leadership was not effective, or because it was accepted by people who did not really have the time or interest in it.

In general, most of the partners are dedicated, involved, and avidly interested in continuing and improving the TMDL process. But because this is essentially a volunteer program, the long term sustainability is suspect.

Voluntary vs. Regulatory: Point sources see the value and opportunity of a voluntary program for phosphorus reduction, because they know if it fails, they will likely be affected by tighter permit limits on their discharges.

Some of the non-point partners, however, don’t seem to be fearful of threatened future non-point regulations. They don’t think it will happen in the near future and therefore do not see any great benefit in taking voluntary action to reduce phosphorus. While many believe it is the right thing to do, some non-point partners are still reluctant to risk additional expense they might incur in changing their operations or behavior. An attempting to pursue additional reductions with committee members often is like “preaching to the choir.” The industry leaders who come to the table and get involved are the ones who recognize that voluntary best practices raise the positive public image of their industry, which is a good thing. Those that resist often are from small or marginal operations and unwilling to change, citing added costs as well as philosophical differences. However, the reality is that each of the proposed strategies recognizes concern for additional costs, and clearly prioritizes behavior changes and operations that minimize cost.

Tracking and Reporting of Phosphorus Reductions: Due to the nature of their operations and the commitments under the Cooperative Agreement, reporting by the point sources does not seem to be a problem.

Establishing a method for tracking non-point source phosphorus reduction activities has proved difficult at times. One reason for this is, again, the voluntary nature of the TMDL. Preparing TMDL reports constitutes extra time expenditure. Several partners whose jobs do involve river conservation may be doing TMDL-related projects, but have not always kept the information needed for entering a record into the tracking website, such as a file for background information or the number of participants at a workshop. Reporting the information needed by the TMDL is not subject to regulation, requires additional time and work, and therefore may not be done. Even when requested and reminded by email, few partners have responded. Federal agencies often are restricted by confidentiality requirements, and data in the past has not been recorded on a watershed by watershed basis. Therefore, it was often difficult to confirm that the data applied to the Kalamazoo River Watershed.

Three large Section 319 watershed projects (Gun River, Battle Creek River and Rice Creek) are soon to enter the implementation phase. Because MDEQ now requires watershed plans to include calculations stating the amount of phosphorus reduced by the completion of a project, these values will give some of the most concrete data on non-point reductions.

Based on our experience, non-point data collection will best be approached in the future as follows:

- Rely on the sub-committees to collect and report. Each sub-committee will update their implementation schedule and make a user-friendly time line for each initiative.
- Continue to obtain NRCS data on EQIP contracts and other relevant programs by township and section, in order to keep only the information from farms in this watershed.
- Send out a request for the information to partners periodically, as a reminder.
- Pay particular attention to the Section 319 projects as they start implementation: plans could rapidly turn into realities.
- Provide a periodic tracking summary, so all partners can see what each group has done and that others are reporting their activities. This would eliminate the perception that the information disappears somewhere and no one is going to see it anyway.
- Simplify the reporting procedure on the website.
- Accept already-written documents such as annual or quarterly reports, and derive data from these instead of requesting partners to make a special effort for TMDL reporting.
- Rely on in-stream monitoring as opposed to tracking non-point reductions.

Scientific Data Gaps: Some partners feel that the baseline data used to establish the TMDL is questionable, and that not enough science went into the process early on. They question if the measurement at Lake Allegan is truly relevant. Phosphorus residing in riverbank and floodplain sediments does pose a concern, because this may become re-suspended through natural processes or during future dam removal. Some believe that Lake Allegan should not be used as an indicator of the health of the river because it is an artificial impoundment.

Stakeholders are asking for information on phosphorus cycling and relative contributions by land use. Previous studies produced phosphorus data that were utilized to set phosphorus reduction levels. While these data have been useful in providing initial insights into the phosphorus cycle the watershed, they were not collected with a strategy that allows an understanding of the relative contributions of phosphorus loads from different land uses/covers or the roles of groundwater and surface water inputs. Such data are critical to identify major geographic and land use phosphate contributors to effectively allocate efforts to areas and strategies with the greatest likelihood of success. Beginning in June, 2004 MSUE began sampling of the River specifically to:

- Understand phosphorus cycling (sources, transport, and pathways) in the Kalamazoo River Watershed.
- Accurately characterize the daily phosphorus loading in the Kalamazoo River/Lake Allegan waterway.
- Identify and quantify non-point source phosphorus contributors through the analysis and correlation of biogeochemical indicators, land use, land cover, and phosphorus loads to understand sources and pathways.

Public Awareness, Education and Stewardship Development: The Implementation Committee has been very active and successful in providing targeted education and promotional events, and evaluations appear to be very positive. However, it is difficult to assess what these activities mean in terms of phosphorus reduction, and what impact those programs have had on the resource. While changing behaviors seems to be a sure way to reduce pollution in the long run, the effect is very hard to measure.

Most of the TMDL data now involves river cleanups, raising awareness, teaching techniques, setting standards and other projects with intangible effects.

The interview-focus group process was helpful in finding out what could be done to improve the functioning of the TMDL, and reaffirmed the partners' dedication and involvement.

WHAT DOES THE FUTURE HOLD?

MSUE Support Until 2007: As previously discussed, MSUE has provided the bulk of support and facilitation for the Implementation Committee. The initial funding for those services, under an EPA grant, expires on March 31, 2005. Fortunately, however, MSUE received another grant in the fall of 2003, this time from the USDA. This funding will let MSUE intensify its stakeholder driven research, extension, and facilitation efforts within the watershed. In partnership with the Implementation Committee, MSUE is working to accomplish the following:

- understand and describe phosphorus cycling within the Kalamazoo River Watershed
- integrate research findings into extension programming
- increase the effectiveness, capacity and sustainability of stakeholder-driven phosphorus reduction efforts
- improve the capacity of volunteer stream monitoring processes

Sustainability - The USDA grant runs until December 31, 2006, and includes the objective of developing some assurance of sustainability for phosphorus reduction efforts throughout the watershed. In December 2004, MSUE conducted a "Sustainability Workshop" for community leaders within the watershed. After hearing from leaders of successful watershed groups from around Michigan, the twenty leaders participated in facilitated discussion on how to maintain momentum on phosphorus reduction and other restoration efforts. The group identified the following priorities:

- *Create a positive identity for the Kalamazoo River:* Even though the river has been cleaned up significantly and does provide great recreational opportunity, many still think of the River in very negative terms. Kanoë the Kazoo did a good job raising awareness about the Kalamazoo River, but reached relatively few people. This group is working with park, recreation and tourist organizations, recreation providers and guides, Chambers of Commerce and others to develop a strategy to accomplish this.
- *Organize on a watershed basis:* while there are literally dozens of groups working on a broad range of issues within the watershed, there is no one group that looks at all issues on a watershed basis. A committee made of leaders of existing groups is examining various opportunities of developing a comprehensive watershed-wide "umbrella" organization, network or alliance. The new group likely would absorb TMDL coordination in the future.
- *Organize and conduct a watershed-wide public forum:* addressing all facets of protection and restoration. Aggressively recruit elected officials, and present results and recommendations of the two items above. A very enthusiastic group has formed, and already determined that a day-long forum will be held October 14, 2005, at the McCamly Place in Battle Creek. A nationally known expert and a high level Michigan politician will serve as keynote speakers.

Volunteer Stream Monitoring - The sustainability of the TMDL process requires the ability to independently, accurately, and costs effectively monitor the phosphorus status of the watershed. There is increasing farmer, landowner and stakeholder group interest in volunteer stream monitoring to augment the increasingly limited state agency role. Also, under leadership from the Calhoun Conservation District, 40 teachers and their classes are participating in a student stream monitoring network, which reports their results to the non-point tracking part of www.kbs.msu.edu/kzoonps. Specific objectives include:

- improve the capacity of volunteers to conduct stream monitoring through extension education programming
- develop and validate a phosphorus monitoring protocol and Quality Assurance Project Plan (QAPP) using procedures and methods indicated by research findings
- in cooperation with the TMDL Implementation Committee and its Technical Committee, implement a volunteer monitoring program which contributes reliable data for use in evaluating progress on the TMDL

MSUE is working in partnership with the monitoring programs of the Calhoun Conservation District program and the Kalamazoo County Department of Environmental Health, the Gun River and Portage Arcadia 319 projects and with the assistance of point source laboratories.

Phosphorus Cycling Research -As previously mentioned, MSUE is addressing data gaps on the sources, pathways and fate of phosphorus in the Kalamazoo Rivers system. This will provide better scientific understanding of the system, and lend greater credibility to targeted phosphorus reduction efforts, educational programming and additional research.

Integrated Research and Education - Effective environmental remediation occurs when decisions by stakeholders are science-based. Future decision making regarding phosphorus reductions will be achieved through three inter-related sets of efforts, with the TMDL implementation committee playing a central role in 1) advising the research process, 2) setting education goals and 3) serving as an information clearinghouse. This should increase public understanding of TMDL goals and the sources, transport and pathways of phosphorus within the watershed, and enhance the capacity to implement phosphorus reduction practices. MSUE will continue to integrate research data, analysis, and methods into Extension programming to support the work of the TMDL.

Gun Lake Tribe Targeted Watershed Grant: In the fall of 2004, the Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians (commonly known as the Gun Lake Tribe) was advised that they received an EPA Targeted Watershed Grant for some \$ 1.3 million. The grant will be used in part to support phosphorus reduction efforts in the Kalamazoo River Watershed, including \$ 250,000 for agricultural best management practices. EPA support also provides for infrastructure, monitoring and evaluation, and education/outreach. A significant part of the funding is expected to pursue additional strategies for "water quality trading", a technique that harnesses the economics of market forces to protect and improve water quality. The tribe will serve as administrative lead, partnering with the TMDL Implementation Committee, Kieser and Associates, the conservation districts, Michigan Farm Bureau and others.

Sub-basin Management: The Kalamazoo River Watershed boasts seven active, successful small watershed projects funded under Section 319 of the Federal Clean Water Act. Each of these groups has undertaken detailed studies and discussions on future protection and enhancement of the sub-watersheds, including identifying and prioritizing projects that will reduce phosphorus and other contaminants. The Portage/Arcadia 319 project is recognized for its full public disclosure through the first of its kind, web-based watershed management plan. It is anticipated that the community organizations generated by these programs will continue to pursue identified strategies for phosphorus reduction and other community needs.

Phase II Stormwater Working Groups: The twenty-three communities cooperating in two working groups are reacting to federal Phase II Stormwater regulations. While not constituted as part of the TMDL, their activities in the future will have significant impact on phosphorus reductions within the watershed. In many cases, participants are involved in both TMDL and stormwater efforts. However, additional steps are being taken to ensure there is no duplication or conflict, resources are shared, efforts are coordinated, and the programs complement one another.

The TMDL and the Watershed Community: The TMDL Implementation Committee, its eventual successor, and all partners must strive to continue an open public process for phosphorus reduction which includes facilitating the wide participation of stakeholders in frequent discussions. Public involvement is essential to success in protecting and restoring our water resources. Watershed management works best when local citizens, businesses, governmental groups and community organizations lead the effort. Attention to group process and community building will influence the success of the TMDL Implementation Plan and ultimately the protection and restoration of this critical community resource.

This TMDL organization is indeed unique; large, unwieldy, diverse in perspectives. But it has become more effective through time as its programs grow, involving more people and more of the river. The form of its future leadership, now under discussion, may be a watershed-wide organization addressing phosphorus pollution as well as other significant concerns, and which would give a more widely-recognized face and voice to the river. Volunteers learning about the river and helping to monitor water quality, coupled with new data from researchers, will form the basis for public education influencing people's actions regarding their waters. Creative economic incentives may be used as additional tools to promote stewardship. Along with these hard-to-measure but predictive citizen-based benefits for water quality, the remedial and preventative work of watershed projects, as well as EPA and DEQ-mandated requirements, will further reduce phosphorus loading to the river.

Those involved in the Kalamazoo River/Lake Allegan Phosphorus TMDL like to think the future is bright. From the beginning, the sustainability of this community-based phosphorus reduction effort has been considered. The process of implementing the TMDL in this watershed will continue to be an iterative one where goals, strategies, progress will be revisited regularly. Success will come, largely due to the sincere dedication of committee members who have brought this great and diverse effort the many accomplishments it has seen and will guide it in the future.

Appendix A

Kalamazoo River/Lake Allegan Watershed Cooperative Agreement for the Reduction of Phosphorus Loading March 19, 2001

This agreement is between the Michigan Department of Environmental Quality (MDEQ), Surface Water Quality Division (SWQD) and the attached signatories, representing both point source (PS) and non-point source (NPS) stakeholders in the Kalamazoo River/Lake Allegan watershed. The primary purpose of the agreement is to create the process to cooperatively reduce phosphorus loading in the Kalamazoo River/Lake Allegan watershed to meet the goals of the Total Maximum Daily Load.

We the undersigned acknowledge the importance of the Kalamazoo River/Lake Allegan as valuable water resources for the residents, aquatic life, and wildlife in the watershed and agree to the following:

1. As identified in the document titled "Total Maximum Daily Load for Phosphorus in Lake Allegan" (TMDL) published March 2001 by the MDEQ, NPS phosphorus loading accounts for a substantial amount of the present phosphorus load to Lake Allegan. In the 1998 growing season, NPS loads accounted for 65 percent of the total phosphorus load.
2. To improve the resource and achieve attainment of the goals of the TMDL, phosphorus levels must be reduced.
3. NPS discharges of phosphorus occur from a variety of rural and urban land uses in the Kalamazoo River/Lake Allegan watershed. Many stakeholders are pursuing a significant reduction in NPS discharges of phosphorus in the watershed. The signatories agree to facilitate this reduction by providing assistance, resources, and the coordination of local efforts. The signatories also agree to develop a NPS Reduction Implementation Plan and submit it to the MDEQ, SWQD, Kalamazoo District Supervisor, within one year of the effective date of this agreement.
4. The MDEQ agrees, subject to United States Environmental Protection Agency approval and public comment, to include the current National Pollutant Discharge Elimination System (NPDES) permit limitations and/or monitoring requirements for phosphorus in the following permits for five years from the effective date of this agreement:

FACILITY NAME	PERMIT NUMBER
A M Todd Company	MI0038407
Albion Wastewater Treatment Plant (WWTP)	MI0022161
Allegan Metal Finishing	MI0042722
Allegan WWTP	MIG570051
Bostik Incorporated	MI0039357
Charlotte WWTP	MI0020788
Checker Motors Corporation	MIG250139
Concord Wastewater Sewage Lagoon (WWSL)	MIG580003

American Paper Mills of Michigan (Crown Vantage)	MI0000205
Eaton Corporation – Proving Grounds	MIG250029
Eaton Corporation – Torque Control Products Division	MI0001970
Food City Pickle, Inc	MI0056197
Glassmaster Control – Kalamazoo	MIG250001
Gun Lake Sewer Authority	MI0042501
Hercules, Incorporated – Kalamazoo Plant	MIG250134
Homer WWSL	MI0021407
International Paper Company	MIG250129
Joseph Campbell Company – Marshall	MI0045268
Kalamazoo WWTP	MI0023299
Kellogg Company	MIG250044
Mark I Molded Plastics	MIG250422
Marshall WWTP	MI0023540
Menasha Corporation	MI0003824
Murco Foods, Incorporated	MI0050628
Olivet WWSL	MIG580267
Otsego WWTP	MI0023744
Parker Hannifin Corporation-Brass Products Division	MI0054038
Parker Hannifin Corporation-Pump/Motor Division	MI0054046
Parma WWSL	MIG580005
Perrigo Company-Plant No. 1	MI0039306
Perrigo Company-Plant Nos. 4 and 5	MI0039314
Pharmacia and Upjohn	MI0002941
Plainwell, Incorporated	MI0003794
Plainwell WWTP	MI0020494
Rock-Tenn Company-Battle Creek	MI0029386
Rock-Tenn Company-Otsego	MI0000787
Springport WWSL	MIG580281

In 2006, the PS permit limits for phosphorus loadings will be evaluated and may need to be revised pursuant to applicable laws and regulations depending on the efficacy of the agreement in meeting the TMDL goals.

5. The permittees agree to develop a PS Reduction Implementation Plan to meet the combined waste load allocation (WLA) of 8,700 pounds of phosphorus per month from April through June, and 6,700 pounds per month from July through September as identified in the TMDL. The PS Reduction Implementation Plan shall be developed and submitted to the MDEQ, SWQD, Kalamazoo District Supervisor, within one year of the effective date of this agreement. The PS Reduction Implementation Plan will contain milestones and a timeline to reach the combined WLA identified in the TMDL within five years of the effective date of this agreement. The permittees listed in #4 above agree to put forth reasonable best efforts for their individual discharges to accomplish the individual phosphorus loading goals set forth in the PS Reduction Implementation Plan. Nothing in this agreement shall be construed to require the use of Best Available Control Technology or any other particular level of treatment technology.
6. The signatories agree to meet semiannually in the spring and fall to: a) discuss overall and individual performance and activity directed towards meeting the goals identified in the TMDL; b) review the PS and NPS Reduction Implementation Plans and recommend modifications for improving implementation; and c) review data and information developed

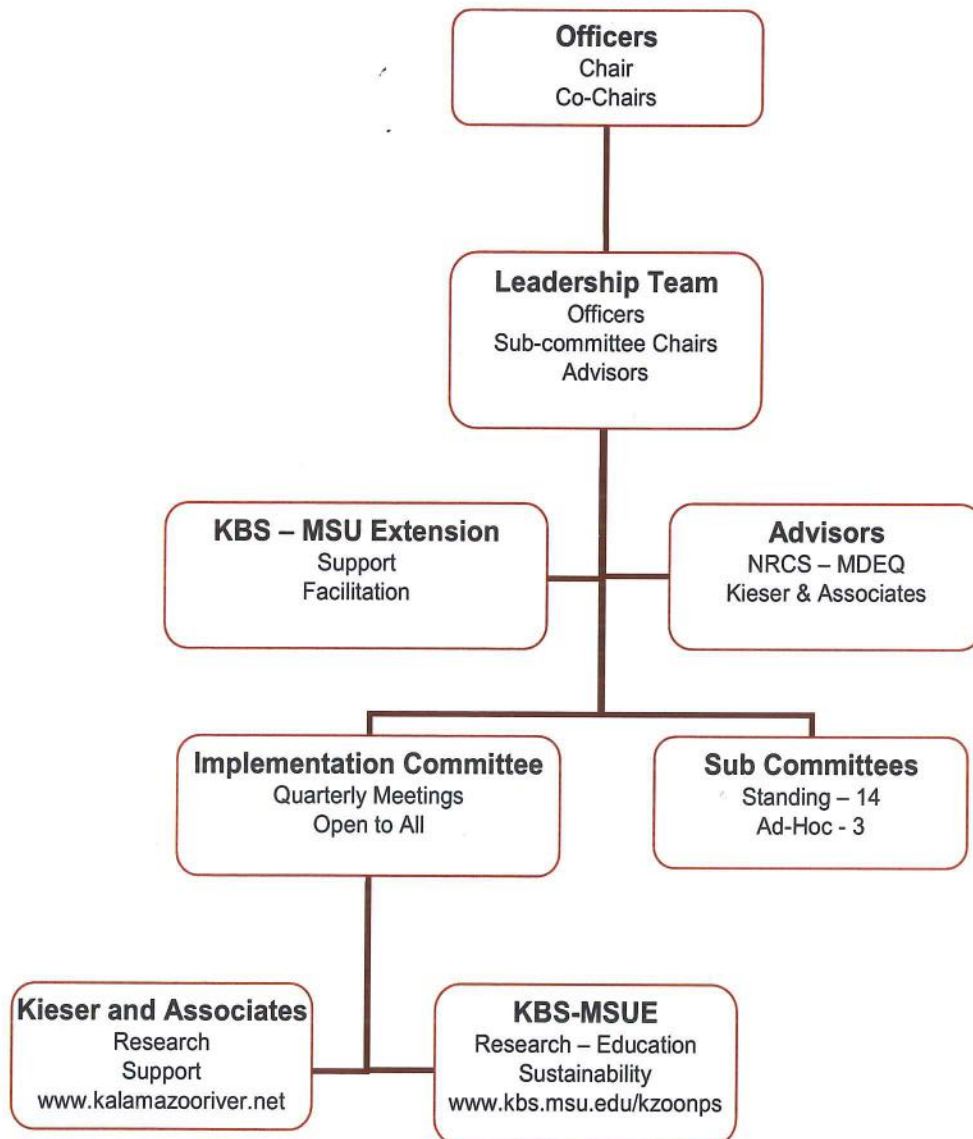
through the continued studies to be conducted pursuant to paragraphs #8 and #9 below.

7. An annual report shall be submitted by the signatories on or before March 1 of each year to the MDEQ, SWQD, Kalamazoo District Supervisor, summarizing progress made towards meeting the goals identified in the TMDL to include the following:
 - Summaries from the semiannual meetings.
 - Progress made on each item identified in the implementation plans.
 - Changes in the implementation plans in response to new challenges.
 - Local successes in phosphorus control.
 - Summary of the PS phosphorus effluent data and control methods.
 - Summary of any locally derived watershed monitoring data, including trend data, as implementation proceeds.
8. The MDEQ agrees to continue monitoring the water quality in Lake Allegan and the Kalamazoo River, as resources allow. Monitoring will be done at the M-89, M-222, and M-40/89 crossings to evaluate the most effective location for inlet monitoring. The exact monitoring locations for the M-89 inlet to Lake Allegan samples are identified in the MDEQ staff report number MI/DEQ/SWQ-99/125. The locations of the M-40/89 and M-222 inlet monitoring points are identified in the TMDL. The minimum monitoring frequency will be monthly from April through September each year at each site in Lake Allegan and the Kalamazoo River. The MDEQ will prepare a report of the annual sampling results by March 1 of each year. The report will be distributed to all signatories of this agreement.
9. The signatories agree that further study may demonstrate designated use attainment in the watershed even if phosphorus levels are not reduced as contemplated in the TMDL. The signatories agree to discuss the continuing study of the water quality parameters and endpoints for the phosphorus reduction program. The study may include, but need not be limited to, the following:
 - Continued monitoring of ambient phosphorus levels.
 - Verify the established baselines and endpoints for relevant warm water fish species and other indigenous aquatic life and wildlife.
 - Study and quantify phosphorus contributions from accumulated sediments.
 - Evaluate other causes of water quality impairment.
 - Establish relationship between phosphorus reduction and water quality improvements.
10. Any signatory may terminate its involvement in this agreement at any time for any reason. Notice of such termination shall be given in writing to all other signatories prior to the effective date of termination.
11. This agreement shall expire on March 1, 2010. The signatories may agree to renew the agreement.
12. No signatory makes any admission of fact or law, or waives any claim, right, or argument against anyone or any entity by becoming a signatory to this agreement or by acting under it. Nothing in this agreement shall create any claim, right, or argument in any third party.
13. The signatories below shall represent either of the following:

- A. For a municipal, state, or other public facility, or a not-for-profit entity, a principal executive officer or ranking elected official (such as the mayor, village president, city or village manager or clerk).
- B. For an organization, company, corporation or authority, a principal executive officer.
- C. For a partnership, a general partner.
- D. For a sole proprietor, the proprietor.
- E. For a corporation, a principal executive officer of at least the level of vice president or their designated representative.
- F. For a local unit of government, a county, city, village, or township official, or an agency of a county, city, village, or township.

Appendix B

Kalamazoo River/Lake Allegan Phosphorus TMDL Implementation Committee



Appendix C

Kalamazoo River/Lake Allegan Phosphorus TMDL Implementation Committee Leadership Team Members

Committee	Name	Representing
Implementation Committee Chair	Larry DeLong	City of Battle Creek WWTP, Public Works Department
Implementation Committee Vice-Chair	Kathy Buckham	Kalamazoo Conservation District
Implementation Committee Vice-Chair	Jeff Eves	Menasha Corporation
Administration-Funding	Tara Egnatuk	Calhoun Conservation District
Agriculture	Jane Herbert	MSUE, KBS Land and Water Program
Construction Activities	Ken Hubers	Home Builders Association of Greater Kalamazoo
Education and Outreach	Dave Heinicke	City of Kalamazoo, KWRP
Greenhouse Nutrients	No chair	
In-Stream, In-Lake Processes	Mark Kieser	Kieser & Associates
Land Use	Mark Kieser	Kieser & Associates
Point Sources	Bruce Merchant	Kalamazoo County Road Commission
Septics/On-Site systems	Bill Hinz	Allegan County Health Department
Stormwater	John Paquin	City of Kalamazoo, KWRP
Sub-Basin Management	Kristine Boley-Morse	Calhoun Conservation District
Technical, and GIS Tracking System	Dean Baas	Michigan State University
Transportation	Dennis Randolph	Calhoun County Road Commission
Turf Grass & Alternative Landscapes	Chris Kosmowski	City of Battle Creek, Public Works Department
Kanoe the Kazoo	Doug Carter	MSUE, KBS Land and Water Program
Lake Allegan Carp Derby	Steve Norton	MDEQ, Kalamazoo District Office
MDEQ Representative	Greg Danneffel	MDEQ, Kalamazoo District Office
NRCS Representative	Bob Baetsen	Sauk Trails RC&D