MIDDLE GRAND RIVER
WATERSHED MANAGEMENT PLAN

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Executive Summary

This Watershed Management Plan (WMP) is the result of a two-year long stakeholder engagement and watershed inventory that informs the planning process. The final WMP describes the watershed, water quality concerns, including impaired or threatened designated uses, and recommendations to address these concerns. Specifically, the plan identifies potential sources contributing to the nonpoint source pollutants that affect the water quality, and where those sources are located, so that water quality improvements (i.e., best management practices) can address the most pressing nonpoint source pollutants, where they are most needed.

This WMP is intended to be used by a wide variety of stakeholders seeking information on the Middle Grand River Watershed, or seeking to improve water quality within the watershed. Detailed analyses, explanations, and procedures (e.g., Quality Assurance Project Plan (QAPP)) are in the appendices for reference.

Watershed Description

The Middle Grand River Watershed (hereafter called Watershed) encompasses approximately 258 square miles – or about 165,000 acres – in Mid-Michigan's Eaton, Ingham, Clinton, and Ionia counties. Twenty-one local units of government make decisions that influence the land uses, and subsequent water quality, of the Watershed. The Middle Grand River section is approximately 129 miles in stream length, has nine subwatersheds (HUC 12), and joins together the Upper Grand River and the Lower Grand River. Together, the entire Grand River Watershed, comprising the Upper, Middle, Lower, Red Cedar, Looking Glass, Thornapple, Flat, Rogue, and Maple rivers, make up the second largest watershed in Michigan. The Middle Grand River WMP is only one part of the entire Grand River Watershed; however, there are several nonpoint source pollutants that this section is contributing to the overall water quality of the Grand River and Lake Michigan.

Water Quality Concerns

A priority for this WMP is to focus efforts on identifying potential causes of nonpoint source pollution and recommending strategies to improve water quality for the stream reaches listed in the 303(d) non-attainment waters. In the Watershed, there are several stream reaches listed by the Michigan Department of Environmental Quality on the 2012 Integrated Report as impaired, which has resulted in Total Maximum Daily Loads (TMDLs) being written for these waterways.

Currently, 59 miles of stream reaches and 110 acres within the Watershed do not currently meet the water quality standards and are listed on the 303(d) list. TMDLs exist for excess *E.coli* levels that exceed total or partial body contact (e.g., downtown Lansing and upstream to Eaton Rapids), aquatic indigenous life (e.g., Carrier Creek in Delta Township), and low dissolved oxygen levels (e.g., downtown Lansing). *E.coli* is the primary nonpoint source pollutant of concern. Improper application of manure or manure storage, aging/failing septic system or improper septic system maintenance, wildlife, domestic pets (e.g., dogs), and other tributaries (e.g., Sycamore Creek or Red Cedar River) are the suspected sources of excess harmful bacteria and other pathogens as evidenced by *E.coli*. Other concerns in the Watershed include loss of critical wetlands and sedimentation.

Impaired and Threatened Designated Uses

A variety of nonpoint source pollutants threatens or impairs water quality within the Watershed. This leads to one or more of the designated uses not being met, outlined below (Table 1).

Table 1. Middle Grand River water quality concerns and corresponding designated uses not being met in a portion of the Watershed, Michigan, April 2012.

Water Quality Concern	Designated Use Not Being Met
High *E.coli* levels	Partial body contact recreation Total body contact recreation between May 1 – October 31
Low dissolved oxygen (DO) levels	Warmwater fishery Other indigenous aquatic life and wildlife
Sedimentation	Other indigenous aquatic life and wildlife

Goals and Objectives

The goals for the WMP are to achieve designated uses and desired uses by meeting water quality standards that are not currently being met. The specific goals to achieve the designated uses are to (1) reduce *E.coli* from contaminating the surface waters for restoration of total and partial body contact recreation, (2) improve dissolved oxygen levels for restoration of warmwater fishery and other indigenous and aquatic life and wildlife, and (3) reduce sedimentation from degrading other indigenous aquatic life and wildlife.

Recommendations

The WMP Steering Committee used information from previous watershed inventories and scientific studies, as well as the information collected through the summer 2012 monitoring and inventory, and specific objectives for each HUC 12 creekshed to determine needed Best Management Practices (BMPs). The recommended BMPs may be structural, vegetative, or managerial. The highest priority of the WMP is to reduce *E.coli* entering the surface waters. To achieve this, the following vegetative and structural BMPs are recommended: wetland restoration, cattle exclusion or controlled access, buffers near livestock or other animal facility, constructed wetlands, on-site septic system repair or maintenance, waterfowl management strategies. The following recommended managerial BMPs are: outreach campaigns to residents about on-site septic system maintenance and proper animal waste proper disposal, outreach campaigns to agricultural producers about on-site manure management and runoff reduction, and county-wide point of sale ordinance for on-site septic system inspection (for Clinton and Ionia counties).

Evaluation

Program evaluation is an important step in determining the extent to which targeted BMPs are enabling water quality improvements that work towards achieving the watershed management goals. Identifying meaningful measures to monitor progress toward achieving goals, and implementing a monitoring strategy is an important step in documenting how BMPs are influencing water quality. This plan presents metrics and measures to evaluate the effect of implementation of BMPs and evaluate the overall progress toward achieving water quality goals.

Sustainability

The Steering Committee was established to guide the Eaton Conservation District throughout the development of the WMP. This Steering Committee is comprised of representatives of the various stakes that affect the watershed land use and subsequent water quality, or are affected by it. Therefore, it is our goal that the Steering Committee will continue to be involved with a range of implementation activities, as well as overall coordination. Below is a summary of the Steering Committee member (i.e., contributing partner) and tasks as part of the long-term implementation plan (Table 2).

Table 2. Implementation task and lead contributing partner

Implementation Task	Lead Contributing Partner (Steering Committee Member)
Facilitate committees and meetings; coordinate with other counties	Eaton Conservation District; Tri-County Regional Planning Commission-Greater Lansing Regional Committee for Stormwater Management; Middle Grand River Organization of Watersheds
Collect additional data and update the WMP when new data are available	Eaton Conservation District; Tri-County Regional Planning Commission-Greater Lansing Regional Committee for Stormwater Management; Middle Grand River Organization of Watersheds
Coordinate and implement BMP strategies	All stakeholders
Implement information and education strategy	Eaton Conservation District; Tri-County Regional Planning Commission-Greater Lansing Regional Committee for Stormwater Management; Middle Grand River Organization of Watersheds
Implement future monitoring plan	Eaton Conservation District; Tri-County Regional Planning Commission-Greater Lansing Regional Committee for Stormwater Management; Middle Grand River Organization of Watersheds
Communicate with MDEQ in regards to the TMDLs and implementation progress and water quality impacts	Eaton Conservation District

1 Introduction

1.1 Purpose of Watershed Management Planning

A watershed is an area of land, defined by hills and ridges, which drains to a common body of water (Figure 1). Watershed management planning is a process that involves interested stakeholders in documenting water quality concerns and goals for watershed management. More specifically, throughout the planning process, locations of water quality impairments (e.g., stream reaches or HUC12 creeksheds) are identified, as well as potential or known contributors of nonpoint source pollutants that are causing the impact. To address these issues, specific structural, vegetative, or managerial strategies (e.g., Best Management Practices or BMPs) are recommended as a proposed solution to address the causes of the water quality impairment. The final product of the planning process is a Watershed Management Plan (WMP) that reflects the interests of watershed stakeholders and provides guidance on future activities.

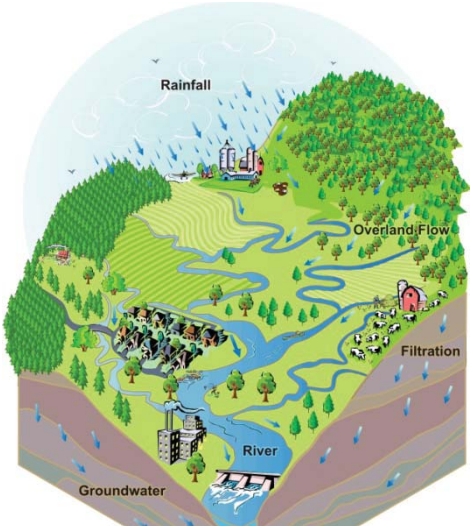

Figure 1. An example watershed.
Source: *www.prairierivers.org*

1.2 Mission and Vision Statements

The mission of the Middle Grand River Watershed Management Planning project is to preserve, improve, and educate the public regarding the wise use of the Middle Grand River and its watershed.

Our vision for the Middle Grand River Watershed is for individual and community actions to protect and improve the health of the Middle Grand River and its watershed, assuring it's natural, economic, and recreational role in Mid-Michigan.

1.3 Designated Uses

A designated use can be defined as a simple narrative description of water quality expectations or water quality goals. A designated use is legally recognized by State and Federal water quality programs such as (1) other indigenous aquatic life and wildlife, (2) total and partial body contact recreation, (3) fish consumption, and (4) public drinking water supply. These are uses that the state or authorized tribe want a waterbody to be healthy enough to fully support.

Surface waters of the state are defined as all of the following, but does not include drainage ways and ponds used solely for wastewater conveyance, treatment, or control (SWAS Rules Part 4):

- The Great Lakes and their connection waters
- All inland lakes
- Rivers
- Streams
- Impoundments

- Open drains
- Wetlands
- Other surface bodies of water within the confines of the state

The Michigan Environmental Protection Act (R323.1 100 of Part 4, Part 31 of P.A. 451, 1994, revised, 1999, as cited in Brown, Peterson, Kline-Robach, Smith, and Wolfson, 2000) identifies eight designated uses for all of Michigan's surface waters:

- **Agriculture** – surface water must be of a quality of water that can be used for irrigation, livestock watering, and spraying crops.
- **Industrial water supply at the point of intake** – surface waters must be clean enough to be used for commercial applications, industrial applications, or non-contact food processing.
- **Public water supply at the point of intake** – after conventional water treatment, surface waters must be able to be a source of water that is safe for human consumption, food processing, and cooking.
- **Navigation** – surface waters must provide for sufficient passage of boat traffic.
- **Warmwater and/or coldwater fishery** – waterbodies designated as warmwater fisheries should be able to sustain populations of species such as bass, pike, and panfish. (Certain waterbodies are also protected as a coldwater fishery.) 5 mg DO/liter. (R 323.1064 Rule 61 (1))
- **Other indigenous aquatic life and wildlife** – surface waters must support fish, other aquatic life and wildlife that use the said waters for any stage of their life cycle.
- **Partial body contact recreation** – surface waters should be of a quality that allows residents to participate into activities (e.g., fishing, wading, hunting, etc.) that involve direct contact with water, but do not involve immersion of one's head. Partial body contact 1,000 organisms/100mL 30-day geometric mean. (R 323.1062 Microorganisms. Rule 62. (1))
- **Total body contact recreation between May 1 and October 31** – surface waters of the state should be of a quality that allows residents to participate in water-based activities that involve complete submersion of the head or a considerable risk of ingesting water (e.g., swimming, snorkeling, water-sking, etc.). Total body contact 130 organisms/100mL 30-day geometric mean, 300 organisms/100mL single sample May 1st to October 1st.

The designated uses bolded in red are currently not being met in certain locations in the Watershed. Chapter 3 will provide an in-depth discussion of the designated uses not being within the Watershed (pg. 30).

The Clean Water Act requires that waterbodies attain or maintain the water quality needed to support designated uses. States are required to provide the Environmental Protection Agency with an assessment of the quality of their waters, and a list of waters that do not support their designated uses or attain water quality standards (WQS) and require the development of total maximum daily loads (TMDLs). The Michigan Department of Environmental Quality (MDEQ) fulfills the Clean Water Act reporting requirements through the submission of a Water Quality and Pollution Control in Michigan Section 303(d), 305(b), and 314 Integrated Report (IR). The IR describes the designated uses attainment status of Michigan's surface waters relative to Michigan's WQS. Michigan's WQS establish minimum

water quality requirements by which the waters of the state are to be managed, and provide a framework that guides the MDEQ's water quality monitoring/assessment and water protection activities.

1.4 Desired Uses within the Watershed

Desired uses can be defined as the ways in which people use the watershed and the ways which people think it should be protected and/or preserved for future generations. To determine desired uses for the watershed, local government and public stakeholder meetings were held throughout the planning process. Also, residents in the Watershed filled out a survey indicating their desired uses for the watershed.

Desired uses for the Watershed include:

- Recreation
- Ecosystem conservation and diversity
- Aesthetics
- Community quality of life

1.5 Key Elements of Developing a Watershed Management Plan

This watershed management plan meets the content requirements of the Michigan Department of Environmental Quality's Clean Michigan Initiative, the Environmental Protection Agency's nine minimum elements, and supports Michigan's implementation of the National Pollutant Discharge Elimination System, Discharge of Stormwater to Surface Waters from a Municipal Separate Storm Sewer System[1]. The Environmental Protection Agency's key elements are outlined below:

1. **Identification of the geographic scope of the watershed.** Boundaries must be hydrologically-based and delineated on a map. A description of the watershed, including information such as hydrology, geology, ecology, land use, is included in this section.
2. **Identification of the designated and desired uses of the watershed.** This WMP includes the designated uses that are currently being met and those not being met, as well as the desired uses. Supporting information about restoring uses not currently being met is in this section.
3. **Identification of water quality threats or impairments.** The plan identifies threats and impairments to water quality, and the designated uses not being met, where appropriate.
4. **Identification of known or suspected causes of each threat or impairment, including specific pollutants.** This plan also includes a quantification or estimate of the magnitude of each pollutant source or cause, and prioritizes the sources and causes.
5. **The sources of the pollutants threatening or impairing water quality that are critical for control are identified, prioritized by area.** The critical areas reflect prioritized areas where nonpoint source pollutants exist (for MDEQ designation) that also reflect where BMPs are needed to reduce the nonpoint source pollutants (for EPA designation).

[1] With some exception, for example less emphasis on stormwater pollution prevention efforts and identification of specific dates for completion of project timeline.

6. **Inclusion of a clear statement of the water quality improvement or protection goals.** This WMP includes both restoration and protection goals for designated uses. Specifically, this plan identifies the estimated load reduction needed to attain the water quality goals (if restoring) or the maximum allowable load to protect water quality.
7. **Identification of the tasks that need to be completed for prevention or control of critical sources or pollution**. Tasks may be physical, structural, or vegetative improvements, policy modifications, information and education activities, or activities to institutionalize watershed protection. Proposed tasks must also include the estimated load reductions for the critical areas.
8. **Estimated amounts of needed technical and financial assistance, by category, and prospective sources that will be relied upon.** Additionally, benefits and costs of actions will be assessed.
9. **Summary of the public participation process.** Opportunity for public comment, how public input and comment were solicited, identification of partners that were involved in the development of the plan and their roles and responsibilities, and planning process included a wide variety of agencies and interests.
10. **Estimated period of time needed to complete each task and proposed sequence of task completion.** This plan also includes establishment of interim milestones for water quality improvement and progress toward implementation efforts.
11. **Propose a process and criteria for evaluating the effectiveness of the plan and resulting changes in water quality.** Monitoring component should include required project specific needs, measureable milestones, local monitoring efforts, and relate to the State water quality monitoring efforts.