

CHAPTER 1: INTRODUCTION

1.1 Layout of Plan

The Cass River Watershed Management Plan (Plan) is organized into ten chapters and six appendices. The organization of the Plan is intended to make a large amount of information about the Cass River into a digestible format for a variety of audiences to read, understand, and utilize. What follows are a summary and rationale for each chapter and appendix in the Plan.

Chapter 1 includes a broad overview of information about the Cass River Watershed planning process and who was involved in the creation and completion of the Plan. Chapter 1 also includes a water quality summary and goals for the overall watershed.

Chapter 2 presents background information about the physical location of the Cass River Watershed, the various underlying factors that influence water quality of the Cass River, and a discussion on the designated uses of the Cass River and the sub-watersheds it contains.

Chapter 3 presents the methods that were used in determining which areas of the watershed were inventoried, the types of inventory methods used, and how restoration sites were identified and prioritized.

Chapter 4 is the urban area analysis, a small percentage of the watershed area wise but still has an impact on the overall water quality of the Cass River. Urban areas were analyzed on the watershed scale as many of the best practices and key stakeholders are similar across the entire watershed.

Chapter 5 is the natural resources section of the watershed that details the vastness of natural lands remaining in the watershed and the opportunities for wetland restoration and priority areas for protection. Similar to Chapter 4, natural resources are presented at the watershed level as many of the project practices and partners are similar across the entire watershed.

Chapter 6 is the overall information and education plan for the watershed and includes strategies by target audience and best practices for each of the pollution problems and threats identified during the planning process.

The requirements set forth by the Environmental Protection Agency (EPA Elements) are organized by sub-basin for Upper Cass River (Chapter 7), Middle Cass River (Chapter 8) and Lower Cass River (Chapter 9). This approach was taken to aid the county conservation districts and the Cass River Greenway committee in developing project proposals for each of the sub-basins as it relates to remediating agricultural based pollution problems.

Chapter 10 outlines next steps that need to occur beyond the scope of the Plan and suggestions for sustaining projects in the Cass River watershed.

Appendices include information that supports recommendations set forth in the Plan but that is not relevant to all of the potential readers of the Plan, these include: (A) Works Cited, (B) Previous Studies and Summaries, (C) Pollutant Loading, (D) Urban Stormwater Inventory and Ordinance, (E) Land Use and Ordinance Recommendations, and (F) Social Monitoring.

1.2 Watershed Management Plan Purpose

The watershed management plan brings together members of our community to manage land activities that affect water quality. It recommends ways to protect and improve water resources as land use changes.

Because water runs over land, land use has the potential to add pollutants to our water resources. We all need water, and all manage our land individually. Our small actions collectively have a large impact on the water quality of the Cass River. The watershed management plan is, in essence, an action plan that details our community's water quality concerns and the most cost-effective strategies to pay for education and installation costs to improve water quality.

This watershed management plan belongs to EVERYONE and can be implemented with funding support from the Nonpoint Source Program of the Michigan Department of Environmental Quality (MDEQ) and additional funding partners through an annual grant application process. Non-profit entities, educational institutions, and government agencies are eligible to apply for funding of this plan per individual funding guidelines.

1.3 Implementation Process

Upon completion of the watershed management plan, it is reviewed by staff from the Michigan Department of Environmental Quality (MDEQ). Upon approval by the MDEQ, the plan is forwarded to the Environmental Protection Agency (EPA) for final review and approval. Watershed Management Plans that are approved on or prior to July 24, 2013 are eligible to apply to MDEQ for funding to fix pollution problems and implement projects identified during the planning phase.

1.4 Steering Committee Roles and Responsibilities

The Steering Committee was comprised of representatives from federal, state, and local government, engineering and education contractors, and residents of the watershed. Collectively, the steering committee members were charged with tracking the progress of the watershed management plan and ensuring its success. The steering committee met monthly during 2011 and bimonthly in 2012. Different presentations were brought in to cover technical topics such as the Landscape Level Functional Wetland Assessment completed by the MDEQ, and the Great Lakes Program of the Nature Conservancy. Additional tasks of the steering committee included the approval of the inventory strategy, prioritization of the implementation plan and education plan.

Table 1.1 Steering Committee Members and Affiliation

Member Name	Affiliation
Robert Zeilinger	Cass River Greenway Committee
Jim Kratz	Tuscola County Conservation District
Joe Kautz	Sanilac County Conservation District
Russ Beaubian	Spicer Group
Brad Barrett	City of Vassar
Michelle Vander Haar	U.S. Fish and Wildlife Service
Charlie Bauer	Michigan DEQ
Sara McDonnell	UM-Flint, Outreach

1.5 Public Participation Process

For the purposes of the watershed management planning process, the ‘public’ is defined as a resident or business owner in the Cass River Watershed. Stakeholders include landowners alongside decision-makers at the federal, state and local levels. Both tiers of the public and stakeholder involvement took place over multiple occasions and multiple forums.

A series of handouts and a presentation were developed and presented to groups including the Saginaw Rotary, Michigan Milk Producers Association, Cass River Greenway Committee, and the Saginaw Bay Coastal Initiative. A large poster and maps were also turned into a display and used at the following events: Bean and Beet Symposium, Saginaw Bay Watershed Conference, annual meetings of the Michigan Association of Conservation Districts and field days hosted by Michigan State University in the Cass River watershed.

During the planning phase, the public was engaged in the steering committee through membership in the Cass River Greenway committee, a local volunteer organization that promotes the wise use and protection of the Cass River for recreation. Residents and stakeholders were also involved in the education committee organized as a subgroup of the steering committee to develop press releases, web content, brochures, and other outreach materials for watershed residents and target groups. Full outcomes of this groups work are outlined in the implementation section.

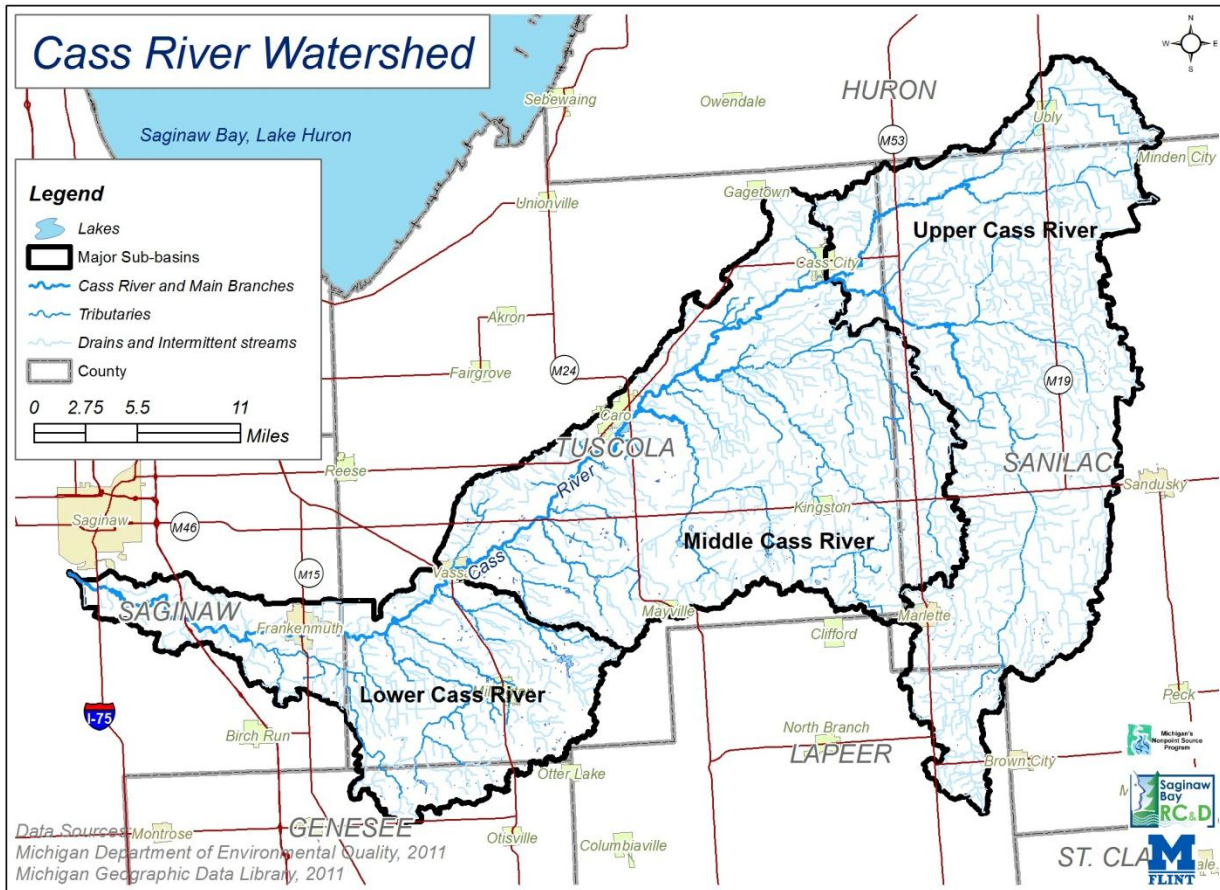
1.6 Public Commenting

The watershed management plan was made available for public comment via print and online viewing from February 26, 2013 – March 26, 2013. The Plan was also reviewed by the Sanilac, Tuscola, and Saginaw Conservation District staff and partners over the course of April-May 2013 where staff from the Saginaw Bay RC&D, UM-Flint, and DEQ gained feedback on restoration priorities and incorporated their recommendations into the final Plan.

1.7 Location of Cass River Watershed, Michigan, U.S.A.

The Cass River Watershed is located in mid-Michigan primarily in the counties of Sanilac, Tuscola, and Saginaw and portions in Genesee, Huron, and Lapeer counties shown in Figure 1.1.

Figure 1.1: Cass River Watershed



1.8 Water Quality Summary

The Cass River Watershed water quality statement includes an assessment of existing water quality data, along with objectives to maintain and further designated uses. This assessment of water quality incorporates previous studies by the Michigan Department of Environmental Quality (MDEQ) and Michigan Department of Natural Resources (MDNR). These entities performed an analysis of the river for many years. Throughout the years, improvements in water quality were measured based on various parameters including DO, biological and habitat surveys, sediment, phosphorus, nutrients, pathogens, and more.

Historically the Cass River has faced many environmental challenges. In 1967 the Federal Water Pollution Control Administration (FWPCA) assembled documentation to assist in

controlling pollution in the Cass River Watershed. During this time period, fishing in the Cass River was deemed its largest recreational use (DOI, 1967). Downstream from Frankenmuth was considered too polluted for fish species to flourish. Due to the Cass River's shallow depth, swimming was a minimal activity.

Although many cities in the basin had constructed treatment plants by 1965, the DO levels below Frankenmuth were reported as very low. This was widely associated with overloading of sewage by industrial waste sources. Phosphates were high in portions of the Cass River, but moderate throughout the rest of its regions. Bacterial pollution was concluded to be moderate, with the exception downstream of the City of Frankenmuth having higher levels.

In 1992, the MDNR Great Lakes and Environmental Assessment Section (GLEAS) assessed the Cass River to determine if aquatic toxicity requirements were being met. This test utilized *Ceriodaphnia dubia* (*C. dubia*) and fathead minnow. The toxicity data indicated the water tested was not chronically toxic to fathead minnows or *C. dubia*. These criteria satisfied the aquatic toxicity requirements of the Michigan Water Quality Standards (MWQS).

In 1993, the MDNR conducted a biological survey determining the current conditions of the Cass River watershed. The macroinvertebrate communities and taxa had continuously improved throughout 1974 to 1988. Sediment metal concentration was lower than previous samples collected by Grant (1976) with the exception of slightly higher total arsenic concentrations. In addition, sediment samples collected in Duff Creek did exceed EPA requirements for arsenic and total zinc. Previously, sedimentation was reported as the greatest contributor to stream habitat reduction (Morse, 1992).

In 2000, GLEAS conducted a biological survey to assess point and nonpoint source impacts on the Cass River Watershed. Based on their findings, "macroinvertebrate and fish populations were rated as acceptable or excellent". Total phosphorous concentrations were regarded as extremely high (0.38 mg/l) at the Mayville Road location (Marlette Township). Sediment samples indicated acceptable levels of organic compounds and metals, with the exception of a depositional area located downstream of the South Branch Cass River Drainage Ditch. In addition, a visual assessment was conducted by MDEQ district staff (Charlie Bauer and Tom Young), along with other biologists. Findings indicated severe flow fluctuations in the wooded floodplain of the Cass River. However, stream bank erosion along the main stem was not an issue. Cattle access was identified as a source causing damage to the surrounding headwater tributaries.

The water quality of the Cass River has improved substantially from the 1960s. However, a continuation of improvement is necessary to assess existing conditions and trends of previous studies. A biological survey conducted by MDEQ Surface Water Assessment Section describes the existing macroinvertebrate communities as acceptable to excellent throughout the main branch. In-stream habitats were generally regarded as good in the main branch, whereas river bank conditions were regarded as poor in areas of the middle and lower branch (Cooper, 2007).

Sediment samples containing heavy metal contaminants between Cass City and Bridgeport did not exceed previous concentration trends (Gerard and Jones, 1999).

In 2008, MDEQ conducted a Total Maximum Daily Loads (TMDLs) for the Cass River to determine sources of low dissolved oxygen (DO). The TMDL reach was defined as a 4 mile stretch starting at East Dayton Road, and ending at Deckerville Road. The target DO TMDL for this reach was determined to be 5mg/l minimum. The primary cause of the impairment was determined to be an abundant plant growth stimulated by organic enrichment from agricultural NPS within the watershed. The drainage basin is primarily designated to agriculture purposes (63.1%), while forest (25.8%) encompasses a vast section (MDEQ, 2008). This is consistent with agriculture being an ample land use contributor within the drainage basin.

According to the EPA, Escherichia coli (E. coli), has been identified as an indicator causing waterborne illness. MDEQ water quality standards recognize concentrations of 300 E. coli per 100 milliliters as unsafe conditions for total body contact recreation. The Cass River was sampled for E. coli during a TMDL study at six stations within Sanilac County over a 12 week period. Concentrations were observed in 100% of the samples with a maximum of 9,600 cfu/100ml in the South Branch of the Cass River at Walker Road (LimnoTech, 2011). The DEQ authored a TMDL for the Lower Cass River Watershed in 2013, "TMDL for E. Coli in Portions of the Cass River and Tributaries, including Millington, Cole, Perry, and Dead Creeks" that summarizes data collected in 2010 and 2012 that documented exceedances of acceptable E. Coli levels for total body contact and partial body contact. The TMDL recommends several strategies mirrored in this watershed plan and that testing for E. coli be taken prior to swimming and wading in the mainstem Cass River primarily during high flow events.

Today the Cass River has a broad range of intended uses, which includes boating, fishing, kayaking, canoeing, swimming, recreation and more. The most recent event held was Frankenmuth's inaugural Relay Swim (June 16, 2012). Local citizens swam approximate 4 miles, beginning at Ormes Road and ended at Heritage Park. This event, along with other recreation, and studies demonstrates the continued improvement of water quality in the Cass River.



Frankenmuth Relay Swim - Courtesy of Frankenmuth News (Web, 2012)

Based on historic water quality testing from 2001 - 2012 the following waterways in the Cass River are safe for:

Eating fish out of: certain species should not be eaten more than once per month by children and women of child-bearing age. More online at www.michigan.gov/eatsafefish

Swimming in: The county health departments conduct testing for bacteria at public bathing beaches. Public notices are placed at the public beaches if bacteria levels are unsafe for swimming. However, many of us like to canoe or kayak and take a dip in the river. Fortunately for us, the Cass River is not known to have any problems with bacteria pollution as a general rule. Areas that should not be swam or waded in include: Cole Creek, Dead Creek (including Carpenter Branch and Zehnder Drain), Duff Creek, Spring Drain, Stony Creek, Perry Creek, and the main branch Cass River downstream of I-75.

Support a healthy ecosystem: The Cass River is it's healthiest in the middle reaches of the watershed thanks to the large areas of forest and wetland that serve as filters for any type of pollutants that may enter the system.

1.9 Cass River Watershed Goals

The steering committee determined that a set of broad goals were needed for the watershed that supported and detailed those required by the MDEQ and that were outside of the scope of designated uses.

1. Preserve the Cass River as a natural and recreational corridor along the mainstem.
2. Support the creation of a natural network for the Cass River watershed and work with partners to protect and connect priority conservation areas.
3. Support the restoration of wetlands in the watershed that restore water quality and hydrologic function.