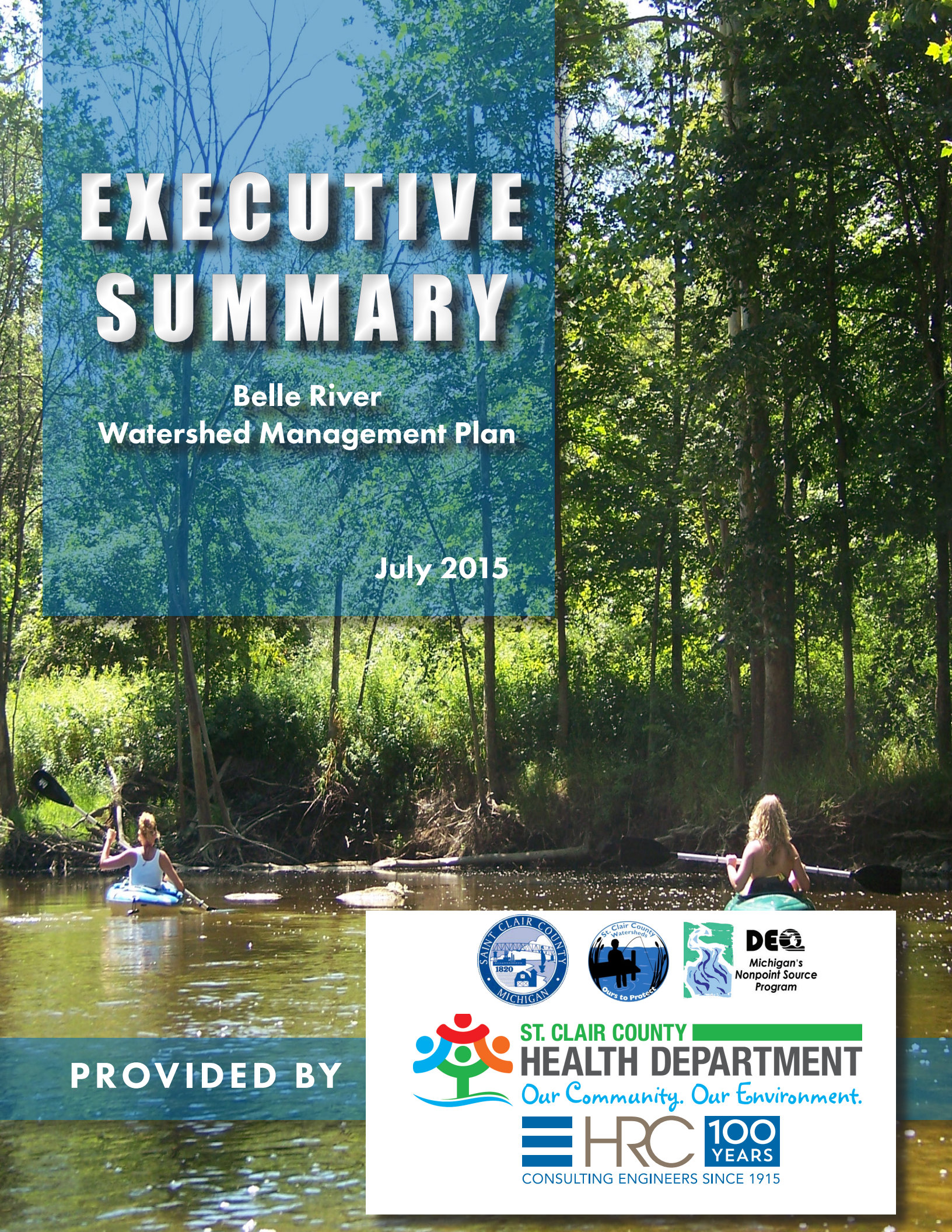

EXECUTIVE SUMMARY

Belle River Watershed Management Plan

July 2015

PROVIDED BY

Michigan's Nonpoint Source Program

ST. CLAIR COUNTY HEALTH DEPARTMENT
Our Community. Our Environment.

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OVERVIEW

The goal of the Belle River Watershed Management Plan (Plan) is to prioritize the sources of water quality pollutants, assess the historical changes the watershed has undergone, and identify the challenges it faces in the future. Citizens, agencies, and local units of government that have jurisdiction over land use and stormwater management in the watershed formed the Belle River Watershed Advisory Group (WAG) to assist with the development of this Plan. As a result of this monitoring and assessment, the Plan has prioritized projects and actions needed to restore, enhance, and protect the Belle River, its tributaries, and headwaters. The Plan can help guide landowners and governmental agencies to fulfill their goals for water resources protection.

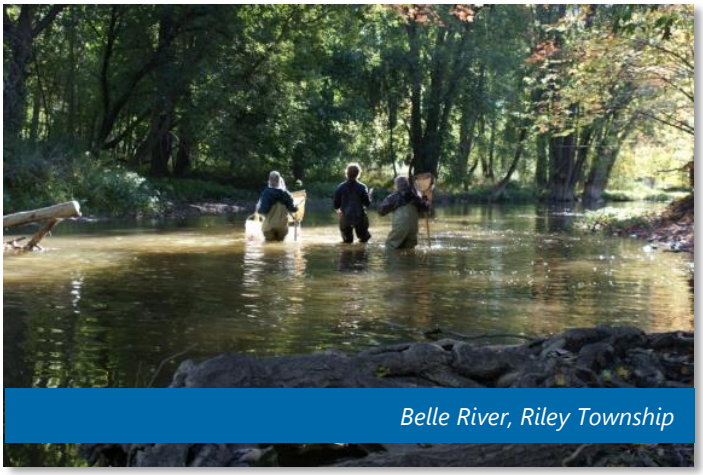
DEVELOPMENT OF THE PLAN

PROCESS

In 2009, the St. Clair County Health Department (SCCHD) and Columbus Township developed a joint operating agreement wherein the Belle River WAG was formed. Two years later, in 2011 with the WAG's input, the SCCHD was successful in receiving grant funding through the MDEQ Clean Michigan Initiative Nonpoint Source Pollution Control Fund and Section 319 of the Federal Clean Water Act to develop the Plan. The complete Plan and its appendices are available at the SCCHD's watershed planning website at www.sccwater.org.

PARTNERS

The Belle River WAG, a large and diverse group of citizens, agencies, and communities, put significant effort into developing the Plan. The WAG met regularly from 2012 through 2015, provided input on concerns and threats to the Belle River, and helped to develop the Plan's goals and recommended actions. The watershed crosses multiple jurisdictions and, as a result, the Plan's implementation success depends on the priorities and budget of dozens of organizations, municipalities, landowners, and businesses.



Belle River, Riley Township

QUICK FACTS

Subwatersheds	Divided into 24 subwatersheds, including the North Branch Belle River, Ashery Creek, Jerome Creek, Cox-Doty Drain, Weston Drain
Jurisdictions	St. Clair County: 122.61 sq. miles, Lapeer County: 80.79 sq. miles; Macomb County: 23.79 sq. miles; Oakland County: 0.04 sq. miles
Population	86,300
Headwaters	Wetlands south of Dryden in southeastern Lapeer County
Mouth	St. Clair River in Marine City, St. Clair County
Length	73.5 miles
Area	227 sq. miles
Land Use	54% agricultural, 25% forested, 8% residential, 4% low intensity, 8% wetlands, 7.5% wooded, and 5% other

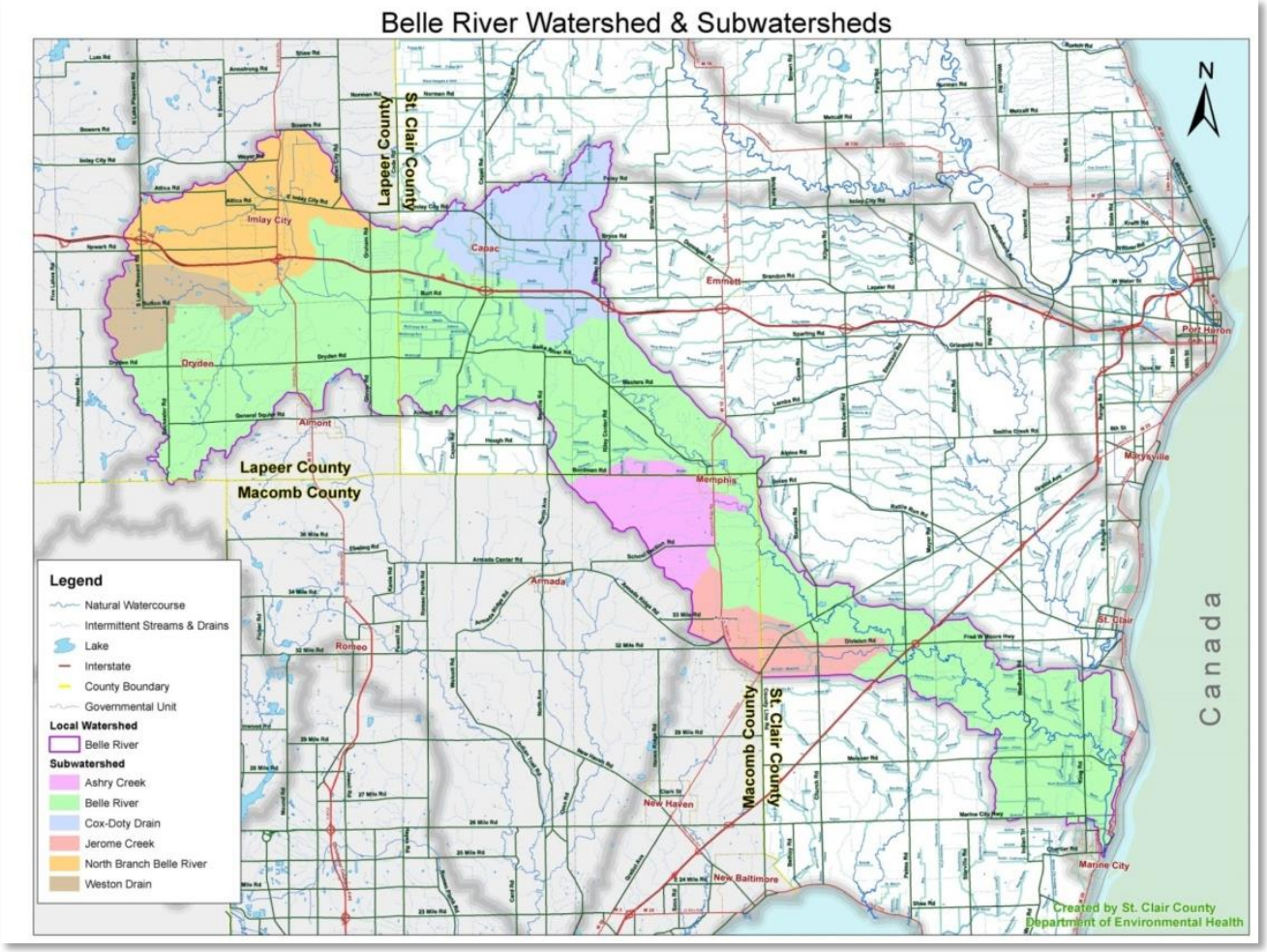
THE WATERSHED'S STORY

SETTING

The Belle River Watershed, located in the thumb of Michigan, is a predominantly agricultural watershed covering 227 square miles mostly in St. Clair County, but also spans portions of Lapeer, Macomb and Oakland Counties. The Belle River contains important natural features, including one of the most diverse and threatened mussel populations in Michigan.

The Belle River, 73.5 miles in length, begins in a marshy area near the eastern border of Lapeer County. There the main branch of the river is joined by the North Branch, which drains out of Long Lake in southeast Lapeer County and then flows into St. Clair County. The river then flows through the northeast corner of Macomb County and returns to St. Clair County reaching its outlet into the St. Clair River at Marine City.

The Belle River Watershed is divided into 24 subwatersheds. These subwatersheds can be aligned into three distinct sections: Headwaters, Middle Section, and Downstream. The Headwaters originate in marshes and wetlands and are mostly channelized to support agricultural land use. Much of the Headwaters and North Branch Belle River are part of a large Intercounty Drain system. The Middle section has very high quality habitat areas containing protected forested riparian buffers and excellent species diversity with rare fish and mussel species. The Downstream section, located in an urbanized area, widens and deepens and is navigable by boat.



HISTORY

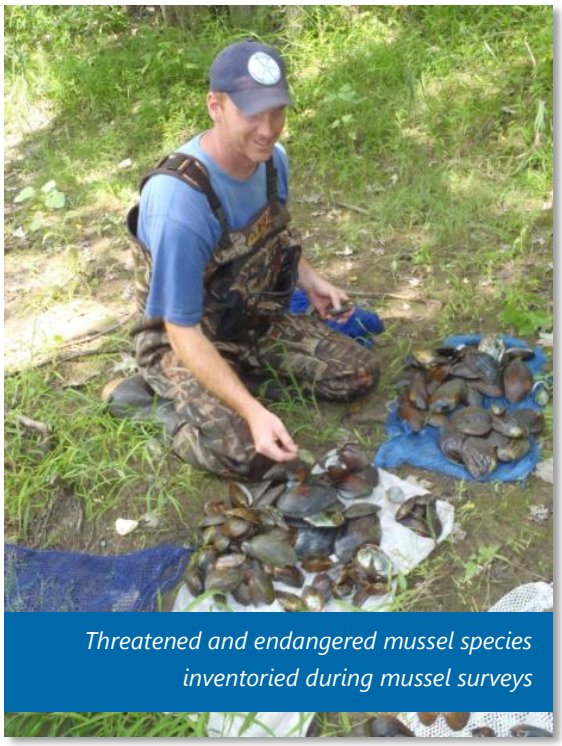
The Belle River Watershed has a complex history of activities that have impacted the river's water quality and physical integrity, particularly over the past century. Today, drainage and farm land management practices have some of the most significant nonpoint pollution source impacts on the river. Despite these impacts, the Middle Section of the Belle River remains one of the highest quality rivers in southeast Michigan.

Belle River, circa 1900, Marine City

Since pre-settlement, the Belle River Watershed has lost over 54,000 acres, or 79%, of its wetlands. This loss of wetlands has increased runoff volumes and decreased base flows, and has negatively affected water quality by reducing areas for infiltration, increasing nutrient inputs, channelizing streams, and altering groundwater and surface water hydrology. Most tributaries have been physically modified by dredging and channel straightening to improve conveyance of increased flows.

NATURAL FEATURES

The Belle River contains some of the highest quality riverine and floodplain habitat areas in southeast Michigan as evidenced by the presence of several threatened and endangered species. The Belle River supports the state threatened Eastern sand darter fish, and mussel species including the state and federal endangered rayed bean and snuffbox, the state endangered round hickorynut, and state threatened slippershell. In addition, a 68 mile portion of the river is designated as a Type IV trout stream, with 7,000 yearling steelhead stocked annually.



Threatened and endangered mussel species inventoried during mussel surveys

LAND USE

The Belle River Watershed is primarily rural with some urban areas within downtown clusters including Marine City, East China, China Township, Imlay City, Almont, and Richmond. Although the percentage of agricultural use has fluctuated over the years, it still remains the dominant land use at 57.5% with urban land cover (16.9%) as the second most common land cover type.

WATERSHED GOALS

The Belle River WAG developed seven specific goals for the watershed after careful review of existing water quality data, stream assessments, and public input. These goals will help guide landowners and governmental agencies to fulfill their goals for water resource protection and address state-listed designated use impairments, along with stakeholder's desired uses. Progress towards achieving these goals will not only restore and protect the natural processes of a healthy watershed, but also bring economic benefits to the communities within the watershed.

1. Restore dissolved oxygen levels to remove the Total Maximum Daily Load (TMDL)
2. Restore hydrologic stability
3. Protect critical ecosystems
4. Improve water quality knowledge and engagement of residents
5. Implement a sustainable large woody material management program
6. Improve public recreation opportunities
7. Reduce *E. coli* levels

WATER QUALITY CONDITIONS

POLLUTION SOURCES

The priority water quality concerns for the Belle River include the subwatersheds in the Headwaters that have a TMDL for low dissolved oxygen (DO) and have high nutrient and sediment loads. Monitoring oxygen levels in rivers is important because adequate dissolved oxygen is necessary for all forms of aquatic life. As dissolved oxygen levels drops, aquatic life is put under stress. Reducing sediment loads would likely result in an increase in dissolved oxygen levels in the river. Additional priority water quality concerns include the Belle River and tributaries that have been listed for TMDL development due to high levels of E. coli (subwatersheds 18, 19, 20, 21) for not meeting Partial and Total Body Contact Standards.

The prioritized pollutants identified in the Belle River Watershed are: 1. Sediment, 2. Pathogens/Bacteria, 3. Nutrients, and 4. Toxic Pollutants. Other concerns impacting the river's health include logjams, debris and litter, and channel instability.

PRIORITIZED POLLUTANTS & SOURCES

1. Sediment	2.Pathogens / Bacteria	3. Nutrients	4. Toxic Pollutants
• Excessive stream bank erosion • Agricultural runoff • Hydromodification • Roadways	• Failing septic systems • Animal waste • Sanitary sewer overflows	• Agricultural runoff • Landscaping • Failing septic systems • Animal waste	• Roadways • Urban runoff • Agricultural runoff

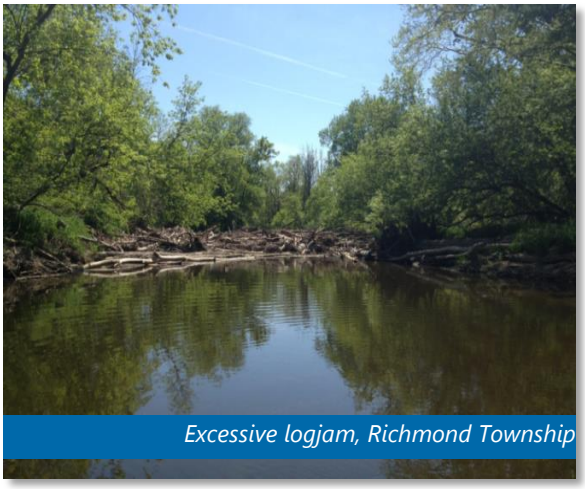
SEDIMENT

Soil erosion and sedimentation are major issues throughout the Belle River Watershed, primarily in the Belle River Intercounty Drain in the Headwaters, which has been developed for a TMDL for low dissolved oxygen. A TMDL outlines the allowable loading of a pollutant in a waterbody to assure that state water quality standards are met. In the Headwaters, much of the pollutant load contributing to low dissolved oxygen levels comes from erosion from cropland and ditches. The Middle and Downriver Sections of the Belle River are negatively affected by these sediments which flow down from the Belle River Intercounty Drain and other tributary drains during heavy rain events.

Agricultural drain in the headwaters of the Belle River

PATHOGENS/BACTERIA

Escherichia coli (E. coli) is a type of bacteria used in Michigan as an indicator of possible sewage contamination. E. coli levels identified in the Belle River Watershed indicate that the water may not always be suitable for partial body contact like canoeing or total body contact such as swimming.



Excessive logjam, Richmond Township

LOGJAMS

A large woody material and logjam inventory was performed during the development of the Plan. Areas were prioritized based on the severity and scale of the logjam in regard to flow, flooding, trash build-up, and recreational navigation. Excessive logjams are a problem in the Middle Section and downstream of I-94. Annual assessments are recommended to determine priority clean-up areas, especially within the 14.5-mile Belle River Blueway Trail from the China Township Park at King Road to the mouth at the St. Clair River in Marine City.

CORE FINDINGS

PROTECT PRIORITY AREAS

"Priority Areas" have been defined as high quality and environmentally-sensitive areas that require protection and preservation. Important to note are the "critical areas", which are areas that produce the highest level of pollutants in the watershed. Implementation efforts should be focused in these two areas where the most beneficial results will be produced.

Prioritized parcel for woodland and wetland preservation, Lapeer County

Six Rivers Land Conservancy led an effort to identify land conservation priorities using a prioritization model and ranking system to score parcels based on key natural resources. Numerous high quality natural areas were found to exist and protecting these areas will be essential in attaining the goals of the Plan.

1. **Significant natural resources**

   Natural features prioritized for protection include existing wetlands, fisheries management primarily in the Downstream section, and areas with threatened and/or endangered species. Communities are encouraged to incorporate a Michigan Natural Features Inventory identifying the highest quality areas into their Master Plan.

2. **Preservation of prime agricultural land and rural character**

   The most productive agricultural lands are located in the Headwaters of the Belle River. As such, these areas should be prioritized for purchase of development rights in conjunction with the Farmland Preservation Program (P.A. 116), and rural townships should pursue adopting an agricultural buffer or stream buffer zoning ordinance.

3. **Creation and preservation of public access to water resources**

   Land acquisition and shoreline development can provide additional areas for the public to access the river. The 14.5 mile Belle River Blueway Trail enhances water access points and promotes recreational opportunities. Communities should create, or update, recreation plans in order to be eligible for various funding sources to acquire additional parks and recreational space.

4. **Protection of priority conservation lands**

   In the Headwaters, priority conservation sites are larger land parcels and properties along stream corridors. The Middle Section's priority sites are riparian buffers that border the main branch of the Belle River. Downstream the most important lands are public parks. Priority sites should be protected by ordinances, development and/or redevelopment regulations, as well as other programs such as purchasing public land or development rights and conservation easements.

RESTORE CRITICAL AREAS

Prioritizing the critical areas is especially important due to the scale of the Belle River Watershed; over 200 square miles of land cannot be retrofitted to manage and treat stormwater runoff. As implementation of the Plan continues, the critical areas may change. As additional challenges to the watershed arise and as more information on the characteristics of the watershed is obtained, additional critical areas may be delineated.

1. **Sediment source areas**

   Sediment is a major concern in the Belle River Watershed. The Middle and Downriver sections of the Belle River are negatively affected by the overly wide Belle River Intercounty Drain and other tributary drains in the Headwaters. Areas with the most erosion potential are croplands in the Headwaters and streambank erosion in the Middle section.

2. **TMDL areas**

   Over 20 miles of the river near and below Imlay City do not meet state standards for dissolved oxygen. Upland areas, particularly agricultural areas, and areas without adequate riparian buffers, are the predominant source of pollutants. In order to decrease dissolved oxygen demanding pollutants, the loading of sediments to the rivers must be reduced.

3. **Areas with altered watershed hydrology**

   Since pre-settlement, the Belle River Watershed has lost 79% (54,000 acres) of its wetlands. Only 21% of original wetland acreage remains in the watershed. Thus, the existing wetlands in the watershed are significant natural features and preservation is essential because wetlands provide flood control, habitat for wildlife, and filter pollutants. Municipalities should implement their own wetlands ordinance and/or use programs such as Wetland Mitigation or Conservation Banking to ensure protection of wetlands.

4. **Areas impaired from high E. coli levels**

   E. coli has been found in levels higher than state water quality standards at sites throughout the Belle River Watershed. In 2014, subwatersheds 18, 19, 20, and 21 were listed as impaired for Total Body Contact Recreation and Partial Body Contact Recreation due to high E. coli levels. These subwatersheds, located in the Middle section, are critical areas where projects need to be implemented to reduce E. coli.

IMPLEMENTING THE RECOMMENDATIONS

PRIORITY PROJECTS

A list of specific priority projects and actions has been developed to address water quality issues in the Belle River Watershed and the Plan's seven goals. These priority projects were compiled based on existing water quality data, non-point source pollutant surveys, pollutant-load modeling, and stakeholder input. The project list highlights the most immediate priorities which will have the greatest impact on water quality and qualify for future funding.

Thirty-four project sites have been identified in the critical area in the Headwaters to decrease sediment and nutrient loading. If Best Management Practices are implemented in these critical areas, over 900 tons of sediment per year could be prevented from entering waterways throughout the Belle River Watershed. These projects range from implementing riparian buffers to replacing culverts to changing agricultural management practices.

WATERSHED GOAL	PRIORITY PROJECTS		
1. Restore dissolved oxygen levels to remove TMDL	1.1 Decrease sediment and nutrient loading in the TMDL area by implementing BMP's in critical areas	1.2 Maintain riparian buffers	1.3. Stabilize streambanks
2. Restore hydrologic stability	2.1. Restore wetlands in critical areas in the TMDL reach (this will also decrease sediment and nutrient loading)	2.2. Restore floodplain connectivity by utilizing two-stage drains in the headwaters	2.3 Develop and implement wetlands ordinances and protection
3. Protect critical ecosystems	3.1. Protect priority parcels identified by Six Rivers Land Conservancy	3.2. Develop and implement wetland protection ordinances	3.3. Develop an invasive species management program

WATERSHED GOAL	PRIORITY PROJECTS		
4. Improve water quality knowledge and engagement of residents	4.1. Promote stormwater education materials (e.g. SEMCOG Seven Simple Steps to Clean Water)	4.2. Develop educational materials about large woody material	4.3. Educate land use decision makers and the agricultural community about conservation programs
5. Implement a sustainable woody debris management program	5.1. Implement a program to identify large woody material issues and to coordinate river clean-up days	5.2. Prioritize and coordinate logjam removals and river clean-up days	
6. Improve recreational opportunities	6.1. Install appropriate access points for recreation	6.2. Organize recreational events that promote recreation and stewardship of the river	6.3. Implement river restoration projects that increase aesthetics and water quality
7. Reduce E. coli levels	7.1. Detect and correct illicit discharges and failed and high risk septic systems		

IMPLEMENTATION AND ASSESSMENT

Implementation of the Plan will be achieved by the Belle River WAG stakeholders working both independently and collectively. Chapter 6 of the plan, *Best Management Practices,* defines 78 Best Management Practices (BMPs) that can be implemented to help achieve the Plan's goals, the state's designated uses, and stakeholder's desired uses. BMPs are the main tools to control the quality and quantity of storm water runoff from construction sites, urban areas, agricultural areas, and roadways. The description of each of the BMPs includes measures to track implementation and to determine success over the short and long term.

Chapter 7, *Watershed Action Plan,* outlines an implementation plan for the proposed BMPs and explains which ones will be or are currently being implemented within each county and municipality. The schedule for implementing BMPs will vary depending on the concerns in each community as well as cost, staff, and planning needs.

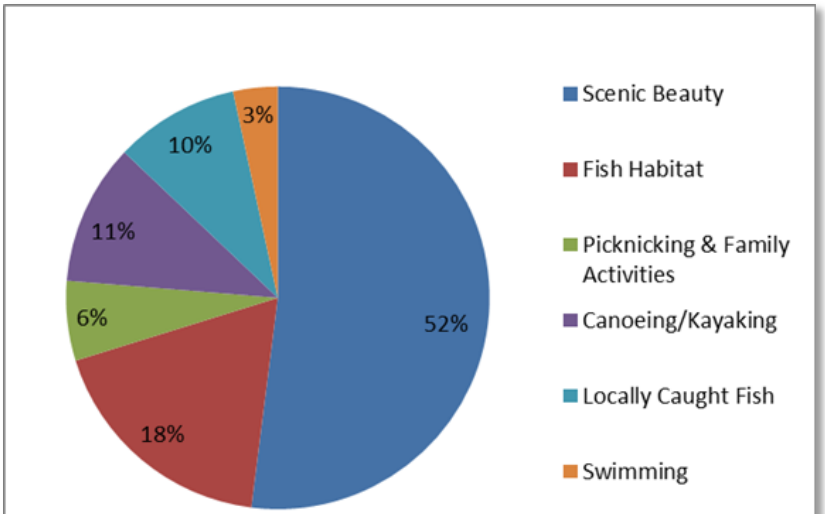
The Plan will be implemented at three levels: the first level is the current implementation of watershed projects and municipal actions to restore and protect the watershed; the second level is the short-term BMP commitments in the first five years that address the critical areas; and the third level is long-term commitments implemented after five years that might demand higher costs or more in-depth planning.

EDUCATION AND OUTREACH

As the Plan moves toward implementation, public education messages will be tailored to two activities that watershed residents indicated were the most important to them: enjoying the scenic beauty of the river and recreational opportunities along the river. Crafting messages that appeal to residents is important if there is going to be long-term support for protecting and managing water quality in the Belle River Watershed.

A 2014 survey of watershed residents provided valuable insight into existing watershed knowledge and opinions about conditions in the watershed and the willingness or impediments to implementing BMPs. This information

will help shape future education initiatives. Respondents indicated that the river's health and water quality, fish and wildlife habitat protection, and the prevention of dumping of trash in the river are their top three concerns. The next step of watershed education will be to develop a personal watershed stewardship campaign, including outreach materials about septic system maintenance, streambank stabilization, logjam clean-ups, and stormwater issues.



Resident responses to a survey question: "Which of these activities is most important to you?"

LOOKING AHEAD

Just as the goals and objectives established in the Plan may change over time, the actions to achieve those goals and objectives may just as likely need to be modified as the physical, socioeconomic, and political landscape of the watershed changes. It is the hope that the planning and implementation process becomes self-sustaining with ever-increasing participation from stakeholders. The focus should be on implementing the most efficient and cost-effective strategies for protecting the watershed.

The Plan is a living document and will be updated as new projects are undertaken, the effectiveness of actions is addressed, and new challenges arise. Continuing in their new role to implement the Plan, the Belle River WAG will coordinate the implementation of projects and assess water quality improvements by conducting ongoing monitoring. As projects are implemented these changes will be reflected in periodic updates to the Plan.

In the end, realizing the vision for a healthy and economically vibrant Belle River Watershed depends on a collaborative approach with the many agencies, communities, academic, and organizations that have joined forces to focus on the vitality and sustainability of the Belle River. The SCCHD is committed to continuing its work on watershed planning by building upon the momentum it has established thus far.

To view the full version and appendices of the Belle River Watershed Management Plan, visit **www.sccwater.org**.

ACKNOWLEDGEMENTS

The St. Clair County Health Department extends their appreciation for the efforts, expertise, and passion of many individuals, representing the following organizations, who make up the Belle River Watershed Advisory Group, for their contributions to the Belle River Watershed Management Plan. This plan could not have been completed without their combined efforts.

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LimnoTech

Primary participating agencies and communities:

St. Clair County Health Department
St. Clair County Parks and Recreation
St. Clair County Community College
St. Clair County Drain Office
St. Clair County Metropolitan Planning Commission
St. Clair Conservation District
Friends of the St. Clair River
Six Rivers Land Conservancy
Macomb County Public Works Office
Macomb County Health Department
Lapeer Conservation District
Lapeer County Drain Office
Columbus Township
Riley Township

Additional participating agencies and communities:

Michigan Department of Natural Resources
Seven Ponds Nature Center
Southeastern Michigan Conservation Club
Southeastern Michigan Council of Governments
St. Clair County Road Commission
USDA - Natural Resources Conservation Service
Almont Township
Attica Township
Berlin Township
Casco Township
China Township
City of Memphis
City of Richmond
Cottrellville Township
Dryden Township
East China Township
Emmett Township
Imlay City
Imlay Township
Marine City
Mussey Township
Richmond Township
St. Clair Township
Village of Capac