

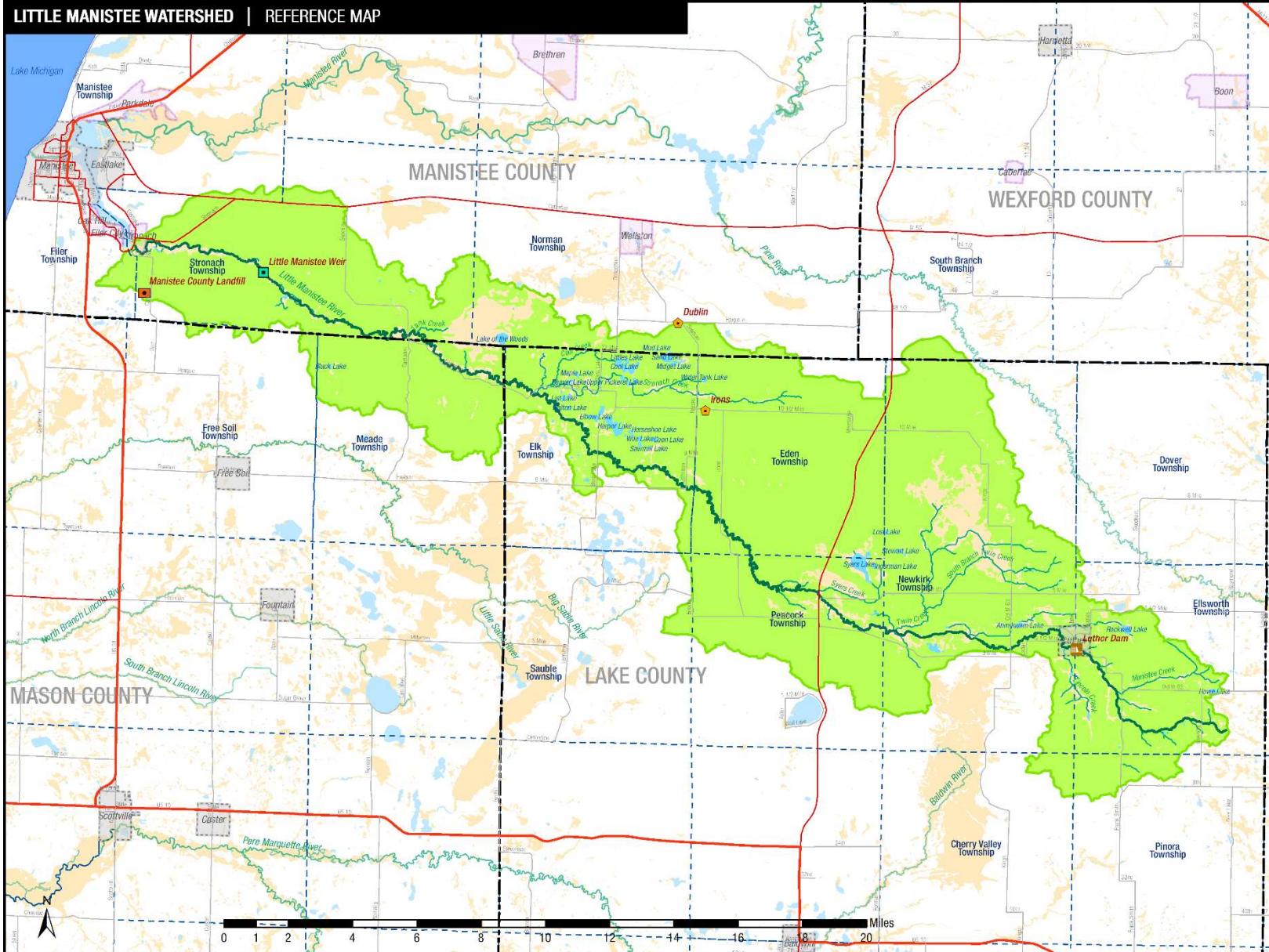
The Little Manistee Watershed



The Little Manistee River Watershed

Lake, Manistee, Mason and Wexford Counties

LITTLE MANISTEE WATERSHED | REFERENCE MAP



LEGEND

LOCATOR MAP | Michigan



KEY | WATERSHED

- Little Manistee River
- Incorporated Cities & Villages
- Unincorporated Places (CDP's)
- LMW Lakes
- LMW Tributaries
- Area Rivers
- NWI Wetlands
- Little Manistee Watershed

FEATURES |

- Dam
- Fish Weir
- Land Fill Facility
- Unincorporated Place
- Other Principal Arterial
- Minor Arterial
- Major Collector
- County Boundary
- Township Boundary
- Lake Michigan
- Little Manistee Watershed Boundary

Source | EPA/MDEQ/MDOT/US Census

Scale | 1:180,000 Date | 5/24/2018

Networks Northwest
Total. Business. Community.

Why Watershed Planning?

- Determine present conditions
- Consider clean-water standards
- Generate Stakeholder input
- Begin Public Education
- Identify problem areas
- Develop solutions
- Apply for funding
- Monitor progress



Watershed Questions:

- A. What do we have?
- B. What do we want?
- C. How do we get from A to B?



Little Manistee WMP Partners

- **Little Manistee Watershed Conservation Council**
- **Conservation Resource Alliance**
- **Manistee Conservation District**
- **Lake County Community Foundation**
- **Manistee County Community Foundation**
- **U.S. Forest Service**
- **Michigan DNR and DEQ**
- **Little River Band of Ottawa Indians**
- **Trout Unlimited**
- **Local government agencies**
- **Alliance for Economic Success**

The Plan **MUST**:

- ✓ Maintain or improve water quality
 - ✓ Meet standards for full-body contact recreation
 - ✓ Protect or improve the fishery
 - ✓ Protect navigation
 - ✓ Include public education
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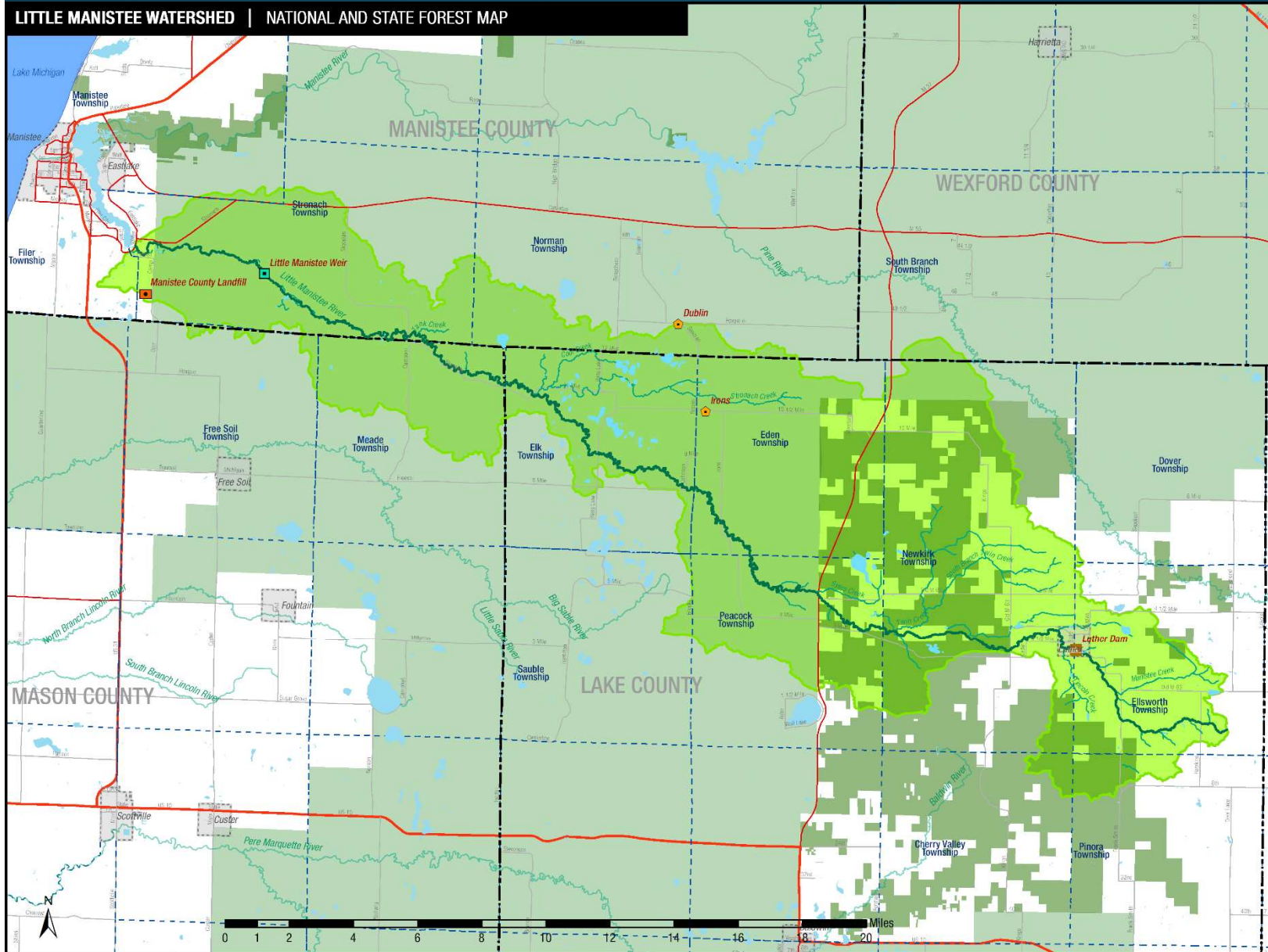
The Plan MAY:

- ✓ Consider scenic and recreational values
- ✓ Address economic conditions
- ✓ Include public access
- ✓ Add locally important issues



State and National Forest Lands

LITTLE MANISTEE WATERSHED | NATIONAL AND STATE FOREST MAP



LEGEND

LOCATOR MAP | Michigan



KEY | FOREST AREAS

- State Forest
- National Forest

FEATURES |

- Little Manistee River
- LMW Tributaries
- Area Rivers
- LMW Lakes
- County Boundary
- Township Boundary
- Roads-Other Principal Arterial
- Roads-Minor Arterial
- Roads-Major Collector
- Incorporated Cities & Villages
- Lake Michigan
- Little Manistee Watershed Boundary
- Little Manistee Watershed

Source | EPA/MDEQ/MDOT/US Census

Scale | 1:180,000 Date | 5/24/2018

Land Cover in Little Manistee Watershed

Vegetation Type

Deciduous Forest	39.1%
Mixed & Evergreen Forest	28.3%
Scrub & Grassland	14.2%

Land Use

Developed	5.0%
Agriculture	3.5%
Water & Wetlands	9.7%

Non Point Source (“NPS”) Stressors

*Little Manistee Watershed
Priority Levels*

Level 1

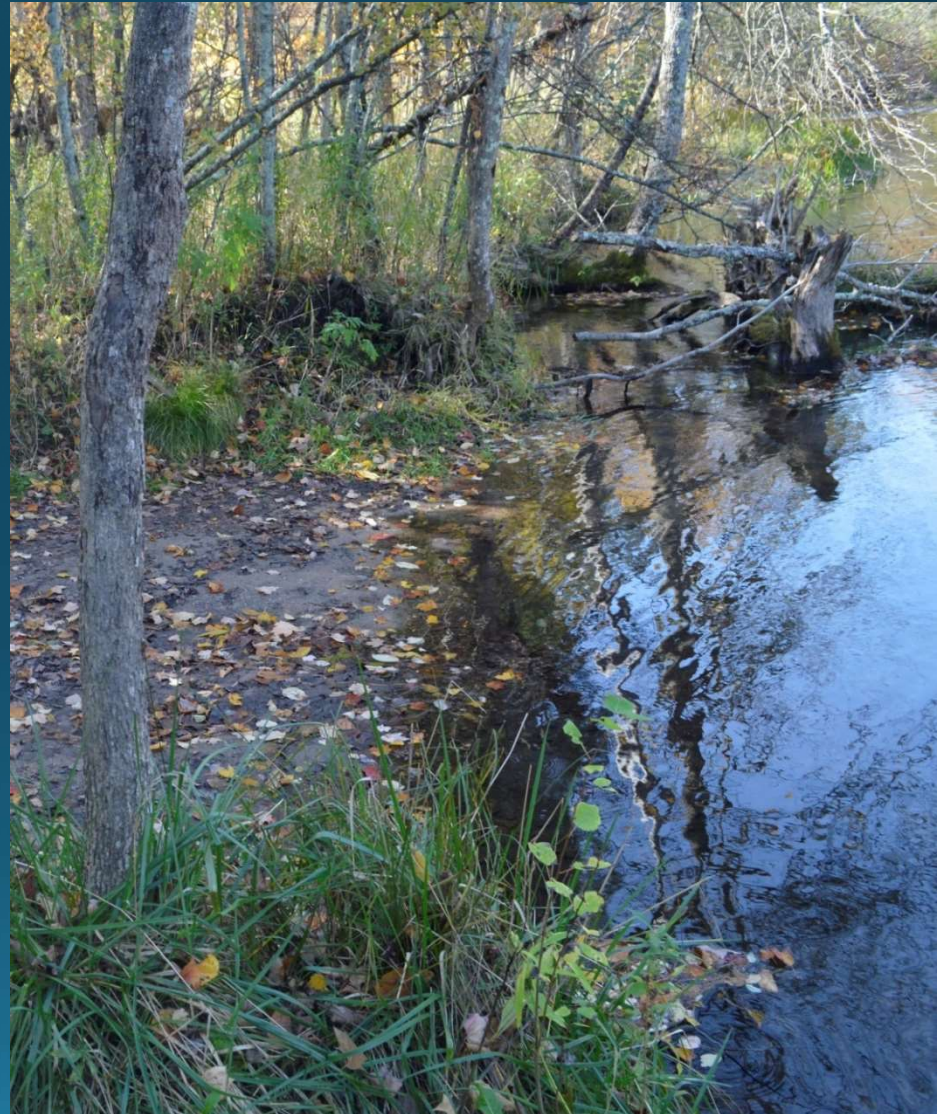
**Thermal Issues
Sediments**

Level 2

**Excessive nutrients
Invasive Species
Biological pathogens**

Level 3

**Other unspecified
pollutants**

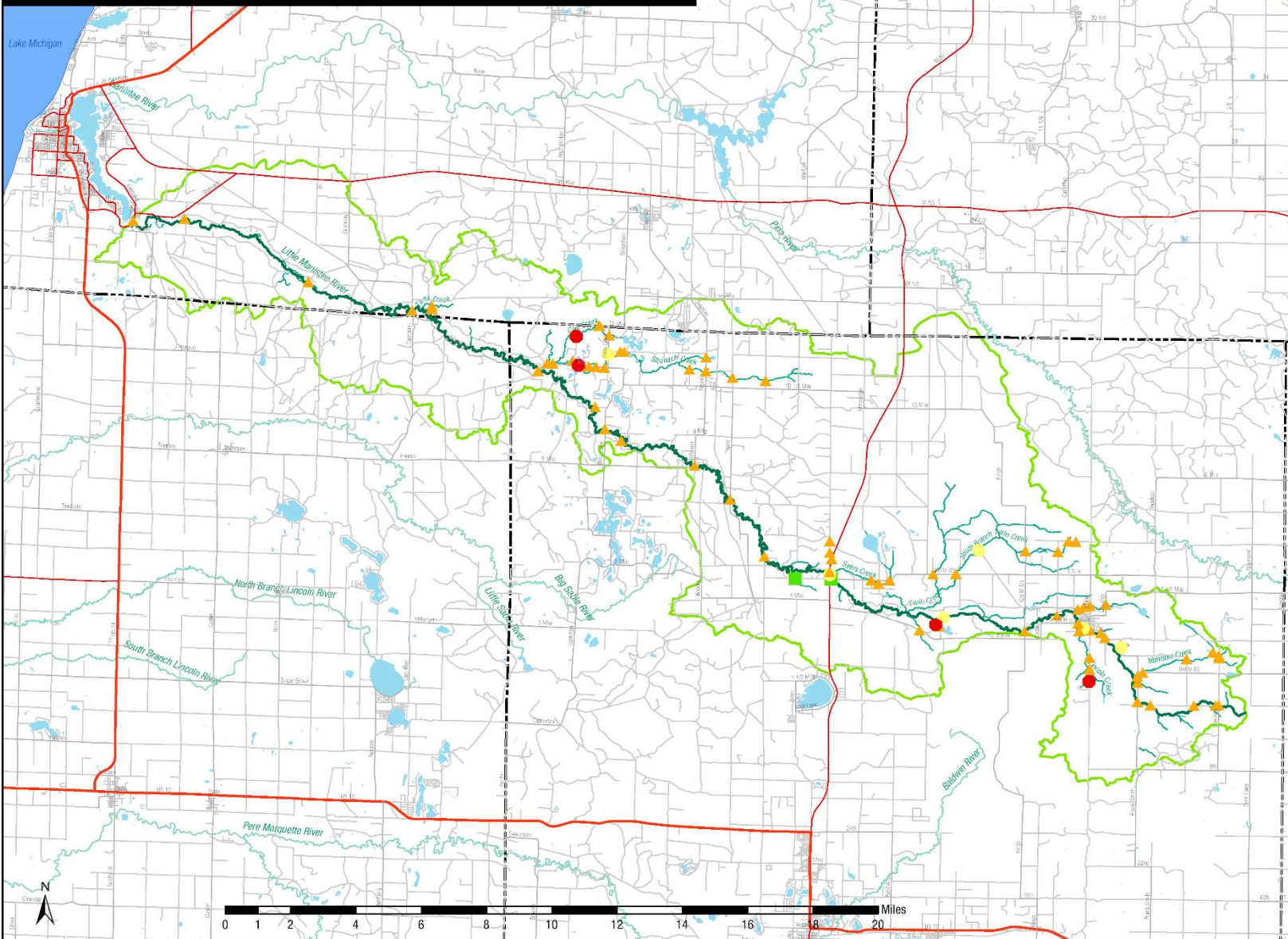


Potential Sources of NPS Pollution

- Land Use (Stormwater runoff from impervious surfaces)
- Transportation (Erosion at road-stream crossings)
- Septic Systems (Nutrients and E. coli from failing systems)
- Recreation (Erosion, spread of invasive species)
- Agriculture (Fertilizer, pesticides, erosion)
- Dams/Impoundments (Sedimentation, thermal issues)

The Little Manistee Watershed has more than 80 road-stream crossings

LITTLE MANISTEE WATERSHED | Road Stream Crossings



LEGEND

LOCATOR MAP | Michigan



KEY | Crossing Severity

- Minor
- Moderate
- Restored
- Severe

FEATURES |

- Little Manistee River
- Other Principal Arterial
- Minor Arterial
- Major Collector
- Local Roads
- County Boundary
- Lake Michigan
- Little Manistee Watershed Boundary
- Lakes

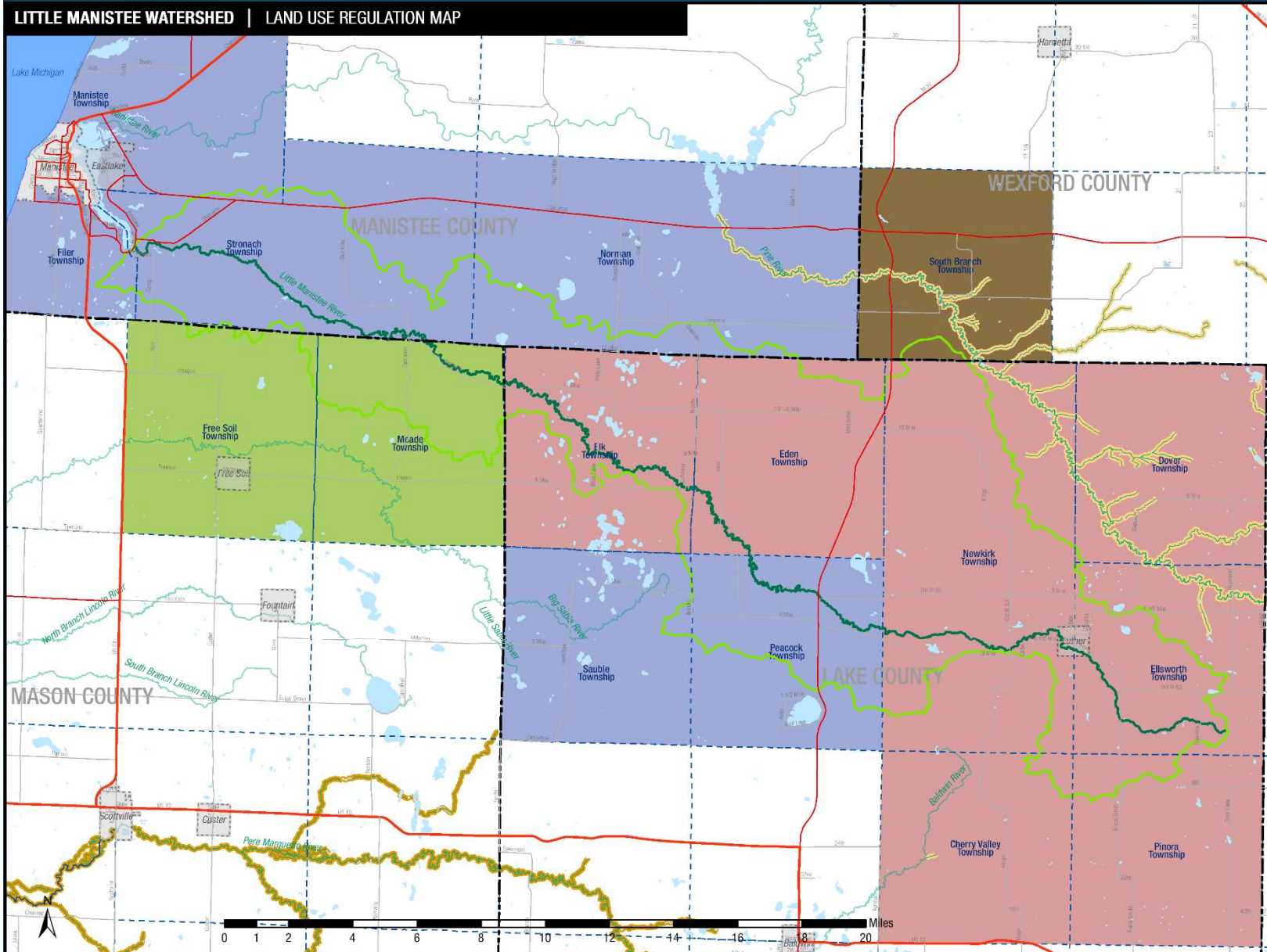
Source | CRA

Scale | 1:180,000

Date | 5/24/2018

Existing Land Use Regulation

LITTLE MANISTEE WATERSHED | LAND USE REGULATION MAP



LEGEND

LOCATOR MAP | Michigan



KEY | LAND USE REGULATION

- Township Zoning
- County Administered Zoning
- Joint Planning & Zoning
- Not Zoned
- Pine River Natural River District
- Pere Marquette Natural River District
- Incorporated Cities & Villages
- Little Manistee River
- Area Rivers

FEATURES |

- Other Principal Arterial
- Minor Arterial
- Major Collector
- County Boundary
- Township Boundary
- Lake Michigan
- Little Manistee Watershed Boundary

Source | Local Governments/MDNR

Scale | 1:180,000 Date | 5/24/2018

Zoned Area of Watershed (Acres)

Zoned Township Administered	42,854
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Zoned County Administered	10,929
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Joint Planning & Zoning	626
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Total Zoned in Watershed	54,410
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Total Watershed Area (Acres)	134,995
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% of Watershed Zoned	40.3%
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Planning & Zoning Best Practices

- **Environmental Protection Priorities**
- **Economics of Environmental Stewardship**
- **Wetland & Shoreline Protections**
- **Buffers & Setbacks**
- **Steep Slope Protections**
- **Minimize Impervious Surfaces**
- **Low Impact Develop (“LIDs”) Incentives**

The Draft WMP Calls For:

- Land Use Education
- Water Quality Monitoring
- Habitat Improvement
- Streambank Stabilization
- Road-Stream Repairs
- Groundwater Protection
- Optional Actions to Guide Future Land-Uses



Implementing the Little Manistee Plan

Category A: Shoreline/Streambank Issues

Task	Priority	Unit Cost	Estimated Total Cost	Milestone 2018-21	Milestone 2022-25	Milestone 2026-28	Potential Project Partners	Potential Funding Sources	Objectives Addressed	Notes
A1 Restore severe and moderate streambank erosion sites identified in CRA inventory. Use whole-tree revegetations where practicable to improve aquatic habitat while stabilizing streambanks.	H	\$120 per linear foot	\$300,000	5 sites restored	C	10 additional sites restored	LMWCC, CRA	Private property owners; Fisheries Trust; Grants	2; 3c; 3e	Sites included by reference from inventory at www.northernmichiganstreams.com
A2 Update streambank inventory on Little Manistee River and major tributaries on 10-year cycle.	M		\$14,000	X	inventory updated	X	CRA	Trout Unlimited; G.L. Fisheries Trust	3c; 3e	
A3 Work with conservation districts and MSU extension to demonstrate natural shoreline protection techniques on Cool, Syers and other developed lakes in the Watershed.	M	\$5,000 per site	\$15,000	One site demonstration complete	C	C	Lake Associations; property owners	Private Property owners; MSUE; Cons. Dist.	3c	Work through Michigan Natural Shoreline Partnership and local certified contractors
A4 Complete removal of sand-berm dam at Syers Lake to restore natural lake configuration and perennial flow to Syers Creek	H	\$120,000	\$120,000	Project complete	Creek monitored	C	LMWCC; CRA; private landowners	LMWCC; T.U.; Grants; Private landowner funds	2e	Funding committed for 2018/2019
A5										

12 categories, 63 specific tasks

Implementation Categories A-B-C-D

Shoreline/Streambank Issues **\$449,000**

Stormwater and Runoff **\$74,000**

Planning, Zoning and Land Use **\$25,000**

Road-Stream Issues **\$4,292,000**

Implementation Categories E-F-G-H

Cat. E. Land Protection and Management \$1,010,000

Cat. F. Habitat for Fish and Wildlife \$280,000

Cat. G. Recreation, Safety, Navigation, Health* N/A

Cat. H Groundwater and Wetlands \$40,000

(Cat. F estimate does not include option for dam removal)

(Cat. G costs are included in other line items)

Implementation Categories I-J-K-L

Water Quality Monitoring \$70,000

Invasive Species \$18,000

Wastewater and Septic Systems \$335,000

Information and Education \$81,000

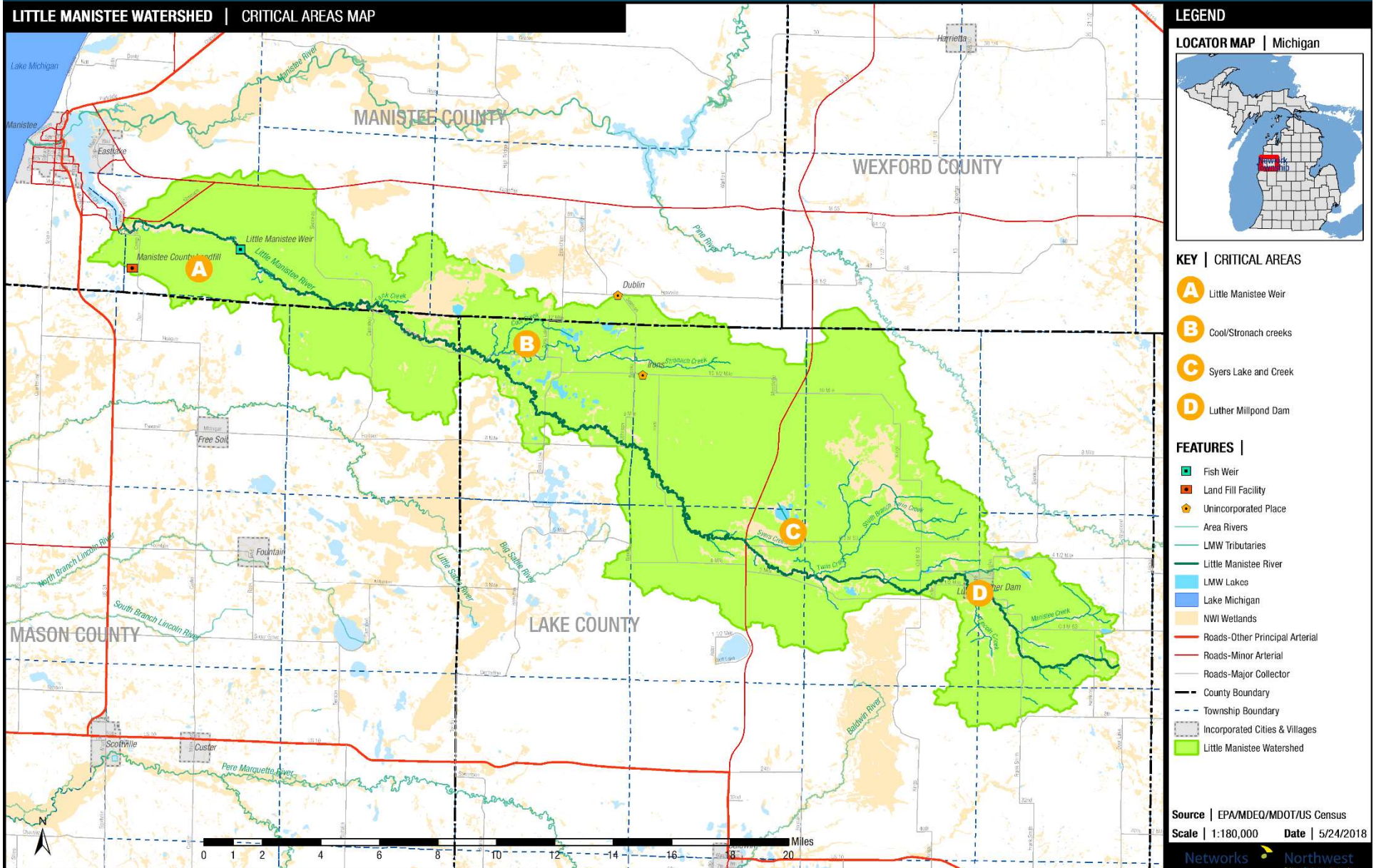
Total Implementation Costs Estimate



TOTAL 10-year Cost: \$6,686,000

Critical Areas for Remediation and/or Protection

LITTLE MANISTEE WATERSHED | CRITICAL AREAS MAP



Little Manistee Weir and Egg-Taking Station



A photograph of a river flowing through a forested area. The river is in the foreground, with water reflecting the sky and surrounding trees. The banks are lined with dense vegetation, including tall evergreen trees and deciduous trees with yellow and orange autumn foliage. The sky is clear and blue.

Cool Creek / Stronach Creek Critical Area

Syers Lake / Syers Creek Critical Area

Luther Millpond Dam



Options: Maintain or Remove?

A photograph of a sunset over a body of water. The sun is a bright, glowing semi-circle on the horizon, casting a shimmering reflection down the center of the water. The sky is filled with horizontal bands of orange and red, with some wispy clouds. The water is a deep orange-red color. The word "Questions?" is written in a large, white, sans-serif font across the lower half of the image.

Questions?