

Developing TMDLs in Ways that Lead to More Seamless Collaboration and Implementation

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2024 NATIONAL TRAINING WORKSHOP ON WATER QUALITY ASSESSMENT AND PLANS

MAXIMIZING CWA PROGRAMS TO ACHIEVE WATER QUALITY GOALS

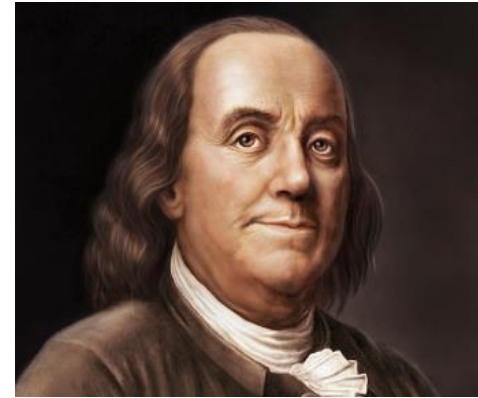
National Conservation Training Center

Shepherdstown, West Virginia

June 4-6, 2024

“If you fail to plan, you are planning to fail.”

- *Benjamin Franklin*



“Those whom plan do better than those who do not plan,
even should they rarely stick to their plan.”

- *Winston Churchill*



“Plans are nothing; planning is everything.”

- *Dwight D. Eisenhower*



The Takeaway from the Three Quotes:

- 1) The significance of the planning process over the specific plans(TMDLs) themselves can not be over emphasized.
- 2) TMDLs can change due to unforeseen circumstances; however, the development process involves thinking, strategizing, and preparing for various scenarios.
- 3) The TMDL development process allows for the flexibility and adaptability needed to navigate uncertainties ensuring greater buy-in, success, and resilience.

Presentation Overview

1) The TMDL Development Process

- a) Participation and Outreach
- b) Data Collection
- c) Subbasin Delineation
- d) Breakout of Allocations by Sources

2) Wastewater Sources

- a) Administrative Code, Permits, and Guidance
- b) Format and Expression of Wasteload Allocations
- c) Meetings

3) Permitted MS4 Sources

- a) Administrative Code, Permits, and Guidance
- b) Format and Expression of Wasteload Allocations
- c) Development Process Meetings

4) Agricultural Nonpoint Sources

- a) Administrative Code, Models, and Plans
- b) Edge-of-Field Targets and Percent Reduction
- c) Defined Baseline and Feasibility Analysis (Reasonable Assurances)

TMDL Development: Participation and Outreach

- Form Sector Groups (MS4, WW, NPS-AG, Monitoring) that are active in the development phase and move forward with implementation.
- Outreach and comment periods at critical development points.
- GovDelivery for all communications and maintain a project specific website.
- For the Wisconsin River Basin TMDL, The TMDL development team collaborated with a consultant group (HDR) hired through NCASI (National Council for Air and Stream Improvement, Inc.) who represents a consortium of pulp and paper companies.

TMDL Development: Participation and Outreach

PAST WEBINARS

- ▼ [August 2023 Informational Webinar](#)
- ▼ [January 2023 Informational Webinar](#)
- ▼ [September 2022 Meeting with Municipal Wastewater Treatment Facilities](#)
- ▼ [December 2021 Informational Webinar](#)
- ▼ [March 2021 Informational Webinar](#)
- ▲ **Summer 2020 Informational Webinar Series:
The TMDL Process and Watershed Model Development**

In summer 2020, the DNR presented a series of public informational webinars to introduce development of the Soil & Water Assessment Tool (SWAT) watershed model for the Northeast Lakeshore TMDL. The [webinar announcement flyer \[PDF\]](#) summarizes the topics of each webinar. Recordings and PDFs of the webinar presentations are below.

- ▼ [Webinar 1: TMDL process and introduction to the Northeast Lakeshore TMDL](#)
- ▼ [Webinar 2: Water Quality Data and Impairments](#)
- ▼ [Webinar 3: Watershed Model Introduction and Data Inputs](#)
- ▼ [Webinar 4: Watershed Model Setup](#)

Webinar Avatar



Kevin Kirsch
Statewide TMDL Coordinator

TMDL Development: Participation and Outreach

Comment Period

**Lake Modeling Report
Draft Allocation Tables**

Find information on the
NE Lakeshore TMDL webpage

Send General TMDL and Allocation
Comments to:
kevin.kirsch@wisconsin.gov

Send Questions Regarding WLA and
Wastewater Discharges to:
Nate Willis
nathaniel.willis@wisconsin.gov

Comment Period

Topic

October 2020 (past)

Watershed Model Report

1. Overview
2. Model Setup

Spring 2021 (past)

Watershed Model Report

3. Calibration and Validation **Approach**
4. Calibration and Validation **Data**
5. Calibration and Validation **Results**
6. **Discussion** of Calibration and Validation
7. Summary of Model Results
8. References

**December 17, 2021,
through COB
January 21, 2022**

Draft Allocations
(including inland lake modeling results)

TMDL Development: Data Collection

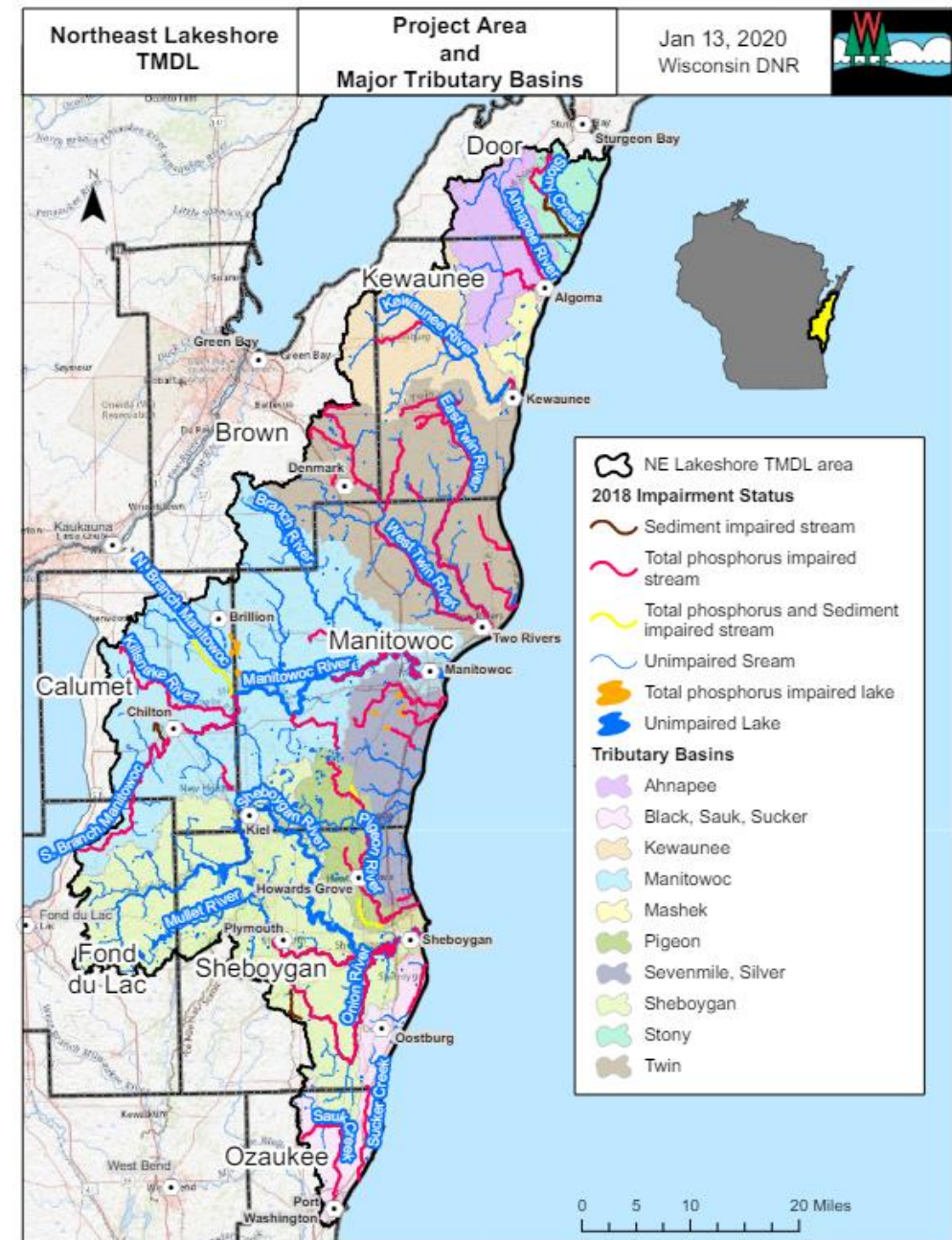
- Contact with County LCD offices, producer led groups, and other agricultural professionals such as crop consultants.
- Contact all industrial and municipal wastewater sources to verify outfall locations, flow rates, and effluent monitoring data.
- Gather data from permitted MS4s and verify sewershed boundaries and boundaries.

TMDL Development: Subbasin Delineation

TMDL development can occur at a larger scale, but implementation should generally occur at a HUC12 or smaller scale.

Start with HUC 12s and further modify the delineations based on:

- Changes in water quality criteria
- Changes in stream flow
- Changes in land use
- Location of wastewater outfalls



TMDL Development: Breakout Allocations

Waste Load Allocation

- WWTPs / POTWs
- Industries
- MS4s
- Non-Metallic Mines
- Construction Sites
- CAFOs

Load Allocation

Traditionally
One Lump
Number





LA Typically Lumps The Good, The Bad , And The Ugly



TMDL Development: A Better-Defined Load Allocation

- Break-out allocations by watershed or sub-watershed (HUC12 or smaller)
- Break-out by land use
 - Agricultural fields and pastures
 - Non-permitted urban areas
 - Woodland, natural areas, and background
- Link the load allocation to an implementation mechanism or field scale tool and provide a defined baseline.

Permitted Wastewater: Statute, Administrative Code, and Permits

Wis. Stat. s. 283.31(3)(d)3. requires DNR to include effluent limits in permits to meet TMDL wasteload allocations. Implemented through s. NR 217.16

- [NR 217.16\(2\)](#) If the phosphorus limitation based on an approved TMDL is less stringent than the water quality based effluent limitation calculated in s. [NR 217.13](#), the department may include the TMDL based limit in lieu of the limit calculated in s. [NR 217.13](#) if the limit calculated under s. [NR 217.13](#) has not yet taken effect.
- [NR 217.16\(3\)](#) If a phosphorus water quality based limit calculated under s. [NR 217.13](#) has already taken effect in a permit, the department may replace the limit with a less stringent TMDL based limit, if allowed pursuant to antidegradation procedures in ch. [NR 207](#).
- [NR 217.16\(4\)](#) If the phosphorus limitation based on an approved TMDL is more stringent than the water quality based effluent limitation calculated under s. [NR 217.13](#), the department shall include the more stringent TMDL based limitation in the WPDES permit.

Permitted Wastewater: Format and Expression of WLAs

Municipal Facilities: Mass allocations and equivalent concentrations calculated using design flow.

Municipal Facilities			Total Phosphorus (TP)					Total Suspended Solids (TSS)						
Facility Name	Permit No.	Baseline Flow (MGD)	TMDL TP WLA (lbs per year)	TP Month Limit (lbs/day)	TP 6-mo Limit (lbs/day)	TP Equivalent Monthly Concentration - Baseline flow (mg/L)	TP Equivalent 6-Month Concentration -Baseline flow (mg/L)	TMDL TSS WLA (lbs per year)	TSS Limit Mo avg (lbs/day)	TSS Limit weekly avg (lbs/day)	TSS Limit daily max (lbs/day)	TSS Equivalent Monthly Concentration (mg/L)	TSS Equivalent weekly Concentration (mg/L)	TSS Equivalent Daily Concentration (mg/L)

Industrial Facilities: Mass allocations and equivalent concentrations calculated using highest annual average flow.

Industrial Facilities			Total Phosphorus (TP)					Total Suspended Solids (TSS)						
Facility Name	Permit No.	Baseline Flow (MGD)	TMDL TP WLA (lbs per year)	TP Month Limit (lbs/day)	TP 6-mo Limit (lbs/day)	TP Equivalent Monthly Concentration - Baseline flow (mg/L)	TP Equivalent 6-Month Concentration -Baseline flow (mg/L)	TMDL TSS WLA (lbs per year)	TSS Limit Mo avg (lbs/day)	TSS Limit weekly avg (lbs/day)	TSS Limit daily max (lbs/day)	TSS Equivalent Monthly Concentration (mg/L)	TSS Equivalent weekly Concentration (mg/L)	TSS Equivalent Daily Concentration (mg/L)

Evaluate Where Facilities are Relative to their TMDL WLA

- **CAN MEET** – Current discharge is at or below WLAs
- **MAY MEET** – Current discharge is close to WLAs and facility may be able to optimize
- **MINOR UPGRADE** – Add chemical treatment system
- **MAJOR UPGRADE** – Add tertiary treatment (filtration) system
- **SPECIAL CASES** - Upgrade underway, no longer discharging to surface water, new discharge

Permitted Wastewater: Meetings and TMDL Appendices

- Review the TMDL development steps.
- Discuss their TMDL WLA and its expression in their permit.
- Discuss compliance options.
- Discuss their compliance schedule.

Appendix O: Trading and Adaptive Management Information

The purpose of this appendix is to provide additional information to support water quality trading (WQT) and adaptive management (AM). In many cases, the Wisconsin River TMDL expands the geographic extent available for generating WQT credits from just the facility's subbasin to the drainage area of one of the reservoirs. In addition, instead of the downstream reservoirs being the point of standard compliance for AM plan which would eliminate the viability of AM, facilities can evaluate AM at a subbasin scale since subbasin allocations are set to meet the water quality standards of the downstream reservoirs. Throughout this appendix, the use of the word facility refers to individually permitted, wastewater dischargers.

Permitted MS4s: Guidance, Permits, and Administrative Code

MS4 TMDL Implementation
Guidance:

<https://dnr.wi.gov/topic/stormwater/documents/ms4tmdlimpguidance.pdf>

For approved TMDLs, appendices are added to the permit (GP) to cover the TMDL allocations and implementation requirements.

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WPDES Permit No. WI-S050075-3

Appendix A: MS4 Permittees Subject to a TMDL Approved Prior to May 1, 2014 including Applicable Updates

A.1 Applicability and Structure of Appendix.

A.1.1 Applicability. In accordance with section 1.5.2.a, this Appendix A applies to permittees subject to a total maximum daily load (TMDL) approved by the United States Environmental Protection Agency (USEPA) prior to May 1, 2014, that includes the following:

- “Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Rock River Basin,” approved by USEPA September 2011
- “Total Maximum Daily Load and Watershed Management Plan for Total Phosphorus and Total Suspended Solids in the Lower Fox River Basin and Lower Green Bay,” approved by USEPA May 2012
- “Lake St. Croix Nutrient Total Maximum Daily Load,” approved by USEPA August 2012
- “Phosphorus Total Maximum Daily Loads (TMDLs) Tainter Lake and Lake Menomin, Dunn County Wisconsin,” approved by USEPA September 2012

Permitted MS4s: Guidance, Permits, and Administrative Code

[NR 216.07\(10\)\(c\)](#) If the permittee is subject to a US EPA-approved TMDL, the permittee shall evaluate its compliance with the applicable wasteload allocation consistent with the assumptions and requirements outlined in the TMDL. If the permittee cannot demonstrate compliance with the wasteload allocation within the first permit term, then the department may allow a permittee to develop a TMDL implementation plan that extends beyond one permit term for attaining the wasteload allocation. The implementation plan shall include estimated cost, schedules, assumptions, and levels of anticipated pollution control for each action. The TMDL implementation plan shall demonstrate continued progress leading to the attainment of the wasteload allocation as soon as possible. The department may establish numeric and narrative benchmarks within each permit term to ensure continued reduction of the pollutant of concern. In determining the length of time allowed under the TMDL implementation plan, the department shall consider all of the following factors:

1. Whether there is a need for the installation of both structural best management practices and the implementation of operation and maintenance programs to attain the wasteload allocation, and if so, how long it will take to implement taking into account factors including the need to acquire property, the need to remove or replace existing infrastructure, and the ability to obtain the necessary financing.
2. The length of time the permittee has had to attain the wasteload allocation under prior permits.
3. The extent to which the permittee has made good faith efforts to attain the wasteload allocation and other requirements in prior permits, if applicable.
4. The extent to which existing best management practices have proven to be effective in addressing the pollutant of concern covered by the wasteload allocation.
5. Whether the TMDL implementation plan is appropriate and necessary because the permittee cannot attain the wasteload load allocations within the existing permit term

Permitted MS4s: Format and Expression of WLAs

Assigned individual allocations for each subbasin.

Implemented using percent reduction with defined baseline.

The allocated loads again represent delivered loads and as such are not directly transferable to output from WinSLAMM.

Total Phosphorus Allocations by MS4

Table K.S.4. Total phosphorus wasteload allocations for each permitted MS4 and the reaches they drain to.

Municipality	Reach	Area (acres)	Allocation (lbs/year)	Allocation (lbs/day)	Reduction from baseline (%)	Reduction from no-controls (%)
City of Port Washington	S1	2,224	134	0.367	69	73
City of Sheboygan	S10	1,964	72	0.198	57	63
Town of Sheboygan	S10	7	0	0.001	57	63
Town of Wilson	S10	1,262	47	0.127	57	63
Town of Taycheedah	S100	6,423	3	0.008	84	87
Town of Sheboygan	S105	1,497	15	0.041	63	68
Village of Howards Grove	S105	472	5	0.013	63	68
City of Sheboygan	S106	2,374	337	0.922	0	15
Town of Sheboygan	S106	264	37	0.102	0	15
City of Sheboygan	S107	599	86	0.234	0	15
Town of Wilson	S107	51	7	0.020	0	15
City of Sheboygan	S108	121	0	0.001	0	20
Town of Wilson	S108	714	2	0.006	0	20
City of Sheboygan	S11	510	2	0.005	73	77
Town of Wilson	S11	2,953	11	0.031	73	77
City of Port Washington	S110	824	77	0.210	62	67
City of Port Washington	S2	14	0	0.000	90	91

From NE Lakeshore TMDL

Permitted MS4s: Development Process and Meetings

Agenda

- TMDL Background Information
- MS4 TMDL Implementation Guidance
 - Development Process
 - Guidance Structure
 - Modeling
- Present TMDL MS4 TMDL Wasteload Allocations
- MS4 TMDL Implementation Permit Framework
 - Compliance Points
 - Compliance Schedule
 - Demonstrating Compliance
- Moving Forward
- Discussion / Q&A

Slides from Milwaukee Basin TMDL

MS4 Wasteload Allocations

- MS4 wasteload allocations are presented in **Appendix A**, table series:
 - A.22** – Phosphorus (lbs/day)
 - A.23** – Phosphorus (lbs/month)
 - A.24** – TSS (lbs/day)
 - A.25** – TSS (lbs/month)
 - A.26** – Fecal Coliform (billion cells/day)
 - A.27** – Fecal Coliform (billion cells/month)
 - A.28** – Percent Reductions (TP and TSS) by reach
 - A.29** – Percent Reductions (TP and TSS) by MS4
- Fecal coliform load duration curves are presented in **Appendix D**

Agricultural Nonpoint Sources: Administrative Code, Models, and Plans

NR 151.005 Performance standard for total maximum daily loads. A crop producer or livestock producer subject to this chapter shall reduce discharges of pollutants from a livestock facility or cropland to surface waters if necessary to meet a load allocation in a US EPA and state approved TMDL.

(1) A crop producer or livestock producer subject to this chapter shall use the best management practices, conservation practices, or technical standards established under ch. [ATCP 50](#) to meet a load allocation in a US EPA and state approved TMDL.

(2) If compliance with a more stringent or additional performance standard, other than the performance standards contained in this chapter, is required for crop producers or livestock producers to meet a load allocation in a US EPA and state approved TMDL, the department shall use the procedure in s. [NR 151.004](#) to promulgate the more stringent or additional performance standard before compliance is required.

Agricultural Nonpoint Sources: Edge-of-Field Targets

SNAPPLUS YIELD TARGETS

Table 1. Agricultural total phosphorus (TP) and total suspended solids (TSS) yield target for TMDL Subbasins. Targets are comparable to outputs from SnapPlus and correspond to attainment of TMDL agricultural load allocations. The targets are calculated from baseline yields for each TMDL Subbasin and percent reductions for the TMDL Subbasin. Cells with '-' indicate model subbasins that lack sufficient agricultural area to establish a baseline load.

TMDL Subbasin	TP			TSS		
	Baseline (lbs./ac/yr)	% Reduction	Target (lbs./ac/yr)	Baseline (tons/ac/yr)	% Reduction	Target (tons/ac/yr)
1	1.68	88%	0.20	1.71	47%	0.91
2	2.74	79%	0.57	2.72	47%	1.45
3	3.41	79%	0.71	3.29	79%	0.69
4	2.10	88%	0.25	1.80	47%	0.96
5	3.14	74%	0.83	2.64	64%	0.96
6	2.31	88%	0.27	2.33	47%	1.24
7	2.14	88%	0.25	2.16	47%	1.15
8	2.14	83%	0.37	2.30	47%	1.22
9	1.90	88%	0.22	1.94	47%	1.03

Agricultural NPS: Defined Baseline and Feasibility Analysis

- Helps evaluate, prioritize, and identify needed management practices.
- Strengthens reasonable assurance section of the TMDL.

Category	Baseline TMDL practice	Conservation Scenario 1	Conservation Scenario 2
Tillage	Moldboard, chisel + disc, disc, strip or no-till	Dairy and Cash Grain: No till used on all years of crop rotation. Potato and Vegetable include spring cultivation.	Same as #1
Cover Crops	None	Dairy rotation: Winter Rye after corn silage - 2 out of 3 yrs. Cash Grain: small grain cover crop after harvest - 3 out of 6 yrs. Potato/Vegetable: small grain after potato harvest - 1 out of 2 yrs.	Same as #1 Same as #1 Same as #1
Contour Farming	None	Field farmed on contour	Same as #1
Fertilizer Application	Spring or In-Season application	Same as baseline	Same as baseline
Solid Manure Application: method, rate, and timing	Spring or Fall+ Winter application; surface applied or incorporated	No winter application; same baseline timing and rate. No manure incorporation, only surface applied	Same as #1
Liquid Manure Application: method, rate, and timing	Spring or Fall + Winter application; surface applied or incorporated	No winter application; same baseline timing and rate; all liquid manure injected, no surface or incorporation	Same as #1
Dairy Rotation - Forage	Alfalfa: Spring seeding + 3 more alfalfa yrs.	Alfalfa-Grass - Fall or Spring seeding + 3 more alfalfa-grass yrs.	Same as #1
Edge of Field Filter Strip	None	None	Edge of Field Filter Strip established and maintained over crop rotation

Agricultural NPS: Defined Baseline and Feasibility Analysis

Table 6. Wisconsin River Basin TMDL TP Summarized by TMDL Subbasin

WI River TMDL TP Parameters and Rounded Credit Threshold					Interim Floor Calculations		Feasibility Analysis	
TMDL Subbasin	Baseline TP loss lb/ac/yr	TMDL % Reduction	TP Credit Threshold lb/ac/yr	Rounded TP Credit Threshold lb/ac/yr	Conservation Scenario 1 lb/ac/yr	Interim Floor lb/ac/yr	Conservation Scenario 2 lb/ac/yr	
1	3.30	63%	1.19	1.50	0.99	NA	0.59	
2	3.10	63%	1.14	1.50	0.80	NA	0.54	
3	1.20	63%	0.45	0.50	0.37	NA	0.30	
4	2.80	63%	1.02	1.00	0.96	NA	0.71	
5	1.60	63%	0.58	0.50	0.72	0.72	0.50	
6	3.10	63%	1.14	1.50	1.29	1.29	0.85	
7	4.50	75%	1.10	1.50	1.32	1.32	0.81	
8	1.90	63%	0.68	1.00	0.90	0.90	0.58	
9	3.20	75%	0.81	1.00	1.36	1.36	0.85	
10	5.20	77%	1.18	1.50	1.56	1.56	0.92	

Note: Some columns pertain specifically to water quality trading

The Conservation Pyramid

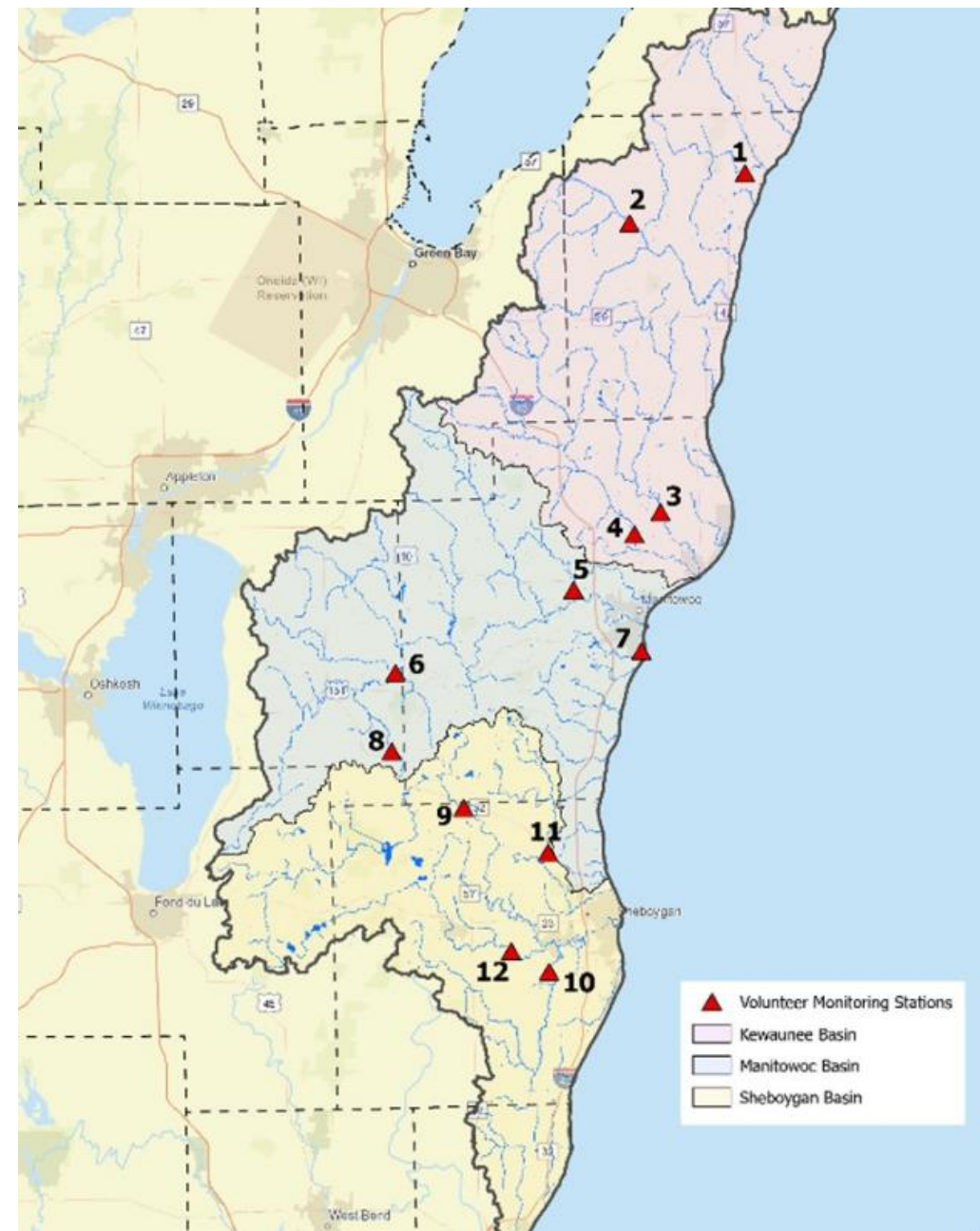
Build the base!!!

Emphasize water quality benefits, agronomic benefits, and better resiliency to extreme weather (climate change).



Implementation Monitoring

1. Engage the public in citizen science and bring public awareness to the water quality issues in the Northeast Lakeshore region.
2. Collect accurate and reliable data.
3. Evaluate nutrient and sediment concentrations in the rivers, streams, and tributaries in the Northeast Lakeshore region.
4. Monitor the health of the watershed over time at a regional scale.
5. Evaluate the long-term effectiveness of implementation of the Northeast Lakeshore TMDL.





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