Minnesota Pollution Control Agency (MPCA) logo and Clean Water Land and Legacy logo

Watershed

[Month and Year of report]

**Draft [Insert Watershed]   
Watershed Total Maximum Daily Load Report [Year]**

A descriptive phrase or sentence in plain language. Tips: Avoid repeating the word “report” if already used above. Active voice is better. Do not use the word “plan.”



*Picture can be inserted in this space. Right click on this picture, choose Change picture, click on the picture you want, then Insert. Resize/Crop the picture to fit this area. Please try to leave same amount of white space above and below. Landscape pictures work best.*

**(Delete this page before submitting to the MPCA for review)**

This template is to be used as a guide for TMDL reports in MN. In addition to overall structure and content, sample language is provided. Whereas this language is not required unless explicitly stated, the language has been reviewed and vetted by MPCA staff, and including it will facilitate MPCA and EPA review. There is flexibility to deviate from the template when there is reason to; please discuss major deviations with an MPCA TMDL writer.

Text in red is explanatory and should be deleted before submitting. Text in black is a mix of required text and example text that may be used in and tailored to TMDL reports; all required text is explicitly called out as such. Some red text is meant to be updated in each report; for example, “No part of the [Name] Watershed is located within the boundary of federally recognized Tribal land.”

Some of the links in this template are only available to MPCA staff. Please contact your MPCA project manager if you would like the linked information.

Below are general recommendations to improve the quality of TMDL reports and better expedite their review. More specific recommendations, including required and example text, are provided throughout this document.

This document is not intended to cover all relevant guidance for completing a TMDL. **Please review** [**All Things TMDL**](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) **at the beginning of a TMDL project for guidance related to TMDLs in Minnesota; other resources are on the MPCA’s** [**TMDL and WRAPS guidance**](https://www.pca.state.mn.us/water/tmdl-project-resources) **webpage.**

* For readability and ease of use we encourage succinct writing with a focus on the essential information necessary to develop and support the TMDL.
* Please use “plain language” as much as possible, as long as scientific integrity is not compromised. Avoid the use of overly technical terms when more simple language can be used instead. For example, avoid using “anthropogenic,” using instead “human-attributed” or “human-made” where possible.
* Prior to submittal to the MPCA for review, TMDLs mustbe carefully checked for spelling, grammar, accuracy of charts and tables, and consistency of any cross-referencing throughout the TMDL report.
* Avoid presenting the same data in multiple tables, graphs, and text. Redundant presentation increases chances of error following revision to underlying data.
* Ensure the proper tense and most current status of activities are used. For example, don’t state “this TMDL report will be used in development of the WRAPS update” if it is being co-noticed with the WRAPS update. Say, “this TMDL report was used in development of the WRAPS update.”
* When inserting URLs in the document, please insert only the most important links and select links that should have the most longevity. Instead of inserting URLs in the body of the report, consider referencing documents in the TMDL report and adding links to the references in the “Literature cited” section.
* Extensive analysis in the areas of fish and macrophyte surveys, and detailed reports addressing hydrology, modeling, limnology, geology, stream channel analysis, habitat, land use, etc. should be included as appendices or, if previously published, by reference.
* Modeling details, including large tables, should be included in an appendix or by reference.
* For load duration curve tables use the following headings to represent flow regimes: **Very High, High, Mid, Low, Very Low.**

Please use sentence case and PCA styles within this template.

Use MS Word’s default **Heading 1** for Contents, Key terms, Executive summary, etc.

These **PCA Report Headings** will be multi-level numbered as 1.; 1.1; 1.1.1; 1.1.1.2; etc.

**PCA Report Heading 1 (with underline) – (Sentence case) Calibri Bold 22, spacing 0/6 pt) (Level 1)**

**PCA Report Heading 2 (Sentence case) Calibri Bold 16, spacing 6 pt/6 pt (Level 2)**

**PCA Report Heading 3 (Sentence case) Calibri Bold 14, spacing 6 pt/6 pt (Level 3)**

**PCA Report Heading 4, standalone (Sentence case) Calibri Bold 12, spacing 6 pt/6 pt (Level 4)**

**PCA Report Heading 4 in-line (Sentence case) Calibri Bold 12, spacing 6 pt/6pt (Level 4)**

**PCA Report Heading 5 (Sentence case) (Level 5)**

**PCA Report Heading 6 (Sentence case) (Level 6)**

PCA Body Text = Calibri 11 spacing 0 points before/6 points after (line spacing multiple 1.15 pt)

Numbered list:

1. This is a PCA numbered list—spacing 0 points before/6 points after (line spacing multiple 1.15 pt)
2. This is a PCA numbered list.
3. This is a PCA numbered list.

PCA Figure/Table title Calibri 10 bold spacing 0 points before/0 points after.

|  |  |  |
| --- | --- | --- |
| PCA Table heading Calibri 10 bold 3/0 | PCA Table heading | PCA Table heading |
| PCA Table text Calibri 10 3/0 | PCA Table text | PCA Table text |
| PCA Table text | PCA Table text | PCA Table text |
| PCA Table text | PCA Table text | PCA Table text |

\*PCA text under Table Calibri 9 spacing 3 pts before/6 points after.

* Table lines = Style: Solid; Color: Automatic; Width: ¼ pt. (PCA Bullet Level 1 style used here)
* Before/after spacing 3/0
* Try to align bottom left first; however, this is flexible due to the different tables we include
* Repeat header on the top of each succeeding page in the table, when possible
* Number figures and tables sequentially, without references to the report section (i.e., Table 1, 2, 3, etc. as opposed to Table 1-1, 1-2, 1-3)

Other TMDL Guidance and Policies are on the MPCA website: [TMDL and WRAPS guidance](https://www.pca.state.mn.us/business-with-us/tmdl-and-wraps-guidance)

### Authors

Principal author

Other author

Other author

### Contributors/acknowledgements

Name

Name

### Editing

Administrative staff

Edit administrative staff name, project phase (EPA Preliminary Review, Public Notice, or Final), and date review complete.

Cover photo credit

# Contents (Heading 1)

[Contents (Heading 1) i](#_Toc160710940)

[List of tables (Heading 1) iv](#_Toc160710941)

[List of figures (Heading 1) v](#_Toc160710942)

[Abbreviations (Heading 1) vi](#_Toc160710943)

[Executive summary (Heading 1) viii](#_Toc160710944)

[1. Project overview (PCA Report Heading 1) 1](#_Toc160710945)

[1.1 Introduction (PCA Report Heading 2) 1](#_Toc160710946)

[1.2 Identification of water bodies 1](#_Toc160710947)

[1.3 Tribal lands 4](#_Toc160710948)

[1.4 Priority ranking 4](#_Toc160710949)

[2. Applicable water quality standards and numeric water quality targets 5](#_Toc160710950)

[2.1 Beneficial uses 5](#_Toc160710951)

[2.2 Narrative and numeric standards 6](#_Toc160710952)

[2.3 Antidegradation policies and procedures 6](#_Toc160710953)

[2.4 [Name] Watershed water quality standards 7](#_Toc160710954)

[3. Watershed and water body characterization 11](#_Toc160710955)

[3.1 Climate trends 11](#_Toc160710956)

[3.2 Lakes 11](#_Toc160710957)

[3.3 Streams 11](#_Toc160710958)

[3.4 Subwatersheds 11](#_Toc160710959)

[3.5 Land use and/or land cover 11](#_Toc160710960)

[3.6 Water quality 11](#_Toc160710961)

[3.7 Pollutant source summary 12](#_Toc160710962)

[3.7.1 [Parameter #1, e.g., *E. coli*] (PCA Report Heading 3) 13](#_Toc160710963)

[3.7.2 [Parameter #2] 20](#_Toc160710964)

[4. TMDL development 21](#_Toc160710965)

[4.1 [Parameter #1] 21](#_Toc160710966)

[4.1.1 Loading capacity methodology 21](#_Toc160710967)

[4.1.2 Boundary conditions 21](#_Toc160710968)

[4.1.3 Load allocation methodology 22](#_Toc160710969)

[4.1.4 Wasteload allocation methodology 22](#_Toc160710970)

[4.1.5 Margin of safety 24](#_Toc160710971)

[4.1.6 Seasonal variation and critical conditions 24](#_Toc160710972)

[4.1.7 Reserve capacity 25](#_Toc160710973)

[4.1.8 Baseline year 25](#_Toc160710974)

[4.1.9 Percent reduction 26](#_Toc160710975)

[4.1.10 TMDL summary 26](#_Toc160710976)

[4.2 [Parameter #2] 28](#_Toc160710977)

[4.2.1 Loading capacity methodology 28](#_Toc160710978)

[4.2.2 Boundary conditions 28](#_Toc160710979)

[4.2.3 Load allocation methodology 28](#_Toc160710980)

[4.2.4 Wasteload allocation methodology 28](#_Toc160710981)

[4.2.5 Margin of safety 28](#_Toc160710982)

[4.2.6 Seasonal variation and critical conditions 28](#_Toc160710983)

[4.2.7 Reserve capacity 28](#_Toc160710984)

[4.2.8 Baseline year 28](#_Toc160710985)

[4.2.9 Percent reduction 29](#_Toc160710986)

[4.2.10 TMDL summary 29](#_Toc160710987)

[5. Future growth considerations 30](#_Toc160710988)

[5.1 New or expanding permitted MS4 WLA transfer process 30](#_Toc160710989)

[5.2 New or expanding wastewater (TSS and *E. coli* TMDLs only) 31](#_Toc160710990)

[6. Reasonable assurance 32](#_Toc160710991)

[6.1 Reduction of permitted sources 32](#_Toc160710992)

[6.1.1 Permitted MS4s 32](#_Toc160710993)

[6.1.2 Permitted construction stormwater 33](#_Toc160710994)

[6.1.3 Permitted industrial stormwater 33](#_Toc160710995)

[6.1.4 Permitted wastewater 33](#_Toc160710996)

[6.1.5 Permitted feedlots 34](#_Toc160710997)

[6.2 Reduction of nonpermitted sources 34](#_Toc160710998)

[6.2.1 SSTS Program 35](#_Toc160710999)

[6.2.2 Feedlot Program 37](#_Toc160711000)

[6.2.3 Minnesota buffer law 38](#_Toc160711001)

[6.2.4 Minnesota Agricultural Water Quality Certification Program 38](#_Toc160711002)

[6.2.5 Section 319 Small Watershed Focus Program 39](#_Toc160711003)

[6.2.6 Minnesota Nutrient Reduction Strategy 39](#_Toc160711004)

[6.2.7 Groundwater Protection Rule 40](#_Toc160711005)

[6.2.8 Conservation easements 41](#_Toc160711006)

[6.2.9 Watershed management organization and district rules and standards 42](#_Toc160711007)

[6.3 Summary of local plans 42](#_Toc160711008)

[6.4 Examples of pollution reduction efforts 43](#_Toc160711009)

[6.5 Funding 43](#_Toc160711010)

[6.6 Other partners and organizations 45](#_Toc160711011)

[6.7 Reasonable assurance conclusion 45](#_Toc160711012)

[7. Monitoring 46](#_Toc160711013)

[8. Implementation strategy summary 47](#_Toc160711014)

[8.1 Permitted sources 47](#_Toc160711015)

[8.1.1 Wastewater 47](#_Toc160711016)

[8.1.2 Municipal separate storm sewer systems 47](#_Toc160711017)

[8.1.3 Construction stormwater 48](#_Toc160711018)

[8.1.4 Industrial stormwater 48](#_Toc160711019)

[8.1.5 Feedlots 49](#_Toc160711020)

[8.2 Nonpermitted sources 49](#_Toc160711021)

[8.2.1 SSTS 49](#_Toc160711022)

[8.2.2 [Additional sections as needed for other sources] 50](#_Toc160711023)

[8.3 Water quality trading 50](#_Toc160711024)

[8.4 Cost 50](#_Toc160711025)

[8.5 Adaptive management 50](#_Toc160711026)

[9. Public participation 52](#_Toc160711027)

[10. Literature cited 53](#_Toc160711028)

[Appendices (Heading 1) 55](#_Toc160711029)

[Appendix A 56](#_Toc160711030)

# List of tables (Heading 1)

[Table 1. Impaired water bodies and impairments in the [Name] Watershed addressed in this TMDL report 3](#_Toc155868172)

[Table 2. Water quality standards for E. coli, TSS, nitrate, and chloride in rivers and streams. 7](#_Toc155868173)

[Table 3. River eutrophication standards for class 2B streams in Minnesota nutrient regions. 8](#_Toc155868174)

[Table 4. Lake eutrophication standards for class 2B lakes, shallow lakes, and reservoirs in Minnesota ecoregions. 8](#_Toc155868175)

[Table 5. Individual wastewater wasteload allocations 23](#_Toc155868176)

[Table 6. Permitted MS4s, estimated regulated area, and TMDL pollutants 23](#_Toc155868177)

[Table 7. Large Lake (XX-XXXX) phosphorus TMDL summary 27](#_Toc155868178)

[Table 8. Mud Creek (07020012-XXX) TSS TMDL summary 27](#_Toc155868179)

[Table 9. SSTS replacements in Fillmore County (2017–2021). 36](#_Toc155868180)

[Table 10. Example BMPs for nonpermitted sources 49](#_Toc155868181)

[Table 11. Impaired water bodies in the [Name] Watershed 57](#_Toc155868182)

# List of figures (Heading 1)

[Figure 1. Number of BMPs per subwatershed (example from Mississippi River–Sartell Watershed); data from the MPCA’s Healthier Watersheds website. To ensure the most current image, please download the image close to the time of finalizing this report and include the years of data that the figure represents. 35](#_Toc155868183)

[Figure 2. Reinvest In Minnesota (RIM) Reserve state-funded conservation easements in the counties that are located in the [Name] Watershed (data from BWSR) 42](#_Toc155868184)

[Figure 3. Spending for watershed implementation projects (example from Mississippi River–Sartell Watershed); data from the MPCA’s Healthier Watersheds website 45](#_Toc155868185)

[Figure 4. Adaptive management 51](#_Toc155868186)

# Abbreviations (Heading 1)

Adapt the following list to match the abbreviations used in your TMDL report.

1W1P One Watershed, One Plan

AU animal unit

BMP best management practice

BWSR Board of Water and Soil Resources

CAFO concentrated animal feeding operation

Chl-*a* chlorophyll-*a*

CRP Conservation Reserve Program

CREP Conservation Reserve Enhancement Program

DNR Minnesota Department of Natural Resources

DO dissolved oxygen

*E. coli Escherichia coli*

EPA U.S. Environmental Protection Agency

EQuIS Environmental Quality Information System

HSPF Hydrologic Simulation Program–Fortran

HUC Hydrologic Unit Code

ITPHS imminent threat to public health and safety

km2 square kilometer

LA load allocation

lb pound

lb/day pounds per day

lb/yr pounds per year

LGU local government unit

m meter

MAWQCP Minnesota Agricultural Water Quality Certification Program

mg/L milligrams per liter

mg/m2-day milligrams per square meter per day

mL milliliter

MDA Minnesota Department of Agriculture

MOS margin of safety

MPCA Minnesota Pollution Control Agency

MS4 municipal separate storm sewer system

NPDES National Pollutant Discharge Elimination System

NRCS Natural Resources Conservation Service

PWP Permanent Wetland Preserve

RIM Reinvest in Minnesota

SDS state disposal system

SSTS subsurface sewage treatment systems

SWCD soil and water conservation district

SWPPP Stormwater Pollution Prevention Plan

TMDL total maximum daily load

TP total phosphorus

TSS total suspended solids

WBIF watershed-based implementation funding

WID water unit identification

WLA wasteload allocation

WRAPS Watershed Restoration and Protection Strategy

WRP Wetland Reserve Program

WQBEL water quality-based effluent limit

μg/L micrograms per liter

# Executive summary (Heading 1)

(High-level overview; ~one page)

Text

1. Project overview (PCA Report Heading 1)
   * + 1. Introduction (PCA Report Heading 2)

Section 303(d) of the federal Clean Water Act requires that total maximum daily loads (TMDLs) be developed for waters that do not support their designated uses. These waters are referred to as “impaired” and are included in Minnesota’s list of impaired water bodies. The term “TMDL” refers to the maximum amount of a given pollutant a water body can receive on a daily basis and still achieve water quality standards. A TMDL study determines what is needed to attain and maintain water quality standards in waters that are not currently meeting those standards. A TMDL study identifies pollutant sources and allocates pollutant loads among those sources. The total of all allocations, including wasteload allocations (WLAs) for permitted sources, load allocations (LAs) for nonpermitted sources (including natural background), and the margin of safety (MOS), which is implicitly or explicitly defined, cannot exceed the maximum allowable pollutant load.

Introduce the watershed and the impairments addressed in this report. Include a watershed map and show where it is in Minnesota (this map may be combined with the map in Section 1.2).

Include project context in relation to previous projects (e.g., TMDLs) or related projects (e.g. WRAPS, monitoring and assessment, stressor identification, modeling). Given that many watersheds have previously completed TMDLs, include a discussion of the relationship between past and current TMDL work, including any relevant regional TMDLs. List previously approved TMDL reports that include impairments and/or watershed area in the watershed of interest. For example, the *Lake Pepin and Mississippi River Eutrophication Total Maximum Daily Load Report* (MPCA 2021) is relevant to many HUC8 watersheds in the Mississippi River Basin even though the impairments are not in the HUC8 watershed of interest. List TMDL reports here with the author and year (e.g., *Lake Pepin and Mississippi River Eutrophication Total Maximum Daily Load Report* (MPCA 2021)) and include the full reference (including the URL) in the literature cited section at the end of the report. Additional information about these related studies should be discussed in the applicable sections throughout this TMDL report. For example, MS4 WLAs from previous reports should be discussed in light of new MS4 WLAs for the same parameter to determine which WLA is more stringent.

Introduce the local partners that had a substantial involvement in the TMDL study.

Text

* + - 1. Identification of water bodies

See Section B.1 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf): *Accounting of TMDLs in impairment tables*.

Provide a table with the water bodies for which TMDLs are developed in this report. **The table must clearly list the impairments that are addressed in this report and what pollutant the TMDL is based on.** For impairments that are not directly pollutant based (e.g., DO, pH, fish, and macroinvertebrates), the text should show the linkage between the impairment and the pollutant on which the TMDL is based. (See Section B.2 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf): *Biological, DO, and pH impairments in TMDL reports*.)

The example table below may be used, and the format of the table may be adapted to the needs of the watershed. Alternatively, the table in Appendix A may be used here instead of in the appendix to document the status of all impairments in the watershed; please review both tables in this template when completing this section. If the impairment count is relatively low, it is preferable to use the table from Appendix A in this section here (Section 1.2) instead of in the appendix. There is no need to list the number of impairments by affected use or by pollutant in the text that accompanies the table.

Include an overview map of the watershed, showing the project boundaries, location within the state of Minnesota, water bodies, counties, cities and townships, tribal lands, watershed districts and watershed management organizations, roads, etc. Please tailor this map to the needs of the project. If there are future TMDLs to discuss, this could be included here; for example, if we are waiting on a site-specific standard for one or more water body.

If applicable, listings for nonpollutant stressors to biological impairments could be mentioned in this section. For example:

Although TMDLs are not developed in this report for nonpollutant stressors to biological impairments, all stressors—not just those with associated TMDLs—are addressed in the concurrently developed Watershed Restoration and Protection Strategies (WRAPS) update. The WRAPS update provides an opportunity to call for environmental improvements in situations where TMDLs alone would not. Nonpollutant stressors include factors such as habitat alteration or flow, and TMDLs are not developed for nonpollutant stressors because they are not subject to load quantification.

Table 1 below and Table 11 in Appendix A (which includes all impairments in this watershed) summarize [Name] Watershed impairments and those addressed by TMDLs in this document.

If applicable, please include this statement: The TMDLs in this report do not replace nor revise previously-approved TMDLs.

Text.

Table 1. Impaired water bodies and impairments in the [Name] Watershed addressed in this TMDL report

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| WID | Water body name | Water body description | Use class | Listing year | Target  completion year | Affected designated use a | Listing Parameter | TMDL Pollutant | Category 4A upon TMDL approval b |
| 13-0083-01 | Goose Lake (North Bay) | 5 miles SW of Rush City | 2B | 2008 | 2015 | AQR | Nutrients | P | Y |
| 58-0117-00 | Rock Lake | Pine City | 2B | 2024 c | 2031 | AQR | Nutrients | P | Y |
| 07010204-556 | Crow River, North Fork | Meeker/Wright County line to Mill Cr | 2Bg | 2012 | 2021 | AQL | TSS | TSS | Y |
| 2012 | 2021 | AQL | Fish bioassessments | TSS | N (inconclusive pollutant stressor remains) |
| 07010204-506 | Crow River, North Fork | Jewitts Cr to Washington Cr | 2Bg | 2012 | 2021 | AQL | Fish bioassessments | TSS | Y |
| 07010204-515 | Mill Creek | Buffalo Lk to N Fk Crow R | 2Bg | 2016 | 2021 | AQL | Nutrients | P | Y |

1. AQR: aquatic recreation; AQL: aquatic life
2. Impairment will be categorized as 4A (impaired and a TMDL study has been approved by EPA) upon approval of this TMDL and will appear as 4A in the next impaired waters list. For a biological impairment to be categorized as 4A, TMDLs for all stressors needed to achieve attainment of applicable water quality standards must be approved by EPA. If there are remaining conclusive stressors, the impairment will remain in category 5 until TMDLs are developed for all conclusive pollutant stressors. (“Impairment” here is defined as a WID–listing parameter combination.)
3. Expected to be listed on the 2024 [insert the year of the next impaired waters list] impaired waters list as impaired.
   * + 1. Tribal lands

Identify tribal lands that are located within the watershed (see Section A.4 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for information on GIS data). For this report the term “tribal lands” shall mean lands within a federally recognized Indian reservation. If the TMDL does not impact any tribal lands and/or waters, include a statement to clarify that this is the case:

The [Name] Watershed is located on the traditional homelands of the [e.g., Dakota Oyate and/or Anishinaabeg; see Section A.4 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for a map to determine traditional homelands]. However, no part of the [Name] Watershed is located within the boundary of federally recognized tribal land, and the TMDL does not allocate pollutant load to any federally recognized Tribal Nation in this watershed.

If tribal lands and/or waters are present within the watershed and are potentially impacted by the TMDL, discuss how the MPCA engaged with the tribes during assessment and listing in addition to during TMDL development. Also discuss how the TMDL may affect those lands and/or waters. (See Appendix E of the [*Guidance Manual for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment*](https://www.pca.state.mn.us/air-water-land-climate/minnesotas-impaired-waters-list)for the MPCA’s approach to assessing and communicating the quality of waters that occur wholly or partially within federally recognized Indian reservations.)

* + - 1. Priority ranking

The Minnesota Pollution Control Agency’s (MPCA’s) TMDL commitments, as indicated on Minnesota’s Section 303(d) impaired waters list, reflect Minnesota’s priority ranking of the impairments addressed in this report. To meet the needs of EPA’s *2022–2032 Vision for the Clean Water Act Section 303(d) Program* (EPA 2022), the MPCA aligned TMDL commitments with the watershed approach and other statewide strategies and initiatives in *Minnesota’s Total Maximum Daily Load Studies Prioritization Framework* (MPCA 2024a). As part of these efforts, the MPCA identified water quality impaired segments to be addressed by TMDLs through the watershed approach and other statewide strategies and initiatives (MPCA 2024b).

* + 1. Applicable water quality standards and numeric water quality targets

The federal Clean Water Act requires states to designate beneficial uses for all waters and develop water quality standards to protect each use. Water quality standards consist of several parts:

* Beneficial uses—Identify how people, aquatic communities, and wildlife use our waters
* Numeric standards—Amounts of specific pollutants allowed in a body of water that still protect it for the beneficial uses (note that EPA uses the phrase “numeric criteria” whereas Minnesota uses the phrase “numeric standards")
* Narrative standards—Statements of unacceptable conditions in and on the water (note that EPA uses the phrase “narrative criteria” whereas Minnesota uses the phrase “narrative standards")
* Antidegradation protections—Extra protection for high-quality or unique waters and existing uses

Together, the beneficial uses, numeric and narrative standards, and antidegradation protections provide the framework for achieving Clean Water Act goals. Minnesota’s water quality standards are in Minn. R. chs. 7050 and 7052.

* + - 1. Beneficial uses

The beneficial uses for waters in Minnesota are grouped into one or more classes as defined in Minn. R. 7050.0140. The classes and associated beneficial uses are:

* Class 1 – domestic consumption
* Class 2 – aquatic life and recreation
* Class 3 – industrial consumption
* Class 4 – agriculture and wildlife
* Class 5 – aesthetic enjoyment and navigation
* Class 6 – other uses and protection of border waters
* Class 7 – limited resource value waters

The Class 2 aquatic life beneficial use includes a tiered aquatic life uses framework for rivers and streams. The framework contains three tiers—exceptional, general, and modified uses.

All surface waters are protected for multiple beneficial uses, and numeric and narrative water quality standards are adopted into rule to protect each beneficial use. TMDLs are developed to protect the most sensitive use of a water body.

* + - 1. Narrative and numeric standards

Narrative and numeric water quality standards for all uses are listed for four common categories of surface waters in Minn. R. 7050.0220. The four categories are:

* Cold water aquatic life and habitat, drinking water, and associated use classes: Classes 1B; 2A, 2Ae, or 2Ag; 3; 4A and 4B; and 5
* Cool and warm water aquatic life and habitat, drinking water, and associated use classes: Classes 1B or 1C; 2Bd, 2Bde, 2Bdg, or 2Bdm; 3; 4A and 4B; and 5
* Cool and warm water aquatic life and habitat and associated use classes: Classes 2B, 2Be, 2Bg, 2Bm, or 2D; 3; 4A and 4B; and 5
* Limited resource value waters: Classes 3; 4A and 4B; 5; and 7

The narrative and numeric water quality standards for the individual use classes are listed in Minn. R. 7050.0221 through 7050.0227. The procedures for evaluating the narrative standards are presented in Minn. R. 7050.0150.

The MPCA assesses surface waters for the following beneficial uses:

* Class 1: Drinking water and aquatic consumption (human health-based standards)
* Class 2: Aquatic life (toxicity-based standards, conventional pollutants, biological indicators)
* Class 2: Aquatic recreation (*E. coli* bacteria, eutrophication)
* Class 2: Aquatic consumption (fish tissue and wildlife-based standards)
* Class 4A: Waters used for production of wild rice
* Class 7: Limited value resource waters (toxicity-based standards, *E. coli* bacteria, conventional pollutants)

Class 2 waters are further broken down into Class 2A and 2B waters. Class 2A waters are protected for the propagation and maintenance of a healthy community of cold water aquatic life and their habitats. Class 2B waters are protected for the propagation and maintenance of a healthy community of cool or warm water aquatic life and their habitats. Both Class 2A and 2B waters are also protected for aquatic recreation activities including bathing and swimming, and for human consumption of fish and other aquatic organisms.

* + - 1. Antidegradation policies and procedures

The purpose of the antidegradation provisions in Minn. R. ch. 7050.0250 through 7050.0335 is to achieve and maintain the highest possible quality in surface waters of the state. To accomplish this purpose:

* Existing uses and the level of water quality necessary to protect existing uses are maintained and protected.
* Degradation of high water quality is minimized and allowed only to the extent necessary to accommodate important economic or social development.
* Water quality necessary to preserve the exceptional characteristics of outstanding resource value waters is maintained and protected.
* Proposed activities with the potential for water quality impairments associated with thermal discharges are consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326.
  + - 1. [Name] Watershed water quality standards

Include a table with designated use classes and all standards/targets applicable to TMDL pollutants in this report (e.g., for chloride, include the chronic, maximum, and final acute value standards). Clearly show which standards/targets were used to develop each TMDL. For water quality standards with multiple parts (e.g., *E. coli*), note which part of the standard is the most stringent and which part of the standard the TMDL is based on (e.g., the chronic or acute standard). Explain that although the TMDL is based on only one part of the standard, both parts of the standard apply. Information on how MPCA assesses certain pollutants may also be included, but please indicate that it is assessment guidance and not part of the water quality standard.

The following table may be adapted; only include parameters and standards for which TMDLs are developed in this report.

Table 2. Water quality standards for *E. coli*, TSS, nitrate, and chloride in rivers and streams.

| **Parameter** | **Water body type** | **Water quality standard** | **Numeric standard** |
| --- | --- | --- | --- |
| *E. coli* | Class 2 (A and B) streams | Not to exceed 126 organisms per 100 milliliters (org/100 mL) as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 1,260 org/100 mL. The standard applies only between April 1 and October 31. | ≤ 126 organisms/100 mL water (monthly geometric mean)  ≤ 1,260 organisms/100 mL water (individual sample) |
| Class 7 streams | Not to exceed 630 org/100 mL as a geometric mean of not less than five samples representative of conditions within any calendar month, nor shall more than 10% of all samples taken during any calendar month individually exceed 1,260 org/100 mL. The standard applies only between May 1 and October 31. | ≤ 630 organisms/100 mL water (monthly geometric mean)  ≤ 1,260 organisms/100 mL water (individual sample) |
| TSS | All Class 2A | 10 mg/L (milligrams per liter); TSS standard may be exceeded for no more than 10% of the time. The standard applies April 1–September 30. | ≤ 10 mg/L |
| Class 2B streams in Northern River Nutrient Region as modified for TSS | 15 mg/L; TSS standards for class 2B may be exceeded for no more than 10% of the time. This standard applies April 1 through September 30. | ≤ 15 mg/L TSS |
| Class 2B streams in Central River Nutrient Region as modified for TSS | 30 mg/L; TSS standards for class 2B may be exceeded for no more than 10% of the time. This standard applies April 1 through September 30. | ≤ 30 mg/L TSS |
| Class 2B streams in Southern River Nutrient Region as modified for TSS | 65 mg/L; TSS standards for class 2B may be exceeded for no more than 10% of the time. This standard applies April 1 through September 30. | ≤ 65 mg/L TSS |
| Nitrate | Class 1B/1C | 10 mg/L; 10mg/L is a federal safe drinking water standard and is incorporated by reference into Minn. R. ch. 7050.0221. | ≤ 10 mg/L |
| Chloride | Class 2B streams | Chronic standard: 230 mg/L  Maximum standard: 860 mg/L  Final acute value: 1,720 mg/L | 230 mg/L |

Table 3. River eutrophication standards for class 2B streams in Minnesota nutrient regions.

Eutrophication standards are compared to summer (June through September) average data.

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **North River Nutrient Region** | **Central River Nutrient Region** | **South River Nutrient Region** |
| Phosphorus, total (μg/L) | ≤ 50 | ≤ 100 | ≤ 150 |
| Chlorophyll-*a* (μg/L) | ≤ 7 | ≤ 18 | ≤ 35 |
| DO flux (mg/L) | ≤ 3.0 | ≤ 3.5 | ≤ 4.5 |
| BOD (mg/L) | ≤ 1.5 | ≤ 2.0 | ≤ 3.0 |
| Periphyton chlorophyll-*a* (mg/m2) a | 150 | 150 | 150 |

Periphyton standard is part of the narrative eutrophication standards (Minn. R. 7050.0222, subp. 2b)

Table 4. Lake eutrophication standards for class 2B lakes, shallow lakes, and reservoirs in Minnesota ecoregions.

Eutrophication standards are compared to summer (June through September) average data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameter** | **Northern Lakes and Forest** Lakes, shallow lakes, and reservoirs | **North Central Hardwood Forest** Lakes and reservoirs | **North Central Hardwood Forest** Shallow lakes | **Western Corn Belt Plains and Northern Glaciated Plains** Lakes and reservoirs | **Western Corn Belt Plains and Northern Glaciated Plains** Shallow lakes |
| Phosphorus, total (μg/L) | ≤ 30 | ≤ 40 | ≤ 60 | ≤ 65 | ≤ 90 |
| Chlorophyll-*a* (μg/L) | ≤ 9 | ≤ 14 | ≤ 20 | ≤ 22 | ≤ 30 |
| Secchi transparency (m) | ≥ 2.0 | ≥ 1.4 | ≥ 1.0 | ≥ 0.9 | ≥ 0.7 |

The following is sample text for select pollutants that can be adapted as applicable:

***E. coli***

There are two *E. coli* numeric standards for class 2 waters—one is applied to monthly *E. coli* geometric mean concentrations, and the other is applied to individual samples. Exceedances of either *E. coli* standard in class 2 waters indicate that a water body does not meet the aquatic recreation designated use. The class 2 standards for *E. coli* apply from April through October. The *E. coli* TMDLs in this report are based on the monthly geometric mean standard of 126 org/100 mL. It is assumed that practices implemented to meet the geometric mean standard will also address the individual sample standard (1,260 org/100 mL), and that the individual sample standard will also be met. Although the TMDLs are based on the monthly geometric mean standard, both standards apply.

**Chloride**

The chronic standard for chloride to protect for class 2B uses is 230 mg/L. The chronic standard is defined in Minn. R. 7050.0218, subp. 3.Q., as “the highest water concentration ... of a toxicant or effluent to which aquatic life, humans, or wildlife can be exposed indefinitely without causing chronic toxicity.” The 230 mg/L value is based on a 4-day exposure of aquatic organisms to chloride. The maximum standard to protect for class 2B uses is 860 mg/L. The maximum standard is defined in Minn. R. 7050.0218, subp. 3.JJ., as “the highest concentration of a toxicant in water to which organisms can be exposed for a brief time with zero to slight mortality.” The 860 mg/L value is based on a 24-hour exposure of aquatic organisms to chloride. The final acute value for chloride to protect for class 2B uses is 1,720 mg/L. The final acute value is defined in Minn. R. 7050.0218, subp. 3.Y as “an estimate of the concentration of a pollutant corresponding to the cumulative probability of 0.05 in the distribution of all the acute toxicity values for the genera or species from the acceptable acute toxicity tests conducted on a pollutant.” These numeric standards are adopted from the EPA's recommended water quality criteria for chloride.

**Phosphorus**

The following text needs to be included for stream phosphorus TMDLs that address river eutrophication standards.

For stream phosphorus TMDLs, in addition to meeting phosphorus standards, the response variables (i.e., chl-*a*, diel dissolved oxygen flux, biochemical oxygen demand, and pH) also need to be met, and clear relationships between the causal factor TP and the response variables have been established. Thus, there is a reasonable probability that by meeting the phosphorus standard, the response variables will be met as well.

The following text needs to be included for all lake phosphorus TMDLs. In addition, omit chlorophyll-*a* and Secchi results from model output.

Lake eutrophication standards in Minnesota differ by ecoregion and by lake depth, and the standards contain numeric standards for phosphorus, which is referred to as the causal variable, and chl-*a* concentration and Secchi disk transparency, which are referred to as the response variables. Chl-*a* concentration is a measure of the amount of suspended algae in a water body. Exceedance of the total phosphorus and either the chl-*a* or Secchi transparency standard indicates that a lake is impaired (Minn. R. ch. 7050, MPCA 2024c).

In developing the lake nutrient standards for Minnesota lakes (Minn. R. ch. 7050), the MPCA evaluated data from a large cross-section of lakes within each of the state’s ecoregions (MPCA 2005). Clear relationships were established between the causal factor TP and the response variables Chl-*a* and Secchi transparency. Based on these relationships there is a reasonable probability that by meeting the phosphorus standard in each lake, the Chl-*a* and Secchi standards will likewise be met.

* + 1. Watershed and water body characterization

Include information relevant to the impairments addressed in this report. Avoid covering background information that is not required and is readily available in other reports (e.g., aquatic plant surveys, watershed monitoring and assessment reports, stressor identification reports).

* + - 1. Climate trends

Discuss trends in precipitation, temperature, and/or other climate components. See [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) Section E.10 for resources.

* + - 1. Lakes

Include a table with morphometric information (including surface area, maximum depth, mean depth, littoral area); identify which are shallow lakes; include ecoregion and subwatershed area.

Text

* + - 1. Streams

Include a table with subwatershed area(s) and other relevant data such as ecoregion, river nutrient region, etc.

Text

* + - 1. Subwatersheds

Describe how subwatershed boundaries of the impaired water bodies were derived. Include map(s) showing subwatersheds for each impaired water body so that it is clear what area is included in the TMDL; if it’s not readily apparent, show drainage patterns.

Text

* + - 1. Land use and/or land cover

Include a summary of current land use and/or land cover by impairment. Use tables and/or maps; include citation/source and year.

Add a brief narrative description of the pre-European settlement or natural conditions of the watershed. Add a brief discussion about when, and to what extent, natural conditions were impacted by which land use changes. Include a pre-European settlement map in addition to the land cover map. (One option for pre-European settlement land cover data is the “[Presettlement vegetation of Minnesota based on Marschner’s original analysis of Public Land Survey notes and landscape patterns](https://gisdata.mn.gov/dataset/biota-marschner-presettle-veg)” GIS layer.)

Text

* + - 1. Water quality

See Section A.2 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for instructions on requesting water quality data from MPCA.

Figures and tables should use at least the most recent 10 years of data; older data can be included to show long term trends; describe sources of flow and water quality data and state the months and date range of data shown; can provide concentrations and/or loads; limit number of figures for lakes by placing all variables—TP, Chl-*a*, Secchi—in one figure, if possible; show the applicable water quality standard for each water body; allow figures/tables to speak for themselves—don’t repeat the numbers in the narrative, but do interpret the data (e.g., trends and conclusions).

Text

* + - 1. Pollutant source summary

In [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf), see Section A.5 for instructions on requesting feedlot and point source information from the MPCA Data Desk and Section C for miscellaneous guidance on pollutant source assessment.

Identify permitted and nonpermitted sources of the pollutant(s) of concern, including location of the source(s) and the quantity of the loading. Please document the source of the information; examples include the following:

* MPCA Data Desk (please include the date that the information was received)
* GIS layer(s)
* If a model is used to estimate sources, please describe the model and reference model documentation/reports.
* Source assessments in previous TMDL reports can be referenced here if the sources and transport mechanisms are similar.

The organization of this section is flexible and will vary based on how many pollutants, how many sources per pollutant, and which sources overlap among pollutants. The following is provided as guidance and sample text to be used in the structure that is selected for the TMDL report.

Please **adapt and add to** the following:

Sources of pollutants in the [Name] Watershed include permitted and nonpermitted sources. The permitted sources discussed here are pollutant sources that require a National Pollutant Discharge Elimination System (NPDES) permit. Nonpermitted sources are pollutant sources that do not require an NPDES permit. Most Minnesota NPDES permits are also state disposal system (SDS) permits; however, some pollutant sources require SDS permit coverage alone without NPDES permit coverage (e.g., spray irrigation, large septic systems, land application of biosolids, and some feedlots).

The phrase “nonpermitted” does not indicate that the pollutants are illegal, but rather that they do not require an NPDES permit. Some nonpermitted sources are unregulated, and some nonpermitted sources are regulated through non-NPDES programs and permits such as state and local regulations.

If there are no permitted sources, please state that. For example: All of the sources are non-permitted; there are currently no *E. coli* pollutant sources that are regulated through NPDES/SDS permits in the [Name] Watershed.

* + 1. [Parameter #1, e.g., *E. coli*] (PCA Report Heading 3)

Text

* + - 1. Permitted sources (PCA Report Heading 4)

Either narrative or table(s)—should not be a list of specific regulated *entities* (those are in the TMDL tables); rather identify the source *categories* (e.g., regulated stormwater, wastewater, CAFOs) by subwatershed and also explain the actual sources within those categories (i.e., rather than just say “stormwater runoff,” state that fecal bacteria come from fecal matter from certain animals; nutrients from grass clippings, leaves, soil, etc.); also briefly describe delivery mechanisms (e.g., runoff during certain times/conditions; sanitary/stormwater cross-connections through pipes); provide estimates or relative magnitudes of loading from identified sources. The following are common categories of NPDES/SDS permitted sources; **adapt as needed**.

Text

Municipal and industrial wastewater

Please see Sections A.5 and A.7 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for data collection on permitted wastewater.

Describe the types of permitted wastewater facilities that have surface disharges in the watersheds of impaired waters (e.g., municipal [pond/controlled vs. mechanical/continuous], industrial, non-contact cooling water, etc.). Facilities without surface discharges do not need to be mentioned. Discuss relevant permit limits and how they relate to the water quality standard. Include other relevant information such as an evaluation of Discharge Monitoring Reports, especially if wastewater is a substantial part of the total pollutant load. This section must include a statement that identifies if there are combined sewer overflows (CSOs) or wastewater releases (often referred to as sanitary sewer overflows [SSOs]) in the project area. This section should not discuss WLAs.

Permitted municipal and industrial wastewater is a source of [list pollutants] in the impairment watersheds. Wastewater is domestic sewage and other wastewater collected and treated by municipalities and industries before being discharged to water bodies as wastewater effluent. Wastewater enters surface water either as treated effluent or sometimes through releases of untreated wastewater.

Text

Municipal separate storm sewer systems

Please see Sections A.5, A.6, and C.2 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for data collection and source assessment on permitted municipal separate storm sewer systems (MS4s).

In addition to cities and townships, entities such as MnDOT, county highway departments, colleges, and jails are covered by MS4 permits across the state when they overlap the urbanized area. Please contact the Stormwater–TMDL Liaison ([Anna.Bosch@state.mn.us](mailto:Anna.Bosch@state.mn.us)) **at the beginning** of each project to verify MS4 permits in the project area.

A municipal separate storm sewer system (MS4) is a conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, storm drains, etc.) that is also:

* Owned or operated by a public entity (which can include the state, cities, townships, counties, or other public body having jurisdiction over disposal of stormwater)
* Designed or used for collecting or conveying stormwater
* Not a combined sewer
* Not part of a publicly owned treatment works

MS4s in Minnesota must satisfy the requirements of the MS4 general permit if they are located in an urban area with a population of 50,000 or more people as determined by the latest Decennial Census by the Bureau of the Census, or owned by a municipality with a population of 10,000 or more, or a population of at least 5,000 and the system discharges to specially classified bodies of water. Minnesota state rule (Minn. R. 7090) establishes criteria and a process for designating MS4s. The MS4 general permit (MNR040000) is designed to reduce the amount of sediment and other pollutants entering state waters from stormwater systems. Entities regulated by the MS4 general permit must develop a stormwater pollution prevention program and adopt best practices.

The Phase II general NPDES/SDS Municipal Stormwater Permit for MS4 communities has been issued to [list permitted MS4s and permit numbers, or put in table] in the Name Watershed. Permitted MS4s can be a source of [list applicable pollutants] to surface waters through the impact of urban systems on stormwater runoff. Stormwater runoff, which delivers and transports pollutants to surface waters, is generated in the watershed during precipitation events.

Text

Construction stormwater

Typically included for TP and TSS TMDLs. Please adapt the following text to your report:

Construction stormwater is regulated through an NPDES/SDS permit. Untreated stormwater that runs off of a construction site often carries sediment to surface water bodies. Because phosphorus travels adsorbed to sediment, construction sites can also be a source of phosphorus to surface waters. Phase II of the stormwater rules adopted by the EPA requires an NPDES/SDS permit for a construction activity that disturbs one acre or more of soil; a permit is needed for smaller sites if the activity is either part of a larger development or if the MPCA determines that the activity poses a risk to water resources. Coverage under the construction stormwater general permit requires sediment and erosion control measures that reduce stormwater pollution during and after construction activities (see Section 8.1.3). Pollutant loading from construction stormwater is inherently incorporated in the watershed runoff estimates and is not considered a significant source [include only if applicable].

Industrial stormwater

Typically included for TP and TSS TMDLs. Please adapt the following text to your report:

Industrial stormwater is regulated through an NPDES/SDS permit when stormwater discharges have the potential to come into contact with materials and activities associated with the industrial activity. Pollutant loading from industrial stormwater is inherently incorporated in the watershed runoff estimates and is not considered a significant source [include only if applicable].

If industrial stormwater is a significant source, please include more details and consider including a table of industrial stormwater sources in an appendix. For example: Appendix F in [Sauk River Watershed TMDL Report 2023](https://www.pca.state.mn.us/sites/default/files/wq-iw8-63e.pdf).

NPDES and SDS permitted animal feedlots

See Section A.5 and C.3 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for information on requesting feedlot information and the use of other available MPCA feedlot data for source assessment. Please use the following text to describe permitted animal feedlots (as applicable).

Feedlots and manure storage areas can be a source of *E. coli* and nutrientsdue to runoff from the animal holding areas or the manure storage areas. Although TMDL reports typically consider only NPDES permitted sources in discussions of permitted sources, this discussion of permitted feedlots includes NPDES and SDS permitted feedlots because of similar discharge requirements.

Concentrated animal feeding operation (CAFO) is a federal definition that implies not only a certain number of animals but also specific animal types. The MPCA uses the federal definition of a CAFO in its permit requirements of animal feedlots along with the state definition of an animal unit (AU). In Minnesota, all CAFOs and non-CAFOs that have 1,000 or more Aus must operate under an NPDES or SDS permit. CAFOs with fewer than 1,000 Aus and that are not required by federal law to maintain NPDES permit coverage may choose to operate without an NPDES permit.

A current manure management plan that complies with Minn. R. 7020.2225 and the respective permit is required for all permitted CAFOs and feedlots with 1,000 or more Aus.

CAFOs and feedlots with 1,000 or more Aus must be designed to contain all manure, manure contaminated runoff, process wastewater, and the precipitation from a 25-year, 24-hour storm event. Having and complying with an NPDES or SDS permit authorizes discharges to waters of the United States and waters of the state (with NPDES permits) or waters of the state (with SDS permits) due to a 25-year, 24-hour precipitation event (approximately x.x inches in the [Name] Watershed [data source: <https://hdsc.nws.noaa.gov/hdsc/pfds/>]) when the discharge does not cause or contribute to nonattainment of applicable state water quality standards. Large CAFOs with fewer than 1,000 Aus that have chosen to forego NPDES permit coverage are not authorized to discharge and must contain all runoff, regardless of the precipitation event. Large CAFOs permitted with an SDS permit are authorized to discharge to waters of the state, although they are not authorized to discharge to waters of the U.S. Therefore, many large CAFOs in Minnesota have chosen to obtain an NPDES permit, even if discharges have not occurred at the facility.

CAFOs are inspected by the MPCA in accordance with the MPCA NPDES Compliance Monitoring Strategy approved by the EPA. All CAFOs (NPDES/SDS permitted, SDS permitted, and not required to be permitted) are inspected by the MPCA on a routine basis with an appropriate mix of field inspections, offsite monitoring, and compliance assistance.

For feedlots with NPDES permits, surface applied solid manure is prohibited during the month of March. Winter application of manure (December through February) requires fields are approved in their manure management plan and the feedlot owner/operator must follow a standard list of setbacks and best management practices (BMPs). Winter application of surface applied liquid manure is prohibited except for emergency manure application as defined by the NPDES permit. “Winter application” refers to application of manure to frozen or snow-covered soils, except when manure can be applied below the soil surface.

Of the approximately [insert number] animal feedlots in the [name] Watershed, there are [insert number] CAFOs with NPDES or SDS permits. All NPDES and SDS permitted feedlots are designed to contain all manure, manure-contaminated runoff, process wastewater, and the precipitation from a 25-year, 24-hour storm event, and as such they are not considered a significant source of [list pollutant(s)]. All other feedlots are accounted for as nonpermitted sources. The land application of all manure, regardless of whether the source of the manure originated from permitted (e.g., CAFOs) or nonpermitted feedlots, is also accounted for as a nonpermitted source.

* + - 1. Nonpermitted sources

Either narrative or table(s)—avoid consolidating all nonpoint sources (e.g., “watershed runoff”). Instead, address separate nonpoint sources including various agricultural sources, watershed runoff from different land cover types, natural background, aquatic invasive species if they affect water quality (e.g., carp, curly-leaf pondweed), and atmospheric deposition. Explain actual sources and delivery mechanisms. Provide estimates or relative magnitudes of loading from identified sources. Include the categories listed here and add additional categories, as applicable.

Text

Watershed runoff

Precipitation that falls in a watershed drains across the land surface, and a portion of it eventually reaches lakes and streams. Pollutants such as fecal bacteria and phosphorus are carried with the runoff water and delivered to surface water bodies. The sources of pollutants in watershed runoff may include soils, fertilizer, vegetation, and livestock, pet, and wildlife waste. A portion of the [list relevant pollutants] in watershed runoff can be considered natural background sources, which are inputs that would be expected under natural, undisturbed conditions.

Explain how watershed runoff was evaluated as a source.

Non-NPDES/SDS permitted animal feedlots and manure application

See Section A.5 and C.3 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for information on requesting feedlot information and the use of other available MPCA feedlot data for source assessment.

Please incorporate the following text to describe nonpermitted feedlots. Add additional information as needed to discuss the nonpermitted feedlots in the project area. Note that some of the language below is relevant only for *E. coli* TMDLs.

Feedlots under 1,000 AUs and those that are not federally defined as CAFOs do not operate with permits. In Minnesota, feedlots with greater than 50 AUs, or greater than 10 AUs in shoreland areas, are required to register with the county feedlot officer if the county is delegated, or with the MPCA if the county is nondelegated. Facilities with fewer AUs are not required to register. Shoreland is defined by Minn. R. 7020.0300 as land within 1,000 feet from the normal high water mark of a lake, pond, or flowage, and land within 300 feet of a river or stream.

Manure that is generated on feedlots is usually stockpiled on site or on crop fields, or stored in liquid manure storage areas on site until field conditions and the crop rotation allow for applying the manure as fertilizer. Manure can be delivered to surface waters from failure of manure containment, runoff from the feedlot itself, or runoff from nearby fields where the manure is applied. The timing of manure spreading, as well as the application rate and method, affects the likelihood of pollutant loading to nearby water bodies. The spreading of manure on frozen soil in the late winter is likely to result in surface runoff with precipitation and snowmelt runoff events. Deferring manure application until snow has melted and soils have thawed decreases overland runoff associated with large precipitation events. Injecting or incorporating manure is a preferred BMP to reduce the runoff of waste and associated pollutants. Incorporating manure into the soil reduces the risk of surface runoff associated with large precipitation events.

Facilities that obtain an interim or construction short form feedlot permit, in addition to feedlots with an operating permit (NPDES or SDS; see Section 3.7.1.1), are required to develop and maintain a manure management plan. Feedlots with more than 300 AUs that use a Commercial Animal Waste Technician to apply their manure and have never obtained a permit are not required to have a manure management plan. [This last sentence is optional.]

While a full accounting of the fate and transport of manure was not conducted for this project, a large portion of it is ultimately applied to the land surface and, therefore, this source is of possible concern. Minn. R. 7020.2225 contains several requirements for land application of manure [for all relevant TMDLs]; however, there are no explicit requirements for *E. coli* treatment prior to land application [for *E. coli* TMDLs only].

All non-CAFOs are inspected in delegated counties by the county feedlot officer on a routine basis in accordance with the delegated county’s Delegation Agreement and Work Plan, which is prepared with and approved by MPCA every other year. Non-CAFOs in nondelegated counties are inspected by MPCA on an as-needed or complaint-driven basis. Consider adding information on delegated counties in project area.

Registered feedlots in the [Name] Watershed are mapped in [link to figure].

Pasture

Include a discussion of pasture if applicable.

Nonpermitted wastewater

See Section A.8 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for information on SSTS compliance rates and areas and communities with SSTS concerns.

The following text may be adapted for use in a TMDL report, as applicable.

Individual subsurface sewage treatment systems

Adequate wastewater treatment is vital to protecting the health, safety, and environment in Minnesota. More than 600,000 Minnesota homes and businesses use subsurface sewage treatment systems (SSTSs). SSTSs that fail to treat wastewater adequately threaten groundwater used for drinking water and surface water used for recreation. Inadequate treatment of wastewater/sewage, which contains bacteria, viruses, parasites, nutrients, and chemicals, can result in contamination of drinking water sources. Additionally, straight-pipe wastewater “systems,” which route raw wastewater to the ground or nearby waters, can directly impact lakes, streams, and wetlands.

SSTSs can fail for a variety of reasons, including excessive water use, poor design, physical damage, and lack of maintenance. Common limitations that contribute to failure include seasonal high water table, fine-grained soils, bedrock, and fragipan (i.e., altered subsurface soil layer that restricts water flow and root penetration). Septic systems can fail hydraulically through surface breakouts or hydrogeologically from inadequate soil filtration. Failure potentially results in higher levels of pollutant loading to nearby surface waters.

Add discussion of failure rates and/or rates of imminent threats to public health and safety (ITPHS) in impairment watershed(s).

Other potential wastewater sources of [pollutant] in the watershed may include straight pipe discharges, earthen pit outhouses, and land application of septage. Straight pipe systems are unpermitted and illegal sewage disposal systems that transport raw or partially treated sewage directly to a lake, stream, drainage system, or the ground surface. Straight pipe systems are required to be addressed 10 months after discovery (Minn. Stat. § 15.55, subd. 11). Outhouses, or privies, are legal disposal systems and are regulated under Minn. R. 7080.2150, subp. 2F and Minn. R. 7080.2280. Septage disposal is regulated under Minn. R. 7080 as well as in local and federal regulations.

Areas and communities with SSTS concerns

To ensure that effective sewage treatment occurs across the state, the MPCA regularly conducts surveys of local governmental units to identify areas in the state that may be areas of concern; these areas are defined as five or more homes within a half mile of each other that have inadequate sewage treatment. These areas are generally unincorporated communities, may not have an organized structure, may consist of families with limited financial resources, and many times do not qualify for the same financial assistance as large incorporated communities. As of [year], there were [number] communities in the impairment watersheds identified as areas and communities with SSTS concerns. The communities may have been listed because they were known to be noncompliant (i.e., imminent threat to public health and safety that backs up into the house or surface discharges inadequately treated wastewater, or a treatment system that is failing to protect groundwater and has a leaky tank or not enough soil separation under the SSTS before reaching saturated soil conditions) or due to an unknown status of SSTS compliance and were listed because of poor soils in the area, small lot size, or are older systems that may be out of compliance.

Natural background sources

The following paragraph is required:

“Natural background” is defined in both Minnesota statute and rule. The Clean Water Legacy Act (Minn. Stat. § 114D.15, subd. 10) defines natural background as “characteristics of the water body resulting from the multiplicity of factors in nature, including climate and ecosystem dynamics, that affect the physical, chemical, or biological conditions in a water body, but does not include measurable and distinguishable pollution that is attributable to human activity or influence.” Minn. R. 7050.0150, subp. 4 states, “‘Natural causes’ means the multiplicity of factors that determine the physical, chemical, or biological conditions that would exist in a water body in the absence of measurable impacts from human activity or influence.”

Please **adapt** the following text to the study area and include the information that was evaluated to determine the extent of natural background sources. If natural background sources were eliminated from consideration, add detail as to why, including the scientific basis for such a conclusion. If natural background was measured, include information on the results. **If natural background sources were not evaluated, the TMDL report should acknowledge and explain why.**

The following is **example text** of an analysis of natural background sources:

Natural background sources are inputs that would be expected under natural, undisturbed conditions. Natural background sources can include inputs from natural geologic processes such as soil loss from upland erosion and stream development, atmospheric deposition, and loading from forested land, wildlife, etc. **[tailor this list]**. However, for each impairment, natural background levels are implicitly incorporated in the water quality standards used by the MPCA to determine/assess impairment, and therefore natural background is accounted for and addressed through the MPCA’s water body assessment process. Natural background conditions were evaluated within the source assessment portion of this study. These source assessment exercises indicate that natural background inputs are generally low compared to livestock, cropland, streambank, wastewater treatment facilities, failing SSTSs, and other anthropogenic sources **[tailor the list to the pollutant and the analysis for this watershed].**

Based on the MPCA’s water body assessment process and the TMDL source assessment exercises, there is no evidence at this time to suggest that natural background sources are a major driver of any of the impairments and/or affect the water bodies’ ability to meet state water quality standards.

Naturalized *E. coli*

For *E. coli* TMDLs, this section of the report is required and should include text describing the naturalized growth of *E. coli* in soil and sediment. This is related to, but distinct from, natural background sources of *E. coli*. If there is microbial source tracking information in the watershed that indicates naturalized *E. coli*, include a discussion of the results here.

The adaptation and evolution of naturalized *E*. *coli* that allow survival and reproduction in the environment make naturalized *E. coli* physically and genetically distinct from *E*. *coli* that cannot survive outside of a warm-blooded host. This naturalized *E. coli* may be a source of *E. coli* to the impairments.

The relationship between *E. coli* sources and *E. coli* concentrations found in streams is complex, involving precipitation and flow, temperature, sunlight and shading, livestock management practices, wildlife contributions, *E. coli* survival rates, land use practices, and other environmental factors. Research in the last 15 years has found the persistence of *E. coli* in soil, beach sand, and sediments throughout the year in the north central United States without the continuous presence of sewage or warm-blooded host sources. This *E. coli* that persists in the environment outside of a warm-blooded host is referred to as naturalized *E. coli* (Jang et al. 2017). Naturalized *E. coli* can originate from different types of *E. coli* sources, including 1) natural background sources such as wildlife and 2) human attributed sources such as pets, livestock, and human wastewater. Therefore, whereas naturalized *E. coli* can be related to natural background sources, naturalized *E. coli* are not always from a natural background source.

An Alaskan study (Adhikari et al. 2007) found that total coliform bacteria in soil were able to survive for six months in subfreezing conditions. Two studies near Duluth, Minnesota found that *E. coli* were able to grow in agricultural field soil (Ishii et al. 2010) and temperate soils (Ishii et al. 2006). A study by Chandrasekaran et al. (2015) of ditch sediment in the Seven Mile Creek Watershed in southern Minnesota found that strains of *E. coli* had become naturalized to the water−sediment ecosystem. Survival and growth of fecal coliform has been documented in storm sewer sediment in Michigan (Marino and Gannon 1991), and *E. coli* regrowth was documented on concrete and stone habitat within an urban Minnesota watershed (Burns & McDonnell Engineering Company, Inc. 2017). This ability of *E. coli* to survive and persist naturally in watercourse sediment can increase *E. coli* counts in the water column, especially after resuspension of sediment (e.g., Jamieson et al. 2005).

If applicable, conclude with the following statement: Although naturalized *E. coli* might exist in the watershed, there is no evidence to suggest that naturalized *E. coli* are a major driver of impairment and/or affect the water bodies’ ability to meet state water quality standards. If not applicable, please contact [Kaity.Taylor@state.mn.us](mailto:Kaity.Taylor@state.mn.us) to discuss options.

* + 1. [Parameter #2]

Text

* + - 1. Permitted sources

Text

* + - 1. Nonpermitted sources

Text

* + 1. TMDL development

Review Section D in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) before starting TMDL development.

The organization of this section will vary based on the similarities and differences in approaches among pollutants in the report. The approach can be separated out by pollutant as is shown here, or certain components can be described for all pollutants. All of the items below need to be addressed, but **the organization can vary**. One option is to add a “TMDL summary” section after this “TMDL development” section, in which all information about an impairment can be brought together—land cover, water quality, sources, TMDL allocations, and implementation recommendations. See the Root River Watershed TMDL report as an example (draft as of January 2024).

A water body’s TMDL represents the loading capacity, or the amount of pollutant that a water body can assimilate while still meeting water quality standards. The loading capacity is divided up and allocated to the water body’s pollutant sources. The allocations include WLAs for NPDES-permitted sources, LAs for nonpermitted sources (including natural background), and an MOS, which is implicitly or explicitly defined. The sum of the allocations and MOS cannot exceed the loading capacity, or TMDL.

* + - 1. [Parameter #1]
    1. Loading capacity methodology

Identify any models used; explain why they were selected; and explain how they were developed, calibrated, and validated and used in the TMDL analysis. Indicate whether inputs (e.g., flows) are based on measured vs. simulated data. Supporting modeling reports should be referenced and provided on the project webpage or included as an appendix.

If tribal lands or other states or Canada are in the watershed of an impaired water body, explain how these lands are accounted for in the TMDL (e.g., allocated to a boundary condition in the TMDL table; see Section D.1 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf)).

When EPA approves a load duration curve TMDL they are actually approving the curve itself as the TMDL, not just the midpoints typically shown in TMDL tables. Below is text that should be used to explain this. Note on a map the location of the flow station used for generating the curve, especially for larger TMDLs with several sampling points.

The load duration curve method is based on an analysis that encompasses the cumulative frequency of historical flow data over a specified period. Because this method uses a long-term record of daily flow volumes, virtually the full spectrum of allowable loading capacities is represented by the resulting curve. In the TMDL equation tables of this report, only five points on the entire loading capacity curve are depicted (the midpoints of the designated flow zones). However, the entire curve represents the TMDL and is what the EPA ultimately approves.

Text

* + 1. Boundary conditions

Include this section if applicable. Please see Section D.1 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf).

Boundary conditions (BCs) are used to set aside load for a geographic area in a TMDL watershed without establishing LAs or WLAs for that area. If part of an impairment watershed is in another state (or tribe or country), a BC allocates a lump sum load to the area that does not fall under Minnesota’s jurisdiction. Minnesota cannot establish allocations for other jurisdictions, and any reductions noted in this TMDL that are needed in the neighboring jurisdiction are consistent with Minnesota’s water quality standards and not more stringent.

Describe how allocations for boundary conditions were developed.

* + 1. Load allocation methodology

The LA is allocated to existing or future nonpermitted pollutant sources.

Describe how the LA was calculated. If individual LAs are based on modeling outputs, state this and reference an appendix or other modeling documentation. This section should not include detail about how *existing* pollutant loads were calculated (e.g., internal loading); that information is part of the source assessment (Section 3.7).

After describing the LA methodology, include a discussion of natural background and how it is accounted for in the TMDL table(s). Be very specific about the process and scientific basis for either eliminating natural background from the LA, for lumping it with nonpoint sources, or for giving natural background a separate allocation.) Example text:

Natural background conditions were also evaluated, where possible, within the modeling and source assessment portion of this study (Section 3.7.1.2). For all impairments addressed in this TMDL report, natural background sources are implicitly included in the LA portion of the TMDL tables, and reductions should focus on the major human attributed sources identified in the source assessment.

Text

* + 1. Wasteload allocation methodology

The WLA is allocated to existing or future NPDES-permitted pollutant sources.

Describe how the WLA was separated from the LA and how individual WLAs were developed. Include enough description to explain why this is an appropriate/justifiable way to assign allowable loads. If a categorical WLA is used, provide a justification for using that approach.

Please include the following statement if applicable: If a permittee that is assigned a WLA in this report has previously been assigned one or more WLAs for the same pollutant for another TMDL, the applicable permit(s) and/or associated planning documents will need to address the most restrictive WLA.

The following are common categories of WLAs.

* + - 1. Municipal and industrial wastewater

Please see Sections A.5 and A.7 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for data collection on permitted wastewater, and Section D.3.a for the relationship between WLAs and permit limits.

For permitted wastewater, describe how the WLAs were developed, which flows were used, or if permit limits (loads) were used. State whether the existing permit limits are consistent with WLA assumptions:

The following wastewater discharges have existing permit limits that are not consistent with the WLA [or: do not include limits or monitoring requirements for the TMDL pollutants(s)] (Table 2): [list]. At permit reissuance, the need for WQBELs and/or additional monitoring requirements will be considered by permitting staff.

Include the following information, preferably in table format:

Table 5. Individual wastewater wasteload allocations

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Facility name | Permit number | Surface discharge station | Design flow a | Impaired water body WID | Pollutant | Permit limit | Wasteload allocation | Existing permit consistent with WLA assumptions |
|  |  |  |  |  |  |  |  | [Y/N] |
|  |  |  |  |  |  |  |  |  |

1. Flow used to calculate the WLA. If this flow differs from the permit’s design flow, explain why.
   * + 1. Municipal separate storm sewer systems

See Section D.4 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for guidance on MS4 WLA development. Describe how the permitted area was estimated and how the WLA was determined. Include a map(s) that shows the permitted MS4 areas, and include the following information, preferably in table format (similar information may be included for cities and townships that are not permitted MS4s; this information could facilitate future MS4 WLA transfers):

Table 6. Permitted MS4s, estimated regulated area, and TMDL pollutants

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MS4 name and permit number | Estimated regulated area (ac or other units) | Impaired water body | Impaired water body WID | Pollutant |
|  |  |  |  |  |
|  |  |  |  |  |

A variation of this statement must be included: Assigned WLAs will [or will not] result in additional MS4 permit requirements per the next MS4 General Permit.

* + - 1. Construction stormwater

WLAs for permitted construction stormwater are typically included for TP, TSS, and oxygen demand TMDLs. See Section D.5 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for guidance on WLA development for construction stormwater.

For *E. coli* TMDLs, include the following: WLAs for regulated construction stormwater (MNR100001) are not developed in Minnesota because *E. coli* is not a typical pollutant from construction sites.

* + - 1. Industrial stormwater

WLAs for permitted industrial stormwater are typically included for TP and TSS TMDLs and may be included for oxygen demand and pH TMDLs. See Section D.6 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for guidance on WLA development for industrial stormwater, including permit types that must be addressed by WLAs.

For *E. coli* TMDLs, include the following: Industrial stormwater receives a WLA only if the pollutant is part of benchmark monitoring for an industrial site in the watershed of an impaired water body. There are no fecal bacteria or *E. coli* benchmarks associated with the industrial stormwater general permit (MNR050000), and therefore industrial stormwater *E. coli* WLAs were not assigned.

* + - 1. NPDES/SDS permitted animal feeding operations

WLAs are not assigned to CAFOs, including CAFOs with NPDES or SDS permits, and CAFOs not requiring permits; this is equivalent to a WLA of zero. Although the NPDES and SDS permits allow discharge of manure and manure contaminated runoff due to a precipitation event greater than or equal to a 25-year, 24-hour precipitation event, the permits prohibit discharges that cause or contribute to nonattainment of water quality standards.

All other non-CAFO feedlots and the land application of all manure are accounted for in the LA for nonpermitted sources.

* + 1. Margin of safety

The MOS accounts for uncertainty concerning the relationship between water quality and allocated loads. The MOS may be implicit (i.e., incorporated into the TMDL through conservative assumptions in the analysis) or explicit (i.e., expressed in the TMDL as a load set aside).

For implicit MOS, discussion is needed on why the conservative assumptions are conservative. Do they overestimate loadings, or underestimate reductions? For explicit MOS, why is X% considered sufficient (and/or why would a higher percentage not be needed)? Do not base the justification for the explicit MOS percentage on the fact that other TMDLs have used it or that EPA has approved that level in the past. Factors that may be included in the MOS discussion include modeling, monitoring data, and *E. coli* die-off and regrowth. See Section D.7 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for guidance on margin of safety.

Text

* + 1. Seasonal variation and critical conditions

TMDLs must be established with consideration of seasonal variations, and the report must describe the method chosen for including seasonal variations.

TMDLs must take into account critical conditions for stream flow, loading, and water quality parameters as part of the analysis of loading capacity. TMDLs should define applicable critical conditions and describe the approach to estimating point and nonpoint source loadings under the critical conditions.

These two components are often related and therefore discussed together in the report. If this is not the case, they may be discussed separately.

The application of LDCs in the *E. coli* TMDLs addresses seasonal variation and critical conditions. LDCs evaluate pollutant loading across all flow regimes including high flow, which is when pollutant loading from watershed runoff is typically the greatest, and low flow, which is when loading from direct sources to the stream typically has the most impact. Because flow varies seasonally, LDCs address seasonality through their application across all flow conditions in the impaired water body.

Seasonal variations are addressed in lake TMDLs by assessing conditions during the summer growing season, which is when the water quality standards apply (June 1 through September 30). The frequency and severity of nuisance algal growth in Minnesota lakes is typically highest during the growing season. The nutrient standards set by the MPCA—which are a growing season concentration average, rather than an individual sample (i.e., daily) concentration value—were set with this concept in mind. Additionally, by setting the TMDL to meet targets established for the most critical period (summer), the TMDL will inherently be protective of water quality during all other seasons.

Seasonal variation and critical conditions are also addressed by the water quality standards. Adapt the following to the pollutants relevant to your report: The *E. coli* standards for aquatic recreation apply from April through October, and the eutrophication standards for lakes apply from June through September. These time periods are when aquatic recreation is more likely to occur in Minnesota waters and when high *E. coli* and phosphorus concentrations generally occur. The TSS standard for aquatic life applies from April through September, when aquatic organisms are most active and when high stream TSS concentrations generally occur.

* + 1. Reserve capacity

See Section D.11 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for guidance on reserve capacity. Include if necessary for future wastewater discharges. This section may be removed if reserve capacity is not established in the TMDLs. The following may be used and adapted if the EPA reviewer requests justification of no reserve capacity:

A reserve capacity was not assigned in these TMDLs. Reserve capacity in Minnesota TSS and *E. coli* TMDLs is not needed for new or expanding wastewater dischargers whose permitted effluent limits are at or below the instream target. A reserve capacity also is not warranted for the phosphorus TMDLs in this report. In the impairment watersheds, the existing population centers that are not currently served by permitted wastewater treatment facilities do not have sufficient population density to justify the use of reserve capacity.

Future increases in permitted stormwater are not typically addressed here; they are usually addressed by LA to WLA transfers, as outlined in Section 5.1.

Text

* + 1. Baseline year

Include baseline year from which reductions are based. The baseline year must be included in any TMDL that has MS4 WLAs, but can be included in all TMDLs. The baseline year is often the midpoint of the 10-year period used in the water quality data assessment (Section 3.6).

* + 1. Percent reduction

See Section D.8 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for guidance on percent reductions in TMDLs.

Describe how the overall percent reduction needed to meet the standard was calculated. Include the following text in the discussion:

The estimated percent reductions provide a rough approximation of the overall reduction needed for the water body to meet the TMDL. The percent reduction is a means to capture the level of effort needed to reduce [pollutant] concentrations [or loads] in the watershed. The percent reductions should not be construed to mean that each of the separate sources listed in the TMDL table needs to be reduced by that amount.

* + 1. TMDL summary

The TMDL table can be for each impaired water body and pollutant or for multiple water bodies. It is preferable to use a consistent approach to rounding the values in the table (e.g., a specific number of significant digits or a specific number of decimal places) and state the approach. See Section D.12 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for more information about rounding in TMDL tables.

Text

TMDL summary table requirements (example below):

* Include the full WID in the title of the table.
* Include the year that the impairment was added to the impaired waters list.
* The baseline year must be provided with all TMDL tables that have MS4 WLAs, although baseline year can be included in all TMDLs.
* Include the numeric standard that was used to calculate the TMDL.
* All listed permits must include permit numbers, and all individual WLAs should be included in the TMDL table. If there are more than 25 permittees then a separate table may be used. That table should be placed immediately below the related TMDL summary table.
* Where feasible, all information regarding existing load for allocated sources should be in the same table.
* For lake TMDLs, the total estimated load reduction can be either the total existing load minus the total allowable load (220 in the example table below), or the sum of the individual load reductions (239 lb/yr in the example table below); the difference between these two options is the MOS. Either way, describe the method used, and use the same method to calculate the total percent reduction.
* Using the table format shown below allows for fewer errors between multiple tables. Please use the same TMDL table format across the entire report.
* Tables should be tables in the Word document and not images.

**Example lake TMDL table:** This format should be used if the existing loads are shown in addition to the allowable loads. Although including existing loads by source in TMDL tables is not required, it is preferred because it will allow the tracking of existing loads and load reductions needed for certain TMDLs on a Watershed Program level. If permitted MS4s are assigned allocations, please include the existing MS4 phosphorus load. The categories under LA are examples only and do not need to be included in every TMDL; only include them if there is sufficient information to estimate.

Table 7. Large Lake (XX-XXXX) phosphorus TMDL summary

* Listing year or proposed year: 2008
* Baseline year: 2010
* Numeric standard used to calculate TMDL: 40 µg/L TP
* TMDL and allocations apply XXX–XXX [list months; e.g., Jan–Dec is most common for lakes]; see Section D.2 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| TMDL parameter | | Existing TP load | | TMDL TP load | | Estimated load reduction | |
| lbs/year | lbs/day | lbs/year | lbs/day | lbs/year | % |
| WLA | Construction stormwater | 0.885 | 0.00243 | 0.885 | 0.00243 | 0 | 0 |
| Industrial stormwater | 0.885 | 0.00243 | 0.885 | 0.00243 | 0 | 0 |
| Blue County (MS400XXX) | 1.32 | 0.00362 | 0.475 | 0.00130 | 0.845 | 64 |
| Green City (MS400XXX) | 288 | 0.789 | 115 | 0.315 | 173 | 60 |
| Red City (MS400XXX) | 29.3 | 0.080 | 9.96 | 0.0273 | 19.3 | 66 |
| **Total WLA** | **320** | **0.877** | **127** | **0.348** | **193** | **60** |
| LA | Watershed runoff | 10.8 | 0.0296 | 4.86 | 0.0133 | 5.94 | 55 |
| SSTS | 46.3 | 0.127 | 23.2 | 0.0636 | 23.1 | 50 |
| Atmospheric deposition | 42.1 | 0.115 | 42.1 | 0.115 | 0 | 0 |
| Internal load | 174 | 0.477 | 157 | 0.430 | 17.0 | 10 |
| **Total LA** | **273** | **0.749** | **227** | **0.622** | **46.0** | **17** |
| MOS | | – | – | 18.7 | 0.0510 | – | – |
| Total load | | 593 | 1.63 | 373 | 1.02 | 220 | 37 |

**Example stream TMDL table using a load duration curve approach:**

Table 8. Mud Creek (07020012-XXX) TSS TMDL summary

* Listing year or proposed year: 2010
* Baseline year: 2012
* Numeric standard used to calculate TMDL: 65 mg/L TSS
* TMDL and allocations apply XXX–XXX [list months; e.g., Apr–Sep for TSS TMDLs]; see Section D.2 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf).

|  | | TMDL TSS load (tons/day) by flow zone | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| TMDL parameter | | Very high | High | Mid | Low | Very low |
| **WLA** | Construction stormwater | 0.21 | 0.050 | 0.016 | 0.0026 | \* |
| Industrial stormwater | 0.21 | 0.050 | 0.016 | 0.0026 | \* |
| Big City MS4 (MS400XXX) | 1.3 | 0.29 | 0.094 | 0.014 | \* |
| Little City MS4 (MS400XXX) | 0.026 | 0.0061 | 0.0019 | 0.00029 | \* |
| Big City WWTP (MN000XXXX) | 0.58 | 0.58 | 0.58 | 0.58 | \* |
| **Total WLA** | 2.3 | 0.98 | 0.71 | 0.60 | \* |
| **LA** | **Total LA** | 115 | 28 | 8.5 | 1.4 | \* |
| **MOS** | | 6.2 | 1.5 | 0.49 | 0.11 | 0.021 |
| **TMDL** | | 123 | 30 | 9.7 | 2.1 | 0.41 |
| **Existing 90th percentile concentration (mg/L)** | | 616 | | | | |
| **Estimated percent reduction** | | 89% | | | | |

\* The permitted wastewater design flows exceed the stream flow in the indicated flow zone(s). The allocations are expressed as an equation rather than an absolute number: allocation = (flow contribution from a given source) x 65 mg/L (or NPDES/SDS permit concentration). See section X.XX for more detail.

* + - 1. [Parameter #2]
    1. Loading capacity methodology

Text

* + 1. Boundary conditions

Text

* + 1. Load allocation methodology

Text

* + 1. Wasteload allocation methodology

Text

* + 1. Margin of safety

Text

* + 1. Seasonal variation and critical conditions

Text

* + 1. Reserve capacity

Include if necessary, otherwise delete.

Text

* + 1. Baseline year

Text

* + 1. Percent reduction

Text

* + 1. TMDL summary

Text

* + 1. Future growth considerations

Include future growth discussion. For example, briefly describe the potential likely growth and cite references such as census projections, land use, or local development plans for the area. Potential data sources include, but are not limited to, the following:

* U.S. Census data, for example:
* County estimates: <https://www.census.gov/data/tables/time-series/demo/popest/2010s-counties-total.html>
* City estimates: <https://www.census.gov/data/tables/time-series/demo/popest/2010s-total-cities-and-towns.html>
* Minnesota State Demographic Center (e.g., <https://mn.gov/admin/demography/data-by-place/>, https://mn.gov/admin/demography/data-by-topic/population-data/our-projections/)
* Metropolitan Council (for Twin Cities Metropolitan Area):
* Regional and local forecasts: <https://metrocouncil.org/Data-and-Maps/Data/CouncilResearchProducts/Council-Forecasts.aspx>
* County water plans, 1W1Ps, city comprehensive plans
  + - 1. New or expanding permitted MS4 WLA transfer process

The following language is required for all TMDLs, even if there are no MS4 WLAs in the current report.

Future transfer of watershed runoff loads in this TMDL may be necessary if any of the following scenarios occur within the project watershed boundaries.

1. New development occurs within a permitted MS4. Newly developed areas that are not already included in the WLA must be transferred from the LA to the WLA to account for the growth.
2. One permitted MS4 acquires land from another permitted MS4. Examples include annexation or highway expansions. In these cases, the transfer is WLA to WLA.
3. One or more nonpermitted MS4s become permitted. If this has not been accounted for in the WLA, then a transfer must occur from the LA.
4. Expansion of a U.S. Census Bureau Urban Area with population over 50,000 encompasses new regulated areas for existing permittees. An example is existing state highways that were outside an urban area at the time the TMDL was completed, but are now inside a newly expanded urban area. This will require either a WLA to WLA transfer or a LA to WLA transfer.
5. A new MS4 or other stormwater-related source is identified and is covered under an NPDES/SDS permit. In this situation, a transfer must occur from the LA.

Load transfers will be based on methods consistent with those used in setting the allocations in this TMDL. [Specify method, if needed; e.g., “Loads will be transferred on a simple land area basis.”] In cases where WLA is transferred from or to a permitted MS4, the permittees will be notified of the transfer and have an opportunity to comment.

* + - 1. New or expanding wastewater (TSS and *E. coli* TMDLs only)

The following language is required for all TSS and *E. coli* TMDLs. See Section D.3.c in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for more information.

The MPCA, in coordination with the EPA Region 5, has developed a streamlined process for setting or revising WLAs for new or expanding wastewater discharges to water bodies with an EPA approved TMDL for TSS or *E. coli* (described in MPCA 2012). This procedure will be used to update WLAs in approved TMDLs for new or expanding wastewater dischargers whose permitted effluent limits are at or below the instream target and will ensure that the effluent concentrations will not exceed applicable water quality standards or surrogate measures. The process for modifying any and all WLAs will be handled by the MPCA, with input and involvement by the EPA, once a permit request or reissuance is submitted. The overall process will use the permitting public notice process to allow for the public and EPA to comment on the permit changes based on the proposed WLA modification(s). Once any comments or concerns are addressed, and the MPCA determines that the new or expanded wastewater discharge is consistent with the applicable water quality standards, the permit will be issued and any updates to the TMDL WLA(s) will be made.

* + 1. Reasonable assurance

“Reasonable assurance” shows that elements are in place, for both permitted and nonpermitted sources, that are making (or will make) progress toward needed pollutant reductions.

* + - 1. Reduction of permitted sources

Adapt the sections provided here, as applicable. Do not include sections for sources not applicable to the TMDL.

* + 1. Permitted MS4s

Adapt the following language, as applicable:

The MPCA is responsible for applying federal and state regulations to protect and enhance water quality in Minnesota. The MPCA oversees stormwater management accounting activities for all permitted MS4 entities listed in this TMDL report. The MS4 General Permit requires regulated municipalities to implement BMPs that reduce pollutants in stormwater to the maximum extent practicable. A critical component of permit compliance is the requirement for the owners or operators of a permitted MS4 conveyance to develop a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP addresses all permit requirements, including the following six measures:

* Public education and outreach
* Public participation
* Illicit discharge detection and elimination program
* Construction site runoff controls
* Post-construction runoff controls
* Pollution prevention and municipal good housekeeping measures

A SWPPP is a management plan that describes the MS4 permittee’s activities for managing stormwater within their regulated area. In the event of a completed TMDL study, MS4 permittees must document the WLA in their future NPDES/SDS permit application and provide an outline of the BMPs to be implemented that address needed reductions. The MPCA requires MS4 owners or operators to submit their application and corresponding SWPPP document to the MPCA for review. Once the application and SWPPP are deemed adequate by the MPCA, all application materials are placed on 30-day public notice, allowing the public an opportunity to review and comment on the prospective program. Once NPDES/SDS permit coverage is granted, permittees must implement the activities described within their SWPPP and submit an annual report to the MPCA documenting the implementation activities completed within the previous year, along with an estimate of the cumulative pollutant reduction achieved by those activities.

This TMDL report assigns WLAs to permitted MS4s in the study area. Depending on the pollutant, the MS4 General Permit either requires permittees to implement specific permit items or to develop compliance schedules for EPA approved TMDL WLAs not already being met at the time of permit application. A compliance schedule includes BMPs that will be implemented over the permit term, a timeline for their implementation, and a long-term strategy for continuing progress towards assigned WLAs. For WLAs being met at the time of permit application, the same level of treatment must be maintained in the future. Regardless of WLA attainment, all permitted MS4s are still required to reduce pollutant loadings to the maximum extent practicable.

The MPCA’s stormwater program and its NPDES/SDS permit program are regulatory activities providing reasonable assurance that implementation activities are initiated, maintained, and consistent with WLAs assigned in this study.

* + 1. Permitted construction stormwater

Regulated construction stormwater was given a categorical WLA is this study. Construction activities disturbing one acre or more are required to obtain NPDES/SDS permit coverage through the MPCA. Compliance with TMDL requirements are assumed when a construction site owner/operator meets the conditions of the Construction General Permit and properly selects, installs, and maintains all BMPs required under the permit, including any applicable additional BMPs required in Section 23 of the Construction General Permit for discharges to impaired waters, or compliance with local construction stormwater requirements if they are more restrictive than those in the State General Permit.

Adapt the above language if *individual* WLAs for construction stormwater are assigned.

* + 1. Permitted industrial stormwater

Industrial stormwater was given a categorical WLA in this study. Industrial activities require permit coverage under the state's NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) or NPDES/SDS Nonmetallic Mining and Associated Activities General Permit (MNG490000). If a facility owner/operator obtains stormwater coverage under the appropriate NPDES/SDS permit and properly selects, installs, and maintains BMPs sufficient to meet the benchmark values in the permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL report.

Adapt the above language if *individual* WLAs for industrial stormwater are assigned.

* + 1. Permitted wastewater

Can also include information from Healthier Watersheds website: [Wastewater treatment plant progress](https://www.pca.state.mn.us/water/wastewater-treatment-plant-progress)

Any NPDES/SDS permitted facility discharging wastewater that has a reasonable potential to cause or contribute to the water quality impairments addressed by these TMDLs include, or will include upon permit reissuance, water quality based effluent limits that are consistent with the assumptions and requirements of these TMDL WLAs. [Consider adding more information applicable to specific permits, or referencing report section where it is discussed.] Discharge monitoring is conducted by permittees and routinely submitted to the MPCA for review.

NPDES/SDS permits for discharges that may cause or have reasonable potential to cause or contribute to an exceedance of a water quality standard are required to contain water quality-based effluent limits (WQBELs) consistent with the assumptions and requirements of the WLAs in this TMDL report. Attaining the WLAs, as developed and presented in this TMDL report, is assumed to ensure meeting the water quality standards for the relevant impaired waters listings. During the permit issuance or reissuance process, wastewater discharges will be evaluated for the potential to cause or contribute to violations of water quality standards. WQBELs will be developed for facilities whose discharges are found to have a reasonable potential to cause or contribute to exceedances of applicable water quality standards. The WQBELs will be calculated based on low flow conditions, may vary slightly from the TMDL WLAs, and may include concentration based effluent limitations.

Chloride TMDL Reasonable Assurance—required language in chloride TMDLs:

For municipal wastewater facilities, technologies capable of removing chloride from wastewater at the wastewater facility are typically cost-prohibitive. Some cities may be able to achieve compliance with the final chloride effluent limit by installing centralized softening and taking action to remove chloride sources, which may include encouraging or requiring removal of residential and commercial ion exchange water softeners or the replacement of ion exchange softeners with high efficiency softeners.

For cities that identify a viable path to compliance (whether via wastewater treatment upgrades, central softening, or removal of chloride sources), compliance schedules may be included in their NPDES/SDS permits, giving them time to take the necessary actions to comply with the final limit. For cities where compliance would result in substantial and widespread economic and social impact, a city may qualify for a variance (40 CFR 131.14 and Minn. R. 7050.0190). A variance would provide time for the respective city to work on identifying sources of chloride, making source reductions (including non-point reductions), and evaluating treatment options while still being required to comply with an alternate effluent limit (a limit set to ensure that chloride levels do not increase). Variances are re-evaluated every five years to ensure that complying with the limit would still result in substantial and widespread economic and social impact and that the alternate effluent limit is representative of the highest quality effluent that is attainable by the permittee. If the conditions upon which the variance was issued are still in effect, the variance may be extended. The permittee is required to comply with the final limit for total chloride at the end of the variance term.

* + 1. Permitted feedlots

See the discussion of the state’s Feedlot Program in Section 6.2.2, which applies to both permitted and nonpermitted feedlots.

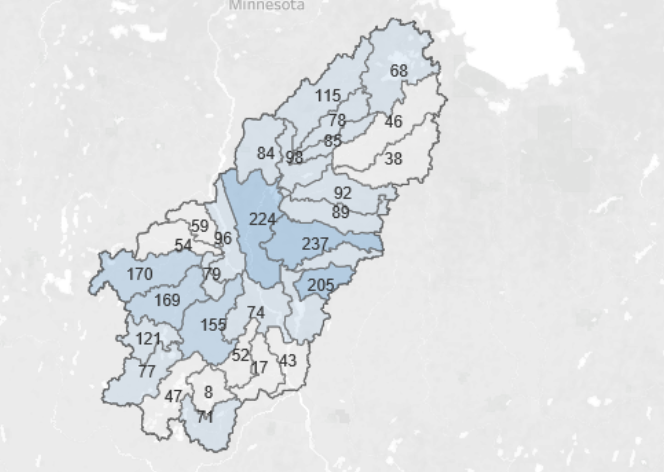
* + - 1. Reduction of nonpermitted sources

For nonpoint sources, reasonable assurance that water quality will be improved should include the following elements:

1. Availability of reliable means of addressing pollutant loads (e.g., BMPs)
2. A means of prioritizing and focusing management
3. Development of a strategy for implementation
4. Availability of funding to execute projects
5. A system of tracking progress and monitoring water quality response
6. Nonpoint source pollution reduction examples at multiple scales

Examples from the project watershed of each of the above elements should be included in the discussions that follow, as applicable. The EPA requires examples of nonpoint source pollution reductions; the examples can be at various scales, e.g. statewide, regional, and local. The intent is to provide confidence that similar projects/programs/etc. will result in nonpoint source pollutant reduction in the future.

Several nonpermitted reduction programs exist to support implementation of nonpoint source reduction BMPs in the [Name] Watershed. These programs identify BMPs, provide means of focusing BMPs, and support their implementation via state initiatives, ordinances, and/or dedicated funding. Figure 1 shows the number of BMPs that have been implemented per subwatershed, as tracked on the MPCA’s Healthier Watersheds website (<https://www.pca.state.mn.us/water/healthier-watersheds>).

Figure 1. Number of BMPs per subwatershed (example from Mississippi River–Sartell Watershed); data from the MPCA’s Healthier Watersheds website. To ensure the most current image, please download the image close to the time of finalizing this report and include the years of data that the figure represents.

Many soil and water conservation districts (SWCDs) are active in the project area, and many provide technical and financial assistance on topics such as [discuss specific activities that SWCDs do and how it relates to load reductions of the pollutant(s) of interest].

The following examples describe large-scale programs that have proven to be effective and/or will reduce pollutant loads going forward.

Adapt the following sections to your watershed.

* + 1. SSTS Program

SSTS regulation: SSTSs are regulated through Minn. Stat. §§ 115.55 and 115.56. SSTS specific rule requirements can be found in Minn. R. 7080 through 7083. Regulations include the following:

* Minimum technical standards for design and installation of individual and mid-size SSTS
* A framework for local units of government to administer SSTS programs
* Statewide licensing and certification of SSTS professionals, SSTS product review and registration, and establishment of the SSTS Advisory Committee
* Various ordinances for SSTS installation, maintenance, and inspection

Each county maintains an SSTS ordinance, in accordance with Minn. Stat. and Minn. R., establishing minimum requirements for regulation of SSTS, for the treatment and dispersal of sewage within the applicable jurisdiction of the county, to protect public health and safety, to protect groundwater quality, and to prevent or eliminate the development of public nuisances. Ordinances serve the best interests of the county’s residents by protecting health, safety, general welfare, and natural resources. In addition, each county zoning ordinance prescribes the technical standards that on-site septic systems are required to meet for compliance and outlines the requirements for the upgrade of systems found not to be in compliance. This includes systems subject to inspection at transfer of property, upon the addition of living space that includes a bedroom and/or a bathroom, and at discovery of the failure of an existing system.

SSTS assessments: State-sponsored funding programs are available for community-wide septic system assessments. The Public Facilities Authority administers the Small Community Wastewater Treatment Program, which provides grants of up to $60,000 to LGUs to conduct preliminary site evaluations and prepare feasibility reports, provide advice on possible SSTS alternatives, and help develop the technical, managerial, and financial capacity to build, operate, and maintain SSTS systems. These studies assess current SSTS compliance status as well as potential future individual and/or community SSTS solutions.

BWSR has provided grant funds in the past to local governments for large-scale SSTS compliance inspection projects. These projects typically involve riparian communities on impaired water bodies.

SSTS upgrades and replacement: All known imminent threats to public health and safety (ITPHS) are recorded in a statewide database by the MPCA. Some of the alleged straight pipes are typically found to have been abandoned, fixed, or not to be a straight pipe system. The remaining known, unfixed, straight pipe systems receive a notice of noncompliance with a 10-month deadline to be fixed, are issued Administrative Penalty Orders, or are docketed in court.

Many counties and SWCDs offer low interest loan programs for SSTS upgrades or replacement. The MPCA Clean Water Partnership program offers low-interest loans to local units of government for implementing non-point source BMPs and other activities that target the restoration and protection of water resources such as lakes, streams, or groundwater aquifers; these funds can be used for SSTS upgrades and replacements. The Small Community Wastewater Program offers grant and loan packages of up to $2,000,000 for the construction of publicly owned community SSTS.

Since 2002, the counties within the [Name] Watershed have, on average, replaced xx systems per year (Table 9).

See Section A.8 in All Things TMDL for instructions on requesting the number of SSTS replacements by county. To ensure the most current data, please update the data close to the time of finalizing this report. The following is an example.

Table 9. SSTS replacements in Fillmore County (2017–2021).

|  |  |
| --- | --- |
| Year | Number of SSTS replaced |
| 2017 | 60 |
| 2018 | 57 |
| 2019 | 70 |
| 2020 | 96 |
| 2021 | 60 |

The MPCA, through the Clean Water Partnership Loan Program, has awarded over $xxx,000 to counties within the [Name] River Watershed to provide low interest loans for SSTS upgrades since 2010. More information on SSTS financial assistance can be found at the following URL: <https://www.pca.state.mn.us/water/ssts-financial-assistance>.

The information on straight pipes will be updated periodically by MPCA staff (contact Steve Oscarson).

To include the information on CWP Loan Program $ per county, please request it from [kurtis.soular@state.mn.us](mailto:kurtis.soular@state.mn.us).

* + 1. Feedlot Program

This section describes the MPCA’s Feedlot Program, which addresses both permitted and nonpermitted feedlots. The Feedlot Program implements rules governing the collection, transportation, storage, processing, and disposal of animal manure and other livestock operation wastes. Minn. R. ch. 7020 regulates feedlots in the state of Minnesota. All feedlots are subject to this rule. The focus of the rule is on animal feedlots and manure storage areas that have the greatest potential for environmental impact. All feedlots capable of holding 50 or more AUs, or 10 in shoreland areas, are required to register. A feedlot holding 1,000 or more AUs is required to obtain a permit.

The Feedlot Program is implemented through cooperation between MPCA and delegated county governments in 50 counties in the state. The MPCA works with county representatives to provide training, program oversight, policy and technical support, and formal enforcement support when needed. A county participating in the program has been delegated authority by the MPCA to administer the Feedlot Program. These delegated counties receive state grants to help fund their feedlot programs based on the number of feedlots in the county and the level of inspections they complete. In recent years, annual grants given to these counties statewide totaled about two million dollars (MPCA 2017). The delegated counties in the project area for this report are [list], and the counties that are not delegated are [list]. In the counties that are not delegated, the MPCA is tasked with running the Feedlot Program.

From [year] through [year—use the most recent 10-year period], xx feedlot facilities were inspected in the [Name] Watershed, with xx of those inspections occurring at non-CAFO facilities and xx at CAFO facilities. There have been an additional xx facilities with manure application reviews within the watershed; xx of those inspections were conducted at CAFO facilities and xx at non-CAFO facilities.

See Section C.3.b in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for instructions on completing the above paragraph.

For nitrogen TMDLs: The Feedlot Program continuously evaluates program requirements to determine if program enhancements are needed. In the most recent reissuance of the Feedlot General Permit, requirements were added to avoid nitrogen loss, including additional restrictions on winter application of solid manure, cover crop requirements from September, and additional nitrogen loss best management practice options for early October.

For nitrogen-related TMDLs in SE MN, see the Feedlot Program section of the Reasonable Assurance in the Root River Watershed TMDL (draft as of February 2024). Also note that the revised general permit is expected to be issued by the end of 2024, and new requirements could be summarized here for further RA.

The Minnesota Department of Agriculture’s (MDA’s) Agriculture BMP Loan Program provides low interest loans to farmers, rural landowners, and agriculture supply businesses. The purpose is to encourage agricultural BMPs that prevent or reduce runoff from feedlots, farm fields, and other pollution problems identified by the county in local water plans.

* + 1. Minnesota buffer law

Minnesota’s buffer law (Minn. Stat. § 103F.48) requires perennial vegetative buffers of up to 50 feet along lakes, rivers, and streams and buffers of 16.5 feet along ditches. These buffers help filter out phosphorus, nitrogen, and sediment. Alternative practices are allowed in place of a perennial buffer in some cases. Amendments enacted in 2017 clarify the application of the buffer requirement to public waters, provide additional statutory authority for alternative practices, address concerns over the potential spread of invasive species through buffer establishment, establish a riparian protection aid program to fund local government buffer law enforcement and implementation, and allowed landowners to be granted a compliance waiver until July 1, 2018, when they filed a compliance plan with the appropriate SWCD.

The Board of Water and Soil Resources (BWSR) provides oversight of the buffer program, which is primarily administered at the local level. Compliance with the buffer law ranges from 94% to 100% for counties in the [Name] Watershed as of January 2023.

Buffer compliance information available on BWSR's [Buffer Program Update webpage](https://bwsr.state.mn.us/buffer-program-update). To ensure the most current data, please update the information close to the time of finalizing this report.

* + 1. Minnesota Agricultural Water Quality Certification Program

The Minnesota Agricultural Water Quality Certification Program (MAWQCP) is a voluntary opportunity for farmers and agricultural landowners to take the lead in implementing conservation practices that protect our water. Those who implement and maintain approved farm management practices will be certified and, in turn, obtain regulatory certainty for a period of 10 years.

Through this program, certified producers receive:

* Regulatory certainty: certified producers are deemed to be in compliance with any new water quality rules or laws during the period of certification
* Recognition: certified producers may use their status to promote their business as protective of water quality
* Priority for technical assistance: producers seeking certification can obtain specially designated technical and financial assistance to implement practices that promote water quality

Through this program, the public receives assurance that certified producers are using conservation practices to protect Minnesota’s lakes, rivers, and streams. Since the start of the program in 2014, the program has achieved the following (estimates as of month year):

* Enrolled over 794,000 acres
* Included 1,119 producers
* Added more than 2,200 new conservation practices
* Kept over 39,000 tons of sediment out of Minnesota rivers
* Saved 114,000 tons of soil and 50,000 pounds of phosphorus on farms
* Cut greenhouse gas emissions by more than 41,000 tons annually

Approximately xx acres in the [Name] Watershed are certified under the MAWQCP (through month year).

The above information (the bulleted list and the acres by watershed) can be found in the Tableau report “[Ag Water Quality Certification Areas](http://tableau/#/views/AgriculturalWaterQualityCertificationProgram-acresbywatershed/AgWaterQualityCertificationAcres?iframeSizedToWindow=true&:embed=n&:showAppBanner=false&:display_count=no&:showVizHome=no&:iid=1).” (Certified areas are updated annually, typically based on calendar year. Narrative summary on the left bar is updated quarterly [[1]](#footnote-2). To ensure the most current data, please update the information close to the time of finalizing this report.)

* + 1. Section 319 Small Watershed Focus Program

Include and adapt if applicable (i.e., only if there is a selected small watershed in the project area).

The federal CWA Section 319 grant program provides funding to states to address nonpoint source water pollution in watersheds. The MPCA has adopted a Section 319 Small Watersheds Focus Program to focus on geographically smaller and longer term watershed projects. The intent of the program is to make measurable progress for targeted water bodies in the Section 319 focus watersheds, ultimately restoring impaired waters and preventing degradation of unimpaired waters. Successful restorations in the [Name] Watershed through this program will support the required pollutant reductions.

* + 1. Minnesota Nutrient Reduction Strategy

The *Minnesota Nutrient Reduction Strategy* (MPCA 2014) guides activities that support nitrogen and phosphorus reductions in Minnesota water bodies and water bodies downstream of the state (e.g., Lake Winnipeg, Lake Superior, and the Gulf of Mexico). The Nutrient Reduction Strategy (NRS) was developed by an interagency steering team with help from public input, and a progress report was completed in 2020. *5-year Progress Report on Minnesota’s Nutrient Reduction Strategy* (MPCA 2020) provides an update on progress made in the state towards achieving the nutrient reduction goals and associated BMP implementation outlined in the original 2014 strategy. Revisions are being made to the NRS to reflect changing land use, climate, and nutrient loading conditions since 2014 and will be available in 2025. *Watershed Nutrient Loads to Accomplish Minnesota’s Nutrient Reduction Strategy Goals* (MPCA 2022a) integrates the state’s NRS into local watershed work by developing load reduction planning goals on a HUC-8 watershed basis.

Fundamental elements of the NRS include:

* Defining progress with clear goals
* Building on current strategies and success
* Prioritizing problems and solutions
* Supporting local planning and implementation
* Improving tracking and accountability

Included within the strategy discussion are alternatives and tools for consideration by drainage authorities and local water resource managers, information on available approaches for reducing phosphorus and nitrogen loading and tracking efforts within a watershed, and additional research priorities. The NRS is focused on incremental progress and provides meaningful and achievable nutrient load reduction milestones that allow for better understanding of incremental and adaptive progress toward final goals. The strategy set a reduction goal of 45% for both phosphorus and nitrogen in waters leaving the state via the Mississippi River (relative to average 1980–1996 conditions). This is a similar goals for nutrient reduction for the Red River/Lake Winnipeg basin (relative to the mid to late 1990s) at the U.S. and Canada border; a goal of no net increase from nitrogen and phosphorus levels in the 1970s was set for Minnesota’s portions of the Lake Superior basin. The strategy also emphasizes the need to achieve local nutrient reduction needs within HUC-8 watersheds.

Successful implementation of the NRS will continue to require broad support, coordination, and collaboration among agencies, academia, local government, and private industry. Minnesota is implementing a watershed approach to integrate its water quality management programs on a major watershed scale, a process that includes:

* Watershed lake and stream monitoring
* Assessment of watershed health
* Development of TMDLs and WRAPS updates that include BMP scenarios to achieve nutrient load reductions
* Comprehensive local water planning and implementation
* Management of NPDES/SDS and other regulatory and assistance programs

This framework will result in nutrient reduction for the basin as a whole and the major watersheds within the basin. [Adapt to relevant watershed.]

* + 1. Groundwater Protection Rule

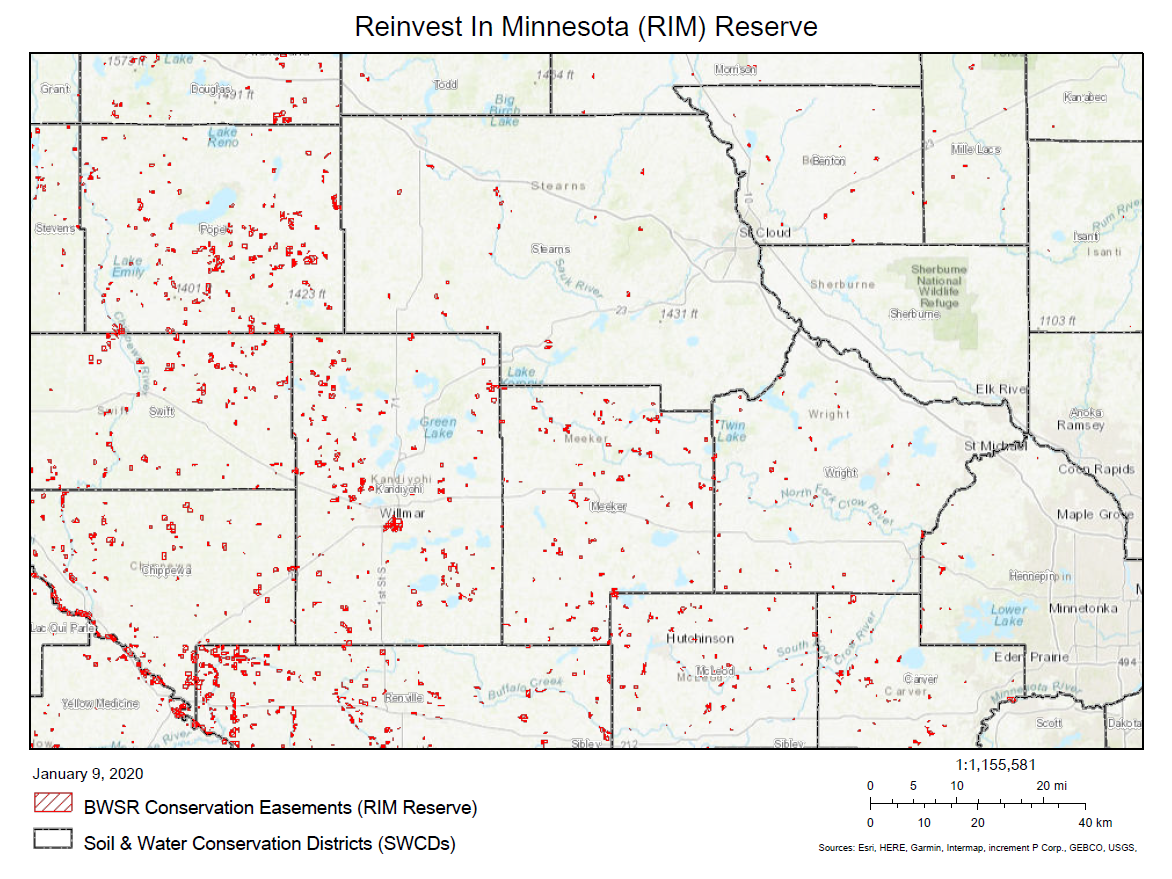
[For nitrogen impairments only]

The Groundwater Protection Rule (Minn. R. ch. 1573) minimizes potential sources of nitrate pollution to the state’s groundwater and protects drinking water. The rule restricts fall application of nitrogen fertilizer in areas vulnerable to contamination, and it outlines steps to reduce the severity of the problem in areas where nitrate in public water supply wells is already elevated. The rule is intended to promote appropriate nitrogen fertilizer BMPs and to involve local farmers and agronomists in adopting the most current science based and economically viable practices that can reduce nitrate in groundwater. Although the rule primarily addresses groundwater protection, BMPs implemented to comply with the rule will also benefit surface waters impacted by high levels of nitrogen.

* + 1. Conservation easements

Conservation easements are a critical component of the state’s efforts to improve water quality by reducing soil erosion, reducing phosphorus and nitrogen loading, and improving wildlife habitat and flood attenuation on private lands. Easements protect the state’s water and soil resources by permanently restoring wetlands, adjacent native grassland wildlife habitat complexes, and permanent riparian buffers. In cooperation with county SWCDs, state and federal programs compensate landowners for granting conservation easements and establishing native vegetation habitat on economically marginal, flood prone, environmentally sensitive, or highly erodible lands. These easements vary in length of time from 10 years to permanent/perpetual easements. Conservation easement types in Minnesota include Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Reinvest in Minnesota (RIM), and the Wetland Reserve Program (WRP) or Permanent Wetland Preserve (PWP). As of August 2019, in the counties that are located in the [Name] Watershed, there were xx acres of short-term conservation easements such as CRP and xx acres of long term or permanent easements (CREP, RIM, WRP). Please do not cite CREP if not in the CREP-eligible area of MN: <https://bwsr.state.mn.us/mn-crep-landowners>.

The above information is updated regularly and can be found on BWSR’s website: [Summary of Conservation Lands by County](https://bwsr.state.mn.us/summary-conservation-lands-county). The map can be generated there as well.

**Figure 2. Reinvest In Minnesota (RIM) Reserve state-funded conservation easements in the counties that are located in the [Name] Watershed (data from BWSR)**

* + 1. Watershed management organization and district rules and standards

As applicable, in consultation with local partners.

* + - 1. Summary of local plans

Minnesota has a long history of water management by local government, which included developing water management plans along county boundaries since the 1980s. The BWSR-led One Watershed, One Plan (1W1P) program is rooted in work initiated by the Local Government Water Roundtable (Association of Minnesota Counties, Minnesota Association of Watershed Districts, and Minnesota Association of SWCDs). The Roundtable recommended that local governments organize to develop focused implementation plans based on watershed boundaries. That recommendation was followed by the legislation (Minn. Stat. § 103B.801) that established the 1W1P program, which provides policy, guidance, and support for developing comprehensive watershed management plans:

* Align local water planning purposes and procedures on watershed boundaries to create a systematic, watershed-wide, science-based approach to watershed management.
* Acknowledge and build off of existing local government structure, water plan services, and local capacity.
* Incorporate and make use of data and information, including WRAPS.
* Solicit input and engage experts from agencies, residents, and stakeholder groups; focus on implementation of prioritized and targeted actions capable of achieving measurable progress.
* Serve as a substitute for a comprehensive plan, local water management plan, or watershed management plan developed or amended, approved, and adopted.

Describe 1W1P development in the project area, including the current stage of development (e.g., developing an application, applied in what year, awarded in what year, actively planning, plan on public notice, or plan approved, etc.). Note that the boundary and the name of the planning area may differ from the HUC-8 watershed and describe any differences if applicable. Adapt the following text as applicable:

Until the completion of a comprehensive watershed management plan in the [Name] Watershed, county water plans remain in effect per the Comprehensive Local Water Management Act (Minn. Stat.   
§ 103B.301). Those plans may be updated with new information, or their expiration dates may be extended pending future participation in the 1W1P program. Local water plans incorporate implementation strategies aligned with or called for in TMDLs and WRAPS and are implemented by SWCDs, counties, state and federal agencies, and other partners.

The following is a list of local county water plans for major counties in the [Name] Watershed and a brief description of how each plan addresses the water quality issues identified in this report:

* List plans and a brief description of how each plan addresses (directly or indirectly) the water quality issues identified in this report. For example, “shoreline protection to reduce lakeshore erosion, which will reduce phosphorus loading to the lake.” If the WRAPS update associated with this TMDL report will be minimal (e.g., in the Twin Cities Metropolitan Area), please include detailed information from the local water plan(s).
* etc.
  + - 1. Examples of pollution reduction efforts

Identify 3–4 projects in the watershed that address pollutant loading to the water bodies of interest. Describe the project and project dates, the parties involved, and expected impacts. Completed and planned projects should be included. Projects should focus on the pollutant of concern, but also note that projects targeted to a specific pollutant may also reduce other pollutants (e.g., BMPs to reduce sediment runoff will also reduce associated phosphorus that is attached to sediment). If you would like to share additional projects, you can list more projects and highlight only 3–4 of them. Consider highlighting pollutant reduction projects that address previously completed TMDLs, if applicable.

If the pollution reduction efforts led to impairment delistings, consider including that information.

* + - 1. Funding

Funding sources to implement TMDLs can come from local, state, federal, and/or private sources. Examples of some of the major funding sources include BWSR’s Clean Water Fund Watershed-based Implementation Funding (WBIF), Clean Water Fund Competitive Grants (e.g., Projects and Practices), and conservation funds from Natural Resources Conservation Service (NRCS) (e.g., Environmental Quality Incentives Program and Conservation Stewardship Program).

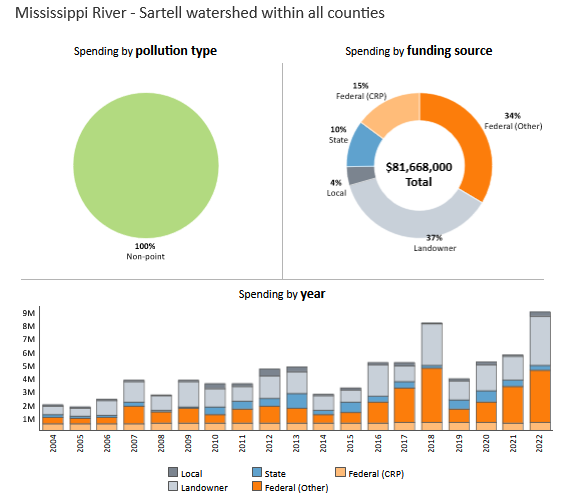
WBIF is a noncompetitive process to fund water quality improvement and protection projects for lakes, rivers/streams, and groundwater. This funding allows collaborating local governments to pursue timely solutions based on a watershed's highest priority needs. The approach depends on the completion of a comprehensive watershed management plan developed under the 1W1P program to provide assurance that actions are prioritized, targeted, and measurable. The [Watershed Name] 1W1P group has received $x in WBIF since 2020 and is anticipated to receive $x in 2024.

BWSR has been moving more of its available funding away from competitive grants and toward WBIF to accelerate water management outcomes, enhance accountability, and improve consistency and efficiency across the state. This approach allows more clean water projects identified through planning to be implemented without having to compete for funds, helping local governments spend limited resources where they are most needed.

WBIF assurance measures summarize and systematically evaluate how WBIF dollars are being used to achieve clean water goals identified in comprehensive watershed plans. The measures will be used by BWSR to provide additional context about watershed plan implementation challenges and opportunities. The following assurance measures are supplemental to existing reporting and on-going grant monitoring efforts:

* Understand contributions of prioritized, targeted, and measurable work in achieving clean water goals.
* Review progress of programs, projects, and practices implemented in identified priority areas.
* Complete Clean Water Fund grant work on schedule and on budget.
* Leverage funds beyond the state grant.

More than $X,000,000 has been spent cumulatively on watershed implementation projects in the [Name] Watershed from 2004 through 2022 [update years] (Figure 3). Information for the following chart is available at [CWAA—Spending for implementation projects](https://public.tableau.com/app/profile/mpca.data.services/viz/CWAA-Spendingforimplementationprojects/Spendingforimplementationprojects).

Figure 3. Spending for watershed implementation projects (example from Mississippi River–Sartell Watershed); data from the MPCA’s Healthier Watersheds website

* + - 1. Other partners and organizations

Discuss non-governmental work (e.g., lake associations, Ducks Unlimited) and other active groups, organizations, and events.

* + - 1. Reasonable assurance conclusion

The reasonable assurance may be concluded with the following summary:

In summary, significant time and resources have been devoted to identifying the best strategies and BMPs, providing means of focusing them in [Name] Watershed, and supporting their implementation via state, local, and federal initiatives and dedicated funding. The [Name] Watershed WRAPS and TMDL process engaged partners to arrive at reasonable scenarios of BMP combinations that attain pollutant reduction goals. Minnesota is a leader in watershed planning and implementation, as well as monitoring and tracking progress toward water quality goals and pollutant load reductions.

* + 1. Monitoring

The EPA does not approve monitoring plans, but providing a general plan is helpful to meet reasonable assurance requirements for nonpoint source reductions. Describe monitoring that occurs under Minnesota’s Water Quality Monitoring Strategy (MPCA 2011), specifically the intensive watershed monitoring (IWM) design; Watershed Pollutant Load Monitoring Network (site number and location); Volunteer Water Monitoring Program (site number and location); Discovery Farms monitoring that is within or close to the watershed; other. Focus on existing programs and efforts as opposed to calling for additional monitoring.

Monitoring recommendations that are outside of the scope of existing programs can be made as long as it is clear that the monitoring is *not required*, but could be considered if resources allow. It can be helpful to document these recommendations even if there is only a small chance that the monitoring will occur.

Text

* + 1. Implementation strategy summary

This section summarizes implementation strategies that could be used to help achieve the TMDLs in this report. Please provide an overview of the implementation strategies that can be used to reduce loading from the various pollutant source types. Detailed discussion of each strategy is not needed; reference the WRAPS update for more information.

* + - 1. Permitted sources
    1. Wastewater

As applicable, summarize strategies to be implemented by wastewater permittees to address the wastewater WLAs. Reference the information in the WLAs (e.g., Section 4.1.4.1) that identifies wastewater discharges with existing permits that are not consistent with the WLA or whose permits do not include limits and/or monitoring requirements for the TMDL pollutant(s).

Text

* + 1. Municipal separate storm sewer systems

As applicable, summarize strategies to be implemented by permitted MS4s to address the MS4 WLAs. Reference the information in the WLAs (e.g., Section 4.1.4.2) that states if assigned MS4 WLAs will or will not result in additional MS4 permit requirements per the next MS4 General Permit. Adapt example language below as needed.

If applicable for TSS TMDLs with MS4 WLAs:

X, Y, and Z MS4s have TSS WLAs requiring reductions. This will result in additional MS4 permit requirements in the next MS4 General Permit. Implemented BMPs should target high flow conditions, as these are the critical conditions for the TSS impairments.

For *E. coli* TMDLs with MS4 WLAs:

The MS4 General Permit has instituted performance based requirements for MS4s with *E. coli* or fecal coliform WLAs requiring reductions. If future permit requirements remain the same, MS4s are expected to inventory potential *E. coli* or fecal coliform sources and prioritize reduction activities that address the identified sources. X, Y, and Z MS4s have *E. coli* WLAs requiring reductions in this TMDL. X MS4 has a previous *E. coli* WLA, so this TMDL will not result in additional permit requirements. Y and Z MS4 do not have prior *E. coli* or fecal coliform WLAs, so this TMDL will result in additional permit requirements. Further information and up to date guidance can be found at [Guidance for meeting bacteria TMDL MS4 permit requirements - Minnesota Stormwater Manual (state.mn.us)](https://stormwater.pca.state.mn.us/index.php?title=Guidance_for_meeting_bacteria_TMDL_MS4_permit_requirements)

For chloride TMDLs with MS4 WLAs:

The MS4 General Permit has instituted performance based requirements for MS4s with chloride WLAs requiring reductions. If future permit requirements remain the same, MS4s are expected to document the amount of deicer applied to permittee owned/operated surfaces, and conduct an annual assessment of the permittee’s winter maintenance operations. X, Y, and Z MS4s have chloride WLAs in this TMDL requiring reductions. They did not have chloride WLAs prior to this, so this TMDL will result in additional permit requirements. Further information and up to date guidance can be found at [Guidance for meeting chloride TMDL MS4 permit requirements - Minnesota Stormwater Manual (state.mn.us)](https://stormwater.pca.state.mn.us/index.php?title=Guidance_for_meeting_chloride_TMDL_MS4_permit_requirements)

Include the following text in any TMDL with an MS4 WLA:

Prior to implementation, permitted MS4s are encouraged to compare their sewersheds (e.g., catchments, pipesheds, etc.) with the drainage areas for each impaired water body to ensure appropriate BMP crediting. If a permitted MS4 sewershed is different from what is defined as the drainage area in this report, the sewershed should be considered part of the MS4 contribution to the impaired water if sufficient evidence of the appropriate sewershed area is provided to the MPCA. With Agency approval, any wasteload-reducing BMP implemented since the TMDL baseline year within the sewershed of an impaired water will be creditable towards an MS4’s load reduction for purposes of annual reporting and demonstrating progress towards meeting the WLA(s).

* + 1. Construction stormwater

Required language:

The WLA for stormwater discharges from sites where there is construction activity reflects the number of construction sites greater than one acre expected to be active in the watershed at any one time, and the BMPs and other stormwater control measures that should be implemented at the sites to limit the discharge of pollutants of concern. The BMPs and other stormwater control measures that should be implemented at construction sites are defined in Minnesota’s NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001). If a construction site owner/operator obtains coverage under the NPDES/SDS General Stormwater Permit and properly selects, installs, and maintains all BMPs required under the permit, including those related to impaired waters discharges and any applicable additional requirements found in Section 23 of the Construction Stormwater General Permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL. Construction activity must also meet all local government construction stormwater requirements.

See Section D.5 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for information on when a TMDL may require additional construction stormwater BMPs.

* + 1. Industrial stormwater

Required language:

The WLA for stormwater discharges from sites where there is industrial activity reflects the number of sites in the watershed for which NPDES/SDS industrial stormwater permit coverage is required, and the BMPs and other stormwater control measures that should be implemented at the sites to limit the discharge of pollutants of concern. Minnesota’s NPDES/SDS Industrial Stormwater Multi-Sector General Permit (MNR050000) [or facility specific Individual Wastewater Permit (MN00XXXXX). This is project specific and is only used if you do assign a WLA to a specific industry. If not, delete.] and NPDES/SDS Nonmetallic Mining and Associated Activities General Permit (MNG490000) establish benchmark concentrations for pollutants in industrial stormwater discharges. If a facility owner/operator obtains stormwater coverage under the appropriate NPDES/SDS Permit and properly selects, installs, and maintains BMPs sufficient to meet the benchmark values in the permit, the stormwater discharges would be expected to be consistent with the WLA in this TMDL report. Industrial activity must also meet all local government stormwater requirements.

* + 1. Feedlots

The NPDES and SDS feedlot permits include design, construction, operation, and maintenance standards that all CAFOs must follow. WLAs are not assigned to CAFOs in this TMDL report, including CAFOs with NPDES or SDS permits, and CAFOs not requiring permits; this is equivalent to a WLA of zero. If the CAFOs are properly permitted and operate under the applicable NPDES or SDS permit, then the CAFOs are expected to be consistent with this TMDL. MPCA inspections of large CAFOs focus on high risk facilities located within or near environmental justice areas, waters impaired by *E. coli* or excess nutrients, drinking water supply and vulnerable groundwater areas, and other sensitive water features, and on facilities that haven’t been inspected in the most recent five years. CAFOs that are found to be noncompliant are required to return to compliance in accordance with applicable NPDES or SDS conditions and Minn. R. ch. 7020.

* + - 1. Nonpermitted sources

For nonpermitted sources, provide an overview of the implementation strategies that can reduce loading. This overview may include a table(s) of strategies, BMPs, and their primary targeted pollutants (as they relate to pollutants of concern in watershed); see the example table below.

Table 10. Example BMPs for nonpermitted sources

|  |  |  |
| --- | --- | --- |
| Strategy | BMP examples | Targeted pollutant(s) |
|  |  |  |
|  |  |  |

The following text may be used where applicable for lake TMDLs:

Implementation strategies for internal loading reduction include water level drawdown, sediment phosphorus immobilization or chemical treatment (e.g., alum), management of aquatic vegetation, and fisheries management. Sequencing of in-lake management strategies both relative to each other as well as relative to external load reduction is important to evaluate and consider. In general, external loading, if moderate to high, should be the initial priority for reduction efforts. In-lake management efforts involving chemical treatment (e.g., alum) should follow after substantial external load reduction has occurred. The success of alum treatments depends on several factors including lake morphometry, water residence time, alum dose used, and presence of benthic-feeding fish. The MPCA recommends feasibility studies for any lakes in which water level drawdown or chemical treatment is considered.

The following text may be used where applicable to address SSTS:

* + 1. SSTS

SSTS assessments, maintenance, and upgrades and replacements address pollutant loading from noncompliant systems (see Section 6.2.1: *SSTS program*). The reductions in loading resulting from upgrading or replacing failing systems in the watershed depend on the level of failure present in the watershed. The most cost-effective approach to manage loads from SSTSs is regular maintenance. The EPA recommends that septic tanks be pumped every three to five years depending on the tank size and number of residents in the household (EPA 2002). Annual inspections, in addition to regular maintenance, ensure that systems function properly. Compliance with state and county code is essential to reducing *E. coli* and phosphorus loading from SSTSs.

Education is another crucial component of reducing pollutant loading from SSTSs. Education can occur through public meetings, routine SSTS service provider home visits, mass mailings, and radio and television advertisements. An inspection program can also help with public education because inspectors can educate owners about proper operation and maintenance during inspections.

* + 1. [Additional sections as needed for other sources]
       1. Water quality trading

Water quality trading can help achieve compliance with WLAs or water quality based effluent limits. Water quality trading can also offset increased pollutant loads in accordance with antidegradation regulations. Water quality trading reduces pollutants (e.g., TP or TSS) in rivers and lakes by allowing a point source discharger to enter into agreements under which the point source “offsets” its pollutant load by obtaining reductions in a pollutant load discharged by another point source operation or a nonpoint source or sources in the same watershed. The MPCA must establish specific conditions governing trading in the point source discharger’s NPDES/SDS permit or in a general permit that covers the point source discharger. The MPCA implements water quality trading through permits. See MPCA’s *Water Quality Trading Guidance* (MPCA 2022b) for more information.

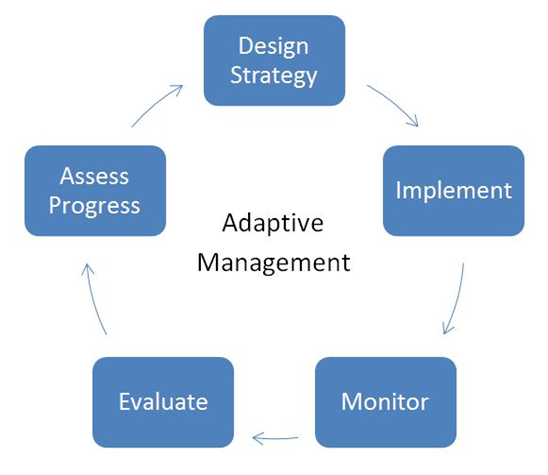
* + - 1. Cost

Include overall cost estimate to achieve TMDLs separated by permitted and nonpermitted sources. See Section E.9 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for a brief list of potential cost information sources.

Text

* + - 1. Adaptive management

Example: The implementation strategies and the more detailed WRAPS update prepared concurrently with this TMDL report are based on the principle of adaptive management (Figure 4). Continued monitoring and “course corrections” responding to monitoring results are the most appropriate strategy for attaining the water quality goals established in this TMDL report. Management activities will be changed or refined as appropriate over time to efficiently meet the TMDL and lay the groundwork for de-listing the impaired water bodies.

Figure 4. Adaptive management

* + 1. Public participation

Include in the final version of the TMDL a sentence or two about the public notice and comment period—public notice dates, number of comment letters received, etc. Other public participation activities must be described here as well; mention local and tribal partners if they were involved in the activities. Including information on significant public participation efforts, including environmental justice efforts, helps give credence to the report.

Update this section to include activities that happened after initial drafts of the TMDL through public notice. If there is a gap of activity in this section, that is a sign that public participation activities have been lacking.

An opportunity for public comment on the draft TMDL report was provided via a public notice in the State Register from xxxx, 20xx through xxxx, 20xx. There were xx comment letters received and responded to as a result of the public comment period. For further information on public participation for this TMDL report, please see the WRAPS update.

Text

* + 1. Literature cited

Any citation style may be used; please be consistent and include DOI when available. The following are references cited in this template; please revise the list based on what is cited in this TMDL report.

Adhikari, H., D. L. Barnes, S. Schiewer, and D. M. White. 2007. Total Coliform Survival Characteristics in Frozen Soils. Journal of Environmental Engineering 133(12):1098–1105. doi: 10.1061/(ASCE)0733-9372(2007)133:12(1098)

Burns & McDonnell Engineering Company, Inc. 2017. Minnehaha Creek Bacterial Source Identification Study Draft Report. Prepared for City of Minneapolis, Department of Public Works. Project No. 92897. May 26, 2017.

Chandrasekaran, R., M. J. Hamilton, P. Wang, C. Staley, S. Matteson, A. Birr, and M. J. Sadowsky. 2015. Geographic Isolation of *Escherichia coli* Genotypes in Sediments and Water of the Seven Mile Creek — A Constructed Riverine Watershed. Science of the Total Environment 538:78–85. <https://doi.org/10.1016/j.scitotenv.2015.08.013>

EPA (U.S. Environmental Protection Agency). 2002. Onsite Wastewater Treatment Systems Manual. EPA/625/R-00/008. EPA Office of Water and Office of Research and Development. February 2002. <https://www.epa.gov/sites/default/files/2015-06/documents/2004_07_07_septics_septic_2002_osdm_all.pdf>

EPA (U.S. Environmental Protection Agency). 2022. 2022–2023 Vision for the Clean Water Act Section 303(d) Program. September 2022. <https://www.epa.gov/system/files/documents/2022-09/CWA%20Section%20303d%20Vision_September%202022.pdf>

Ishii, S., W.B. Ksoll, R.E. Hicks, and M. Sadowsky. 2006. Presence and Growth of Naturalized *Escherichia Coli* in Temperate Soils from Lake Superior Watersheds. Applied and Environmental Microbiology72: 612–21. doi:10.1128/AEM.72.1.612–621.2006

Ishii, S., T. Yan, H. Vu, D. L. Hansen, R. E. Hicks, and M. J. Sadowsky. 2010. Factors Controlling Long-Term Survival and Growth of Naturalized *Escherichia coli* Populations in Temperate Field Soils. Microbes and Environments 25(1):8−14. doi: 10.1264/jsme2.me09172

Jamieson, R. C., D. M. Joy, H. Lee, R. Kostaschuk, and R. J. Gordon. 2005. Resuspension of Sediment-Associated *Escherichia* *coli* in a Natural Stream. Journal of Environmental Quality 34(2):581-589.

Jang, J., H.-G. Hur, M. J. Sadowsky, M. N. Byappanahalli, T. Yan, and S. Ishii. 2017. Environmental *Escherichia Coli*: Ecology and Public Health Implications—a Review. Journal of Applied Microbiology 123(3): 570–81. <https://doi.org/10.1111/jam.13468>

Marino, R. P., and J. J. Gannon. 1991. Survival of Fecal Coliforms and Fecal Streptococci in Storm Drain Sediments. Water Research 25(9):1089–1098.

MPCA (Minnesota Pollution Control Agency). 2005. Minnesota Lake Water Quality Assessment Report: Developing Nutrient Criteria, 3rd Edition. September 2005. <https://www.pca.state.mn.us/sites/default/files/wq-lar3-01.pdf>

MPCA (Minnesota Pollution Control Agency). 2011. Minnesota’s Water Quality Monitoring Strategy: 2011 to 2021. Document number p-gen1-10. <https://www.pca.state.mn.us/sites/default/files/p-gen1-10.pdf>

MPCA (Minnesota Pollution Control Agency). 2012. Zumbro Watershed Total Maximum Daily Loads for Turbidity Impairments. Document number wq-iw9-13e. <https://www.pca.state.mn.us/sites/default/files/wq-iw9-13e.pdf>

MPCA (Minnesota Pollution Control Agency). 2014. The Minnesota Nutrient Reduction Strategy. St. Paul, MN. Document number wq-s1-80. <https://www.pca.state.mn.us/sites/default/files/wq-s1-80.pdf>

MPCA (Minnesota Pollution Control Agency). 2017. Livestock and the Environment MPCA Feedlot Program Overview. Document number wq-f1-01. November 2017. <https://www.pca.state.mn.us/sites/default/files/wq-f1-01.pdf>

MPCA (Minnesota Pollution Control Agency). 2020. 5-year Progress Report on Minnesota’s Nutrient Reduction Strategy. Document number wq-s1-84a. August 2020. Available at <https://www.pca.state.mn.us/water/five-year-progress-report>

MPCA (Minnesota Pollution Control Agency). 2022a. Watershed nutrient loads to accomplish Minnesota’s Nutrient Reduction Strategy Goals: Interim Guidance for Watershed Strategies and Planning. Document number wq-s1-86. <https://www.pca.state.mn.us/sites/default/files/wq-s1-86.pdf>

MPCA (Minnesota Pollution Control Agency). 2022b. Water Quality Trading Guidance. Document number wq-gen1-15. September 2022. Available at <https://www.pca.state.mn.us/sites/default/files/wq-gen1-15.pdf>.

MPCA (Minnesota Pollution Control Agency). 2024a. Minnesota’s Total Maximum Daily Load Studies Prioritization Framework 2022–2032. March 2024. Document number wq-iw1-82. <https://www.pca.state.mn.us/sites/default/files/wq-iw1-82.pdf>

MPCA (Minnesota Pollution Control Agency). 2024b. Minnesota’s TMDL Commitments. March 2024. Document number wq-iw1-83. <https://www.pca.state.mn.us/sites/default/files/wq-iw1-83.pdf>

MPCA (Minnesota Pollution Control Agency). 2024c. Assessment Manual, Guidance for Assessing the Quality of Minnesota Surface Waters for Determination of Impairment: 305(b) Report & 303(d) Impaired Waters List, 2024 Assessment and Listing Cycle. Document number wq-iw1-04m. April 2024. <https://www.pca.state.mn.us/sites/default/files/wq-iw1-04m.pdf>

# Appendices (Heading 1)

Include modeling input/output summary. Avoid including separate published reports here; reference them instead.

# Appendix A

See Section B.1 in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf): *Accounting of TMDLs in impairment tables*.

The following is a table that should be used to account for all impairments in the watershed. Most of the information can be found in the Tableau report[[2]](#footnote-3) [Impaired waters TMDL planning summary](http://tableau/#/views/Draft-IWLandTMDLPlanningList/IWLandTMDLplanninglist?:iid=1); the specific information included in the table may be adapted to the needs of the watershed. If there are few impairments in a watershed, this table may be placed in Section 1.2 instead of as an appendix.

If a 4B, 4C, 4D, or 4E “planned recategorization” is included in the table, the MPCA PM and/or other staff still need to fill out and submit the recategorization forms and follow the process. Recategorizations are officially approved through the EPA’s approval of Minnesota’s impaired waters list and not through a TMDL report. See the most recently approved [303(d) list](https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list) for the current status on EPA Category for each impairment. See “Recategorizations” in [All Things TMDL](https://www.pca.state.mn.us/sites/default/files/wq-iw1-72.pdf) for more information (Section 2.4).

This appendix lists all of the impairments in the [Name] Watershed along with the TMDL status of each impairment (Table 11). Planned recategorizations are provided for listings that have been further assessed and for which recategorization will be considered. Recategorizations will not be final until they are approved by EPA as part of Minnesota’s list of impaired water bodies; therefore, this table represents a snapshot in time, and the EPA category or planned recategorization may change.

Table 11. Impaired water bodies in the [Name] Watershed

| Water body name | Water body description | WID (HUC-8-) | Use class a | Year added to list | Affected designated use b | Listing parameter | Stressors to bioassessment impairments | | EPA category in next impaired waters list c | Planned recategor-ization d | TMDL developed in this report [info re: the “why” is optional] |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Confirmed | Inconclusive |
| Crooked Creek, South Fork | T102 R5W S26, west line to Crooked Creek | 574 | 1B, 2Ag | 2018 | AQL | Benthic macroinvertebrate bioassessments | Dissolved oxygen, eutrophication, temperature | Flow alteration, longitudinal connectivity, pesticides, suspended solids | 5 | 4C (approved for 2022 list) | No |
| AQL | Fish bioassessments |
| Winnebago Creek | T101 R4W S27, west line to south line | 693 | 1B, 2Ag | 2018 | AQR | *E. coli* | NA | NA | 4A |  | Yes: *E. coli* |
| AQL | Benthic macroinvertebrate bioassessments | TSS | Flow alteration, nitrates, pesticides, physical habitat | 5 |  | Yes: TSS |
| AQL | TSS | NA | NA | 4A |  |
| Unnamed Creek | Unnamed creek to Upper Iowa River | 544 | 2Bg | 2018 | AQL | Benthic macroinvertebrate bioassessments | Flow alteration, physical habitat, nitrates | Eutrophication, flow alteration, suspended solids | 5 |  | No: TMDL deferred because water quality standard not established (nitrate); non-pollutant stressor (flow and habitat) |
| Deer Creek | Unnamed cr to MN/IA border | 520 | 2Bg | 2018 | AQL | Fish bioassessments | Longitudinal connectivity, physical habitat | DO, eutrophication, flow alteration, nitrates, suspended solids | 5 |  | No: non-pollutant stressors |
| Mississippi R | Root R to MN/IA border | 509 | 2Bg | 1998 | AQC | Mercury in fish tissue | NA | NA | 4A |  | No: TMDL previously completed |
| Mississippi R | Root R to MN/IA border | 509 | 2Bg | 1998 | AQC | PCBs in fish tissue | NA | NA | 5 |  | No |

1. 1B: domestic consumption; 2Ag: aquatic life and recreation—general cold water habitat; 2Bg: aquatic life and recreation—general warm water habitat; 7: limited resource value water.
2. AQR: aquatic recreation, AQL: aquatic life, AQC: aquatic consumption
3. 4A: Impaired and a TMDL study has been approved by USEPA. All TMDLs needed to result in attainment of applicable water quality standards for this impairment have been approved or established by EPA. For biological impairments, there are no remaining conclusive stressors for which TMDLs are needed.

4C: Impaired but a TMDL study is not required because the impairment is not caused by a pollutant.

4D: Impaired but a TMDL study is not required because the impairment is due to natural conditions with insignificant anthropogenic influence.

5: Impaired and a TMDL study has not been approved by EPA.

1. Provided for listings that have been further assessed and are proposed for recategorization. Recategorizations will not be final until they are approved by EPA as part of Minnesota’s list of impaired water bodies. [Delete this column and footnote if not needed.]

1. This Tableau report can only be accessed internally at MPCA. If you would like to view the report, please request it from your MPCA contact. [↑](#footnote-ref-2)
2. This Tableau report can only be accessed internally at MPCA. If you would like to view the report, please request it from your MPCA contact. [↑](#footnote-ref-3)