

2026 – 2035 Vermillion River Watershed Management Plan

Adopted on April 22, 2026

Acknowledgments

The Vermillion River Watershed Joint Powers Board voted to adopt the 2026-2035 Vermillion River Watershed Management Plan upon approval by the Minnesota Board of Water and Soil Resources on April 22, 2026. In accordance with Minnesota Statutes and Rules, this Plan was developed by Vermillion River Watershed Joint Powers Organization staff and Joint Powers Board, with input and review by the organization's Community Advisory Committee and Technical Advisory Committee; interested residents; community groups; relevant nonprofits; state review agencies; and local government units. The following organizations were provided opportunities to review and comment on the Plan:

Cities

- Apple Valley
- Burnsville
- Coates
- Elko New Market
- Empire
- Farmington
- Hampton
- Hastings
- Lakeville
- Rosemount
- Vermillion

Counties

- Dakota County
- Scott County

Townships

- Castle Rock Township
- Douglas Township
- Eureka Township
- Hampton Township
- Marshan Township
- New Market Township
- Nininger Township
- Ravenna Township
- Vermillion Township

Soil and Water Conservation Districts

- Dakota County Soil and Water Conservation District
- Scott Soil and Water Conservation District

State/Regional Review Agencies

- Metropolitan Council
- Minnesota Board of Water & Soil Resources
- Minnesota Department of Agriculture
- Minnesota Department of Health
- Minnesota Department of Natural Resources
- Minnesota Department of Transportation
- Minnesota Pollution Control Agency

Additional Reviewers

- Twin Cities Trout Unlimited
- Friends of the Mississippi River

Certifications

This Plan was created under the direct guidance of the Vermillion River Watershed Joint Powers Board Chair, Administrator, and Co-Administrator.

4-23-2026

Dakota County Commissioner Mike Slavik, Joint Powers Board Chair — **Date**

4/23/2026

Travis Thiel, Administrator — **Date**

4/23/2026

Melissa Bokman Ermer, Co-Administrator — **Date**

Table of Contents

List of Tables……..**ii**

List of Figures……...**iii**

List of Acronyms Used in this Document……..**vii**

Executive Summary……**1**

Section One: Introduction……**10**

1.1 Watershed History and Organization……..10

1.2 VRWJPO Mission……11

1.3 Plan Development Process and Stakeholder Engagement….11

1.4 Amendments to the Plan……...13

1.5 Consistency with Local Water Management Plans……...13

Section Two: Issues, Goals, Objectives, and Topics of Importance……...**15**

2.1 Identification of Issue Categories……15

2.2 Issue Statements, Goals, Objectives, and Topics of Importance……16

Section Three: Implementation Plan……..**24**

3.1 Evaluation of 2016-2025 Implementation Activities……..24

3.2 Implementation Plan Structure……25

3.3 Prioritization……26

3.4 Targeting……36

3.5 Implementation Actions……41

3.6 Plan Reporting and Assessment……..64

Section Four: Watershed Financing……..**69**

4.1 Property Tax Levy……..69

4.2 Wetland Banking Program……70

4.3 Grant Funding……71

4.4 Partner Cost-Share……72

4.5 Annual Budget Adoption……...72

Appendices

Appendix A: Inventory of Studies and Plans……**A-1**

Appendix B: Land and Water Resources Inventory……**B-1**

Appendix C: Community and Stakeholder Engagement……**C-1**

Appendix D: Standards for the Vermillion River Watershed Joint Powers Organization……..**D-1**

List of Tables

Table E-1: Priority Actions in the Implementation Plan……6

Table 3-1: Pollutant load reductions from the 2016-2025 Watershed Management Plan……25

Table 3-2: Prioritized Water Quality Objectives……...30

Table 3-3: Prioritized Water Quality Topics of Importance……30

Table 3-4: Prioritized Stormwater Management Objectives……..31

Table 3-5: Prioritized Stormwater Management Topics of Importance……31

Table 3-6: Prioritized Groundwater Sustainability Objectives…...32

Table 3-7: Prioritized Groundwater Sustainability Topics of Importance……32

Table 3-8: Prioritized Climate Resilience Objectives……...33

Table 3-9: Prioritized Climate Resilience Topics of Importance……33

Table 3-10: Prioritized Natural Environments Objectives……..34

Table 3-11: Prioritized Natural Environments Topics of Importance……34

Table 3-12: Prioritized Community Relationships Objectives……35

Table 3-13: Prioritized Community Relationships Topics of Importance……35

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses……43

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses……54

Table 3-16: VRWJPO 2026-2035 Implementation Plan: Measurable Outcomes……65

Table 4-1: 2016-2025 Tax Levy Annual Revenue……...69

Table 4-2: VRWJPO Wetland Bank Credit Sales……70

Table B-1: VRWJPO City and Township Area Calculations…….B-1

Table B-2: 1984, 2020, and projected 2040 VRWJPO Land Uses ……...B-3

Table B-3: 2014-2024 Rosemount Weather Station Data……..B-16

Table B-4: Severe Summer Events for Dakota and Scott Counties ……B-18

Table B-5: VRMN Stream Monitoring Stations……B-26

Table B-6: CAMP Lake Water Quality Trends……B-66

Table B-7: Buffer Standards for Wetlands……...B-76

Table C-1: Engagement in Phase 1 opportunities……C-6

Table C-2: CAC Scoring of Proposed Issues……..C-10

Table C-3: TAC Scoring of Proposed Issues……...C-11

Table D-1: Buffer Requirements by Wetland Management Classification……D-15

Table D-2: Watercourse Buffer Width Standards……...D-15

List of Figures

Figure E-1: Map of VRWJPO Political Boundaries……1

Figure E-2: VRWJPO Mission Statement……...1

Figure E-3: South Creek tributary of the Vermillion River……...2

Figure E-4: Dakota County Soil and Water Conservation District monitoring staff……2

Figure E-5: Stormwater improvements on the North Creek Tributary of the Vermillion River……...3

Figure E-6: Brook trout in South Creek……3

Figure E-7: Stormwater improvements on a tributary to South Creek……3

Figure E-8: Educational signage at a stormwater reuse system implemented by the VRWJPO and the City of Lakeville……...3

Figure E-9: VRWJPO staff showcase an Adopt-a-Drain display….4

Figure 1-1: Issue Statements and Goals developed following engagement……...12

Figure 1-2: Graphical format of Plan structure……13

Figure 2-1: Timeline of engagement and Plan development stages……15

Figure 3-1: Visual representation of Plan development process 26

Figure B-1: Indigenous Dakota People Overlook the Minnesota River in the "Valley of the St. Peters"……..B-2

Figure B-2: 1984 VRWJPO Land Use……B-3

Figure B-3: 2024 Land Use……..B-4

Figure B-4: 2040 Land Use……..B-4

Figure B-5: Minnesota Land Cover Classification System Designations……B-5

Figure B-6: Topography……B-6

Figure B-7: Upper Mainstem Subwatershed Inset Map……...B-7

Figure B-8: South Creek Subwatershed Inset Map……..B-7

Figure B-9: Middle Creek Subwatershed Inset Map……B-8

Figure B-10: North Creek Subwatershed Inset Map……B-8

Figure B-11: Lower Vermillion Subwatershed Inset Map……B-8

Figure B-12: Middle Mainstem Subwatershed Inset Map……B-9

Figure B-13: South Branch Subwatershed Inset Map……..B-9

Figure B-14: Mississippi Direct Subwatershed Inset Map…..…B-10

Figure B-15: Soil Texture Triangle……B-11

Figure B-16: Hydrologic Soil Groups……B-11

Figure B-17: Surficial Geology……...B-13

Figure B-18: Bedrock Geology……..B-14

Figure B-19: Depth to Bedrock……..B-15

Figure B-20: Average Annual Temperatures, 1895-2024…….B-16

Figure B-21: Maximum Annual Temperatures, 1895-2024…...B-17

Figure B-22: Minimum Annual Temperatures, 1895-2024……B-17

Figure B-23: Minimum January Temperatures, 1895-2024…..B-17

Figure B-24: Annual Average Precipitation, 1895-2024……B-17

Figure B-25: Average 30-Year Precipitation Compared to Historic Normals……..B-18

Figure B-26: MN Statute 103G Public Waters……B-19

Figure B-27: Twin Cities Metropolitan Mississippi River Corridor ……B-23

Figure B-28: Vermillion River Water Monitoring Network……..B-26

Figure B-29: Upper Mainstem Vermillion River Subwatershed Total Suspended Solids Monitoring: 2016-2024……..B-28

Figure B-30: Upper Mainstem Vermillion River Subwatershed Total Phosphorus Monitoring: 2016-2024……B-29

Figure B-31: Upper Mainstem Vermillion River Subwatershed Nitrate Monitoring: 2016-2024……B-30

Figure B-32: South Creek Subwatershed Total Suspended Solids Monitoring: 2016-2024……B-31

Figure B-33: South Creek Subwatershed Total Phosphorus Monitoring: 2016-2024……B-32

Figure B-34: South Creek Subwatershed Nitrate Monitoring: 2016-2024……B-33

Figure B-35: South Branch Subwatershed Total Suspended Solids Monitoring: 2016-2024……B-34

Figure B-36: South Branch Subwatershed Total Phosphorus Monitoring: 2016-2024……B-35

Figure B-37: South Branch Subwatershed Nitrate Monitoring: 2016-2024……B-36

Figure B-38: North Creek Subwatershed Total Suspended Solids Monitoring: 2016-2024……B-37

Figure B-39: North Creek Subwatershed Total Phosphorus Monitoring: 2016-2024……B-38

Figure B-40: North Creek Subwatershed Nitrate Monitoring: 2016-2024……B-39

Figure B-41: Middle Mainstem Vermillion River Subwatershed Total Suspended Solids Monitoring: 2016-2024……B-40

Figure B-42: Middle Mainstem Vermillion River Subwatershed Total Phosphorus Monitoring: 2016-2024……B-41

Figure B-43: Middle Mainstem Vermillion River Subwatershed Nitrate Monitoring: 2016-2024……B-42

Figure B-44: Lower Mainstem Vermillion River Subwatershed Total Suspended Solids Monitoring: 2016-2024……B-43

Figure B-45: Lower Mainstem Vermillion River Subwatershed Total Phosphorus Monitoring: 2016-2024……B-44

Figure B-46: Lower Mainstem Vermillion River Subwatershed Nitrate Monitoring: 2016-2024……B-45

Figure B-47: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2016……B-46

Figure B-48: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2017……B-46

Figure B-49: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2018……B-47

Figure B-50: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2019……B-47

Figure B-51: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2020……B-48

Figure B-52: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2021……B-48

Figure B-53: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2022……B-49

Figure B-54: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2023……B-49

Figure B-55: Vermillion River Monitoring Network Subwatershed Total Suspended Solids Pollutant Yields: 2024……B-50

Figure B-56: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2016……B-50

Figure B-57: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2017……B-51

Figure B-58: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2018……B-51

Figure B-59: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2019……B-52

Figure B-60: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2020……B-52

Figure B-61: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2021……..B-53

Figure B-62: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2022……..B-53

Figure B-63: Vermillion River Monitoring Network Subwatershed Total Phosphorus Pollutant Yields: 2023……..B-54

Figure B-64: Vermillion River Monitoring Network Subwatershed Phosphorus Pollutant Yields: 2024……B-54

Figure B-65: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2016……B-55

Figure B-66: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2017……B-55

Figure B-67: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2018……B-56

Figure B-68: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2019……B-56

Figure B-69: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2020……B-57

Figure B-70: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2021……B-57

Figure B-71: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2022……B-58

Figure B-72: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2023……B-58

Figure B-73: Vermillion River Monitoring Network Subwatershed Nitrate Pollutant Yields: 2024……..B-59

Figure B-74: Biomonitoring Plan Annual Monitoring Sites……B-61

Figure B-75: Vermillion River at Lakeville Stream Stage: 2015-2025……B-63

Figure B-76: Vermillion River at Lakeville Stream Discharge: 2015-2025……..B-64

Figure B-77: Vermillion River Near Empire Stage Height: 2015-2025……B-64

Figure B-78: Vermillion River Near Empire Discharge: 2015-2025 ……B-65

Figure B-79: Vermillion River at Vermillion Falls Stage Height: 2015-2025……B-65

Figure B-80: Alimagnet Lake Secchi Transparency……..B-67

Figure B-81: Alimagnet Lake Total Phosphorus……B-67

Figure B-82: East Lake Secchi Transparency……B-67

Figure B-83: East Lake Total Phosphorus……B-67

Figure B-84: Farquar Lake Secchi Transparency……...B-68

Figure B-85: Farquar Lake Total Phosphorus……B-68

Figure B-86: Long Lake Secchi Transparency……...B-68

Figure B-87: Long Lake Total Phosphorus……..B-68

Figure B-88: Lake Marion Secchi Transparency……B-69

Figure B-89: Lake Marion Total Phosphorus……...B-69

Figure B-90: Lake Rebecca Secchi Transparency……B-69

Figure B-91: Lake Rebecca Total Phosphorus……B-69

Figure B-92: MS4 Regulated Storm Sewer Systems……B-71

Figure B-93: Conceptual image of Vermillion River losing stream reach……...B-75

Figure B-94: Unique Features and Scenic Areas……...B-79

Figure C-1: Timeline of public engagement……..C-2

Figure C-2: Photos from Phase 1 Engagement Events……C-8

Figure C-3: CAC Issue Category Prioritization Survey Results ……C-10

Figure C-4: TAC Issue Category Prioritization Survey Results C-11

Figure D-1: Watercourse Classifications and Buffer Standards
……D-17

List of Acronyms Used in this Document

ACRE	Agricultural Chemical Reduction Effort
AIG	Accelerated Implementation Grant
AIS	Aquatic Invasive Species
AMA	Aquatic Management Area
BMP	Best Management Practice
BWSR	Minnesota Board of Water and Soil Resources
CAC	Vermillion River Watershed Community Advisory Committee
CAMP	Citizen Assisted Monitoring Program
CIP	Capital Improvement Program
CPCA	County Park Conservation Area
CPL	Conservation Partners Legacy
CVA	Climate Vulnerability Assessment
CWF	Clean Water Fund
DCSWCD	Dakota County Soil and Water Conservation District
DWSMA	Drinking Water Supply Management Area
DNR	Minnesota Department of Natural Resources
EAB	Emerald Ash Borer
ECOC	Emerging Contaminants of Concern
ECS	Ecological Classification System
EPA	United States Environmental Protection Agency
ERA	Emergency Response Area
GIS	Geographic Information System
HOA	Homeowners Association
HSG	Hydrologic Soil Group
HUC	Hydrologic Unit Code
IBI	Index of Biological Integrity
JPA	Joint Powers Agreement
JPB	Vermillion River Watershed Joint Powers Board
LA	Load Allocation
LGU	Local Government Unit
LID	Low Impact Development
LWMP	Local Water Management Plan
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MIDS	Minimum Impact Design Standards

List of Acronyms cont.

MNDOT	Minnesota Department of Transportation
MPARS	Minnesota Permitting and Reporting System
MPCA	Minnesota Pollution Control Agency
MS4	Municipal Separate Storm Sewer System
MTDs	Manufactured Treatment Devices
NHIS	National Heritage Information System
NOAA	National Oceanic and Atmospheric Administration
NO_3	Nitrate
NPDES	National Pollutant Discharge Elimination System
OHF	Outdoor Heritage Fund
PEP	Public Engagement Plan
Plan	Vermillion River Watershed Management Plan
SNA	Scientific and Natural Area
SSTS	Subsurface Sewage Treatment Systems
SSWCD	Scott Soil and Water Conservation District
SWCDs	Soil and Water Conservation Districts
TAC	Vermillion River Watershed Technical Advisory Committee
TALU	Tiered Aquatic Life Use
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
VRMN	Vermillion River Monitoring Network
VRWJPO	Vermillion River Watershed Joint Powers Organization
WASCOB	Water and Sediment Control Basin
WBIF	Watershed Based Implementation Funding
WCA	Minnesota Wetland Conservation Act
WLA	Waste Load Allocation
WMA	Wildlife Management Area
WRAPS	Watershed Restoration and Protection Strategies
WOMP	Watershed Outlet Monitoring Program
WWTP	Wastewater Treatment Plant

Executive Summary

Introduction

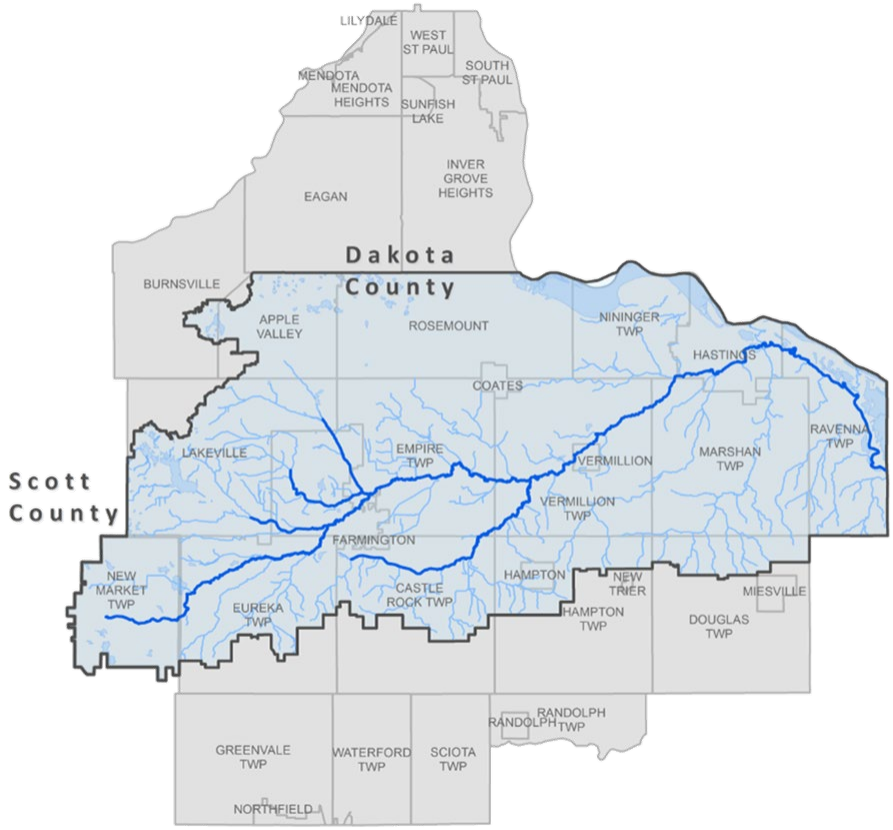


Figure E-1: Map of VRWJPO Political Boundaries

The Vermillion River Watershed drains 335 square miles in Dakota and Scott counties, with the majority in central Dakota County, to the Vermillion River and tributary waterbodies. It is the largest geographic watershed in the Twin Cities Metropolitan Area and part of one of the state's 81 "major" watersheds, denoted by an 8-digit Hydrologic Unit Code (HUC-07040001), meaning an area of the landscape that drains to a portion of a stream network. It is unique to a large metropolitan area for its 51.6 miles of Minnesota Department of Natural Resources (DNR)-designated trout streams. An interactive map of the watershed can be seen here.

The Vermillion River Watershed Joint Powers Organization (VRWJPO) formed in 2002 when Dakota and Scott counties signed a joint powers agreement (JPA) to manage the Vermillion River Watershed per Minnesota Statutes 103B and Minnesota Rules 8410. The VRWJPO is governed by a three-member Joint Powers Board (JPB) consisting of two Dakota County Commissioners and one Scott County Commissioner. The VRWJPO's mission is to:

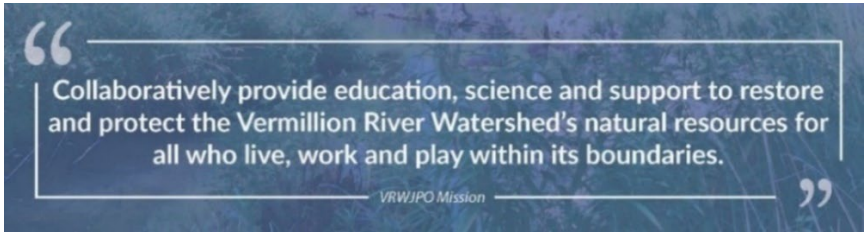


Figure E-2: VRWJPO Mission Statement

To achieve this mission, VRWJPO staff support and implement a range of programs, activities, and projects designed to protect, improve, and manage resources in its jurisdiction.

This third-generation 2026-2035 Vermillion River Watershed Management Plan (Plan) includes the input of many stakeholders who care about the resources in the watershed where they live, work, or play. It contains details relating to topography, soils, geology, groundwater resources, surface water resources, stormwater systems, climate and precipitation, natural communities, endangered and invasive species, fish and wildlife habitat, water-based recreation areas, and land uses. This information helps illustrate the ecological diversity within the VRWJPO, the role the human-built environment imparts on the natural environment, and the condition of resources within its

boundaries, helping to inform issues and actions to address said issues. *A full analysis of the VRWJPO's natural resources can be found in Appendix B.*

Stakeholder Engagement

At the start of this Plan update process, the VRWJPO created a Public Engagement Plan (PEP) to give stakeholders ways to provide input on priority issues, per Minnesota Rule 8410.0045. Engaged stakeholders included:

- Residents
- Business and industries in the watershed
- Nonprofit, advocacy, and special interest groups
- Cities, counties, and townships in the VRWJPO
- State and regional agencies

Outreach efforts included:

- Three in-person stakeholder events
- Two in-person pop-up events
- Six virtual stakeholder meetings
- Online and in-person surveys
- Display boards at four public libraries and two parks

Themes of Stakeholder Response

Below are the themes that arose from the stakeholder engagement process. These form the foundation of the Plan and encompass focus areas for its 10-year span. *Details of the full engagement process can be found in Appendix C.*

Surface Water Quality



Figure E-3: South Creek, a major tributary of the Vermillion River

The Vermillion River Watershed is rich with surface water resources, including streams and recreational lakes. Stakeholders feel a strong connection to these resources, and the VRWJPO seeks to foster that relationship. Surface water quality efforts are interwoven throughout many aspects of the VRWJPO's work.

Groundwater Quality

Everyone deserves access to clean drinking water. Groundwater is the primary source of drinking water for VRWJPO residents, through either municipal or private wells (the only exception is the City of Burnsville, which sources its drinking water from the Kramer Quarry). Emerging contaminants, winter operations, and pollutants from agricultural activities threaten groundwater quality. While other agencies take the lead in groundwater planning and protection, the VRWJPO can foster partnerships that protect groundwater quality.



Figure E-4: Dakota County Soil and Water Conservation District (DCSWCD) Monitoring Staff



Figure E-5: Stormwater improvements on the North Creek tributary of the Vermillion River

Stormwater Management

The VRWJPO is home to several communities that are experiencing significant residential, commercial, and industrial development. With development comes additional impervious surface and stormwater runoff. Stormwater runoff collects pollutants as it runs over the landscape and contributes the runoff and pollutants to waterbodies. The VRWJPO will foster implementation of practices to ease stormwater impacts over the life of the Plan.

Natural Environments

The VRWJPO contains diverse natural environments unique to a major metropolitan area. However, these environments are threatened by competing land uses and invasive species. This Plan prioritizes protection, enhancement, and restoration of natural ecosystems.



Figure E-6: Brook trout in South Creek

Climate Resilience

Weather patterns have become more erratic, favoring intense storm events that produce excessive runoff and decrease natural infiltration, as well as extreme drought and temperature fluctuations. These negatively affect the VRWJPO's natural and built environments. While the VRWJPO does not have a direct role in addressing greenhouse gases, this Plan defines the VRWJPO's role in climate resilience relating to water resources.



Figure E-7: Stormwater improvements on a tributary of South Creek



Figure E-8: Educational signage at a stormwater reuse system in Lakeville, implemented by the City, VRWJPO, and Dakota County

Groundwater Sustainability

The same groundwater used for drinking is also used in agriculture, industry, and other residential needs. Groundwater also supports surface baseflows in the Vermillion River and its tributaries, along with ecosystem function. At the start of the Plan process, the region experienced a three-year-long drought, highlighting the need to balance groundwater supply with demand.

Community Relationships

Stakeholders in the VRWJPO can implement practices in their daily lives that improve local water resources. However, there is room for growth in community engagement. Engaging the public on stewardship opportunities, environmental issues, and the work of the VRWJPO are focuses of this Plan.



Figure E-9: VRWJPO Staff Showcase an Adopt-a-Drain Display

Plan Structure

After the initial public engagement process, VRWJPO staff sought direction from the organization's Community Advisory Committee (CAC), Technical Advisory Committee (TAC), and JPB to assess priority issues for the Plan based on stakeholder input. Staff married their direction with other local plans, pertinent studies, monitoring and assessment data, and the VRWJPO's role in water governance to formulate Issue Categories, Issue Statements, and Goals. *A list of studies and references used in constructing this Plan can be found in Appendix A.*

Issues and Goals

This Plan is organized by the six Issue Categories described below, each with a unique color and icon and Issue Statements and Goals. The framework of the Plan provides the greatest level of measurability at the Action level. Each Action has connected Measurable Outcomes listed in *Table 3-16* on page 65.

Progress toward Issue Category Goals is based on measures that reflect a challenging yet achievable success rate of Measurable Outcomes. A success rate percentage was defined for each Goal, while accounting for unknown circumstances such as: available budget (i.e. grant success rate, partner funds); landowner willingness; property acquisition and access; project and partner support; and other factors to align with the requirements of Minnesota Rule 8410.0080.

1. Water Quality

Water Quality Issue Statements

- Surface water quality is threatened or impaired.
- Groundwater quality is threatened or impaired.

Water Quality Goals

- Protect and improve surface water quality by reducing 234.5 lbs/yr Total Phosphorus (TP) and 823.9 tons/yr Total Suspended Solids (TSS).
- Protect and improve groundwater quality by reducing 1,323 lbs/yr Nitrate (NO_3).

2. Stormwater Management

Stormwater Management Issue Statements

- Land alterations and lack of adequate stormwater management in the VRWJPO have increased the rate and volume of stormwater runoff, impacted water quality, degraded habitat, and increased flood risk.
- Watershed regulations are challenging for some local government units to enforce.

Stormwater Management Goals

- Reduce runoff rate and volume by 110 acre-ft/yr.
- Develop and implement practicable and protective VRWJPO Rules and Standards through the revision process with stakeholder involvement three times.

3. Groundwater Sustainability



Groundwater Sustainability Issue Statements

- Groundwater aquifer supply is threatened due to increased and competing uses.
- Groundwater recharge rates are decreasing due to landscape alterations and climatic fluctuations.

Groundwater Sustainability Goal

- Protect and improve groundwater aquifer supply through partnerships with other organizations to implement 2 groundwater conservation assessments and 8 groundwater conservation projects.

4. Climate Resilience



Climate Resilience Issue Statements

- Climate patterns are negatively impacting the VRWJPO's natural and built environments.
- Historic stormwater infrastructure is not adequate to manage climate patterns.

Climate Resilience Goals

- Improve the resilience of the VRWJPO's natural and built environments through implementation of 5 projects.
- Adapt stormwater infrastructure to changing precipitation patterns through implementation of 2 projects.

5. Natural Environments



Natural Environments Issue Statement

- Human-caused ecosystem disruptions decrease biological diversity, promote the proliferation of invasive species, and have wide-reaching impacts to the VRWJPO's natural environment.

Natural Environments Goals

- Mitigate impacts from human-caused ecosystem disruptions.*
- Protect and enhance natural environments.*

* Measure of combined goals' success based on percentage of measurable outcomes presented in *Table 3-16*, including: 29 projects, 40 acres of wetland restored, 1,334 lbs/yr TP removed, 351 tons/yr TSS removed, 8,607 lbs/yr NO_3 removed.

6. Community Relationships

Community Relationships Issue Statements

- Public awareness and understanding of the VRWJPO are limited.
- Community members in the watershed lack awareness of opportunities to engage in the VRWJPO's work.

Community Relationships Goals

- Improve the awareness and understanding of the VRWJPO through 1,740 social media posts, 24 newsletters, 117,000 website views and posting 9 project signs.
- Increase community connection to the watershed's natural resources through awarding 6 Stewardship Grants, implementation of 96 LCW projects, 12 Lawns Reimagined projects, participation in 72 public events, and offering 3 watershed tours.
- Increase community understanding of environmental issues through 1,740 social media posts, 24 newsletters, 117,000 website views, 12 community organization presentations, 6 classroom presentations, and posting 9 project signs.

Implementation Plan

Implementation Actions are detailed in Section Three. Estimated costs, year(s) of implementation, priority level, and relationship to Plan Objectives are associated with each Action within the Implementation Plan (*Tables 3-14 and 3-15*). The Implementation Plan was developed to encompass critical ongoing Actions, as well as Actions to address emerging issues and changing priorities. Notable actions of highest priority include those listed in *Table E-1*:

Table E-1: Priority Actions in the Implementation Plan

Category	Item ID	Action Description
Water Quality	WQ-1	Annually administer the Vermillion River Monitoring Network (VRMN) including physical, chemical, and biological monitoring.
	WQ-2	Fund additional subwatershed, geomorphic and other assessments to identify water quality improvement projects and practices.
	WQ-3	Implement projects such as infiltration, filtration, ponding, reuse, hydrodynamic separators, and Manufactured Treatment Devices (MTDs) identified within the City of Lakeville North Creek and East Lake Subwatershed Assessment.
	WQ-4	Implement projects such as infiltration, diversion, reuse, and alum identified within the City of Apple Valley East Lake Subwatershed Assessment.
	WQ-5	Implement projects such as filter strips, grassed waterways, Water and Sediment Control Basins (WASCOBs), wetland restorations, and native grasses identified within the Vermillion River Headwaters Subwatershed Assessment.
	WQ-6	Implement projects such as filter strips, grassed waterways, WASCOBs, streambank and shoreline stabilizations identified within the Upper Mainstem Subwatershed Assessment.
	WQ-7	Implement projects such as grassed waterways, WASCOBs, critical area plantings, filter strip, grade stabilization, streambank stabilizations, and wetland restorations identified within the South Branch Vermillion River Subwatershed Assessment.

Table E-1 Continued: Priority Actions within the Implementation Plan

Category	Item ID	Action Description
Water Quality	WQ-8	Implement projects such as WASCOBs and grassed waterways identified within the Vermillion River Lower Mainstem South Subwatershed Assessment.
	WQ-9	Implement projects and practices to address East Lake's Waste Load Allocation (WLA) defined within the Vermillion River Watershed Total Maximum Daily Load (TMDL).
Stormwater Management	SW-1	Implement projects such as infiltration, filtration and hydrodynamic separators identified within the Hastings Direct Drainage Subwatershed Assessment.
	SW-2	Implement projects such as infiltration, filtration, pervious paver, boulevard tree trench, cistern, wetland and stream restoration, and MTDs identified within the South Creek Subwatershed Assessment.
	SW-3	Implement projects such as treatment train, underground vault/pipe gallery and biofiltration projects identified within the City of Farmington Subwatershed Assessment.
	SW-4	Implement projects such as bioretention basin, retention pond, impervious reduction, and stormwater reuse identified within the City of Farmington Stormwater Retrofit Assessment for Independent School District 192.
	SW-5	Implement innovative Stormwater Management projects and practices such as green infrastructure, stormwater reuse, and Low Impact Development (LID) Best Management Practices (BMPs).
Groundwater Sustainability	GS-1	Collaborate with partners for local, regional and state groundwater conservation assessments.
	GS-2	Implement projects, programs and practices identified within the Dakota County Groundwater Plan such as a VRWJPO-wide water supply/conservation initiative, cost-sharing for water conservation projects, working with the DNR to ensure large groundwater appropriation requests are sustainable, and more.
Climate Resilience	CR-1	Partner in the development of a Climate Resiliency Plan to include, but not be limited to an inventory of inadequate stormwater infrastructure, feasibility of stormwater pond smart technology, flood risk assessments, and natural resource susceptibilities to drought.
	CR-2	Provide incentives for projects identified within the Climate Resiliency Plan.
	CR-3	Implement restoration and enhancement projects that connect water resources to the historic floodplain.

Table E-1 Continued: Priority Actions within the Implementation Plan

Category	Item ID	Action Description
Natural Environments	NE-1	Implement projects such as: natural channel restoration/relocation, grade control, floodplain management, riparian management, bank stabilization, and culvert crossing projects identified within the South Creek Geomorphic Assessment.
	NE-2	Implement projects such as: natural channel restoration/relocation, grade control, floodplain management, riparian management, bank stabilization, and culvert crossing projects identified within the Etter Creek and Ravenna Coulees Geomorphic Assessment.
	NE-3	Implement projects such as: bank stabilization, floodplain management, grade control, natural channel restoration, and riparian management projects identified within the Middle and North Creek Geomorphic Assessment.
	NE-4	Implement projects such as: bank stabilization, culvert crossing, natural channel restoration, infrastructure, and riparian management projects identified within the Empire Drainages Geomorphic Assessment.
	NE-5	Implement projects such as: bank stabilization, riparian management, and infrastructure improvement projects identified within the Lower Mainstem Vermillion River Geomorphic Assessment.
	NE-6	Restore priority wetlands and administer the VRWJPO Wetland Banking Program to achieve no net loss of wetlands within the watershed.
	NE-7	Restore areas identified within Priority Wetland Restoration studies, not just for the purpose of the creation of a wetland bank.
	NE-8	Implement projects and practices to address East Lake's Load Allocation (LA) defined within the Vermillion River Watershed TMDL.

Category	Item ID	Action Description
Community Relationships	CMR-1	Provide Stewardship Grants to individuals and groups in the watershed who are looking to install BMPs with direct water resource benefits.
	CMR-2	Host display tables at community events where attendees are likely to be interested in environmental topics.
	CMR-3	Keep the VRWJPO website up to date by regularly reviewing and posting pertinent content.
	CMR-4	Electronically distribute VRWJPO newsletter with watershed updates, news, and tips.
	CMR-5	Annually plan, promote, and provide financial incentives for partner programs that align with the goals and objectives of this Plan.
	CMR-6	Engage stakeholders and the public through insightful social media posts.

Evaluating Success

Within 120 days of the end of each calendar year, the VRWJPO must submit an annual activity and financial report to the Minnesota Board of Water and Soil Resources (BWSR) in accordance with Minnesota Rule 8410.0150. Items in the submitted report include, but are not limited to:

- Descriptions of activities completed relating to the previous year's annual work plan
- Expenditures relating to the VRWJPO's general budget categories and special projects
- Monitoring data for water quantity, quality, temperature, and biological characteristics at several stream reaches
- A budgeted work plan and activities for the next year

In prior years, the VRWJPO would also create a measurable outcomes evaluation of progress made towards goals and implementation actions within the 2016-2025 Vermillion River Watershed Management Plan, including items part of the Capital Improvement Program (CIP), every two years. Beginning in 2024, staff began folding measurable outcomes data into the annual activity report. If, during the evaluation process, it is found that the Plan should be modified to continue planned progress towards goals and actions, VRWJPO staff will follow the amendment process described in *Subsection 1.4: Amendments to the Plan.*

Local Water Management Plan Implementation

Following adoption of the Plan, Local Government Units (LGUs) with land use planning and regulatory authority for territory within the VRWJPO must prepare a local water management plan (LWMP), a CIP, and official controls to ensure local water management is consistent with the VRWJPO's Plan. Content must follow guidelines described in MN Statute 103B.235 and MN Rule 8410.0160. LGUs are responsible for permitting and implementation of local or state jurisdictional controls to ensure they meet or exceed the VRWJPO's Standards (*Appendix D).*

Section One: Introduction

The Vermillion River Watershed 2026-2035 Management Plan establishes the priorities and framework for managing water resources within the VRWJPO over the next ten years. The Plan will be implemented by VRWJPO staff at the discretion of the JPB.

1.1 Watershed History and Organization

The Metropolitan Surface Water Management Act (Minnesota Statutes 103B.201-253) established the purposes of watershed management organizations, including to:

- Protect, preserve, and use natural surface and groundwater storage and retention systems
- Minimize public capital expenditures needed to correct flooding and water quality problems
- Identify and plan for means to effectively protect and improve surface and groundwater quality
- Establish more uniform local policies and official controls for surface and groundwater management
- Prevent erosion of soil into surface water systems.
- Promote groundwater recharge
- Protect and enhance fish and wildlife habitat and water recreational facilities
- Secure the other benefits associated with the proper management of surface and groundwater

In 1984, the cities and townships within the Vermillion River Watershed entered into a JPA to manage the watershed. This organization was unable to fulfill the conditions of the Metropolitan Surface Water Management Act and dissolved in August 2000.

Following the dissolution of the first watershed management organization, Dakota and Scott counties became statutorily responsible for managing the Vermillion River Watershed. In 2002, the counties entered into a JPA to create the VRWJPO as it operates today. The VRWJPO is governed by the three-member JPB, composed of two Dakota County Commissioners and one Scott County Commissioner. The JPA underwent minor updates in 2024 to modernize language and meeting formats. The revised JPA was approved by the respective Dakota and Scott County Boards in January 2025.

In accordance with Minnesota Rule 8410.0045, the JPA established a nine-member CAC for the purpose of making recommendations to the JPB on the Plan. The JPB also established a TAC consisting of cities, state agencies, and other interested groups to provide technical consultation.

The first-generation Vermillion River Watershed Management Plan was adopted in 2005. The second-generation Plan was adopted in 2016 and amended in 2022 following completion of the Vermillion River Watershed Restoration and Protection Strategy (WRAPS) document. Since the adoption of the 2016-2025 Plan, changes observed across the VRWJPO include, but are not limited to:

- Continued development and population growth
- Increased storm intensity as reflected in the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, with the NOAA currently developing Atlas 15 to constitute the new authoritative, spatially continuous National Precipitation Frequency Atlas of the United States
- Moderate to severe drought conditions in 2021, 2022, and 2023
- Changes in federal, state, and local regulations affecting water management
- Key scientific research that changed the understanding of water resources
- Technology developments

- The VRWJPO receiving biennial Clean Water Fund Watershed-Based Implementation Funding (WBIF) to accelerate water management outcomes
- Emerging and worsening pollutants of concern
- Increased water usage by high-volume users (e.g. industrial, agricultural, municipal)

Development of this third-generation Plan has incorporated these observed changes, considering their role within the scope of priority issue identification.

1.2 VRWJPO Mission

The mission of the VRWJPO is to collaboratively provide education, science, and support to restore and protect the Vermillion River Watershed's natural resources for all who live, work, and play within its boundaries. VRWJPO staff and stakeholders operate according to the idea that watershed management should be based on inclusive public engagement, targeted priorities, beneficial outcomes, and sound scientific data. These principles form the foundation of all VRWJPO's work.

1.3 Plan Development Process and Stakeholder Engagement

Development of the third-generation Plan took place in accordance with Minnesota Rules 8410.0045, 8410.0080 and 8410.0105. This included:

- Authorization from the JPB to begin the Plan update
- A 60-day comment period for plan review agencies identified in MN Statute 103B.231 and key stakeholders to provide input on priority issues, water management goals, and water resource information before beginning further Plan development
- Hosting an initial planning meeting following the 60-day comment period complying with open meeting law
- Creating a Public Engagement Plan (PEP) to outline the steps for gathering timely, relevant, and candid stakeholder feedback on issues, concerns, and potential strategies to be included in the Plan
- Engaging stakeholders, the CAC, TAC, and JPB in assessing and identifying priority issues with a variety of outreach methods
- Identifying and considering all relevant local plans, programs, monitoring data, studies, assessments, VRWJPO roles, and funding levels for establishment of priority issues and "edge-matching" with partner efforts
- Ensuring measurable Goals address priority Issues and allow annual measurement of progress made towards Actions in the Plan
- Requesting CAC, TAC, and JPB prioritization of Objectives meant to address priority Issues identified within the Plan
- Requesting CAC, TAC, and JPB prioritization of Topics of Importance meant to inform creation of Implementation Plan actions and schedule
- Meeting with LGUs in the watershed to discuss their 10-year CIPs and potential partnerships
- Establishing prioritized implementation actions that align with stakeholder input, staff capacity, and scientific data
- Ensuring clear illustration of VRWJPO project and program funding relating to implementation actions, LGU partnerships, annual levy projections, and staff capacity
- Performing a 60-day review and comment period for the draft Plan for statutorily required review agencies (Minn. Stat. 103B.231) from Aug. 28-Oct. 28, 2025
- Responding in writing to all comments received by review agencies no less than 10 days before the public hearing

- Holding a public hearing on the draft Plan after the 60-day review period on January 22, 2026

A consulting firm worked with VRWJPO staff to develop, facilitate, organize, and summarize the public engagement process. *Details of the full engagement process and findings can be found in Appendix C.*

Staff found the following Plan structure to be the most navigable for implementation and measuring progress:

- **Watershed Mission** – Guides all aspects of the Plan.
- **Issue Categories** – Derived from feedback collected during the engagement process, these present areas of focus that will be addressed in the Goals and Implementation sections of the Plan. Issue Statements developed by staff sum up items a Plan user can expect to see within each respective category, allowing categorization of initiatives in a meaningful and representative way.
- **Goals** – Measurable Goals accompany each Issue Category. Goals are consistent with the purposes of the Metropolitan Water Management Program described in Minnesota Statute 103B.201. These Goals provide direction toward



Figure 1-1: Issue Categories, Issue Statements, and Goals in the Plan

addressing the VRWJPO's Issues and set up how to measure progress over the life of the Plan.

- **Objectives** – Objectives catalog activities required to achieve Goals.
- **Topics of Importance** – Topics of Importance relate to each Issue Category to guide prioritization of Action items included in the Implementation Plan.
- **Actions** – Prioritized Implementation Actions are the finest-scale items within the Plan, speaking to specific projects, programs, and practices, along with corresponding geographic locations. While the Plan presents Actions organized by Issue Categories, development of Actions followed the directives of Minnesota Rule 8410.0105. This includes assurance of Actions that fit within local CIPs, operation and maintenance programs, information and education programs, data collection programs, regulatory programs, incentive programs, and water restoration and protection programs.



Figure 1-2: Graphic overview of Plan structure

1.4 Amendments to the Plan

This third-generation Watershed Management Plan guides the VRWJPO's work for 2026-2035, based on the collective vision of VRWJPO's staff, JPB, CAC, TAC, and stakeholders. However, changes during the life of the Plan may result in the need for amendments. The following changes can be made to the Plan without an official amendment:

- Formatting or reorganization of the Plan
- Revising a procedure to streamline administration of the Plan
- Clarification of existing Goals or policies
- Inclusion of additional data not requiring interpretation
- Expansion of public process
- Adjustments to how an organization will carry out program activities within its discretion

All other changes to the Plan require an amendment, per Minn. Rule 8410.0140. The process for amending the Plan will follow Minn. Statute 103B.231.

1.5 Consistency with Local Water Management Plans

Per MN Statute 103B.235, following adoption or amendment of this Plan, LGUs with land use and regulatory responsibility for territory in the VRWJPO shall prepare LWMPs, CIPs, and official controls as necessary to bring local water management into conformance with the Plan. This includes the requirement for each LGU in Dakota and Scott Counties to determine by resolution whether to prepare a LWMP or to delegate all or part of the preparation of the LWMP to the County. LGUs shall follow all review, adoption, and amendment proceedings as prescribed by statute, including adopting LWMPs no more than two years before the local comprehensive plan is due. A LWMP must:

- Describe the existing and proposed physical environment and land use
- Define drainage areas and volumes, rates, and paths of stormwater runoff
- Identify areas and elevations for stormwater storage adequate to meet performance standards established in the VRWJPO's Plan
- Identify regulated areas
- Set forth an implementation program, including a description of official controls and, as appropriate, a CIP

Prior to adoption, each LGU must submit its LWMP to the VRWJPO for review to ensure consistency with the Plan, pursuant to MN Statute 103B.231. The VRWJPO will provide its response within 60 days. If in Dakota County, the LGU must also submit its LWMP to Dakota County to ensure consistency with the 2020-2030 Dakota County Groundwater Plan. The County will have 45 days to complete its review. Should either organization fail to complete its review by the deadline, the LWMP will be deemed approved unless the LGU agrees to an extension.

At the same time, each LGU must submit its LWMP to the Metropolitan Council for review and comment. The Council will have 45 days to review and comment on the LWMP for consistency with their Comprehensive Development Guide for the Twin Cities Metropolitan Area. The Council's 45-day review period runs concurrently with the 60-day VRWJPO review period.

Following approval by the VRWJPO, the LGU must adopt its LWMP within 120 days. Any amendments to official controls required to maintain consistency with the VRWJPO's Plan must be completed within 180 days.

Section Two: Issues, Goals, Objectives, and Topics of Importance

2.1 Identification of Issue Categories

As detailed in *Appendix C*, the VRWJPO and its consultant executed a PEP in 2023-2024 to develop, organize, facilitate, and summarize an engagement process to inform the Plan development. The PEP guided the public engagement process through effective and inclusive engagement methods for a diverse range of stakeholder groups to motivate and involve the VRWJPO's traditional stakeholders and those stakeholders who may not normally engage. Highlights of engagement events associated with execution of the PEP are shown in *Figure 2-1*.

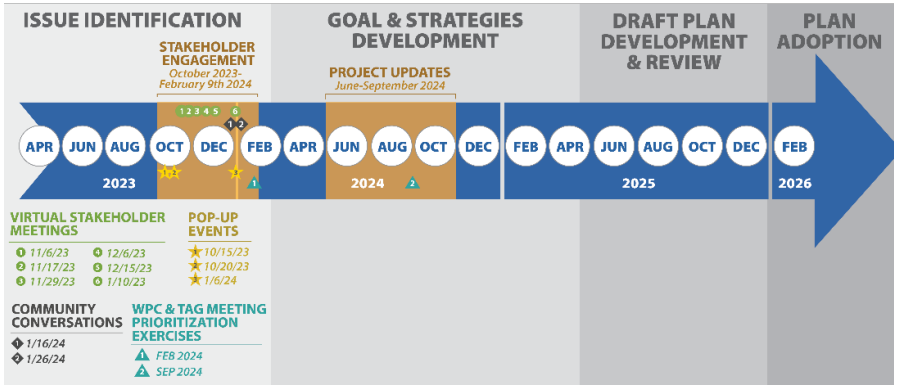


Figure 2-1: Timeline of engagement and Plan development stages

With the authorization of the JPB, on April 3, 2023, the VRWJPO notified all state review agencies as required in MN Rule 8410.0045 of their initiation of the Plan update process, requesting feedback related to priority issues, water management goals, and water resource information. Agencies had 60 days to provide comments. After the initial 60-day comment period, VRWJPO hosted an initial planning meeting and open house on October 14, 2023, to formally begin receiving public input.

Issue Identification engagement ran through the end of January 2024, and included virtual meetings, Community Conversations, online and paper surveys, a Social Pinpoint map, and pop-up events. Nearly 320 people participated in the issue identification phase of the Plan update through this process. Additionally, VRWJPO staff regularly solicited feedback from the CAC (*formerly called the Watershed Planning Commission, or WPC, as seen in Figure 2-1*), TAC (*formerly called the Technical Advisory Group, or TAG as seen in Figure 2-1*), and legally required review agencies. *Details of the feedback collected during the engagement process, including lists of entities engaged, written responses, survey results, and prioritization exercises can be found in Appendix C.*

Using the information collected from this round of public engagement, staff developed six Issue Categories:

1. Water Quality
2. Stormwater Management
3. Groundwater Sustainability
4. Climate Resilience
5. Natural Environments
6. Community Relationships

2.2 Issue Statements, Goals, Objectives, and Topics of Importance

As detailed in Subsection 1.3 (Plan Development Process and Stakeholder Engagement), the Plan is organized according to Issues, Goals, Objectives, and Actions. The various stakeholder-identified issues are sorted into Issue Categories. Issue Statements clarify the specific issues identified by stakeholders, informing Goals, Objectives, and Actions found within the Implementation Plan.

Topics of Importance are also included in each Issue Category. During the Plan prioritization process, it became clear that prioritizing items at the Objective level would allow for enough detail to give clear direction on initiatives over the Plan's lifespan. However, Topics of Importance were needed to help staff formulate activity-specific prioritization.

For detailed information relating to the VRWJPO's surface and groundwater resources, water quality and quantity trends, public drainage systems, subwatershed and geomorphic assessments, monitoring programs, and other information that aided in the formulation of Goals, Objectives, and Topics of Importance, please refer to Appendix B.

The subsections on the following pages present the six Issue Categories, along with their respective Issue Statements, Goals, Objectives, and Topics of Importance. Each Objective and Topic of Importance is marked as High, Medium, or Low Priority based on stakeholder and staff prioritization exercises, which are described in Section Three (Implementation Plan).

Water Quality

Issue Category 1: Water Quality

Water quality has been a primary driver of work since the VRWJPO's inception. For this generation Plan, water quality encompasses both surface and groundwater sources.

Water quality can be impacted by either point sources or non-point sources of pollution. Point source pollution discharges to a receiving water at a specific point with a known source, whereas a non-point source pollutant cannot be traced to a singular location or source. Examples of point source pollution include failing septic systems or untreated industrial discharges. Non-point pollutant sources include stormwater or agricultural runoff.

Point and non-point sources of pollution can originate from all types of land uses. As the VRWJPO is diverse in terms of land use, there are a variety of pollutant sources the water quality issue category aims to address. The Plan approaches this issue holistically, including actions to: implement practices that protect and improve water quality, participate in and support water quality monitoring, and foster partnerships that result in protecting or improving water quality.

Water Quality Issue Statements

- Surface water quality is threatened or impaired.
- Groundwater quality is threatened or impaired.

Water Quality Goals

- Protect and improve surface water quality by reducing 234.5 lbs./yr of TP and 823.9 tons/yr of TSS
- Protect and improve groundwater quality by reducing NO_3 pollution by 1,323 lbs./yr

Water Quality Objectives (H = High Priority, M = Medium Priority, L = Low Priority)

- Remove surface waters from the impaired waters list - **H**
- Protect surface waters from impairments - **H**
- Use surface water quality monitoring data to inform restoration and protection decisions - **H**
- Support and implement projects, programs, and practices to protect or improve groundwater quality - **M**
- Coordinate with others to assess impacts to groundwater from the Vermillion River and its tributaries - **M**
- Assist and coordinate groundwater quality work with lead groundwater organizations - **L**

Water Quality Topics of Importance (H = High Priority, M = Medium Priority, L = Low Priority)

- Projects that address nutrients (phosphorus, NO_3) - **H**
- Projects that address total suspended solids/sediment - **H**
- Projects that address aquatic biota (temperature, dissolved oxygen) - **M**
- Projects that address chloride - **M**
- Projects that address toxics/metals/emerging concern contaminants/pesticides - **M**
- Projects that address bacteria - **L**
- Projects that address aquatic invasive species (AIS) - **L**

Issue Category 2: Stormwater Management

Land alterations disrupt natural hydrology through the removal of natural vegetation, increasing the amount of impervious surface, draining the landscape for production, and lessening water's natural ability to infiltrate into the ground. When water is unable to infiltrate naturally, it is directed elsewhere as stormwater runoff.

Runoff collects pollutants as it runs across the landscape, eventually making its way, often untreated, into area waterbodies. Runoff volume also has implications for natural and built environments, with streams and stormwater infrastructure subjected to higher flow rates and volumes than their natural or built capacities, resulting in degraded habitat, disconnected floodplains, and exacerbated erosion. Through development, historic wetlands have been filled or become altered or diminished, removing natural flood attenuation features and increasing the likelihood of flooding in populated areas.

This Plan addresses management of stormwater through implementation Actions that: promote conservation of features that naturally attenuate stormwater, expand on built practices that can improve stormwater quality and quantity, and capture and reuse stormwater where feasible.

Stormwater Management Issue Statements

- Land alterations and lack of adequate stormwater management in the VRWJPO have increased the rate and volume of stormwater runoff, impacted water quality, degraded habitat and increased flood risk.
- The VRWJPO Standards are challenging for some LGUs to enforce.

Stormwater Management Goals

- Reduce runoff rate and volume by 110 acre-ft/yr
- Develop and implement practicable and protective VRWJPO Standards through the revision process with stakeholder involvement three times

Stormwater Management Objectives (H = High Priority, M = Medium Priority, L = Low Priority)

- Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape - H
- Promote and implement infiltration practices - H
- Promote protection of natural floodplain capacities - M
- Assist in the development and implementation of policies and programs that promote green infrastructure and LID practices - M
- Collaborate with technical experts and LGUs when updating, revising, or changing VRWJPO Standards - M
- Ensure VRWJPO Standards can be administered by local governments - L
- Assist local governments with navigating and understanding regulatory framework - L

Stormwater Management Topics of Importance (H = High Priority, M = Medium Priority, L = Low Priority)

- Green infrastructure/LID BMPs: BMPs that act to reduce the amount of impervious surface including rain gardens, tree trenches, green roofs, landscaping islands - H
- **Infiltration** BMPs: BMPs that capture stormwater runoff, temporarily store it, and then allow it to infiltrate into the underlying soil rather than (or in addition to) conveying it offsite. Examples include infiltration basins, infiltration trenches, dry wells, underground infiltration systems. Some other BMPs like bioretention, permeable pavement, or tree trenches/boxes can also function as infiltration devices - M
- **Filtration** BMPs: BMPs include above or below ground constructed devices or systems that provides water quality

treatment by filtration or sieving stormwater runoff through media (gravel, sand, biochar, etc.), including sand filters, enhanced sand filters, or stormwater pond perimeter filtration benches - **M**

- Stormwater reuse projects - **M**
- More stringent stormwater management requirements for new development or redevelopment (discharge rate reduction, increase amounts of volume control and decrease floodplain alteration) – **L**
- Temporary storage sedimentation BMPs: BMPs that temporarily pond water and allow for sediment to settle from the water column, including wet ponds, stormwater wetlands and manufactured devices such as hydrodynamic separators - **L**

Issue Category 3: Groundwater Sustainability

Communities within the VRWJPO rely primarily on groundwater aquifers for drinking water, whether supplied via municipal or private wells. With VRWJPO community growth and changing climate patterns leading to more runoff or persistent and intense droughts, groundwater supplies are being impacted.

While the VRWJPO is not a governing body for groundwater supply, impacts to groundwater have implications for local communities and groundwater's interaction with surface water resources. For this reason, the Plan incorporates groundwater supply implementation Actions that assist with groundwater conservation initiatives and lean on the expertise of groundwater supply lead agencies.

Groundwater Sustainability Issue Statements

- Groundwater aquifer supply is threatened due to increased and competing uses.
- Groundwater recharge rates are decreasing due to landscape alterations and climatic fluctuations.

Groundwater Sustainability Goal

- Protect and improve groundwater aquifer supply through partnerships with other organizations to implement 2 groundwater conservation assessments and 8 groundwater conservation projects.

Groundwater Sustainability Objectives (H = High Priority, M = Medium Priority, L = Low Priority)

- Assist with and coordinate groundwater supply planning, protection, and improvement efforts with lead groundwater organizations - **H**
- Assist with and implement projects, programs, and practices that reduce landscape and agricultural water use - **M**
- Assist with and implement projects, programs, and practices that promote infiltration - **L**

Groundwater Sustainability Topics of Importance (H = High Priority, M = Medium Priority, L = Low Priority)

- Soil health initiatives (cover crops, compost amendments, residue and tillage management, contour buffer strips, critical area plantings) - **H**
- Agricultural irrigation efficiency improvements- **H**
- Residential, commercial, and industrial irrigation efficiency improvements - **H**
- Projects and practices that promote natural infiltration (low-input landscapes, bioretention, trees, green roofs, permeable pavement, bioswales, etc.) - **M**
- Indoor appliance efficiency improvements (toilets, dishwashers, washing machines) - **L**

Climate Resilience

Issue Category 4: Climate Resilience

Deviations from historic climate patterns have resulted in changes to the VRWJPO's precipitation and temperature trends. Precipitation frequency and intensity trends now result in increased risk of flooding, drought, and corresponding risk to vegetation and infrastructure. Variable temperature swings (high-highs and low-lows) likewise place strain on vegetation and infrastructure through increased freeze-thaw cycles and changing plant hardiness zones.

While the VRWJPO does not have a direct role in greenhouse gas reductions, water planning entities and local communities are tasked with fostering resilience on the built and natural landscapes. The Plan achieves this through implementation Actions that: support engineering best practices for the built environment, improve historic infrastructure to account for climate deviations, and promote resilience in the natural environment.

Climate Resilience Issue Statements

- Climatic patterns are negatively impacting the VRWJPO's natural and built environments.
- Historic stormwater infrastructure is not adequate to manage climate patterns.

Climate Resilience Goals

- Improve the resilience of the VRWJPO's natural and built environment through implementation of 5 projects.
- Adapt stormwater infrastructure to changing precipitation patterns through implementation of 2 projects.

Climate Resilience Objectives (H = High Priority, M = Medium Priority, L = Low Priority)

- Foster partnerships to implement projects, programs, and practices that improve stormwater infrastructure's resilience to climate impacts – H
- Foster partnerships to implement projects, programs, and practices to increase the amount of green infrastructure - M
- Support re-evaluation of VRWJPO floodplains using updated data - M
- Promote reconnection to historic floodplains - M
- Support LGUs in stormwater infrastructure adaptation - L

Climate Resilience Topics of Importance (H = High Priority, M = Medium Priority, L = Low Priority)

- Storm sewer and hard infrastructure modifications or improvements (appropriate sizing of new infrastructure, adapting historic infrastructure to new climate patterns) – H
- Stormwater basin/retention ponds modifications or improvements (larger/deeper ponds and basins) – H
- Large or industrial scale water reuse - M
- Green infrastructure BMPs (bioretention, trees, small scale rain barrels/cisterns, green roofs, permeable pavement, bioswales, etc.) - M
- Stormwater pond smart technology (automated pumping in anticipation of runoff events) - L

Natural Environments

Issue Category 5: Natural Environments

Five ecological subsections exist within the VRWJPO, as further described within the Land and Water Resources Inventory (*Appendix B*). These ecoregions include the Big Woods Subsection, the Oak Savanna Subsection, the Rochester Plateau Subsection, the St. Paul Baldwin Plains and Moraines Subsection, and the Bluff lands Subsection. Environmental conditions vary depending on landscape position within the VRWJPO, including water physical and chemical properties, biological diversity, and soil and geologic properties. Development and agricultural production have resulted in changes to the VRWJPO's natural environments.

While ceasing development or agricultural production in the VRWJPO is infeasible, achieving change in an environmentally responsible manner is possible. The Plan supports this ethic through implementation Actions that: support native biodiversity, protect and improve habitat, and minimize impacts on local ecosystems.

Natural Environments Issue Statement

- Human-caused ecosystem disruptions decrease biological diversity, promote the proliferation of invasive species, and have wide-reaching impacts to the VRWJPO's natural environment.

Natural Environments Goals

- Mitigate impacts from human-caused ecosystem disruptions.*
- Protect and enhance natural environments.*

*Measure of combined goals' success based on percentage of measurable outcomes presented in *Table 3-16*, including: 29 projects, 40 acres of wetland restored, 1,334 lbs/yr TP reduction, 351 tons/yr TSS reduction, 8,607 lbs/yr NO_3 reduction

Natural Environments Objectives (H = High Priority, M = Medium Priority, L = Low Priority)

- Identify and improve high-priority water resource environments found to be significantly impacted by humans - **H**
- Coordinate with others and implement projects, programs, and practices that protect the VRWJPO's aquatic and riparian habitats - **H**
- Coordinate with others to implement projects, programs, and practices that improve soil health - **M**
- Coordinate with others to implement projects, programs, and practices that improve disturbed landscapes - **L**

Natural Environments Topics of Importance (H = High Priority, M = Medium Priority, L = Low Priority)

- Wetland restoration - **H**
- Streambank/shoreline restoration - **H**
- In-stream habitat restoration - **M**
- Upland restoration - **L**
- In-lake restoration (aquatic plants, fisheries) - **L**

Community Relationships

Issue Category 6: Community Relationships

Establishing and nurturing relationships with individuals and groups that live, work, and play within the VRWJPO is essential for VRWJPO success. Local communities provide opportunities for implementation of programs, projects, and practices, and act as a bridge between VRWJPO staff's technical expertise and those that interact regularly with local water resources.

Community relationships take many forms, from involvement in volunteer opportunities to helping others understand complex environmental issues and VRWJPO operations. The Plan will foster meaningful community relationships through Actions that: articulate the impact local communities have on water resources and natural environments; engage individuals and groups in environmental stewardship projects, programs, and practices; and grow understanding of the VRWJPO's role in various capacities.

Community Relationships Issue Statements

- Public awareness and understanding of the VRWJPO are limited.
- Community members in the VRWJPO lack awareness of opportunities to engage in the VRWJPO's work.

Community Relationships Goals

- Improve the awareness and understanding of the VRWJPO through 1,740 social media posts, 24 newsletters, 117,000 website views, and 9 project interpretive signs.
- Increase community connection to the VRWJPO's natural resources by awarding 6 Stewardship Grants, implementation of 96 LCW projects and 12 Lawns Reimagined projects, participation in 72 public events, and holding 3 watershed tours.
- Increase community understanding of environmental issues with 1,740 social media posts, 24 newsletters, 117,000 website views, 12 community presentations, 6 classroom presentations, and 9 project signs.

Community Relationships Objectives (H = High Priority, M = Medium Priority, L = Low Priority)

- Consistently communicate and promote the work of the VRWJPO with partners and stakeholders – H
- Create and support opportunities for stakeholder connection and engagement with the VRWJPO's natural resources – H
- Grow the number of VRWJPO stakeholders - M
- Engage citizens to promote sustainable stewardship of lakes and streams - M
- Communicate with stakeholders regarding the environmental issues that directly impact the VRWJPO - M
- Maintain or increase ways for stakeholders to provide relevant input to the VRWJPO - L

Community Relationships Topics of Importance (H = High Priority, M = Medium Priority, L = Low Priority)

- Social media – H
- Community events – H
- Direct financial support for individuals' projects (e.g. Stewardship Grants, MN Water Stewards, LCW) – H
- VRWJPO-hosted events - M
- Marketing/media paid campaigns - L
- Volunteer programs - L
- Project interpretive signs - L

Section Three: Implementation Plan

3.1 Evaluation of 2016-2025 Implementation Actions

To initiate the development of the 2026-2035 Implementation Plan, VRWJPO staff catalogued the progress made toward items included in the 2016-2025 Vermillion River Watershed Management Plan. This was accomplished by:

- Referencing Measurable Outcomes Progress Reports, which highlighted narratives and data from various implementation activities.
- Reviewing the master Implementation Table progress tracking tool, which identified all 239 implementation activities and their status as Done, Future, or Ongoing.
- Performing a full-scale Action Audit of all 239 implementation activities, noting whether activities belonged in the 2026-2035 Plan based on: whether they had been implemented, if they had components that could continue to add value to VRWJPO success, or if they were administrative functions that did not belong in the Plan.

The Action Audit found that during the previous generation Plan:

- Extensive physical, chemical, habitat, and biological monitoring activities were completed annually to inform watershed management activities.
- More than 133 total BMPs were implemented via partnerships with LGUs to reduce pollutant loading.
- 99% of the VRWJPO became compliant with the State Buffer Law.
- 52 native garden, 83 raingarden, and 4 shoreline restoration projects were installed in the VRWJPO through the DCSWCD's Landscaping for Clean Water (LCW) program.
- 19 groundwater quality BMPs were implemented throughout the VRWJPO.
- The VRWJPO conducted 24 Irrigation Audits at homeowner associations (HOAs) to identify opportunities for irrigation efficiency improvement.
- Irrigation system improvements were cost-shared at 9 HOAs.
- 18.82 million gallons of groundwater per year were saved via implementation of stormwater harvest and reuse systems.
- 10 million gallons of groundwater per year were saved via implementation of a splash pad recirculation project.
- 15 stormwater retrofit projects were implemented.
- 62 projects addressing erosion were implemented.
- TP concentrations are decreasing in several VRWJPO lakes, resulting in better water clarity.
- TSS concentrations, monitored as a part of the VRMN, are improving (trending downward) within the Upper Mainstem, South Creek, North Creek, South Branch, and Lower Mainstem subwatersheds.
- Residents reported high levels of trust in the VRWJPO, according to a 2021 survey by the University of Minnesota Center for Changing Landscapes.
- Awareness of the VRWJPO is increasing, with user interaction with the VRWJPO webpage increasing from 2,325 users in 2016 to over 8,600 in 2024.
- VRWJPO staff engaged over 16,875 community members through workshops, field days, volunteer events, community events, school events, town hall discussions, tours, panel discussions, and presentations.

Table 3-1 highlights the pollutant load reductions achieved through implementation of 146 BMPs during the 2016-2025 Plan.

Table 3-1: Pollutant load reductions from 2016-2025 Watershed Plan

Subwatershed	TSS Reduction (tons/yr)	TP Reduction (lbs/yr)	NO_3 Reduction (lbs/yr)	Volume Reduction (acre-ft/yr)
Upper Mainstem	531.38	486.97	926.4	6.01
South Creek	44.51	82.54	0.0*	29.2
North Creek	285.76	487.25	1,262.0	175.6
South Branch	912.32	450.72	13,925.0	0.0
Middle Creek	367.21	374.8	0.0*	9.54
Middle Mainstem	136.58	60.5	0.0*	0.0
Lower Mainstem	864.1	460.43	14.66	0.0
Mississippi Direct	1,160.67	627.48	5,852.0	0.0
Totals	**4,302.53**	**3,030.69**	**21,980.06**	**220.35**

*Pollutant reductions were calculated based on project target pollutant. Those cells denoted with "0" within the NO_3 Reduction column do not mean that a reduction was not achieved; rather, that a reduction amount was not calculated as it was not the primary target pollutant for a given project.

Many of the projects implemented were considered more readily achievable than projects anticipated for the 2026-2035 planning cycle. In addition, not all Actions in the 2016-2025 Plan's Implementation Table had readily available modeled pollutant reductions. For these reasons, and to account for unforeseen factors such as available budget (e.g. grant success rate, local and partner funds); landowner willingness; property acquisition and access; project and partner support; and other factors; the numbers in the Goals and Measurable Outcomes of this Plan are smaller than those achieved during the 2016-2025 Plan.

3.2 Implementation Plan Structure

Through the Action Audit, staff saw that the 2016-2025 Plan was structured to include items related to day-to-day functions as implementation Actions. To streamline ease of use, implementation, and progress assessments, it was decided that the 2026-2035 Implementation Plan would include:

- Administrative items pertinent to the VRWJPO, but not in so much detail as to create an exorbitant amount of day-to-day activities
- Programs such as monitoring, assessment and research, communications, outreach, and public relations, grants, facility/infrastructure management, and regulations
- Activities such as feasibility studies, modeling efforts, and planning and operational work
- CIP projects, including engineering/design and construction activities

Implementation Actions are organized by Issue Category. For each Action, related measurable outcomes, partners, and costs are listed. While reviewing the Implementation Table, it may be helpful to view the VRWJPO Interactive Map to see where Actions are being proposed.



Figure 3-1: Visualization of the Plan development process

3.3 Prioritization

Per MN Rule 8410.0045, MN Rule 8410.0080, and MN Rule 8410.0105, the Plan must establish priority issues, goals, and actions, utilizing input received during the public engagement process, considering the VRWJPO's relationship with other relevant plans and programs, and assessing data and trends. While all items included within the Plan are important, the VRWJPO needed a method to prioritize items for implementation. Well-designed prioritization and execution results in:

- Implementation of projects, programs, and practices that provide the greatest benefit
- Optimized use of taxpayer and staff resources
- The ability to regularly evaluate and report on Plan outcomes

When assigning priority levels to aspects of the Plan, staff had to decide if priority would be assigned at the Issue, Goal, Objective, or Action level. This has direct impacts on VRWJPO's annual budgeting, including development of work plans and projects. It was agreed upon to assign priority levels to Objectives because staff viewed prioritization at the Issue level as too broad and the Action level as too detailed.

Staff also had to determine how various projects or activities would be prioritized. For example, in the Water Quality Issue Category, would projects that address nutrients be prioritized higher or lower than projects that address TSS? For this reason, Topics of Importance are included with each Issue Category (see *Subsection 2.2: Issue Statements, Goals, Objectives, and Topics of Importance*). As described in *Appendix C*, the prioritization regime used input received from the public engagement process.

During Phase I of engagement in fall 2023, a public survey (Survey 1) presented various questions to help staff identify and shape Issue Categories. Survey 1 was provided at public outreach events and on the VRWJPO website. Questions included:

1. Do you feel the current mission adequately describes the focus of the VRWJPO?
2. What is your relationship with the watershed?
3. What do you care about when it comes to water?
4. What concerns need to be addressed?
5. Are there any goals that you think should be added or reworded?
6. What other watershed issues are concerning to you?
7. How should the VRWJPO approach solutions?
8. Do you see any new opportunities for collaboration and coordination?

9. What barriers and opportunities do you see to protect groundwater and surface water quality and quantity?

Most questions were multiple choice, steering respondents towards Plan content and development of priority issues per Minnesota legal requirements. Some questions also left space for additional feedback.

After Survey 1 closed in early 2024, staff used the results to conduct a second survey (Survey 2) with the CAC and TAC. Survey 2 assessed how priorities identified by the public in Phase I could be tailored to align with the VRWJPO's roles and directives. Survey 2 listed the issues garnered from the input-gathering process, asking members to rank them by whether they were:

1. Either "Essential for the function of the JPO," "Good for the JPO to do," or "Not within the JPO's scope of work," and
2. Considered High/Medium/Low priority.

Survey 2 provided staff a priority ranking for the issues gathered from Survey 1. Results were presented to the JPB at a Strategic Planning Session on March 21, 2024. At this session, the JPB generally agreed with the CAC and TAC's priority rankings, while offering the following additional input:

1. Prioritization should be tailored to ensure actions provide the most positive watershed impact
2. Focus should be placed on the implementation of high-quality projects, rather than a large quantity of projects
3. The Plan should be consistent with other local plans
4. Consideration should be given to adopting a prioritization regime that allows for flexibility

The CAC and TAC convened on September 25, 2024, for Survey 3, which listed draft Objectives and asked participants to choose their top ~50% within each Issue Category and rank them as High, Medium, or Low priority levels. For example:

Issue Category 1: Water Quality

The VRWJPO has identified the following Objectives that will advance our Implementation Plan for Water Quality. **Please choose your top three Objectives and rank them in order of priority**:

- Remove surface waters from the impaired waters list.
- Protect surface waters from impairments.
- Use surface water quality monitoring data to inform restoration and protection decisions.
- Assist and coordinate groundwater quality work with lead groundwater organizations.
- Support and implement projects, programs, and practices to protect or improve groundwater quality.
- Coordinate with others to assess impacts to groundwater from the Vermillion River and its tributaries.

Survey 3 also included a subprioritization exercise, which asked CAC and TAC members to rank Topics of Importance for each Issue Category. For example:

Issue Category 1: Water Quality

- Projects that address nutrients (phosphorus, NO_3)
- Projects that address TSS/sediment
- Projects that address aquatic biota (temperature, dissolved oxygen)
- Projects that address chloride

- Projects that address toxics/metals/emerging concern contaminants/pesticides
- Projects that address bacteria
- Projects that address AIS

During the joint CAC-TAC meeting, members provided their priority rankings using a polling platform called Mentimeter. Results were displayed in real-time, facilitating additional discussion. Mentimeter uses a system called a "Borda count", which assigns priority points based on an item getting ranked as first place (then receiving three points), second place (then receiving two points), and last place (then receiving one point) by each participant.

The Borda count selected the highest priority Objectives and Topics of Importance based on which options received the most points. To ensure that survey results comprehensively communicated the desires of member rankings, additional statistical analyses were performed on the results, focusing on assigning weighted scoring and calculating the average weighted scoring. Staff assessed the Borda count, weighted scoring, and average weighted scoring priority rankings, paired them with technical expertise and understanding of VRWJPO roles, and drafted a priority ranking matrix for Objectives and Topics of Importance.

The draft matrix was presented to the JPB at their December 5, 2024, meeting. Staff requested Commissioners' input on whether their priority levels aligned with or deviated from the presented matrix. The JPB concurred with what was included in the matrix. Feedback was logged, creating a final matrix that compared:

- CAC and TAC member input ranked using the Borda count
- Staff recommendations on priority ranking after performing additional statistical analyses on raw CAC and TAC input
- Overall JPB recommendations

Surveys 1, 2 and 3, their results, and the priority ranking matrix can be found in Appendix C.

While gathering prioritization input from stakeholders and the CAC, TAC, and JPB, staff also reviewed the following to help further inform prioritization:

- Annual physical and chemical water monitoring data
- Annual fish, macroinvertebrate, and habitat monitoring data
- Subwatershed and geomorphic assessments
- Feasibility studies
- Local, regional, and state plans and studies

A list of studies and plans referenced can be found in *Appendix A*. Data and trends in *Appendix B: Land and Water Resources Inventory* were also used to prioritize Objectives and Topics of Importance, such as:

- Topographic, geologic, and soil characteristics
- Precipitation trends and their impacts on flood levels and water quantity discharges
- Water quality and quantity monitoring trends (including pollutant loading utilizing monitoring data)
- Groundwater sensitivities and supplies, including groundwater-surface water connections
- Stormwater systems, drainage systems, and control structures
- Regulated pollutant sources and permitted wastewater discharges
- Fish and wildlife habitat and rare and endangered species
- Water-based recreation areas
- Existing land uses and proposed development in local municipal comprehensive plans
- Priority areas for wetland preservation, enhancement, restoration, and establishment

Staff integrated stakeholder input and the items listed above with VRWJPO's capacity and implementation roles to define the final prioritization regime. This led to the method of prioritizing items according to High, Medium, and Low priority rankings.

The Implementation Table in Subsection 3.3 has been organized to graphically display Objectives and Actions by this ranking. Issue Categories and their priority-level groupings of both their respective Objectives and Topics of Importance are included on the following pages in this format:

High Priority
Medium Priority
Low Priority

Table 3-2: Prioritized Water Quality Objectives

High Priority	Protect surface waters from impairments	Use surface water quality monitoring data to inform restoration and protection decisions	Remove surface waters from the impaired waters list
Medium Priority	Support and implement projects, programs and practices to protect or improve groundwater quality	Coordinate with others to assess impacts to groundwater from the Vermillion River and its tributaries	
Low Priority	Assist with and coordinate groundwater quality work with lead groundwater organizations		

Table 3-3: Prioritized Water Quality Topics of Importance

High Priority	Projects that address nutrients (phosphorus, NO_3)	Projects that address TSS/sediment	
Medium Priority	Projects that address aquatic biota (temperature, dissolved oxygen)	Projects that address toxics/metals/emerging concern contaminants/pesticides	Projects that address chloride
Low Priority	Projects that address AIS	Projects that address bacteria	

Table 3-4: Prioritized Stormwater Management Objectives

High Priority	Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape	Promote and implement infiltration practices	
Medium Priority	Assist in the development and implementation of policies and programs that promote green infrastructure and LID practices	Promote protection of natural floodplain capacities	Collaborate with technical experts and local governments when updating, revising, or changing VRWJPO Standards
Low Priority	Ensure VRWJPO Standards can be administered by local governments	Assist local government with navigating and understanding regulatory frameworks	

Table 3-5: Prioritized Stormwater Management Topics of Importance

High Priority	Green infrastructure/LID BMPs: BMPs that act to reduce the amount of impervious surfaces, such as raingardens, tree trenches, green roofs, and landscaping islands		
Medium Priority	Infiltration BMPs: BMPs that do not have underdrains, such as permeable pavement, sand filters, and infiltration basins	Filtration BMPs: BMPs that do have underdrains, such as pretreatment filtration devices, vegetated filter strips, and sand filters	Stormwater reuse projects
Low Priority	Temporary storage sedimentation BMPs that temporarily pond water and allow sediment to settle from the water column, such as wet ponds, stormwater wetlands, and manufactured treatment devices like hydrodynamic separators	More stringent stormwater management requirements for new development or redevelopment (discharge rate reduction, increased amounts of volume control, and decreased floodplain alteration)	

Table 3-6: Prioritized Groundwater Sustainability Objectives

High Priority	Assist with and coordinate groundwater supply planning, protection, and improvement efforts with lead groundwater organizations
Medium Priority	Assist with and implement projects, programs, and practices that reduce landscape and agricultural water use
Low Priority	Assist with and implement projects, programs, and practices that promote infiltration

Table 3-7: Prioritized Groundwater Sustainability Topics of Importance

High Priority	Soil health initiatives	Residential, commercial, and industrial irrigation efficiency improvements	Agricultural irrigation efficiency improvements
Medium Priority	Projects and practices that promote natural infiltration		
Low Priority	Indoor appliance efficiency improvements		

Table 3-8: Prioritized Climate Resilience Objectives

High Priority	Foster partnerships to implement projects, programs, and practices that improve stormwater infrastructure's resilience to climate impacts		
Medium Priority	Support re-evaluation of watershed floodplains using updated data	Foster partnerships to implement projects, programs and practices to increase the amount of green infrastructure	Promote reconnection to historic floodplains
Low Priority	Support LGUs in stormwater infrastructure adaptation		

Table 3-9: Prioritized Climate Resilience Topics of Importance

High Priority	Storm sewer and hard infrastructure modifications (appropriate sizing of new infrastructure, adapting historic infrastructure to new climate regimes)	Stormwater basin/retention pond modifications or improvements (larger/deeper ponds and basins)
Medium Priority	Green infrastructure BMPs (bioretention, trees, small scale rain barrels/cisterns, green roofs, permeable pavement, bioswales)	Large or industrial scale water reuse
Low Priority	Stormwater pond smart technology (automated pumping in anticipation of storm events)	

Table 3-10: Prioritized Natural Environments Objectives

High Priority	Coordinate with others to implement projects, programs, and practices that protect the VRWJPO's aquatic and riparian habitats	Identify and improve high-priority water resource environments found to be significantly impacted by humans
Medium Priority	Coordinate with others to implement projects, programs, and practices that improve soil health	
Low Priority	Coordinate with others to implement projects, programs, and practices that improve disturbed landscapes	

Table 3-11: Prioritized Natural Environments Topics of Importance

High Priority	Wetland restoration	Streambank/shoreline restoration
Medium Priority	In-stream habitat restoration	
Low Priority	In-lake restoration (aquatic plants, fisheries)	Upland restoration

Community Relationships

Table 3-12: Prioritized Community Relationships Objectives

High Priority	Consistently communicate and promote the work of the VRWJPO with partners and stakeholders	Create and support opportunities for stakeholder connection and engagement with the VRWJPO's natural resources	
Medium Priority	Grow the amount of VRWJPO stakeholders	Communicate with stakeholders regarding environmental issues that directly impact the watershed	Engage citizens to promote sustainable stewardship of lakes and streams
Low Priority	Maintain or increase ways for stakeholders to provide relevant input to the VRWJPO		

Table 3-13: Prioritized Community Relationships Topics of Importance

High Priority	Direct financial support for individuals' projects	Social media	Community events
Medium Priority	VRWJPO-hosted events		
Low Priority	Project interpretive signs	Marketing/media paid campaigns	Volunteer programs

3.4 Targeting

In addition to establishing a priority schedule for Implementation Actions, the VRWJPO looks to ensure that those programs, projects, and practices that are implemented provide the greatest positive impact. This results in the attainment of water and land resource benefits while addressing constituent concerns for fiscal responsibility. To accomplish this, the Plan is organized to target geographic areas or specific VRWJPO resources based on Topics of Importance. These targeted geographic areas or resources are organized into eight subwatersheds:

- Upper Mainstem Vermillion River
- South Creek
- North Creek
- South Branch Vermillion River
- Middle Creek
- Middle Mainstem Vermillion River
- Lower Mainstem Vermillion River
- Mississippi River Direct

Targeting is informed via chemical and physical monitoring, biological monitoring, pollutant load modeling, subwatershed assessments, geomorphic assessments, the WRAPS process, waterbody impairment designations, the tiered aquatic life use framework, GIS analyses, restorable wetland assessments, TMDL studies, surface water and groundwater interactions, and land use trends. *(For comprehensive overviews, see Appendix A: Inventory of Studies and Plans and Appendix B: Land and Water Resources Inventory).* By relying on sound scientific data to inform our work, the VRWJPO can ensure that work is performed in the most meaningful and cost-effective way.

The exception to the aforementioned targeting approach relates to the Community Relationships Issue Category. This Issue Category involves education, outreach, and community engagement; thus it would not be appropriate to target on a geographic scale unless directed by other Issue Categories. Instead, this Issue Category:

- Targets audiences, such as community groups, residents, landowners, businesses, students, and elected and appointed officials.
- Relies on targeting regimes defined within other Issue Categories. For example: Financial incentives for individuals' projects was a high-ranking Topic of Importance for this Issue Category. If an activity in the **Water Quality** Issue Category identified a need for residential rain gardens within a specific subwatershed, based on findings from a subwatershed assessment, staff may target audiences in that subwatershed for Stewardship Grants.

Targeting details for the remaining five Issue Categories are described on the following pages.

Issue Category 1: Water Quality

Projects that address nutrients (TP and NO_3)

- Subwatersheds with lakes
- Areas modeled to show they produce the highest TP pollutant yields
- Subwatersheds that have been modeled to show they produce the highest NO_3 pollutant yields
- Areas that are identified as priority agricultural chemical reduction areas within the Dakota County 2020-2030 Groundwater Plan

Projects that address TSS/sediment

- Subwatersheds that have been modeled to show they produce the highest TSS pollutant yields
- Subwatersheds with waterbodies that have TSS impairments

Projects that address aquatic biota (temperature and dissolved oxygen)

- Areas identified within geomorphic assessments
- Waterbodies listed as not supporting aquatic life
- Stream reaches that have been artificially channelized and/or ditched
- Streams that are DNR-designated trout streams
- Areas within 1,000 feet of a river or tributary upstream of State Highway 52

Projects that address chloride

- Areas with a high percentage of impervious surfaces
- Those areas in which 1999 – 2019 (and new data as it becomes available) Dakota County well monitoring found increasing chloride concentration trends
- Areas that show increasing chloride concentration trends based on VRMN data

Projects that address toxics/metals/emerging concern contaminants/pesticides/herbicides

- Waterbodies within municipalities that are confirmed to have toxics/metals/emerging concern contaminants above health risk standards
- Areas where private wells show concentrations of toxics/metals/emerging concern contaminants
- Communities that have been significantly affected by emerging concern contaminants
- Areas that have pesticide and/or herbicide concentrations above health risk standards based on 2001-2024 Dakota County and MDA monitoring data and future monitoring results

Projects that address bacteria

- Areas found to have consistently high bacteria concentrations based on monitoring
- Areas defined as moderate, high, or very high priority based on the VRWJPO-Prioritized Feedlot Inventory

Projects that address AIS

- Lakes that are relatively hydrologically isolated
- Lakes that are listed as infested according to the DNR's Infested Waters List

Issue Category 2: Stormwater Management

Infiltration BMPs

- Projects identified in a subwatershed assessment

- VRWJPO-wide LGU CIP collaboration
- Downstream of or within areas that have documented flood issues
- Areas with soil types A and B
- Areas in public ownership

Filtration BMPs

- Projects identified in a subwatershed assessment
- VRWJPO-wide LGU CIP collaboration
- Areas with soil type C and D
- Areas where an Emergency Response Area (ERA) within a Drinking Water Supply Management Area (DWSMA) is classified as having high or very high vulnerability as defined by the Minnesota Department of Health (MDH) or regulated by an LGU's Municipal Separate Storm Sewer System (MS4) Permit
- Areas in public ownership

Temporary storage sedimentation BMPs

- Projects identified in a subwatershed assessment
- Areas in public ownership
- Downstream of or within areas that have documented flooding issues
- Downstream of or within areas with little or no stormwater management practices
- VRWJPO-wide LGU CIP project collaboration

Green infrastructure/LID BMPs

- Projects identified in subwatershed assessments
- Stormwater treatment retrofits within urbanized areas with high impervious surface land cover
- Downstream of or within areas with little or no stormwater management practices
- Watershed-wide LGU CIP project collaboration
- Areas with soil types A and B

Stormwater reuse projects

- VRWJPO-wide LGU CIP project collaboration
- Within areas with little or no stormwater management practices
- Areas in public ownership
- Areas that preclude infiltration
- Municipalities in which the Metropolitan Council Master Water Supply Plan predicts future aquifer drawdown

More stringent stormwater management requirements

- Meet or exceed Minnesota Pollution Control Agency (MPCA) or MDH standards for stormwater treatment

Issue Category 3: Groundwater Sustainability

Soil health initiatives

- Rural areas with highly erodible soils
- Subwatersheds that have been modeled to show they produce the highest NO_3 pollutant yields
- Those areas that are within MDH-designated DWSMAs
- Those areas with coarse-textured soils

Projects and practices that promote natural infiltration

- Areas identified as Desired Recharge Areas within the Dakota County Groundwater Plan
- Projects identified within subwatershed assessments
- Areas with A and B type soils
- Urban areas with little to no stormwater treatment

Agricultural irrigation efficiency improvements

- Agricultural areas projected to have the largest aquifer drawdown according to the Metropolitan Council Master Water Supply Plan and updated Metro Models
- Top agricultural irrigation water users according to Minnesota Permitting and Reporting System (MPARS) data

Residential, commercial, and industrial irrigation efficiency improvements

- Residential – those homes constructed post-2000, HOAs, and/or municipality-identified high-water users according to city utility billing data
- Non-residential – those with large greenspace, golf courses, industry, commercial, public facilities, and/or institutional facilities

Indoor appliance efficiency improvements

- Public schools and public facilities
- Homes built pre-2010

Issue Category 4: Climate Resilience



Large or industrial-scale water reuse

- Within municipalities identified as higher water users
- Areas identified by Metropolitan Council Master Water Supply Plan with predicted higher aquifer drawdown
- Areas with soil type C and D

Green infrastructure BMPs

- Projects identified in a subwatershed assessment
- Stormwater treatment retrofits within urbanized areas with high impervious surface land cover
- Downstream of or within areas with little or no stormwater management practices
- VRWJPO-wide LGU CIP project collaboration
- Areas with soil types A and B

Storm sewer and hard infrastructure modifications or improvements

- Priority areas based on outcomes of the forthcoming Climate Resiliency Plan
- Areas in public ownership
- Areas with buildings and critical infrastructure at risk from flooding
- VRWJPO-wide LGU CIP Project collaboration
- Downstream of or within areas with little or no stormwater infrastructure

Stormwater basin/retention pond modifications or improvements

- Stormwater treatment retrofits within urbanized areas with high impervious surface land cover
- VRWJPO-wide LGU CIP collaboration
- Areas in public ownership
- Downstream of or within areas that have documented flood issues
- Priority areas based on outcomes of forthcoming Climate Resiliency Plan

Stormwater pond smart technology

- VRWJPO-wide LGU CIP Project collaboration
- Within areas where remote data delivery infrastructure is in place
- Areas in public ownership

Issue Category 5: Natural Environments

In-stream habitat restoration

- Areas identified within completed geomorphic assessments
- DNR-designated trout streams or principal connectors
- Stream reaches that have been artificially channelized or ditched

Wetland restoration

- Priority areas identified in restorable wetland assessments
- Areas that expand upon previously restored wetlands

Streambank/shoreline restoration

- Areas identified within geomorphic assessments
- Areas in majority public ownership

Upland restoration

- Areas with a prevalence of invasive species based on the DNR invasive plants list
- Upland areas that are directly adjacent to lakes, streams, and wetlands
- Areas identified as Conservation Focus Areas in the Dakota County Land Conservation Plan

In-lake restoration

- Lakes that are nearly meeting or have met external nutrient loading targets
- Lakes that have increasing water clarity, thus increasing potential to support native plant restoration
- Lakes that have improving in-lake habitat, thus increasing potential to support native fisheries

3.5 Implementation Actions

This Plan's Implementation Table combines information relating to Issues, Goals, Objectives, priority levels, and targeting to show annual work plan and budgetary expectations from 2026-2035. Actions are organized by Issue Category and priority level based on their corresponding Objectives. Each Action identifies targeted resources/audiences, Objectives addressed, date of planned implementation, costs, expected partners, funding sources, and VRWJPO budget categories. CIP-specific programs, projects, and practices can be isolated by referencing only those actions listed as being funded by the CIP and Maintenance budget category. To fulfill the requirements of MN Rule 8410.0105, an Administration Category is included in addition to the six Issue Categories.

When reviewing the annual action costs, it is important to note that the number incorporated by year does not reflect the full implementation cost for all Actions, but rather the VRWJPO's expected contribution. For example, if an Action identifies funding from the VRWJPO General Fund, Partner Funds, and Grants, the number in the financing section of the Implementation Table represents the VRWJPO's contribution to such an initiative. Grants and partner funds would also be needed to fully implement said Action. Actions that are solely identified as sourced from the General Fund, however, represent both the full cost to implement and VRWJPO's expected contribution. This is true for all Actions in the Administration and Community Relationships categories.

Operations and maintenance activities relating to inspections, stormwater infrastructure, public works, facilities, and natural and artificial watercourses are not included in the Implementation Table or other aspects of this Plan, as they are the responsibility of LGUs. However, the VRWJPO adopted a Watershed Partner Project Maintenance Policy in 2025 to ensure that CIP projects implemented either independently by the VRWJPO or with

assistance from partners are routinely inspected and maintained to retain original design performance standards. This process is reflected in a CIP/Maintenance Action in the Implementation Table. In general:

- VRWJPO staff inspect all CIP projects implemented since 2006 on a biennial basis.
- Following inspection, VRWJPO staff prepare a CIP maintenance inspection report including photographs, narratives of site conditions, and required follow-up items.
- VRWJPO staff provide partnering LGUs a copy of the CIP maintenance inspection report (as applicable).
- LGUs and the VRWJPO enter agreements to address any necessary design or maintenance work (as applicable).
- VRWJPO intends to offer funding for needed maintenance in accordance with the Watershed Partner Project Maintenance Policy on an annual basis, subject to JPB approval.

In the 2016-2025 Plan, the Scott County Board was the drainage authority for Scott County Ditch 12 (CD 12), which was the only drainage ditch within the VRWJPO regulated by MN Statute 103E. On April 15, 2025, the Scott County Board of Commissioners adopted Resolution No. 2025-122, abandoning CD 12. As such, no implementation Actions relating to inspection, operation and maintenance of any 103E regulated drainage ditches are included.

Implementation of VRWJPO Standards

The VRWJPO regulatory program, or Standards, are included as Appendix D and are not reflected within the Implementation Table. The VRWJPO Standards contain provisions relating to:

- Floodplain Alterations
- Wetland Alterations
- Buffers
- Erosion and Sediment Control
- Stormwater Management
- Drainage Alteration

Local Water Management Plans

LGUs are responsible for adopting LWMPs and local controls that implement the VRWJPO Plan and Standards. Per MN Statute 103B.235, the VRWJPO must approve all LWMPs within the watershed. LGU local controls must meet or exceed the VRWJPO Standards and must be implemented through the LGU's permitting programs. LGUs may elect to adopt the VRWJPO's Plan by reference, though this option still requires creation or revision of local ordinances to meet the Standards.

If an LGU's official controls are deemed inadequate or cannot be enforced, the VRWJPO will assume permitting authority until such time as VRWJPO Standards are met. During this period, the VRWJPO will review plans, issue permits, perform site inspections, and monitor activities necessary to ensure compliance with the Standards. Expenditures relating to implementation of the VRWJPO Standards and regulatory program are reflected in the Implementation Table Staffing Action (*item A-1 in the table*).

Implementation Table Formats

The 2026-2035 Implementation Plan is on the following pages in two formats:

Format One: 10-Year Expenses (Table 3-14)

- Detailed descriptions for each Action
- Priority designation of Actions
- Objectives/targets addressed for each Action
- 10-year costs associated with each Action
- A summary table describing 10-year costs associated with each Issue Category

Format Two: Annual Expenses (Table 3-15)

- Annual expenses associated with each Action from 2026-2035
- A summary table describing annual costs associated with each Issue Category from 2026-2035

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Water Quality	WQ-1	Vermillion River Monitoring Network	Annually administer the VRMN, including physical, chemical, and biological monitoring. Costs include: DCSWCD staff/consultant time for water quality, aquatic macroinvertebrate and fish monitoring; data analyses; samples analyses; report preparation; agency coordination; equipment/supplies and United States Geological Survey (USGS), and DNR flow gaging.	High	Use surface water quality monitoring data to inform restoration and protection decisions.	Watershed-wide	DCSWCD, SSWCD, DNR, MPCA	General Fund	Inventory, Assessment and Research	$1,226,635
	WQ-2	Assessments	Fund additional subwatershed, geomorphic, and other assessments to identify projects and practices as well as their project costs and pollutant loading reductions or water resource/habitat improvement metrics.	High	Protect surface waters from impairments. Remove surface waters from the impaired waters list.	Watershed-wide	Many	General Fund, Grants	Inventory, Assessment and Research	$35,000
	WQ-3	Projects Identified within the City of Lakeville North Creek and East Lake Subwatershed Assessment	Implement projects such as infiltration, filtration, ponding, reuse, hydrodynamic separator, and MTDs identified within the North Creek and East Lake Subwatershed Assessment conducted within the bounds of the City of Lakeville.	High	Protect surface waters from impairments. Remove surface waters from the impaired waters list.	North Creek and East Lake	City of Lakeville	General Fund, Partner Funds, Grants	CIP and Maintenance	$180,000
	WQ-4	Projects Identified within the City of Apple Valley East Lake Subwatershed Assessment	Implement projects such as infiltration, diversion, reuse, and alum identified within the East Lake Subwatershed Assessment conducted within the bounds of the City of Apple Valley.	High	Remove surface waters from the impaired waters list.	East Lake	City of Apple Valley	General Fund, Partner Funds, Grants	CIP and Maintenance	$345,000
	WQ-5	Projects Identified within the Vermillion River Headwaters Subwatershed Assessment	Implement projects such as filter strips, grassed waterways, WASCOBs, wetland restoration, and native grasses identified within the Vermillion River Headwaters subwatershed assessment.	High	Remove surface waters from the impaired waters list. Protect surface waters from impairments.	Vermillion River Headwaters Subwatershed	SSWCD, Landowners	Grants, Partner Funds	CIP and Maintenance	$100,309
	WQ-6	Projects Identified within the Upper Mainstem Subwatershed Assessment	Implement projects such as filter strips, grassed waterways, WASCOBs, streambank, and shoreline stabilizations identified within the Upper Mainstem subwatershed assessment.	High	Remove surface waters from the impaired waters list. Protect surface waters from impairments.	Upper Mainstem Subwatershed	Landowners, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$315,257
	WQ-7	Projects Identified within the South Branch Vermillion River Subwatershed Assessment	Implement projects such as grassed waterways, WASCOBs, critical area plantings, filter strips, grade stabilizations, streambank stabilizations, and wetland restorations identified within the South Branch Vermillion River subwatershed assessment.	High	Remove surface waters from the impaired waters list. Protect surface waters from impairments.	South Branch Vermillion River Subwatershed	Landowners, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$100,309

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Water Quality	WQ-8	Projects Identified within the Vermillion Lower Mainstem South Subwatershed Assessment	Implement projects such as WASCOBS and grassed waterways identified within the Vermillion Lower Mainstem South subwatershed assessment.	High	Remove surface waters from the impaired waters list. Protect surface waters from impairments.	Lower Mainstem Subwatershed	Landowner, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$100,309
	WQ -9	Opportunity Projects/assessments	Through the life of the Plan, the VRWJPO will remain open to projects, initiatives, studies or other opportunities that align with Plan goals and objectives as they arise which are unknown at the time of Plan creation.	Medium	Many	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000
	WQ-10	BMP Performance Monitoring	Monitor performance of pollutant reductions associated with BMPs implemented with funding assistance from grant or partner dollars.	Medium	Use surface water quality monitoring data to inform restoration and protection decisions.	Watershed-wide	Many	General Fund	Inventory, Assessment and Research	$22,800
	WQ-11	Vermillion River Groundwater Interaction Assessment	Fund an assessment in the Hastings DWSMA to investigate surface water-groundwater interaction from the Vermillion River and its tributaries.	Medium	Coordinate with others to assess impacts to groundwater from the Vermillion River and its tributaries.	South Branch, Lower Mainstem, and Mississippi Direct Subwatersheds	Dakota County, City of Hastings	General Fund, Partner Funds, Grants	Inventory, Assessment and Research	$49,400
	WQ-12	Groundwater Quality Projects, Programs and Practices	Assist lead groundwater organizations with projects, programs and practices that protect or improve groundwater quality, such as soil health initiatives, increasing continuous cover and other actions identified within the Dakota County Agricultural Chemical Reduction Effort (ACRE).	Medium	Support and implement projects, programs and practices to protect or improve groundwater quality.	Watershed-wide	Many	General Fund, Partner Funds	CIP and Maintenance	$200,618
	WQ-13	Enhanced Street Sweeping Study	Complete an Enhanced Street Sweeping Study to prioritize areas for enhanced sweeping based on pollutant recovery/removal potentials.	Medium	Remove surface waters from the impaired waters list. Protect surface waters from impairments.	Regulated MS4s	Dakota County	General Fund, Partner Funds	Inventory, Assessment and Research	$45,000
	WQ-14	Assist with Development of Low Salt Design Standards	Support the development of low salt design and stormwater management standards.	Medium	Protect surface waters from impairments. Support and implement projects, programs and practices that protect or improve groundwater quality.	Watershed-wide	Many	General Fund	Administration and Operations; Regulation	$10,000

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Water Quality	WQ-15	Projects that Address E. coli	Partner with lead agencies to investigate and implement projects that address E. coli in Scott County.	Low	Remove surface waters from the impaired waters list. Use surface water monitoring data to inform restoration and protection decisions.	Upper Mainstem Subwatershed	SSWCD, Scott County	General Fund, Partner Funds	Inventory, Assessment and Research	$7,500
	WQ-16	Projects that Address Toxics/Metals/ECOC/Pesticides	Investigate opportunities to partner with lead agencies to implement projects that address toxics/metals/ECOC/pesticides.	Low	Support and implement projects, programs and practices to protect or improve groundwater quality.	Watershed-wide	Many	General Fund, Partner Fund, Grants	Many	+
Stormwater Management	SW-1	Projects Identified within the Hastings Direct Drainage Subwatershed Assessment	Implement projects such as infiltration, filtration, and hydrodynamic separators identified within the Hastings Direct Drainage Assessment Report.	High	Promote and implement infiltration practices. Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape.	Lower Mississippi Direct Subwatershed	City of Hastings	Grants, Partner Funds	CIP and Maintenance	$130,000
	SW-2	Projects Identified within the South Creek Subwatershed Assessment	Implement projects such as infiltration, filtration, pervious paver, boulevard tree trench, cistern, wetland and stream revitalization, and MTDs identified within South Creek Subwatershed Assessment.	High	Promote and implement infiltration practices. Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape.	South Creek Subwatershed	City of Lakeville, Landowners, Dakota County	General Fund, Partner Funds, Grants	CIP and Maintenance	$30,000
	SW-3	Projects Identified within the City of Farmington Subwatershed Assessment	Implement projects such as treatment train, underground vault/pipe gallery, and biofiltration projects identified within City of Farmington Subwatershed Assessment.	High	Promote and implement infiltration practices. Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape.	North Creek, Middle Creek and Middle Mainstem Subwatersheds	City of Farmington	General Fund, Partner Funds, Grants	CIP and Maintenance	$75,000
	SW-4	Projects Identified within the City of Farmington Stormwater Retrofit Assessment for Independent School District 192	Implement projects such as bioretention basin, retention pond, impervious reduction, and stormwater reuse identified within City of Farmington Stormwater Retrofit Assessment for Independent School District 192.	High	Promote and implement infiltration practices. Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape.	North Creek, Middle Creek and Middle Mainstem Subwatersheds	City of Farmington	General Fund, Partner Funds, Grants	CIP and Maintenance	+

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Stormwater Management	SW-5	Innovative Stormwater Management Projects and Practices	Implement innovative stormwater management projects in partnership with LGUs such as green infrastructure, stormwater reuse, and LID BMPs.	High	Promote and implement infiltration practices. Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape.	Watershed-wide	Cities, Counties	General Fund, Partner Funds, Grants	CIP and Maintenance	$270,000
	SW-6	Opportunity Projects/assessments	Through the life of the Plan, the VRWJPO will remain open to projects, initiatives, studies or other opportunities that align with Plan goals and objectives as they arise which are unknown at the time of Plan creation.	Medium	Many	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000
	SW-7	Projects identified within the Long and Farquar TMDL Implementation Plan and Long and Farquar Pond Feasibility Analysis	Implement stormwater projects identified within the Long and Farquar TMDL Implementation Plan such as: road corridor BMPs, infiltration benches, infiltration basins, private large lot redevelopments, and residential BMPS/buffers/sweeping. Implement projects identified within the Long and Farquar Pond Feasibility Analysis.	Medium	Promote and implement infiltration practices. Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape.	Long and Farquar Lakes	City of Apple Valley	General Fund, Partner Funds, Grants	CIP and Maintenance	$58,000
	SW-8	Low Impact Development Practice Policies and Programs	Promote implementation of LID practices through the development of policies and programs to further adoption.	Medium	Assist in the development and implementation of policies and programs that promote green infrastructure and Low Impact Development practices.	Urban and Suburban Landscapes	Many	General Fund	Many	+
Groundwater Sustainability	GS-1	Groundwater Conservation Assessments	Collaborate with partners for local, regional and state groundwater conservation assessments.	High	Assist with and coordinate groundwater supply planning, protection and improvement efforts with lead groundwater organizations.	Watershed-wide	Many	General Fund	Inventory, Assessments and Research	$10,000
	GS-2	Projects, Programs and Practices Identified within the Dakota County Groundwater Plan's Groundwater Quantity Tactics	Implement projects, programs and practices identified within the Dakota County Groundwater Plan such as: a VRWJPO-wide water supply/conservation initiative, cost-sharing for water conservation projects, working with the DNR to ensure large groundwater appropriation requests are sustainable, and more.	Medium	Assist with and implement projects, programs and practices that reduce landscape and agricultural water use. Assist with and implement projects, programs and practices that promote infiltration.	Dakota County	Dakota County, LGUs, DCSWCD	General Fund, Grants, Partner Funds	CIP and Maintenance; Regulation; Inventory, Assessments and Research	$75,000

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/ Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Groundwater Sustainability	GS-3	Groundwater Conservation Assessment Projects	Implement projects, programs and practices identified within other groundwater conservation assessments.	Medium	Assist with and implement projects, programs and practices that reduce landscape and agricultural water use. Assist with and implement projects, programs and practices that promote infiltration.	Watershed-wide	Many	General Fund, Grants, Partner Funds	CIP and Maintenance	+
	GS-4	Soil Health Initiative Partnerships	Assist with implementation and promotion of partner soil health programs.	Medium	Assist with and implement projects, programs and practices that reduce landscape and agricultural water use.	Urban and Suburban Landscapes	Many	General Fund, Grants, Partner Funds	CIP and Maintenance; Communications, Outreach and Public Relations	+
	GS-5	Opportunity Projects/assessments	Through the life of the Plan, the VRWJPO will remain open to projects, initiatives, studies or other opportunities that align with Plan goals and objectives as they arise which are unknown at the time of Plan creation.	Medium	Many	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000
Climate Resilience	CR-1	Climate Resiliency Plan	Partner in the development of a Climate Resiliency Plan to establish a baseline assessment of climate resiliency and develop strategic goals and recommendations to move towards a more climate resilient Watershed. Scope to include, but not be limited to: inventory of inadequate stormwater infrastructure, feasibility of stormwater pond smart technology, flood risk assessment, and natural resource susceptibilities to drought.	High	Foster partnerships to implement projects, programs and practices that improve stormwater infrastructure's resilience to climate impacts.	Watershed-wide	Many	General Fund, Grants	Feasibility/ Preliminary Engineering; Inventory, Assessment and Research	$100,000
	CR-2	Climate Resilient Project Incentives	Provide incentives for projects identified within the Climate Resiliency Plan.	High	Foster partnerships to implement projects, programs and practices that improve stormwater infrastructure's resilience to climate impacts.	Urban and Suburban Landscapes	Cities, Counties, SWCDs	General Fund, Partner Funds, Grants	CIP and Maintenance	$153,000

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Climate Resilience	CR-3	Floodplain Reconnection	Implement restoration and enhancement projects that connect water resources to the historic floodplain.	Medium	Promote reconnection to historic floodplains	Floodplains	Many	General Fund, Partner Funds, Grants	CIP and Maintenance; Feasibility/ Preliminary Engineering	$55,000
	CR-4	Opportunity Projects/assessments	Through the life of the Plan, the VRWJPO will remain open to projects, initiatives, studies or other opportunities that align with Plan goals and objectives as they arise which are unknown at the time of Plan creation.	Medium	Many	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000
	CR-5	Stormwater Infrastructure Adaptation	Partner with LGUs to upgrade existing stormwater infrastructure to be more climate resilient.	Low	Support LGUs in stormwater infrastructure adaptation	Urban and Suburban Landscapes	LGUs	General Fund, Partner Funds, Grants	CIP and Maintenance	$30,000
	CR-6	Green Infrastructure BMPs	Implement green infrastructure BMPs in partnership with LGUs.	Low	Foster partnerships to implement projects, programs and practices to increase the amount of green infrastructure	Urban and Suburban Landscapes	LGUs	General Fund, Partner Funds, Grants	CIP and Maintenance	+
	CR-7	Updated Floodplain Model	Assist partners in the investigation of updated floodplain models.	Low	Support re-evaluation of Watershed floodplains using updated data	Watershed-wide	Cities, Counties, DNR	General Fund, Partner Funds	Feasibility/ Preliminary Engineering	+
Natural Environments	NE-1	Projects identified within the South Creek Geomorphic Assessment	Implement projects such as natural channel restoration/relocation, grade control, floodplain management, riparian management, bank stabilization, and culvert crossing projects identified within the South Creek Geomorphic Assessment.	High	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	South Creek Subwatershed	City of Lakeville, Dakota County	Grants, Partner Funds	CIP and Maintenance	$85,000
	NE-2	Projects identified within the Etter Creek and Ravenna Coulee Geomorphic Assessment	Implement projects such as natural channel restoration/relocation, grade control, floodplain management, riparian management, bank stabilization, and culvert crossing projects identified within the Ravenna Coulee Geomorphic Assessment.	High	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	Mississippi Direct Subwatershed	Dakota County, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$10,000

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Natural Environments	NE-3	Projects identified within the Middle and North Creek Geomorphic Assessment	Implement projects such as bank stabilization, floodplain management, grade control, natural channel restoration and riparian management projects identified within the Middle and North Creek Geomorphic Assessment.	High	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	Middle Creek and North Creek Subwatersheds	City of Lakeville, City of Farmington, Dakota County	Grants, Partner Funds	CIP and Maintenance	$45,000
	NE-4	Projects identified within the Empire Drainages Geomorphic Assessment	Implement projects such as bank stabilization, culvert crossing, natural channel restoration, infrastructure, and riparian management projects identified within the Empire Drainages Geomorphic Assessment.	High	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	Middle Mainstem Subwatershed	City of Empire, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$20,000
	NE-5	Projects identified within the Lower Mainstem Geomorphic Assessment	Implement projects such as bank stabilization, riparian management, and infrastructure improvement projects identified within the Lower Mainstem Geomorphic Assessment.	High	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	Lower Mainstem Subwatershed	Dakota County, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$20,000
	NE-6	VRWJPO Wetland Banking Program	Restore priority wetlands and administer the VRWJPO Wetland Banking Program to achieve a no-net-loss of wetlands within the VRWJPO.	High	Identify and improve high-priority water resource environments found to be significantly impacted by humans.	Restorable Wetlands	SWCDs, Counties, BWSR	General Fund, Partner Funds, Grants	CIP and Maintenance	+
	NE-7	Priority Wetland Restoration	Restore areas identified within Priority Wetland Restoration studies, not just for the purpose of the creation of a wetland bank.	High	Identify and improve high-priority water resource environments found to be significantly impacted by humans.	Restorable Wetlands	Many	General Fund, Partner Funds	CIP and Maintenance	$105,000
	NE-8	East Lake In-lake Projects and Practices	Implement projects and practices to address East Lake's LA defined within the Vermillion River Watershed TMDL. Examples include, but are not limited to invasive fish management, fish stocking, native aquatic plant establishment, AIS management, alum treatments, lake drawdown, and shoreline restorations.	High	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	East Lake	City of Apple Valley, City of Lakeville, DNR, Dakota County	General Fund, Partner Funds, Grants	CIP and Maintenance	$45,000
	NE-9	Cost-share for DCSWCD and SSWCD Incentive Programs	Provide cost-share for the following programs: DCSWCD's Incentive Payment Practices Program; SSWCD's Cover Crop and Soil Health Incentives; and others as they are developed.	Medium	Coordinate with others to implement projects, programs and practices that improve soil health	Agricultural Landscapes	DCSWCD and SSWCD	General Fund	CIP and Maintenance	$272,267

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Natural Environments	NE-10	In-stream Habitat Restoration	Implement projects not identified in a geomorphic assessment that restore in-stream habitat.	Medium	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	Streams	Many	General Fund, Grants, Partner Funds	CIP and Maintenance	$190,000
	NE-11	Opportunity Projects/assessments	Through the life of the Plan, the VRWJPO will remain open to projects, initiatives, studies or other opportunities that align with Plan goals and objectives as they arise which are unknown at the time of Plan creation.	Medium	Many	Watershed-wide	Many	Many	All Budget Categories excluding Administration and Operations	$8,000
	NE-12	In-lake management projects identified within the Long and Farquar TMDL Implementation Plan	In-lake management projects identified within the Long and Farquar TMDL Implementation Plan such as AIS management activities, fisheries management (surveys, stocking, removals), aeration, and lake drawdown.	Low	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	Long and Farquar Lakes	DNR and City of Apple Valley	Grants, Partner Funds, General Fund	CIP and Maintenance	+
	NE-13	Upland Restoration Adjacent to Water Resources	Partner with stakeholders to restore upland areas adjacent to lakes, rivers, and wetlands.	Low	Coordinate with others to implement projects, programs and practices that protect the Watershed's aquatic and riparian habitats.	Watershed-wide	Many	Grants, Partner Funds, General Fund	Public Communications, Outreach and Public Relations; CIP Maintenance	$5,000
Community Relationships	CMR-1	Stewardship Grants	Provide cost-share funding to individuals and groups in the watershed who are looking to install BMPs with direct water resource benefits.	High	Create and support opportunities for stakeholder connection and engagement with the Watershed's natural resources. Engage citizens to promote sustainable stewardship of lakes and streams.	Residents, landowners, businesses, community groups	Many	General Fund	Public Communications, Outreach and Public Relations; Administration and Operations	$346,221
	CMR-2	Public Event Participation	Host display tables at community events where attendees are likely to be interested in environmental topics. Examples may include, but are not limited to: Dakota County Fair, Take a Kid Fishing Day, Home and Garden Expos, Parks and Recreation Month, Fix-It Clinics	High	Consistently communicate and promote the work of the VRWJPO with partners and stakeholders. Grow the amount of watershed stakeholders.	Many	Many	General Fund	Public Communications, Outreach and Public Relations	$96,221
	CMR-3	Maintain Website	Keep the VRWJPO website up to date by regularly reviewing and posting pertinent content. Website contents include: upcoming events; watershed project updates; project fact sheets; watershed assessment studies; volunteer opportunities; recreational resources; and anything else determined relevant.	High	Consistently communicate and promote the work of the VRWJPO with partners and stakeholders. Maintain or increase ways for stakeholders to provide relevant input to the VRWJPO.	Many	N/A	General Fund	Public Communications, Outreach and Public Relations	$53,456

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Community Relationships	CMR-4	Distribute Newsletter	Electronically distribute VRWJPO newsletter with watershed updates, news, and tips.	High	Consistently communicate and promote the work of the VRWJPO with partners and stakeholders. Communicate with stakeholders regarding the environmental issues that directly impact the watershed.	Newsletter subscribers	Many	General Fund	Public Communications, Outreach and Public Relations	$85,530
	CMR-5	Partner Programs	Annually plan, promote and provide financial incentives for programs that align with the goals and objectives of this Plan. Examples include, but are not limited to: the Dakota SWCD Landscaping for Clean Water Program, the Dakota County Lawns Reimagined Program, Scott SWCD Clean Water Education Program, Smart Salting Trainings in Dakota County, Turfgrass Maintenance Trainings in Dakota County, volunteer events with direct benefits to the watershed (e.g. Trout Unlimited)	High	Create and support opportunities for stakeholder connection and engagement with the Watershed's natural resources. Engage citizens to promote sustainable stewardship of lakes and streams.	Watershed-wide	Many	General Fund	Public Communications, Outreach and Public Relations	$899,915
	CMR-6	Social Media Presence	Engage stakeholders and the public through insightful social media posts. Topics include, but are not limited to: project updates, BMP suggestions for residents, relevant news articles, photos from around the watershed, events, on Facebook and Instagram.	High	Communicate with stakeholders regarding environmental issues that directly impact the watershed	Many	Many	General Fund	Public Communications, Outreach and Public Relations	$138,986
	CMR-7	Collaborative Education and Outreach	Collaborate with partners to develop and distribute educational materials on topics including, but not limited to: MS4 Permit requirements to reduce stormwater pollution; residential BMPs to improve water quality; water conservation BMPs; indoor appliance water conservation rebates; soil health; interesting fish and macroinvertebrate information	Medium	Communicate with stakeholders regarding environmental issues that directly impact the watershed. Grow the number of watershed stakeholders.	Residents, landowners, businesses	LGUs	General Fund	Public Communications, Outreach and Public Relations	$117,603
	CMR-8	Engagement with Schools in the VRWJPO	Connect with teachers and education professionals in the watershed and participate in their programming as appropriate. Examples may include but are not limited to Outdoor Education Days, Earth Day events, in-class discussions.	Medium	Grow the number of watershed stakeholders	Students	DCSWCD and SSWCD	General Fund	Public Communications, Outreach and Public Relations	$83,456

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Community Relationships	CMR-9	VRWJPO Watershed Tours	Host watershed tours for stakeholders to highlight demonstrations of innovative technology, successful water quality and quantity improvement projects, and restoration and enhancement activities	Medium	Consistently communicate and promote the work of the VRWJPO with partners and stakeholders. Grow the amount of watershed stakeholders.	Elected and appointed officials	LGUs, state agencies, environmental organizations	General Fund	Public Communications, Outreach and Public Relations	$53,456
	CMR-10	Project Signage	Post signage that directs stakeholders and the public to the Project Update landing page for on-going projects. Place interpretive signs at completed VRWJPO project sites to inform the public about what the projects do for water resources.	Low	Consistently communicate and promote the work of the VRWJPO with partners and stakeholders.	Many	LGUs	General Fund	Public Communications, Outreach and Public Relations	$7,000
Administration	AD-1	Staffing	Staffing for VRWJPO Administrator, Co-Administrator, Senior Watershed Specialist, Water Resources Engineer and Communications and Outreach Specialist for hours related to: Administration and Operations; Planning; Inventory, Assessment, Research; Feasibility/Preliminary Engineering; Regulation; and CIP and Maintenance.	High	Many	N/A	Dakota County, Scott County	General Fund	All Budget Categories minus Public Communications, Outreach and Public Relations	$5,944,337
	AD-2	Insurance	Fees associated with insurance required for operation of the VRWJPO.	High	N/A	N/A	N/A	General Fund	Administration and Operations	$51,587
	AD-3	Legal Support	Fees associated with legal support for contract and/or agreement establishment, bidding document review and other legal support.	High	N/A	N/A	Dakota County	General Fund	Administration and Operations	$286,597
	AD-4	Public Notices	Keep website updated on following information: JPB agendas, meeting packets and meeting minutes; CAC agendas, meeting packets and meeting minutes; the Watershed Management Plan; VRWJPO Standards; monitoring reports; annual reports; legal public notices.	High	N/A	N/A		General Fund	Administration and Operations	$53,456

Table 3-14: VRWJPO 2026-2035 Implementation Plan: 10-Year Expenses continued

Category	Item ID	Action	Description	Priority Level	Objective(s) Addressed	Target Resource/Audience	Partners	Funding Source	Budget Category	*Total 10-Year Cost
Administration	AD-5	Watershed Management Plan Update	Funds to hire a contractor to update the Plan following MN Rule 103B and MN Statute 8410 requirements.	High	N/A	N/A	Dakota County and Scott County	General Fund	Planning	$195,000
	AD-6	CIP Maintenance	Funding for maintenance of CIP projects completed through partnerships with LGUs or independently by the VRWJPO.	High	Many	N/A	LGUs	General Fund	CIP and Maintenance	$343,916
	AD-7	Miscellaneous Operational Costs	Funding for miscellaneous operational costs including, but not limited to: website technical support, webpage host, software licenses, public notices, tools, equipment, subscriptions, communication materials, clothing, CAC per diems, trainings and mileage reimbursements.	High	Many	N/A	N/A	General Fund	Administration and Operations	$150,000

Notes:

(*) Dollars shown reflect only those costs sourced from the VRWJPO general budget. If funding source identifies grants or partner funds, additional dollars would be needed for full project implementation. VRWJPO general budget expenditures have been accounted for as partners have identified action within 2-, 5- or 10-year CIP programs, or other long-range implementation plans. Generally, for CIP partnerships, VRWJPO contributions range from 10-25% of the full project cost.

(+) Currently, no funding from the VRWJPO is identified to support this action. This action may be completed as partner and/or grant funding becomes available.

	Total 10-Year Cost
Water Quality Total	$2,746,136
Stormwater Management Total	$571,000
Groundwater Sustainability Total	$93,000
Climate Resilience Total	$346,000
Natural Environments Total	$805,267
Community Relationships Total	$1,881,843
Administration Total	$7,024,894
Total	$13,468,141

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses

Category	Item ID	Action	Target Resource/Audience	Partners	Funding Source	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Water Quality	WQ-1	Vermillion River Monitoring Network	Watershed-wide	DCSWCD, SSWCD, DNR, MPCA	General Fund	Inventory, Assessment and Research	$107,000	$110,210	$113,516	$116,922	$120,429	$124,042	$127,764	$131,597	$135,544	$139,611
	WQ-2	Assessments	Watershed-wide	Many	General Fund, Grants	Inventory, Assessment and Research						$35,000				
	WQ-3	Projects Identified within City of Lakeville North Creek and East Lake Subwatershed Assessment	North Creek and East Lake	City of Lakeville	General Fund, Partner Funds, Grants	CIP and Maintenance			$60,000	$60,000					$30,000	$30,000
	WQ-4	Projects Identified within City of Apple Valley East Lake Subwatershed Assessment	East Lake	City of Apple Valley	General Fund, Partner Funds, Grants	CIP and Maintenance		$57,500	$57,500	$115,000	$115,000					
	WQ-5	Projects Identified within Vermillion River Headwaters Subwatershed Assessment Projects	Vermillion River Headwaters	SSWCD, Landowners	Grants, Partner Funds	CIP and Maintenance	$8,750	$9,013	$9,283	$9,561	$9,848	$10,144	$10,448	$10,761	$11,084	$11,417
	WQ-6	Projects Identified within Upper Mainstem Subwatershed Assessment	Upper Mainstem Subwatershed	Landowners, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$27,500	$28,325	$29,175	$30,050	$30,951	$31,880	$32,836	$33,822	$34,836	$35,881

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/Audience	Partners	Funding Source	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Water Quality	WQ-7	Projects Identified within South Branch Vermillion River Subwatershed Assessment	South Branch Subwatershed	Landowners, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$8,750	$9,013	$9,283	$9,561	$9,848	$10,144	$10,448	$10,761	$11,084	$11,417
	WQ-8	Projects Identified within Vermillion Lower Mainstem South Subwatershed Assessment	Lower Mainstem Subwatershed	Landowner, DCSWCD	Grants, Partner Funds	CIP and Maintenance	$8,750	$9,013	$9,283	$9,561	$9,848	$10,144	$10,448	$10,761	$11,084	$11,417
	WQ -9	Opportunity projects/assessments	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000									
	WQ-10	BMP Performance Monitoring	Watershed-wide	Many	General Fund	Inventory, Assessment and Research	$2,000		$2,200	$2,300	$2,400	$2,500	$2,700	$2,800	$2,900	$3,000
	WQ-11	Vermillion River Groundwater Interaction Assessment	South Branch, Lower Mainstem and Mississippi Direct Subwatersheds	Dakota County, City of Hastings	General Fund, Partner Funds, Grants	Inventory, Assessment and Research									$49,400	
	WQ-12	Groundwater Quality Projects, Programs and Practices	Watershed-wide	Many	General Fund, Partner Funds	CIP and Maintenance	$17,500	$18,025	$18,566	$19,123	$19,696	$20,287	$20,896	$21,523	$22,168	$22,834
	WQ-13	Enhanced Street Sweeping Study	Regulated MS4s	Dakota County	General Fund, Partner Funds	Inventory, Assessment and Research	$45,000									

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/Audience	Partners	Funding Source	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Water Quality	WQ-14	Assist with Development of Low Salt Design Standards	Watershed-wide	Many	General Fund	Administration and Operations; Regulation		$5,000				$5,000				
	WQ-15	Projects that Address E. coli	Upper Mainstem Subwatershed	DCSWCD, SSWCD, Dakota County, Scott County	General Fund, Partner Funds	Inventory, Assessment and Research	$7,500									
	WQ-16	Projects that Address Toxics/Metals/ECOC/Pesticides	Watershed-wide	Many	General Fund, Partner Fund, Grants	CIP and Maintenance; Inventory, Assessment and Research; and Communication, Outreach and Public Relations										
Stormwater Management	SW-1	Projects Identified within Hastings Direct Drainage Subwatershed Assessment	Lower Mississippi Direct Subwatershed	City of Hastings	Grants, Partner Funds	CIP and Maintenance		$25,000			$50,000		$55,000			
	SW-2	Projects Identified within South Creek Subwatershed Assessment	South Creek Subwatershed	City of Lakeville, Landowners, Dakota County	General Fund, Partner Funds, Grants	CIP and Maintenance					$10,000		$10,000		$10,000	
	SW-3	Projects Identified within City of Farmington Subwatershed Assessment	North Creek, Middle Creek and Middle Mainstem Subwatersheds	City of Farmington	General Fund, Partner Funds, Grants	CIP and Maintenance						$75,000				

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/Audience	Partners	Funding Source	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Stormwater Management	SW-4	Projects Identified within City of Farmington Stormwater Retrofit Assessment for Independent School District 192	North Creek, Middle Creek and Middle Mainstem Subwatersheds	City of Farmington	General Fund, Partner Funds, Grants	CIP and Maintenance	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
	SW-5	Innovative Stormwater Management Projects and Practices	Watershed-wide	Cities, Dakota County, Scott County	General Fund, Partner Funds, Grants	CIP and Maintenance		$65,000	$65,000				$70,000	$70,000		
	SW-6	Opportunity projects/assessments	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000									
	SW-7	Projects identified within the Long and Farquar TMDL Implementation Plan and Long and Farquar Pond Feasibility Analysis	Long and Farquar Lakes	City of Apple Valley	General Fund, Partner Funds, Grants	CIP and Maintenance	$18,000					$40,000				
	SW-8	Low Impact Development Practice Policies and Programs	Urban and Suburban Landscapes	Many	General Fund	Many	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
Groundwater Sustainability	GS-1	Groundwater Conservation Assessments	Watershed-wide	Many	General Fund	Inventory, Assessments, and Research			$10,000							
	GS-2	Projects, Programs and Practices Identified within the Dakota County Groundwater Plan's Groundwater Quantity Tactics	Dakota County	Dakota County, LGUs, DCSWCD	General Fund, Grants, Partner Funds	CIP and Maintenance; Regulation; Inventory, Assessments and Research	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/Audience	Partner(s)	Funding Source(s)	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Groundwater Sustainability	GS-3	Groundwater Conservation Assessment Projects	Watershed-wide	Many	General Fund, Grants, Partner Funds	CIP and Maintenance	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
	GS-4	Soil Health Initiative Partnerships	Urban and Suburban Landscapes	Many	General Fund, Grants, Partner Funds	CIP and Maintenance; Communications, Outreach and Public Relations	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
	GS-5	Opportunity projects/assessments	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000									
Climate Resilience	CR-1	Climate Resiliency Plan	Watershed-wide	Many	General Fund, Grants	Feasibility/ Preliminary Engineering; Inventory, Assessment and Research			$50,000	$50,000						
	CR-2	Climate Resilient Project Incentives	Urban and Suburban Landscapes	Cities, Counties, SWCDs	General Fund, Partner Funds, Grants	CIP and Maintenance						$25,000	$40,000	$28,000	$35,000	$25,000
	CR-3	Floodplain Reconnection	Watershed-wide	Many	General Fund, Partner Funds, Grants	CIP and Maintenance; Feasibility/ Preliminary Engineering				$20,000				$35,000		

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/Audience	Partner(s)	Funding Source(s)	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Climate Resilience	CR-4	Opportunity projects/assessments	Watershed-wide	Many	General Fund, Partner Funds, Grants	All Budget Categories excluding Administration and Operations	$8,000									
	CR-5	Stormwater Infrastructure Adaptation	Urban and Suburban Landscapes	LGUs	General Fund, Partner Funds, Grants	CIP and Maintenance					$15,000				$15,000	
	CR-6	Green Infrastructure BMPs	Urban and Suburban Landscapes	LGUs	General Fund, Partner Funds, Grants	CIP and Maintenance	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
	CR-7	Updated Floodplain Model	Watershed-wide	Cities, Counties, DNR	General Fund, Partner Funds	Feasibility/Preliminary Engineering	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
Natural Environments	NE-1	Projects identified within the South Creek Geomorphic Assessment	South Creek Subwatershed	City of Lakeville, Dakota County	Grants, Partner Funds	CIP and Maintenance		$50,000	$35,000							
	NE-2	Projects identified within the Etter Creek and Ravenna Coulee Geomorphic Assessment	Mississippi Direct Subwatershed	Dakota County, DCSWCD	Grants, Partner Funds	CIP and Maintenance				$10,000						
	NE-3	Projects identified within the Middle and North Creek Geomorphic Assessment	Middle Creek and North Creek Subwatersheds	City of Lakeville, City of Farmington, Dakota County	Grants, Partner Funds	CIP and Maintenance							$45,000			

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/ Audience	Partner(s)	Funding Source(s)	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Natural Environments	NE-4	Projects identified within the Empire Drainages Geomorphic Assessment	Middle Mainstem Subwatershed	City of Empire, DCSWCD	Grants, Partner Funds	CIP and Maintenance								$20,000		
	NE-5	Projects identified within the Lower Mainstem Geomorphic Assessment	Lower Mainstem Subwatershed	Dakota County, DCSWCD	Grants, Partner Funds	CIP and Maintenance								$20,000		
	NE-6	VRWJPO Wetland Banking Program	Restorable Wetlands	SWCDs, Counties, BWSR	General Fund, Partner Funds, Grants	CIP and Maintenance	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
	NE-7	Priority Wetland Restoration	Restorable Wetlands	Many	General Fund, Partner Funds	CIP and Maintenance				$25,000		$35,000				$45,000
	NE-8	East Lake In-lake Projects and Practices	East Lake	City of Apple Valley, City of Lakeville, DNR, Dakota County	General Fund, Partner Funds, Grants	CIP and Maintenance	$10,000	$5,000	$5,000			$25,000				
	NE-9	Cost-share for DCSWCD and SSWCD Incentive Programs	Agricultural landscapes	DCSWCD and SSWCD	General Fund	CIP and Maintenance	$23,750	$24,463	$25,196	$25,952	$26,731	$27,533	$28,359	$29,210	$30,086	$30,988
	NE-10	In-stream Habitat Restoration	Streams	Many	General Fund, Grants, Partner Funds	CIP and Maintenance		$15,000			$50,000		$37,500	$62,500		$25,000

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/Audience	Partner(s)	Funding Source(s)	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Natural Environments	NE-11	Opportunity projects/assessments	Watershed-wide	Many	Many	All Budget Categories excluding Administration and Operations	$8,000									
	NE-12	In-lake management projects identified within the Long and Farquar TMDL Implementation Plan	Long and Farquar Lakes	DNR and City of Apple Valley	Grants, Partner Funds, General Fund	CIP and Maintenance	Currently, no funding identified. This action may be completed as partnerships and funding becomes available.									
	NE-13	Upland Restoration Adjacent to Water Resources	Watershed-wide	Many	Grants, Partner Funds, General Fund	Public Communications, Outreach and Public Relations; CIP Maintenance	$2,500	$2,500								
Community Relationships	CMR-1	Stewardship Grants	Residents, landowners, businesses, community groups	Many	General Fund	Public Communications, Outreach and Public Relations; Administration and Operations	$32,650	$33,033	$33,434	$33,856	$34,299	$34,764	$35,252	$35,764	$36,303	$36,868
	CMR-2	Public Event Participation	Many	Many	General Fund	Public Communications, Outreach and Public Relations	$7,650	$8,033	$8,434	$8,856	$9,299	$9,764	$10,252	$10,764	$11,303	$11,868
	CMR-3	Maintain Website	Many	N/A	General Fund	Public Communications, Outreach and Public Relations	$4,250	$4,463	$4,686	$4,920	$5,166	$5,424	$5,695	$5,980	$6,279	$6,593

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses continued

Category	Item ID	Action	Target Resource/Audience	Partner(s)	Funding Source(s)	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Community Relationships	CMR-4	Distribute Newsletter	Newsletter subscribers	Many	General Fund	Public Communications, Outreach and Public Relations	$6,800	$7,140	$7,497	$7,872	$8,265	$8,679	$9,113	$9,568	$10,047	$10,549
	CMR-5	Partner Programs	Watershed-wide	Many	General Fund	Public Communications, Outreach and Public Relations	$78,500	$80,855	$83,281	$85,779	$88,352	$91,003	$93,733	$96,545	$99,441	$102,425
	CMR-6	Social Media Presence	Many	Many	General Fund	Public Communications, Outreach and Public Relations	$11,050	$11,603	$12,183	$12,792	$13,431	$14,103	$14,808	$15,548	$16,326	$17,142
	CMR-7	Collaborative Education and Outreach	Residents, landowners, businesses	LGUs	General Fund	Public Communications, Outreach and Public Relations	$9,350	$9,818	$10,308	$10,824	$11,365	$11,933	$12,530	$13,156	$13,814	$14,505
	CMR-8	Engagement with Schools in the Watershed	Students	DCSWCD and SSWCD	General Fund	Public Communications, Outreach and Public Relations	$7,250	$7,463	$7,686	$7,920	$8,166	$8,424	$8,695	$8,980	$9,279	$9,593
	CMR-9	VRWJPO Watershed Tours	Elected and appointed officials	LGUs; state, local and regional agencies	General Fund	Public Communications, Outreach and Public Relations	$4,250	$4,463	$4,686	$4,920	$5,166	$5,424	$5,695	$5,980	$6,279	$6,593
	CMR-10	Project Signage	Many	LGUs	General Fund	Public Communications, Outreach and Public Relations	$500	$500	$500	$500		$500	$500	$500	$500	$3,000

Table 3-15: VRWJPO 2026-2035 Implementation Plan: Annual Expenses

Category	Item ID	Action	Target Resource/Audience	Partner(s)	Funding Source(s)	Budget Category	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Administration	AD-1	Staffing	N/A	Dakota County, Scott County	General Fund	All Budget Categories minus Public Communications, Outreach and Public Relations	$472,602	$496,232	$521,044	$547,096	$574,451	$603,173	$633,332	$664,998	$698,248	$733,161
	AD-2	Insurance	N/A	N/A	General Fund	Administration and Operations	$4,500	$4,635	$4,774	$4,917	$5,065	$5,217	$5,373	$5,534	$5,700	$5,871
	AD-3	Legal Support	N/A	Dakota County	General Fund	Administration and Operations	$25,000	$25,750	$26,523	$27,318	$28,138	$28,982	$29,851	$30,747	$31,669	$32,619
	AD-4	Public Notices	N/A	N/A	General Fund	Administration and Operations	$4,250	$4,463	$4,686	$4,920	$5,166	$5,424	$5,695	$5,980	$6,279	$6,593
	AD-5	Watershed Management Plan Update	N/A	Dakota County and Scott County	General Fund	Planning									$95,000	$100,000
	AD-6	CIP Maintenance	N/A	LGUs	General Fund	CIP and Maintenance	$30,000	$30,900	$31,827	$32,782	$33,765	$34,778	$35,822	$36,896	$38,003	$39,143
	AD-7	Miscellaneous Operational Costs	N/A	N/A	General Fund	Administration and Operations	$15,000	$15,000	$15,00	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000

Note:
Annual dollar expenditures reflect only those costs sourced from the VRWJPO general budget. If funding source identifies grants or partner funds, additional dollars would be needed for full project implementation. VRWJPO general budget expenditures have been accounted for as partners have identified action within 2-, 5- or 10-year CIP programs, or other long-range implementation plans. Generally, for CIP partnerships, VRWJPO contributions range from 10-25% of full project cost.

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Water Quality Total	$240,750	$246,098	$308,805	$372,079	$318,022	$249,141	$215,540	$222,025	$308,102	$265,576
Stormwater Management Total	$26,000	$90,000	$65,000	$0	$60,000	$115,000	$135,000	$70,000	$10,000	$0
Groundwater Sustainability Total	$15,500	$7,500	$17,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500	$7,500
Climate Resilience Total	$8,000	$0	$50,000	$70,000	$15,000	$25,000	$40,000	$63,000	$50,000	$25,000
Natural Environments Total	$44,250	$96,963	$65,196	$60,952	$76,731	$87,533	$110,859	$131,710	$30,086	$100,988
Community Relationships Total	$162,250	$167,368	$172,694	$178,238	$183,509	$190,018	$196,273	$202,787	$209,571	$219,136
Administration Total	$551,352	$576,980	$603,853	$632,033	$661,584	$692,574	$725,073	$759,156	$889,900	$932,388
Total	$1,048,102	$1,184,907	$1,283,048	$1,320,802	$1,322,346	$1,366,765	$1,430,245	$1,456,178	$1,505,159	$1,550,588

3.6 Plan Reporting and Assessment

Following MN Statute 103B.231 and MN Rule 8410.0150, the VRWJPO submits an annual activity and financial audit report to the BWSR within 120 days of the end of a calendar year. The annual report must include the following:

- A list of board members, names of designated officers, the governmental organization that each board member represents, and the county that appointed each member
- Identification of a contact person capable of answering questions about the VRWJPO, including postal and electronic mailing addresses and telephone numbers
- An assessment of the previous year's annual work plan that indicates whether the stated activities were completed including the expenditures of each activity with respect to the approved budget, unless included in the audit report
- A work plan and budget for the current year specifying which activities will be undertaken
- An evaluation of progress on goals and the implementation actions, including the CIP, to determine if amendments to the implementation actions are necessary
- A summary of significant trends of monitoring data
- The VRWJPO's activities related to the biennial solicitations for interest proposals for legal, professional or technical consultant services
- An evaluation of the status of LWMP adoption and local implementation activities
- The status of any locally adopted ordinances or rules required by the VRWJPO and their enforcement
- A summary of permits and variances issues or denied and violations under rule or ordinance requirements of the VRWJPO

Staff present these items in the following formats:

- Tables and graphs showing monitoring trends in the reporting and subsequent monitoring years as they relate to biological and chemical parameters in lakes and rivers
- Tables narrating projects implemented, organized according to specific goal and implementation actions, and associated pollutant reductions, costs, grant funding, partnering communities, and subwatershed location
- Metrics of groundwater conservation and protection activities, according to urban and agricultural sources
- Tables narrating stormwater adaptation projects implemented, organized according to project type, and their associated volume reductions, project cost, grant funding, partnering communities, and subwatershed location
- Community engagement metrics including those associated with the number of participants engaged at various community outreach events (volunteer programs, workshops, events and presentations)
- A final treasurer's report for the reporting year, logged according to projects implemented and budget funding sources
- Work plan activities planned for the following year as well as the corresponding budgeting amounts, sorted by Plan categories
- Resolutions made by the JPB in the reporting year, organized according to meeting date

In addition to the annual report, the VRWJPO tracks measurable outcomes relating to specific Implementation Actions. This Plan's measurable outcomes are laid out in *Table 3-16.*

Table 3-16: VRWJPO 2026-2035 Implementation Plan Measurable Outcomes

Category	Item ID	Action	Measurable Outcomes
Water Quality	WQ-1	Vermillion River Monitoring Network	• 1 Monitoring Report Completed Annually
	WQ-2	Assessments	• Assessments: Up to 3
	WQ-3	Projects Identified within City of Lakeville North Creek and East Lake Subwatershed Assessment	• Projects: Up to 4 • TSS Reduction: Up to 11,200 lbs/yr • TP Reduction: Up to 40.7 lbs/yr
	WQ-4	Projects Identified within City of Apple Valley East Lake Subwatershed Assessment	• Projects: Up to 2 • TP Reduction: Up to 101 lbs/yr
	WQ-5	Projects Identified within Vermillion River Headwaters Subwatershed Assessment Projects	• Projects: Up to 10 • TSS Reduction: Up to 509.9 tons/yr • TP Reduction: Up to 193.3 lbs/yr • NO_3 Reduction: Up to 1,889.24lbs/yr
	WQ-6	Projects Identified within Upper Mainstem Subwatershed Assessment	• Projects: Up to 4 • TSS Reduction: Up to 46 tons/yr
	WQ-7	Projects Identified within South Branch Vermillion River Subwatershed Assessment	• Projects: Up to 9 • TSS Reduction: Up to 583 tons/yr
	WQ-8	Projects Identified within Vermillion Lower Mainstem South Subwatershed Assessment	• Projects: Up to 9 • TSS Reduction: Up to 31.95 tons/yr
	WQ-9	Opportunity Projects/assessments	• Projects: Up to 2
	WQ-10	BMP Performance Monitoring	• BMPs Evaluated: Up to 3
	WQ-11	Vermillion River Groundwater Interaction Assessment	• Report: 1
	WQ-12	Groundwater Quality Projects, Programs and Practices	• Projects: Up to 5
	WQ-13	Enhanced Street Sweeping Study	• Report: 1
	WQ-14	Assist with Development of Low Salt Design Standards	• Collaborative Interactions: Up to 5
	WQ-15	Projects that Address E. coli	• Projects: Up to 1
	WQ-16	Projects that Address Toxics/Metals/ECOC/Pesticides	• Projects: Up to 1

Table 3-16: Measurable Outcomes continued

Category	Item ID	Action	Measurable Outcomes
Stormwater Management	SW-1	Projects Identified within Hastings Direct Drainage Subwatershed Assessment	• Projects: Up to 3 • TSS Reduction: Up to 2.22 tons/yr • TP Reduction: Up to 6.7 lbs/yr
	SW-2	Projects Identified within South Creek Subwatershed Assessment	• Projects: Up to 3 • TSS Reduction: Up to 7,920 lbs/yr
	SW-3	Projects Identified within City of Farmington Subwatershed Assessment	• Projects: Up to 1 • TSS Reduction: Up to 16.9 lbs/yr
	SW-4	Projects Identified within City of Farmington Stormwater Retrofit Assessment for Independent School District 192	To be identified as funding becomes available.
	SW-5	Innovative Stormwater Management Projects and Practices	• Projects: Up to 2
	SW-6	Opportunity Projects/assessments	• Projects: Up to 2
	SW-7	Projects identified within the Long and Farquar TMDL Implementation Plan and Long and Farquar Pond Feasibility Analysis	• Projects: Up to 1 • TP Reduction: Up to 8.04 lb/yr
	SW-8	Low Impact Development Practice Policies and Programs	• Collaborative Interactions: Up to 2
Groundwater Sustainability	GS-1	Groundwater Conservation Assessments	• Assessments: Up to 3
	GS-2	Projects, Programs and Practices Identified within the Dakota County Groundwater Plan's Groundwater Quantity Tactics	• Projects: Up to 5
	GS-3	Groundwater Conservation Assessment Projects	• Projects: Up to 3
	GS-4	Soil Health Initiative Partnerships	• Projects: Up to 5
	GS-5	Opportunity Projects/assessments	• Projects: Up to 2
Climate Resilience	CR-1	Climate Resiliency Plan	• Plan: Up to 1
	CR-2	Climate Resilient Project Incentives	• Projects: Up to 5
	CR-3	Floodplain Reconnection	• Projects: Up to 2
	CR-4	Opportunity Projects/assessments	• Projects: Up to 2
	CR-5	Stormwater Infrastructure Adaptation	• Projects: Up to 3

Table 3-16: Measurable Outcomes continued

Category	Item ID	Action	Measurable Outcomes
Climate Resilience	CR-6	Green Infrastructure BMPs	• Projects: Up to 1
	CR-7	Updated Floodplain Model	• Updated Model: Up to 1
Natural Environments	NE-1	Projects identified within the South Creek Geomorphic Assessment	• Projects: Up to 1
	NE-2	Projects identified within the Etter Creek and Ravenna Coulee Geomorphic Assessment	• Projects: Up to 1
	NE-3	Projects identified within the Middle and North Creek Geomorphic Assessment	• Projects: Up to 1
	NE-4	Projects identified within the Empire Drainages Geomorphic Assessment	• Projects: Up to 1
	NE-5	Projects identified within the Lower Mainstem Geomorphic Assessment	• Projects: Up to 1
	NE-6	VRWJPO Wetland Banking Program	• Projects: Up to 1 • ~80 acres wetland restored
	NE-7	Priority Wetland Restoration	• Project: Up to 2 • TP Reduction: Up to 1,320 lbs/yr
	NE-8	East Lake In-lake Projects and Practices	• Projects: Up to 3
	NE-9	Cost-share for DCSWCD and SSWCD Incentive Programs	• Projects: Up to 35 • TSS Reduction: Up to 502 tons/yr • TP Reduction: Up to 586 lbs/yr • NO_3 Reduction: Up to 12,295 lbs/yr
	NE-10	In-stream Habitat Restoration	• Projects: Up to 2
	NE-11	Opportunity Projects/assessments	• Projects: Up to 2
	NE-12	In-lake Management Projects Identified within the Long and Farquar TMDL Implementation Plan	To be identified as funding becomes available.
	NE-13	Upland Restoration Adjacent to Water Resources	• Projects: Up to 5

Table 3-16: Measurable Outcomes continued

Category	Item ID	Action	Measurable Outcomes
Community Relationships	CMR-1	Stewardship Grants	• Applications: Up to 10
	CMR-2	Public Event Participation	• Events: Up to 120
	CMR-3	Maintain Website	• Website Views: Up to 195,000
	CMR-4	Distribute Newsletter	• Electronic newsletters: Up to 40
	CMR-5	Partner Programs	• Landscaping for Clean Water Projects: Up to 160 • Lawns Reimagined Projects: Up to 20
	CMR-6	Social Media Presence	• Social Media Posts: Up to 2,900
	CMR-7	Collaborative Education and Outreach	• Community Organization Presentations: Up to 20
	CMR-8	Engagement with Schools in the Watershed	• Classroom Presentations: Up to 10
	CMR-9	VRWJPO Watershed Tours	• Tours: Up to 5
	CMR-10	Project Signage	• Number of Signs: Up to 15
Administration	AD-1	Staffing	• 4 full-time staff, 1 part-time staff
	AD-2	Insurance	N/A
	AD-3	Legal Support	N/A
	AD-4	Public Notices	N/A
	AD-5	Watershed Management Plan Update	• Plan Update: 1
	AD-6	CIP Maintenance	N/A
	AD-7	Miscellaneous Operational Costs	N/A

Section Four: Watershed Financing

The VRWJPO annually allocates funding for fixed and variable costs to accomplish the Goals and Objectives detailed in the Plan. Primary revenue streams include:

- Watershed Management Tax District Levy
- Wetland Banking Program
- Grant Funding
- Partner Cost-Share

Budget appropriations cover fixed costs for Administration and Operations, which includes but is not limited to, maintaining appropriate levels of VRWJPO staff, staff training, office space and supplies, equipment, and other overhead costs. Budget appropriations for Planning, Inventory/Assessment/Research, Feasibility/Preliminary Engineering, Regulation, Communication/Outreach/Public Relations, and CIP/Maintenance are more variable.

4.1 Property Tax Levy

In accordance with MN Statute 103B.253, Dakota and Scott Counties established a Watershed Management Tax District for the VRWJPO. An annual levy is collected by Dakota and Scott Counties from properties within the Tax District to pay for projects, programs, and practices identified in an approved and adopted Watershed Management Plan that:

1. Protect, preserve, and use natural surface water and groundwater storage and retention systems
2. Minimize public capital expenditures needed to correct flooding and water quality problems
3. Identify and plan for means to effectively protect and improve surface water and groundwater quality
4. Establish more uniform local policies and official controls for surface water and groundwater management
5. Prevent erosion of soil into surface water systems
6. Promote groundwater recharge
7. Protect and enhance fish and wildlife habitat and water recreational facilities
8. Secure the other benefits associated with the proper management of surface water and groundwater

The majority of the VRWJPO's revenue comes from the tax levy. Over the years, the levy has increased steadily to help offset inflation and other service cost increases, apart from 2020-2024 when the annual levy was the same. Levy amounts from 2016-2025 are listed in *Table 4-1*:

Table 4-1: 2016-2025 VRWJPO Watershed Management Tax District Levy Annual Revenue

Year	Dakota County	Scott County	Total
2016	$821,140	$31,460	$852,600
2017	$861,700	$33,500	$895,200
2018	$887,900	$34,100	$922,000
2019	$912,900	$35,100	$948,000
2020	$966,000	$34,000	$1,000,000
2021	$966,650	$33,350	$1,000,000
2022	$967,500	$32,500	$1,000,000
2023	$964,900	$35,100	$1,000,000
2024	$965,600	$34,400	$1,000,000
2025	$990,832	$36,050	$1,026,882

4.2 Wetland Banking Program

The VRWJPB has prioritized offsetting wetland impacts and a no net loss of wetlands within the VRWJPO and established a policy to address this priority. Based on United States Army Corps of Engineers (USACE) and BWSR wetland regulations, when wetlands are impacted the preferred method to offset those impacts is to purchase credits from an approved wetland bank rather than attempting on-site wetland mitigation, which has historically had poor restoration success.

A wetland bank is a successfully restored wetland where the acres of wetland restored and approved by the USACE and BWSR are sold on the open market as credits for wetland impact elsewhere. While Minn. Rule 8420, known as the Minnesota Wetland Conservation Act (WCA), allows wetland replacement following Bank Service Area boundaries, VRWJPO Standards require wetland replacement within the boundaries of the VRWJPO when possible. To support these Standards, the VRWJPO invests in wetland restoration for the purpose of wetland banking. These restorations typically take place in partnership with LGUs, SWCDs, or the BWSR. Initially, the proceeds from wetland credit sales are used to pay down any wetland banking design, construction, vegetation establishment and easement costs. Remaining proceeds are then set aside in a revolving fund for future wetland banking projects.

The first VRWJPO-sponsored wetland bank was constructed in 2021. At the time, the VRWJPO contributed $500,000 towards the cost of restoration, which resulted in the creation of 35.42 acres of credit available for purchase on the wetland market. *Table 4-2* indicates the proceeds generated from the sale of wetland bank credits through 2025.

Table 4-2: VRWJPO Wetland Bank Credit Sales

Date Withdrawn	Credits Withdrawn (Acres)	Cost
6/7/2022	0.1600	$5,920.00
7/19/2022	2.812	$104,044.00
9/14/2022	0.2478	$9,168.60
10/18/2022	0.9800	$36,260.00
7/17/2024	0.9300	$34,410.00
5/29/2024	0.8800	$32,560.00
10/15/2024	0.1200	$4,440.00
01/07/2025	0.5800	$28,922.86
04/16/2025	1.1408	$56,888.27
04/16/2025	0.0988	$4,926.86
05/20/2025	0.3230	$16,107.04
06/12/2025	0.3060	$15,259.30
06/17/2025	0.2500	$12,466.75
8/20/2025	0.3790	$18,899.59
11/27/2025	1.0400	$51,861.68
Total	**10.2474**	**$432,134.96**

4.3 Grant Funding

The VRWJPO has procured $6.53 million in grant funding between 2016 and 2025. These funds have helped the VRWJPO and its partners implement projects to improve impaired waters, protect water resources that are meeting state water quality standards, enhance fish and wildlife habitat, protect groundwater quality and quantity, and more.

The most awarded grants received by the VRWJPO are those funded through the Minnesota Clean Water, Land, and Legacy Amendment, such as:

- **Clean Water Fund Competitive Grants through the BWSR (CWF):** CWF Grants are awarded to projects that restore, protect, and enhance water quality in lakes, rivers and streams; protect groundwater from degradation; and protect drinking water sources. Applying for and receiving awards has historically been offered annually through a statewide competitive grant application process, though that process changed to biennially in 2025. However, funding appropriations for the CWF Grant may change over the course of this plan, as Minnesota transitions to its watershed management approach. As watershed-based plans are completed, funding will gradually shift away from traditional project-by-project CWF Grants toward increased support for watershed-based grants such as the following.
- **Watershed-Based Implementation Funding Grants through the BWSR:** WBIF Grants provide biennial grant funding to implement projects and programs that protect, enhance, and restore surface water quality in lakes, rivers, and streams; protect groundwater from degradation; and protect drinking water sources. The VRWJPO and LGUs have access to this funding source since the VRWJPO has an approved Watershed Management Plan and Dakota County has an approved Groundwater Plan. Every two years, partners submit funding requests based on their prioritized plan activities. This funding allows collaborating LGUs, partners, and the VRWJPO to effectively implement projects, programs, and practices based on the Plan's prioritization and targeting metrics.
- **Conservation Partners Legacy Grant Program (CPL) through the Minnesota DNR:** CPL Grants fund conservation projects that restore, protect, or enhance prairies, wetlands, forests or habitat for fish, game, or wildlife in Minnesota. Grant applications are accepted every year and provide funding for a wide range of eligible projects, programs and practices identified in the Plan.
- **Outdoor Heritage Fund (OHF) through the Lessard-Sams Outdoor Heritage Council:** This grant is similar to and allocates funds to the CPL grant program, but it has a different application and evaluation process. The goals of the OHF grant are the restoration, protection, and enhancement of wetlands, prairies, forests, and habitat for fish, game, and wildlife.
- **MDH Accelerated Implementation Grant (AIG) for Groundwater Protection:** This grant program is intended to help build capacity to accelerate the implementation of groundwater projects across the state.

Staff remain apprised of additional funding opportunities for VRWJPO initiatives.

4.4 Partner Cost-Share

Partnerships with LGUs, regional and state agencies, landowners, non-governmental organizations, community groups, and educational institutions help advance projects and practices within the VRWJPO. Since 2016, these partners have contributed $2.58 million toward initiatives aligning with the Goals and Objectives of the Plan. Partners have also provided cash, staff time, and/or other resources (in-kind).

During the same timeframe, the VRWJPO offered contributions totaling $3.17 million dollars from its budget to further projects and practices aligning with the Goals and Objectives of the Plan. Financial contributions included:

- Grant cash matching
- Cost-share towards LGU CIP Projects and Maintenance
- The VRWJPO Stewardship Grant
- A contribution towards the Metro Children's Water Festival
- Funding towards the Minnesota Water Stewards Program
- Cost-share for BMPs implemented via the DCSWCD's and SSWCD's incentive programs
- Cost-share for well decommissioning via the Dakota County Well Sealing Grant
- Trainings on chloride (Smart Salting Certification Program)
- and turf (Turfgrass Management Certification) BMPs
- Wetland bank establishment

In-kind contributions include:

- Grant administration
- Construction oversight for VRWJPO and/or LGU project implementation
- Dakota County CIP administration and construction oversight
- Assistance with implementation of the VRWJPO Standards and LGU permitting programs
- Hosting a learning station at DCSWCD's Outdoor Education Days

4.5 Annual Budget Adoption

The VRWJPO budget is adopted annually. In general terms, the budget is developed, reviewed, and approved in the following sequence:

- Per VRWJPO policy, the VRWJPB must adopt a preliminary budget with a proposed maximum levy from each county for the following calendar year by September 1. That amount must be certified by Dakota and Scott Counties by September 15. Other contributions or assessments from Dakota County or Scott County may be made at any time.
- In early December of each year, the VRWJPB adopts a final budget and levy for the following calendar year. The proposed levy may not exceed the amount identified in the preliminary budget but can be less. Dakota and Scott Counties must certify the final Watershed Management Tax District levy by December 28.

Appendix A: Inventory of Studies and Plans

A-1 Studies

The below list is a collection of references that were used to: formulate the information provided in the Land and Water Resources Inventory; inform implementation priorities; geographically target areas for action implementation; and ensure consistency with state, regional, and local planning documents. Weblinks are provided where possible.

Watershed Assessments

- Vermillion River Watershed Restoration and Protection Strategy Report (WRAPS) – MPCA, 2015
- Stressor Identification Report for the Vermillion River WRAPS – MPCA, 2013
- Vermillion River Watershed Monitoring and Assessment Report – MPCA, 2018
- Vermillion River Watershed Total Maximum Daily Load Report – MPCA, 2015
- Vermillion River Monitoring Network Annual Reports, Chemical Monitoring, and Stream Gaging – DCSWCD, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024
- Scott County *E. coli* Investigation Reports – SSWCD, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023
- Vermillion River Watershed Monitoring and Assessment Report – MPCA, 2012
- Vermillion River Watershed Stressor ID Update – MPCA, 2022
- Vermillion River Watershed Assessment and Trends Update – Minnesota Pollution Control Agency, 2021
- DNR Watershed Health Assessment Framework

Subwatershed Assessments

- Subwatershed Analysis for the Vermillion River Headwaters – SSWCD, 2014
- Alimagnet Lake Subwatershed Assessment Report – VRWJPO, 2016
- South Creek Subwatershed Assessment Report – VRWJPO, 2016
- Subwatershed Analysis for Vermillion Upper Mainstem – DCSWCD, 2019
- Subwatershed Analysis for South Branch Vermillion River – DCSWCD, 2022
- Subwatershed Analysis for Vermillion Lower Mainstem South – DCSWCD, 2023
- Vermillion River Headwaters Subwatershed and Stream Habitat Assessment – SSWCD, 2025
- Apple Valley East Lake Subwatershed Assessment – City of Apple Valley, 2022
- City of Lakeville North Creek and East Lake Subwatershed Assessment – MPCA, 2022
- North Creek and South Creek Supplemental Dissolved Oxygen Study – VRWJPO, 2022
- Vermillion River Headwaters Groundwater Recharge Area Inventory and Protection Plan – VRWJPO, 2007
- Farmington Subwatershed Assessment – City of Farmington, 2023
- Hastings Water Quality Improvement Planning – City of Hastings, 2023
- Stormwater Retrofit Assessment for Independent School District 192 – DCSWCD, 2018

Geomorphic Assessments

- South Creek Subwatershed Fluvial Geomorphic Assessment Report – VRWJPO, 2010
- Fluvial Geomorphic Assessment of Etter Creek and the Ravenna Coulees – VRWJPO, 2011
- Fluvial Geomorphic Assessment of North Creek and Middle Creek – VRWJPO, 2012
- Empire Drainages Geomorphic Assessment – VRWJPO, 2013
- Lower Vermillion River Geomorphic Assessment – VRWJPO, 2018
- South Branch Vermillion River: Minnesota Department of Natural Resources Geomorphic Overview – DNR, 2020

Biomonitoring

- East Lake Carp Assessment Report – VRWJPO, 2018
- East Lake Carp Movement Study Report – City of Lakeville, 2019
- Vermillion River Watershed Fish Community Monitoring – VRWJPO, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023
- Vermillion River Biomonitoring Plan – VRWJPO, 2008

Feasibility Studies

- East Lake Common Carp Barrier Alternatives Feasibility Evaluation – City of Lakeville, 2020
- Long and Farquar Pond Feasibility Analysis – City of Apple Valley, 2023
- Alimagnet Lake Alum Treatment Feasibility Study – VRWJPO, 2023
- Golden Pond Channel Stabilization Phase 1 – City of Lakeville, 2016
- Long and Farquar TMDL Implementation Plan Update – City of Apple Valley, 2017
- Dakota County Rural SWMM Study – Dakota County, 2020

Other Studies/Inventories

- Drained Wetland Inventory, Vermillion River Watershed Upper Vermillion and South Branch Drainage Areas – DCSWCD, 2012
- Potential Wetland Restoration Inventory – DCSWCD, 2017
- Low Salt Design Guide – Bolton & Menk, 2025
- Dakota County Groundwater Nitrate Modeling – Dakota County, 2022
- Prioritized Feedlot Inventory – VRWJPO, 2019
- Landowner Perspectives About Water Resource Protection in the Vermillion River Watershed – University of Minnesota Center for Changing Landscapes, 2021

A-2 Plans

Local Management Plans

- City of Apple Valley 2018-2027 Surface Water Management Plan
- City of Burnsville 2018-2027 Water Resources Management Plan
- City of Farmington 2018-2027 Surface Water Management Plan
- City of Hastings Watershed Management Plan
- City of Lakeville 2018-2027 Water and Natural Resources Management Plan
- City of Rosemount 2018-2027 Surface Water Management Plan
- Dakota County Rural Collaborative 2040 Comprehensive Plan: Surface Water Local Management Plan, 2018

Regional Management Plans

- DCSWCD 2016-2025 Comprehensive Plan
- SSWCD 2018-2027 Comprehensive Plan

- Dakota County 2040 Comprehensive Plan
- Dakota County 2020-2030 Groundwater Plan
- Dakota County Agricultural Chemical Reduction Effort (ACRE) Plan – 2022
- Dakota County Land Conservation Plan – 2020
- Twin Cities Metropolitan Area Master Water Supply Plan – Metropolitan Council, 2015

State Management Plans

- Minnesota Nutrient Reduction Strategy – MPCA, 2014 (original) and 2025 (update)
- Minnesota Statewide Chloride Management Plan – MPCA, 2020
- Minnesota Climate Action Framework – MPCA, 2025
- Minnesota Nitrogen Fertilizer Management Plan – MDA, 2019
- Overview of Nitrate Reduction Strategy Supporting the Groundwater Protection Rule in the Hastings Drinking Water Supply Management Area (DWSMA) – MDA, 2023
- Best Management Practices for the Hastings DWSMA – MDA, 2025

Appendix B: Land and Water Resources Inventory

This appendix provides an analysis of physical and natural environments in the watershed and trends forecasted to affect the VRWJPO from 2026 through 2035.

B-1 LGU Population and Geographic Proportions

The VRWJPO encompasses 335 square miles of rural, suburban, and urban landscapes from the river's headwaters in Scott County, crossing Dakota County to its confluence with the Mississippi River near Red Wing. It is the largest geographic watershed in the Twin Cities Metropolitan Area.

Table B-1 lists each city and township in the VRWJPO, their respective populations, and the percentage of the VRWJPO's geographic area covered by them. It also includes the proportion of each municipality that is in the VRWJPO's jurisdictional area.

Table B-1: VRWJPO City and Township Area Calculations

City/Township	Population (2020 U.S. Census)	Area in VRWJPO (acres)	Area in VRWJPO (miles^2)	Percent of total VRWJPO area	Proportion within VRWJPO
City of Apple Valley	47,290	9,794	15.3	4.5%	87.5%
City of Burnsville	4,610	866	1.4	0.4%	5.0%
Castle Rock Township	316	12,543	19.6	5.9%	55.7%
City of Coates	147	966	1.5	0.4%	100%
Douglas Township	296	4,902	7.7	2.3%	22.7%
Elko New Market	2,536	1,527	2.39	0.7%	72.7%
City of Empire	3,177	19,617	30.65	9.2%	100%
Eureka Township	1,093	15,232	23.80	7.1%	68.3%
City of Farmington	23,632	10,268	16.04	4.8%	100%
City of Hampton	744	808	1.27	0.3%	100%
Hampton Township	351	7,136	11.15	3.3%	32.7%
City of Hastings	22,152	7,533	11.77	3.5%	100%
City of Lakeville	58,326	20,928	32.70	9.8%	84.5%
Marshan Township	1,153	21,975	34.34	10.3%	100%
New Market Township	2,244	10,058	15.72	4.7%	100%
Nininger Township	865	10,415	16.27	4.8%	99.7%
Ravenna Township	2,354	14,043	21.94	6.6%	99.9%
City of Rosemount	25,650	22,552	35.24	10.6%	99.9%
City of Vermillion	441	635	0.99	0.3%	100%
Vermillion Township	1,290	21,806	34.07	10.2%	100%

B-2 Land Use

Early History

According to the Minnesota State Archaeologist, people have lived in Minnesota for over 12,000 years. When people first entered North America, many areas would not have been habitable for human settlement due to the presence of glacial ice and large glacial lakes. However, following warmer and dryer periods, newly uncovered land and Glacial Lake Agassiz made way for re-vegetation of spruce forest and tundra grassland, providing food for woodland and grassland species.

Records show that the Oneota peoples arrived in the area that is now Dakota County as early as 1000 CE. They lived in large villages along the terraces of the Cannon River, cleared and cultivated land in the river bottoms, and hunted and fished in the river valley. The confluence of the Mississippi and Minnesota Rivers at Mendota (Oȟéyawahe, “the hill much visited,” now called Pilot Knob) has long been significant to the Dakota people. Oral history denotes the Mississippi and Minnesota River confluence as the origin of the Dakota people and the center of the universe. Mendota, Mdo-te or Bdote, meaning the confluence of two rivers, was an important site for the Dakota, fur traders, and American soldiers, including those who built Fort Snelling.

When settlers of European descent arrived, the Dakota had communities at Mendota (as mentioned above), Black Dog, and Kaposia (in what is now South St. Paul). The Dakota also had communities along the Cannon River, which they called “Inyan Bosndata,” or Standing Rock River, referring to the formation now known as Castle Rock in central Dakota County. The Dakota called the Vermillion River Wa Se Sa Wa Kpa, meaning Red Paint River, after the bright red and orange ocher in outcrops of St. Peter

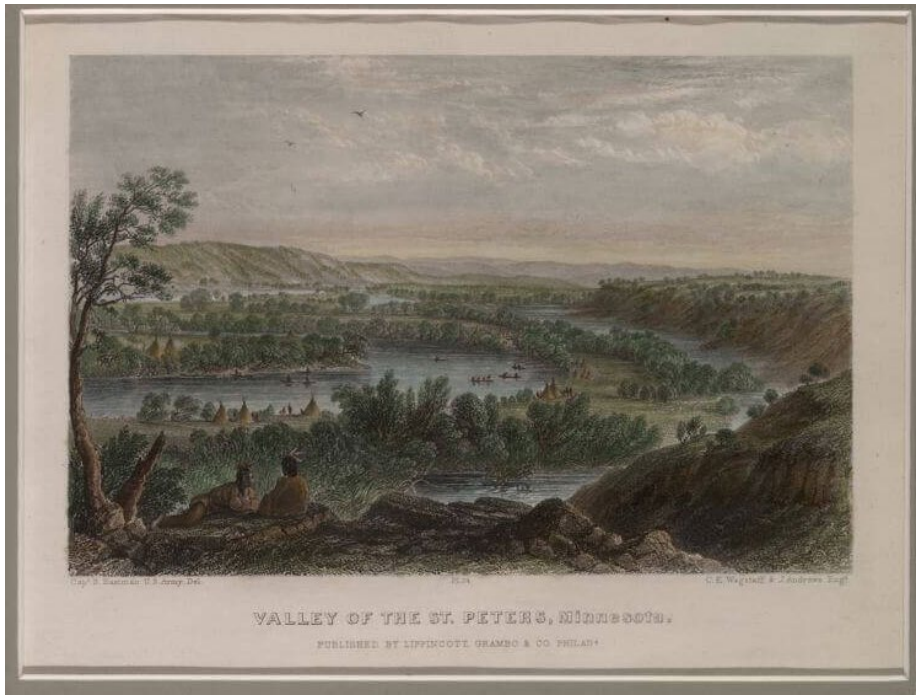


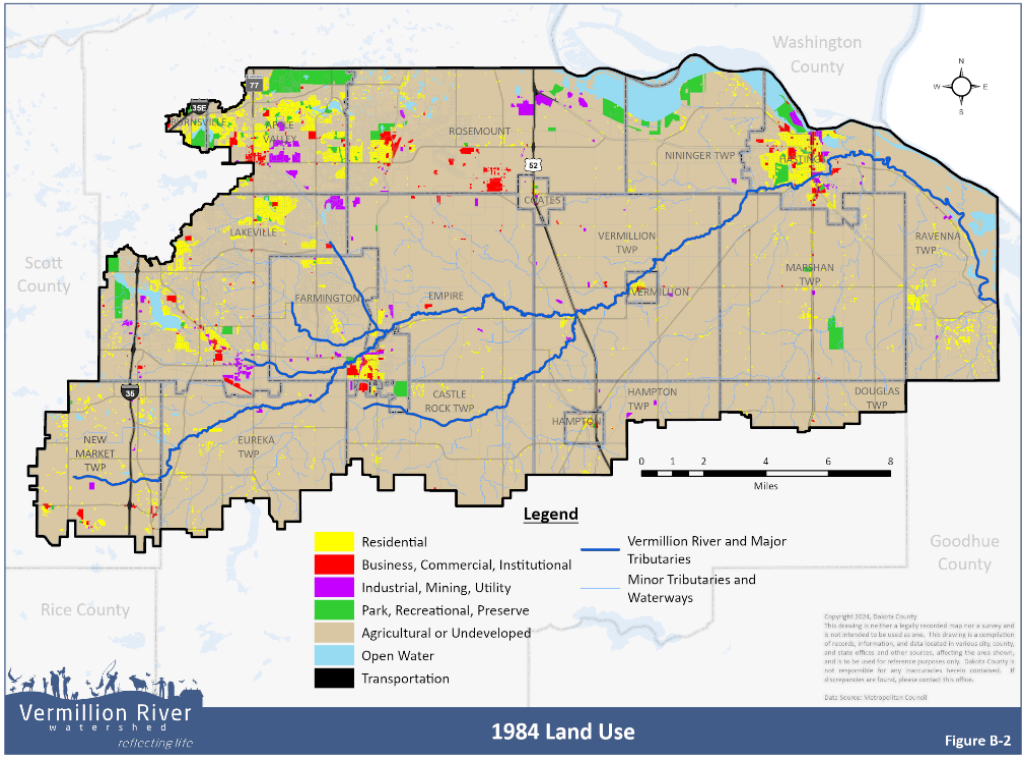
Figure B-1: Indigenous Dakota people overlook the Minnesota River in the "Valley of St. Peters"

Source: Shakopee Mdewakanton Sioux Community

sandstone near the river (such as Chimney Rock in Marshan Township). The color vermilion is a rich shade of red orange.

Since initial European settlement in the mid-1800s, agriculture has been the watershed’s predominant land use. Central Dakota and Scott counties developed later than communities north of the Minnesota and Mississippi Rivers.

With growth expanding since the mid-1970s, land use in the northwestern portion of the VRWJPO is mostly suburban. By that time, the I-35 corridor had set the stage for future growth in Lakeville. In 1984, agricultural and undeveloped land uses covered 88 percent of the watershed *(Figure B-2)*.

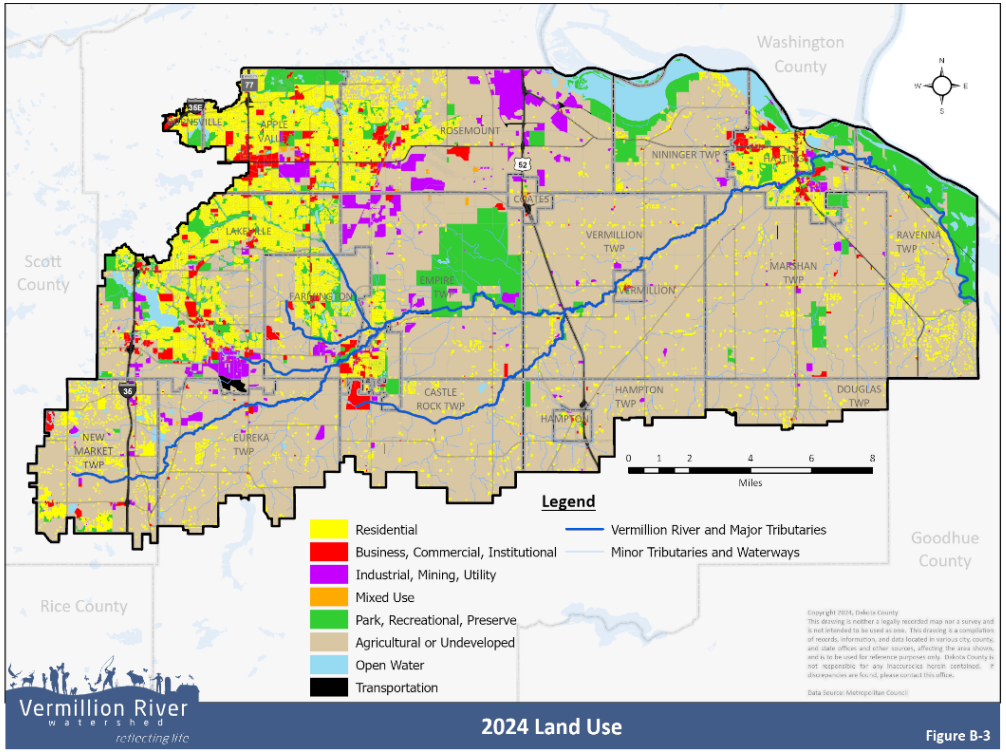


Between 1984 and 2010, 18 percent of the VRWJPO's land area converted from agriculture or undeveloped to residential, recreation, and industrial uses. Since the last VRWJPO Plan update, development has continued at a slower pace, with 3 percent of the watershed's agricultural and undeveloped land shifting to development.

Park and recreational acreage grew substantially from 1984-2020 from land acquisition by Dakota County, other LGUs, and the DNR, such as 7,000 acres for Gores Pool #3 Wildlife Management Area (WMA) and conversion of nearly 3,000 acres of the University of Minnesota Rosemount Agricultural Research Center into the Vermillion Highlands WMA. Today, the watershed is about 67 percent agricultural and undeveloped land *(Table B-2, Figure B-3)*.

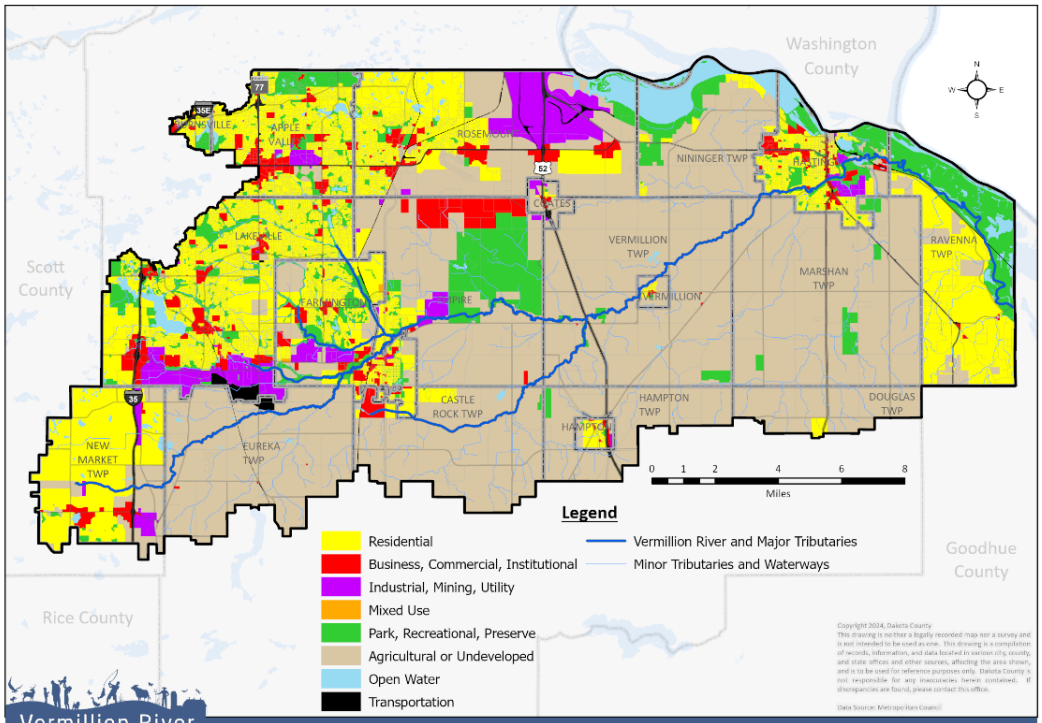
Table B-2: 1984, 2020, and projected 2040 VRWJPO land uses

Land Use	1984 Acres	1984 Percent	2020 Acres	2020 Percent	2040 Acres	2040 Percent	Net change 1984-2040
Agricultural/ Undeveloped	188,476	88.3%	144,154	67.3%	109,345	51.0%	-37.3%
Residential	10,211	4.8%	30,317	14.1%	55,033	25.7%	+20.9%
Park, Recreational, Preserve	3,922	1.8%	18,907	8.8%	18,806	8.8%	+7.0%
Open Water	6,062	2.8%	6,929	3.2%	7,227	3.4%	+0.6%
Industrial, Mining, Utility	1,775	0.8%	6,575	3.1%	7,495	3.5%	+2.7%
Business, Commercial, Institutional	2,117	1.0%	2,132	1.0%	13,561	6.3%	+5.3%
Transportation	884	0.4%	2,038	1.0%	2,947	1.4%	+1.0%



Each decade, communities prepare comprehensive plans projecting future land use to address growth-related needs, such as housing, transportation, public sewer, drinking water, and parks. Local community assessments of the most likely changes that will occur by 2040 *(Figure B-4)* include:

- Elko New Market and Hastings will mostly transition out of rural agricultural to large-lot rural residential land use.
- Industrial development is expected to increase, which may increase demand for water and/or electricity.
- More development is expected eastward in Rosemount along Dakota County Road 46 east of U.S. Hwy. 52.
- Rural townships in Dakota County will remain mostly agricultural, which will become the land use for roughly half of the watershed.



Land Use Change and Water Impacts

Agricultural and urban development alter natural hydrologic cycles, processes, connections, quantities, and qualities. Over the past 150 years, the natural hydrology of the VRWJPO has been altered in ways such as:

- Impeded natural infiltration that recharges groundwater
- Expedited water movement off the land to surface waters
- Increased groundwater withdrawals related to population increases and changes in land use
- Hydrologic temperature impacts
- Increased water quality impairments
- Degraded ecosystem quality
- Contamination of groundwater quality due to agricultural and waste disposal practices

As the VRWJPO is unique in being reliant on cool, high quality water resources to support its naturally occurring aquatic communities (e.g. trout populations), it is vital that land use authorities consider these potential impacts and associated effects when reviewing proposed developments.

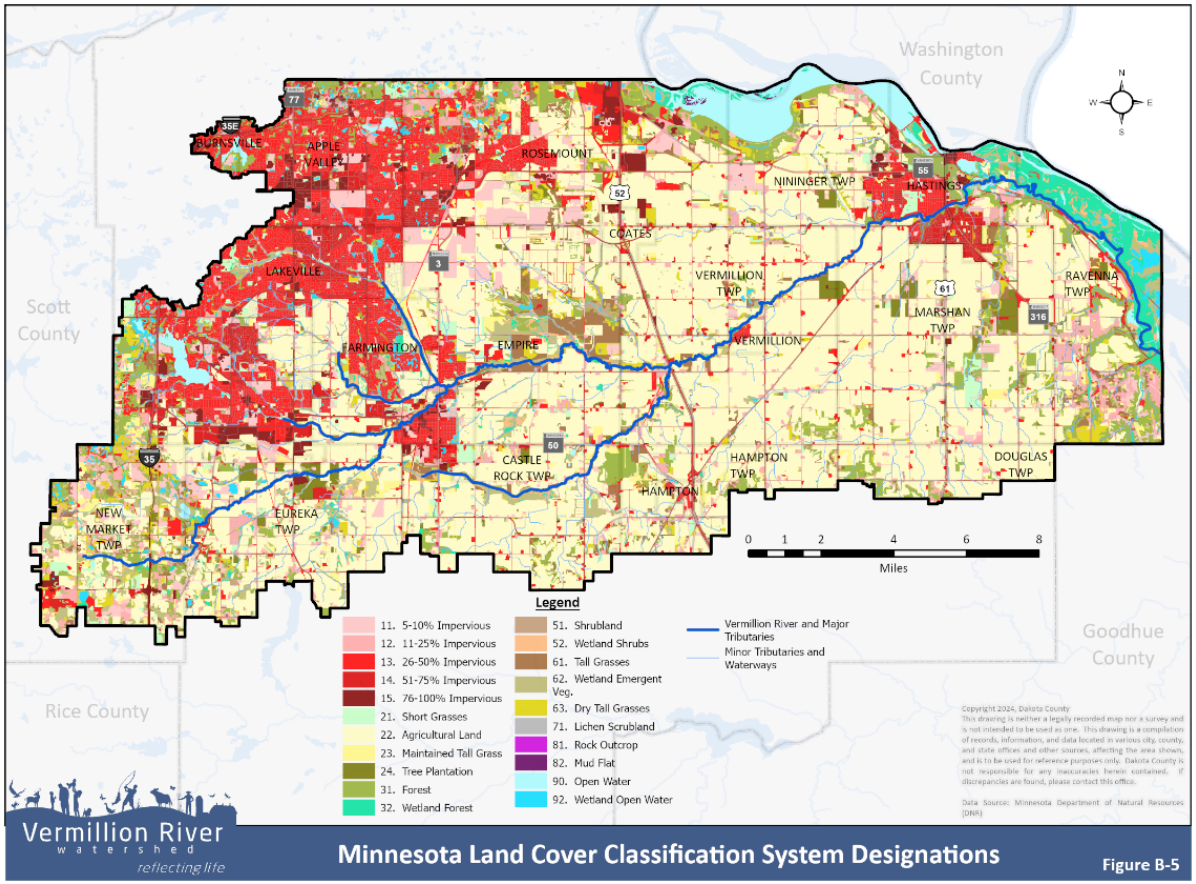
Urban: Increased Impervious Surfaces

The increase in impervious (non-infiltrative) surface that often accompanies urban development:

- Promotes rapid runoff of large volumes of stormwater and snowmelt to nearby waterways, causing channel and downstream bank erosion and carrying sediment, surface pollutants, and heat, impacting native flora and fauna
- Impedes the natural processes of soil infiltration and groundwater recharge

Based on studies by the Maryland Department of Natural Resources, negative impacts to stream health can occur with as little as 10 percent impervious cover in a watershed. As the proportion of impervious surface increases, streams collect more heat and pollutants. The Minnesota Land Cover Classification System (MLCCS) Map (*Figure B-5*) shows that more than 23 percent of the VRWJPO's land area has more than 10 percent impervious cover.

In accordance with the Metropolitan Surface Water Management Act (Minn. Stat. 103B), the VRWJPO has the authority to regulate the use and development of land for LGUs that do not have land use authority (and other situations as described in 103B.211). The VRWJPO Standards (*Appendix D*) include specific requirements regarding volume control. For LGUs with land use authority, they must have LWMPs in conformance with the VRWJPO's Plan and Standards at least as stringent (*see Subsection 1.5 - Consistency with Local Water Management Plans*).



The VRWJPO Standards require (with some exceptions) that runoff volumes generated post-development from the 2-year/24-hour storm greater than pre-development conditions be managed on site (primarily promoting infiltration, if feasible). They also include stipulations for managing peak runoff rates to predeveloped conditions for 1, 10, and 100-year/24-hour storms, and regulations for drainage alterations in the watershed.

Rural: Cropping Practices and Water Management

Although the percentage of land area in agriculture has diminished over time, some cultivated lands have become more productive through irrigation, drainage, and nutrient management. While these practices can yield higher economic benefits for farm operators, they can also influence watershed hydrology and water quality through:

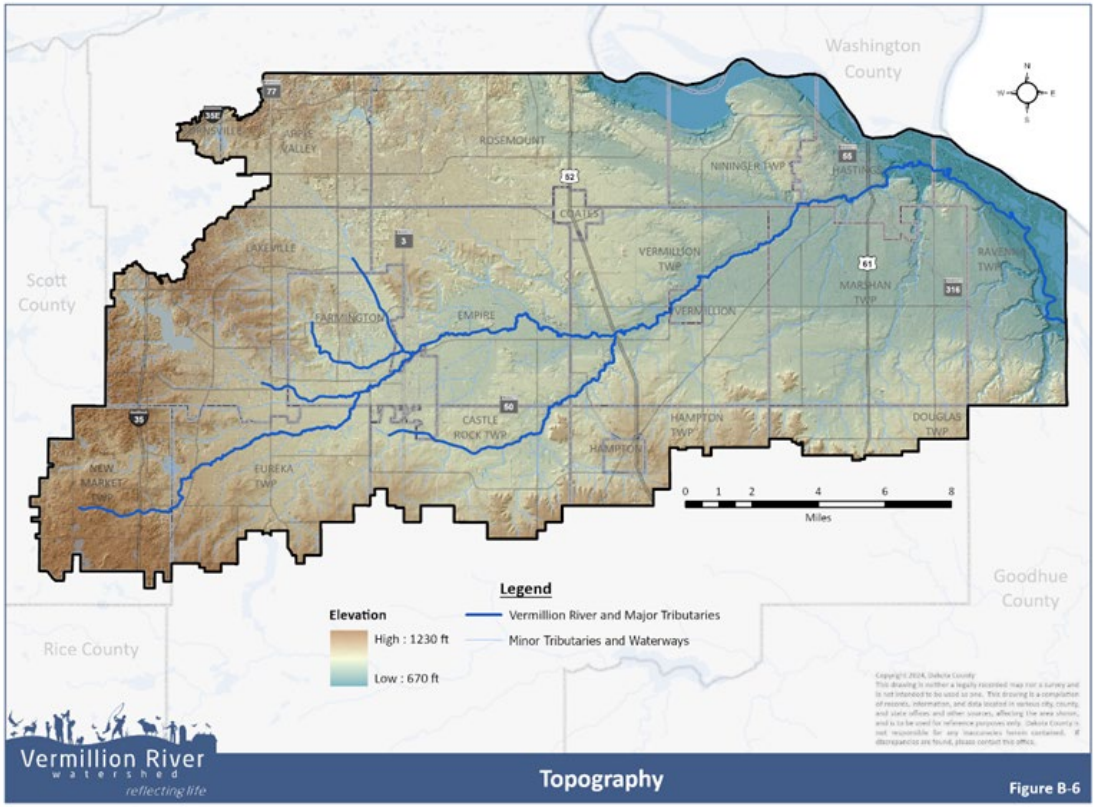
- Increased intensity of crop irrigation
- Expanded drainage and ditching to rapidly convey excess water from the land
- Increased use of inputs, such as fertilizer and pesticides, that move into groundwater and surface water
- Decreased soil ability to hold water due to reduced organic matter and diversity of soil organisms, such as those provided by crop residue, perennial or multi-year vegetation (pasture, alfalfa, etc.), animal manure, cover crops, or other practices

Cropping practices that support agricultural production while maintaining natural hydrology and soil health include:

- Crop rotation
- Cover crops
- Conservation tillage
- Water-saving irrigation systems and practices
- Conservation drainage systems
- No-till planting

B-3 Topography and Fluvial Geomorphology

The overall topography of the Vermillion River Watershed is relatively flat, with low relief throughout most of it. The watershed's highest elevation is 1,230 feet and lowest elevation is 670 feet. The western portions of the VRWJPO have varied topographical features due to glacial moraine deposits. The central and eastern VRWJPO areas are relatively level glacial outwash plains. Steep bedrock bluffs border the Mississippi River in the easternmost VRWJPO, although bluff lands make up a small proportion of the overall watershed area (*Figure B-6*).



The VRWJPO has funded several fluvial geomorphic assessments to describe control points, knickpoints, accelerated erosion and habitat quality issues, to improve understanding of various bank or channel stability locations, and to identify opportunities for restoration projects addressing geomorphic processes and habitat. Through these assessments, staff can determine geomorphic characteristics as they relate to various subwatersheds, identifying potential project locations and pinpointing unique characteristics in each subwatershed. The VRWJPO has also funded several subwatershed assessments that describe subwatershed landscape characteristics, pollutant loads, and potential pollutant reduction BMPs.

It is noted in the fluvial geomorphic assessments that it is important to consider the erosion and depositional processes that are characteristic to streams. As is seen throughout the VRWJPO, streams are continually moving sediment eroded from the bed and banks in high-velocity areas and depositing them elsewhere in lower-velocity areas. This process results in the migration of rivers within their floodplains, known as dynamic equilibrium. When this equilibrium is out of balance, a stream reach may be defined as in a degradation status (eroding) or an aggradation status (depositing). When a channel is in equilibrium, it may move across the floodplain, erode, and deposit sediment, but general landform geometry, cross-sectional shape and slope remain relatively constant over human lifetimes.

High-level findings from these fluvial geomorphic and subwatershed assessments can be found on the following pages. For more detailed assessment findings, please reference the full reports on the VRWJPO website. The reports are also linked in Appendix A. The VRWJPO Interactive Map can be used to orient the subwatersheds in the context of the watershed as a whole.

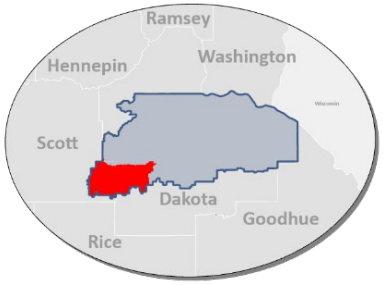


Figure B-7: Upper Mainstem Vermillion River Subwatershed Inset Map

Upper Mainstem Subwatershed

In 2014, the Scott SWCD completed a subwatershed assessment within the Upper Mainstem Vermillion River subwatershed (*Figure B-7)* to identify potential phosphorus reduction BMPs. An updated assessment was done in 2025 that evaluated potential sediment, phosphorus, and nitrate reduction BMPs. As the Upper Mainstem subwatershed straddles Scott and Dakota Counties, DCSWCD completed a subwatershed assessment for the Dakota County portion in 2019. This subwatershed contains the Vermillion River's headwaters.

Historically, this subwatershed has been nearly all agricultural land use, with the City of Elko New Market being the only developed area. In recent years, the City has added more development in the Scott County portion of the subwatershed. The City of Lakeville has annexed portions of the southeastern part of the subwatershed into Dakota County. The majority land use in this subwatershed remains agricultural.

Onsite and desktop findings from the assessment included:

- The majority of areas in agricultural production use conventional tillage practices that contribute to high rates of surface erosion in fields.
- The majority of the Vermillion River within this subwatershed has maintained natural riparian vegetation adjacent to the river or has had riparian restorations completed.
- Portions of the river that historically had crops up to its edge benefitted from the implementation of Minnesota's Buffer Law.
- Erosional features in agricultural fields present opportunities for pollutant reduction BMPs throughout the subwatershed.

South Creek Subwatershed

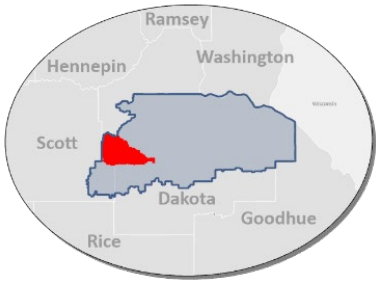


Figure B-8: South Creek Subwatershed Inset Map

The South Creek subwatershed (*Figure B-8*) fluvial geomorphic assessment was completed in 2009. The purpose of the assessment was to provide potential restoration projects and prioritize them by:

- Ability to address specific goals
- Compatibility with current land use
- Design, installation and maintenance costs
- Dependence on installation of other practices or coordination with other landowners
- Nature of relationship with landowner and SWCD, NRCS, and/or VRWJPO staff

The assessment was completed to provide a more up-to-date inventory of potential projects from the previous DNR geomorphic assessment in 1999. The VRWJPO's consultant collected and analyzed aerial photographs, plat maps, geologic maps and the 1999 assessment to define historic subwatershed characteristics. Land use changes, soils and road crossings were also reviewed to determine stream reach breaks. Field reconnaissance then informed current subwatershed conditions.

Historically, South Creek was a relatively short and very sinuous creek. There were no major wetland areas or tributaries located within the subwatershed. By the time of the 1999 assessment, South Creek had multiple tributaries that were straightened and channelized or ditched. Straightening and lack of woody vegetation are seen as reasons for channel erosion.

Onsite findings included:

- The straightening and ditching of South Creek had resulted in a lack of channel complexity and aquatic habitat.
- Along several reaches, channel connectivity was interrupted.
- Much of the stream within the subwatershed lacked sinuosity and showed signs of channel widening.
- A previous restoration of South Creek near Cedar Avenue consisting of channel bends and riffles provided increased channel complexity when compared to unrestored reaches.
- Banks were found to be stable, and the channel was highly sinuous and uniform in planform.

Middle and North Creek Subwatersheds

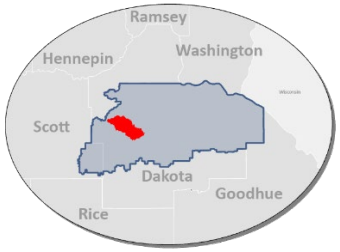


Figure B-9: Middle Creek Subwatershed Inset Map

In 2012, the VRWJPO worked with a consultant to define fluvial geomorphic characteristics within the Middle and North Creek subwatersheds (*Figures B-9 and B-10*). The two were lumped together as they have similar geomorphic characteristics. The assessment found that, historically, the headwaters of both creeks were complexes of marsh and wetland surrounded by prairie and some forest. The channels were also sinuous and much shorter. Over time, agricultural and residential development resulted in draining of historic wetlands and caused the channels to be straightened in many areas.

On-site findings included:

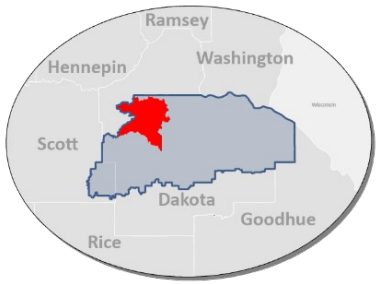


Figure B-10: North Creek Subwatershed Inset Map

- Channels were generally low gradient, with bank erosion and incision occurring in the upper portions of the subwatershed.
- Channels had been straightened into ditches with little riparian vegetation or buffer from row crops or residential development.
- Increased water flow into the streams following adjacent development and tiling had resulted in steeper channel banks, incision, and bank erosion in many areas.
- Previously restored sections of North Creek and Middle Creek had resulted in increased channel sinuosity, cooler water temperatures, improved aquatic habitat, and improved riparian vegetation.

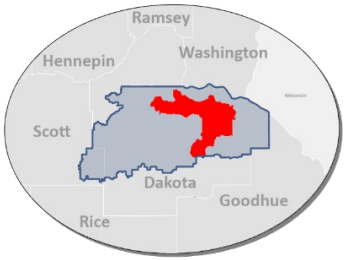


Figure B-11: Lower Mainstem Subwatershed Inset Map

Lower Mainstem Vermillion River Subwatershed

In December 2018, the VRWJPO hired a consultant to complete a geomorphic assessment for the Lower Vermillion River subwatershed (*Figure B-11*). The study looked at the Vermillion River from U.S. Highway 52 to Vermillion Falls in Hastings. The assessment showed that the Lower Vermillion River meandered within a large alluvial valley, likely formed by a glacial hydrologic regime that set the course of the river.

Historically, the area was covered by prairies and floodplain forests. Much of it has been cleared, plowed, drained, and converted to agriculture. Land conversion included the

straightening of the Vermillion River and its tributaries and draining of wetlands. These hydrologic changes resulted in adjustments to channel slopes and dimensions. The modern Lower Vermillion River is almost entirely surrounded by cropland, with some urban development near the cities of Vermillion and Hastings.

On-site findings from the assessment included:

- Pollutant loading remains a significant concern as extensive agricultural drainage has resulted in flashy flows and in-stream and surficial soil loss.
- Overall, physical habitat complexity along the Lower Vermillion River is greater than many headwaters reaches and straightened tributaries; however, aquatic habitat has been impacted by warm water surface runoff.
- The Lower Vermillion River has maintained sinuosity in most locations, unlike some other subwatershed streams.

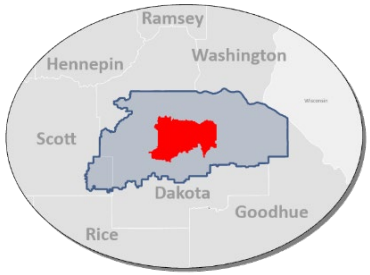


Figure B-12: Middle Mainstem Subwatershed Inset Map

Middle Mainstem Vermillion River Subwatershed

The Middle Mainstem subwatershed (*Figure B-12*) is a mixture of developed, agricultural and conservation areas. Developed areas include the City of Farmington, the City of Empire and the City of Vermillion. The Middle Mainstem of the Vermillion River and its tributaries flow through these developed areas as well as Whitetail Woods Regional Park, Dakota County Park Conservation Areas (CPCAs), and agricultural fields.

Neither a geomorphic nor subwatershed assessment has been completed in the Middle Mainstem subwatershed. However, high-level desktop analysis shows:

- Historically, several areas in agricultural production did not leave natural riparian corridor vegetation adjacent to the stream.
- More recent aerial imagery shows that the majority of the Middle Mainstem has natural riparian habitat adjacent to the river.
- Many of the tributaries to the Middle Mainstem lack natural riparian habitat.

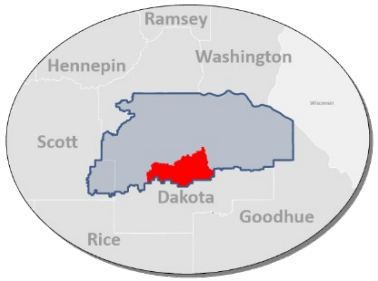


Figure B-13: South Branch Subwatershed Inset Map

South Branch Vermillion River Subwatershed

In 2020, the DNR completed a geomorphic overview in the South Branch subwatershed (*Figure B-13*) to help inform potential causes of the aquatic life impairment for fish and macroinvertebrate communities. The geomorphic assessment included desktop analysis, review of current and historical aerial photos, land use changes, and generalized stream and valley type classification of reaches using GIS tools. Site reconnaissance also took place to observe channel conditions near crossings and confirm aspects of the desktop analysis.

Historically, 75 percent of land cover in the South Branch subwatershed was prairie. Today, it is dominated by agricultural production, with small percentages of forested/grasslands, developed area, and wetland. DNR staff used the Watershed Health Assessment Framework (WHAF) to assess how vulnerable the current subwatershed is to erosion and found it to be moderately vulnerable.

Onsite reconnaissance findings included:

- Many ditched segments of the South Branch Vermillion River and its tributaries were well-vegetated with gradually sloped sides, creating small floodplain areas less susceptible to streambank erosion.
- A culvert inventory during the assessment found several undersized culverts on the South Branch, negatively impacting channel stability.
- Downed woody vegetation was seen filling stream cross-sectional areas, causing widening and sediment aggradation.

Mississippi Direct Subwatershed

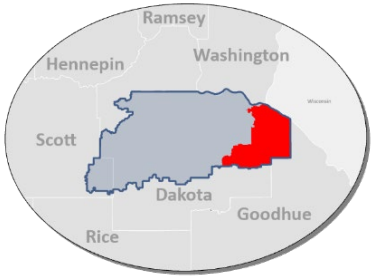


Figure B-14: Mississippi Direct Subwatershed Inset Map

In 2011, the VRWJPO's consultant completed a geomorphic assessment of a portion of the Mississippi Direct subwatershed (*Figure B-14*), focusing on the Etter Creek and Ravenna Coulees. The purpose of the assessment was to improve the understanding of stream bank stability and to identify opportunities where restoring geomorphic processes and conditions would be beneficial.

Etter Creek and the four Ravenna Coulees studied are located along the eastern edge of Dakota County and drain directly to the Vermillion River near its mouth at the Mississippi River. Historic plat maps from 1855 showed no indication of streams or associated tributaries within the study area. Some small areas of prairie were noted, with the rest presumed to be forested.

Onsite reconnaissance findings included:

- The majority of the land in the study area has been converted to agriculture, except areas too steep to farm.
- Clearing of the land for agricultural production reduced infiltration rates and sped the flow of rainwater and snowmelt, which resulted in the observed ravines.
- Channels formed from erosion have been adjusting their geometry by incising and widening to compensate for higher flow volumes.
- Erosional characteristics have resulted in downstream sedimentation, loss of land, damage to infrastructure and reduction of riparian habitat.

B-4 Soils

Soils are described based on their physical and chemical properties, including their hydrologic soil group (HSG). A soil's HSG classification describes its infiltration rate (velocity at which water enters the soil), transmission rate (groundwater migration horizontally through soil), and potential to produce runoff. The four hydrologic soil groups are illustrated in *Figure B-15 (next page)*.

Group A: Well- to excessively drained soils with low runoff potential and high infiltration rates, even when thoroughly wetted. They consist of sand, loamy sand, or sandy loam types of soil that are typically deep and have a high rate of water transmission.

Group B: Soils with silt loam or loam compositions which have moderate infiltration rates when thoroughly wetted. Moderately well- to well-drained soils with moderate infiltration rates when thoroughly wetted. Soils are moderately well to well drained with moderately fine to moderately coarse textures.

Group C: Soils that have sandy clay loam texture. They have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure.

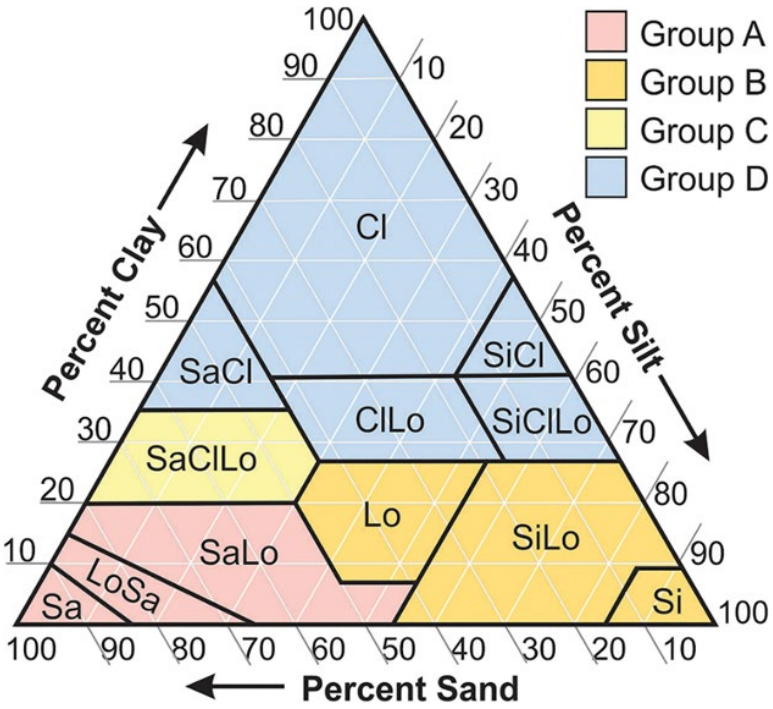
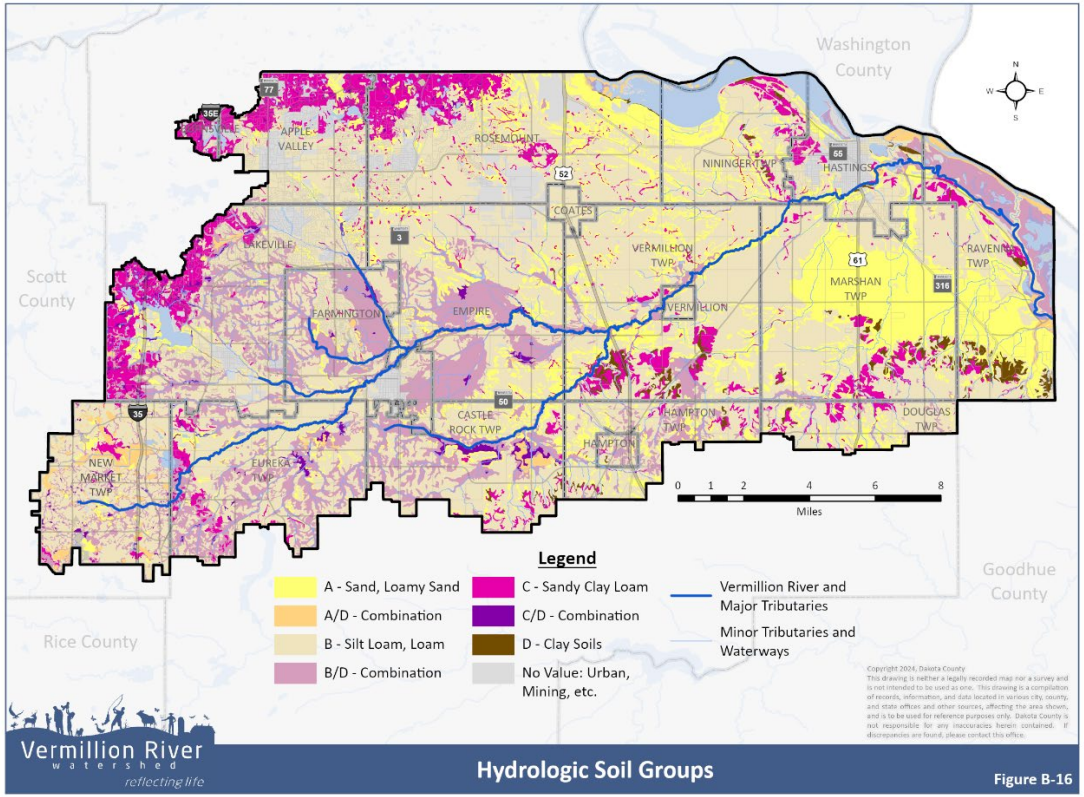


Figure B-15: Hydrologic Soil Groups Triangle
Source: Wang, P.W. and Feddema, J. (2020). Linking Global Land Use/Land Cover to Hydrologic Soil Groups.

Group D: Soils that have clay loam, silty clay loam, sandy clay, silty clay, or clay textures. These have the highest runoff potential and very low infiltration rates when thoroughly wetted. They consist chiefly of clay soils with a high swelling potential, soils with permanently high water tables, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Some soils classified as within group D are included due to high water tables creating drainage problems. If these soils become effectively drained, they are placed in a different soil group. For example, a soil may be classified as an A/D soil, indicating that the drained soil is in group A, while the undrained soil is in group D.

In summary, soils with higher sand percentages have low runoff potential (Group A), while those with higher clay content have high runoff potential (Group D). The majority of the VRWJPO's soils are well-drained, silty, or loamy soils with occasional sandy areas (Groups A and B). Areas of low infiltration (Groups C and D) are generally isolated in river and tributary floodplains and lower and flatter areas of the upper watershed (*Figure B-16*).



Dakota and Scott counties' interactive GIS mapping applications contain soils data that are electronically digitized from soil survey maps originally created by the NRCS. The following maps hosted on the VRWJPO website also illustrate other soil features: High Infiltration Soils, Highly Erodible Soils, Hydric Soils.

B-5 Geology

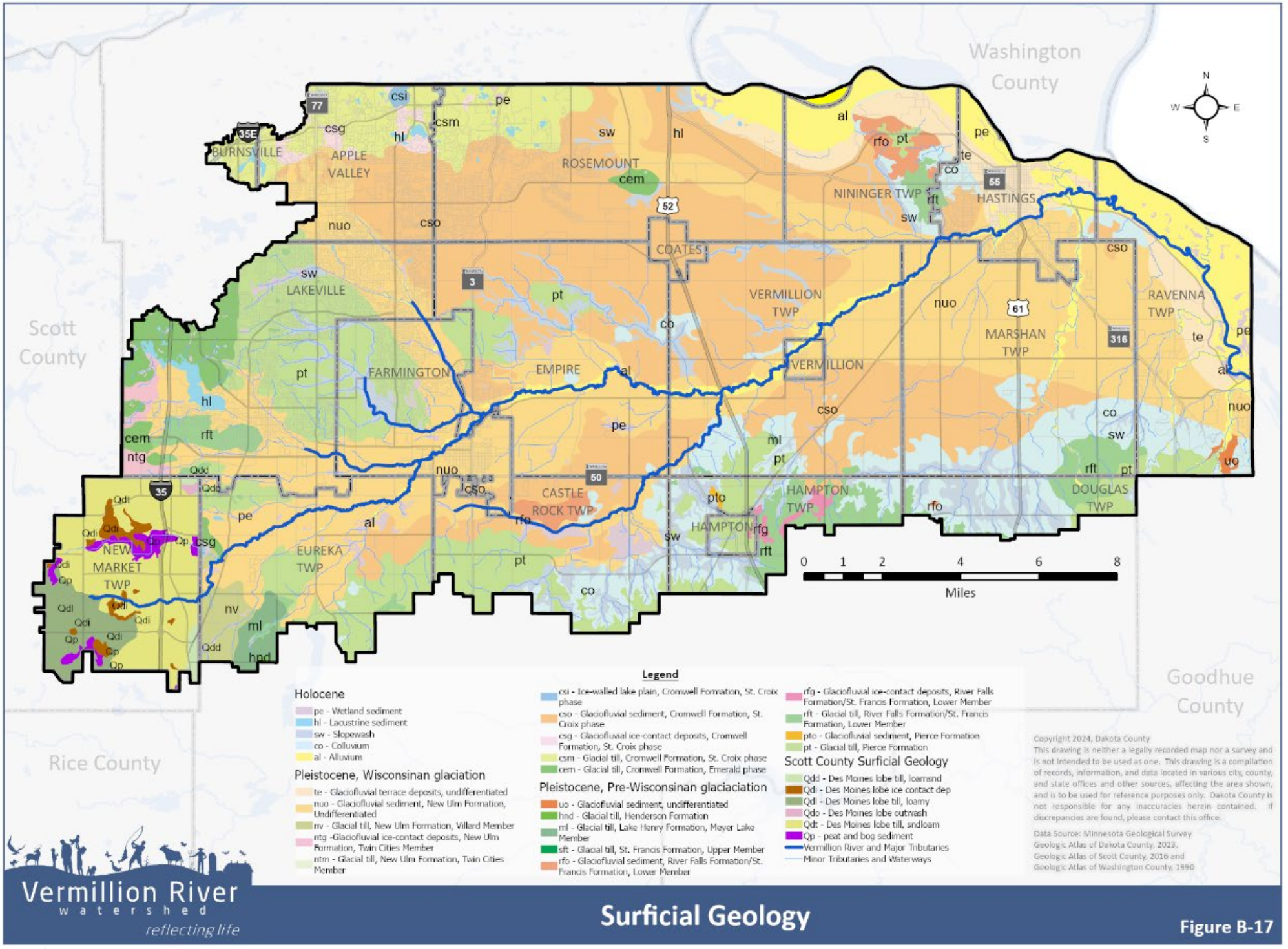
Surficial Geology

Over millions of years, geologic processes have determined the watershed's physical environment. The distribution of bedrock, unconsolidated sediments, landforms, and structural features are the framework upon which current biological and human environments exist. The characteristics of the physical environment ultimately determine the availability of natural resources, the susceptibility of resources to pollution, and the success of living organisms in the watershed. Wind, water, and ice shaped the VRWJPO's landscape, and movement of continental ice sheets was the most influential process on watershed topography.

During the Pleistocene Epoch (2 million to 10,000 years ago), continental glaciation took place in what is now Dakota County. The most recent glaciations, called the Wisconsin Glaciations, began approximately 75,000 years ago and ended approximately 12,000 years ago. As glaciers moved across the landscape, glacial moraines and outwash plains defined the area, with topographic character originating from the various glacial advances and retreats. Moraines are masses of rocks, gravel, sand, and clay transported by glaciers and deposited at the edge of a glacier. Moraine landscapes have rolling to steep hills and closed depressions where lakes and wetlands are common. Moraine sediments are complex assortments of till (mixed sand, silt, clay, pebbles, cobbles, and boulders), silt and sand lenses, and sand and gravel deposits. *A detailed map of the VRWJPO's surficial geology can be found in Figure B-17 on the next page.*

The northwestern part of the watershed lies in the Eastern St. Croix Moraine, and the southwestern watershed lies in the Prior Lake Moraine. The Eastern St. Croix Moraine marks the limit of the Superior Lobe, and the Prior Lake Moraine marks the limit of the Des Moines Lobe. Lobes are finger-shaped glaciers that develop at the edge of continental ice sheets. Perched water tables can also be found in these areas due to variability in material size, consisting of mixtures of sand, gravel, boulders, and clay. The till of the Superior Lobe is red and has a coarse sandy loam texture. The till of the Des Moines Lobe is gray to yellowish brown with a fine loam texture. A till plain extends away from the Prior Lake Moraine into the west-central watershed. This till plain is composed of a thin layer of Des Moines Lobe till covering the sediments from older glaciations. The topography of this area is characterized by long rolling hills.

Beyond the moraines and till plain are outwash plains and valleys. Outwash blanketed the landscape as melting glaciers drained water away, leaving deposits of sand, gravel, and other sediments. The Superior Lobe outwash plain extends over much of the watershed, with sands and gravels that become thinner and finer in texture farther away from the moraine. Outwash from the Des Moines Lobe cuts across the Superior outwash plain in broad valleys. The sands and gravels of the outwash valleys also become thinner and finer eastward away from the moraine. The outwash plain and the outwash valleys are very subtle features. They appear on the landscape as nearly level topography and terraces.



Vermillion River watershed
reflecting life

Surficial Geology

Figure B-17

Vermillion River watershed
reflecting life

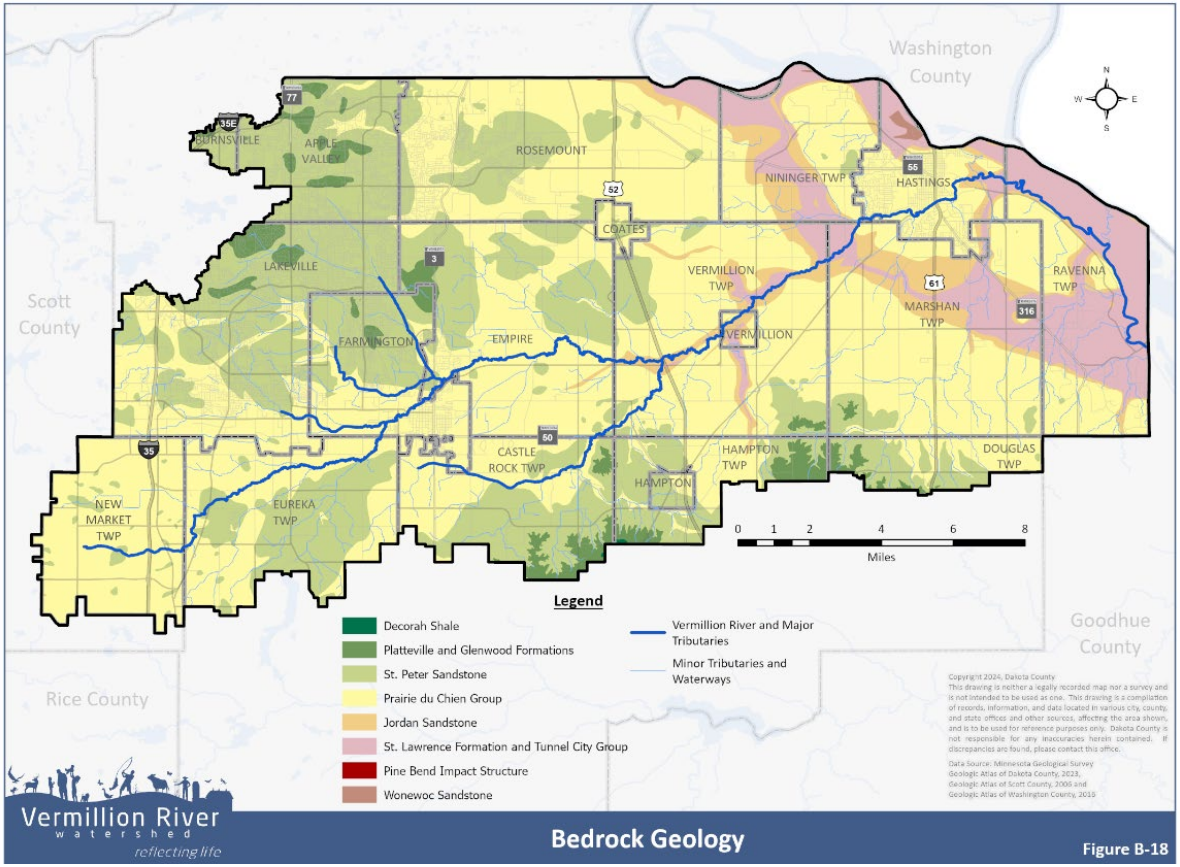
Modern streams and rivers dissect and cross the glacial geomorphology of the watershed. The Vermillion River and its tributaries have floodplains, terraces (abandoned floodplains due to river downcutting), meanders, bars, natural levees, and other landforms. The Mississippi River on the eastern edge of the watershed has a wide floodplain and three distinct terrace levels. Sediments of these floodplains and terraces are moderately sorted materials deposited by rivers and streams during flood stage. The fluvial sediments of the Mississippi River are much thicker than those of the Vermillion River.

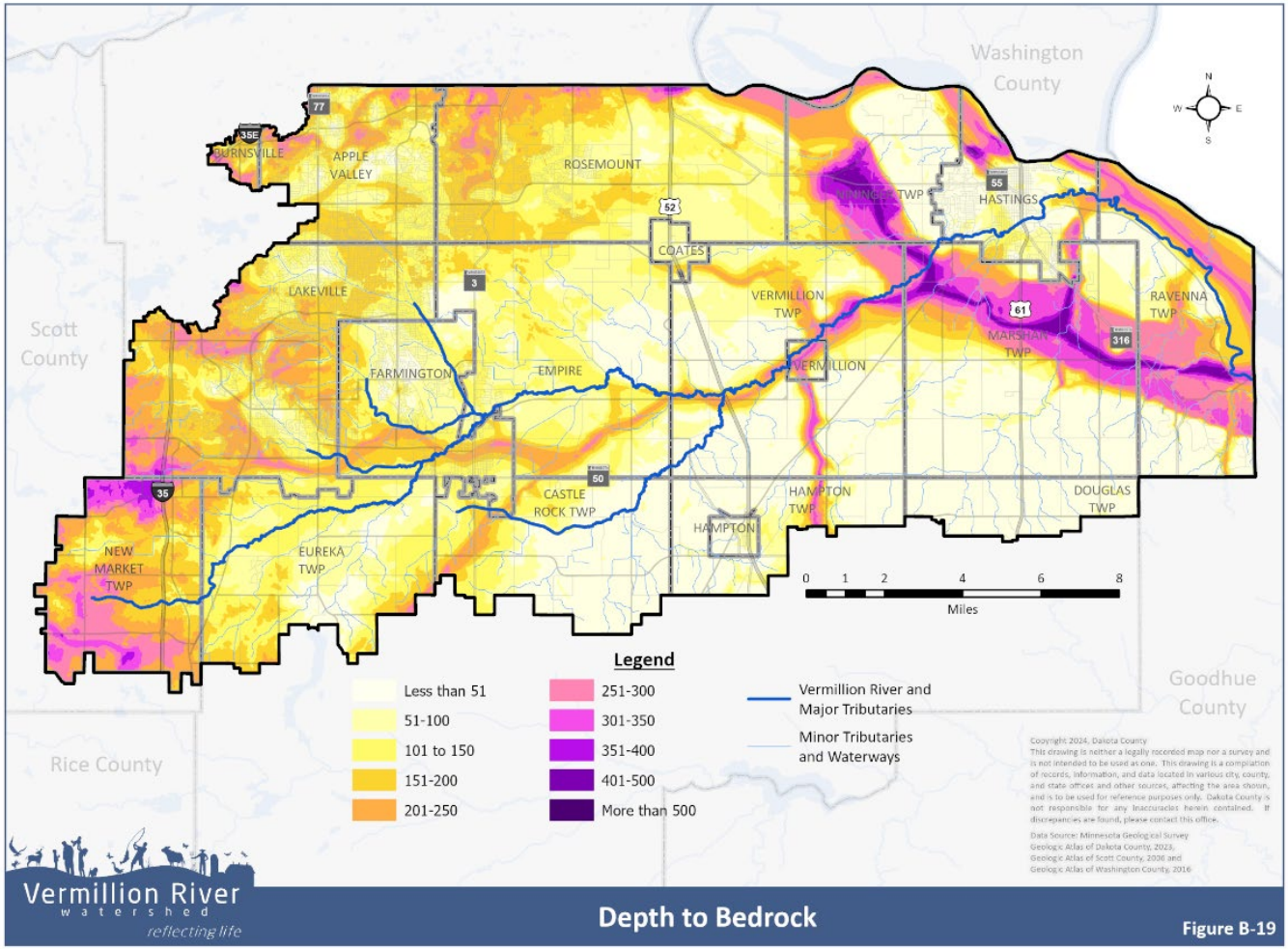
Bedrock Geology

Sedimentary bedrock of marine origin lies directly beneath unconsolidated glacial materials, at depths ranging from surface exposure to more than 500 feet (*Figures B-18 and B-19*). The bedrock surface is determined by each rock type's resistance to weathering. Shales and poorly cemented sandstones break down rapidly, while limestones and dolostones are more resistant. Resistant rock units become high points in the bedrock topography, while the less resistant rock units become low areas.

The most significant topographic features of the bedrock surface are the buried bedrock valleys formed by ancient drainage patterns. Sediments from advancing and retreating glaciers covered the bedrock and filled the valleys, creating the modern landscape. The largest of these valleys is in the eastern watershed and is believed to be an ancient Mississippi River course, filled with outwash from the last ice age.

The watershed is on the southeastern edge of the Twin Cities Basin bedrock formation, so the bedrock surface in the watershed slopes downward toward the north and west. Dominant bedrock features in the watershed are the Vermillion Anticline (a fold, convex upward) and the Empire Fault. Both are oriented from the northeast to the southwest, almost parallel to the course of the modern Vermillion River. These structural features are not expressed on the land surface but can be seen in bedrock outcrops along the Mississippi River bluffs above Hastings.





Depth to Bedrock **Figure B-19**

B-6 Climate and Precipitation

The VRWJPO has a humid continental climate, with four distinct seasons ranging from hot, humid summers to frigid winters. Minnesota and the Upper Midwest have some of the widest temperature ranges in the U.S., occasionally reaching negative double digits Fahrenheit in winter and exceeding 100 degrees Fahrenheit in summer. Storms can be severe, typically resulting from cold, dry air masses from the north colliding with warm, humid air masses from the south. Monthly VRWJPO averages for minimum, maximum, and average temperatures and inches of precipitation over the past decade are compiled in *Table B-3*.

Table B-3: 2015-2024 VRWJPO Monthly Precipitation, Minimum, Maximum, and Average Temperatures

Month	Precipitation (Inches)	Minimum Temperature (F)	Maximum Temperature (F)	Average Temperature (F)
January	0.8	7.6	23.4	15.5
February	1.0	6.1	26.4	16.2
March	1.8	22.4	41.2	31.8
April	2.7	34.8	54.6	44.7
May	4.1	48.2	69.0	58.6
June	4.2	59.4	80.2	69.7
July	4.4	62.1	82.7	72.4
August	4.8	59.0	79.4	69.2
September	3.3	52.7	74.6	63.7
October	2.9	38.5	59.0	48.7
November	1.5	26.1	43.0	34.5
December	1.1	14.7	29.7	22.2
Annual Average	**32.5**	**36.0**	**55.3**	**45.6**

Source: Minnesota DNR, Climate Data collected from Rosemount Weather Station

Figures B-20 through *B-24* graphically display temperature and precipitation changes over time in Mississippi River-Lake Pepin Watershed, the state's major (8-digit HUC) watershed that includes the VRWJPO area. The data is from the Minnesota DNR's Climate Data collection.

Figure B-20 demonstrates that the watershed is getting warmer, with increasing average annual temperatures between 1895 (the earliest recorded temperatures) and 2024 for the Mississippi River-Lake Pepin Watershed. The trend line (purple) shows an estimated increase of 2.35 degrees.

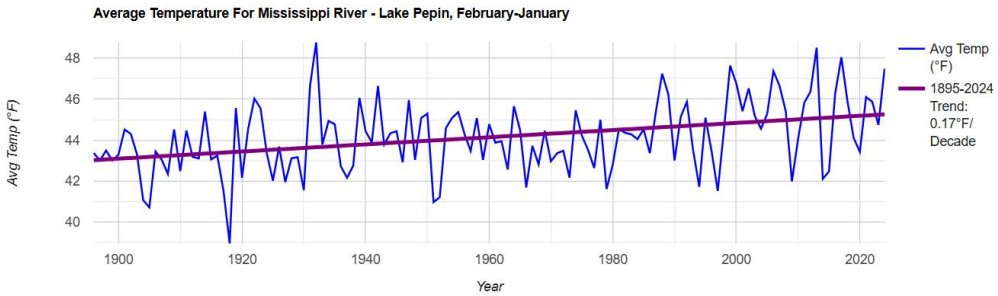


Figure B-20: Average Annual VRWJPO Temperatures (F), 1895-2024

Both maximum temperatures and minimum temperatures have increased, with warming more pronounced in winter than in summer. Annual maximum temperatures (*Figure B-21*) have increased by 1.2 degrees since 1895, while annual minimum temperatures (*Figure B-22*) have increased by 3.7 degrees.

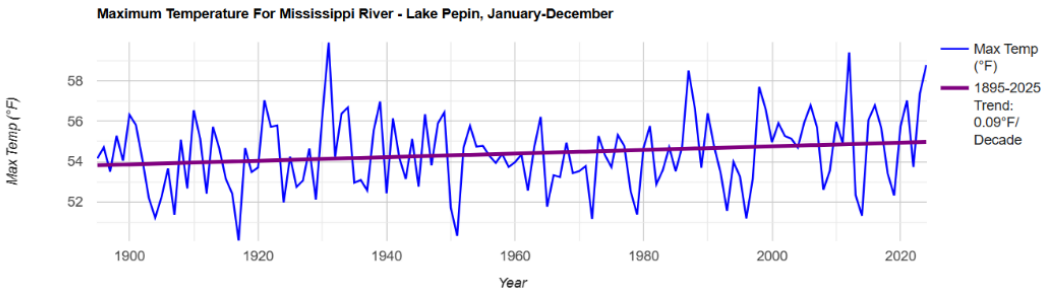


Figure B-21: Maximum VRWJPO Temperatures (F), 1895-2024

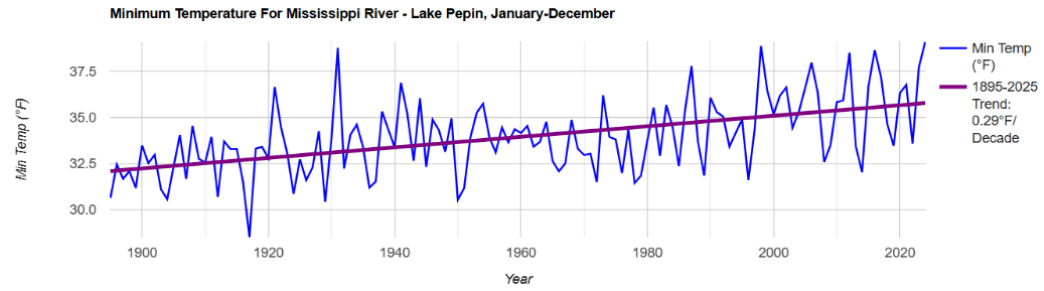


Figure B-22: Minimum VRWJPO Temperatures (F), 1895-2024

Figure B-23 shows that January minimum temperatures have increased by an average of 5.5 degrees.

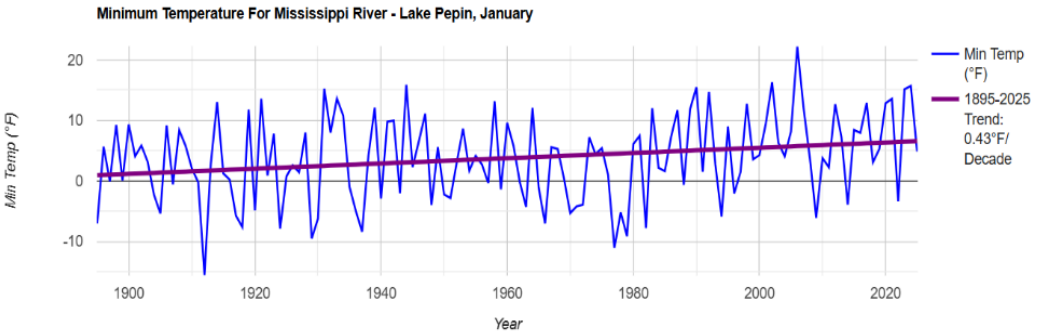


Figure B-23: Minimum VRWJPO January Temperatures (F), 1895-2024

Figure B-24 demonstrates that the watershed also is getting wetter. The graph shows average annual precipitation between 1895 and 2024 for the Mississippi River-Lake Pepin Basin. While annual precipitation totals range dramatically from year to year (from 12 to 45 inches), the overall trend (purple line) is increasing. The annual increase is estimated at 6.4 inches.

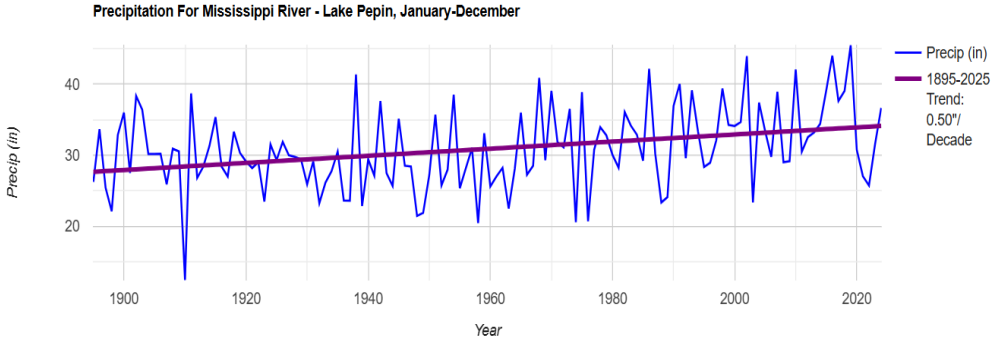


Figure B-24: Average Annual VRWJPO Precipitation, 1895-2024

The National Weather Service (NWS), a division of the NOAA, has collected and studied climate data within the Greater Twin Cities area for more than a century. Historical precipitation data are presented as "normals," or the average of the past 30 years (1991-2020), not the entire available climate record since 1888. Normals take climate variations over time into account. The previous 30-year period (1981-2010) had a normal total annual precipitation consisting of rain and snow equivalent to 31.3 inches. The normal total annual precipitation for the most recent 30-year period (1991-2020) consisting of rain and snow is equivalent to 32.32 inches (*Figure B-25*).

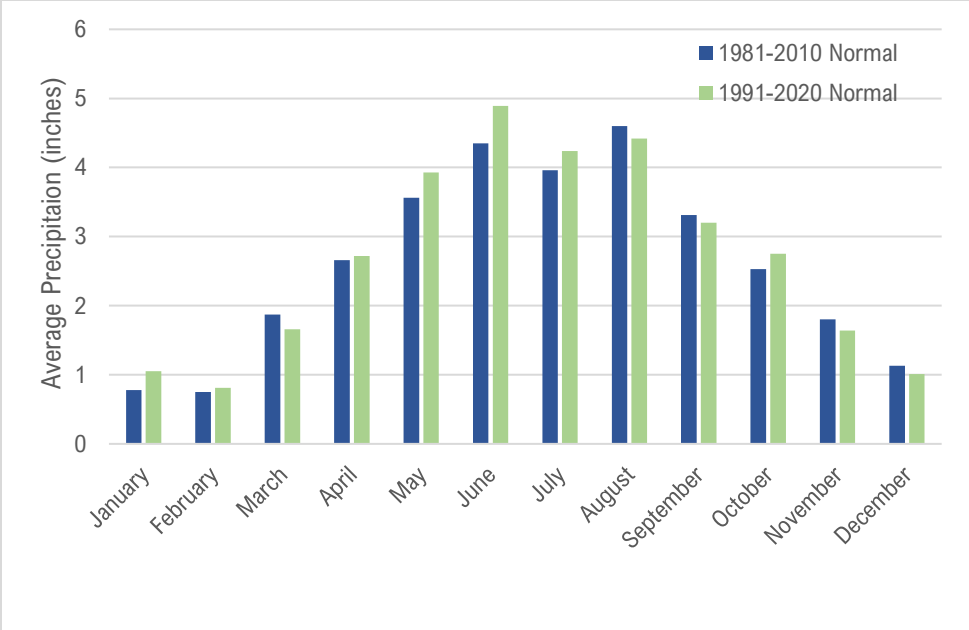


Figure B-25: Average 30-Year Precipitation Compared to Historic Normals

Source: NOAA Monthly Precipitation Normals, 1991-2020, Farmington Weather Station

Although the two most recent "normals" periods have similar total precipitation amounts, data suggest that the frequency and severity of storms appears to be increasing. NWS data for Dakota and Scott counties over the last three "normals" periods shows an increase in severe winter and summer weather events *(Table B-4).*

Table B-4: Severe Summer Events for Dakota and Scott Counties

Severe Summer Events	1971-2000 Dakota	1971-2000 Scott	1981-2010 Dakota	1981-2010 Scott	1991-2020 Dakota	1991-2020 Scott
Flash Flood	4	3	11	12	21	16
Flood	4	4	8	13	10	16
Hail	60	55	136	144	224	199
Thunderstorm Wind	67	60	134	95	180	141
Tornado	12	7	17	13	19	17
Total Summer Events	**147**	**129**	**306**	**303**	**454**	**389**

Source: National Oceanic and Atmospheric Administration, National Center for Environmental Information, Storm Events Database

In 2014, the VRWJPO adopted the use of NOAA Atlas 14, Vol. 8 precipitation frequency estimates for evaluating and designing stormwater infrastructure. Atlas 14 improved upon its predecessor, Technical Paper 40 (TP40), with denser data networks, a greater period of record, more robust statistical analyses, and improved spatial interpolation and mapping.

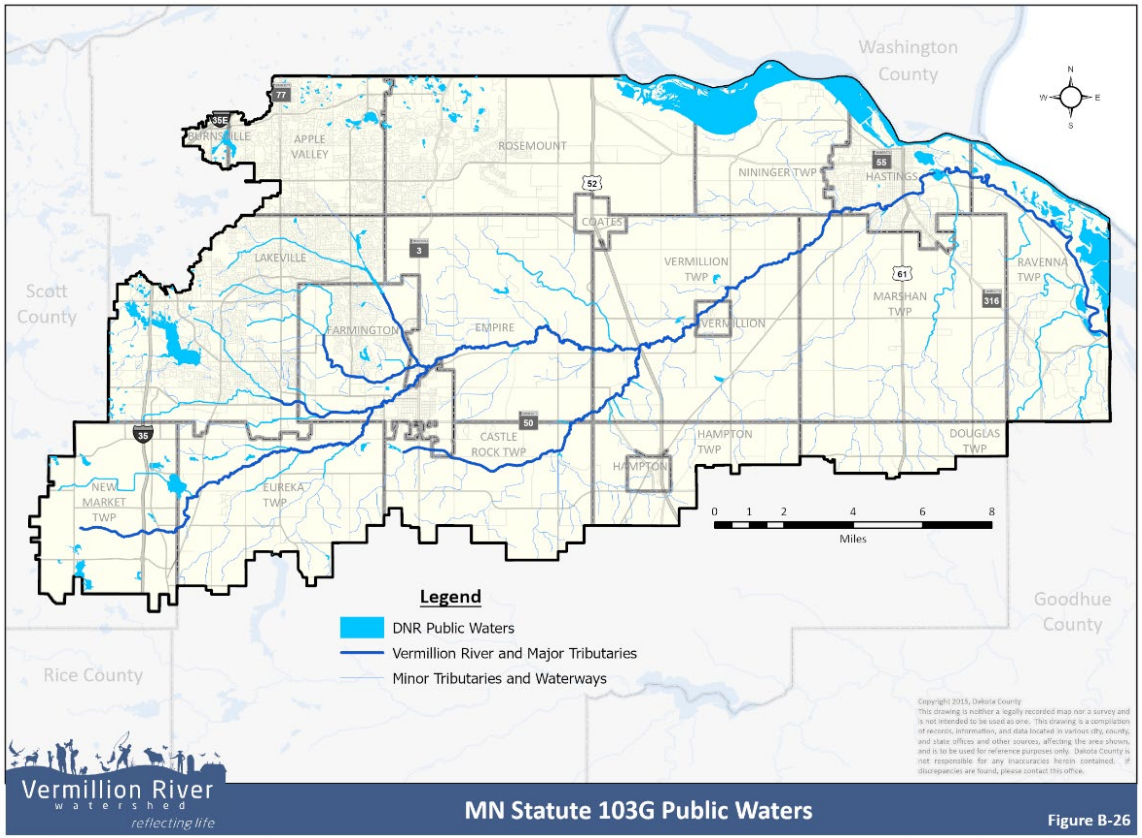
For the VRWJPO, Atlas 14 generally forecasts higher precipitation amounts than TP40 for specific storm events, such as 100-year storms (storms with a one percent chance of occurring). Because the projected rainfall values have increased, existing infrastructure may be inadequately designed to handle current and future climate conditions. The NOAA is currently developing Atlas 15, which will replace Atlas 14 as the authoritative national precipitation frequency atlas of the United States, once complete. Atlas 15 will incorporate nonstationary statistical precipitation frequency estimates, as well as future temporal trends to assist in creation of climate resilient infrastructure.

B-7 Surface Water Resources

The VRWJPO is home to 459 miles of DNR-designated public water streams, 9 public water lakes, and 8,363 acres of public water wetlands (*Figure B-26)*.

DNR Public Waters are defined as:

a. Water basins assigned a shoreline management classification by the commissioner [of the DNR], under Minn. Stat. sections 103F.201 to 103F.221, except wetlands less than 80 acres in size that are classified as natural environment lakes;
b. waters of the state which have been finally determined to be public waters or navigable waters by a court of competent jurisdiction;
c. meandered lakes, excluding lakes that have been legally drained;
d. water basins previously designated by the commissioner for management for a specific purpose such as trout lakes and game lakes pursuant to applicable laws;
e. water basins designated as scientific and natural areas under Section 84.033;
f. water basins located within and totally surrounded by publicly owned lands;
g. water basins where the State of Minnesota or the federal government holds title to any of the beds or shores, unless the owner declares that the water is not necessary for the purposes of the public ownership;
h. water basins where there is publicly owned and controlled access intended to provide for public access to the basin;
i. natural and altered watercourses with a total drainage area greater than 2 square miles in area;
j. natural and altered watercourses designated by the commissioner as trout streams; and
k. public water wetlands, unless the statute expressly states otherwise.



[The "major" (8-digit HUC) Vermillion River Watershed includes eight subwatersheds], which allows the VRWJPO to more easily identify finer-scale characteristics of water resources. Following are descriptions of notable surface water resources in each of the named subwatersheds and assessments of their conditions. (*See Subsection B-3 for more information about the subwatersheds.)*

Streams

Vermillion River Mainstem

While the headwaters of the Vermillion River lie within the North Central Hardwood Forest ecoregion, the majority of the watershed is within the Western Cornbelt Plains ecoregion. The Vermillion River meanders for 28 miles from the southeastern corner of Scott County to the northeast, where it reaches the Vermillion Falls in the City of Hastings. From there, the river splits into the Vermillion Slough and the continuance of the Vermillion River.

The Vermillion Slough periodically flows north a short distance to the Mississippi River from the Falls, while the river itself continues another 20 miles south before draining into the Mississippi River near Red Wing. Between the headwaters and the mouth of the Vermillion River, there is a 420-foot elevation change, with a 90-foot drop at the Falls.

The Mainstem contains DNR-designated trout stream reaches and supports naturally reproducing populations of brown trout in some areas. Rainbow trout are stocked as a harvestable species at the start of trout fishing season. Brook trout have been stocked by the DNR in the Mainstem, South Creek, and South Branch with the goal of establishing a naturally reproducing population. These are more closely related to the original native trout species to the river than brown or rainbow trout and more sensitive to habitat stressors. The DNR's willingness to stock brook trout demonstrates the positive impact of VRWJPO's restoration efforts.

South Creek

South Creek and its tributaries flow from the southeastern part of the City of Lakeville until it joins the Vermillion River Mainstem just south of the City of Farmington. Much of South Creek is DNR-designated trout stream.

Records from 1855 illustrate that South Creek historically existed as a relatively short, sinuous stream. In 1999, the DNR conducted an assessment of South Creek and its tributaries and found that much of the 10.8-mile creek had been straightened and channelized or ditched. Channel stability scores for the stream and its tributaries ranged from fair to good. Riparian vegetation consisted of woody species with limited grasses and forbs. During the assessment, three of the five reaches contained brown trout, but the habitat was found to be less than optimal.

The VRWJPO funded another assessment on South Creek and its tributaries in 2010. This study confirmed that the stream is primarily straightened and ditched through agricultural fields, industrial and commercial complexes and housing developments. These practices have impacted its geomorphology, channel stability, riparian zone, and habitat.

South Branch Vermillion River

The South Branch Vermillion River is a coldwater, DNR-designated trout stream, starting just south of the City of Farmington and feeding the Vermillion River Mainstem at U.S. Highway 52 and Dakota County Road 66. It flows through a primarily agricultural landscape, though the DNR has acquired land along the South Branch to protect the known trout habitat. The stream flows north, passing the Hampton Woods Wildlife Management Area (WMA) before meeting the Mainstem. The South Branch Aquatic Management Area (AMA) is located just west of the confluence of the South Branch and Mainstem. (*See Subsection B-13 for information about WMAs and AMAs.)*

Like the Mainstem, the South Branch is home to a naturally reproducing brown trout population, with rainbow trout stocked as a harvestable species annually. Various restorations along the stream have improved spawning, feeding and hiding habitat for fish by building riffles and adding woody material along the banks.

Middle Creek

Middle Creek and its tributaries are 24.5 miles long, with the majority of these reaches within the middle and eastern portions of the City of Lakeville. Middle Creek flows through the north- and west-central portions of Farmington and meets the Vermillion River Mainstem at State Highway 3 in the City of Empire.

The headwaters were historically marsh and wetland surrounded by prairie and limited forest. Agriculture and residential development have resulted in drained wetlands, channel straightening, added impervious surface reducing infiltration rates of the surrounding landscape, and reduced the amount of riparian buffer along the stream banks.

The downstream reaches of Middle Creek are DNR-designated trout streams. Groundwater is near the surface in some of these areas, presenting the potential to increase coldwater habitat.

North Creek

North Creek flows eastward through Lakeville and turns southeast on the eastern edges of Lakeville and Farmington, until it meets with Middle Creek in the City of Empire. Much like Middle Creek, the headwaters of North Creek were historically identified as marsh or wetland, covered by expanses of forest or prairie. Stream channels were shorter and naturally sinuous prior to the 1950s, after which most channels were converted into ditches and incised perennial waterways for agricultural purposes.

Presently, much of the land surrounding North Creek and its tributaries are in residential development. The increase in water flow rate and volume to the stream, resulting from the addition of impervious surfaces and reduction in natural vegetation, has resulted in stream erosion and channel incision.

Lakes

Lake Marion

Lake Marion is a 530-acre lake in the west-central part of the City of Lakeville. It has a maximum depth of 21 feet. The lake is split by I-35, with the portion of the lake on the west side of the freeway being shallower than the portion on the east side. The western portion of the lake is locally coined as the “kidneys of the lake,” with prevalent aquatic vegetation and limited surrounding development acting as safeguards.

Lake Marion boasts many amenities including a public boat launch, two fishing piers, 10.17 miles of shoreline, a large swimming beach, and a 5-mile-long mountain bike trail. Ritter Farm Park, a 340-acre natural area, is adjacent to the west side of the lake, and includes an environmental learning center, several acres of prairie and woodland restoration, and an extensive trail system used for hiking, cross-country skiing, and horseback riding.

Fish populations within the lake are dominated by average sized northern pike, largemouth bass, and bluegill sunfish. Walleye fry are annually stocked by the DNR, but abundance remains low. Invasive Eurasian watermilfoil, curlyleaf pondweed, and zebra mussels are present within the lake.

Alimagnet Lake

Alimagnet Lake is a 102-acre lake, split between the Cities of Burnsville and Apple Valley, at the intersection of Dakota County Roads 11 and 38. It has a maximum depth of 11.5 feet with an average depth of 6 feet, earning it the classification of a shallow lake. It has a watershed area of approximately 985 acres, which is dominated by residential and commercial development.

The lake is directly adjacent to Alimagnet Park, a 220-acre recreational area that includes extensive oak woodland, nearly two

miles of shoreline, a public canoe launch, disc golf course, and nature trails. It is also regularly aerated with an in-lake aeration system and a life station that operates the lake outlet.

Fish populations are dominated by bluegill sunfish, black bullheads, and black crappies. An in-lake aerator is run in winter months to improve potential game fish survival. Invasive Eurasian watermilfoil and curlyleaf pondweed are present within the lake.

Long and Farquar Lakes

Long and Farquar Lakes are hydrologically connected shallow lakes located within the City of Apple Valley. Long Lake, which drains directly to the eastern Farquar Lake, is just south of the intersection of Dakota County Roads 31 and 33. The lakes are 34 acres and 67 acres in size, respectively. Average depths are less than 5 feet. Nearly half of Farquar Lake's 2,100-acre developed urban watershed is routed through Long Lake before entering Farquar. Long Lake follows a 5-year partial drawdown cycle.

Long Lake is primarily used for nonmotorized boating and wildlife habitat. The lake is publicly accessible on the west side of the lake through the City of Apple Valley's Long Lake Park but is not accessible by vehicles. Farquar Lake is publicly accessible with a fishing pier located in the City's Farquar Lake Park.

Fathead minnows, black bullheads and bluegills have been historically observed in the lakes. Due to shallow depths, both lakes are susceptible to annual fish winterkills. Farquar Lake is regularly aerated throughout the winter as a preventative measure for fishkills. Invasive curlyleaf pondweed grows at nuisance levels in both lakes.

Cobblestone Lake

Cobblestone Lake is a created stormwater basin with a surface area of 37 acres and a maximum depth of 21 feet. The lake was developed from a former mining pit area. It is in the southeastern portion of Apple Valley at the intersection of Dakota County Roads 46 and 33. Water levels within the lake are controlled by a lift station, which pumps outflow into the City of Lakeville's storm sewer system. However, the pump is rarely operated (except for standard maintenance) due to seepage losses to groundwater. The entire Cobblestone Lake shoreline is owned by the City of Apple Valley. A walking trail exists around the lake and a fishing pier is located near on the north.

Cobblestone is a part of the DNR's Fishing in the Neighborhood initiative, which is a program aimed at increasing angling opportunities, public awareness, and environmental stewardship within the seven-county Twin Cities Metro Area. Recreators will find bluegill, black crappie, walleye, and bullheads within the lake. Invasive Eurasian watermilfoil is present within the lake.

Valley Lake

Valley Lake is an eight-acre lake located in the City of Lakeville near the intersection of Dakota County Roads 46 and 23. Prior to its lake designation, it was a historic gravel pit. It has a watershed drainage area of 117 acres and a maximum depth of 10 feet. It outlets to the south toward North Creek.

Valley Lake Park, managed by the City, surrounds the lake, with walking trails and a fishing pier. There is limited diversity of fish species but includes a proliferation of bluegills and black crappies. Invasive Eurasian watermilfoil is present within the lake.

East Lake

East Lake is a 42-acre lake located within the City of Lakeville south of Dakota County Road 46. It has a maximum depth of 10 ft and an average depth of 4 ft. Its large, 11,579-acre watershed drainage area spans five separate municipalities and townships,

including Burnsville, Eagan, Apple Valley, Lakeville, Rosemount, and Empire. The lake was historically a farmed wetland, but as urban development advanced, more water was directed to the area changing it from more wetland-like to lake-like.

The lake has approximately 1.75 miles of shoreline, all of which is owned by the City of Lakeville. To the northwest of the lake sits 18 acres of oak savanna, bordered by a 1-acre historic prairie restoration. On the west side of the lake runs the North Creek Greenway, a 3.2-mile stretch of a Dakota County regional trail connecting Lebanon Hills Regional Park to the Minnesota Zoo and south into Apple Valley. The lake outlets south to a tributary to North Creek.

Invasive common carp and goldfish are abundant in East Lake. Black bullheads and black crappies are also found in high numbers. Historically, aquatic vegetation has been absent.

Mississippi River and Backwater Lakes

The Mississippi River has limited extent in the furthest northeastern section of the watershed. Along its extent, the Mississippi River is managed by the Mississippi River Corridor Critical Area Program (MRCCAP). The MRCCAP is a joint state, regional, and local program that provides coordinated land use planning and zoning regulations for the 72-mile stretch of the Mississippi River through the seven-county Twin Cities Metropolitan Area (*Figure B-27*).

While Figure B-27 appears to show the Vermillion River connecting to the Mississippi at Hastings, the image is simplified. While the Vermillion River connects to the Mississippi in this location via the Vermillion Slough, it also continues south until it fully drains into the Mississippi near the City of Red Wing. The Mississippi Lock and Dam system has created a chain of backwater lakes in the watershed.

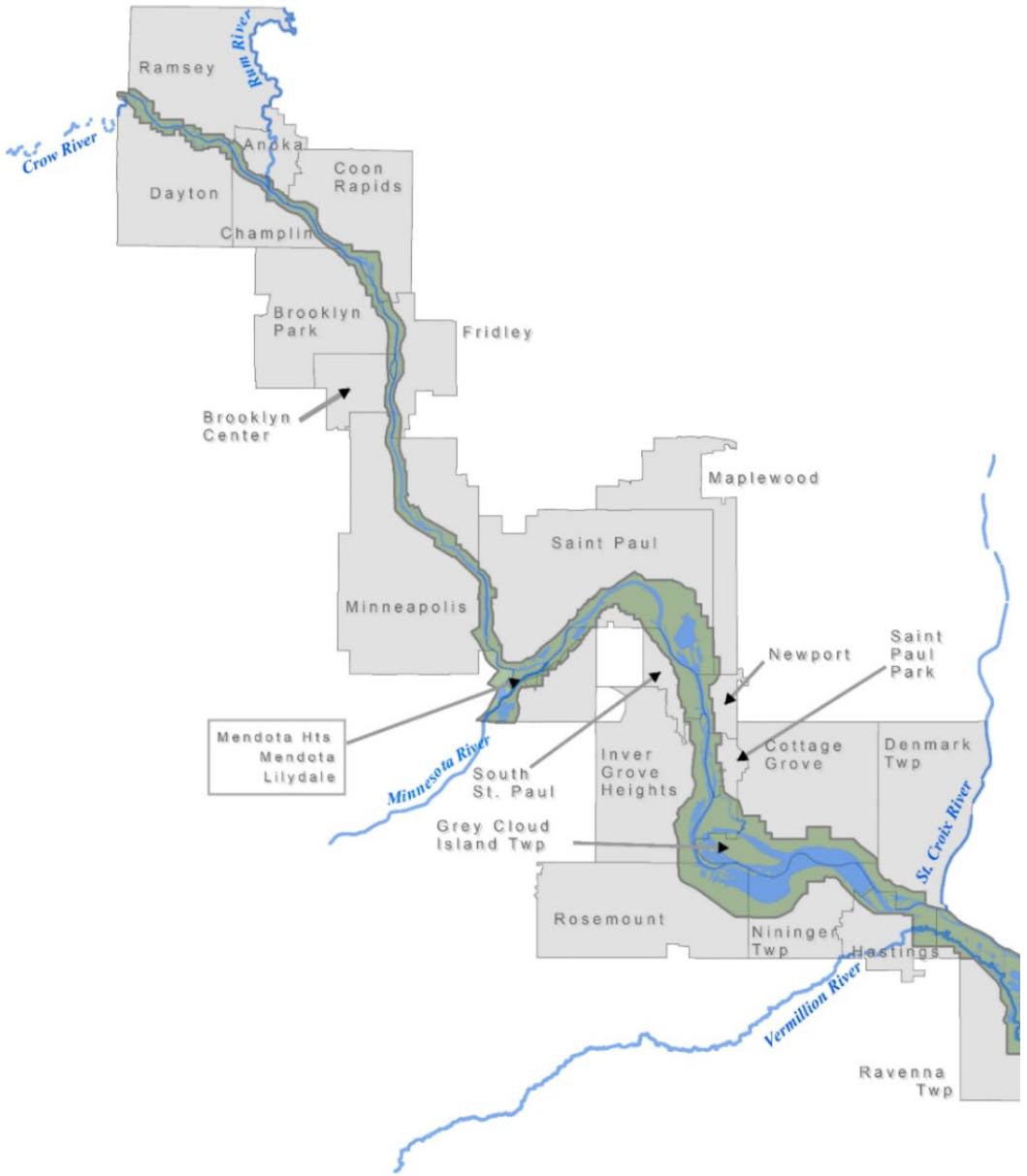


Figure B-27: Twin Cities Metropolitan Area Mississippi River Corridor

Spring Lake

Spring Lake is a backwater lake of Pool 2 of the Mississippi River, three miles upstream of Lock and Dam No. 2 at Hastings. Prior to the flooding of the Mississippi in the 1930s from the lock and dam, the lake consisted of a diverse mix of river floodplain, forest, marsh and scattered oak savanna. Its name pays homage to the historic trait of a portion of the area being a naturally spring-fed lake. Today, the lake acts as a slack-water pool that regularly fills with sediment and needs continual dredging to maintain an open navigation channel. Spring Lake receives little fishing and recreation due to limited accessibility, shallow water, and an abundance of snags. However, Dakota County has dedicated resources to restore the area surrounding the lake.

Spring Lake Park Reserve is adjacent to Spring Lake and the surrounding bluffs of the Mississippi River. It is a 1,097-acre reserve located in Nininger Township, just west of the City of Hastings. The natural area features river terraces and steep limestone and sandstone bluffs that support rare natural communities. Spring ephemeral wildflowers present beneath the preserve's forest canopies and remnant prairies occur sporadically across the bluff. Much of the central and eastern portions of the park were ranked as having "high biodiversity significance" by the Minnesota Biological Survey in the 1990s.

The park landscape has great significance to the history, cultural identity, spirituality, and lifeways of the Dakota Oyate as a place where the ancestors of today's Indigenous communities lived and are buried. A cultural landscape analysis conducted by the Upper Sioux Community Tribal Historic Preservation Office for the 2021 Spring Lake Park Reserve Master Plan surveyed culturally sensitive sites associated with Indigenous peoples and use dating as far back as 10,000 BCE. The survey notes that "the boundaries of Spring Lake Park Reserve encompass numerous highly sensitive Traditional Cultural Properties of importance to the Dakota people and their ancestors."

Lake Isabelle

Lake Isabelle is a 95-acre shallow lake in the northeast section of the City of Hastings. It has an average depth of 5 feet and a maximum depth of 7 feet. A boat launch and fishing pier add recreational value. Fish species in the lake include northern pike, crappies, panfish, and bass. Adjacent to the lake is the City's Lake Isabel Park, which was renovated in 2024. The lake has been found to contain invasive zebra mussels.

Lake Rebecca

Lake Rebecca is an 82-acre oxbow lake adjacent the Mississippi River in Hastings. It has 3.6 miles of shoreline and a maximum depth of 15 feet. The entire shoreline is in public ownership and the lake has surface water restrictions limiting boaters to the use of electric motors only.

Lake Rebecca Park is a 130-acre community park that is a part of the Mississippi National River and Recreation Area corridor. It is located in the City of Hastings between Lock and Dam Road and Lake Rebecca. Within the park is a strip of restored prairie called the Flint Hills Resources Riverfront Nature Preserve.

During high water events, Lake Rebecca often becomes hydrologically connected to the Mississippi River. Due to this characteristic, the lake contains many species typically associated with riverine systems, including sauger, white bass, freshwater drum, and catfish species. The lake is managed as a northern pike-crappie lake, with catfish stocked regularly. Invasive zebra mussels and Eurasian watermilfoil have been found in the lake.

Scott County Ditch 12

County Ditch 12 (CD 12) in Scott County is the only public drainage ditch that was regulated by MN Statute 103E during the previous generation Watershed Management Plan. The ditch was constructed in 1956 in the southeast portion of Scott County and runs 5.17 miles in length. There are two branches associated with CD 12, draining approximately 6,900 acres; however, the most recently assessed benefits role includes approximately 1,561 acres of watershed, representing only a fraction of the total drainage area. Historically, SSWCD coordinated ditch inspections.

In 1972, 1975, and 1985, Scott County received petitions for repairs of CD 12. The repairs were not approved by the Drainage Authority due to wetland impacts. In accordance with MN Statute 103E.811 Subd. 2, a petition for abandonment of a public drainage ditch must be signed by at least 51 percent of the property owners assessed for the construction of the drainage system or by the owners of not less than 51 percent. On October 10, 2024, Scott County staff mailed letters to all benefited owners of CD 12. Benefited owners of 816.05 acres (52 percent) voted to abandon the ditch.

On April 15, 2025, a public hearing was held during a Scott County Board of Commissioners meeting to hear comments relating to the ditch abandonment. One public comment was received, resulting in another landowner providing their desire for ditch abandonment. Resolution No. 2025-122: Adopting Findings and an Order Granting a Petition Abandoning Scott County Drainage Ditch No. 12 passed.

B-8 Monitoring

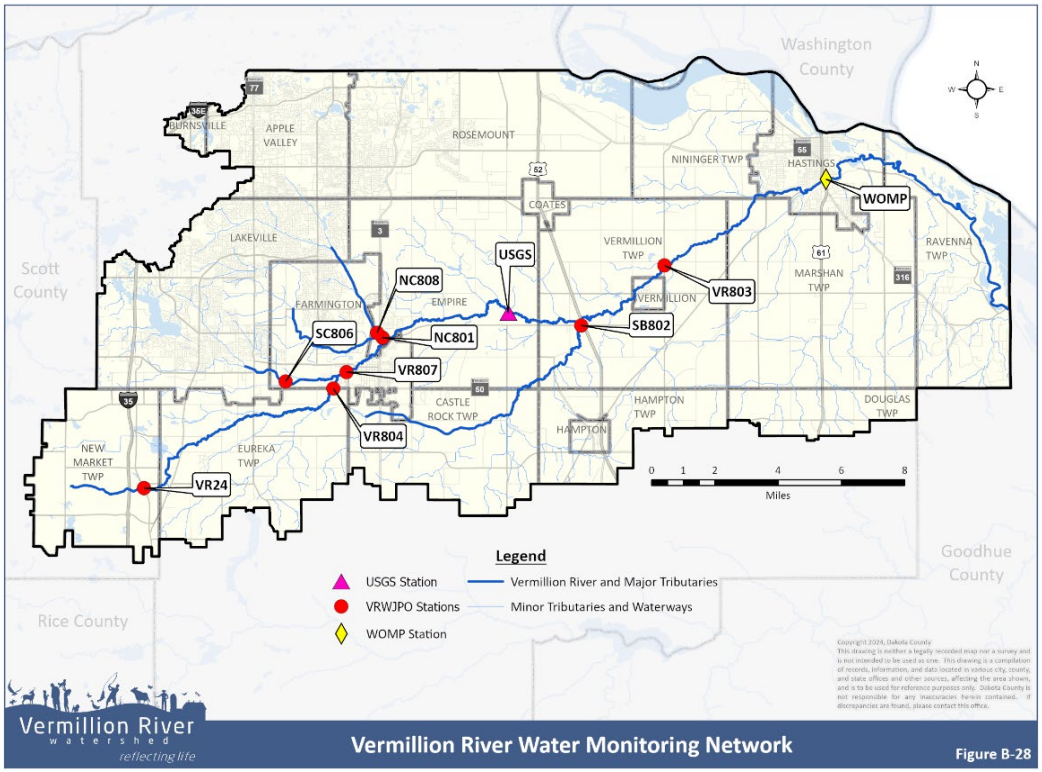
The VRWJPO completes physical and chemical monitoring of streams; fish and macroinvertebrate assessments; stream flow gaging; and BMP efficacy monitoring. Lake monitoring is done as a part of the Metropolitan Council's Citizen-Assisted Monitoring Program (CAMP) with support from partner LGUs and volunteers.

Following is an outline of monitoring activities and locations supported by the VRWJPO. Detailed annual monitoring reports can be found on the VRWJPO website.

Water Quality Monitoring – Vermillion River Monitoring Network

From March-October each year, the VRWJPO conducts physical and chemical monitoring of stream sites in coordination with the DCSWCD and SSWCD, through the Vermillion River Monitoring Network (VRMN). The VRMN was established to collect water quality and quantity data and define pollutant loading trends in the VRWJPO. The data enables VRWJPO staff to make informed water management decisions based on sound science. A map of VRMN sites can be found in *Figure B-28*. *Table B-5* lists these sites with the years in which monitoring has been conducted.

The VRMN contains both coldwater (2A) and warmwater (2B) stream reaches as designated by the MPCA, which have different sets of state water quality standards. In Minnesota, 2A streams are protected as potential drinking water sources. In the past, the VRWJPO has petitioned to change 2A stream reach designations or establish site-specific standards, as data may suggest a case for waters not meeting 2A characteristics.



When the VRMN opened in 2000, it consisted of eight monitoring stations, seven monitored by DCSWCD staff and one (VR24) monitored by SSWCD staff. The sites were equipped with pressure transducers and data logging equipment, which were installed in spring and removed for the winter. River stage was logged every 15 minutes. These records were converted to discharge values using annually updated rating curves.

Base flow samples were collected monthly through the growing season. Runoff samples were also collected after one inch or greater rain events. Samples were characterized as snowmelt if early season samples were collected with snow on the ground, or if precipitation took place leading to snowmelt. In 2007, an automated weather station was added to the network near the center of the watershed to better inform runoff monitoring events.

Table B-5: VRMN Stream Monitoring Stations

Location	Site Name	Subwatershed	Years Monitored
Vermillion River at Scott County Road 46	VR24	Upper Mainstem	2000-Present
Vermillion River at I-35	VR12	Upper Mainstem	2006
Vermillion River South of 235th St W	VR809	Upper Mainstem	2005-2010
South Creek at Flagstaff Ave	SC806	South Creek	2011-Present
Vermillion River at 220th St	VR804	Upper Mainstem	2000-Present
Vermillion River at Denmark Ave	VR807	Middle Mainstem	2000-Present
Upstream North Creek at Minnesota Highway 3	NC808	Middle Creek	2000-Present
North Creek at MN Highway 3	NC801	North Creek	2000-Present
South Branch Vermillion River at Dakota County Road 66	SB802	South Branch	2000-Present
Vermillion River at Goodwin Ave	VR803	Middle Mainstem	2000-Present
Vermillion River at Vermillion Falls Park	VR0020	Lower Mainstem	2000-Present

All samples were analyzed according to EPA-specified protocols at the Metropolitan Council Environmental Services Lab in St. Paul. Analytes included: alkalinity, 5-day biological oxygen demand, conductivity, chloride, dissolved phosphorus, E. coli, fecal coliform, NO_3, nitrite, pH, total ammonia nitrogen, total Kjeldahl nitrogen, TP, TSS, turbidity, and volatile suspended solids. Results from sampling were annually reported to the MPCA and EPA and informed VRWJPO project plans.

Over time, the VRMN has evolved with changing environmental conditions and technology. Changes included:

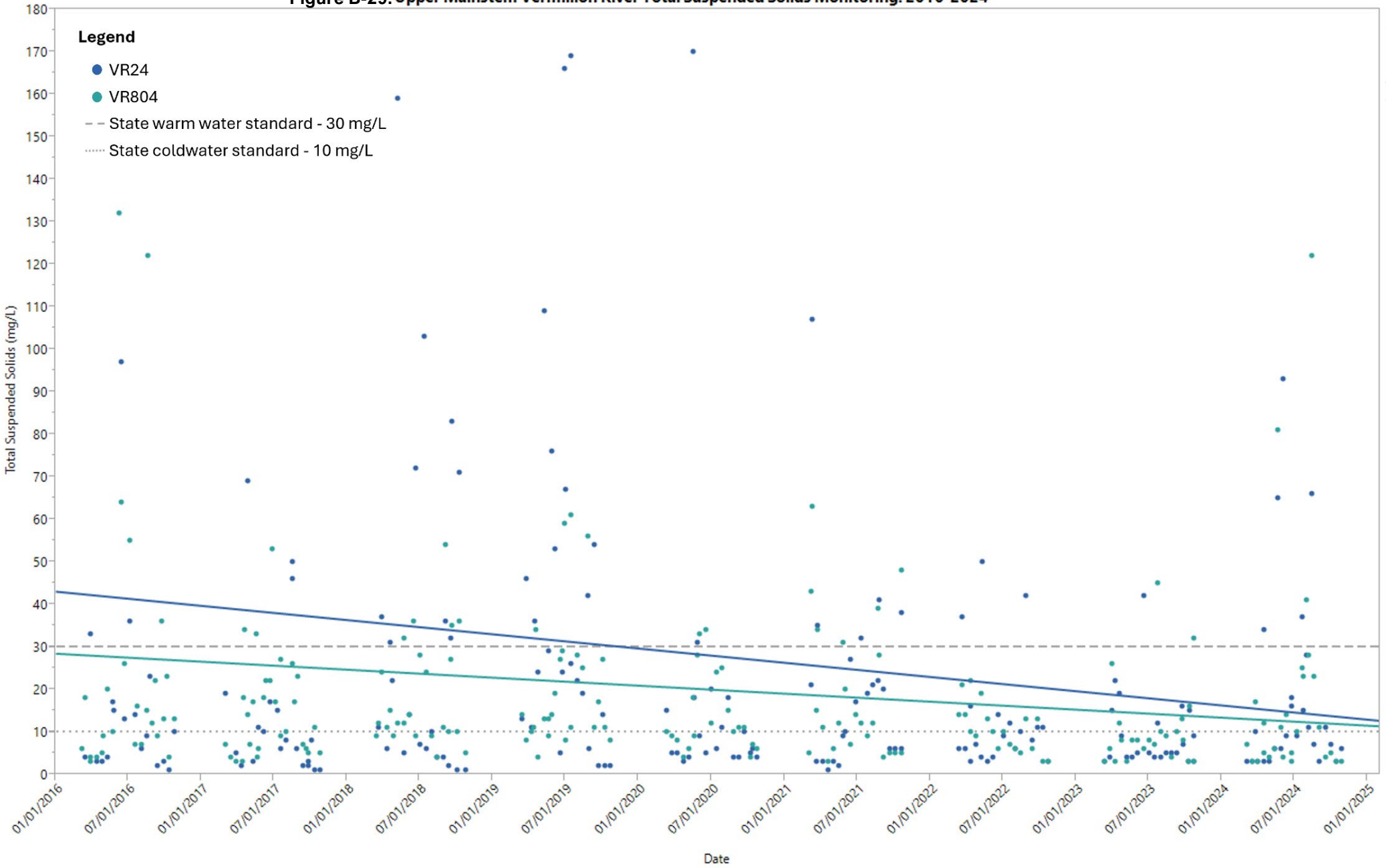
- In 2006, the VR12 site was added to assess additional Scott County drainage areas. It was abandoned after one year of monitoring due to access issues.
- Starting in 2009, sampling transitioned to a bi-weekly basis, as there was a desire to gather more baseflow data to accurately represent river and stream conditions. Runoff events continued to be monitored as well.
- In 2011, monitoring station VR809 was abandoned due to the river frequently going dry at this location. The monitoring equipment was relocated to the SC806 site, where there was a need for additional monitoring data.
- In 2014, the MPCA replaced turbidity standards with TSS standards for the measure of organic and inorganic suspended particles for impairments. Hence, samples have been analyzed for TSS rather than turbidity since 2014.
- In 2015, the DNR installed continuous stage monitoring equipment at SC806, VR804, VR807, SB802, and VR803.
- In 2018, DNR installed continuous stage monitoring equipment at the NC801 and NC808 sites. Afterward, DCSWCD staff have annually installed equipment, and DNR staff have performed data analyses relating to rating curve measurements.
- In 2019, chloride and chlorophyll-a were added to the analysis suite in response to growing concerns for chloride levels in the Twin Cities Metropolitan Area and the inclusion of chlorophyll-a in the MPCA's water quality assessment process for rivers and streams.

With more than 20 years of VRMN data, VRWJPO staff have established baseline pollutant loading trends and created the ability to determine the impact of various projects, programs, and practices implemented within the watershed over time. Complete monitoring reports can be found on the VRWJPO website.

The following pages contain:

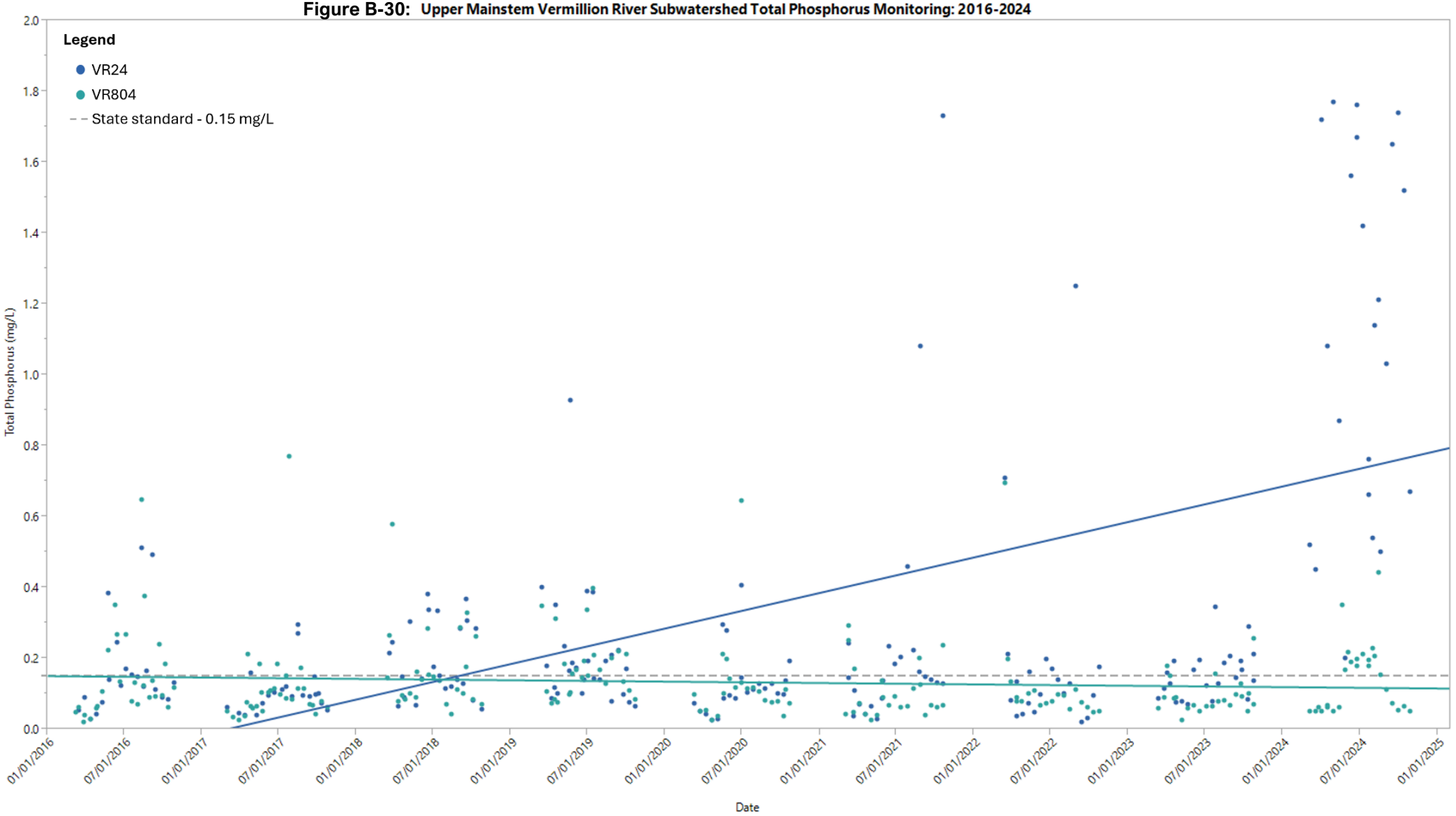
- *Pages B-28 to B-47*: Graphs displaying 2016-2024 TSS, TP, and NO_3 trends by subwatershed. This timeframe was selected to illustrate monitoring trends observed during the implementation of the 2016-2025 Vermillion River Watershed Management Plan. Graphs were created using data collected from VRMN stations, organized according to the VRWJPO's eight HUC-12 subwatersheds. (*Figures B-29 to B-46*)
- *Pages B-48 to B-61:* TSS, TP, and NO_3 pollutant loading maps from 2016-2024. Maps were created using water quality data collected from VRMN stations, with subwatersheds defined using the ArcHydro modeling extension for ArcView GIS, based on MN Lidar elevation data that was converted into a Digital Elevation Model, using the monitoring station locations as pour points. (*Figures B-47 to B-73*)
- *Pages B-61 to B-63*: Brief discussions of overall monitoring trends prior to and following the implementation of the TSS standards in place of turbidity standards. Trends are discussed in these two timeframes as monitoring protocols varied.

Figure B-29: Upper Mainstem Vermillion River Total Suspended Solids Monitoring: 2016-2024



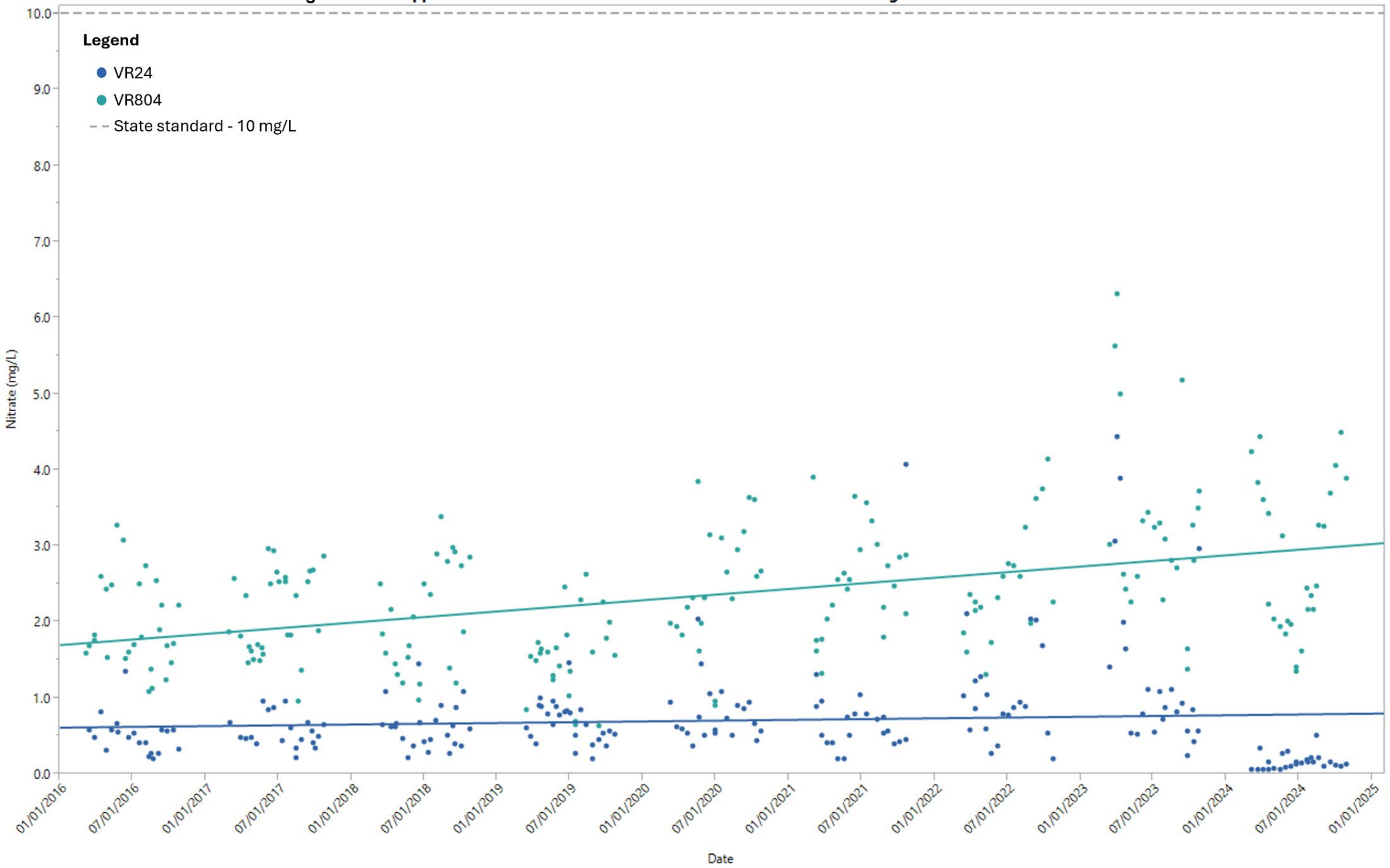
Upper mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR24 (Scott County) and VR804 (Dakota County).

Figure B-30: Upper Mainstem Vermillion River Subwatershed Total Phosphorus Monitoring: 2016-2024



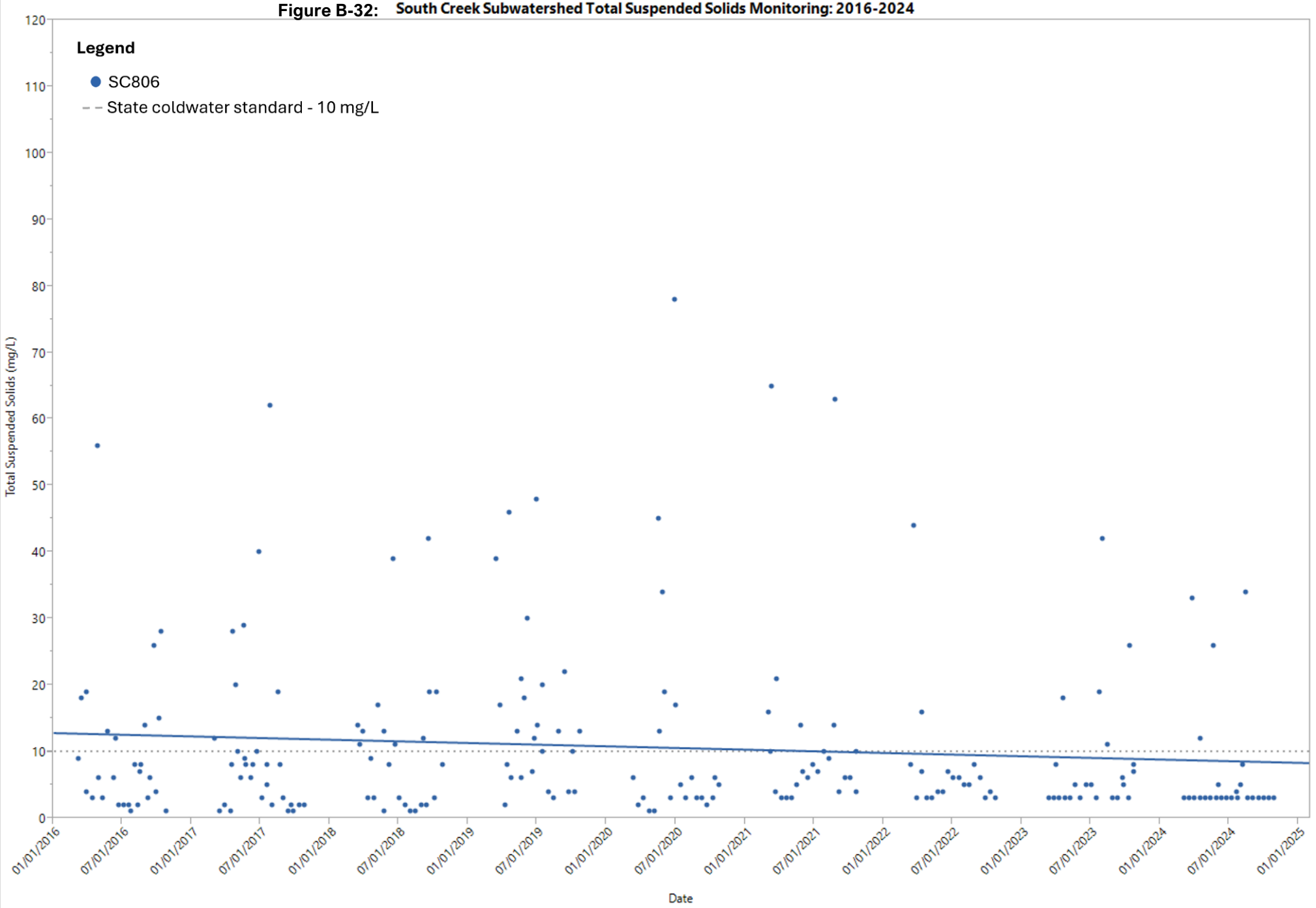
Upper mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR24 (Scott County) and VR804 (Dakota County). **VR24 has four outliers for 2024 - 4.01 mg/L on 3/26/24, 3.64 mg/L on 4/17/24, 3.11 mg/L on 5/22/24, and 3.06 mg/L on 6/3/24.

Figure B-31: Upper Mainstem Vermillion River Subwatershed Nitrate Monitoring: 2016-2024



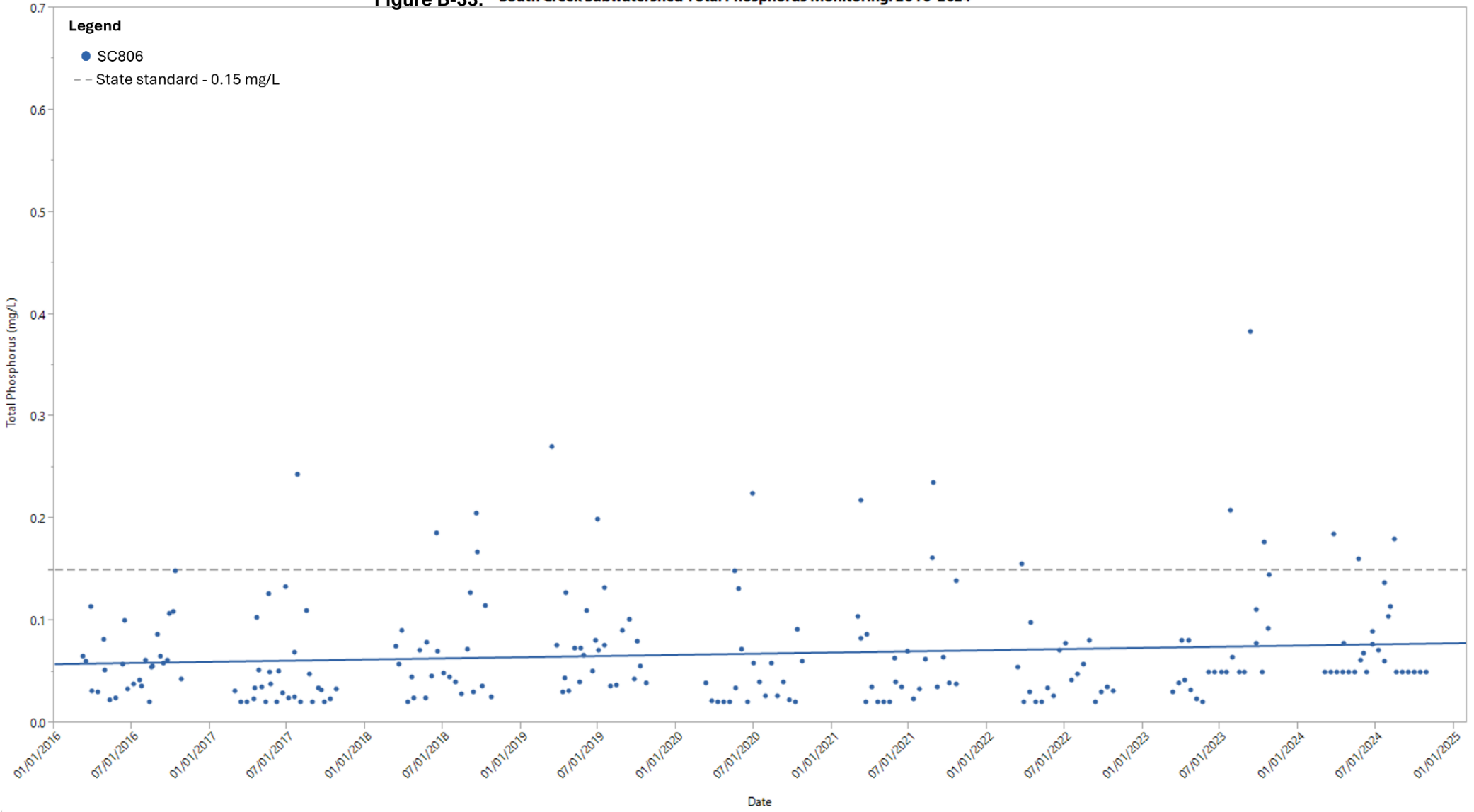
Upper mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR24 (Scott County) and VR804 (Dakota County).

Figure B-32: South Creek Subwatershed Total Suspended Solids Monitoring: 2016-2024



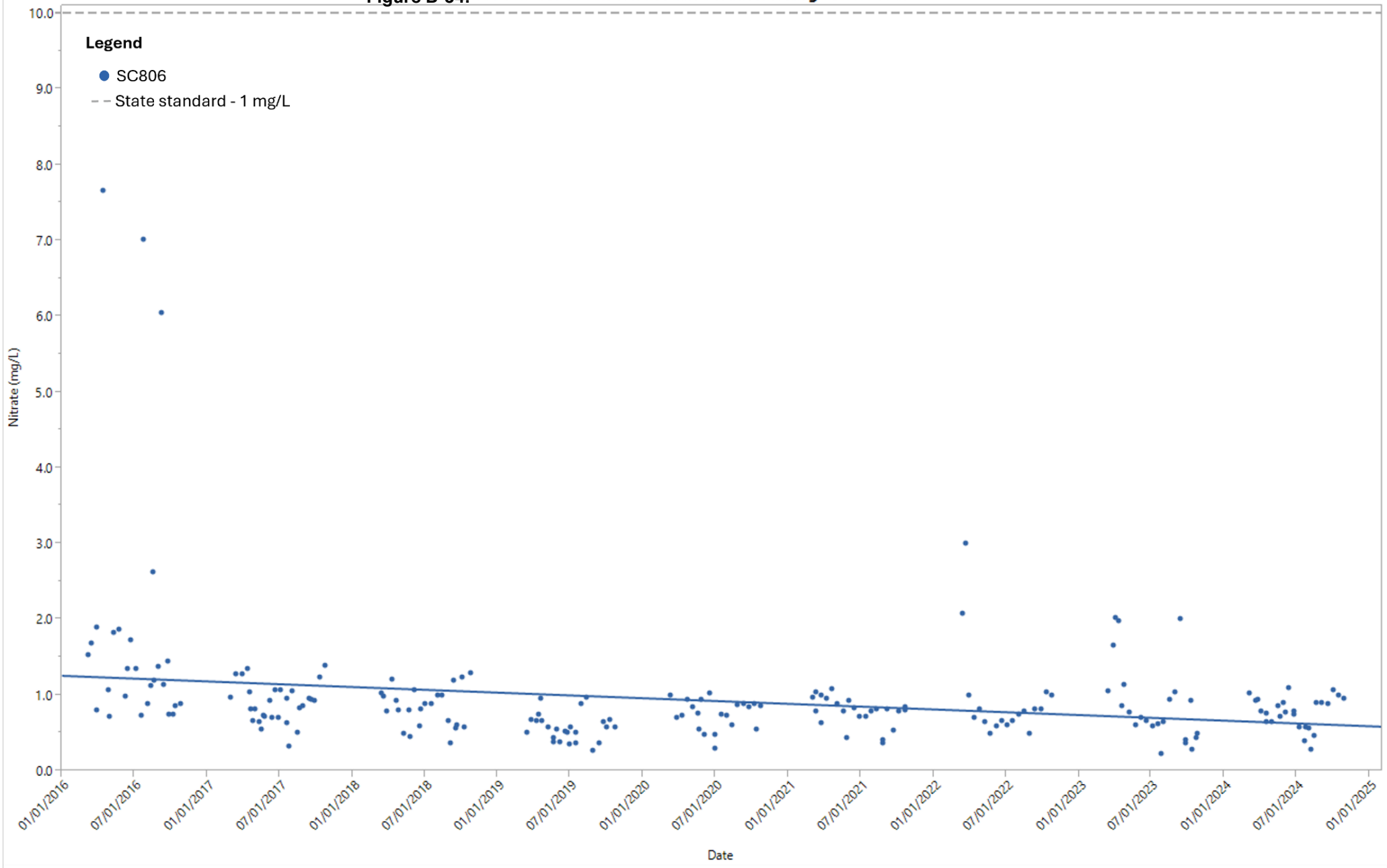
South Creek monitoring for the Vermillion River Monitoring Network is conducted at SC806.

Figure B-33: South Creek Subwatershed Total Phosphorus Monitoring: 2016-2024



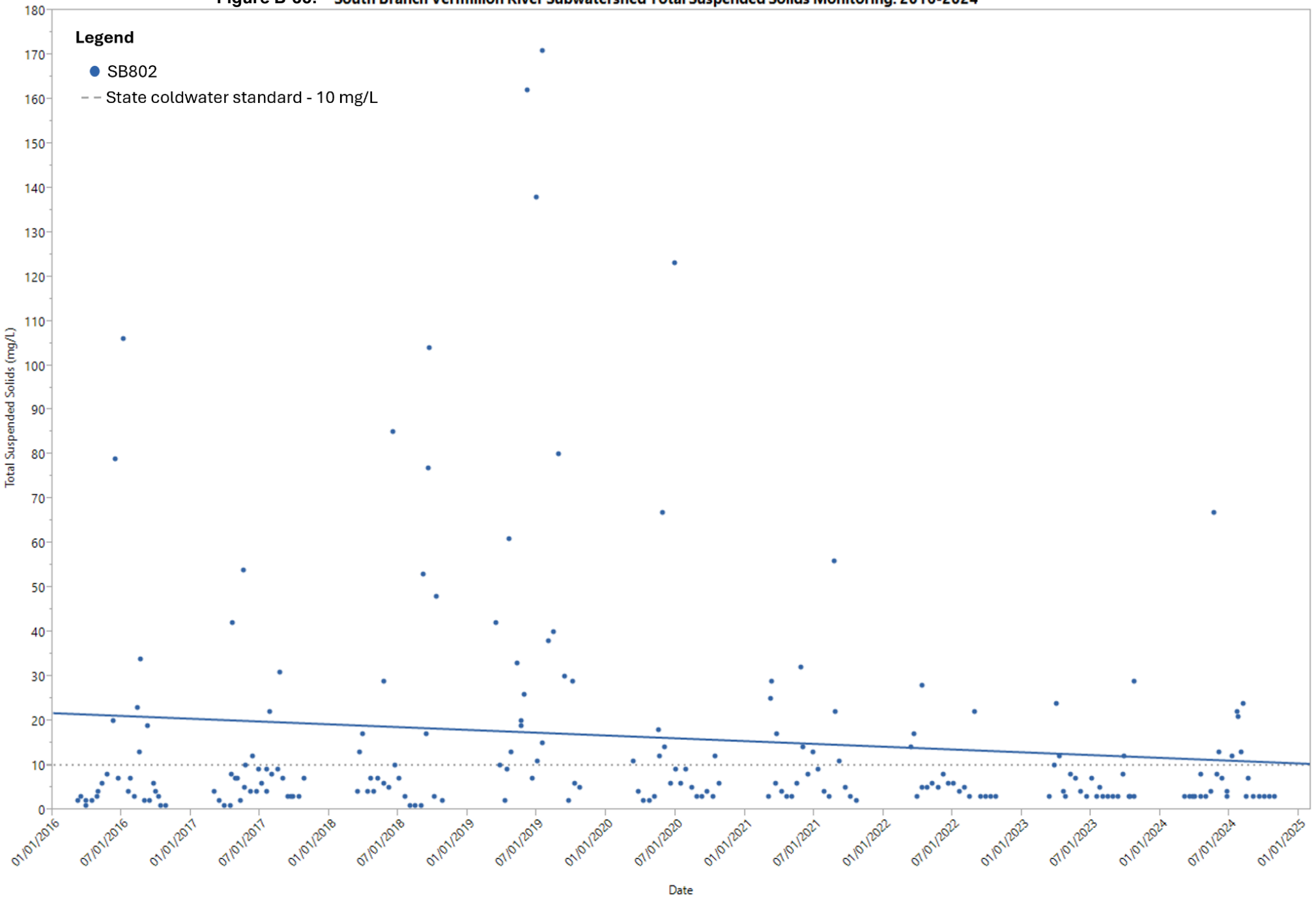
South Creek monitoring for the Vermillion River Monitoring Network is conducted at SC806.

Figure B-34: South Creek Subwatershed Nitrate Monitoring: 2016-2024



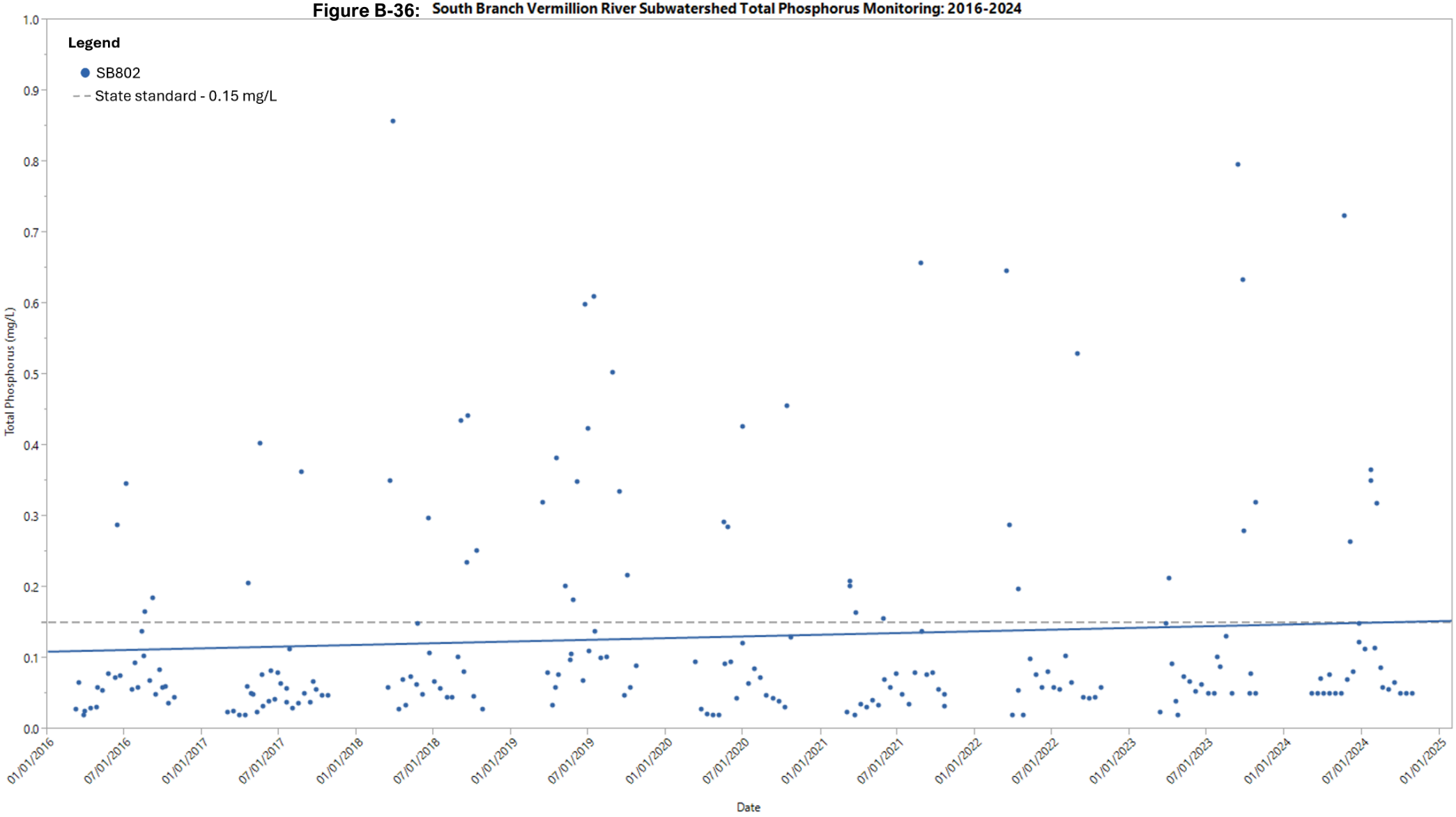
South Creek monitoring for the Vermillion River Monitoring Network is conducted at SC806.

Figure B-35: South Branch Vermillion River Subwatershed Total Suspended Solids Monitoring: 2016-2024



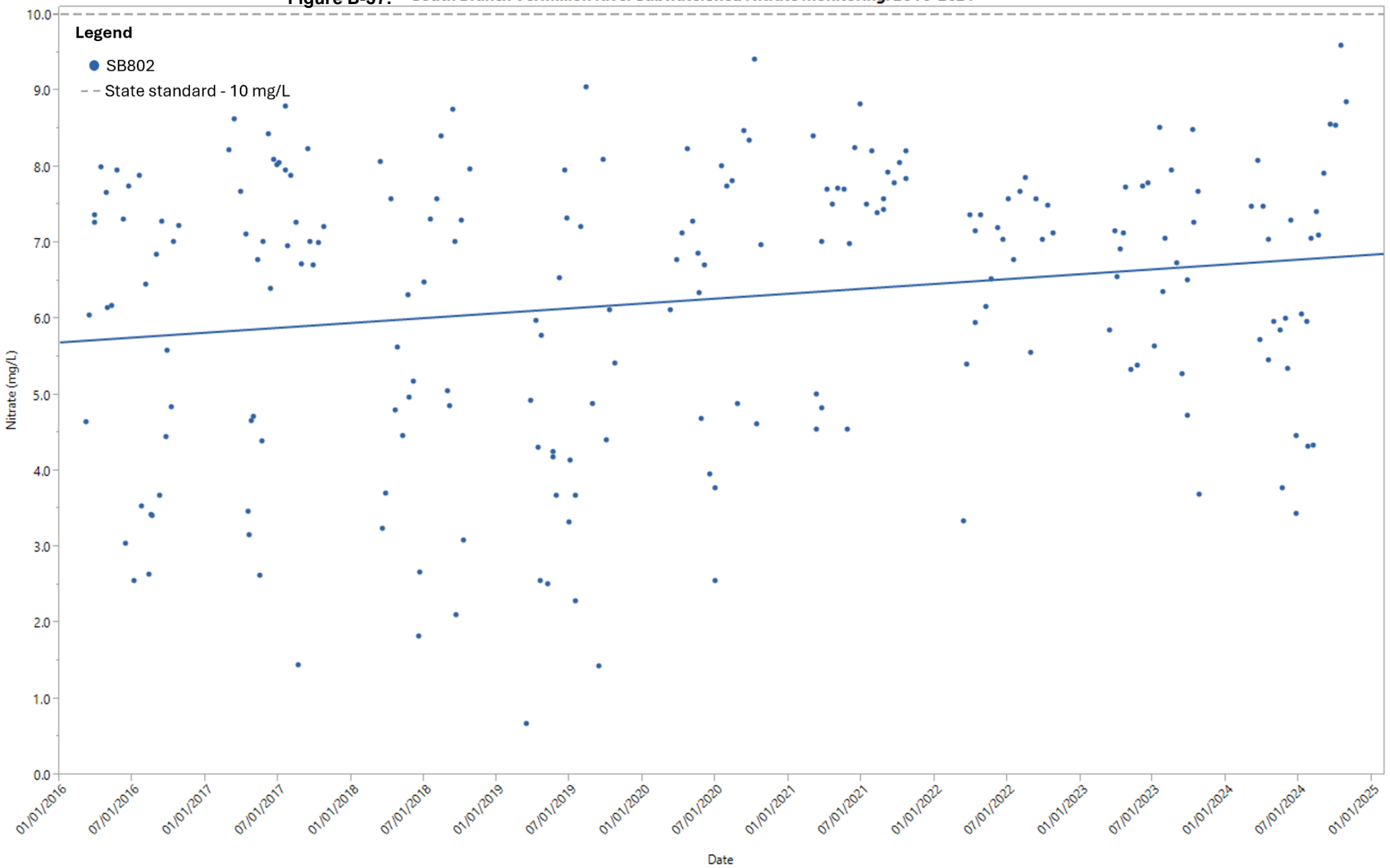
South Branch Vermillion River monitoring for the Vermillion River Monitoring Network is conducted at SB802.

Figure B-36: South Branch Vermillion River Subwatershed Total Phosphorus Monitoring: 2016-2024



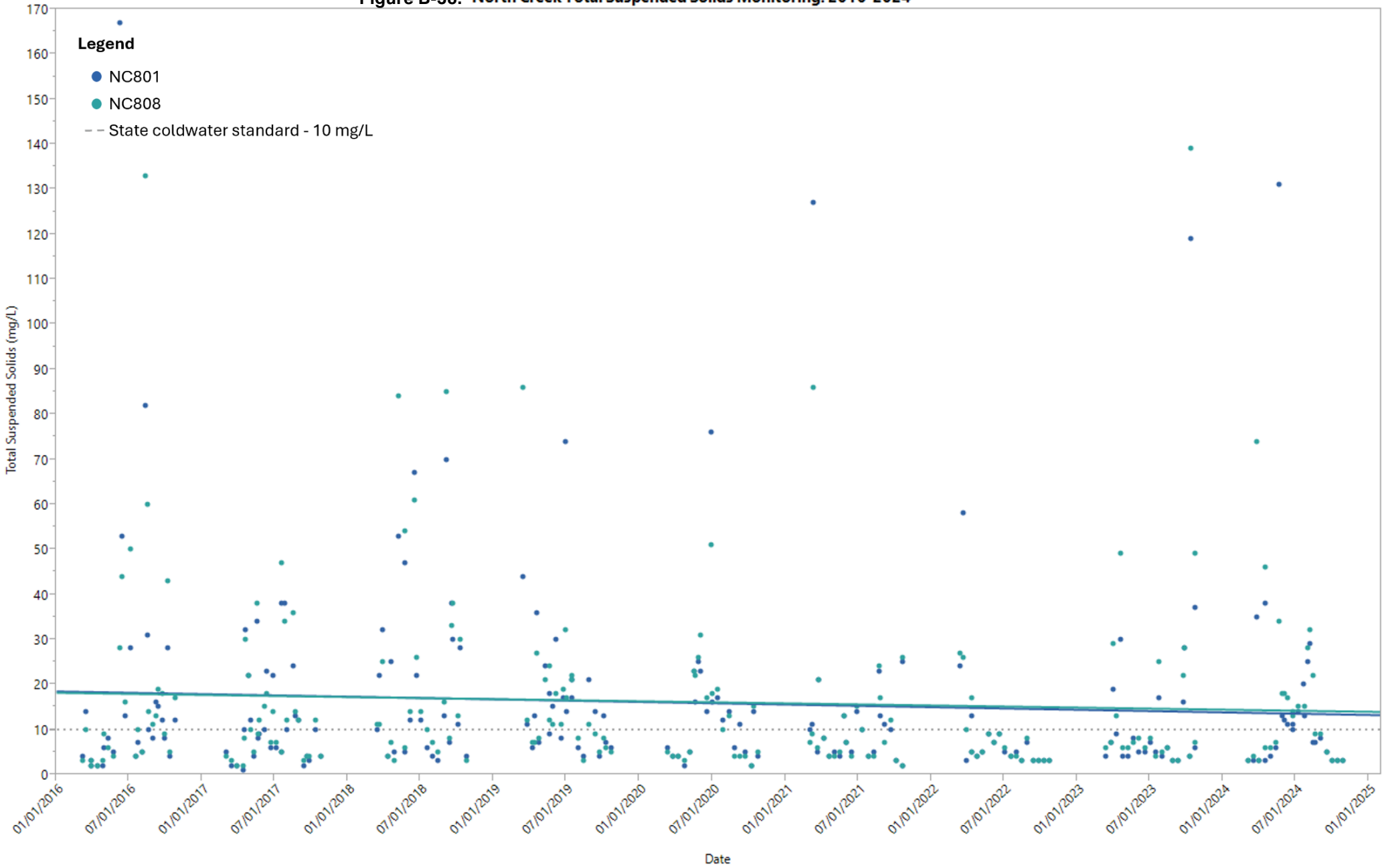
South Branch Vermillion River monitoring for the Vermillion River Monitoring Network is conducted at SB802.

Figure B-37: South Branch Vermillion River Subwatershed Nitrate Monitoring: 2016-2024



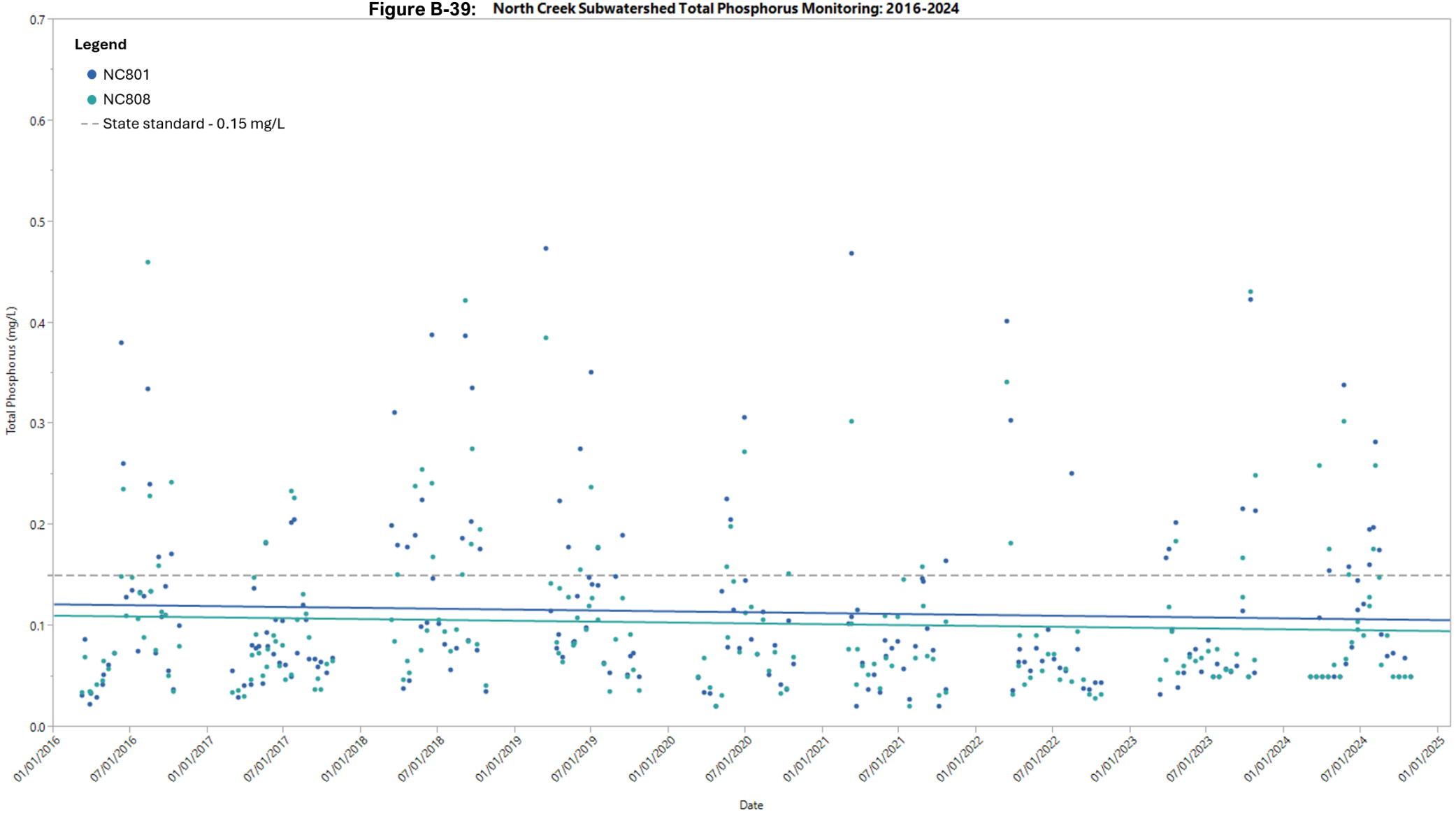
South Branch Vermillion River monitoring for the Vermillion River Monitoring Network is conducted at SB802.

Figure B-38: North Creek Total Suspended Solids Monitoring: 2016-2024



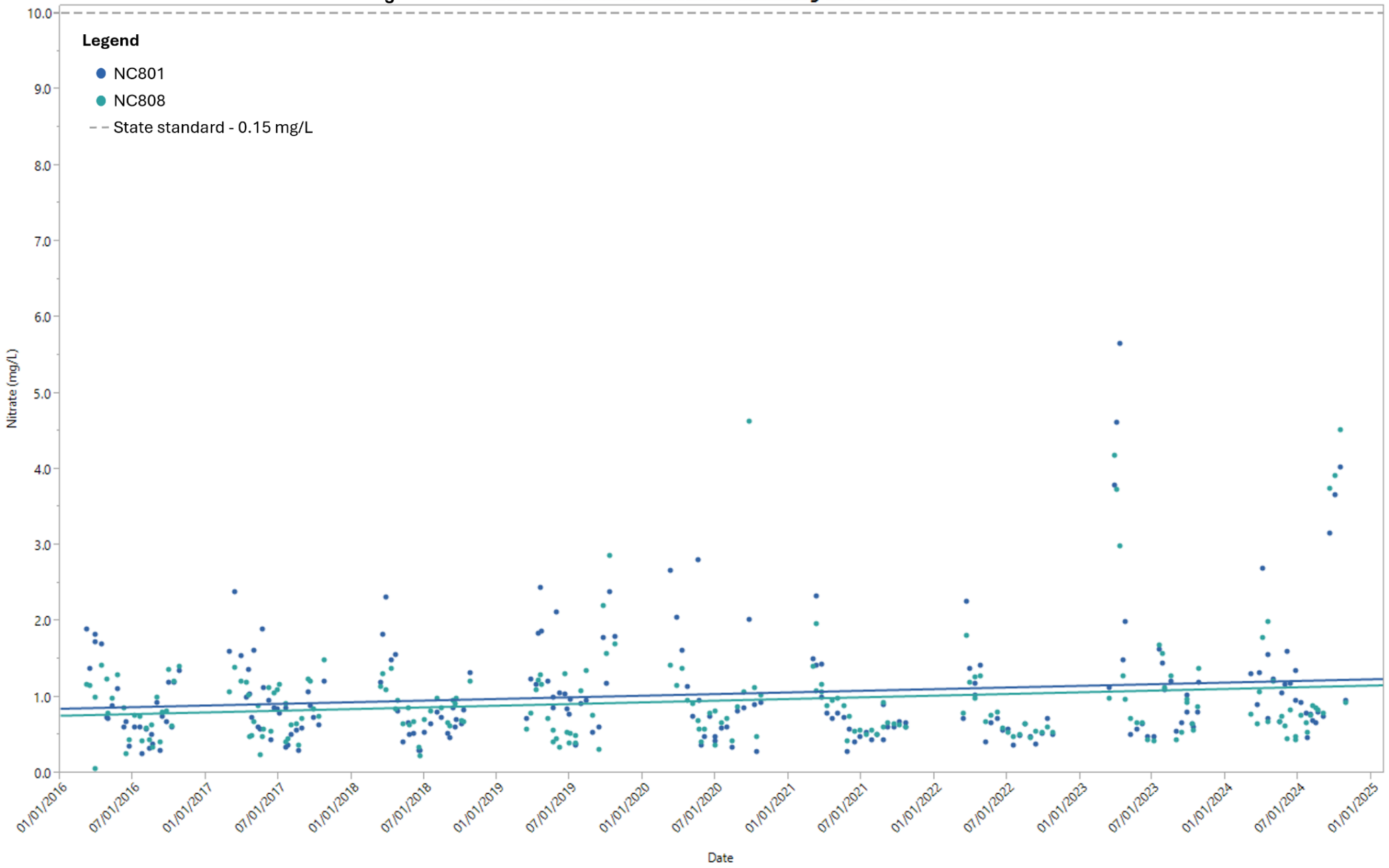
North Creek monitoring for the Vermillion River Monitoring Network is conducted at NC801 and NC808.

Figure B-39: North Creek Subwatershed Total Phosphorus Monitoring: 2016-2024



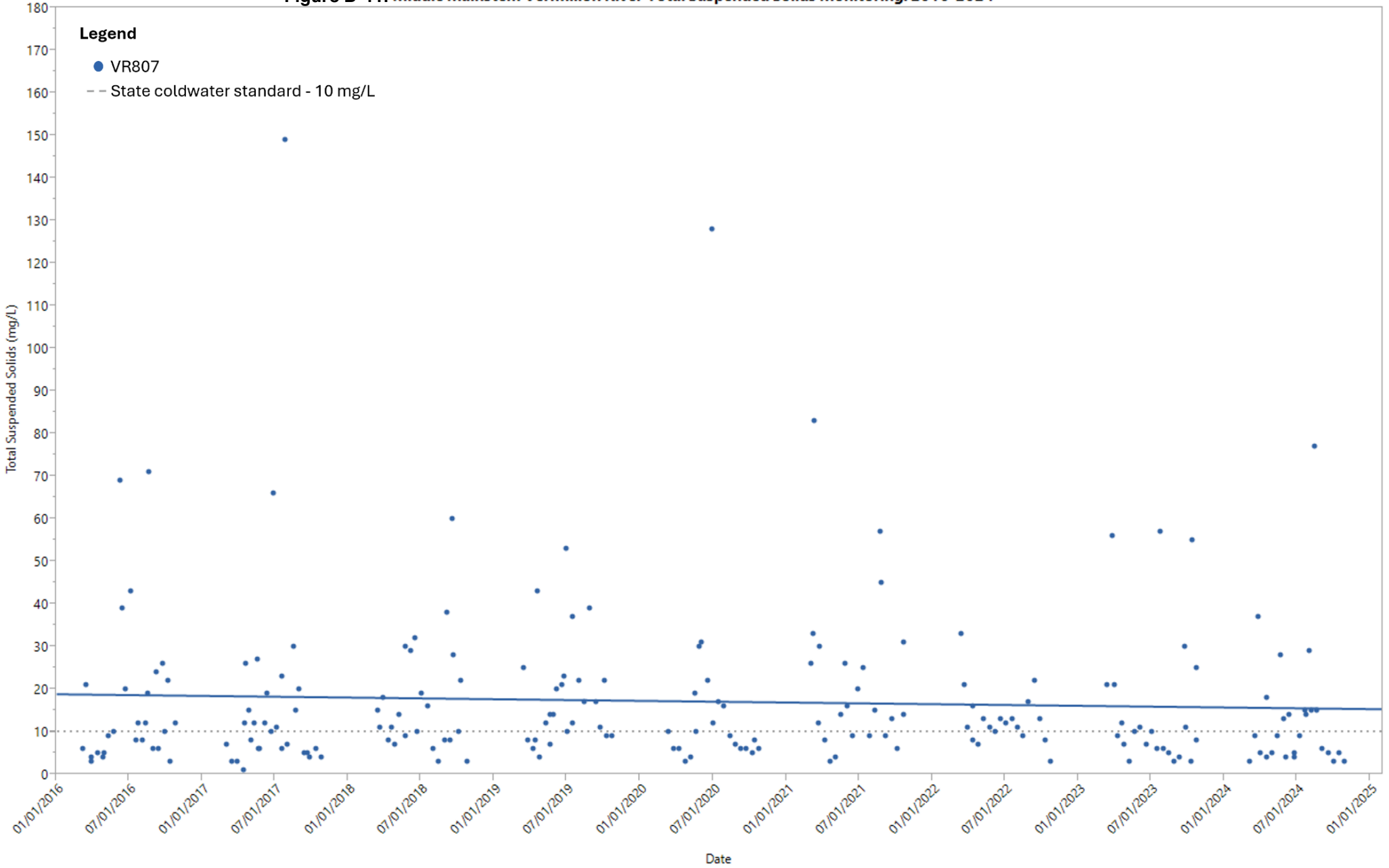
North Creek monitoring for the Vermillion River Monitoring Network is conducted at NC801 and NC808.

Figure B-40: North Creek Subwatershed Nitrate Monitoring: 2016-2024



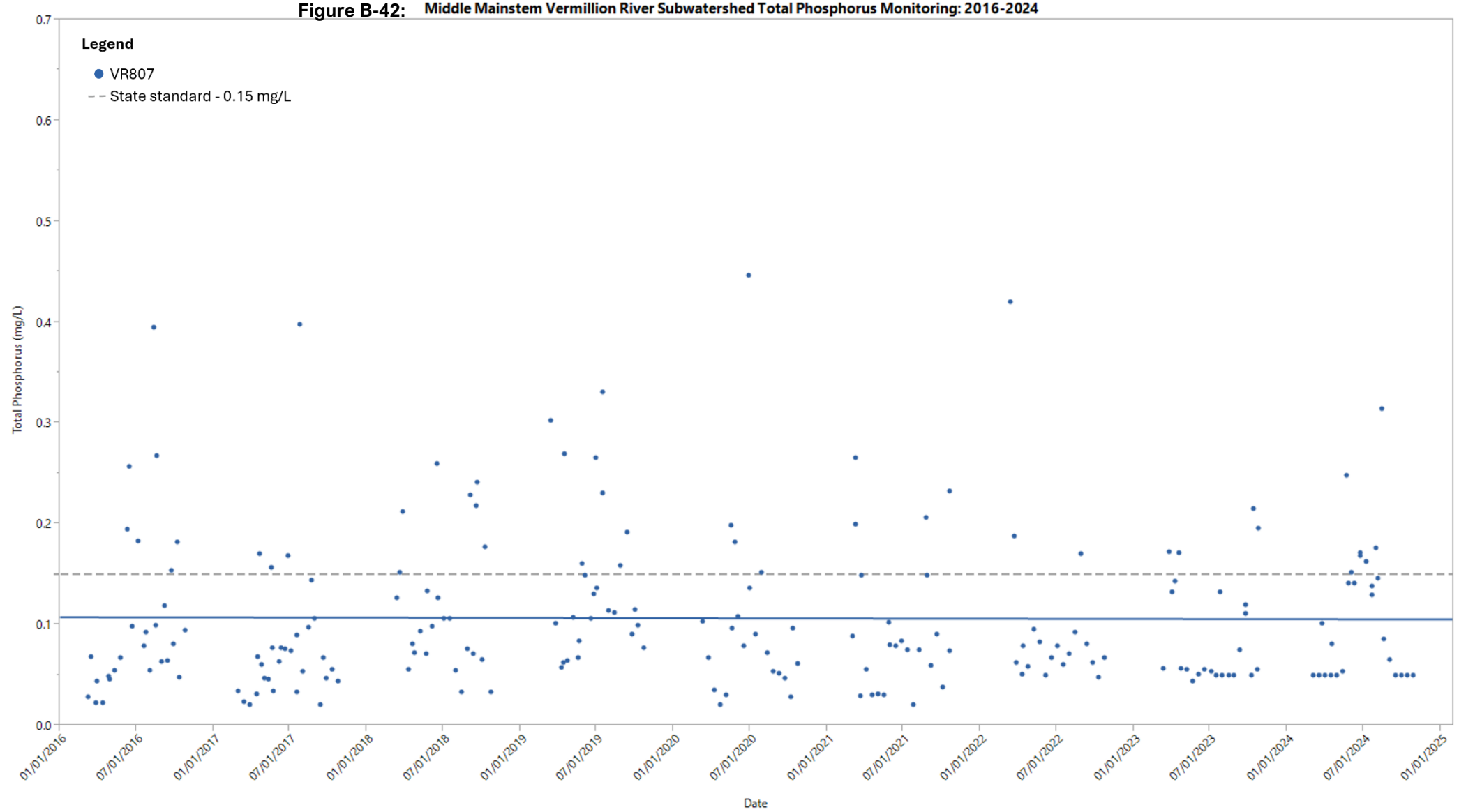
North Creek monitoring for the Vermillion River Monitoring Network is conducted at NC801 and NC808.

Figure B-41: Middle Mainstem Vermillion River Total Suspended Solids Monitoring: 2016-2024



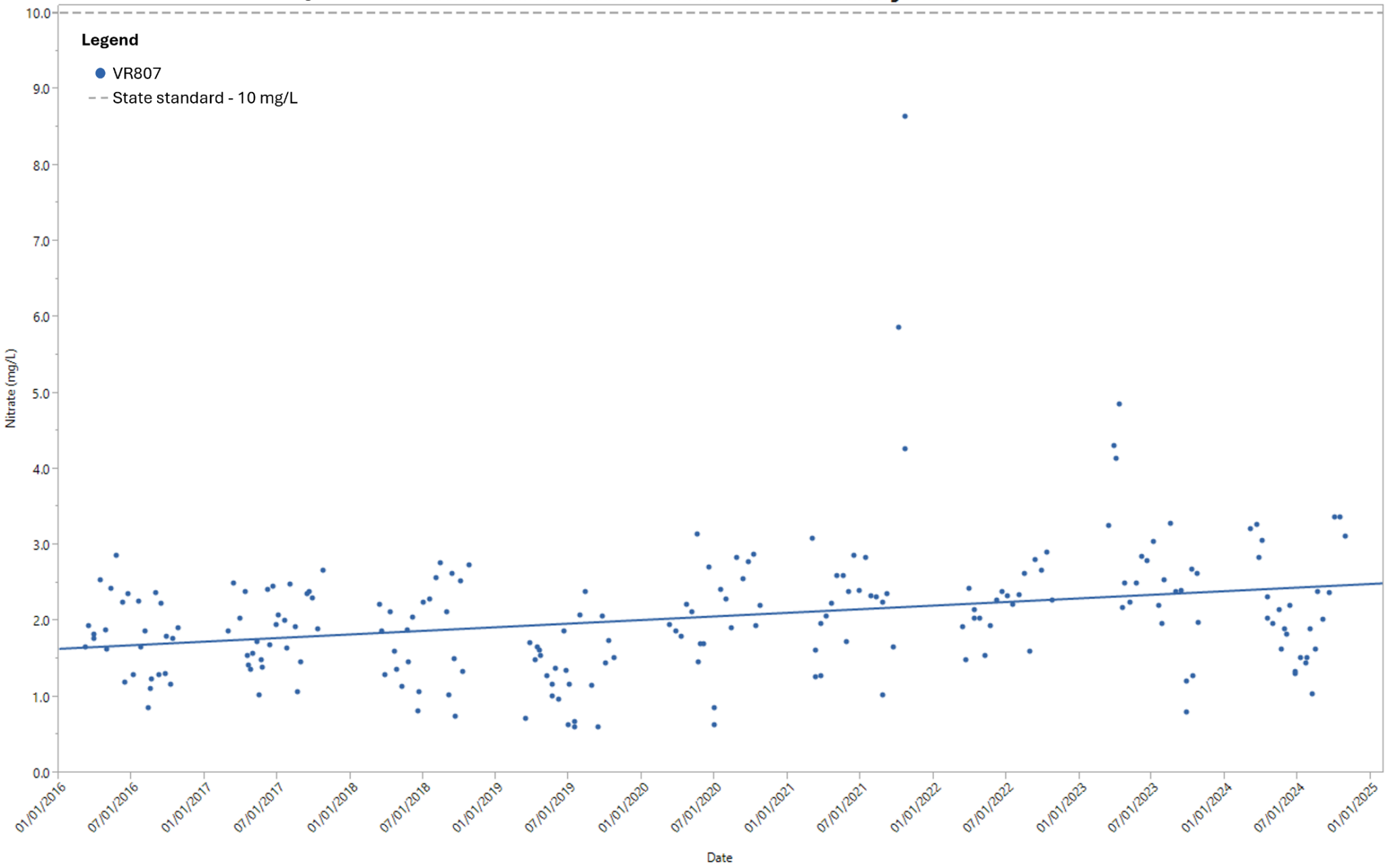
Middle mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR807.

Figure B-42: Middle Mainstem Vermillion River Subwatershed Total Phosphorus Monitoring: 2016-2024



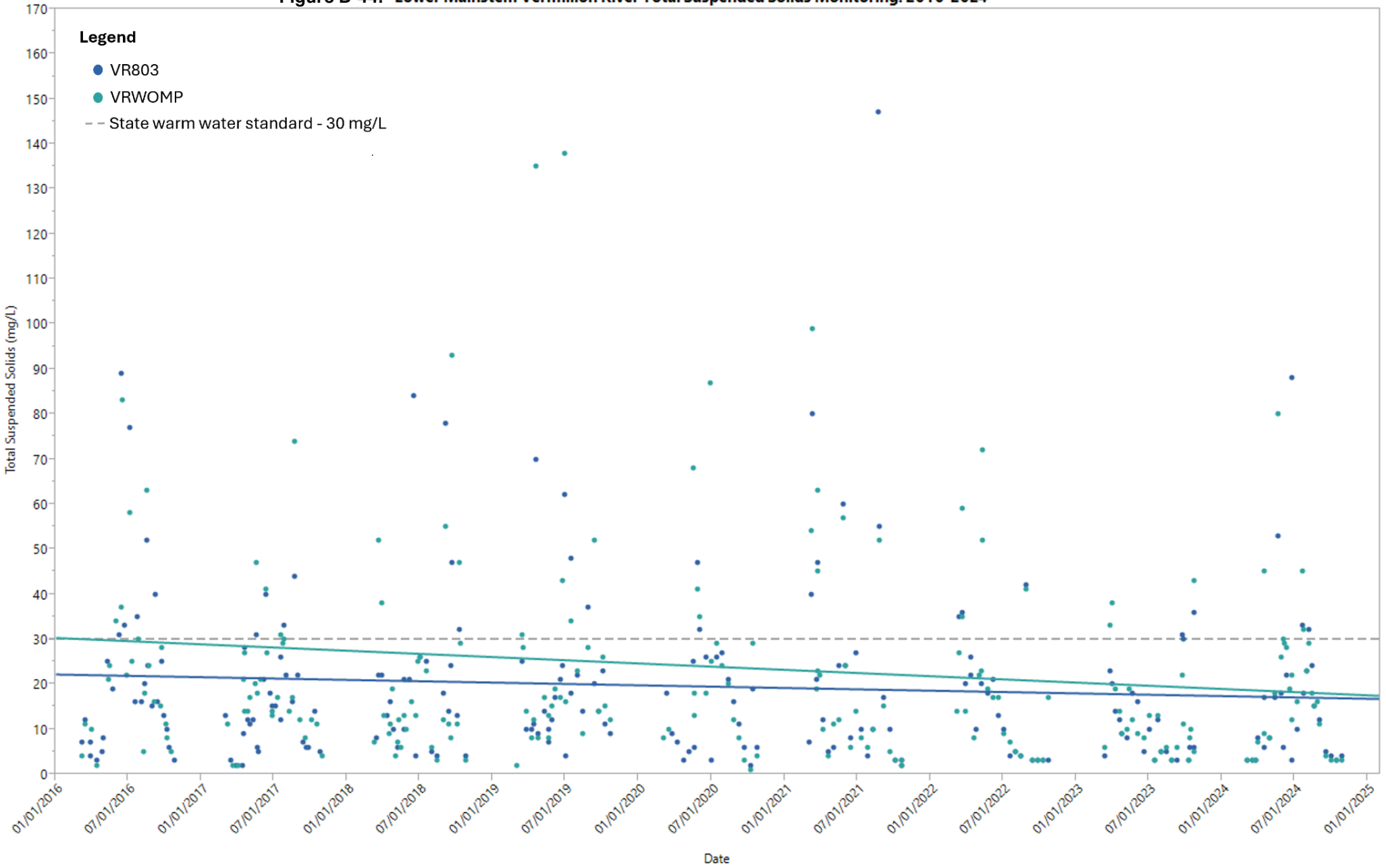
Middle mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR807.

Figure B-43: Middle Mainstem Vermillion River Subwatershed Nitrate Monitoring: 2016-2024



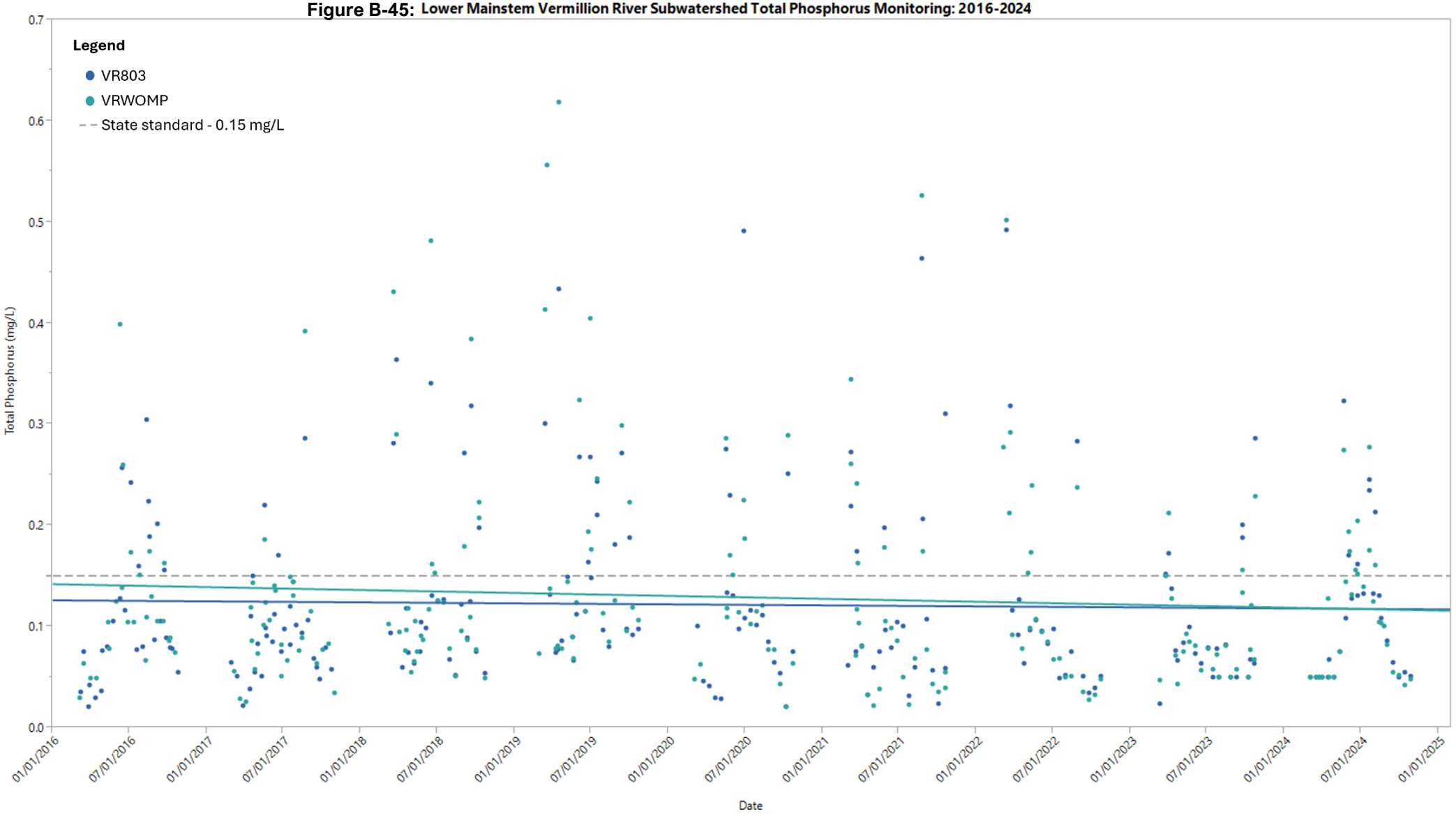
Middle mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR807.

Figure B-44: Lower Mainstem Vermillion River Total Suspended Solids Monitoring: 2016-2024



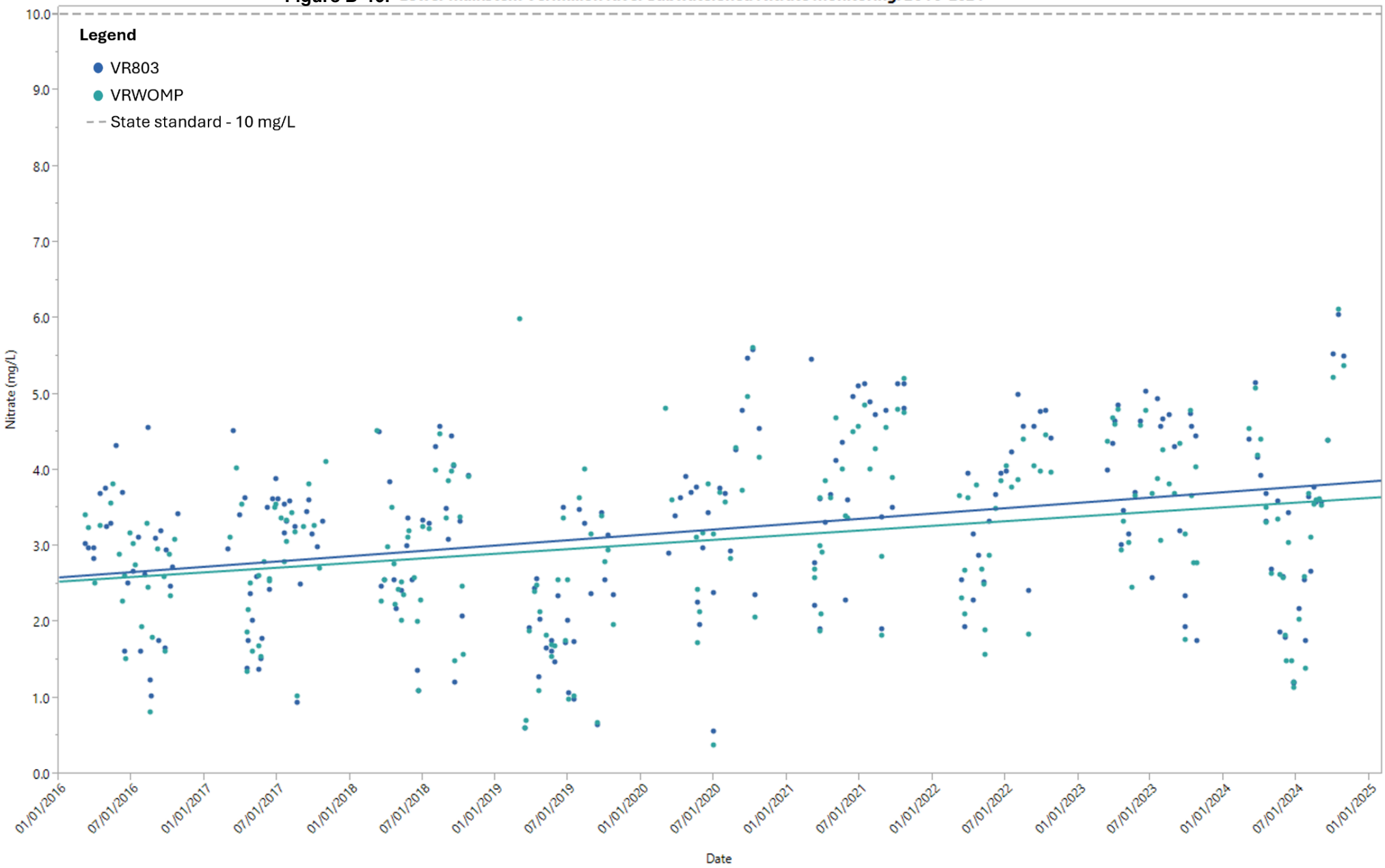
Lower mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR803 and VRWOMP (Vermillion River Watershed Outlet Monitoring Program site in Vermillion Falls Park in Hastings).

Figure B-45: Lower Mainstem Vermillion River Subwatershed Total Phosphorus Monitoring: 2016-2024



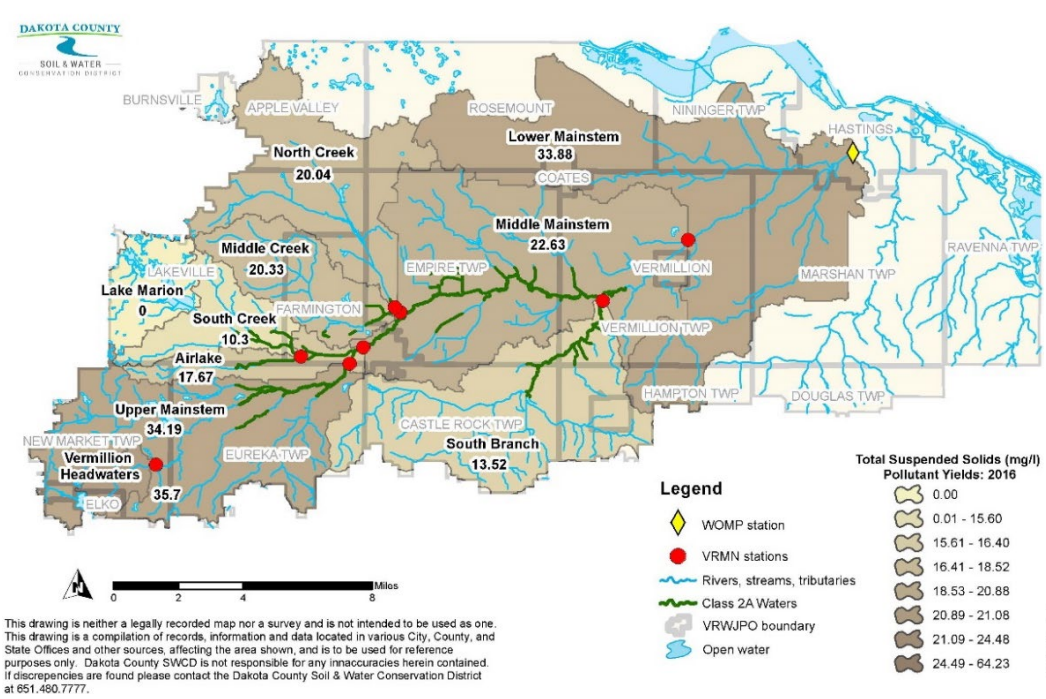
Lower mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR803 and VRWOMP (Vermillion River Watershed Outlet Monitoring Program site in Vermillion Falls Park in Hastings).

Figure B-46: Lower Mainstem Vermillion River Subwatershed Nitrate Monitoring: 2016-2024



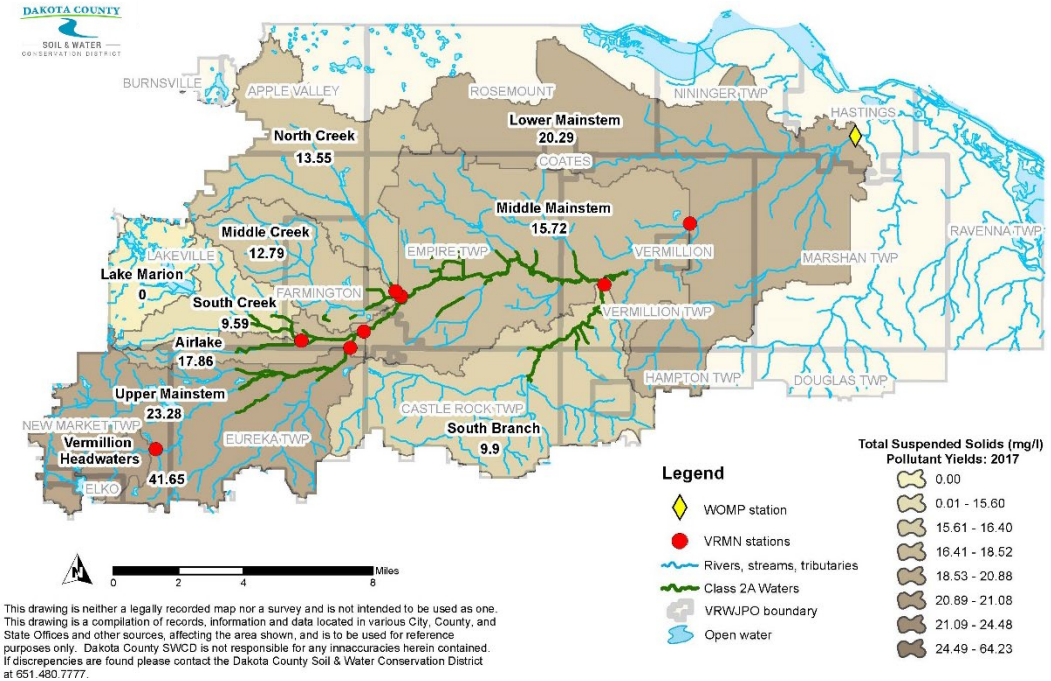
Lower mainstem monitoring for the Vermillion River Monitoring Network is conducted at VR803 and VRWOMP (Vermillion River Watershed Outlet Monitoring Program site in Vermillion Falls Park in Hastings).

Figure B-47: VRMN Subwatershed TSS Pollutant Yields: 2016



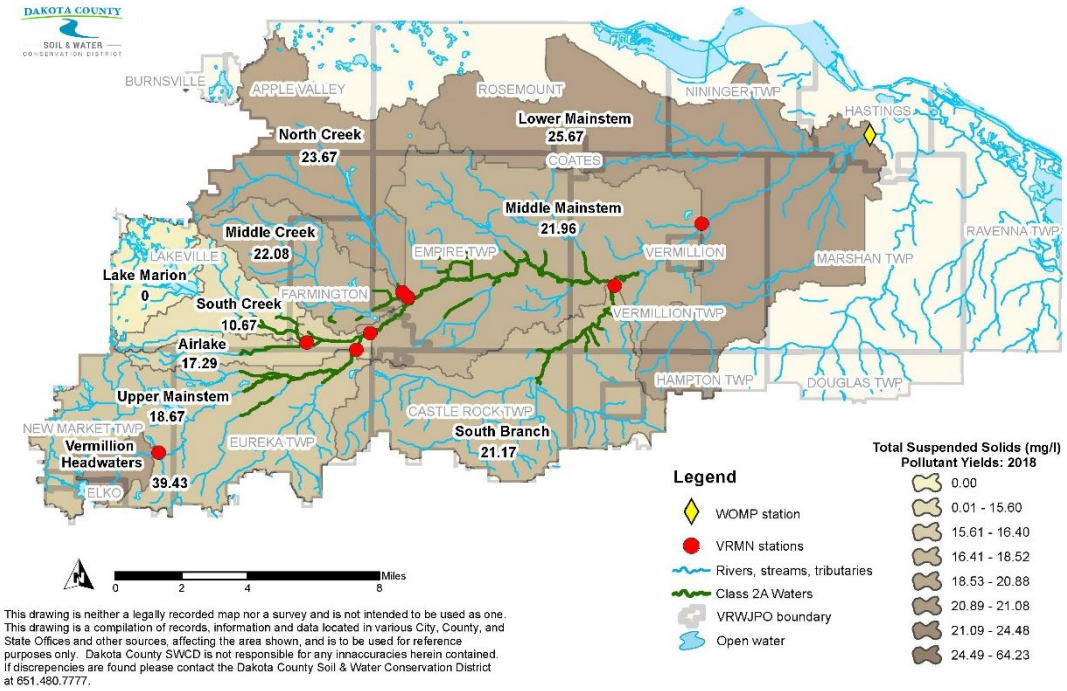
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Figure B-48: VRMN Subwatershed TSS Pollutant Yields: 2017



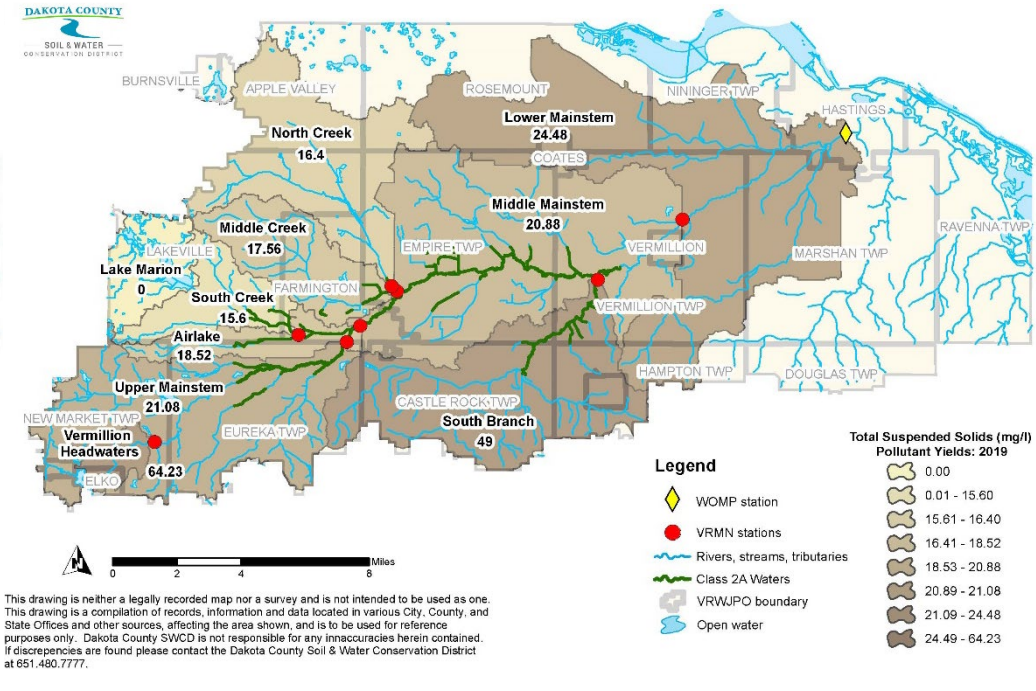
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Figure B-49: VRMN Subwatershed TSS Pollutant Yields: 2018



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Figure B-50: VRMN Subwatershed TSS Pollutant Yields: 2019



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Figure B-51: VRMN Subwatershed TSS Pollutant Yields: 2020

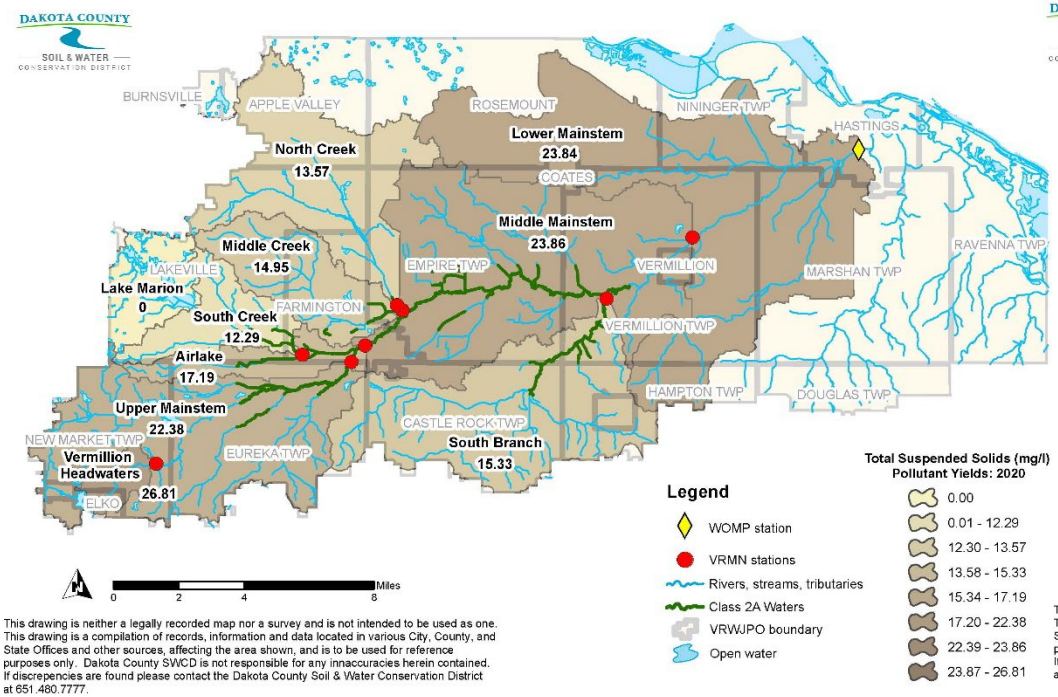


Figure B-52: VRMN Subwatershed TSS Pollutant Yields: 2021

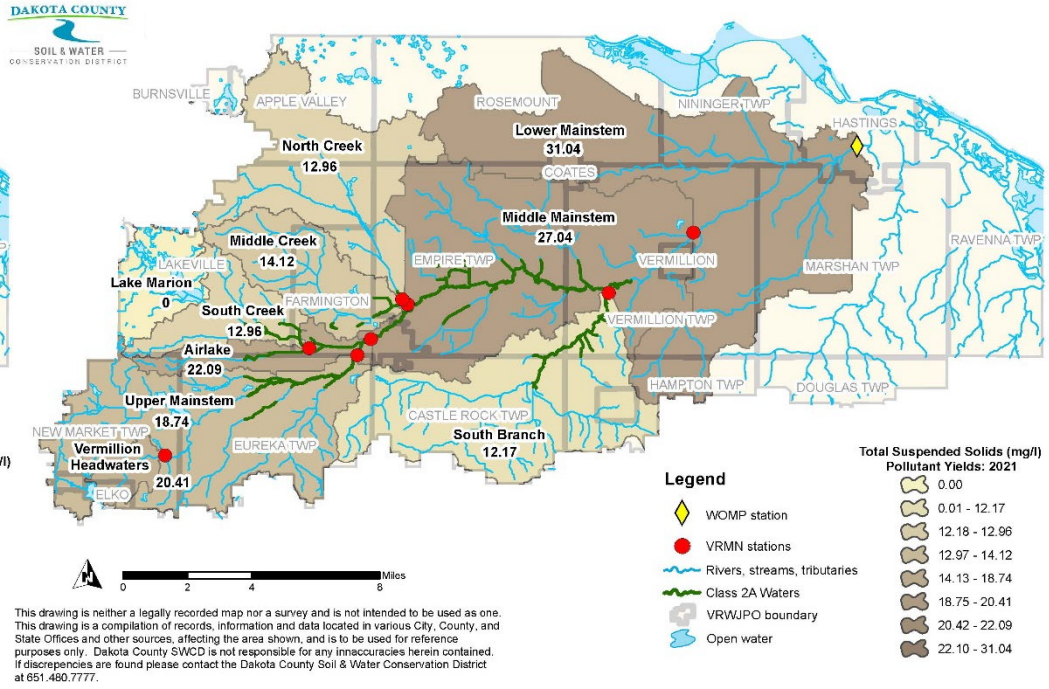
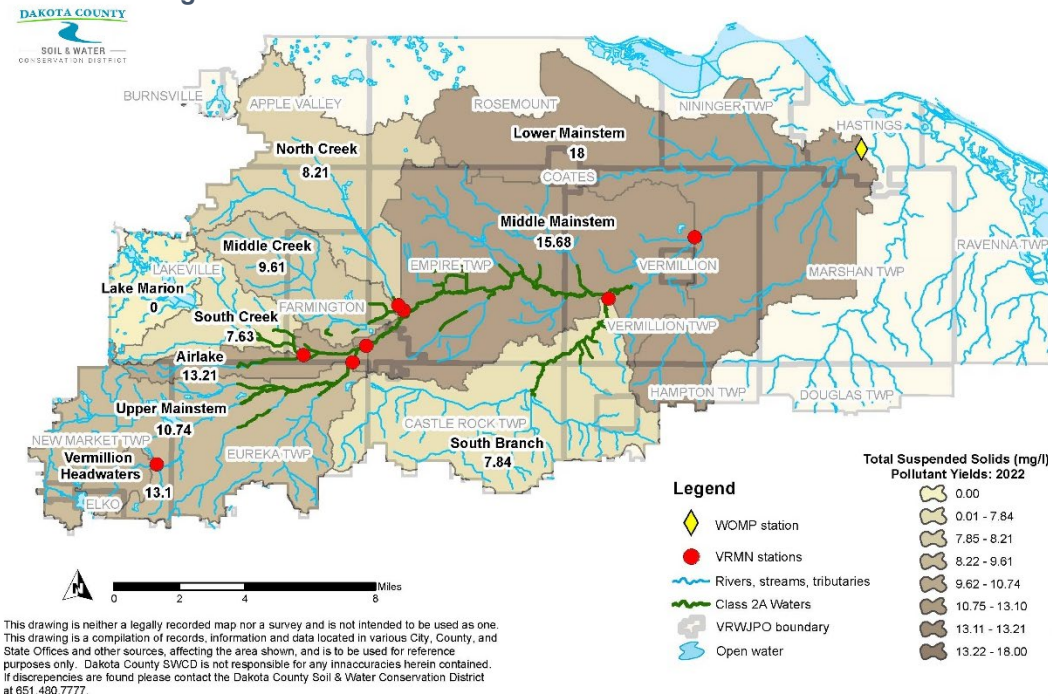
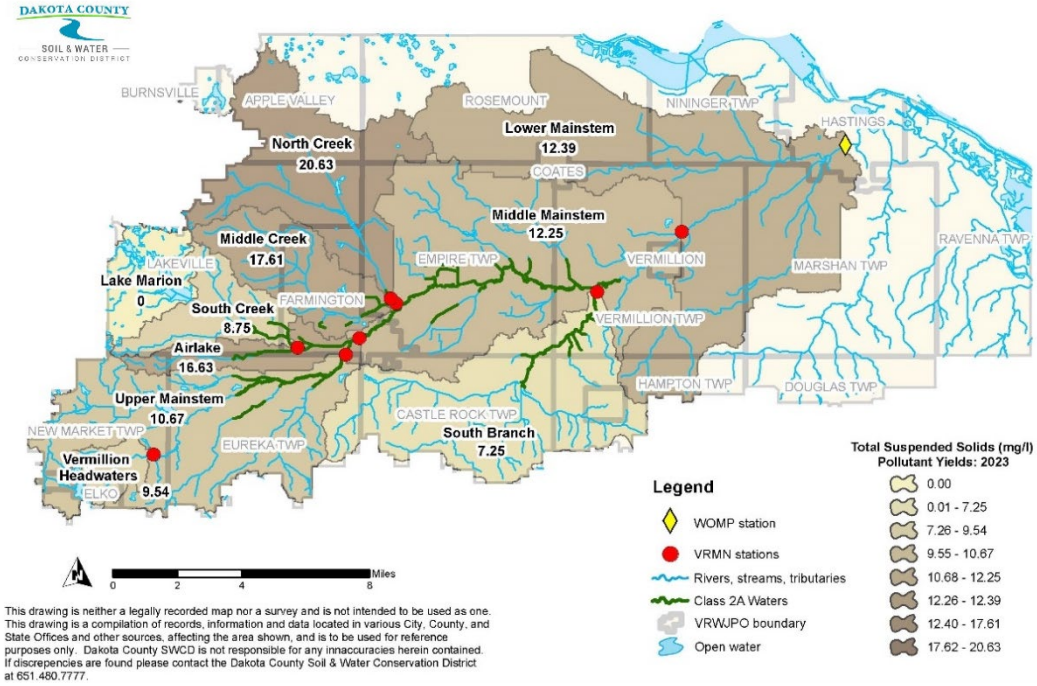


Figure B-53: VRMN Subwatershed TSS Pollutant Yields: 2022



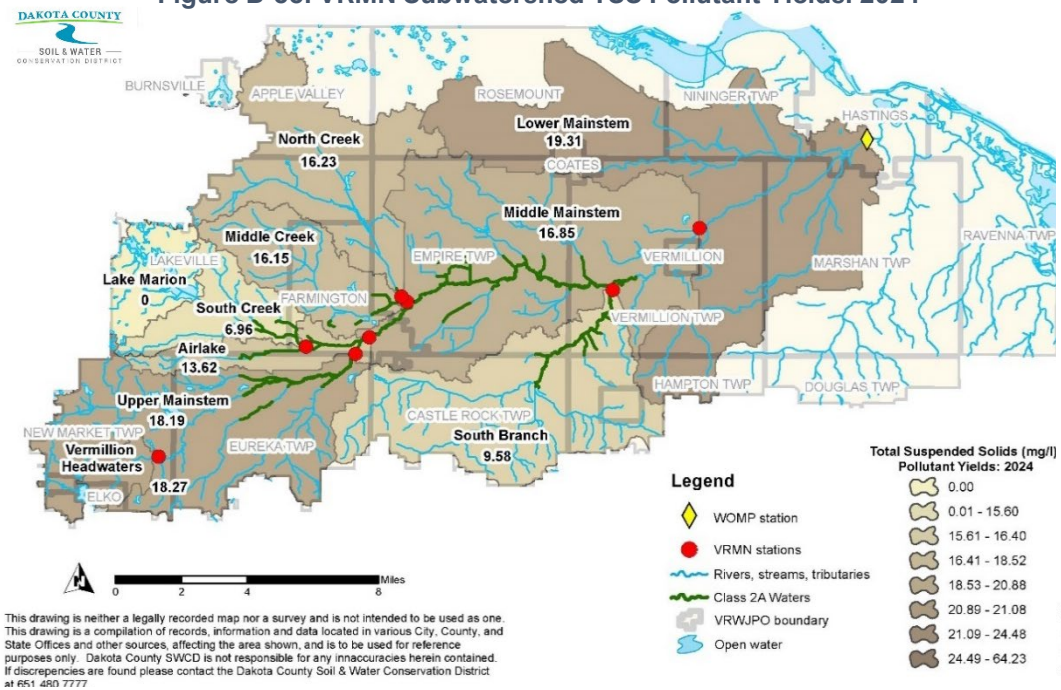
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Figure B-54: VRMN Subwatershed TSS Pollutant Yields: 2023



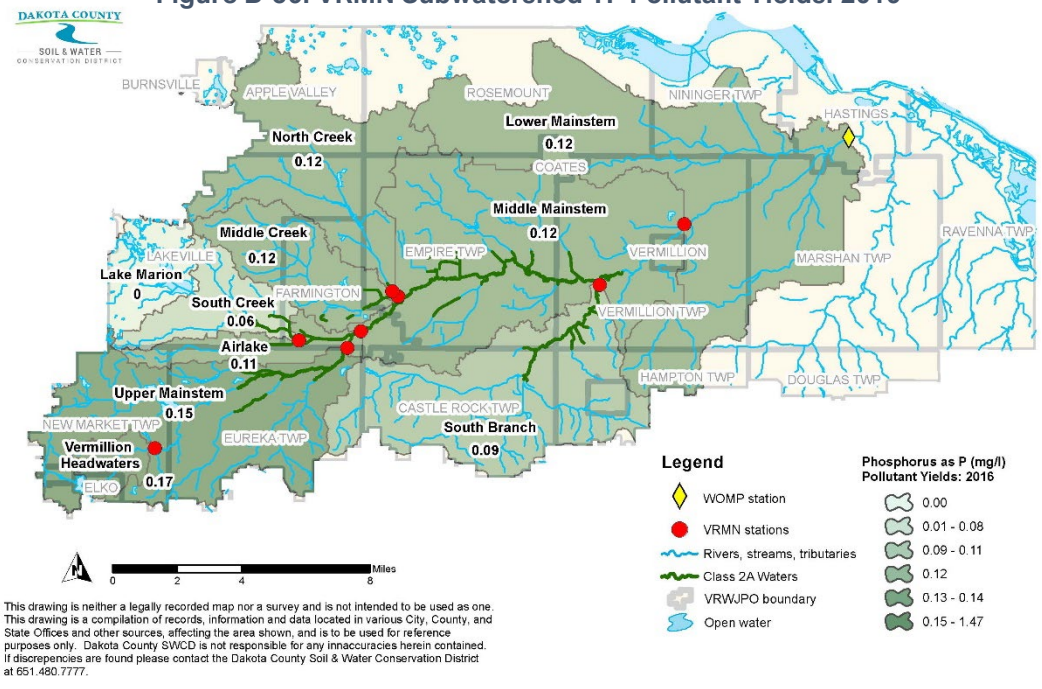
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Figure B-55: VRMN Subwatershed TSS Pollutant Yields: 2024



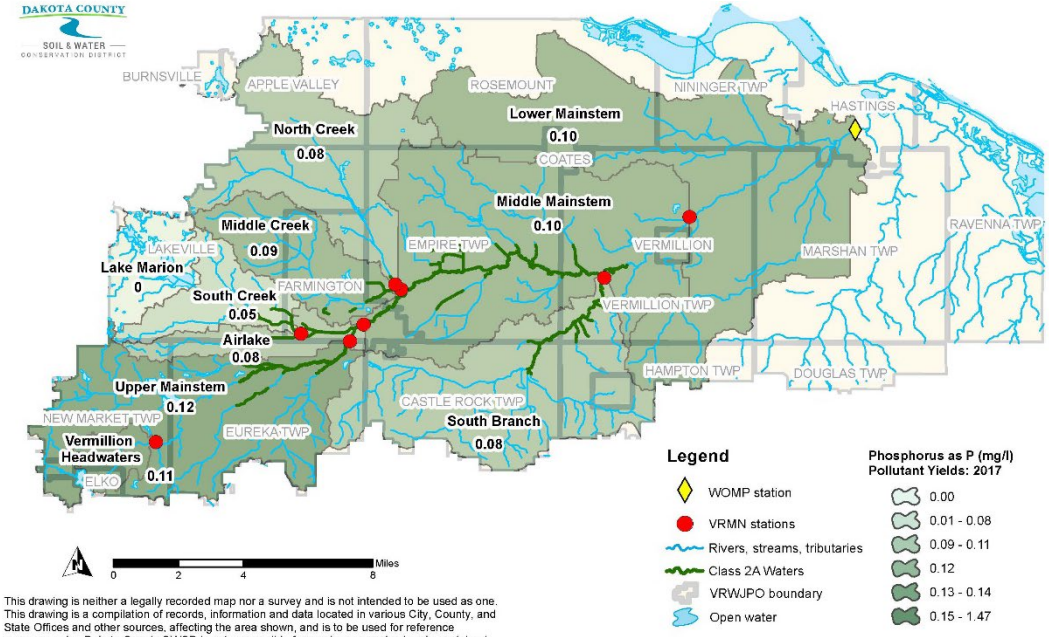
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Figure B-56: VRMN Subwatershed TP Pollutant Yields: 2016



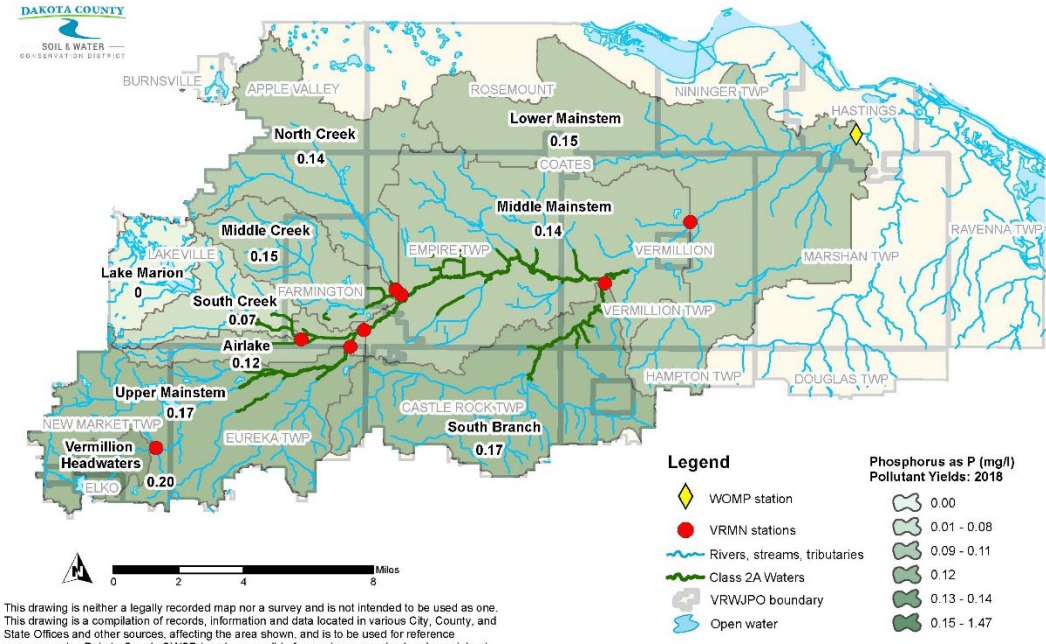
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Figure B-57: VRMN Subwatershed TP Pollutant Yields: 2017



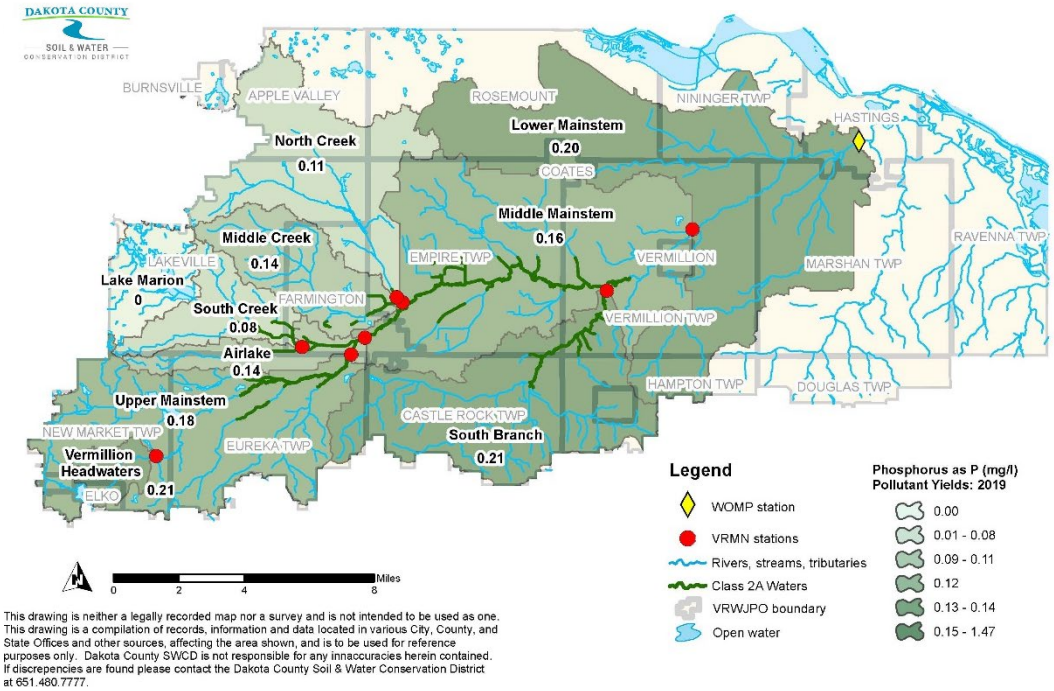
This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data located in various City, County, and State Offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County SWCD is not responsible for any innaccuracies herein contained. If discrepencies are found please contact the Dakota County Soil & Water Conservation District at 651.480.7777.

Figure B-58: VRMN Subwatershed TP Pollutant Yields: 2018



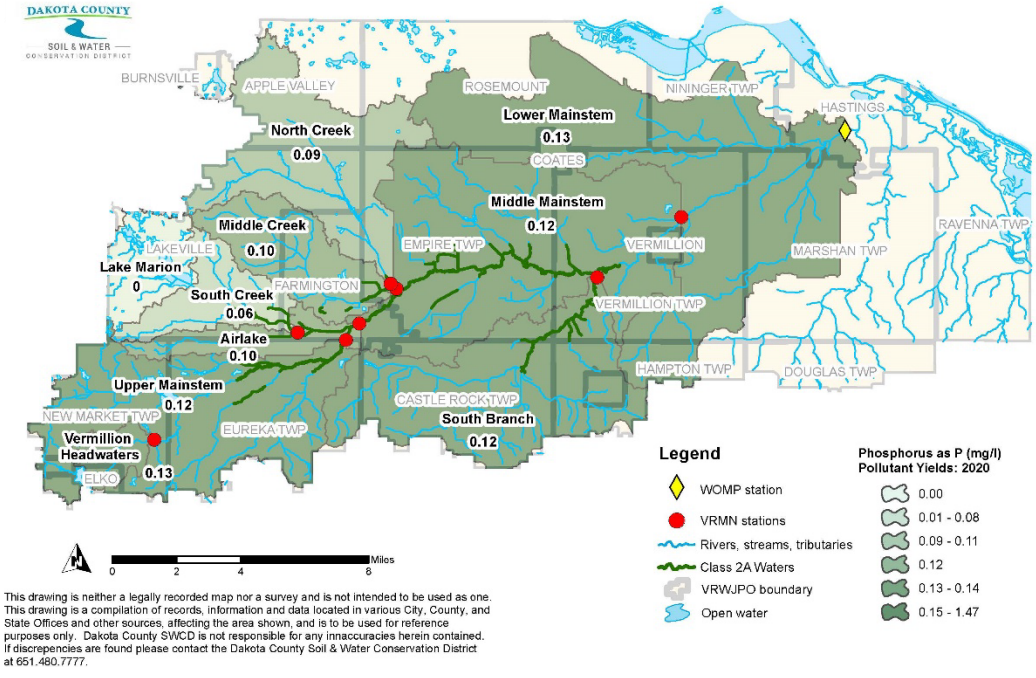
This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data located in various City, County, and State Offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County SWCD is not responsible for any innaccuracies herein contained. If discrepencies are found please contact the Dakota County Soil & Water Conservation District at 651.480.7777.

Figure B-59: VRMN Subwatershed TP Pollutant Yields: 2019



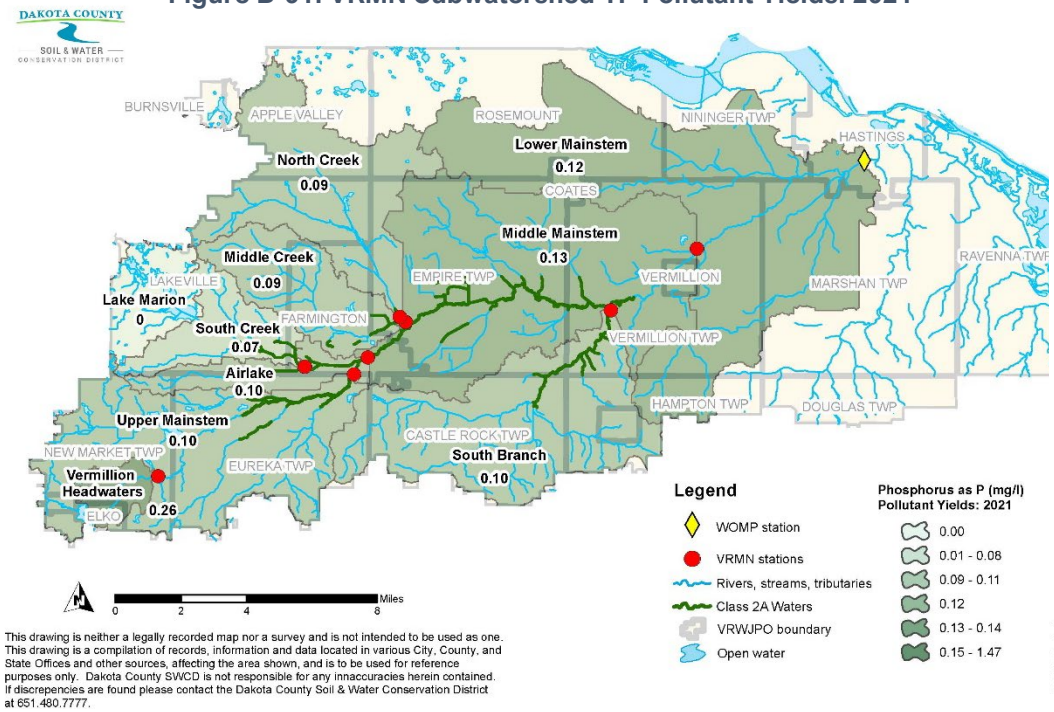
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Figure B-60: VRMN Subwatershed TP Pollutant Yields: 2020



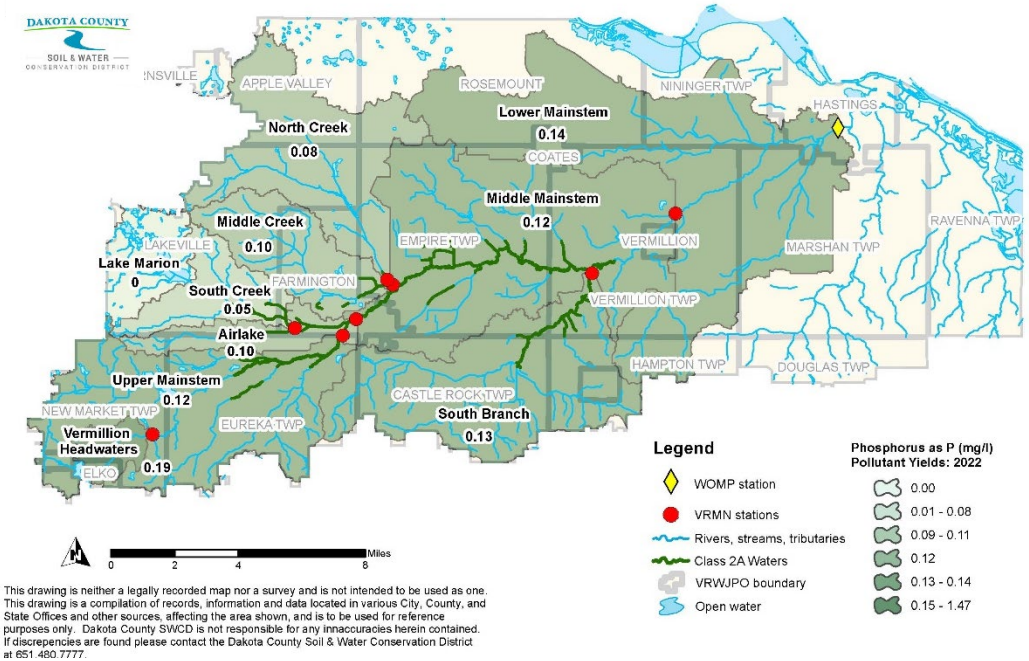
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Figure B-61: VRMN Subwatershed TP Pollutant Yields: 2021



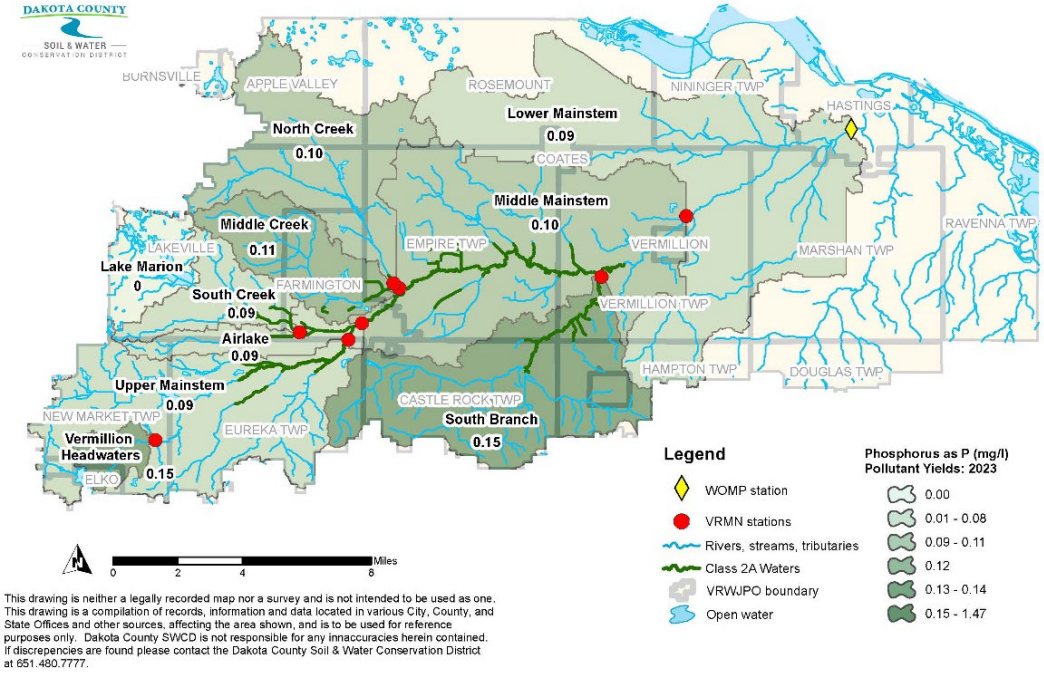
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Figure B-62: VRMN Subwatershed TP Pollutant Yields: 2022



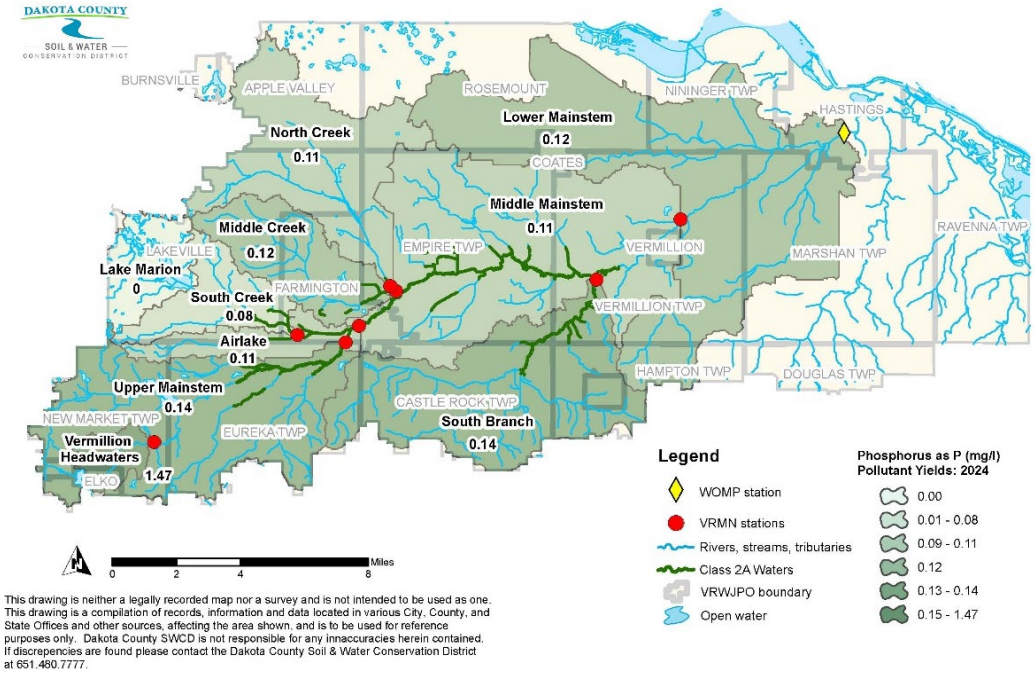
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Figure B-63: VRMN Subwatershed TP Pollutant Yields: 2023



This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data located in various City, County, and State Offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County SWCD is not responsible for any innaccuracies herein contained. If discrepencies are found please contact the Dakota County Soil & Water Conservation District at 651.480.7777.

Figure B-64: VRMN Subwatershed TP Pollutant Yields: 2024



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Figure B-65: VRMN Subwatershed Nitrate Pollutant Yields: 2016

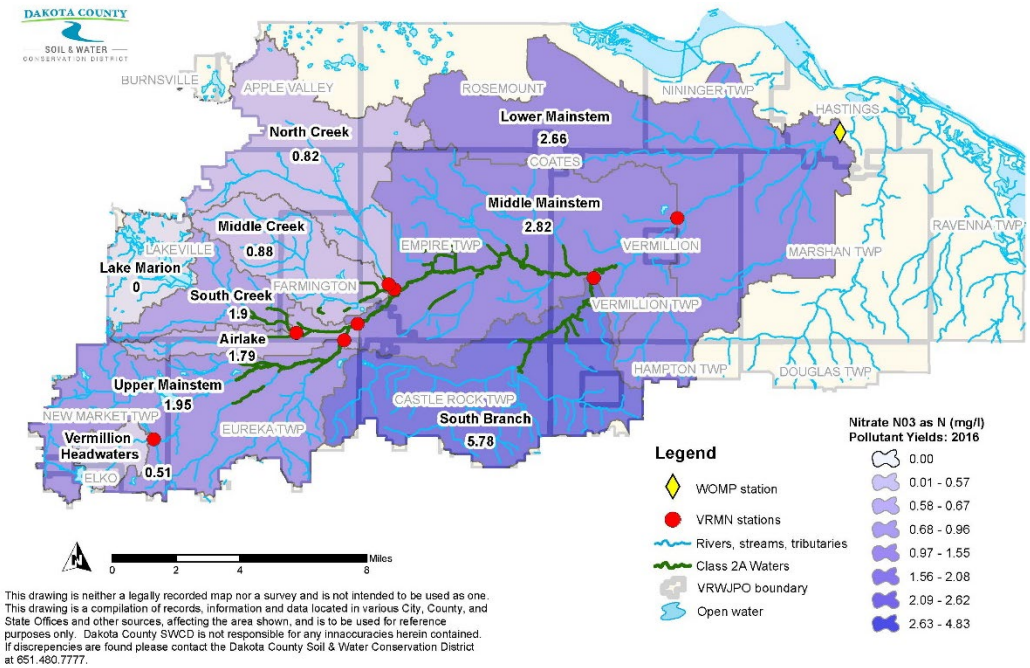


Figure B-66: VRMN Subwatershed Nitrate Pollutant Yields: 2017

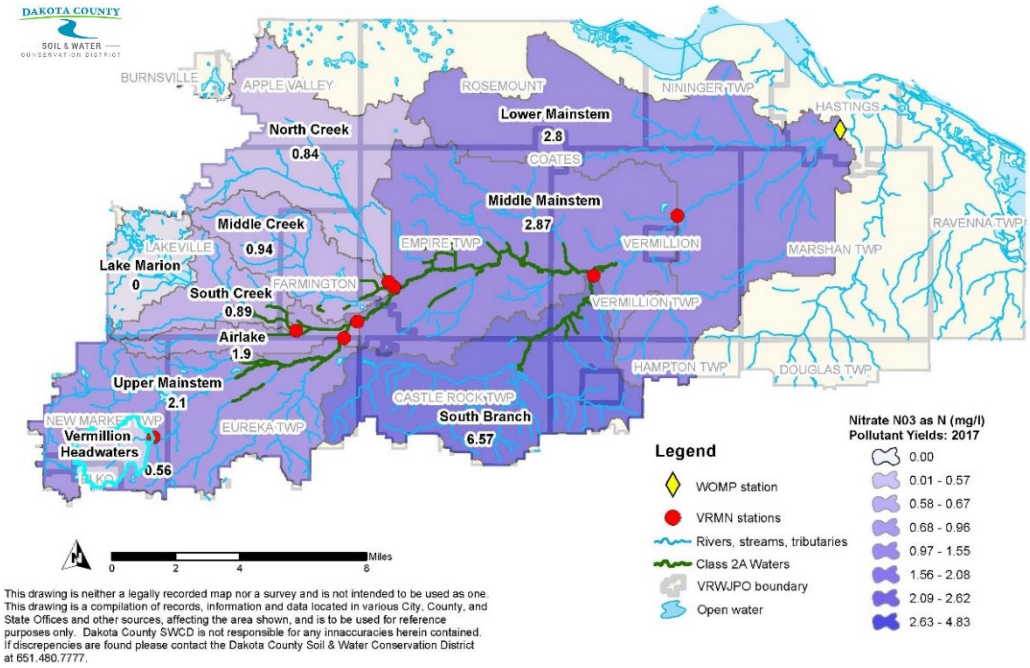
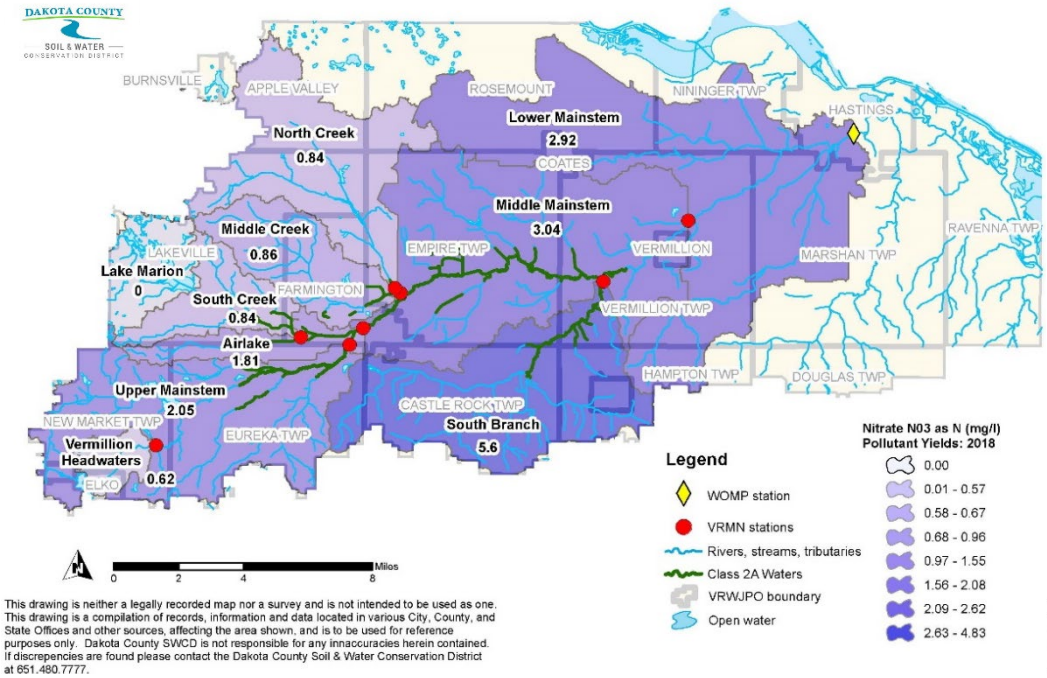
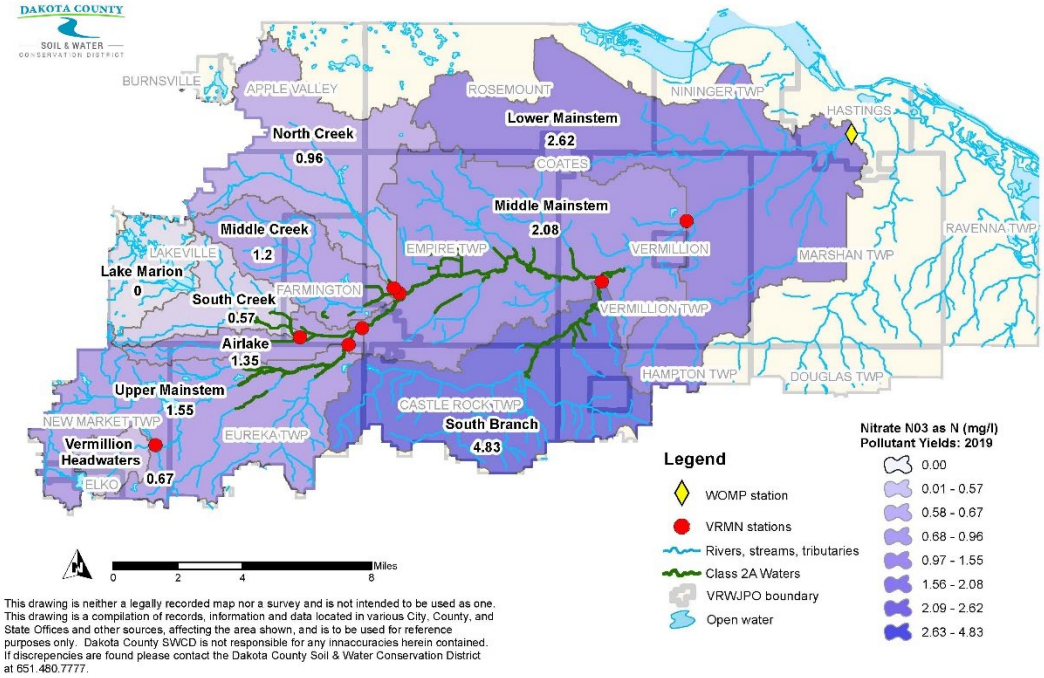


Figure B-67: VRMN Subwatershed Nitrate Pollutant Yields: 2018



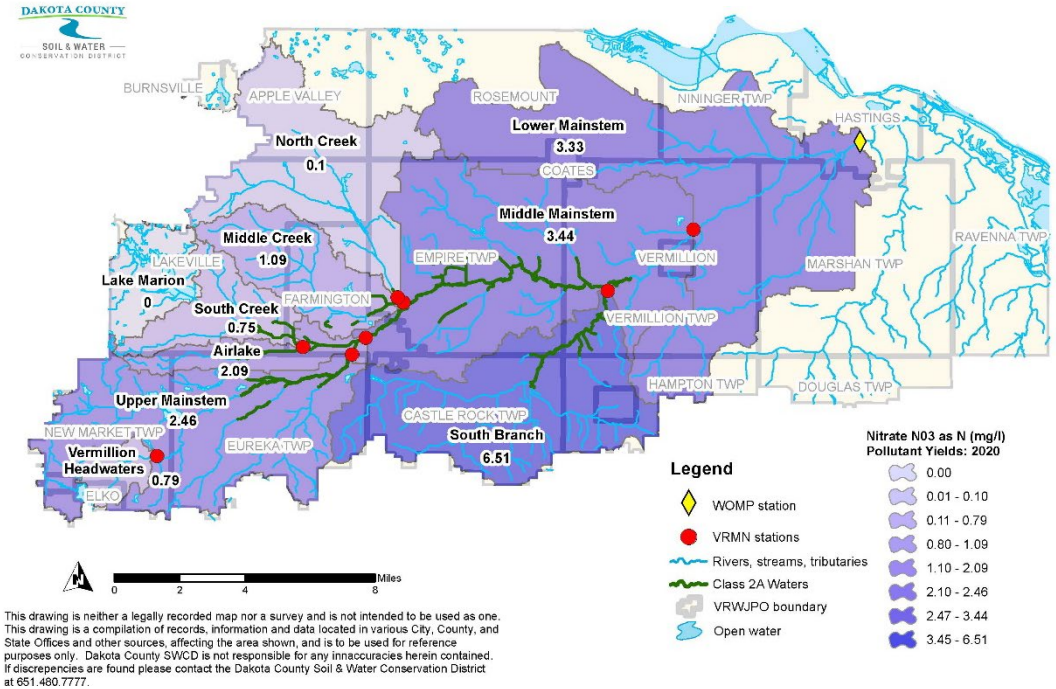
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Figure B-68: VRMN Subwatershed Nitrate Pollutant Yields: 2019



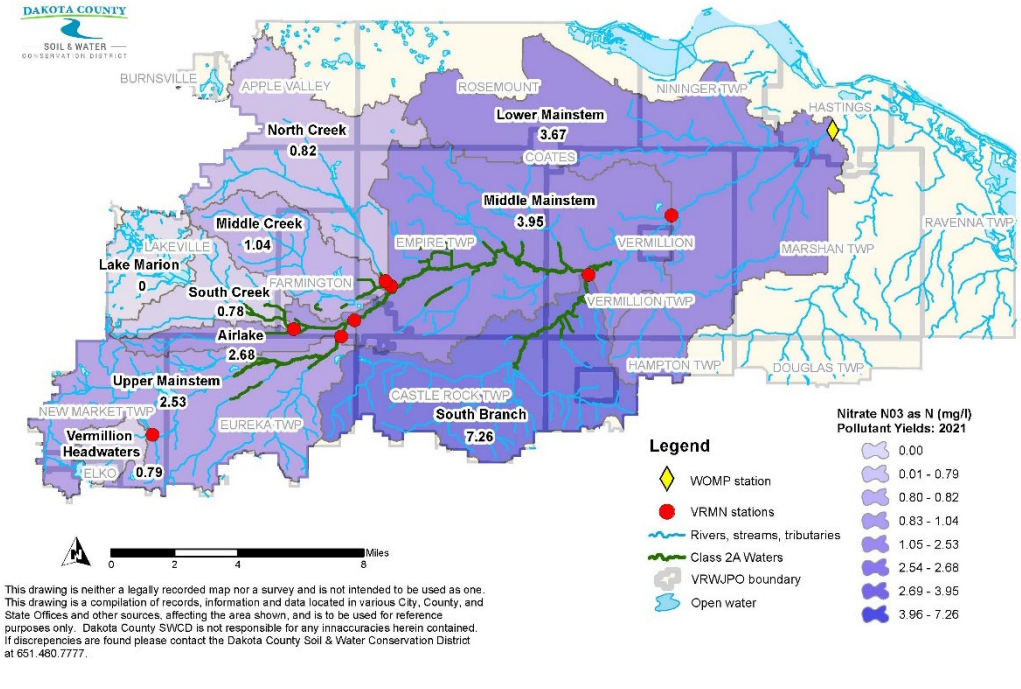
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Figure B-69: VRMN Subwatershed Nitrate Pollutant Yields: 2020



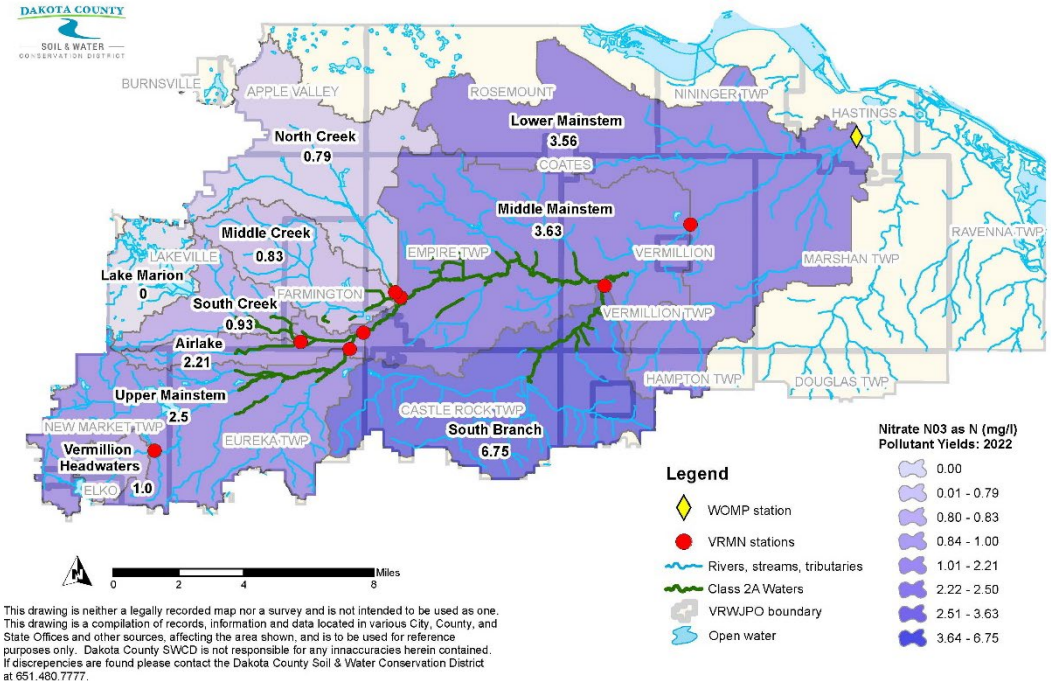
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Figure B-70: VRMN Subwatershed Nitrate Pollutant Yields: 2021



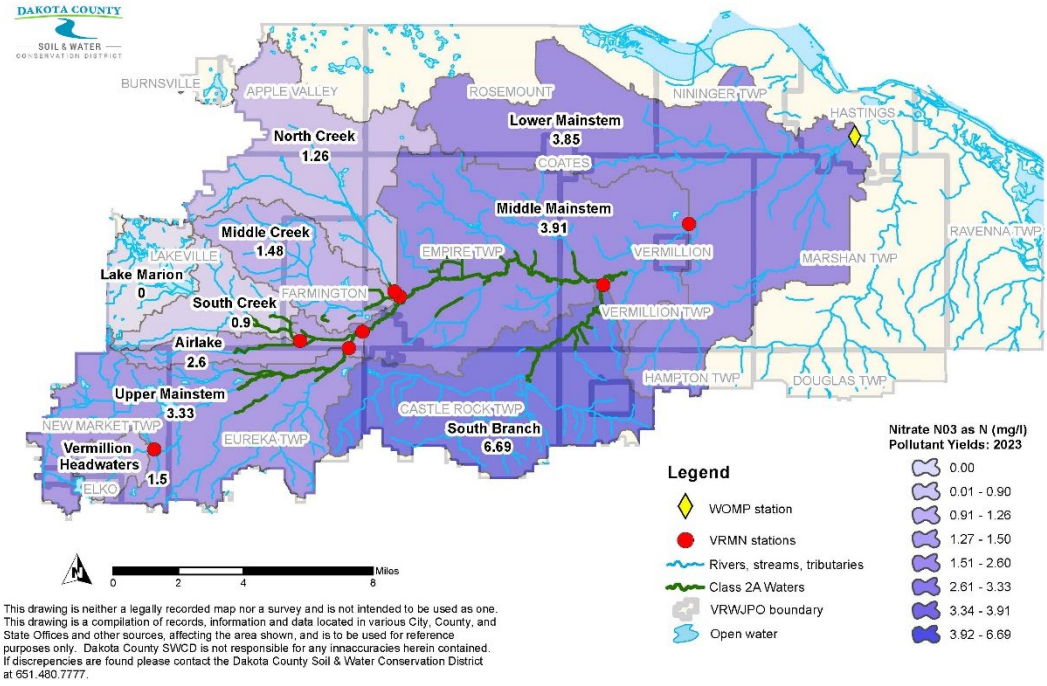
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Figure B-71: VRMN Subwatershed Nitrate Pollutant Yields: 2022



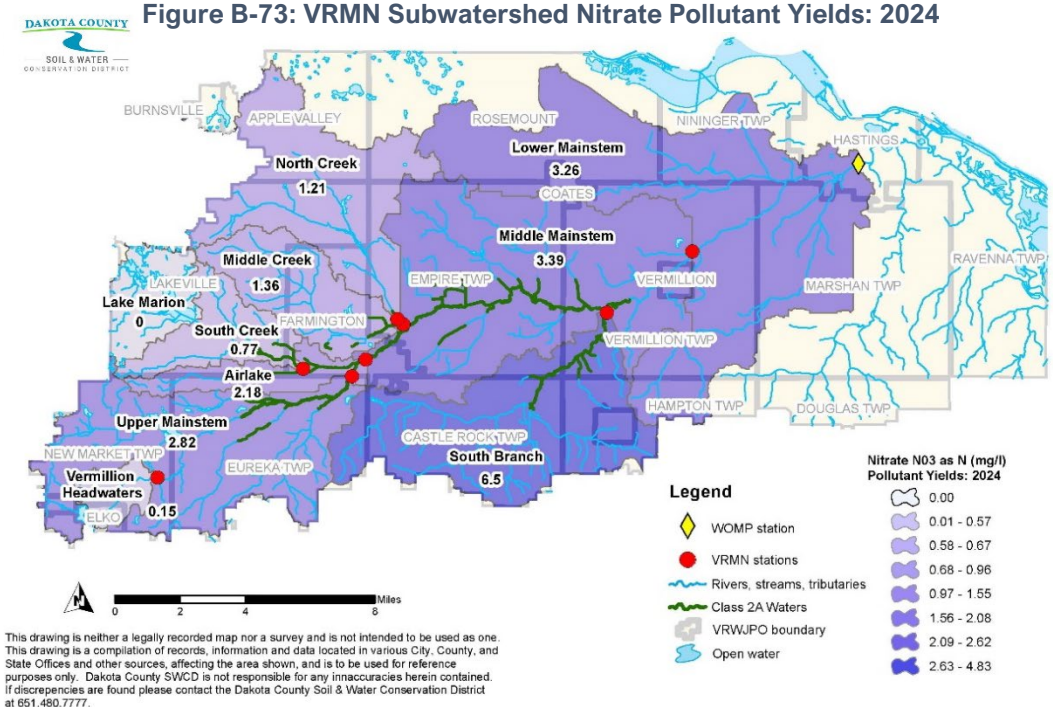
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Figure B-72: VRMN Subwatershed Nitrate Pollutant Yields: 2023



This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data located in various City, County, and State Offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County SWCD is not responsible for any innaccuracies herein contained. If discrepencies are found please contact the Dakota County Soil & Water Conservation District at 651.480.7777.

Figure B-73: VRMN Subwatershed Nitrate Pollutant Yields: 2024



This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information and data located in various City, County, and State Offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County SWCD is not responsible for any innaccuracies herein contained. If discrepencies are found please contact the Dakota County Soil & Water Conservation District at 651.480.7777.

Narratives for monitoring trends before and after MPCA's switch from the turbidity standard to the TSS standard can be found following. Summaries are high-level; for in-depth monitoring reports, visit the Vermillion River Watershed monitoring webpage.

2000 – 2013 Monitoring Protocols and Trends

In addition to logging monitoring results, as a part of the VRMN data analyses staff calculated pollutant loading via the FLUX stream load computation tool (2006-2011) and by calculating the Flow-Weighted Mean Concentration (2012-2013). A pollutant load is the total mass of a particular pollutant that flows through a monitoring station over a given period. Calculated loads were then divided by the area of the associated subwatershed to provide a pollutant yield (pollutant load per acre), allowing staff to geographically target areas of higher yield.

- From 2000 – 2013, monitoring stations generally met state turbidity standards during baseflow conditions; however, during runoff conditions, sample medians were often not meeting the standard. In 2008, the MPCA listed a stretch of the Vermillion River as impaired for turbidity, including the VR807 and VR804 monitoring stations. To track TMDL reduction, two automated turbidity probes were added at these stations. During the monitoring period, the highest turbidity TSS pollutant loading was consistently from the Upper Mainstem or South Creek subwatersheds, informed by the probes and grab sampling throughout the watershed.
- TP trends during this monitoring timeframe showed a decrease in concentrations during baseflow over time, likely due to upgrades made at the Elko New Market and Empire wastewater treatment plants (WWTPs). In addition, routing of WWTP effluent was diverted from the Vermillion River to discharge directly to the Mississippi River, which resulted in lower baseflow TP concentrations. However, from 2006-2013 TP concentrations frequently did not meet state standards during runoff events. TP pollutant loading analyses began in 2012. From 2012-2013, the highest TP pollutant loading was sourced from the Middle Creek Subwatershed.
- Nitrate concentrations at all monitoring stations were all well within the state standard during baseflow. During runoff events, higher concentrations were measured but remained within the standard. However, a unique relationship was present at the SB802 (South Branch Vermillion River) monitoring station: Higher nitrate concentrations were seen at baseflow than runoff. The subwatershed draining to the station is in predominately agricultural land use and has coarse-textured soils and a high water table. The water table is often artificially lowered via tile and ditches to make agricultural production more viable, which may be why nitrate concentrations are higher during baseflow rather than during runoff.

- In 2005, the VRWJPO was awarded an EPA Targeted Watershed Grant to monitor temperature in the Vermillion River and its tributaries. Monitoring took place annually from 2005 through 2013. Temperature can be influenced by many factors, including flow volume, conductivity, TSS concentration, groundwater impacts, and anthropogenic impacts. Likely due to residential development within the South Creek and North Creek subwatersheds, stations VR807, NC808, and NC801 saw worsening trends through this monitoring period.
- The Vermillion River was listed as impaired for fecal coliform in 1998. The MPCA completed a TMDL in the Lower Mississippi River Basin for fecal coliform and, in 2004, completed a Vermillion River-specific study on the impairment. The study identified the Middle and North Creek subwatersheds as contributing unusually high concentrations. Fecal coliform concentrations consistently did not meet the state standard at all monitoring sites, with higher concentrations following precipitation events.
- In 2008, the MPCA suggested discontinuing fecal coliform monitoring and instead monitor *E. coli* for bacteria tracing. From 2006 – 2013, monitoring focused on identifying the source of bacteria loading, which remained elusive.

2014-2023 Monitoring Protocols and Trends

The VRWJPO experienced three consecutive years of drought from 2021-2023. The 2021 drought was the most severe drought in Minnesota since 1988, leading many watersheds to enter the "drought warning" designation and several into the "drought restrictive" designation, restricting certain water use activities to protect drinking water supplies. Water quality parameters can be significantly impacted by drought, especially measures such as temperature. VRWJPO monitoring results from these years reflect the drought conditions.

- For runoff events, TSS concentrations did not meet the state standard at all sites in the VRMN. However, during baseflow conditions, most sites did meet the standard. TSS concentrations at the VR804 and VR807 sites during baseflow did not meet state standards, reflecting the impairment of this reach of the river.
- TP levels generally met the state standard during baseflow, but occasionally did not during runoff events. Runoff-related increases of TP were more common during snowmelt monitoring in years with higher amounts of snowpack. There are no TP impairments in the VRMN.
- Nitrate concentrations met the state standard at all sites during the period at baseflow and runoff sampling events. Consistent with the previous monitoring period, NO_3 concentrations were higher at the SB802 station.
- All Class 2A stream monitoring stations within the VRMN consistently showed temperature maximums within the brown trout resistance range (range at which mortality can be observed) during all summer months. Highest temperatures were generally observed in July. However, median temperatures were observed toggling between the optimum and tolerance ranges for brown trout, depending on seasonal fluctuations. August median temperatures were lower at SC806 and SB802 sites, which could be attributed to cool groundwater contributions.
- *E. coli* concentrations not meeting the state standard were observed at all sites during baseflow and runoff events throughout this timeframe. Consistently high concentrations suggest a potential animal or septic source.
    - In 2016, SSWCD staff began further source monitoring focused on and around the VR24 monitoring station, which showed concentrations markedly higher than other sites. Source monitoring involved: adding nearby monitoring sites within potential hotspot areas; environmental DNA

sampling to determine if the source was from a human or animal source; and considering other potential monitoring locations.

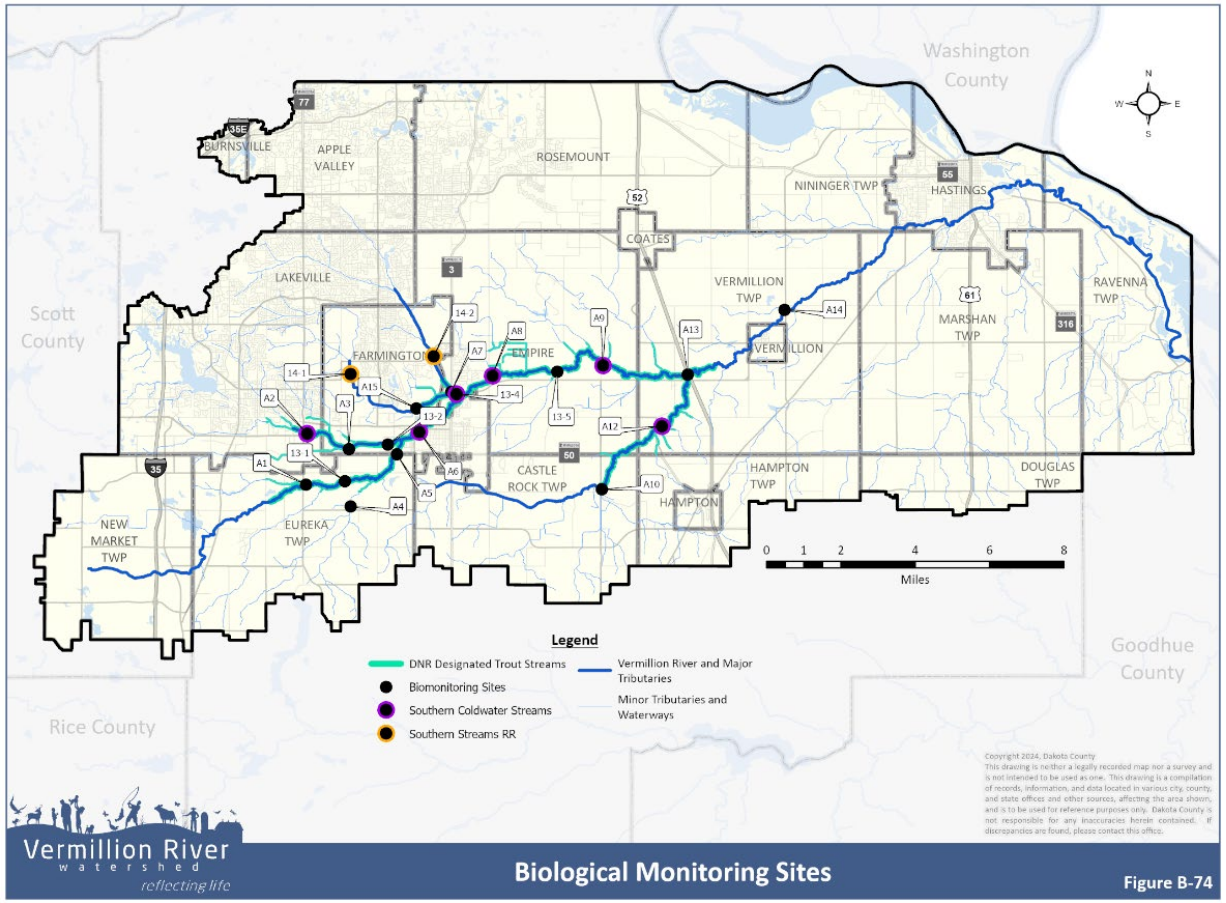
- After collecting eight years of source identification data, SSWCD offered septic upgrade incentives in hopes of addressing some pollutant load that may be originating from failing septic systems. VRWJPO and partners continue to target potential E. coli improvements based on collected data.

Biological Monitoring – Vermillion River Monitoring Network

In 2008, the Vermillion River Biomonitoring Plan (VRBP) was created to define the scope and procedures for evaluating biological health in the VRWJPO, with six goals:

1. Characterize the current biological conditions of the Vermillion River and its tributaries to evaluate attainment of the beneficial uses
2. Establish appropriate biological indicators for the coldwater, warmwater, Mainstem, and tributary reaches of the Vermillion River
3. Delineate coldwater and warmwater communities in the Vermillion River
4. Assess long-term biological changes and trends in the condition of the Vermillion River including responses to urbanization and channel restoration
5. Provide a framework for determining the impact of policies and regulations on water quality and biotic health
6. Identify appropriate management and restoration objectives

Since 2009, VRWJPO has assessed the numbers and types of fish and aquatic macroinvertebrates in the water, as well as aquatic habitat, at 14 sites (*Figure B-74*), in accordance with the VRBP. Aquatic macroinvertebrates are organisms that lack backbones (e.g. snails, mayflies, dragonflies, beetles) that live on substrates within the water (sediment, debris, logs, or plants) for parts of their life cycles. Populations and diversity of aquatic macroinvertebrates and fish species change in predictable ways with water quality. Some species can tolerate poor water quality, while others can only survive in clean water.



Sampling took place annually during a consistent time frame and was associated with recruitment cycles of organisms. The State of Minnesota defines the optimal time frame for aquatic macroinvertebrate sampling as between August 1 – September 30. For fish, the optimal sampling period is mid-June to mid-September. Aquatic macroinvertebrate and habitat assessments took place at all sites where fish sampling was conducted.

The VRWJPO followed MPCA standards when sampling fish and aquatic macroinvertebrates. Generally, fish sampling included collecting fish, sorting by species, weighing and measuring all fish, and returning them to the stream. Macroinvertebrates were collected using a multihabitat method, collecting organisms from each of the stream's representative habitats in a stream reach. Samples were then subsampled to 300 organisms and identified to the genus level.

Upon evaluating and quantifying the collected fish and aquatic macroinvertebrates, the MPCA calculates a score for the monitoring site under an index of biological integrity (IBI), a measure to determine if a biological community is impaired. The MPCA calculates the VRWJPO's IBI scores with the following goals:

1. Measure water quality and the health of its biological communities
2. Diagnose the type of stressors in a waterbody
3. Define management approaches to protect and restore the water's biological communities
4. Evaluate the effectiveness of protection and restoration activities

All sites were monitored each year from 2009-2015. In 2016, the dataset was analyzed to determine intra- and inter-annual variation and appropriate sampling frequency for future biological monitoring. Based on the analysis, staff began monitoring some sites once every two years and others once every three years. For comprehensive monitoring reports, visit the VRWJPO Monitoring webpage. Findings of note from 2009-2024 include:

- From 2009-2011, while precipitation patterns and mean temperatures fluctuated, aquatic macroinvertebrate results were consistent. Yet, macroinvertebrate IBI values failed to meet standards for all sites, resulting in numerous impairments.
- From 2009-2013, there was high variability in fish IBI scores at the nine long-term sites in the Southern Coldwater Stream (2A) MPCA IBI category, with some years meeting and some not meeting the impairment threshold. However, in most years, the coldwater reaches generally met the standard.
- From 2010-2016, the 14-1 site, one of two monitoring sites in the Southern Headwater Streams MPCA IBI category, received consistently high fish IBI scores.
- From 2010-2022, site A-14, the other monitoring site in the Southern Headwater Streams category, stayed in a stable habitat score range from "fair" to "good".
- From 2012-2020, aquatic macroinvertebrate and habitat assessment scores remained "fair," which is lower than desired. Recommendations for improvements to overall stream habitat (fish cover, channel sinuosity, channel substrate) were included in monitoring reports these years.
- In 2014, streams in the warmwater (2B) Southern Streams category set record highs for numbers of fish sampled. However, in 2015 and 2016, those sites set record lows.
- In 2020, six of the ten coldwater monitoring sites received the highest observed fish IBI scores on record, with a range of three to twelve years of data collection.
- In 2021, aquatic macroinvertebrate and habitat scores were found to be "good" or "fair" for most sites, showing signs of potential improvement compared to previous years. The same year, four of the five monitored coldwater stream sites

received fish IBI scores above the general use threshold, one of the best yearly results for the fish monitoring program.

- In 2022-2023, most macroinvertebrate and habitat scores were "poor" or "fair". Drought conditions and lower water levels likely contributed to lower-than-usual scores.
- As brown trout are not native to the Vermillion River, coldwater sites have consistently received low scores for metrics on native coldwater fish species. This led staff to question the applicability of established IBI standards within coldwater reaches in the watershed.
- In 2024, brook trout were captured for the first time at two coldwater sites due to recent stocking efforts by DNR. However, native coldwater fish species may remain a limiting factor on fish IBI scores in the watershed.

Water Quantity Monitoring Sites – Vermillion River Monitoring Network

The VRWJPO works with the DNR to monitor stream water quantity in order to track potential impacts to the Vermillion River from groundwater withdrawals via DNR appropriations permits. Partnerships with the USGS and Metropolitan Council allow quantification of stream flow trends at other locations. The VRWJPO receives data from three real-time monitoring stations – one operated by DNR, one by the USGS, and one by the Metropolitan Council. These stations show flow trends within the Upper Mainstem, Middle Mainstem, and Lower Mainstem subwatersheds.

Vermillion River at Lakeville, CR23 (DNR)

The pressure sensor/datalogger for this monitoring station was installed on April 15, 2015, for the purpose of stream gaging. DNR staff collect stage data, take flow measurements, and compile data for the VRWJPO and partners. The station drains 13,254 acres within the Upper Mainstem subwatershed and collects data at 15-minute intervals.

The site saw a gradual increase in stream stage from 2015-2020, with a fall in stream stage from 2021-2024. Three years of drought from 2021-2023 likely impacted stream levels during this monitoring period. A time series graph of stream stage at this station from the DNR's Cooperative Stream Gaging Program can be seen in *Figure B-75*.

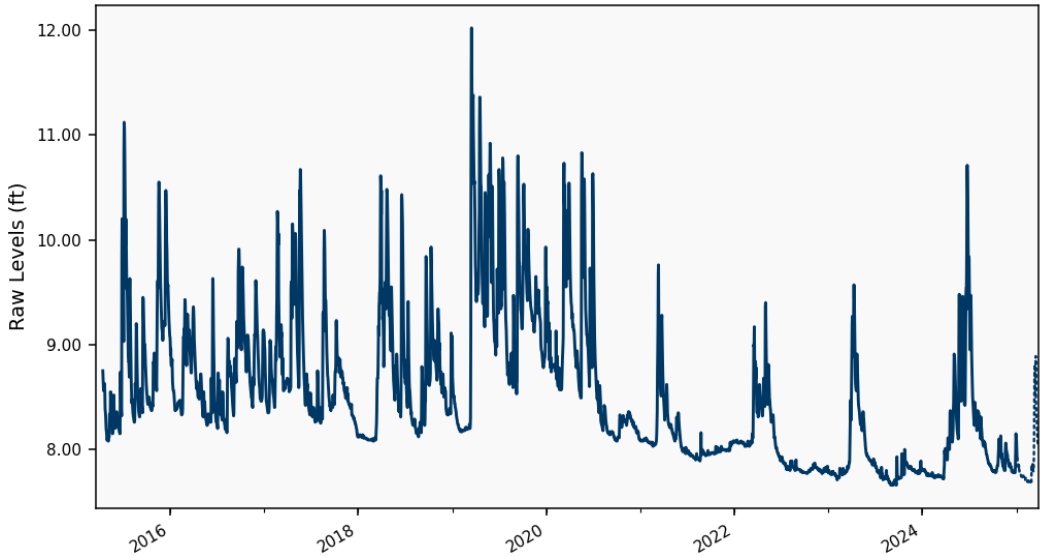


Figure B-75: Vermillion River at Lakeville Stream Stage (in feet), 2015-2025

A time series graph of discharge at this station over the same period can be seen in *Figure B-76*.

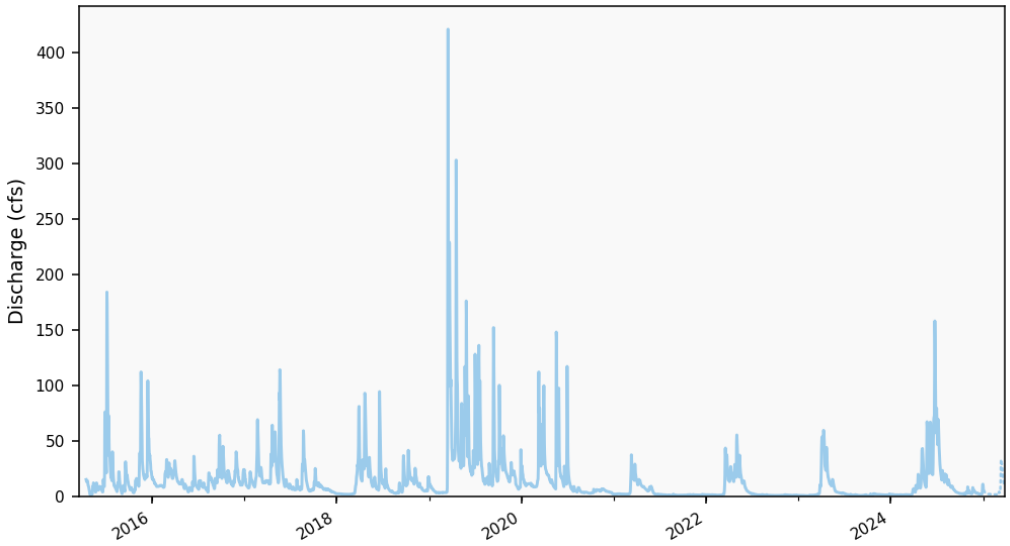


Figure B-76: Vermillion River at Lakeville stream discharge rate (cubic feet per second), 2015-2025

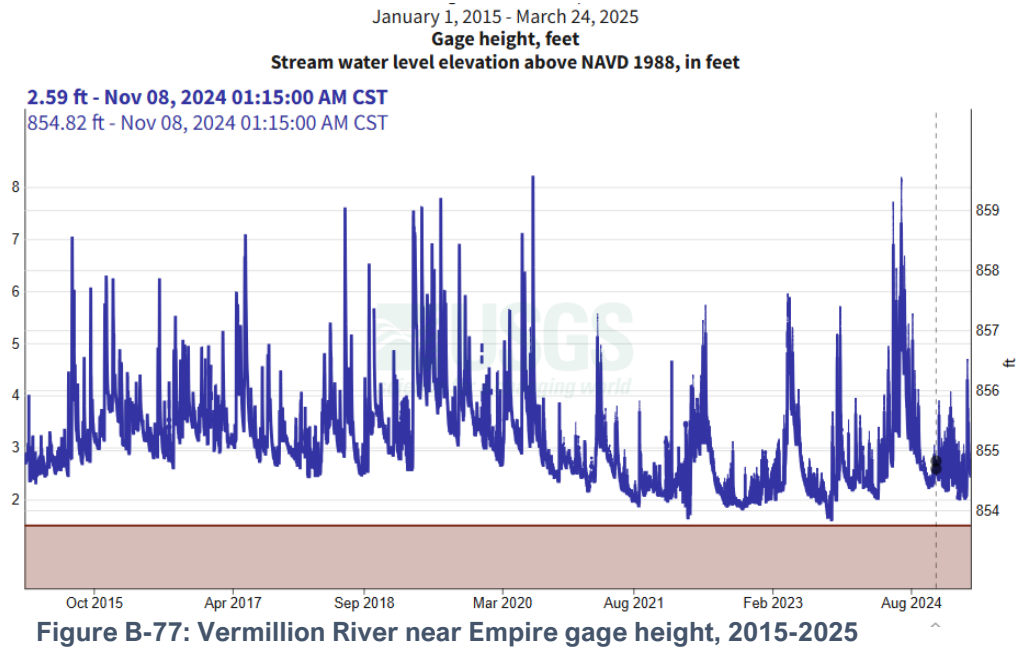


Figure B-77: Vermillion River near Empire gage height, 2015-2025

Vermillion River near Empire, 05345000 (USGS)

The VRWJPO provides cost-share for the operation of the USGS gaging station located along Blaine Ave. in Empire. The station has the longest continuous record of discharge within the watershed, with some data types dating back to 1942. The station drains 82,560 acres within the Middle Mainstem and upstream subwatersheds. Data is logged at 15-minute intervals and logs stage and flow measurements.

From 2015-2025, the river saw a similar trend as the Lakeville monitoring station. Generally, the river increased in stage height gradually from 2015-2020, followed by a decrease from 2021-2023 due to drought. A wet spring in 2024 brought the river to near normal stage.

A time series graph of continuous data relating to river stage obtained from the USGS' monitoring website can be seen in *Figure B-77*.

A time series graph of discharge occurring over the same period can be seen in *Figure B-78 (following page).*

USGS also calculates daily site statistics for discharge, communicating low, medium, high, mean, and percentiles based on 53 years of data. These results, which vary depending on date of query, are as follows:

Statistics for March 24, 2025 based on 53 years of data

Streamflow, ft^3/s

low (2013)	25th percentile	median	75th percentile	mean	high (2011)
23.6 ft3/s	58 ft3/s	84 ft3/s	120 ft3/s	118 ft3/s	643 ft3/s

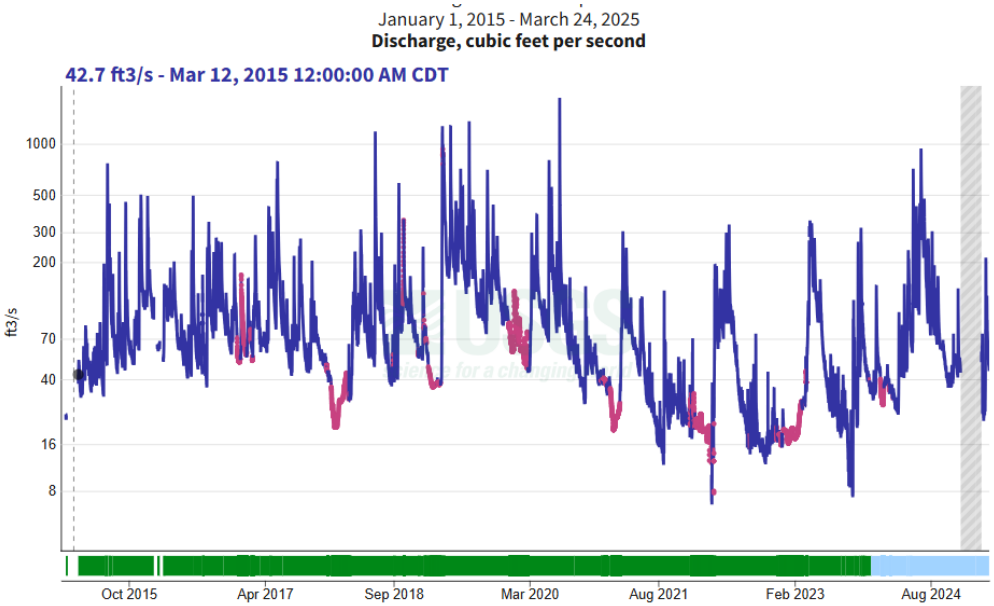


Figure B-78: Vermillion River near Empire discharge rate, 2015-2025

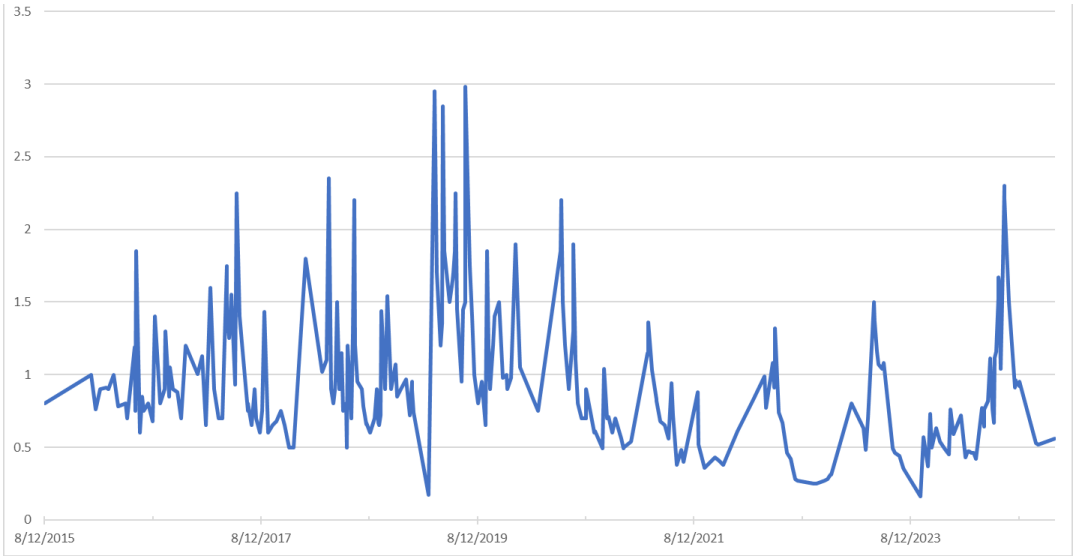


Figure B-79: Vermillion River at Vermillion Falls Stage Height, 2015-2025

Vermillion River at Vermillion Falls in Hastings

The Metropolitan Council oversees the Watershed Outlet Monitoring Program (WOMP), a series of 20 long-term, automated stream and tributary monitoring stations across the Twin Cities Metro Area. Stage height, discharge, temperature, and specific conductance are routinely monitored. The VRWJPO's WOMP station is located at the Vermillion Falls in Hastings and has logged data since 1995.

Over the 2015-2025 monitoring period, the gage at the Vermillion Falls station followed a similar pattern to other stations, showing an increase in stage height from 2015-2020, then a decrease during the 2021-2023 drought (*Figure B-79*). Another factor that may contribute to decreased stage height is that the Vermillion River is a losing stream between the City of Vermillion and the Falls. *This is detailed in Subsection B-10.*

Lake Water Quality Monitoring

The VRWJPO does not oversee lake water quality monitoring. However, the Metropolitan Council CAMP has collected extensive data on seven VRWJPO lakes: Alimagnet Lake, East Lake, Farquar Lake, Lake Marion, Lake Rebecca, Long Lake, and Valley Lake. The CAMP, sponsored by partnering municipalities, empowers community scientists and governmental organizations to collect bi-weekly lake water samples to be analyzed in the Metropolitan Council Environmental Services lab, which are paired with temperature and clarity data for annual lake assessments.

Monitoring trends for TP and transparency for six lakes* can be found in graphs on pages 67-69 (*Figures 80-91*). Long-term monitoring reports and annual assessments can be found on the Council's Lake and Monitoring Assessment page.

Table B-6: CAMP Lake Water Quality Trends 2007-2024

Lake	TP Trends	Secchi Transparency Trends
Alimagnet (2007-2024)	Improving	Improving
East (2007-2024)	Improving	Improving
Farquar (2007-2024)	Improving	Improving
Long (2007-2024)	Improving	Improving
Marion (2007-2024)	Improving	Improving
Rebecca (2015-2024)	Improving	Worsening

Table B-6 describes total phosphorus and Secchi transparency trends measured in VRWJPO lakes by CAMP, five of which have been monitored since 2007 and one (Rebecca) since 2015. By tracking lake monitoring trends over time, staff can deduce trends relating to water quality decline, stability or improvement.

**Note: Valley Lake is not included in the graphs because it was not identified as a recreational lake in the 2016-2025 Vermillion River Watershed Plan; thus the VRWJPO did not collect data for it.*

Figure B-80: Alimagnet Lake Secchi Transparency

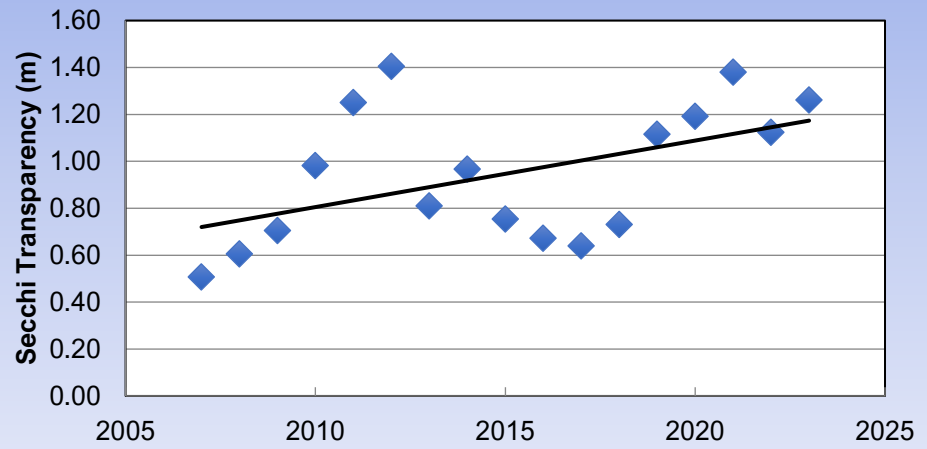


Figure B-81: Alimagnet Lake Total Phosphorus

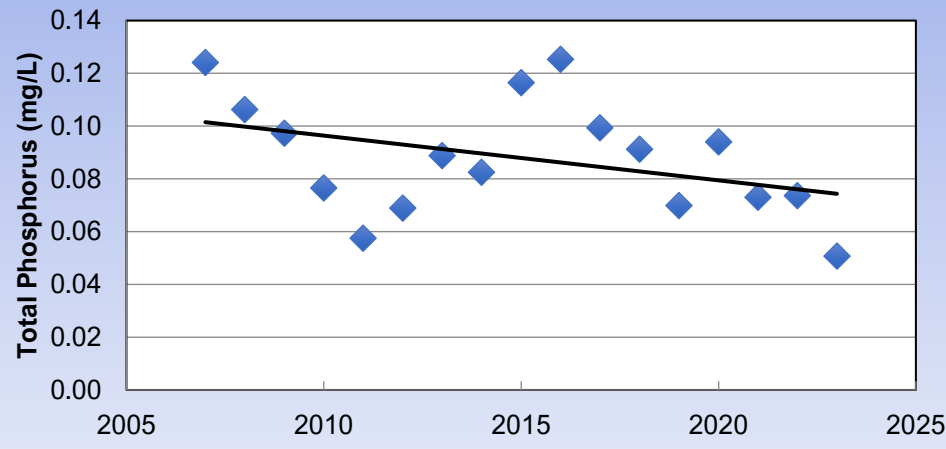


Figure B-82: East Lake Secchi Transparency

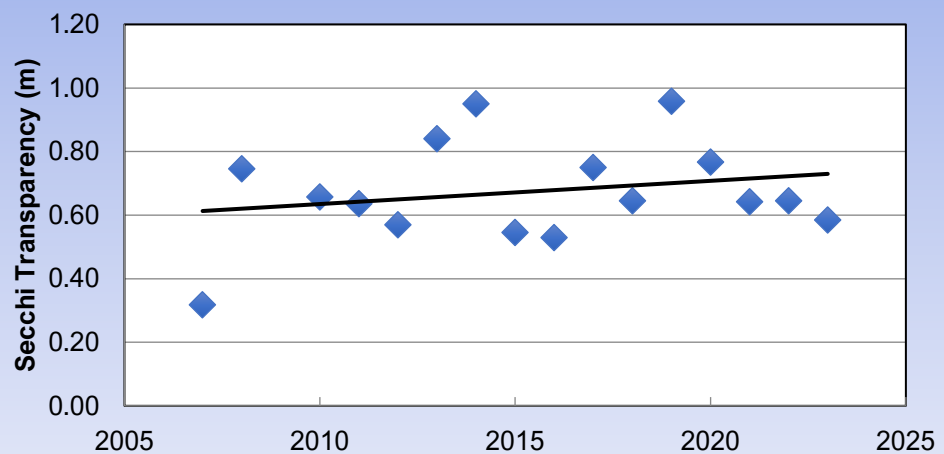


Figure B-83: East Lake Total Phosphorus

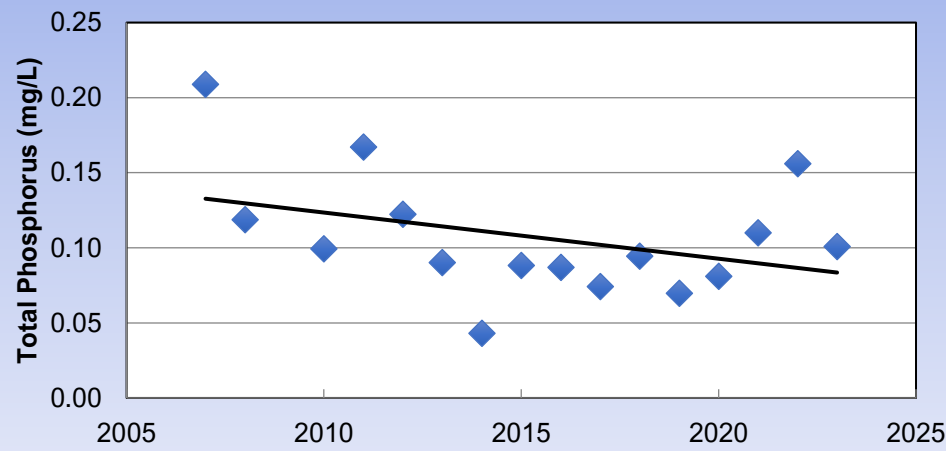
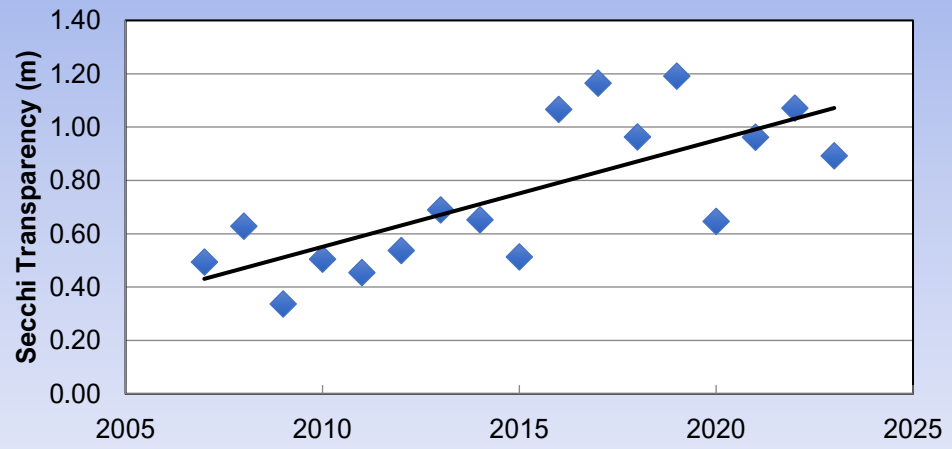
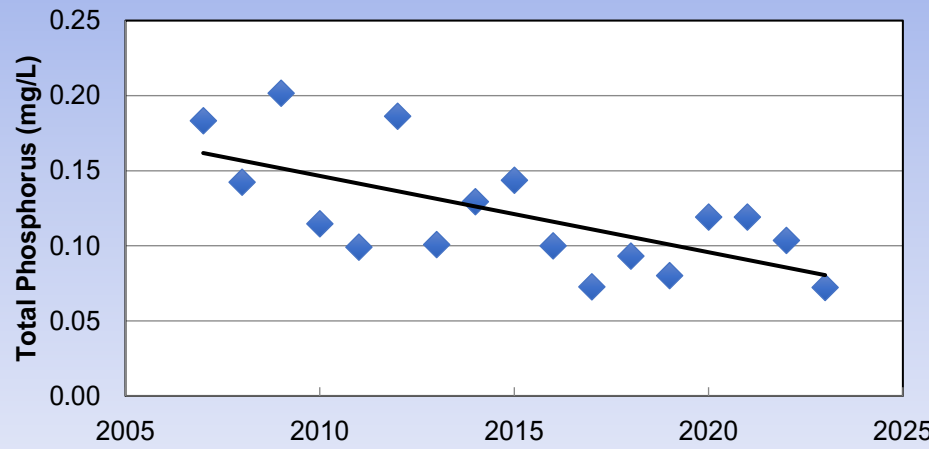


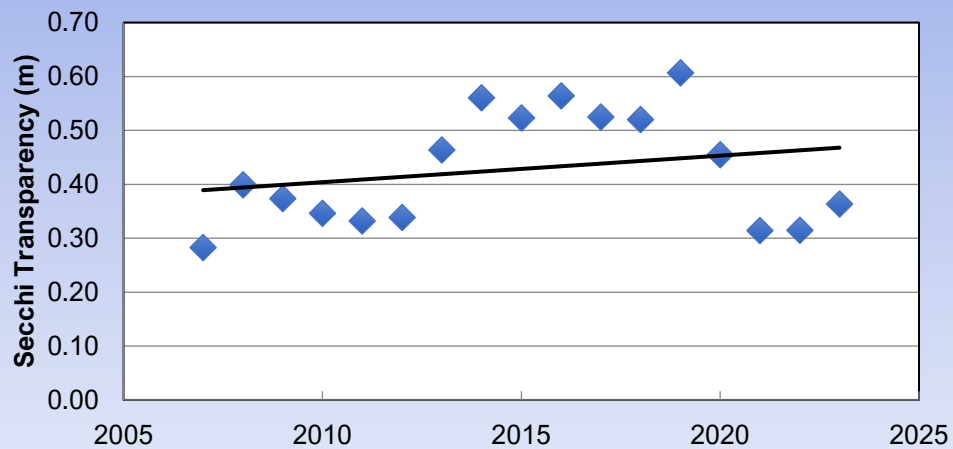
Figure B-84: Farquar Lake Secchi Transparency



B-85: Farquar Lake Total Phosphorus



B-86: Long Lake Secchi Transparency



B-87: Long Lake Total Phosphorus

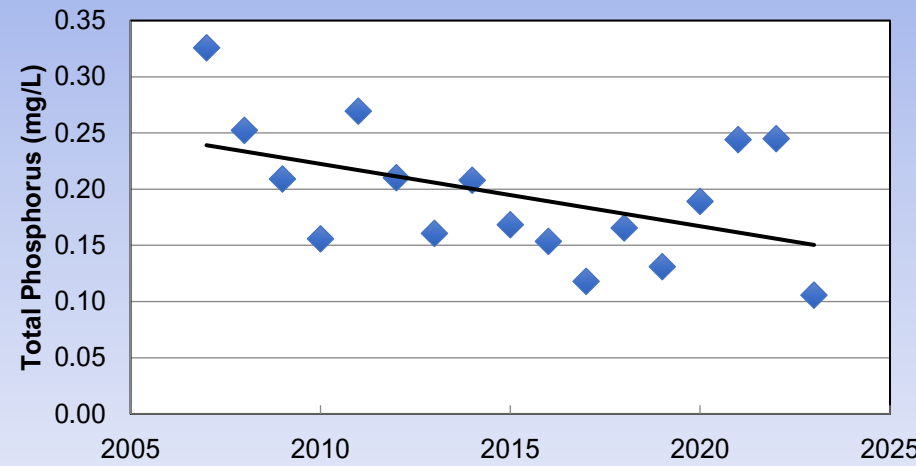


Figure B-88: Lake Marion Secchi Transparency

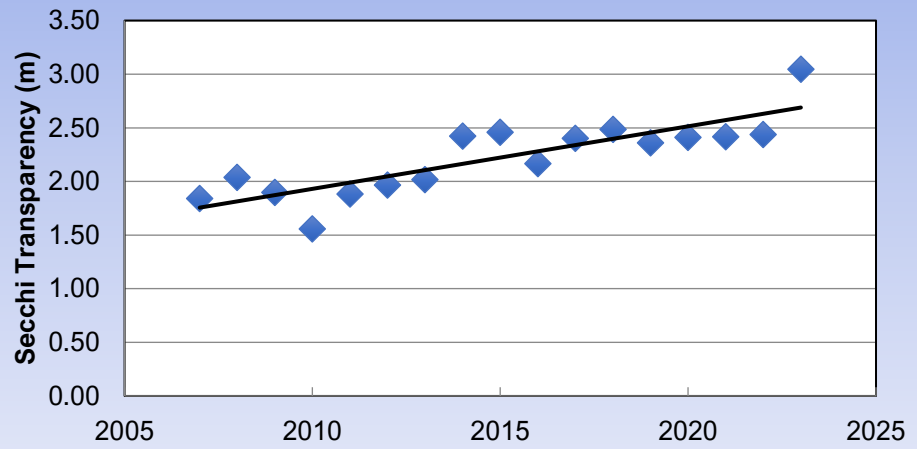


Figure B-89: Lake Marion Total Phosphorus

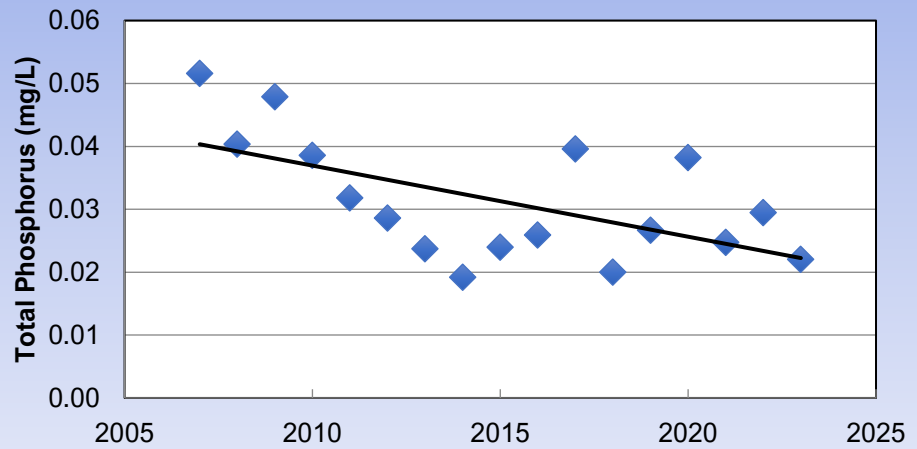


Figure B-90: Lake Rebecca Secchi Transparency

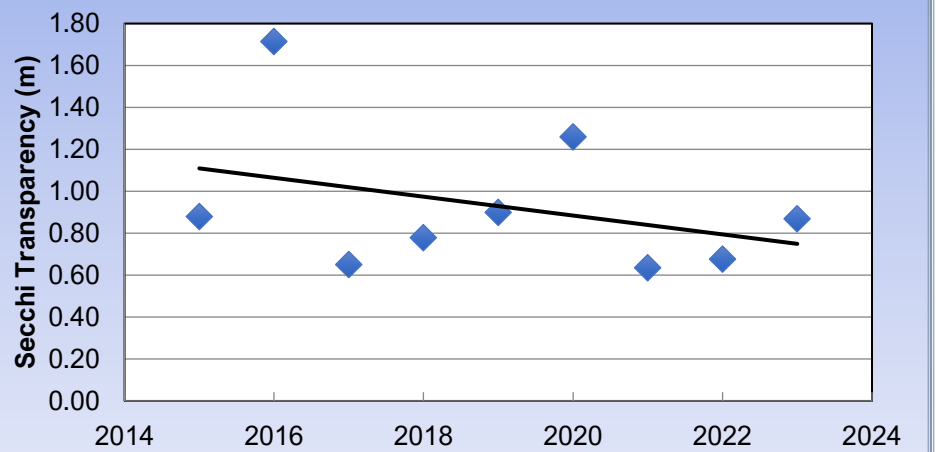
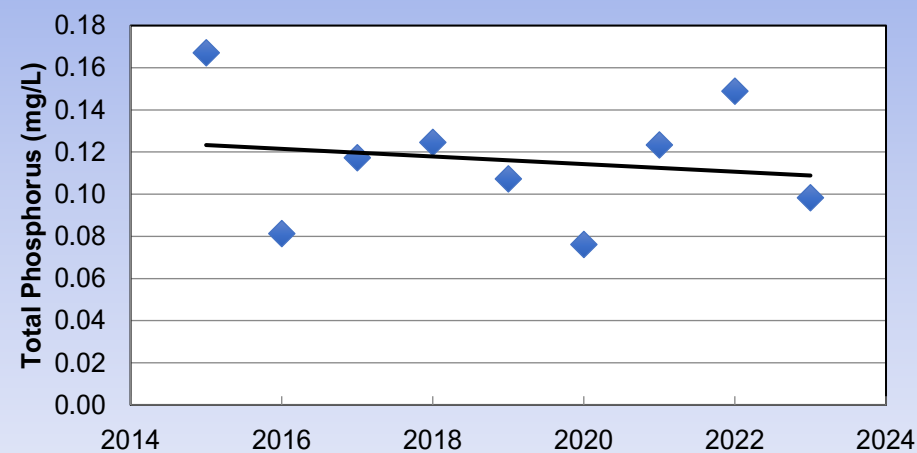


Figure B-91: Lake Rebecca Total Phosphorus



Impairments

The federal Clean Water Act requires states to identify and list water bodies that are impaired, meaning they do not meet state water quality standards, and submit their lists to the EPA every two years. Minnesota's Impaired Waters List is compiled by the MPCA. A current list of impaired waters can be found on the MPCA's Impaired Waters List webpage. Impaired waterbodies can also be viewed on the Impaired Waters Viewer map.

Several waterbodies within the Vermillion River Watershed are listed as impaired. The VRWJPO directs those interested in current impairments to navigate to the MPCA's website for up-to-date listings. In 2015, the MPCA completed a Total Maximum Daily Load (TMDL) analysis to quantify the pollutant reductions needed to meet state standards for TSS, bacteria, and nutrients for 14 impaired streams and lakes within the VRWJPO.

While the VRWJPO monitors water quality and biological conditions annually, the MPCA oversees an extensive examination of major lakes and streams in each of the state's 80 major (8-digit HUC) watersheds every 10 years to inform impaired water status decisions. The MPCA first assessed the VRWJPO in 2011, using data collected from 2000-2009 to establish baseline conditions. A second examination took place in 2020, using data collected from 2010-2019. The 2020 MPCA examination found the following:

- Several new aquatic life impairments were added onto streams already on the Impaired Waters List: seven TSS, two dissolved oxygen, and one aluminum.
- Several biological impairments (six fish and five macroinvertebrate) resulted from revisions to water quality standards.
- No new impairments were added for lakes. Scientists determined that three lakes were supporting aquatic life and five were supporting aquatic recreation. The east bay of Lake Marion was the only one found to be supporting both designated uses.
- Several lakes had sufficient data to evaluate water clarity trends. All were either improving or remaining stable.
- After rerouting effluent from the Empire WWTP to the Mississippi River in 2008, the Vermillion River has experienced significant reductions in nitrate and phosphorus concentrations.
- While many streams in the watershed are listed as impaired for aquatic life, fish and macroinvertebrate IBI scores suggest that conditions are improving.

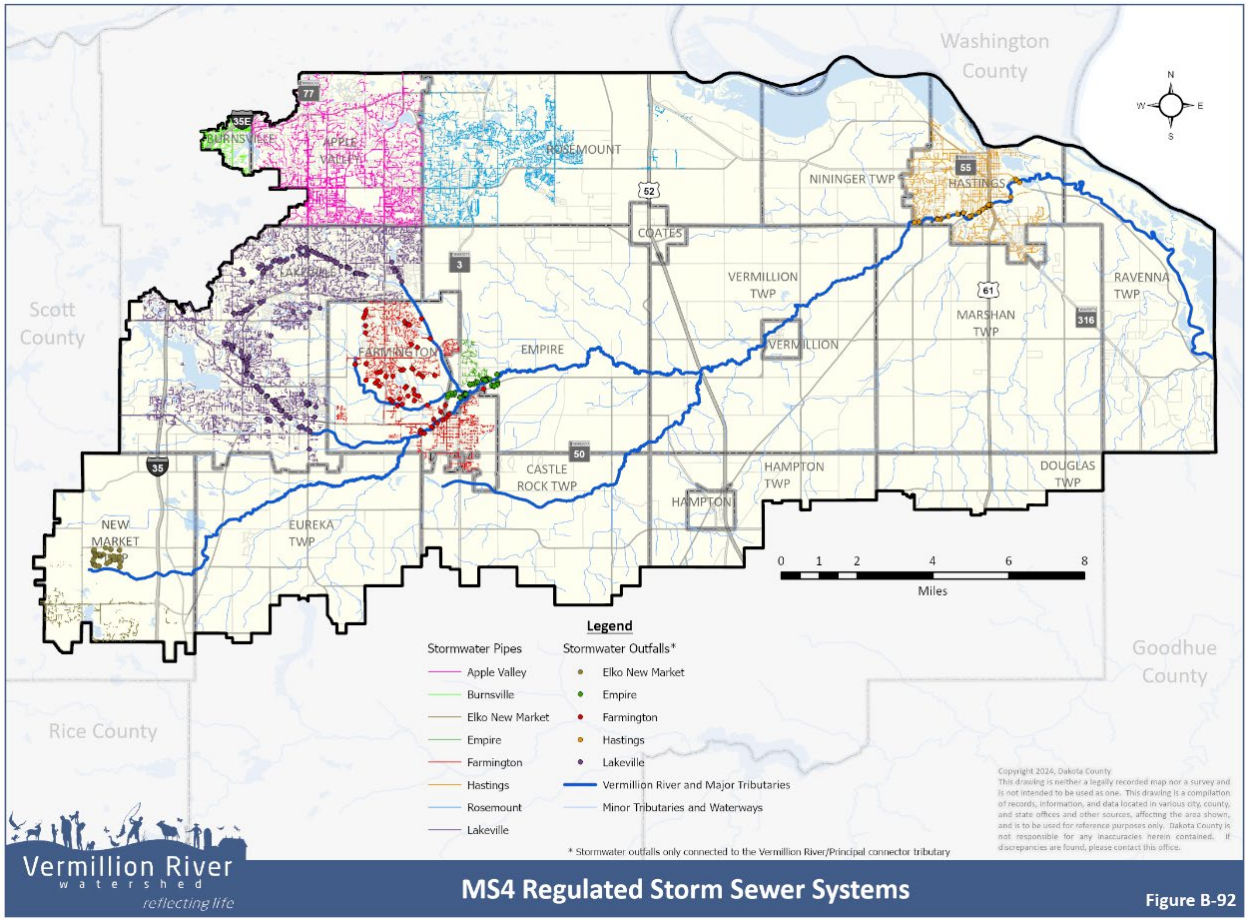
While some of these results may suggest that water quality conditions have degraded, the replacement of turbidity standards with TSS standards, the implementation of the tiered aquatic life use (TALU) framework, lake aquatic life biological assessments, and reaches of the South Branch Vermillion River changing from a 2B stream to a 2A stream during this timeframe should be noted.

Hundreds of BMPs have been implemented across the watershed to improve water quality. However, more efforts are needed to address water quality issues and protect waters currently not impaired. More details relating to the MPCA's examination can be found in their Watershed Assessment and Trends Update document.

B-9 Regulated Pollutant Sources and Control Structures

Stormwater Systems

The Vermillion River Watershed contains a mixture of agricultural, suburban, and urban landscapes. In developed areas, historic drainage patterns have been significantly altered as networks of stormwater management systems have been constructed to convey stormwater from impervious surfaces. Rural towns have smaller urban footprints and populations and thus lack complex stormwater systems. Conversely, municipalities such as Lakeville and Rosemount are undergoing rapid suburban and commercial development, adding miles of infrastructure that conveys stormwater to area waterbodies. Additionally, the majority of the City of Apple Valley was developed prior to the implementation of state stormwater standards. The City works to add stormwater infrastructure as they are able to enhance water quality.



While varying levels of stormwater systems exist across the VRWJPO, most stormwater infrastructure eventually drains to the Vermillion River, then northeast to the Mississippi River. This drainage takes place through a stormwater system composed of pipes, outfalls, ponds, ditches, swales, constructed treatment structures, and other drainage conveyances. *Figure B-92** shows a high-level look at public stormwater systems within the VRWJPO.

**Note: Due to the scale of the watershed, Figure B-92 only shows stormwater system piping and structures that drain directly to the Vermillion River or principal connectors (when available).*

Stormwater conveyance systems are regulated according to the MPCA's MS4 General Permit. Entities must obtain an MS4 General Permit if their stormwater conveyance systems:

- Are located in an urbanized area and used by a population of 1,000 or more
- Are owned by a municipality with a population of 10,000 or more
- Have a population of at least 5,000 and a system that discharges to specially classified bodies of water

The following entities within the VRWJPO are required to obtain MS4 General Permit coverage from the MPCA:

- City of Apple Valley
- City of Burnsville
- Dakota County
- City of Elko New Market
- City of Empire
- City of Farmington
- City of Hastings
- City of Lakeville
- City of Rosemount
- Scott County
- Minnesota Department of Transportation

The MS4 General Permit is designed to reduce the amount of sediment and pollution that enters surface water and groundwater from storm sewer systems. As such, permittees must develop a Stormwater Pollution Prevention Program (SWPPP) that incorporates programs and practices to improve stormwater quality. The SWPPP must be organized by the following areas of focus, known as Minimum Control Measures (MCMs):

- Public Education and Outreach
- Public Participation/Involvement
- Illicit Discharge Detection and Elimination
- Construction Site Stormwater Runoff Control
- Post-Construction Stormwater Management
- Pollution Prevention/Good Housekeeping for Municipal Operations

The most recent update to the MS4 General Permit was completed in 2020. All permittees are required to have MS4 programs in compliance with the items outlined in the 2020 MS4 General Permit and report annually on permit outcome measures.

Other Regulated Pollutant Sources

In addition to stormwater systems, other regulated pollutant sources and permitted wastewater discharges exist within the VRWJPO. The MPCA maintains a database of facilities with air, water and other environmental permits and registrations. Types of permits and registrations currently within the VRWJPO are those associated with:

- Feedlots
- Hazardous waste
- Solid waste
- Subsurface Sewage Treatment Systems (SSTS)
- Industrial National Pollutant Discharge Elimination System (NPDES)/SDS
- Industrial wastewater
- Municipal wastewater
- Underground tanks

A current inventory, including mapping of permit and registration location, can be referenced by accessing the MPCA's What's in My Neighborhood platform.

Control Structures

The VRWJPO has two notable control structures just outside of its boundary. US Lock and Dam 2, owned by the USACE, located in Hastings just outside of the watershed. Located on the Mississippi River, the original system went into operation in July of 1931. Poor soil conditions caused the lock structure to tip and resettle, requiring construction of a new lock that went into operation in 1948. A major rehabilitation to the structure was then completed by the USACE in 1995. It is one of four lock and dam systems located in Minnesota.

The second notable control structure located near the VRWJPO is the Lake Byllesby Dam & Reservoir. It is located on the southern edge of Dakota County on the Cannon River. It is owned and operated by Dakota County and has been granted a Federal Regulatory Energy Commissioner exemption to operate the internal turbines to produce electricity. It was built in 1910 and was originally owned by Northern States Power until 1969, at which time it was sold to Dakota and Goodhue counties. Dakota County became the sole owner in 2009.

In addition to the lock and dam system and reservoir, a unique feature of the VRWJPO is found in Vermillion Falls Park in the City of Hastings. Just off Highway 61 and County Road 47, the Vermillion River drops 100 feet descending from the falls. Historically, the water was used to power three Hastings flour mills at the end of the Pioneer Wheat Trail. Downstream of the falls sits the ruins of the Ramsey Mill, which burned down in 1894.

B-10 Flooding/Floodplain Management

Floodplains are low-lying areas adjacent to lakes, wetlands, the Vermillion River, and its tributaries that may be inundated during flood events. For regulatory purposes, a “floodplain” is defined as the area expected to be underwater during a storm with a 1% chance of occurring in any given year (commonly known as the “100-year” event).

The Federal Emergency Management Agency (FEMA) conducts Flood Insurance Studies (FIS) and produces Flood Insurance Rate Maps (FIRMs) to identify areas subject to flooding during the 100-year event. The water surface elevation associated with this 1% annual-chance flood is called the Base Flood Elevation (BFE), which is used to determine the regulated floodplain. Homeowners whose properties fall within FEMA-mapped floodplains are required to obtain flood insurance. This requirement is implemented through the National Flood Insurance Program (NFIP), which is informed by, but separate from, VRWJPO planning efforts. In Dakota and Scott counties, current FEMA boundaries can be viewed on their respective GIS platforms, using information from FEMA’s official flood hazard data, which is available at FEMA's National Flood Hazard Layer (NFHL) Viewer.

The VRWJPO does not directly implement or enforce floodplain regulations. In Dakota and Scott Counties, cities are responsible for regulating floodplain activities within incorporated areas. The counties administer floodplain regulations within their unincorporated townships.

In addition to riverine flooding, intense stormwater runoff can exceed the capacity of local storm-sewer systems, causing nuisance flooding such as street ponding or backyard swale flooding. To address these issues, LGUs in the incorporated areas of the VRWJPO have developed local water management plans that identify specific local flooding concerns and proposed actions. Performance standards established by the VRWJPO and LGUs include requirements to manage stormwater volume and peak flow rates to reduce flooding impacts in existing urban areas and new developments as impervious surfaces increase.

B-11 Groundwater Resources

Bedrock and unconsolidated sediments units include aquifers, geologic units that can store and transmit enough water to reasonably supply wells. Most residents of the VRWJPO source their drinking water from the region’s aquifers.

Just like surface waterbodies, an aquifer has inputs, outputs, and storage capacity. The quality and quantity of surface and groundwater resources are directly related. Water enters aquifers via infiltration from the land, percolation from surface waterbodies, or flow from other aquifers. Aquifers discharge groundwater to

surface waters as baseflow through seeps or springs, to other aquifers, or by withdrawals via wells. The VRWJPO has many areas of direct surface and groundwater interaction, which has both risks and benefits. Transference between aquifers and surface waterbodies can lead to contamination from one affecting the other.

Quaternary Aquifers

The uppermost aquifers (surficial aquifers) in the watershed are in unconsolidated sediments left behind by glaciers. These "Quaternary" aquifers are not often used for public drinking water supply in the VRWJPO. Quaternary aquifers do provide cool groundwater that supports the Vermillion River's trout populations.

Because the thickness of glacial sediments varies dramatically across the watershed, the saturated thickness of the Quaternary aquifers varies from zero to more than 200 feet. The potential yield, or maximum rate at which water can be withdrawn from an aquifer, varies with saturated thickness. Potential yields range from less than five gallons per minute (gpm) in the shallowest areas to more than 2,000 gpm in the thickest areas.

Since most Quaternary aquifers are composed of sand and gravel, water can move very quickly through them, as much as 100,000 to 200,000 gallons per foot per day. High movement rates and proximity to surface activities make these aquifers highly sensitive to pollution. High nitrate concentrations have been documented in the Quaternary aquifers. Pesticide pollution is also common.

Bedrock Aquifers

Bedrock aquifers are often named for the rock unit in which they occur. The uppermost, water-producing bedrock units in the watershed, the Platteville and St. Peter formations, occur discontinuously primarily in the northwestern watershed. Both formations are sometimes dry or locally contain an unreliable amount of water. The St. Peter formation is used for limited domestic wells in northern Dakota County and can become easily contaminated due to its exposure to the overlying Quaternary glacial deposits. In parts of Castle Rock Township, the water table is also in the St. Peter formation. Recharge into the St. Peter formation is greatest where the Glenwood formation is missing and sands overlay the aquifer.

The most significant and widely used aquifer in the watershed is the Prairie du Chien-Jordan, which is composed of two geologic units (dolomite and sandstone) with differing hydrologic characteristics. In Dakota County, these units are separated and act as independent aquifers. The saturated thickness of the Prairie du Chien-Jordan aquifer in the watershed extends to 300 feet. The potential water yield is like that of the Quaternary aquifers, ranging from under 500 gpm to more than 2,500 gpm.

The Minnesota Geological Survey has designated most of the Prairie du Chien and Jordan aquifers within the watershed as highly- to very-highly sensitive to contamination. Sensitivity is based on geologic characteristics of overlying rock and sediment, including the surface's ability to absorb and hold contaminants, dilute contaminants, and control the rate that contaminants move in and through aquifers. In high-sensitivity areas, contaminants can reach the aquifer within weeks to years. In very high sensitivity areas, contaminants can enter the aquifer in a matter of hours to months. Like the Quaternary aquifers, high concentrations of nitrate have been found within bedrock aquifers.

Below the Prairie du Chien-Jordan are the Tunnel City (Franconia) and the Wonewoc (Ironton-Galesville) formations. The Tunnel City formation is a low-to-moderate yield (<200 gpm) sandy dolomite aquifer. The Wonewoc is a thin sandstone aquifer (about 50 feet thick). Neither aquifer is a significant source of drinking water for the watershed's population.

The deepest high-yield aquifer available in the watershed, the Mt. Simon-Hinckley, is separated from the nearest aquifer by 200 feet of the Eau Claire Formation, a confining geologic unit with little or no permeability. Under normal conditions, the Mt. Simon-Hinckley aquifers are hydrologically isolated from the Tunnel City and Wonewoc formations.

Because of its pristine and isolated nature, appropriations from the Mt. Simon-Hinckley are addressed directly in state statute (Minn. Stat. 103G.271, Subd. 4a). The DNR cannot issue permits for withdrawals from this aquifer unless it is for potable (drinkable) water, there is no alternative source, and a water conservation plan is included in the permit. The potential yield of this aquifer is calculated to be between 650 and 1,800 gpm. Several communities in the watershed use this aquifer for high-capacity industrial, municipal, and multi-aquifer wells. As a result, the Mt. Simon-Hinckley aquifer is recharged from overlying aquifers, locally changing the flow direction and water chemistry.

Groundwater-Surface Water Connections

While surface waters often receive inputs from groundwater, it is less common for surface water to contribute directly to groundwater. A significant example of this occurs in the Vermillion River. Many upstream reaches of the river are groundwater-fed, but there are reaches where the river loses water to underlying aquifers. The most notable example is between the Cities of Vermillion and Hastings. As a result, the Vermillion River is characterized as a "losing stream" in this reach. *Figure B-93* provides a conceptual image of this.

In the South Branch subwatershed, just upstream of this losing reach, groundwater has been found to have higher levels of nitrate than in the other subwatersheds. This is noteworthy due to its potential connection with heightened nitrate levels in the highly vulnerable 53,313-acre Hastings Drinking Water Supply

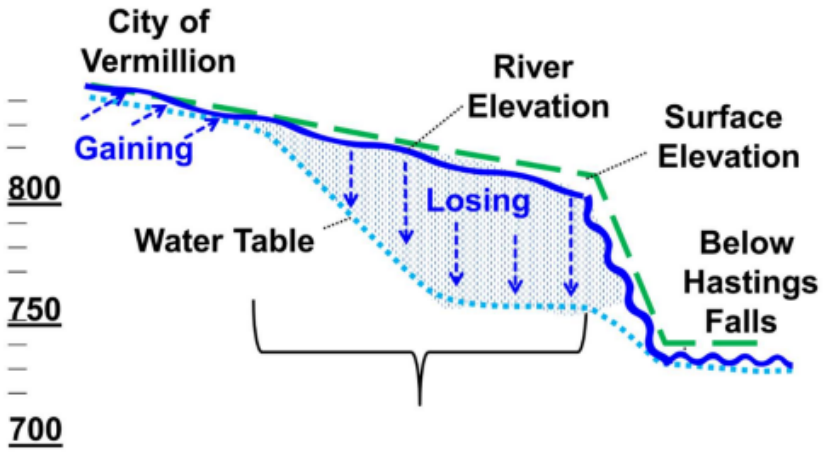


Figure B-93: Conceptual Design of Vermillion River Losing Stream Reach
Source: 2020-2030 Dakota County Groundwater Plan

Management Area (DWSMA), encompassing the entirety of the cities of Hastings, Vermillion, and Hampton. Data from shallow private wells within the Hastings DWSMA shows elevated nitrate levels. Nitrates' adverse impacts on human health are widely recognized and, as such, projects to address nitrate pollution within this area are considered high priority. An additional DWSMA with elevated nitrate concentrations is within the City of Rosemount. DWSMA extents can be viewed on the MDH's Source Water Protection Web Map Viewer.

B-12 Wetlands

A wetland is defined as an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support (and under normal circumstances does support) a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands provide ecological, recreational, and economic benefits. They promote species diversity, flood control, erosion control, groundwater recharge and discharge, and water quality protection.

Historically, wetlands were often drained or filled to be farmed or developed. In Minnesota, the Wetland Conservation Act (WCA), which was passed in 1991, regulates the filling, excavation, and draining of wetlands. WCA is administered by an LGU, typically staffed by city, county, or SWCD staff. The LGU is responsible for enforcing WCA standards to maintain no net loss in Minnesota wetlands. The following LGUs in the VRWJPO are responsible for WCA permitting within their respective boundaries:

- City of Apple Valley
- City of Burnsville
- City of Elko New Market
- City of Hastings
- City of Lakeville
- City of Rosemount
- City of Vermillion
- DCSWCD is the acting LGU for WCA permitting within the following political boundaries: Castle Rock Township, City of Coates, City of Hampton, City of Empire, City of Farmington, Douglas Township, Eureka Township, Hampton Township, Marshan Township, Nininger Township, Ravenna Township, and Vermillion Township
- SSWCD is the LGU for WCA permitting for New Market Township

In addition, the VRWJPO has set wetland alterations standards and wetland buffer standards, included with other VRWJPO Standards in *Appendix D*. Wetland buffer standards are summarized in *Table B-7*. A wetland functional assessment for vegetative diversity is performed using a functional assessment method approved by BWSR to determine the management classification level.

Table B-7: Buffer Standards for Wetlands

Buffer Requirement	Exceptional Quality Wetland (Preserve)	High Quality Wetland (Manage 1)	Medium Quality Wetland (Manage 2)	Low Quality Wetland (Manage 3)
Average Width	50 feet	40 feet	30 feet	25 feet
Minimum Width	30 feet	30 feet	25 feet	16.5 feet

Priority Areas for Wetland Preservation

The VRWJPO prioritizes preserving the hydrologic and ecological function of wetlands in the watershed. This is reflected in the VRWJPO Wetland Alteration Standards *Appendix D*), which state:

"It is the policy of the VRWJPO to:

- Work to achieve no net loss of wetlands in the watershed.
- Replace lost wetlands in the same subwatershed whenever possible.
- Provide equal or greater functions and values for lost wetlands at the replacement ratios dictated by the WCA.
- Avoid direct or indirect wetland disturbance in accordance with state and federal requirements and approved local wetland management plans.
- Limit the use of high-quality wetlands for stormwater management where other alternatives exist.

- Avoid fragmentation of natural areas and corridors when feasible and mitigate when unavoidable."

This policy is then furthered by mechanisms for wetland replacement prioritizing restoration within VRWJPO boundaries when wetland impacts take place. This criteria states:

"Wetland replacement/mitigation siting must follow the priority order below:

1. Mitigation within the VRWJPO boundary (on-site if approved by the WCA Jurisdictional Authority)
2. Mitigation within Dakota and Scott County
3. Within BWSR Wetland Bank Service Area 8
4. Within any other BWSR Bank Service Area"

Staff regularly assess opportunities for wetland restoration within the watershed. Through these assessments, priority wetland restoration areas are identified, based on aspects including, but not limited to:

- ability to maintain wetland hydrology, vegetation and soils
- pollutant load reductions associated with restoration support of ecological corridors resultant of restoration
- proximity to special waters, such as trout streams or impaired waters

While these assessments provide priority areas for restoration, the limiting factors are land ownership and landowner willingness. Assessments that provide priority wetland areas are described in further detail below:

- In 2012, DCSWCD staff developed a Drained Wetland Inventory in the Upper Vermillion and South Branch subwatersheds to prioritize wetland restoration opportunities. The inventory was developed via GIS assessment. The assessment used hydric soils as a primary indicator to determine historical wetland locations. Staff analyzed the Dakota County Soil Survey Geographic Database and the MLCCS to distinguish between wetlands and impervious surfaces. Once existing wetlands were identified, they were removed from the dataset. The remaining very poorly drained and poorly drained soils represented locations with a potential for wetland restoration efforts.
- The inventory found that within the Upper Vermillion River Mainstem subwatershed, 3,624 acres of existing wetlands made up 15% of the entire drainage area. Additionally, 3,237 acres of potential wetland (based on hydric soil presence) restoration areas existed.
- In the South Branch Vermillion River subwatershed, 1,327 acres of wetland were found, making up 6% of the entire drainage area. 2,330 acres of hydric soil were found that could potentially provide the capacity to restore wetland characteristics.
- In 2017, DCSWCD staff developed another assessment to identify potential wetland restoration sites across southern Dakota County. This included areas in the Upper Mainstem, South Creek, South Branch, Middle Mainstem and Lower Mainstem subwatersheds. It identified 24 potential "hydric farmed" wetlands, totaling 3,781 acres.
- In 2020, Dakota County utilized a consultant to create a 450-square mile, county-wide model to evaluate flooding and water quality in rural reaches of the County, including all of the VRWJPO. The goal of the study was to identify flood-prone areas for potential water quality improvement and wetland restoration. Methods included review of flood insurance study reports and models, river gauge data, survey data, a PC-SWMM model and GIS files. The 2020 model identified 59 potential wetland restorations in the full study area and ranked them by priority according to their flood area, flood volume, TSS load reduction and TP load reduction potentials. The top ten ranked projects were then further analyzed and preliminary

water retention berm alignments were developed. Water quality benefits were then evaluated using the P8 software. Project cost estimates were also developed.

The VRWJPO has been involved in a number of wetland restorations and/or preservations over the years, for reasons including water quality improvement, habitat enhancement, and wetland bank establishment. Staff continue to reference priority area wetland restoration studies when assessing potential restoration/preservation sites.

B-13 Ecology and Unique Areas

Ecological Classification Subsections

The DNR and the U.S. Forest Service have developed a statewide Ecological Classification System (ECS) that identifies, describes, and maps land areas with uniform ecological features. The ECS draws on climate, geology, topography, soils, hydrology, and vegetation characteristics for its classifications. The VRWJPO contains five Ecological Subsections:

Big Woods Subsection

The far western portion of the watershed, including the City of Elko New Market and New Market Township, is classified as within the Big Woods Subsection. The subsection coincides with a large block of deciduous forest that was present at the time of Euro-American settlement. Topography is gently to moderately rolling. Soils are formed in thick deposits of gray limey glacial till left by the Des Moines lobe. Northern red oak, sugar maple, basswood, and American elm were most common in this dominantly forested region.

The majority of this subsection is cropland, with sparse amounts of pasture, upland forest, and wetland. Big Woods habitats feature woodland birds, such as red-shouldered hawks and warblers, savanna species such as Blanding's turtles and red-headed woodpeckers, and wetland species such as turtles, ospreys, Forster's terns, and black terns.

Oak Savanna Subsection

This subsection represents acreage within the central part of the VRWJPO. It spans far south into southeastern Minnesota and is characterized by gently rolling hills. Loess-mantled ridges over sandstone and carbonate bedrock and till characterize these plains, which allowed historic fires from surrounding prairies to frequently burn the landscape enough to maintain oak opening rather than dense forest.

Presently, much of the subsection is farmed, but residential development is changing the primary land use. Species of greatest concern within the subsection include the common mudpuppy, western harvest mouse, eastern fox snake, and red-headed woodpecker.

Rochester Plateau Subsection

The southeastern part of the VRWJPO, including parts of Marshan, Douglas, Vermillion, and Hampton townships, are in the Rochester Plateau Subsection. This subsection consists of an old plateau covered by loess in the east and pre-Wisconsin age glacial till in the central and western parts. The majority of this subsection is heavily farmed.

Wildlife present in this subsection include a variety of reptiles, such as timber rattlesnakes, western foxsnakes, racers, Blanding's turtles, and wood turtles; birds, including Louisiana waterthrushes, prothonotary warblers, cerulean warblers, blue-winged warblers, peregrine falcons; fish, including American brook lampreys and suckermouth minnows; and mussels, such as ellipse mussels.

St. Paul Baldwin Plains and Moraines Subsection

This subsection encompasses much of the eastern Twin Cities and is dominated by urban land uses. Oak and aspen savannas were primary plant communities before European settlement; tallgrass prairie and maple-basswood forest were also common. The Mississippi River flows through the center of this subsection and the St. Croix River forms its eastern boundary. It is a significant migratory corridor for birds. Mussels and fish depend on the clear, unpolluted waters of the St. Croix. Featured species include bald eagles, peregrine falcons, red-shouldered hawks, Blanding's turtles, trumpeter swans, hooded warblers, and bobolinks. Recreational opportunities abound in state and regional parks, scientific and natural areas, and nature centers.

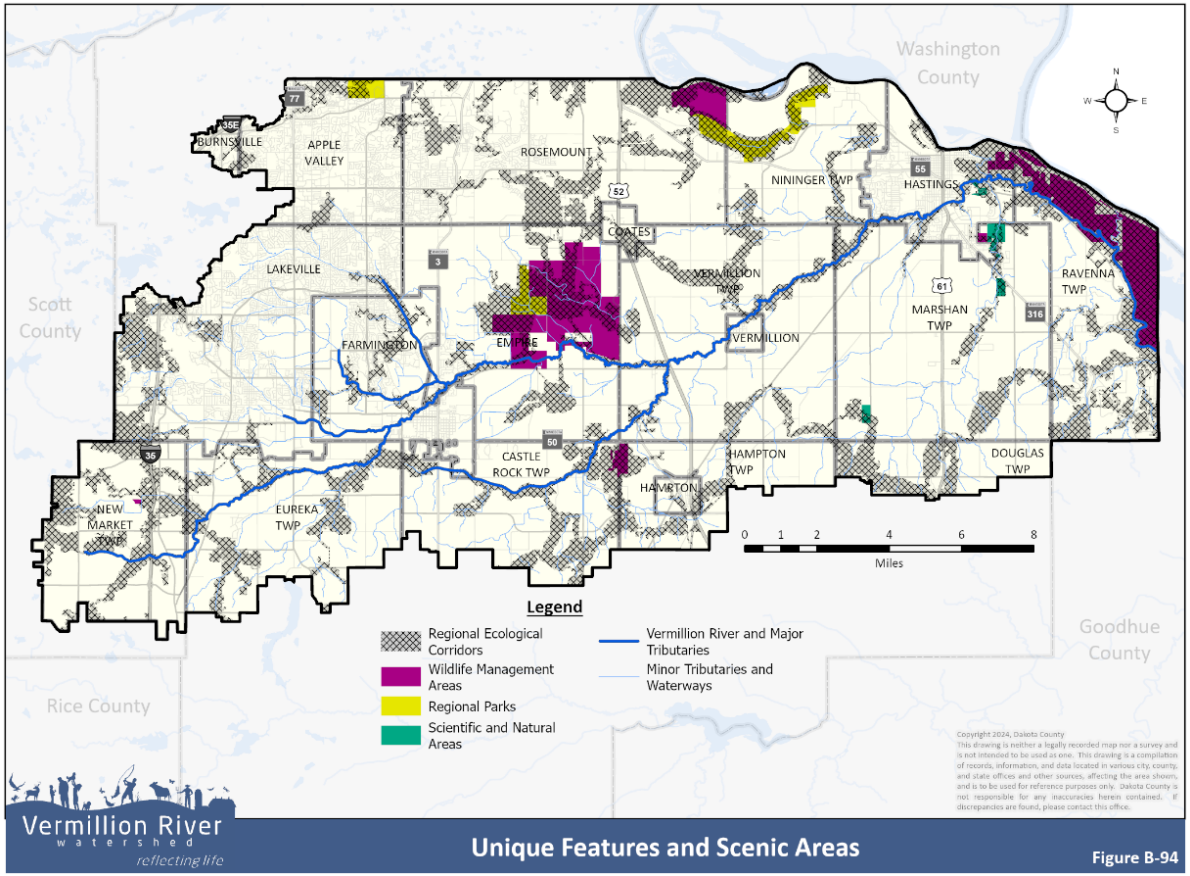
The Blufflands Subsection

The far eastern part of the watershed, including Hastings and Ravenna Township, is in the Blufflands Subsection. This subsection consists of an old plateau covered by loess that has been extensively eroded along rivers and streams. It is characterized by highly dissected landscapes associated with major rivers in southeastern Minnesota. Tallgrass prairie and bur oak savanna were major vegetation types on ridge tops and dry upper slopes. Red oak-white oak-shagbark hickory-basswood forests were present on moister slopes, and red oak-basswood-black walnut forests in protected valleys. Prairie was restricted primarily to broader ridge tops, where fires could spread, but also occurred on steep slopes with south or southwest aspect.

Bluffs and deep stream valleys (500 to 600 feet deep) are common. River bottom forests grew along major streams and rivers. About 35 percent of this subsection is cropland, 23 percent is in pasture, and 33 percent is in woodland. The Blufflands provide a critical migratory corridor for forest songbirds, raptors, and waterfowl. It is the most important subsection for reptiles and one of the most important subsections for mollusks.

Unique Features and Scenic Areas

The Vermillion River Watershed provides unique areas of ecological value, with several Scientific and Natural Areas (SNAs), Wildlife Management Areas (WMAs), and Aquatic Management Areas (AMAs) open to the public *(Figure B-94)*.



DNR Scientific and Natural Areas

SNAs preserve natural features and rare resources of exceptional scientific and educational value. The VRWJPO has three SNAs:

- **Hastings SNA** (64.9 acres) is located within the Vermillion/Mississippi River floodplain within the City of Hastings. Talus slopes and steep escarpments of dolomitic limestone provide habitat for mosses, lichens and liverworts. The SNA boasts a wide variety of spring ephemerals including snow trilliums, dutchman's breeches, bloodroot and wild ginger. Upwards of seventeen state-listed threatened and endangered species, as well as one federally endangered species, are found within a mile of the site.
- **Hastings Sand Coulee SNA** (267 acres) is situated in a sandy ravine, or "coulee", formed by a glacial stream that flowed into the Vermillion River. The site is home to the largest dry prairie and associated oak woodland in Dakota County, boasting over fifteen rare plant and animal species such as the loggerhead shrike, fritillary butterfly and rusty-patched bumble bee. The site provides a safe haven for resident animals as well as a vital rest stop for migratory birds who depend on the Mississippi migratory flyway.
- **Chimney Rock SNA** (76 acres) in Marshan Township, escaped the last glacial advance and is characterized by deposits of loess over bedrock. The site contains a significant geologic feature consisting of three St. Peter Sandstone chimney formations capped by Platteville Limestone. The SNA also has four native plant communities that are characteristic of dry sandy soils underlying the site.

DNR Wildlife Management Areas

WMAs are part of Minnesota's outdoor recreation system established to protect lands and waters with high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. Five are in the VRWJPO:

- **Gores Pool #3 WMA** (7,092 acres), partly in Hastings and Ravenna townships, consists of Mississippi and Vermillion River floodplain forests and backwater marshes. A designated Migratory Waterfowl Refuge near the south end of North Lake is off limits to all activities.
- **Hampton Woods WMA** (207 acres) is one of the largest and most diverse contiguous forested areas of southern Dakota County, mostly mesic oak forest with a great diversity of tree, shrub, and forb species. Game species include deer, small game, upland forest birds, turkey, and doves. This WMA is south of County Highway 50 and west of US Highway 52.
- **Hastings WMA** (40 acres) consists of restored prairie, several small woody plantings and woodlands and provides upland habitat. It is located just west of Gores Pool #3 WMA and the Mississippi River. Hastings Sand Coulee SNA is adjacent to the eastern boundary.
- **Vermillion Highlands Research, Recreation, and WMA** (2,838 acres) were established by the state as part of the University of Minnesota (U of M) stadium agreement in 2006. The unit, managed by the DNR and U of M, provides recreation for the public and research opportunities for the University. Portions of this WMA are open for in-season hunting of certain species throughout the year.
- **Vermillion River WMA** (1,493 acres) is adjacent to the south boundary of the Vermillion Highlands Research Recreation and WMA along the Vermillion River in Empire. Much of this WMA was intensively farmed in the past except for the central area, which has remnant prairie species. Significant portions of the WMA have now been restored to native prairie. Recreation opportunities include hunting, fishing, birding, and nature photography.

- **Spartina WMA** (17 acres) in New Market Township (Scott County) is located entirely within a drained wetland basin. It is located within an area of scattered woods and wetlands, and the predominant vegetation is lowland shrubs and trees, some wetland and some grassland. This unit is managed for wetland species as well as species that prefer brushland.

DNR Aquatic Management Areas

AMAs are areas along shorelines that provide angler and management access, protect critical habitat, and provide areas for education and research. The VRWJPO has three AMAs:

- **Gores Pool #3 AMA** (162 acres) is adjacent to the Gores Pool #3 WMA in northeastern Hastings. The AMA includes Mississippi and Vermillion River shoreline, floodplain, and upland areas. Recreational uses include fishing, non-motorized travel, wildlife observation, hunting, and trapping.
- **South Branch Vermillion River AMA** (62 acres) is west of US Highway 52 and south of County Road 66 in Vermillion Township along a section of the South Branch Vermillion River. Recreational use includes fishing, non-motorized travel, wildlife observation, hunting, and trapping.
- **Vermillion River AMA** (460 acres) in Empire includes seven non-contiguous sections of the Vermillion River that are designated trout stream. Recreational uses include angling, non-motorized travel, wildlife observation, hunting, and trapping.

B-14 Rare and Endangered Species

Endangered Species

Minnesota has a rich natural heritage, but many species seen by early explorers of the state no longer exist or survive only in small, fragmented populations. To prevent further losses, the state Legislature passed Minnesota's Endangered and Threatened Species law in 1971, directing the DNR to identify species at greatest risk of disappearing from the state. The DNR manages endangered species regulations, permitting, and environmental review processes.

The DNR Natural Heritage Information System (NHIS) databases identify several species listed by the U.S. Fish and Wildlife Service (FWS) as federally endangered or threatened that are potentially found within the watershed. Of note, the mussel species primarily are found in the Mississippi River and other deep rivers. Species information is from the FWS.

- **Rusty Patched Bumblebee**, listed as federally endangered in 2017 after a widespread and steep decline in populations. While the cause of the decline remains unclear, evidence suggests a synergistic effect between pesticides and an introduced pathogen. Historically, the rusty patched bumble bee was broadly distributed across the Eastern U.S. and Upper Midwest.
- **Higgins Eye Pearlymussel,** a federally endangered freshwater mussel, depends on deep, free-flowing rivers with clean water and is typically found in the Missisisppi River above Lock and Dam 9 at Keokuk, Iowa. Municipal, industrial, and farm run-off have degraded water quality in areas preferred by Higgins eye. Mussels concentrate chemicals and toxic metals in body tissues and can be poisoned by chemicals in their water. Dredging and waterway traffic produce siltation,

which can cover river substrate and mussel beds. Zebra mussels attach to pearlymussels and prevent them from moving, burrowing, or opening and closing their shells.

- **Sheepnose**, a federally endangered freshwater mussel that is now considered extirpated from roughly 75 percent of its historical range. Primary risks to this species include contaminants, hydrological regime changes, landscape alterations, lack of connectivity and invasive species.
- **Snuffbox**, a federally endangered freshwater mussel, is declining throughout its range due to habitat modification and destruction, sedimentation, and pollution. Despite this, it remains the most widespread and abundant member of the genus Epioblasma, of which the other members are now either extinct or severely imperiled.
- **Spectaclecase**, a federally endangered freshwater mussel, is found in the Mississippi, Missouri, and Ohio River basins. The Spectaclecase requires very specific habitat, which limit its current range and distribution to certain sites in large rivers. Generally, mussels are long-lived, with individuals surviving up to several decades, sometimes up to 100 to 200 years. The oldest documented Spectaclecase is thought to be 70 years old. Major threats to the Spectaclecase mussel include dams, small population size and fragmentation, sedimentation, and pollution. Dams have contributed to the decline of the Spectaclecase more than any other factor.
- **Winged Mapleleaf**, a federally endangered freshwater mussel. Winged Mapleleaf were once found in 38 locations in the Midwest from Minnesota to Arkansas but are now found only in six. This mussel spends most of its time buried in sediments and is primarily sedentary. The St. Croix River in Minnesota contains the only populations known to be reproducing. Two of the main threats to the winged mapleleaf are habitat fragmentation, small population size, and invasive species (Zebra Mussels).
- **Northern Long-Eared Bat**, a federally endangered mammal, was proposed for listing because of a disease called white-nose syndrome. The disease is thought to kill hibernating bats by using up their stored energy too rapidly. Gates or other structures to exclude people from caves and mines restrict bat flight and movement, change airflow, and change internal cave and mine microclimates. A few degrees change can make a cave unsuitable for hibernating bats. *(Note: not currently in NHIS data for the watershed area.)*
- **Prairie Bush Clover** is a federally threatened prairie plant found only in the tallgrass prairie region of four Midwestern states, including Minnesota. It is a member of the bean family and a Midwestern "endemic" – known only from the tallgrass prairie region of the upper Mississippi River Valley. Some of the surviving populations are threatened by conversion of pasture to cropland, overgrazing, agricultural expansion, herbicide application, urban expansion, rock quarrying, and transportation right-of-way maintenance and rerouting. *(Note: Not currently in NHIS data for the watershed area.)*

The DNR sets regulations, permits, and environmental reviews affecting these species. However, managers aware that certain species are endangered, threatened, or of special concern have a better chance of addressing issues and maintaining diverse and sustainable populations of plants, animals, and aquatic species. Minnesota's List of Endangered, Threatened and Special Concern Species can be accessed here. Information about federally listed species can be found here.

B-15 Recreational Areas

Dakota and Scott counties have areas with rapidly expanding populations. Substantial planning ensures that parks and recreational spaces are protected. Both counties acquire easements to provide permanent protection for prime farmland, natural areas, and shoreland. A current map of protected lands in Dakota County is available on the County website, www.dakotacounty.us, with the search term *land conservation map summary*.

Dakota County conducted a Vermillion River Corridor planning and visioning effort in 2010 to ask people what they perceived as the river's best future condition and how it could be achieved. The Corridor Plan focused on improvements to water quality, habitat, and recreation opportunities.

Dakota County Parks within or affecting the hydrology of the VRWJPO include:

- Lebanon Hills Regional Park in Eagan and Apple Valley
- Spring Lake Park Reserve in Hastings
- Whitetail Woods Regional Park in Empire
- Dakota Woods Dog Park in Empire

Dakota County trails and greenways in the watershed include:

- Mississippi River Greenway
- North Creek Greenway
- Lake Marion Greenway
- Vermillion Highlands Greenway
- Vermillion River Greenway
- Rosemount Greenway

Each park has a guiding plan, available at www.dakotacounty.us, search *park plans*.

Dakota County has also established County Park Conservation Areas (CPCAs) to protect areas of natural quality and areas with high potential for restoration and provide public access. CPCAs in the VRWJPO include:

- 66.34 acres along South Creek
- 185.74 acres along the Vermillion River Mainstem
- One 10.4-acre CPCA along a tributary to North Creek

Lake Marion and Lake Rebecca are heavily used for recreation. The VRWJPO has provided financial assistance for projects to help the City of Lakeville reduce nutrient impairments in Lake Marion.

Canoeing and kayaking locations on the Vermillion River Mainstem, primarily east of U.S. Highway 52 and on the Vermillion River Bottoms below the falls in Hastings, can be accessed at road crossings at the road rights-of-way or on public land. The VRWJPO provides an online map resource for people interested in fishing, canoeing, or kayaking the river. Approximately 90 percent of the land along the Vermillion River corridor is privately owned, so people interested in canoeing or kayaking must respect landowner rights.

Appendix C: Community and Stakeholder Engagement

Overview

In accordance with Minnesota Rule 8410.0045, the Plan was developed in consultation with stakeholders and officials in the VRWJPO, including:

- Residents
- VRWJPO TAC
- VRWJPO CAC
- Vermillion River Watershed JPB
- City and township officials
- Dakota and Scott counties
- State and regional agencies
- Dakota and Scott SWCDs
- Environmental organizations
- Agricultural organizations
- Recreational groups

To ensure stakeholders, officials, and residents were engaged in Plan development meaningfully, VRWJPO staff developed a Public Engagement Plan (PEP) with assistance from a consultant in July 2023. The primary objectives of the PEP included:

- Collecting data to best inform VRWJPO staff and JPB throughout the Plan revision process, including attitudes, behaviors, issues, and priorities related to the watershed
- Discussing and receiving feedback on proposed Plan goals, objectives, and actions with relevant stakeholder groups
- Requesting feedback, ideas, and opinions from stakeholder groups on how to:
    - Identify and assess challenges within the watershed for groundwater and surface water restoration and protection and determine strategies for addressing those challenges
    - Identify opportunities for and barriers to implement and/or to follow proposed Plan strategies
    - Understand the level of support for prospective Plan strategies
    - Provide accurate, relevant, and timely information to help all of those involved understand the Plan revision process and prospective strategies for them to make informed comments and recommendations

Public engagement was completed in three rounds (see *Figure C-1* on the following page for an infographic overview):

- **Opening Comments and Issue Identification:** Spring-summer 2023, identified key issues to address in the plan
- **Issues and Priorities:** Fall-winter 2023-2024, focused on further identifying and prioritizing issues
- **Goal and Objective Development and Prioritization:** Fall 2024, focused on reviewing and discussing Plan goals, objectives, and priorities

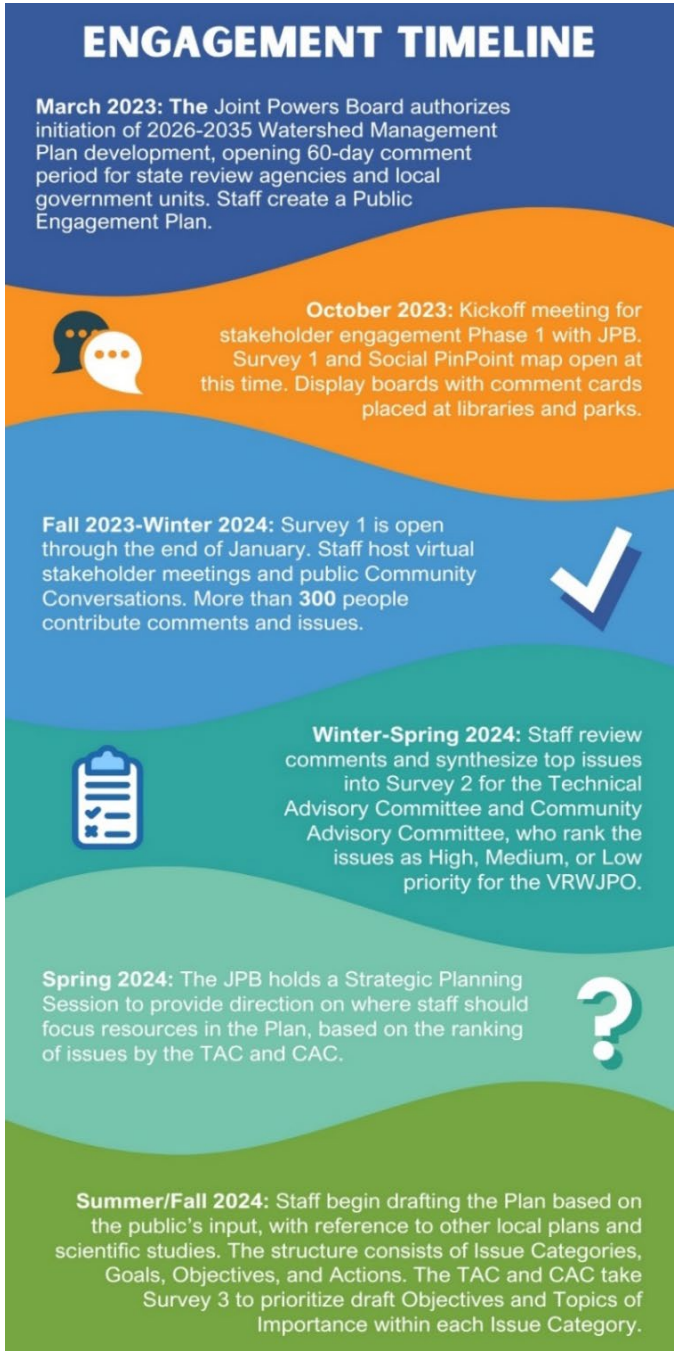


Figure C-1: Timeline of public engagement

C-1 Opening Comments

The JPB authorized the Plan update process to begin on March 23, 2023 (VRW Resolution 23-08). The VRWJPO sent an official notice of the Plan update to the state-designated Plan review agencies on April 3, 2023. In the notice, agencies and interested parties were given 60 days to provide comments relating to:

- Priority issues or opportunities and management expectations
- Water management goals for the next 10 years
- Water resource data, reports, and other relevant materials

State and regional review agencies required by statute included:

- BWSR
- MDA
- MDH
- DNR
- MNDOT
- Metropolitan Council
- MPCA

The same notice was also provided to representatives from:

- Black Dog WMO
- Castle Rock Township
- City of Apple Valley
- City of Burnsville
- City of Coates
- City of Elko New Market
- City of Empire
- City of Farmington
- City of Hampton
- City of Hastings
- City of Lakeville
- City of Rosemount

- City of Vermillion
- Dakota County
- Dakota County Farm Bureau
- Dakota County Farmers Union
- DCSWCD
- Douglas Township
- Eagan-Inver Grove Heights WMO
- Eureka Township
- Freshwater
- Friends of the Mississippi River
- Hampton Township
- Hmong American Farmers Association
- Lower Mississippi River WMO
- Marshan Township
- New Market Township
- Nininger Township
- North Cannon River WMO
- Prairie Island Indian Community
- Ravenna Township
- Scott County
- SSWCD
- Vermillion Township

Staff received comments from three cities (Apple Valley, Empire, and Rosemount), the Dakota County Environmental Resources Department, DCSWCD, Metropolitan Council, BWSR, DNR, and MPCA. The initial comments can be categorized into the following topics.

Water Quality

- The VRWJPO is encouraged to address impairments through restoration efforts that target their root causes, as well as protecting those waters not on the Impaired Waters List, through proactive implementation of BMPs
- Expand efforts to address chloride pollution, utilize Twin Cities Metropolitan Chloride Management TMDL, and consideration of Twin Cities Chloride Management Plan (MPCA) and the Regional Assessment of Chloride in Select Twin Cities Metro Streams (Metropolitan Council)
- Consider metrics in the Plan to encourage communities to look at a sample ordinance on chloride use
- Incorporate and implement strategies to address TMDLs
- Implement best management practices and innovative management techniques to reduce stormwater/nutrient and sediment runoff from surrounding commercial, residential and agricultural land
- Address impaired lakes and streams within the watershed
- Address impairments due to high levels of *E. coli* and/or fecal coliform due to feedlots, land application of manure, cattle in riparian areas, and leaking septic systems
- Identify water bodies that are "nearly or barely" impacted, prioritize keeping them from becoming impaired or work toward delisting
- Seek implementation activities that provide multiple benefits to water (quality, quantity, habitat, recreation)
- Target projects in areas with highest contributors of pollutants
- Consider testing Vermillion River for per- and polyfluorinated substances (PFAS)
- Groundwater sustainability
- Participate in water supply/conservation initiatives
- Consider strategies that promote water conservation practices and projects
- Consider water reuse strategies, such as reuse of stormwater and wastewater to offset groundwater demand for irrigation
- Maintain and enhance aquifer recharge
- Support Dakota County ACRE Plan
- Refer to Dakota County drinking water studies in planning process

Stormwater/Flooding

- Keep water where it falls by protecting and restoring wetlands, ensuring water courses are connected to their floodplains, and managing stormwater runoff with rate control and volume reduction standards
- Reduce the flow of water volume and nutrients through drainage systems
- Design culverts and bridges to retain floodplain functions and bank stability on natural channels and other drainage systems
- Consider re-evaluating 100-year floodplain risks for riparian areas based on most recent local model data and extreme rain events
- Reduce peak flow and volume of surface water runoff in areas that experience flooding or excessive soil loss
- Consider stormwater discharge needs of communities within the watershed
- Address the need for infiltration on sandy soils
- Address storm sewer infrastructure capacity and corresponding flooding problems

Climate Resiliency

- Address climate change and prioritization and expanded efforts related to climate resiliency
- Address changing weather patterns and extreme weather events
- Use tools such as the Climate Resiliency Toolbox and climate vulnerability assessment (CVA)

Land Use/Development

- Support land use planning and practices that protect, restore, and enhance priority ecological resources
- Minimize impacts of shoreline development
- Do not change requirements for setbacks for new home construction
- Promote green infrastructure
- Support Minimum Impact Design Standards (MIDS) and the LID approach
- Consider goals and objectives that will increase voluntary adoption of agricultural best management practices and alternate management tools
- Do not recommend changes to agriculture/farming practices
- Address soil erosion problems, and consider programs to protect or restore soil health
- Refer to the Dakota County Model Mining Ordinance to minimize impacts of aggregate mining on groundwater quality
- Keep wetland protection and management plans up to date
- Request that developers building significant amounts of impervious surfaces develop a chloride management plan

Habitat/Recreation

- Support use of BWSR-approved, weed-free, native seed mixes to provide pollinator habitat
- Address AIS and best management practices in watershed project plans and designs
- AIS such as Eurasian watermilfoil and curly-leaf pondweed may require herbicide or mechanical treatment to stop them from being a recreational nuisance
- Require NHIS review as early in planning stage of projects as possible
- Plan for impacts of Emerald Ash Borer (EAB)
- Address impacts to recreation opportunities
- Maintain and enhance native perennial vegetation as well as native buffers
- Understand causes of streambank erosion before attempting to stabilize streambanks

Collaboration

- Increase coordination and communication activities between organizations
- Consider other agency priorities under the Prioritized, Targeted, and Measurable criteria for developing goals and objectives to align efforts and allow pooling of resources

Administration

- Refer to MN Rule 8410, MN Statute 103B, and the One Watershed One Plan Guidebook for developing the Plan
- Include measurable goals for water quantity, water quality, public drainage systems, groundwater, wetlands, and other identified priority issues
- Plan should consider recent plans and processes such as the Dakota County Groundwater Plan, Dakota County ACRE Plan, Minnesota Groundwater Protection Rule, Dakota County Model Mining Ordinance
- Address issues, problems, CIP projects, or land use changes related to regional parks
- Address concerns identified in subwatershed assessments
- Public input process should consider diversity, equity, and inclusion elements and incorporate environmental justice principles
- Conduct integrated water resource management by utilizing the Watershed Health Assessment Framework (WHAF) interactive online map
- Utilize the Met Council Priority Water lists to help inform policies and activities
- Ensure opportunities for draft Plan review are provided

Education/Outreach

- Consider promoting homeowner education for proper use and maintenance or septic systems
- Consider partnering on education and outreach opportunities with private well owners
- Increase communication about the risks of overuse and degradation of groundwater resources
- Promote education of the public on the control of and spread of aquatic and terrestrial invasive species
- Target lakeshore owners and lake associations to help increase compliance with AIS laws
- Partner on Smart Salting Training and certification efforts
- Partner on turf management and low-input turf workshops to reduce irrigation and chemical use on lawns

Monitoring/Research

- Identify policies and strategies related to monitoring of water resources
- Identify and provide information regarding emerging contaminants
- Monitor water levels as they relate to water quantity and sustainability
- Identify issues with surface water-groundwater interaction
- Increase coordination of monitoring activities between organizations: e.g., groundwater monitoring data is available through Dakota County; Met Council waterbody monitoring is available on the EIMS website

C-2 Issue and Priority Identification

This round of stakeholder engagement focused on introducing the VRWJPO to the public, working to educate them about the VRWJPO's mission and goals, helping them to understand the types of projects and activities that the VRWJPO conducts within their communities, and seeking their input on the issues or priorities they'd like the VRWJPO to address in the Plan.

Table C-1: Engagement in Phase 1 opportunities

Method	Participation	Audiences Engaged
Initial Planning Meeting	29	• Cities • Environmental organizations • Dakota County • Metropolitan Council • State review agencies
Public Surveys	153	• Residents and visitors
Social Pinpoint	13	• Residents and other stakeholders
Displays		• Park and library visitors
Virtual Stakeholder Meetings	31	• Cities and townships • State agencies • Environmental organizations • Residents
Pop-Up Events	60	• Farm Market at Brand Farms • Indoor Farmers Market in Apple Valley
Community Conversations	26	• Residents • Recreational groups • Volunteers • City representatives
Advisory Committee Surveys	28	• TAC and CAC
	340	**Total Participants**

Initial Planning Meeting

VRWJPO staff hosted an initial planning kick-off meeting on October 12, 2023, as required by state rules. VRWJPO provided legal public notice of this meeting and distributed the notice to review agencies and stakeholders. The purpose of the meeting was to discuss watershed management issues and priorities that stakeholders wanted included in the 2026-2035 Plan. Staff also shared the comments received to date, explained the opportunities to provide input throughout the planning process, and provided attendees time to share feedback via display boards, take the public survey (Survey 1), and mark locations of interest or concern on an online map.

Twenty-nine people attended, representing: the JPB, the CAC, Dakota County, DCSWCD, MDH, Metropolitan Council, Twin Cities Trout Unlimited (TCTU), the City of Farmington, the City of Empire, Apple Valley Eco Advocates, and Minnesota Water Stewards.

Online and Paper Surveys

163 completed surveys were received (135 online, 28 hard copies). Survey 1 was offered in English and Spanish. Questions asked ranged from opinions on the existing mission statement to personal views on goals, issues, and concerns. Demographic questions helped capture a snapshot of who was able to be reached:

- 74 residents of the watershed
- 6 non-white respondents
- 5 low-income respondents
- 59 business, industry, agriculture, or non-profit agency stakeholders
- 11 respondents representing regional boards or agencies, such as counties, SWCDs, and Metropolitan Council

- 72 respondents from environmental organizations, such as Hastings Environmental Protectors and Twin Cities Trout Unlimited

Display Boards

- **Four public libraries** – Farmington, Lakeville, Hastings, and Elko New Market libraries hosted displays of printed materials that informed the public about the planning process, directed them to online resources, and collected in-person surveys and comment cards.
- **Two Dakota County parks** – Lebanon Hills Regional Park Visitor Center (Eagan) and Whitetail Woods Regional Park (Empire) hosted displays with QR code links to digital feedback methods. Lebanon Hills offered paper surveys.

Social Pinpoint Map

13 total comments. This online interactive mapping tool allowed visitors to voice their thoughts and opinions on geographically specific projects, features, and areas of concern within the watershed.

Community Conversations

26 total attendees. Two in-person Community Conversations were held in Lakeville and Hastings in January 2024. Open to the public, these meetings consisted of a short presentation followed by informational displays, conversation, and activities. Attendees who attended could fill out Survey 1. Attendees included Vermillion River Watershed Joint Powers Board members (Dakota County Commissioners Mike Slavik, Bill Droste, and Mary Liz Holberg, and Scott County Commissioner Tom Wolf), Hastings Mayor Mary Fassbender, residents concerned about floodplains on their property, residents interested in expanding civic engagement with the VRWJPO, and representatives from TCTU and the Rapids Riders.

Virtual Stakeholder Engagement Meetings

31 total attendees. Six virtual meetings were held with specific stakeholder groups (cities, townships, state agencies, nonprofits, citizen groups) in the watershed to discuss the existing watershed management plan goals and what issues or priorities were important in the new plan. Conversations centered around what is working well, what needs improvement, and possible solutions and resources moving forward.

Pop-Up Events

About 60 people engaged. VRWJPO and their consultant tabled at two community events – a fall market at Brand Farms (Empire) in October 2023 and an indoor farmers' market in Apple Valley in January 2024 – to gather input from the public (Figure C-2). Board displays, activities, and surveys were used to draw in conversation, educate about the watershed's role and plan update, and collect feedback on existing concerns. Coloring sheets were provided as a children's activity.



Figure C-2: Photos from Phase 1 Engagement Events

Key Takeaways

The following emerged as top priorities among commenters for where the VRWJPO should focus efforts over the next 10 years:

Protecting Water Quality and Quantity

- Maintain or improve water quality in the watershed
- Address contaminants such as nitrates, phosphorus, chlorides, and emerging contaminants such as PFAS
- Ensure that groundwater use remains sustainable, and aquifers are not at risk of excessive pumping or drawdown
- Best management practices (such as water reuse) and public education

Monitoring and Mitigating Impacts from New Developments

- Impacts of development on habitat, biodiversity, wetlands, and shorelines with population and economic growth
- Knowing what rules developers must abide by and how to monitor impacts on the watershed
- More education about authority, collaboration on rules/regulations, and enforcement strategies

Desire for More Education/Outreach

- Encourage opportunities to become more involved with stakeholder groups (e.g., Master Gardeners, Trout Unlimited, Minnesota Lakes & Rivers) to publicize existing programs and funding opportunities
- Connect with agriculture groups
- More education about private wells, septic systems, overuse of groundwater, AIS controls, reducing salt use, and low input turfgrass

Support for More Investment

- Maintain the watershed's assets and a willingness to increase funding, so long as there is continued education and information about where those dollars are being spent
- Sixty-two percent of respondents said they support additional financial investment in the watershed, with 88 percent of that group indicating they'd be willing to pay $20-100 more

Concerns about Trout Populations and Stream Health

- Among survey respondents, 66% currently fish rivers and creeks within the watershed
- Stream temperature monitoring, additional stocking, and protecting spawning habitat

Climate Change

- Climate change effects on fish populations and stream temperatures from droughts and rainfall amounts
- Ways to help mitigate the impacts and evaluate vulnerabilities to improve climate resilience, such as protecting and restoring wetlands and improving drainage systems

Assistance, Programs, and Funding

- Programs and funding available to and through VRWJPO
- Programs to implement cover crops
- Outside grants that might be available for large-scale watershed projects

Role in the Region – Regulations and Enforcement

- Need for more education, public outreach, and clear messaging about the VRWJPO, what it does for the community, how it relates to other agencies, and what role it plays in their day-to-day lives
- Confusion about the rules and regulations the VRWJPO can and cannot enforce

CAC and TAC Issue Prioritization

After the completion of the public input process, CAC and TAC members were invited to take a survey (Survey 2) to evaluate 25 overarching issues from the public. Twenty-eight people took the survey in total. Participants were asked to rate the identified issues on relevance to the VRWJPO's work and priority level.

1. Watershed Role in the Issue

- Essential JPO activity
- Good for JPO to do when possible
- Not JPO's work

2. Watershed Plan Priority (Essential or Good for the JPO to address)

- High
- Medium
- Low

CAC members rated each issue on a scale of 3.0 to 6.0 for relevance and plan priority. The combined scores are in the following graph (*Figure C-3*).

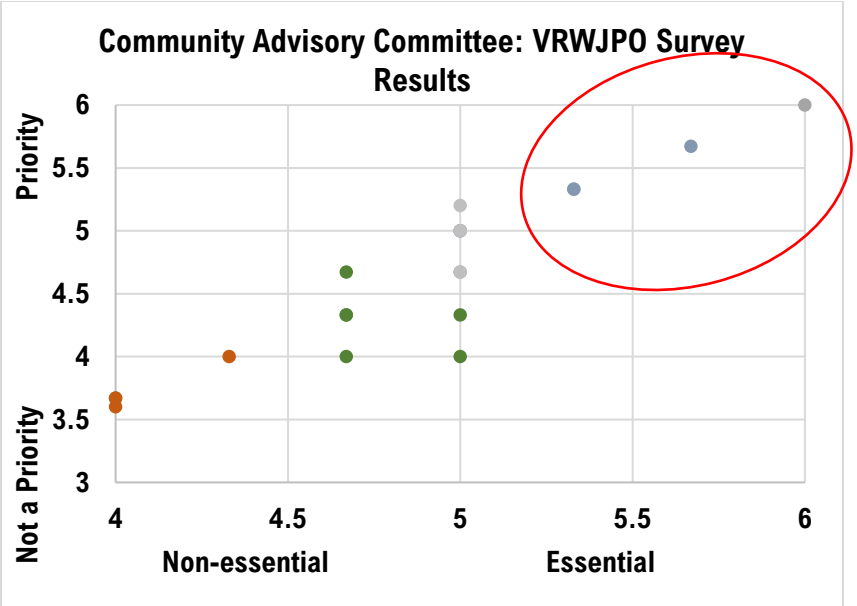


Figure C-3: CAC Issue Prioritization Survey Results

Issues with identical rating scores are plotted at the same point in the graph. Points in the upper right quadrant (circled in red) were identified as highly relevant for the VRWJPO's work and planning priorities.

Issues receiving a score of 4.5 (the midpoint value) or greater for relevance and priority included (*Table C-2*):

Table C-2: CAC Scoring of Proposed Issues

ISSUE (CAC Ratings)	Relevance	Priority	Average
Continue to evaluate, collaborate, and initiate projects that promote stream stability and natural channel restoration	6	6	6
Monitor effectiveness of JPO's watershed strategies and activities	5.67	5.67	5.67
Continue efforts to evaluate, collaborate, and initiate projects that address nitrogen levels in surface water and groundwater	5.33	5.33	5.33
Continue efforts to evaluate, collaborate, and initiate projects that address phosphorus levels in surface water	5.33	5.33	5.33
Continue to evaluate, collaborate, and initiate projects that mitigate loss and preserve wetlands	5.33	5.33	5.33
Improve collaboration and monitor effectiveness with LGUs on shared policies/standards, collaboration on beneficial projects, programs, and practices	5	5.2	5.1
Continue efforts and collaborate on initiatives for chloride reduction (re: smart salting techniques)	5	5	5
Reevaluate floodplains and impacts in flood-prone areas	5	5	5
Develop broader environmental education and engagement using earned and paid media	5	5	5
Review current regulations and make adjustments that are reasonable and enforceable by rural LGUs	5	5	5
Evaluate and collaborate on groundwater sustainability	5	5	5

TAC members also rated each issue on a scale of 3.0 to 6.0 for relevance to the JPO and priority for the Plan update. Combined scores are in the following graph (*Figure C-4*).

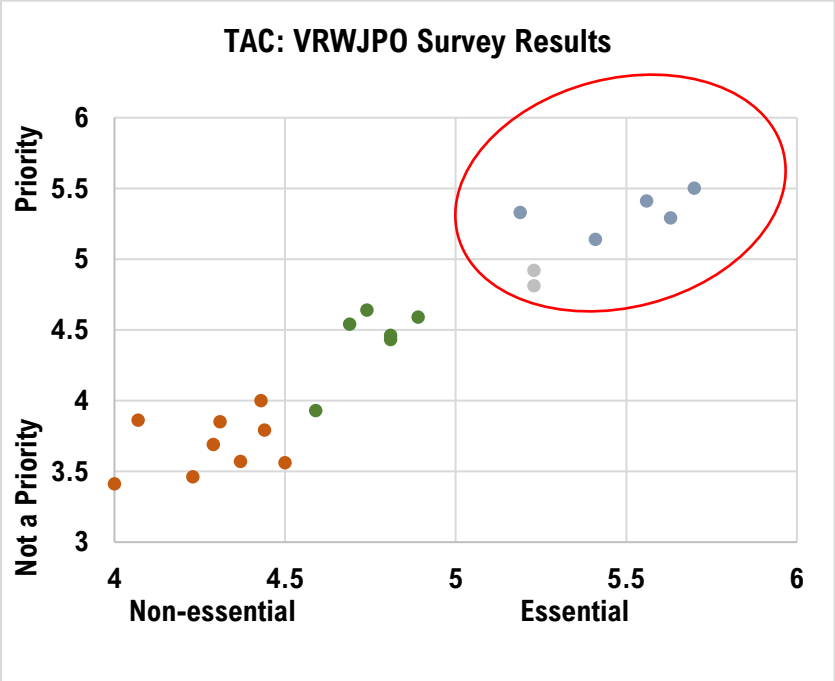


Figure C-4: TAC Issue Prioritization Survey Results

Issues receiving a score of 4.5 (the midpoint value) or greater for relevance and priority included *(Table C-3)*:

Table C-3: TAC Scoring of Proposed Issues

ISSUE (TAC Ratings)	Relevance	Priority	Average
Monitor effectiveness of JPO's watershed strategies and activities	5.7	5.5	5.60
Continue to promote effective stormwater management	5.56	5.41	5.49
Continue to evaluate, collaborate, and initiate projects that address phosphorous levels in surface water	5.63	5.29	5.46
Continue to evaluate, collaborate, and initiate projects that promote stream stability and natural channel restoration	5.41	5.14	5.28
Continue to evaluate, collaborate, and initiate projects that mitigate loss and preserve wetlands	5.19	5.33	5.26
Improve collaboration and monitor effectiveness with LGU's on shared policies/standards, collaboration on beneficial projects, programs, and practices	5.23	4.92	5.08
Continue to evaluate, collaborate, and initiate projects that address nitrogen levels in surface water and groundwater	5.23	4.81	5.02
Collaborate on initiatives that assess water resource impacts from riparian land changes/uses that aren't addressed through existing regulatory requirements to protect and restore soil health	4.89	4.59	4.74
Continue efforts and collaborate on initiatives for chloride reduction (re: smart salting techniques)	4.74	4.64	4.69
Continue to evaluate, collaborate, and initiate projects that address stormwater reuse	4.81	4.46	4.64
Review current regulations and make adjustments that are reasonable and enforceable by rural LGUs	4.81	4.43	4.62
Evaluate and collaborate on groundwater sustainability	4.69	4.54	4.62

Both committees gave similarly high ratings (4.5 or greater) to these topics:

- Projects for stream channel stability and restoration

- Monitoring the effectiveness of VRWJPO's strategies and activities
- Projects to preserve wetlands and mitigate wetland loss
- Addressing nitrogen and phosphorus levels
- Promoting effective stormwater management
- Improving collaboration with LGUs
- Initiatives for chloride reduction
- Collaborating on groundwater sustainability
- Ensuring that regulations are enforceable by LGUs
- Stormwater reuse
- Assessing impacts from riparian land use changes
- Re-evaluating floodplains
- Broadening education and engagement with earned and paid media

Staff shared these results with the JPB at a Strategic Planning Session on March 21, 2024, seeking direction on how to best focus efforts within the Plan based on what they'd learned. The JPB suggested the following:

- Determine which actions have the most impact. The "lowest-hanging fruit" projects have been completed, so the VRWJPO should determine where the best value is now.
- Staff should place focus on achieving high-quality projects, rather than striving for quantity, and continue coordination and collaboration with local partners for the best outcomes. Implementation actions should reflect this approach.
- The Plan should "edge-match" with other plans, such as county groundwater plans, city CIP plans, SWCD comprehensive plans, and land conservation plans, so as not to duplicate work being done elsewhere.
- The Plan should be as simple and clear as possible for communicating to the public and show how their tax dollars make a positive impact.

To keep the public apprised, a web page was posted that shared:

- Findings from initial outreach efforts
- A guide to the structure of the Plan
- A roadmap of the steps in the planning process
- Information about Plan content as it was developed

C-3 Goal and Objective Development and Prioritization

Based on the input received, VRWJPO staff chose six Issue Categories that structure this Plan. Each Issue Category includes:

- Issue Statements defining the larger problems being faced
- Measurable Goals establishing desired endpoints or results
- Objectives organizing Actions that will lead to accomplishing said Goals (*Actions for each Objective are listed in Table 3-14 on page 43)*

Prioritization Survey (Survey 3)

To assess and prioritize identified issues and corresponding objectives, staff invited the TAC and CAC to participate in a survey (Survey 3) on September 25, 2024. Members were provided draft Issue Categories, Goals, and Objectives before the meeting and were asked to rank the Objectives on what they saw as most important for the Plan. Staff also formulated Topics of Importance for each Issue Category and asked participants to rank them. Ranking schemes were provided as participants entered their answers into an online polling program called Mentimeter, which allows participants to vote from anywhere while the session is live and displays real-time results as votes are submitted. This method created a platform for real-time responses and prompted discussion among those in attendance.

Attendance

Twenty-five people participated in the survey, combined between in-person and virtual attendees. Participants represented organizations including:

- CAC
- Dakota County Environmental Resources Department
- DCSWCD
- City of Lakeville
- City of Rosemount
- City of Farmington
- Vermillion Township
- DNR
- MDH
- MDA
- BWSR
- MPCA
- MNDOT
- Metropolitan Council
- TCTU
- Minnesota Agriculture & Water Resources Coalition
- Emmons and Olivier Resources (EOR)
- RES

Aligning TAC-CAC Prioritization with JPB and Staff

VRWJPO staff collected the results following Survey 3. It was noted that the Mentimeter platform assigns priority based on a weighted scoring. To ensure the data represented the full audience perspective, more statistical analyses were conducted on the results. This additional lens of review, along with staff understanding of VRWJPO roles, resulted in a few minor differences in recommendations from staff from those presented by Survey 3 results.

On December 5, 2024, staff asked the JPB to provide their priority levels for Plan Objectives. Staff presented the information in a matrix that included a table for each Issue Category, organized into four columns:

- Column 1 lists the Objectives
- Column 2 presents TAC and CAC priority level recommendations from Survey 3
- Column 3 presents staff recommendations
- Column 4 presents the JPB's priority level recommendations

The full matrices for prioritization of Objectives can be seen in the tables on pages C-16 through C-21. The prioritization levels are applied to actions in the Implementation Table on page 43.

C-4 Local Government Unit Capital Improvement Program Review

To further edge-match the Plan with other relevant local efforts, staff met with various LGUs in the watershed to learn about their visions for 2026-2035 and how they match with VRWJPO priorities. Partnership ideas included:

- Street sweeping studies
- Stormwater drain and pond improvements
- Agricultural BMPs
- Streambank stabilizations
- Wetland restorations
- Stormwater reuse
- Potential assessments and studies
- Filtration basins
- Hydrodynamic separators
- Reconnecting water bodies to historic floodplains
- Irrigation improvements

Participating LGUs included:

- City of Apple Valley
- City of Burnsville
- City of Empire
- City of Farmington
- City of Hastings
- City of Lakeville
- City of Rosemount
- Dakota County

C-5 Standards Review and Update

As part of the full Plan update, staff found it prudent to revise the VRWJPO Standards as well, as they had not been updated since 2019. Proposed revisions to the Standards were drafted following input received during prioritization surveys. Feedback from the stakeholder surveys suggested that any regulations and criteria that are overly complicated, not enforceable by the VRWJPO, or not pertinent to engineering design should be removed from the Standards.

In response, VRWJPO staff drafted revisions to the Standards to the extent feasible for review. On March 13, 2025, VRWJPO staff met with the TAC to discuss the proposed revisions. Their input was incorporated into the final draft of the revised Standards (*Appendix D*), with the following changes made from the 2019 Standards:

Sections 1-9:

- Text not related to engineering design has been removed.
- Minor text updates related to engineering design have been added or revised for clarification.
- Duplicative criteria that are already in other LGU or MPCA ordinances/standards have been removed.

Section 5: Wetland Alteration Standards

- Wetland banking criteria have been modified to align with VRWJPO administration policies.

Section 6: Buffer Standards

- Wetland Functional Assessment rules have been replaced with language consistent with state wetland functional assessment protocols. *Figure D-1* may be revised from time to time throughout the life of the Plan, depending on changing trout stream designations that the DNR regulates.
- The “Exceptions” text has been moved to either “Regulation” or “Criteria”.

Section 7: Erosion and Sediment Control Standards

- Land disturbing activities will be permitted through the MPCA (or LGU with an MS4 permit) since unincorporated areas (other than Eureka Township, where the VRWJPO currently issues permits) face challenges with following VRWJPO Standards for projects that disturb less than one acre of land. This makes the Standards consistent with those of the North Cannon River WMO, which some townships in the VRWJPO also drain to.
- Removed section titled “Exceptions”.

Section 8: Stormwater Management Standards

- Text has been reorganized to follow a typical engineering design workflow:
    - Volume Control
    - Rate Control
    - Post-Construction Water Quality Criteria
- Removed sections on waivers, trading, and exceptions.

Section 10: Agricultural Standards

- Removed section. Most routine ongoing agricultural activities are exempt from permitting under the Clean Water Act, and voluntary stewardship programs are managed through other organizations like SWCDs.

C-6 Draft Plan Comment Period

Staff received approval from the JPB to submit the draft Plan for the statutorily required 60-day review and comment period for the two counties, Metropolitan Council, state review agencies, SWCDs, all cities in the watershed, and all townships in the watershed. Dakota County reviewed the draft Plan for consistency with the County's Groundwater Plan. The 60-day comment period took place from August 28 to October 28, 2025.

VRWJPO responded to stakeholder comments in writing and hosted a public hearing on the draft Plan on January 22, 2026, meeting the statutory requirement to hold a public hearing no sooner than 14 days after the 60-day comment period. The draft Plan, comments received, a record of the public hearing, and a summary of changes incorporated from the review period were submitted to the Metropolitan Council, required state review agencies, and the BWSR for final review of compliance with statute. These records are posted on the VRWJPO website.

Following the public hearing, the JPB passed Resolution VRW 26-08 to adopt the Plan contingent upon approval by the BWSR. VRWJPO staff presented the Plan to the BWSR Central Region Committee on April 6, 2026. The committee recommended approval of the Plan to the full Board, which voted to approve it on April 22, 2026.

Water Quality

Issue Category Information

Water quality has been a primary driver of work in the Vermillion River Watershed since the VRWJPO's inception. For this generation Plan, water quality encompasses both surface and groundwater sources. Issue Statements include:

- Surface water quality is threatened or impaired.
- Groundwater quality is threatened or impaired.

Water Quality Objectives	*CAC-TAC Input*	*Staff Recommendations* *(Based On Expertise & Statistical Analysis)*	*Board Recommendations*
Protect surface waters from impairments	High Priority	High Priority	High Priority
Support and implement projects, programs and practices to protect or improve groundwater quality	High Priority	Medium Priority	Medium Priority
Use surface water quality monitoring data to inform restoration and protection decisions	Medium Priority	High Priority	High Priority
Remove surface waters from the impaired waters list	Medium Priority	High Priority	High Priority
Coordinate with others to assess impacts to groundwater from the Vermillion River and its tributaries	Low Priority	Medium Priority	Medium Priority
Assist and coordinate groundwater quality work with lead groundwater organizations	Low Priority	Low Priority	Low Priority

Stormwater Management

Issue Category Information

This Plan is structured to address management of stormwater runoff through implementation actions that: promote conservation of features that naturally attenuate stormwater, expand on built practices that can improve stormwater quality and quantity, and capture and reuse stormwater where feasible. Issue Statements include:

- Land alterations and lack of adequate stormwater management in the VRWJPO have increased the rate and volume of stormwater runoff, impacted water quality, degraded habitat and increased flood risk.
- VRWJPO Rules and Standards are challenging for some local government units to enforce.

Stormwater Management Objectives	*CAC-TAC Input*	*Staff Recommendations* (Based On Expertise & Statistical Analysis)	*Board Recommendations*
Promote and implement stormwater practices that manage the peak rate and volume of runoff from the landscape	High Priority	High Priority	High Priority
Promote and implement infiltration practices	High Priority	High Priority	High Priority
Assist in the development and implementation of policies and programs that promote green infrastructure and low impact development practices	Medium Priority	Medium Priority	Medium Priority
Promote protection of natural floodplain capacities	Medium Priority	Medium Priority	Medium Priority
Collaborate with technical experts and local governments when updating, revising, or changing watershed rules and standards	Medium Priority	Medium Priority	Medium Priority
Ensure watershed rules and standards can be administered by local governments	Low Priority	Low Priority	Low Priority
Assist local governments with navigating and understanding regulatory frameworks	Low Priority	Low Priority	Low Priority

Groundwater Sustainability

Issue Category Information

While the VRWJPO is not a governing body for groundwater, impacts have implications for local water resources and watershed communities. For this reason, this Plan incorporates groundwater sustainability implementation actions that: assist with groundwater conservation initiatives and lean on the expertise of groundwater supply leading agencies. Issue Statements include:

- Groundwater aquifer supply is threatened due to increased and competing uses.
- Groundwater recharge rates are decreasing due to landscape alterations and climatic fluctuations.

Groundwater Sustainability Objectives	*CAC-TAC Input*	*Staff Recommendations* (Based On Expertise & Statistical Analysis)	*Board Recommendations*
Assist with and coordinate groundwater supply planning, protection, and improvement efforts with lead groundwater organizations	High Priority	High Priority	High Priority
Assist with and implement projects, programs and practices that reduce landscape and agricultural water use	Medium Priority	Medium Priority	Medium Priority
Assist with and implement projects programs and practices that promote infiltration	Low Priority	Low Priority	Low Priority

Climate Resilience

Issue Category Information

While the VRWJPO does not have a role in minimizing greenhouse gas reductions, water planning entities and local communities are tasked with fostering resilience on the build and natural landscapes. The Plan achieves this through implementation actions that: support engineering best practices for the built environment, improve historic infrastructure to account for climate deviations and promote resilience in the natural environment. Issue Statements include:

- Climatic patterns are negatively impacting the watershed's natural and built environments.
- Historic stormwater infrastructure is not adequate to manage climate patterns.

Climate Resilience Objectives	*CAC-TAC Input*	*Staff Recommendations* (Based On Expertise & Statistical Analysis)	*Board Recommendations*
Foster partnerships to implement projects, programs and practices that improve stormwater infrastructure's resilience to climate impacts	High Priority	High Priority	High Priority
Support LGUs in stormwater infrastructure adaption	High Priority	Low Priority	Low Priority
Foster partnerships to implement projects, programs, and practices to increase the amount of green infrastructure	Medium Priority	Medium Priority	Medium Priority
Support re-evaluation of watershed floodplains using updated data	Medium Priority	Medium Priority	Medium Priority
Promote reconnection to historic floodplains	Low Priority	High Priority	Medium Priority

Natural Environments

Issue Category Information

The Watershed Management Plan supports growth in an environmentally responsible manner through implementation actions that: support native biodiversity, protect and improve local habitats and minimize impacts to local ecosystems. The Issue Statement relating to this category can be found below:

- Human-caused ecosystem disruptions decrease biological diversity, promote the proliferation of invasive species and have wide-reaching impacts to the watershed's natural environment.

Natural Environments Objectives	*CAC-TAC Input*	*Staff Recommendations* (Based On Expertise & Statistical Analysis)	*Board Recommendations*
Coordinate with others to implement projects, programs, and practices that protect the watershed's aquatic and riparian habitats	High Priority	High Priority	High Priority
Identify and improve high-priority water resource environments found to be significantly impacted by humans	High Priority	High Priority	High Priority
Coordinate with others to implement projects, programs, and practices that improve soil health	Medium Priority	Medium Priority	Medium Priority
Coordinate with others to implement projects, programs, and practices that improve disturbed landscapes	Low Priority	Low Priority	Low Priority

Community Relationships

Issue Category Information

Establishing and nurturing relationships with individuals that live, work and play within the Vermillion River Watershed is essential for our success. This Plan will foster the longevity of meaningful community relationships through implementation actions that: articulate the impact local communities have on local water resources and natural environments; promote the engagement of individuals and groups in implementation of environmental stewardship projects, programs, and practices; and increase the understanding of the VRWJPO's role in various environmental activities. Issue Statements can be found below.

- Public awareness and understanding of the VRWJPO are limited.
- Community members in the watershed lack awareness of opportunities to engage in the VRWJPO's work.

Community Relationships Objectives	*CAC-TAC Input*	*Staff Recommendations* (Based On Expertise & Statistical Analysis)	*Board Recommendations*
Create and support opportunities for stakeholder connection and engagement with the watershed's natural resources	High Priority	High Priority	High Priority
Consistently communicate and promote the work of the VRWJPO with partners and stakeholders	High Priority	High Priority	High Priority
Communicate with stakeholders regarding the environmental issues that directly impact the watershed	High Priority	High Priority	High Priority
Engage citizens to promote sustainable stewardship of lakes and streams	Medium Priority	Medium Priority	Medium Priority
Grow the amount of watershed stakeholders	Medium Priority	Medium Priority	Medium Priority
Maintain or increase ways for stakeholders to provide relevant input to the VRWJPO	Low Priority	Low Priority	Low Priority

Appendix D: Standards for the Vermillion River Watershed Joint Powers Organization

Table of Contents

Section 1: Policy Statement.....**D-3**

Section 2: Relationship with Local Government Units.....**D-4**

Section 3: Definitions.....**D-5**

Section 4: Floodplain Alteration Standards.....**D-10**

4.1 Policy.....D-10

4.2 Regulation.....D-10

4.3 Criteria.....D-10

Section 5: Wetland Alteration Standards.....**D-11**

5.1 Policy.....D-11

5.2 Regulation.....D-11

5.3 Criteria.....D-11

Section 6: Buffer Standards.....**D-12**

6.1 Policy.....D-12

6.2 Regulation.....D-12

6.3 Criteria.....D-13

Section 7: Erosion and Sediment Control Standards.....**D-18**

7.1 Policy.....D-18

7.2 Regulation.....D-18

7.3 Criteria.....D-18

Section 8: Stormwater Management Standards.....**D-19**

8.1 Policy.....D-19

8.2 Regulation.....D-19

8.3 Criteria.....D-19

8.4 Maintenance.....D-21

8.5 Easements.....D-21

8.6 Covenants.....D-21

Section 9: Drainage Alteration Standards.....**D-22**

9.1 Policy.....D-22

9.2 Regulation.....D-22

9.3 Criteria.....D-22

9.4 Exceptions.....D-23

Adopted April 22, 2026, as part of the 2026-2035 Vermillion River Watershed Management Plan.

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Section 1: Policy Statement

The Vermillion River Watershed Joint Powers Organization (VRWJPO) is a watershed management organization as defined in the Metropolitan Surface Water Management Act (Minn. Statutes Chapter 103B). This Act provides the VRWJPO with the authority to accomplish its statutory purpose – to protect, preserve and manage surface and groundwater systems within the Vermillion River Watershed (Watershed).

The VRWJPO has adopted a Watershed Management Plan (Plan) pursuant to the Act and Minn. Rules Chapter 8410. As defined by Minn. Rule 8410.0105, the Plan must incorporate controls or performance standards relating to, at minimum, wetland management, management of stormwater runoff, flooding impacts, and a classification system for the management of waterbodies.

The Plan provides the management Goals, Objectives, and Actions that the VRWJPO will use to protect, improve, preserve, and manage water resources in the watershed, and the need and reasonableness for standards, rules, and ordinances to enforce the Goals, Objectives, and Actions of the plan. Many of these Standards are intended to mitigate the potential for impacts to water resources in the watershed from land development and other activities, essentially acting as a tool to protect, preserve, and manage water resources. In this way, the following Standards implement the Plan's Goals, Objectives, and Actions.

Watershed studies have documented streambank erosion where changes in land use and land management throughout the watershed have resulted in increased flow volume, intensity, and duration, combined with poor quality riparian vegetation, leading to bank instability. Unstable stream channels can depress land values, damage property, and endanger high value structures. Accelerated streambank erosion can also increase the rate and severity of stream channel migration, which could result in property loss. In addition, unstable channels undermine bridges, clog culverts, and can otherwise damage infrastructure, requiring costly repairs and ensuring legal issues for both public agencies and private individuals.

A number of sensitive habitats and communities exist in the watershed, including designated trout streams, natural communities, rare and endangered species, and wetlands. Trout and their habitats may be threatened by development without appropriate stormwater management or appropriate land management on agricultural lands. Other sensitive resources, such as natural communities, rare species, and wetlands, have been depleted or have been altered throughout the watershed. This has increased the value of remaining natural communities and resources. Wetlands can be impacted directly by development and land disturbing activities, and indirectly by hydrologic and water quality changes that are sometimes associated with development and other land disturbing activities. Wetlands provide a variety of functions and values, which are important to the overall character and function of the watershed.

Cities and residents throughout the VRWJPO derive their drinking water from groundwater. High nitrates have been documented in groundwater and wells in the eastern portions of the watershed. The nitrates have largely been linked to agricultural activities. Future activities without better management or adequate controls may further impact groundwater quality. Impacts to groundwater and water resources from agricultural resources are no longer addressed by these Standards, as the previous version of the Standards (2019) did not provide any tools for regulation or enforcement. The VRWJPO intends to work with partner agencies that are regulating agricultural activities to avoid overlapping requirements and work with partner agencies on proactive projects to improve land management and stewardship.

These Standards address the issues identified in the Plan to protect the public health, safety, welfare and natural resources of the VRWJPO by regulating the improvement or alteration of land and waters within the watershed to reduce the severity and frequency of high water, to preserve floodplain and wetland storage capacity, to improve the chemical and physical quality of surface waters, to reduce sedimentation, to preserve the hydraulic and navigational capacities of waterbodies, to preserve and protect channels and drainageways, to promote and preserve natural infiltration areas, protect groundwater, and to preserve natural shoreline features. In addition to protecting natural resources, these Standards are intended to minimize future public expenditures and liability on issues caused by the improvement or alteration of land and waters.

Section 2: Relationship with Local Government Units

The VRWJPO recognizes that the control and determination of appropriate land use is the responsibility of the Local Governmental Units (LGUs, e.g. cities, townships, counties). The VRWJPO can adopt Rules consistent with these Standards in the event it acquires the authority of a watershed district under Minn. Stat. 103B.211, Subd. 1(a)(3).

LGUs are responsible for adopting Local Water Plans (LWPs) and other regulatory controls that implement the Plan. Pursuant to Minn. Stat. 103B.235, The Vermillion River Watershed Joint Powers Board must approve LWP's. The standards in the LWP's must meet or exceed the VRWJPO's Standards and must implement the Standards. LGUs may elect to adopt the VRWJPO Plan by reference, though this option still requires creation of a local ordinance to meet these Standards.

In Dakota County, the cities are the LGUs within their corporate limits. The Townships are the planning and zoning authority in the unincorporated areas in Dakota County. Dakota County maintains permitting authority over development impacting Shoreland and Floodplain and may be the permitting authority for Individual Sewage Treatment Systems (depending on the Township or location within Shoreland and Floodplain). In Scott County, the County is the planning and zoning authority in addition to maintaining permitting authority over Shorelands and Floodplain and Individual Sewage Treatment Systems in unincorporated areas. Thus, in the Scott County portions of the VRWJPO, cities are the LGUs in incorporated areas and Scott County is the LGU in unincorporated areas.

The VRWJPO will evaluate local government official controls to determine if they match the VRWJPO Standards. If a local government's official controls are found to be insufficient (i.e., do not meet the VRWJPO Standards), the VRWJPO will implement a permitting program in that community.

If an LGU incorporates the VRWJPO Standards into its official controls, and demonstrates compliance with the VRWJPO Standards, that LGU will be responsible for permitting activities. The VRWJPO will require LGUs responsible for permitting to submit some proposed plans to the VRWJPO for review and comment on an as-needed basis. LGUs may also request assistance from the VRWJPO with the review of development plans or clarifications on Standards being implemented through local ordinances. Plans with the following conditions are particularly important to the VRWJPO for review and/or comment:

- Diversions which negatively affect downstream water courses
- Intercommunity flows (upon request from adjoining communities)
- Project site size of 40 acres or more

- Projects that are adjacent to or appear to impact watercourses or unique natural resources

All land alteration plans that require an amendment to, or a variance from, the adopted local water plan must be submitted to the VRWJPO for review and approval, or denial, as prescribed by Minn. Stat. 103B.211. The VRWJPO can enforce these Standards or Rules (if Rules are implemented) as allowed by Minn. Stat. 103B and 103D and may evaluate LGU enforcement of Standards at any time. If these evaluations reveal non-compliance with the Standards, the VRWJPO will implement a permitting program for all applicable Standards that fall under the VRWJPO's direct enforcement authority in that community. In the event of implementing a permitting program, the VRWJPO will collect permit fees from applicants to offset the costs of implementing a permitting program.

These Standards present the VRWJPO's interpretation of how the Goals, Objectives, and Actions in the Plan should be translated into Standards. LGUs may adopt more restrictive standards. The VRWJPO recognizes that LGUs have different authorities and different ways of implementing programs that will necessitate variation in language and approaches from those presented in the Standards. However, ordinances and official controls implementing the VRWJPO Standards must ultimately show compliance.

Section 3: Definitions

Unless the context clearly indicates otherwise, the following words and phrases shall have the meanings ascribed to them in this section. Unless specifically defined herein, terms used in these Standards shall have the same definition as provided in Minn. Stat. 103B and 103D and Minn. Rule 8410 as may be amended, and if not defined there, shall have common usage meaning. For purposes of these Standards, the words "must" and "shall" are mandatory, and the word "may" is permissive.

Agricultural Activity – The use of land for growing and/or production and wholesale distribution of field crops, livestock, and livestock products to produce income or own use, including but not limited to the following:

1. Field crops, including but not limited to: hemp, wheat, wheatgrass, barley, beans, corn, hay, oats, potatoes, rye, peas, sorghum, and sunflowers
2. Livestock, including but not limited to, structures used for care of livestock, dairy and beef cattle, goats, sheep, hogs, horses, poultry, game birds and other animals, including deer, rabbits, elk, alpaca, llama, and mink
3. Livestock products, including but not limited to, structures used to produce or store products, milk, butter cheese, eggs, meat, fur, and honey
4. Trees, shrubs, bushes, and plants for wholesale distribution
5. Sod farming
6. Orchards

Agricultural Preserve – A land area created and restricted according to Minn. Stat. 473H.05 to remain in agricultural use.

Alteration or Alter – When used in conjunction with public waters or wetlands, any activity that will change or diminish the course, current or cross-section of public waters, public waters wetlands, or wetlands.

Bankfull Channel Width – The channel width of a stream, creek, or river at bankfull stage.

Bankfull Stage – The water level in a stream channel, creek, or river where the flow just begins to leave the main channel and enter the connected floodplain.

Base Flood Elevation – The computed elevation to which floodwater is anticipated to rise during a 100-year flood (a flood that has a 1% chance of occurring in any given year). It is determined by the Federal Emergency Management Association (FEMA) and used in floodplain management, insurance, and building regulations to establish safe construction practices.

Best Management Practices or BMPs – Techniques proven to be effective in controlling runoff, erosion and sedimentation, including those documented in the Minnesota Construction Site Erosion and Sediment Control Planning Handbook (BWSR, 1988); Protecting Water Quality in Urban Areas (MPCA, 2000); the Minnesota Small Sites BMPs Manual (Metropolitan Council, 2001); the Minnesota Stormwater Manual (MPCA 2005); and, other sources as approved by the VRWJPO: as such documents may be amended, revised or supplemented.

BWSR – The Minnesota Board of Water and Soil Resources.

Buffer – An area of natural, minimally maintained, vegetated ground cover abutting or surrounding a watercourse, public waters wetland, or wetland.

Commercial Use Development – The development of property for use as a commercial business or office.

Compensatory Storage – Excavated volume of material below the floodplain elevation required to offset floodplain fill.

Dakota SWCD – The Dakota County Soil and Water Conservation District.

Dead Storage – The volume of space located below the overflow point of a basin, pond or landlocked basin.

Drain or Drainage – Any method for removing or diverting water from water bodies, including excavation of an open ditch, installation of subsurface drainage tile, filling, diking, or pumping.

Erosion – The wearing away of the ground surface as a result of wind, flowing water, ice movement, or land disturbing activities.

Erosion and Sediment Control Plan – A plan of BMPs or equivalent measures designed to control runoff and erosion and to retain or control sediment on land during the period of land-disturbing activities using standards adopted by the jurisdictional authority.

Excavation – The artificial removal of soil or other earth material.

Fill – The process of adding soil, gravel, or other materials to raise the ground level or create a stable foundation. Fill is used to build up low areas, level uneven terrain, or provide a base for construction projects such as roads, building pads, or embankments.

Filtration – A process by which stormwater runoff is captured, temporarily stored, and routed through a filter, vegetated strip, underdrain, or buffer to improve water quality.

Floodplain – Any land area susceptible to being inundated by floodwaters from any source. More specifically, FEMA's Special Flood Hazard Area (SFHA) refers to the area that has a 1% annual chance of flooding (also called the 100-year floodplain). Floodplains are categorized on Flood Insurance Rate Maps (FIRMs), which indicate flood risk and are used for insurance, building regulations, and disaster preparedness.

Floodplain Storage – The volume of space available for flood water volume within the floodplain.

Fragmentation – The breaking up of an organism's habitat into discontinuous components.

Grassed Waterway – A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.

Green Acres – Real property or real estate that qualifies as agricultural property having agricultural use under the Minnesota Agricultural Property Tax Law, Minn. Stat. § 273.111.

Industrial Use Development – The development of property for industrial use as identified by the Standard Industrial Classification (SIC) codes or the North American Industry Classification System (NAICS code).

Infiltration – A process by which stormwater runoff is captured, temporarily stored, and routed through a filter, vegetated strip, or buffer to improve water quality while reducing the volume of stormwater runoff by transmitting runoff into the ground.

Impervious Surface – A constructed hard surface that either prevents or retards the entry of water into the soil and causes water to run off the surface in greater quantities and at an increased rate of flow than before development. Examples include rooftops, sidewalks, patios, driveways, parking lots, storage areas, and concrete, asphalt, or gravel roads.

Infrastructure – The system of public works for a county, state, or LGU, including, but not limited to, structures, roads, bridges, culverts, sidewalks, stormwater management facilities, conveyance systems and pipes, pump stations, sanitary sewers and interceptors, hydraulic structures, permanent erosion control and stream bank protection measures, water lines, gas lines, or electrical lines and associated facilities, and communication lines and supporting facilities.

Land Disturbing Activity – Any activity on property that results in a change or alteration in the existing ground cover (both vegetative and non-vegetative) and/or the existing soil topography. Land disturbing activities include, but are not limited to, development, redevelopment, demolition, construction, reconstruction, clearing, grading, filling, stockpiling, excavation, and borrow pits. The use of land for new and continuing agricultural activities and routine vegetation management activities shall not constitute a land disturbing activity under these Standards.

Landlocked Basin – A basin that is one acre or more in size and does not have a natural outlet at or below the existing 100-year flood elevation as determined by the 100-year runoff event.

Local Governmental Unit or LGU and/or Jurisdictional Authority – Any federal, state, city, county, and township lying in whole or part within the VRWJPO having the authority to review and approve items related to development, redevelopment, improvement, or modification of the natural landscape.

Lot – A parcel of land designated by metes and bounds, subdivision plats, platted property, or other accepted means and separated from other parcels or portions by said description for the purpose of sale, lease, or separation thereof, as designated by Scott or Dakota County.

Lot of Record – Any lot that legally existed prior to the current adoption date of these Standards.

Meander – A sinuous bend of a river, stream, or creek.

Meander Belt – The area between lines drawn tangential to the extreme limits of fully developed meanders.

Minimum Impact Alignment – The alignment for a proposed road, street, utility, path or access that creates the smallest area of

impact to a buffer, watercourse, or floodplain. For activities that cross a buffer, watercourse, or floodplain the minimum impact alignment is one that crosses perpendicular, or near perpendicular, to the longitudinal orientation of the buffer, watercourse, or floodplain as reasonable to serve the intended purpose of the improvement.

MPCA – The Minnesota Pollution Control Agency.

MS4 – 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 cities, townships, counties, military bases, hospitals, prison complexes, highway departments, universities, sewer districts, etc.), designed or used for collecting or conveying stormwater, not a combined sewer, and not part of a publicly owned treatment works.

Native Vegetation – Plant species that are indigenous to Minnesota, or that expand their range into Minnesota without being intentionally or unintentionally introduced by human activity and are classified as native in the Minnesota Plant Database.

Natural Retention or Detention – Retention or detention storage of rainwater and runoff that occurs due to the natural landscape and is not artificially constructed.

New Development – The construction of any public or private improvement project, infrastructure, structure, street or road that creates more than 1 acre of new or additional impervious surface or, the subdivision of land.

Noxious Weeds – Any plant listed as a prohibited or restricted or secondary weed according to the Minnesota Department of Agriculture's Minnesota Noxious Weed List.

NPDES – National Pollutant Discharge Elimination System.

NRCS – United States Department of Agriculture Natural Resources Conservation Service.

Ordinary High Water (OHW) Level – The boundary of water basins, watercourses, public waters, and public waters wetlands pursuant to Minnesota Statues 103G.005, subd. 14.

Outlot – A parcel of land shown on a subdivision plat as an outlot, as designated by Scott or Dakota County, and designated alphanumerically, (for example – Outlot A.). Outlots are used to designate one of the following: Land that is part of the subdivision but is to be subdivided into lots and blocks at a later date; land that is to be used for a specific purpose as designated in a developer's agreement or other agreement between the Local Governmental Unit and the developer; or for a public purpose that may have restricted uses such as a buffer.

Plat – The drawing or map of a subdivision prepared for filing of record pursuant to Minn. Stat. § Ch. 505.

Pre-development Condition – The land use on a site that existed in 2005.

Public Waters Wetland – Any public waters wetland as defined in Minn. Stat. § 103G.005, subd. 15a.

Recreational Use Development – Any development of land for recreational use, including but not limited to, parklands, sporting facilities, golf courses, and other commercial or public facilities designed and used to provide recreational opportunities to the public.

Redevelopment – The rebuilding, repair, or alteration of a structure, land surface, road or street, or facility that creates less

than 1 acre of new impervious surface, and disturbs, replaces, or alters more than 1 acre of existing impervious surface.

Right-Of-Way – A strip of land occupied or intended to be occupied by a street, railroad, electric transmission line, oil or gas pipeline, water main, sanitary or storm sewer main, or another special use, and dedicated to public use by the recording of the plat on which such right-of-way is established.

Runoff – Rainfall, snowmelt or irrigation water flowing over the ground surface.

Rural Preserves – Class 2a or 2b property that had been assessed under Minnesota Stat. § 2006, section 273.111, or that is part of an agricultural homestead under Minnesota Stat. § 2006, section 273.13, subdivision 23, paragraph (a).

Scott SWCD – The Scott Soil and Water Conservation District.

Sediment – Soil or other surficial material transported by surface water.

Sedimentation – The process or action of depositing sediment.

Sinuous – The curving patterns of a river, stream, or creek.

Stewardship Plan – A conservation plan completed for agricultural land and activities accepted by the Dakota SWCD, the Scott SWCD, or the VRWJPO.

Stream Type – One of numerous stream types based on morphology defined by Rosgen D., *Applied River Morphology*, 1996.

Stormwater Pollution Prevention Plan or SWPPP – A plan for stormwater discharge that includes erosion prevention measures and sediment controls that, when implemented, will decrease soil erosion on a parcel of land and decrease off-site nonpoint pollution.

Structure – Anything manufactured, constructed, or erected which is normally attached to or positioned on land, including portable structures, earthen structures, water and storage systems, drainage facilities, and parking lots.

Subdivision – The separation of an area, lot, or tract of land under single ownership into two or more parcels, tracts, or lots.

USDA – United States Department of Agriculture.

VRWJPO – Vermillion River Watershed Joint Powers Organization.

Watercourse – Intermittent and perennial streams identified on Map 1 attached to these Standards.

Wetland – Any wetland as defined in Minn. Stat. § 103G.005, subd. 19.

Wetland Conservation Act or WCA – The Minnesota Wetland Conservation Act of 1991, as amended.

Section 4: Floodplain Alteration Standards

Summary of Purpose and Jurisdiction Guidance

Floodplain alteration involves land disturbing activities and projects that may impact the floodplain, or the area around waterbodies that is inundated during heavy rainfall or snowmelt events. Regulations exist for land disturbing activities and projects in floodplain areas to maintain floodplain storage, to minimize changes to upstream and downstream property and stream reaches, and to protect property and structures.

In Dakota County, cities are the LGUs in incorporated areas that regulate floodplain activities and must be contacted for appropriate permits. Dakota County administers Shoreland and Floodplain requirements through its Ordinance 50 in unincorporated townships and must be contacted for appropriate permits for activities within the floodplain. In Scott County, cities are the LGUs for incorporated areas while Scott County requires permits for the unincorporated areas that regulate floodplain activities and must be contacted for appropriate permits. The VRWJPO does not have a direct role in the implementation or oversight of floodplain activities as that is the responsibility of the jurisdictional authority.

4.1 Policy

It is the policy of the VRWJPO to:

- Protect the natural function of the Federal Emergency Management Agency (FEMA)-designated floodplain storage areas from encroachment.
- Maintain storage volumes in FEMA-designated floodplains.
- Require Local Plans to include a provision that restricts construction of new structures in FEMA-designated floodplains.
- Require Local Governments to adopt floodplain ordinances that are consistent with Dakota and Scott County water resources plans and ordinances.
- Require floodplain alterations result in “no net loss” of floodplain storage, including the preservation, restoration, and management of floodplain wetlands.
- Encourage local governments gain compensatory storage above direct replacement for new developments within the floodplain.

4.2 Regulation

No person or political subdivision shall obstruct flood flows, increase flood elevations, fill, excavate, or store materials or equipment below the Base Flood Elevation of any watercourse, public waters, public waters wetland, or other wetland without first obtaining a permit from the appropriate LGU.

4.3 Criteria

Development within the floodplain is regulated by the jurisdictional authority.

Section 5: Wetland Alteration Standards

Summary of Purpose and Jurisdiction Guidance

Wetlands are areas that collect and filter water and are defined by their soils, vegetation, and hydrology (the way water is held by and flows through them). Wetlands are critical resources for storage and treatment of surface water runoff and are extremely valuable to the watershed. LGUs are required to enforce the Wetland Conservation Act (WCA) in Minnesota. As a result, the VRWJPO does not have a direct role in the implementation or oversight of WCA, as that is the direct role of the jurisdictional authority.

In Dakota County, cities and townships are the LGUs for WCA enforcement and require wetland delineations and permit approvals if wetland impacts cannot be avoided. The Dakota SWCD is contracted to do wetland reviews for many of the townships and some cities in Dakota County. In Scott County, cities are the LGUs for incorporated areas, while Scott County reviews delineations and approvals for the unincorporated areas.

5.1 Policy

It is the policy of the VRWJPO to:

- Work to achieve no net loss of wetlands in the watershed.
- Replace lost wetlands in the same subwatershed whenever possible.
- Provide equal or greater functions and values for lost wetlands at the replacement ratios dictated by the WCA.
- Avoid direct or indirect wetland disturbance per State and Federal requirements and approved local wetland management plans.
- Limit the use of high-quality wetlands for stormwater management where other alternatives exist.
- Avoid fragmentation of natural areas and corridors when feasible and mitigate when unavoidable.

5.2 Regulation

No person or political subdivision shall drain, fill, excavate, or otherwise alter a wetland or public waters wetland without first submitting a wetland application and obtaining approval from the LGU with jurisdiction over the activity.

5.3 Criteria

Wetland replacement/mitigation siting must follow the priority order below:

1. Mitigation within the VRWJPO boundary (on-site if approved by the WCA Jurisdictional Authority)
2. Mitigation within Dakota or Scott County
3. Within BWSR Wetland Bank Service Area 8
4. Within any other BWSR Wetland Bank Service Area

Section 6: Buffer Standards

Summary of Purpose and Jurisdiction Guidance

Buffers are areas of perennial vegetation surrounding watercourses, public waters wetlands, and wetlands that help protect water resources by limiting erosion and filtering runoff. These VRWJPO Buffer Standards will ensure placement of buffers upon development to protect watercourses and wetlands.

In Dakota County, cities and townships ensure that Buffer Standards are enforced through the platting, subdivision, and permitting process. In Scott County, cities ensure Buffer Standards are enforced through the platting, subdivision, and permitting process, while Scott County ensures buffer standards are enforced for subdivisions in the unincorporated areas.

6.1 Policy

It is the policy of the VRWJPO to:

- Work to establish buffers, acting as filter strips, around every wetland and watercourse based on its management classification.
- Avoid fragmentation of natural areas and corridors when feasible and mitigate when unavoidable.
- Protect wetlands and watercourses from chemical, physical, biological, or hydrological changes to prevent significant adverse impacts.

Based on program evaluation, water quality monitoring, and research, the VRWJPO may, in the future, modify standards to vary by subwatershed or require buffers on lands in addition to developing land to meet water quality management objectives.

6.2 Regulation

For any lot created after March 22, 2007, or the adoption of local ordinances implementing the VRWJPO standards, a buffer shall be maintained around the perimeter of all wetlands, watercourses, and public waters wetlands. Buffer strip establishment shall apply to all lots of the proposed subdivision, regardless of whether the watercourse, wetland, or public waters wetland is on a specific lot within a proposed development.

In areas where land use is zoned agricultural with one building eligibility per every quarter of a quarter section (40 acres) of property, the buffer requirement will not be exercised until such time as the land use zoning is changed to an alternate use zoning or a higher density of residential building eligibilities. At that time, the buffer requirement will be fully implemented.

The Buffer Standards do not apply to:

- Lots created that are enrolled in Green Acres, Rural Preserves, Agricultural Preserves, or similar agricultural or rural preservation programs controlling or limiting the potential for future lot subdivision or development, as part of the subdivision process.
- A lot of record as of March 22, 2007, until such lot is subdivided.
- Wetland or public waters wetland with an applicable exemption listed under the WCA, and to those portions of wetlands that will be filled under approved wetland replacement plans per the WCA.
- To existing outlots that received preliminary plat approval in the two-year period preceding March 22, 2007. Buffer standards in effect at the time of LGU approval of a development agreement shall remain in effect throughout the term of the agreement or for a ten-year period from the date of approval, whichever is less.

6.3 Criteria

A. LGU Comprehensive Wetland Management Plans, which prescribe required buffer widths shall be compliant with standards set by the VRWJPO; applicable ordinances, governing widths, restrictions, allowable uses, and monumentation must meet or exceed the requirements set by the VRWJPO.

B. Where a stream meandering project has been completed, the buffer width shall be established by the LGU.

C. Where acceptable natural vegetation exists in buffer areas, the retention of such vegetation in an undisturbed state is required unless approval to replace such vegetation is received. A buffer has acceptable vegetation if it:

   1. Has a continuous, dense layer of perennial grasses and forbs that has been uncultivated or unbroken for at least 5 consecutive years
   2. Has an overstory of trees and/or shrubs that has been uncultivated or unbroken for at least 5 consecutive years
   3. Contains a mixture of the plant communities in 1 and 2 above that has been uncultivated or unbroken for at least 5 years

D. Buffers shall be staked and protected in the field prior to construction unless the vegetation and the condition of the buffer are considered inadequate by the jurisdictional authority. Existing condition vegetation will be considered unacceptable if:

   1. Physical condition of the buffer tends to channelize the flow of surface water
   2. Vegetative cover is less than 90%

E. Where buffer vegetation and conditions are unacceptable, or where approval has been obtained to replant, buffers shall be replanted and maintained according to the following Standards:

   1. Buffers shall be planted with a native seed mix approved by the State of Minnesota, with the exception of a one-time planting with an annual nurse or cover crop. Plantings of native forbs and grasses may be substituted for seeding. All substitutions must be approved by the LGU. Groupings/clusters of native trees and shrubs, of species and at densities appropriate to site conditions, can also be planted throughout the buffer area.
   2. The seed mix and planting shall be broadcast/installed according to the State of Minnesota specifications. The selected seed mixes and plantings for permanent cover shall be appropriate for the soil site conditions and free of invasive species.
   3. Buffer vegetation (both natural and created) shall be protected by erosion and sediment control measures during construction.
   4. During the first five full growing seasons, except where the LGU has determined vegetation establishment is acceptable, the owner or applicant must replant buffer vegetation where the vegetative cover is less than 90%. The owner or applicant must assure reseeding/or replanting if the buffer changes at any time through human intervention or activities.

F. The buffer shall be protected under a conservation easement, acceptable to the LGU, or include the buffer in a dedicated outlot as part of platting and subdivision approval, except where the buffer is located in a public transportation right-of-way. Buffers shall also be monumented to clearly designate the boundaries of all new buffers within new residential subdivisions. A monument shall consist of a post and a buffer strip sign approved by the LGU.

G. Alterations, including building, storage, paving, routine mowing, burning, plowing, introduction of noxious vegetation, cutting, dredging, filling, mining, dumping, grazing livestock, agricultural production, yard waste disposal, or fertilizer application are prohibited within any buffer. Periodic mowing or burning, or the use of fertilizers and pesticides for the purpose of managing and maintaining native vegetation is allowed with approval of the LGU. Noxious weeds may be removed and mechanical or spot herbicide treatments may be used to control noxious weeds, but aerial or broadcast spraying is not acceptable. Prohibited alterations would not include plantings that enhance the natural vegetation or selective clearing or pruning of trees or vegetation that are dead, diseased or pose similar hazards, or as otherwise clarified in Criteria F.

H. The following activities shall be permitted within any buffer and shall not constitute prohibited alterations:

1. The following activities are allowed within both the minimum and average buffer width areas:

   a. Use and maintenance of an unimproved access strip through the buffer, not more than 10 feet in width, for recreational access to the watercourse or wetland and the exercise of riparian rights.
   b. Structures that exist when the buffer is created.
   c. Placement, maintenance, repair, or replacement of public roads and utility and drainage systems that exist on creation of the buffer or are required to comply with any subdivision approval or building permit obtained from the LGU or county, so long as any adverse impacts of public road, utility, or drainage systems on the function of the buffer have been avoided or minimized to the extent practical.
   d. Clearing, grading, and seeding are allowed, if part of an approved Wetland Replacement Plan or approved Stream Restoration Plan.
   e. A multipurpose trail through an area protected by conservation easement or in a dedicated outlot, is allowed provided it is designed and constructed to minimize erosion and new impervious surfaces, and maintains an absolute minimum distance of at least fifteen feet as measured from the edge of the trail nearest the water resource to the wetland or public waters wetland edge, the bank of the watercourse, or the meander belt, and averages at least one-half the total VRWJPO identified buffer width. Where needed to cross the watercourse, the minimum impact alignment shall be used. The area between the trail and the water resource must be maintained in perennial vegetation in an undisturbed state excepting regular required maintenance of the buffer. Boardwalks and pedestrian bridges associated with a multipurpose trail must be approved by the LGU.
   f. The construction of underground utilities such as water, stormwater, and sanitary sewers and pipelines provided the minimum impact alignment is used, the area is stabilized in accordance with Criteria C.

2. The following activities are allowed within those portions of the average buffer width that exceed the minimum buffer width:

   a. Stormwater management facilities, provided the land areas are stabilized in accordance with Criteria C above, and alterations prohibited in Criteria E above are upheld.
   b. The area of shallow vegetated infiltration and biofiltration facilities, and water quality ponds not to

exceed 50 percent of the pond area, adjacent to wetlands and watercourses may be included in buffer averaging provided the facilities do not encroach into the minimum buffer width, and the land areas are stabilized in accordance with Criteria C above, and alterations prohibited in Criteria E above are upheld.

I. A wetland functional assessment for vegetative diversity, using a functional assessment method approved by the BWSR, will be completed with each wetland and public waters wetland, delineated for a project and buffers established according to the management classification in *Table D-1*. LGUs may require more restrictive buffer widths for the protection of jurisdictional wetlands.

J. Watercourse buffers shall be established adjacent to watercourses as shown and classified on *Figure D-1 (page D-17)* included in these Standards, and as described for the various classifications below. The specified buffer widths shall be applied on each side of the watercourse (*Table D-2*).

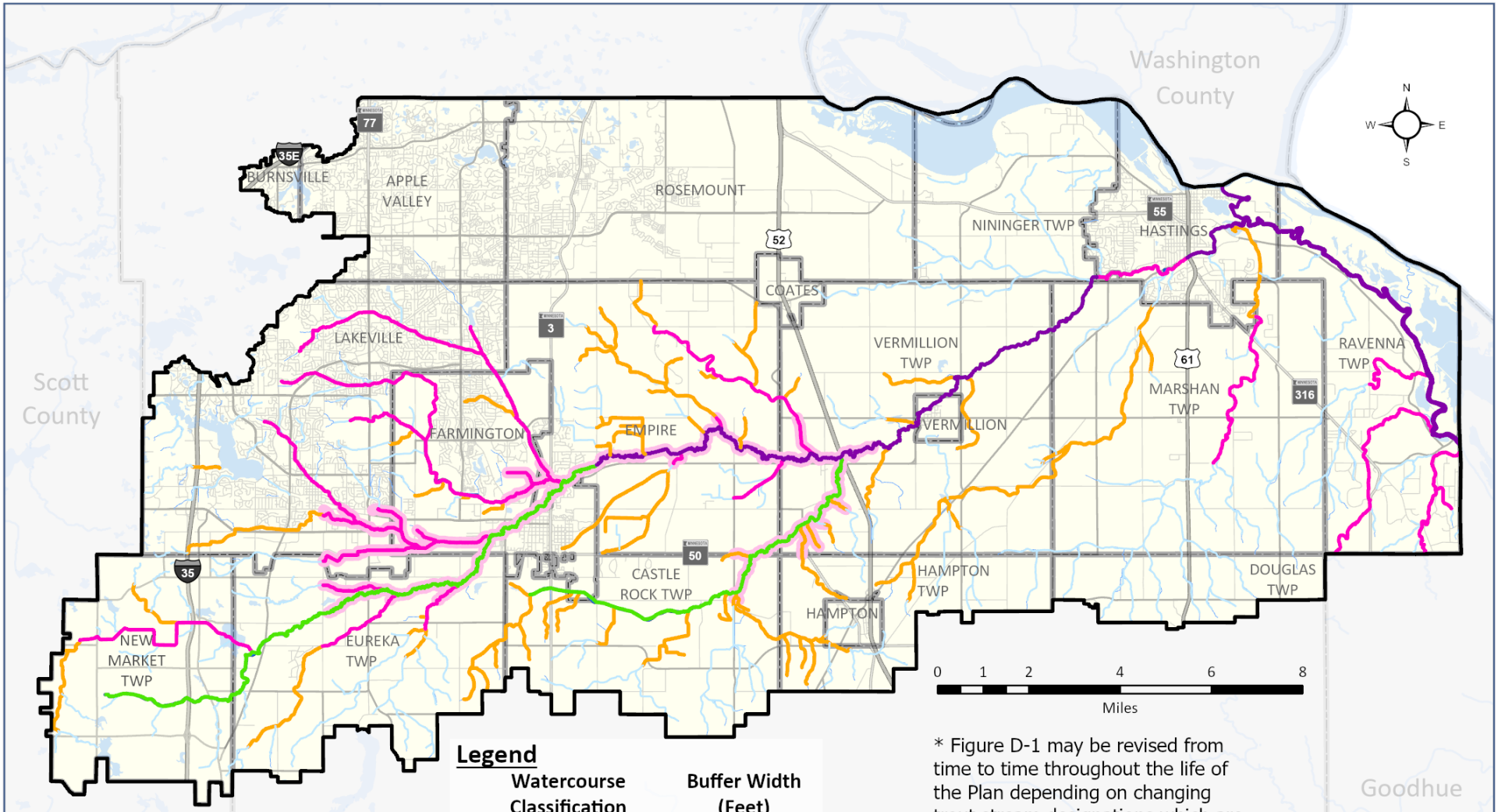
Table D-1: Buffer Requirements by Wetland Management Classification

Buffer Requirement	Exceptional Quality Wetland (Preserve)	High Quality Wetland (Manage 1)	Medium Quality Wetland (Manage 2)	Low Quality Wetland (Manage 3)
Average Buffer Width	50 feet	40 feet	30 feet	25 feet
Minimum Buffer Width	30 feet	30 feet	25 feet	16.5 feet

Table D-2: Watercourse Buffer Width Standards

Watercourse Classification	Buffer Width Standard
Conservation Corridor	• Lower Reach (Vermillion River downstream of Biscayne Avenue): 150-foot average, 100-foot minimum measured from the edge of the meander belt of the river. • Upper Reach (Vermillion River upstream of Biscayne Avenue and South Branch Vermillion River): 150-foot average, 100-foot minimum measured from the edge of the meander belt of the river. If meander belt isn't present, buffer shall be measured from edge of streambank.
Aquatic Corridor – Principal Connector	Required buffer width 100-foot average, 65-foot minimum measured from the edge of the meander belt of the river. If meander belt isn't present, buffer shall be measured from edge of streambank.
Aquatic Corridor – Principal Connector with Trout Stream Designation	100-foot, no averaging, as required by MN R100001 (NPDES General Construction Permit) issued by the Minnesota Pollutant Control Agency, August 1, 2003, or latest revision.

Watercourse Classification	Buffer Width Standard
Aquatic Corridor – Tributary Connector	50-foot average, 35-foot minimum measured from the edge of the meander belt of the tributary. If meander belt isn't present, buffer shall be measured from edge of streambank.
Water Quality Corridor	30-foot average, 20-foot minimum where there is a flow path for concentrated surface runoff measured from the center line of the flow path.



Legend

Watercourse Classification	Buffer Width (Feet)
Conservation Corridors	
Lower Reach	150
Upper Reach	150
Aquatic Corridors	
Principal Connectors	100
DNR Trout Streams/Tributaries	
Tributary Connectors	50
Water Quality Corridors	30

* Figure D-1 may be revised from time to time throughout the life of the Plan depending on changing trout stream designations which are regulated by the DNR.

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This drawing is neither a legally recorded map nor a survey and is not intended to be used as one. This drawing is a compilation of records, information, and data located in various city, county, and state offices and other sources, affecting the area shown, and is to be used for reference purposes only. Dakota County is not responsible for any inaccuracies herein contained. If discrepancies are found, please contact this office.

Vermillion River watershed
reflecting life

Watercourse Classifications and Buffer Standards

Figure D-1

Section 7: Erosion and Sediment Control Standards

Summary of Purpose and Jurisdiction Guidance

Land disturbing activities, like building construction projects, expose soils to rainfall and runoff which can cause erosion of soil and deposition of sediment onto neighboring properties or in waterbodies and watercourses. Erosion and sediment control measures (e.g., a silt fence) keep soil on site during construction and help ensure soil does not permanently wash away.

In Dakota County, cities and townships are generally the LGUs for oversight of erosion and sediment control. Erosion and sediment control requirements are often incorporated into requirements for building, agricultural building, grading, or other local permits. In Scott County, cities are the LGUs for oversight of erosion and sediment control in incorporated areas, while Scott County requires erosion and sediment control measures for the unincorporated areas.

7.1 Policy

It is the policy of the VRWJPO to:

- Minimize the movement of soil within the landscape of the watershed.
- Reduce or mitigate the mechanisms that are the cause of soil movement to the extent practicable.
- Capture soil that does move as close to its point of origination as possible.
- Reduce the delivery of sediment to natural water bodies due to land disturbing activities to the extent practicable.

7.2 Regulation

No person or political subdivision shall commence a land disturbing activity encompassing one acre or more of land without first obtaining a land disturbing activity permit consistent with the NPDES General Construction Permit (MNR 100001) requirements.

MS4-permitted LGUs may have stricter requirements for erosion and sediment control either by election or by other permitting requirements. Local permits must be obtained when required by the LGU.

7.3 Criteria

A. Land disturbing activities encompassing one acre or more of land or if a project is part of a common plan of development or sale that ultimately will disturb more than an acre are regulated under the MN R100001 (NPDES General Construction Permit).
B. Jurisdictional authorities must be provided a copy of an NPDES General Construction Permit associated with activities.

Section 8: Stormwater Management Standards

Summary of Purpose and Jurisdiction Guidance

When development and construction projects create new impervious surfaces like roofs and parking lots, they increase the amount of water and the speed of water that can leave the site as runoff. Stormwater management addresses the rate and volume of stormwater leaving sites through long-term practices like stormwater ponds and infiltration basins.

In Dakota County, cities and townships are generally the LGUs responsible for oversight of stormwater management requirements. Stormwater management requirements are often incorporated into requirements for building, agricultural building, grading, or other local permits. In Scott County, cities are the LGUs responsible for oversight of stormwater management in incorporated areas while Scott County ensures stormwater management requirements are met in the unincorporated areas.

8.1 Policy

It is the policy of the VRWJPO to:

- Manage stormwater to minimize erosion.
- Require land disturbing activities to address impacts on water resources, including cumulative impacts.
- Require development plans to consider impacts on local natural resources and corresponding receiving waters.
- Minimize impacts of runoff from land disturbing activities and preserve in-stream conditions supportive of a viable trout fishery by developing stormwater rate and volume control techniques.
- Develop standards that include requirements for controlling stormwater runoff by minimizing impervious surfaces, maximizing infiltration, requirements for cities and townships to control stormwater rates crossing municipal boundaries, and creating stormwater storage that addresses not only peak flows for extreme events, but takes into account the cumulative effects of runoff volume, and will include stormwater rate control requirements.
- Prevent further degradation of waterbodies in the watershed included on the MPCA impaired waters [303(d)] list so that these waterbodies can be removed from the list.
- Encourage use of existing natural retention and detention areas for stormwater management to maintain or improve existing water quality.
- Minimize water quality impacts (including thermal impacts) from land-disturbing activities.
- Ensure stormwater management systems are maintained.

8.2 Regulation

No person or political subdivision shall commence a land disturbing activity for “new development” or “redevelopment” (per Section 3: Definitions) without first obtaining a permit from an LGU.

8.3 Criteria

Stormwater management criteria are presented separately below for Runoff Volume Control, Peak Runoff Rate Control, and Water Quality Criteria.

Runoff Volume Control Criteria

A. New development or redevelopment must incorporate volume control practices into the design sufficient to prevent an increase in the runoff volume from the 2-year, 24-hour storm for site conditions prior to development. Determination of the necessary control volume to achieve this Standard is calculated on a site-by-site basis for each activity.

B. Runoff volume reducing practices in site design are the preferred method for meeting volume control requirements and shall be considered prior to the design of the required practices. Practices applying the Minnesota Minimal Impact Design Standards (MIDS) are allowed. Applicants must identify specific practices and provide documentation of the application of the MIDS calculator (or equivalent) in practice selection and site design. Stormwater volume-reducing BMPs other than those identified by MIDS, and their associated credits, must be approved by the LGU. Final crediting must be approved by the LGU before application to final design of site stormwater volume control facility requirements.
C. The water quality control volumes that meet NPDES General Construction Permit criteria using infiltration or filtration technologies can count toward the Volume Control requirements of these Standards.
D. Infiltration volumes and facility sizes shall be calculated using design criteria from the Minnesota Stormwater Manual.
E. Infiltration areas must be protected from disturbance before the land disturbing activity starts.
F. For sites with predominantly Type C and D soils, or where a shallow water table prevents construction of infiltration systems, the following additional criteria must be met in order of decreasing preference:

    1. Minimize connected impervious surfaces to the maximum extent practicable.
    2. Underdrains are used.
    3. Wet ponds are designed for zero discharge for the 2-year, 24-hour storm.
    4. Ponds with overflows or outlets located below the seasonally high-water table are allowed only where it can be demonstrated that there is a reasonable need for such an outlet to control seepage damage to existing structures.

Peak Runoff Rate Control Criteria

A. A hydrograph method based on the most recent precipitation frequency estimates based on scientifically accepted methods and/or applicable federal or state guidance and deemed appropriate by the VRWJPO will be used to analyze runoff for the design or analysis of flows and water levels.
B. Numerical flow standards must be adopted at intercommunity boundaries as identified in the VRWJPO Hydrologic Model (2009 as amended) for the communities of Burnsville, Apple Valley, Rosemount, Lakeville, Farmington, Hastings, and Elko-New Market. Those communities must apply the VRWJPO Hydrologic Model values in the calibration of their own local hydrologic models.
C. Runoff rates for proposed activities shall apply land cover conditions existing prior to development and shall not exceed existing runoff rates for the 1-year, 10-year, and 100-year 24-hour duration storm event.

Water Quality Criteria

Post construction stormwater runoff quality measures shall meet the standards of the General Permit Authorization to Discharge Storm Water Associated with Construction Activity under the NPDES General Construction Permit (MNR10001) issued by the Minnesota Pollution Control Agency, August 1, 2023, as amended; except where more specific requirements which are intended to address an increase in runoff temperature:

A. Infiltration or other volume reduction practices are the preferred approach to minimize any increase in temperature in areas that drain to the trout stream portions of the Vermillion River and its tributaries from the 2-year 24-hour precipitation event where such areas do not first drain to a waterbody with 10 or more acres of open water.

B. Vegetation used in conjunction with infiltration systems must be tolerant of urban pollutants, and the range of soil moisture conditions anticipated.
C. Ponds with permanent wet pools are allowed in areas tributary to the trout stream portions of the Vermillion River and its tributaries where such areas do not first drain to a waterbody with 10 or more acres of open water provided no net increase in the temperature of the discharge for the 2-year 24-hour precipitation event.
D. Plans and reports must include a narrative description of the temperature-sensitive practices incorporated.

8.4 Maintenance

All stormwater management infrastructure shall be maintained in perpetuity to assure function as originally designed. The responsibility for maintenance shall be assumed either by the city, township, or county with jurisdiction over the infrastructure; or by the applicant, their successors, or assigns entering into a maintenance agreement with the LGU.

8.5 Easements

The applicant may be required to establish, in a form acceptable to the LGU, temporary and perpetual easements, or dedicated outlots, for ponding, flowage, and drainage purposes over hydrologic features such as waterbodies and stormwater basins. The easements, or outlots, shall include the right of reasonable access for inspection, monitoring, maintenance, and enforcement purposes.

8.6 Covenants

The LGU may require that the land be subjected to restrictive covenants, a conservation easement, or easement in form acceptable to the LGU, to prevent the future expansion of impervious surfaces and the loss of infiltration capacity.

Section 9: Drainage Alteration Standards

Summary of Purpose and Jurisdiction Guidance

The intent of these drainage alteration standards is to provide a means for permitting significant drainage changes within the watershed that may have negative impacts for water resources.

There is no specific LGU that oversees drainage alteration permits, but LGUs should review proposed drainage alterations as part of subdivision reviews, building permits, grading permits, or other local controls. LGUs should provide land alteration plans to the VRWJPO for projects with proposed drainage alterations and are encouraged to contact the VRWJPO staff for assistance with drainage alteration concerns.

9.1 Policy

It is the policy of the VRWJPO to:

- Use existing natural retention and detention areas for stormwater management to maintain or improve existing water quality.
- Manage stormwater to minimize erosion.
- Allow outlets from landlocked basins, provided such outlets are consistent with State and Federal regulations, and the downstream impacts, floodway elevation impacts, riparian impacts, and habitat impacts of such outlets have been analyzed and no detrimental impacts result.
- Mitigate and reduce the impact of past increase in stormwater discharge on downstream conveyance systems.
- Address known flooding/erosion problems that cross jurisdictional boundaries and address other boundary issues and the diversion/alteration of watershed flows in local water plans.
- Address gully erosion problems in the watershed.
- Maximize upstream floodwater storage.

9.2 Regulation

No person or political subdivision shall artificially drain surface water or obstruct or divert the natural flow of runoff so as to affect a drainage system, or harm the public health, safety, or general welfare of the VRWJPO, without first obtaining authorization from the LGU or the VRWJPO.

9.3 Criteria

A. Outlets from landlocked basins with a tributary drainage area of 100 acres or more will be allowed, provided such outlets are consistent with other portions of these Standards, State and Federal regulations, and the downstream impacts, floodplain elevation impacts, riparian impacts, and habitat impacts of such outlets have been analyzed and no detrimental impacts result. The analysis and determination shall:

   1. Use a hydrograph method based on the most recent precipitation frequency estimates based on scientifically accepted methods and/or applicable federal or state guidance and deemed appropriate by the VRWJPO to analyze runoff for the design or analysis of flows and water levels.
   2. Ensure a hydrologic regime consistent with the Peak Runoff Rate Control Criteria and the Runoff Volume Control Criteria of these Standards.
   3. Ensure the outlet does not create adverse downstream flooding or water quality conditions, or materially affect the stability of downstream watercourses.
   4. Maintain dead storage within the basin to the maximum extent practicable.

5. Ensure that proposed development tributary to the land-locked basin has incorporated runoff volume control practices to the maximum extent practicable.

B. Artificial drainage, flow obstruction, and diversions involving watercourses, public waters, public waters wetlands, and wetlands with drainage areas of 640 acres or more, will be allowed provided such alterations or diversions are consistent with other portions of these Standards, state and federal regulations, and the downstream impacts, riparian impacts, floodplain elevation impacts, and habitat impacts of such alterations or diversions have been analyzed and no detrimental impacts result. Proposals for drainage alterations and diversions shall demonstrate that:

   1. There is a reasonable necessity for such drainage alteration or diversion to improve or protect human health and safety, or to improve or protect aquatic resources.
   2. Reasonable considerations have been made and actions taken to avoid unnecessary injury to upstream and downstream land and water resources.
   3. The drainage alteration or diversion is being accomplished by improving and aiding the normal and natural system of drainage according to its natural carrying capacity, or, in the absence of a practicable natural drain, a reasonable and feasible artificial drainage system that does not create adverse impacts is being implemented.

C. Drainage alterations, diversions, and landlocked basin outlets shall be provided with stable outfalls and channels designed to withstand erosion during the 10-year, 24-hour precipitation event.

9.4 Exceptions

A. No authorization shall be required where it is demonstrated that the proposed drainage alteration or diversion does not cause off-site erosion, sedimentation, flooding, or other damage.
B. The LGU may waive the requirements regarding upstream and downstream flooding impacts if the applicant submits easements or other documentation in form acceptable to the LGU demonstrating and recording the consent of the owner of any land burdened by the proposed alteration.