



# **Executive Summary: Measurable Outcomes Progress Update for the 2016-2025 Vermillion River Watershed Management Plan**

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*For the Vermillion River Watershed Joint Powers Board*

*June 22, 2023*

## Contents

Introduction .....	2
Goal A: Protect or restore water quality in lakes, streams, and wetlands .....	2
Goal B: Protect and restore groundwater quality .....	14
Goal C: Maintain a sustainable water supply.....	20
Goal D: Address more intense fluctuations (up and down) in river flow rate and volume.....	21
Goal E: Improve public awareness and stewardship of water resources .....	23
Goal F: Improve watershed resilience to changing precipitation and temperature patterns .....	28
Goal G: Protect or restore sensitive biological resources, such as plants, fish, insects, and wildlife.....	31

## Introduction

As the 2016-2025 Vermillion River Watershed Plan is implemented, the Vermillion River Watershed Joint Powers Organization (VRWJPO) is using series of outcome measurements to track progress on the Plan goals. These measures are tracked and reported to the Vermillion River Watershed Joint Powers Board (VRWJPB), VRWJPO local partners, and the public annually.

## Goal A: Protect or restore water quality in lakes, streams, and wetlands

### 1. Restore impaired waters and protect those currently not impaired

#### OUTCOME MEASURE: Water quality monitoring demonstrates a trend toward meeting water quality standards

The Vermillion River Monitoring Network was created to assess water quality and quantity in the Vermillion River Watershed. Staff with the Dakota and Scott Soil & Water Conservation Districts monitor eight locations on a biweekly basis from snowmelt (mid-March) through Nov. 1 for nitrate (NO<sub>3</sub>), phosphorus (P), dissolved oxygen (DO), total suspended solids (TSS), chloride, chlorophyll, temperature, macroinvertebrate index of biological integrity (Goal G.1), habitat health, and bacteria.

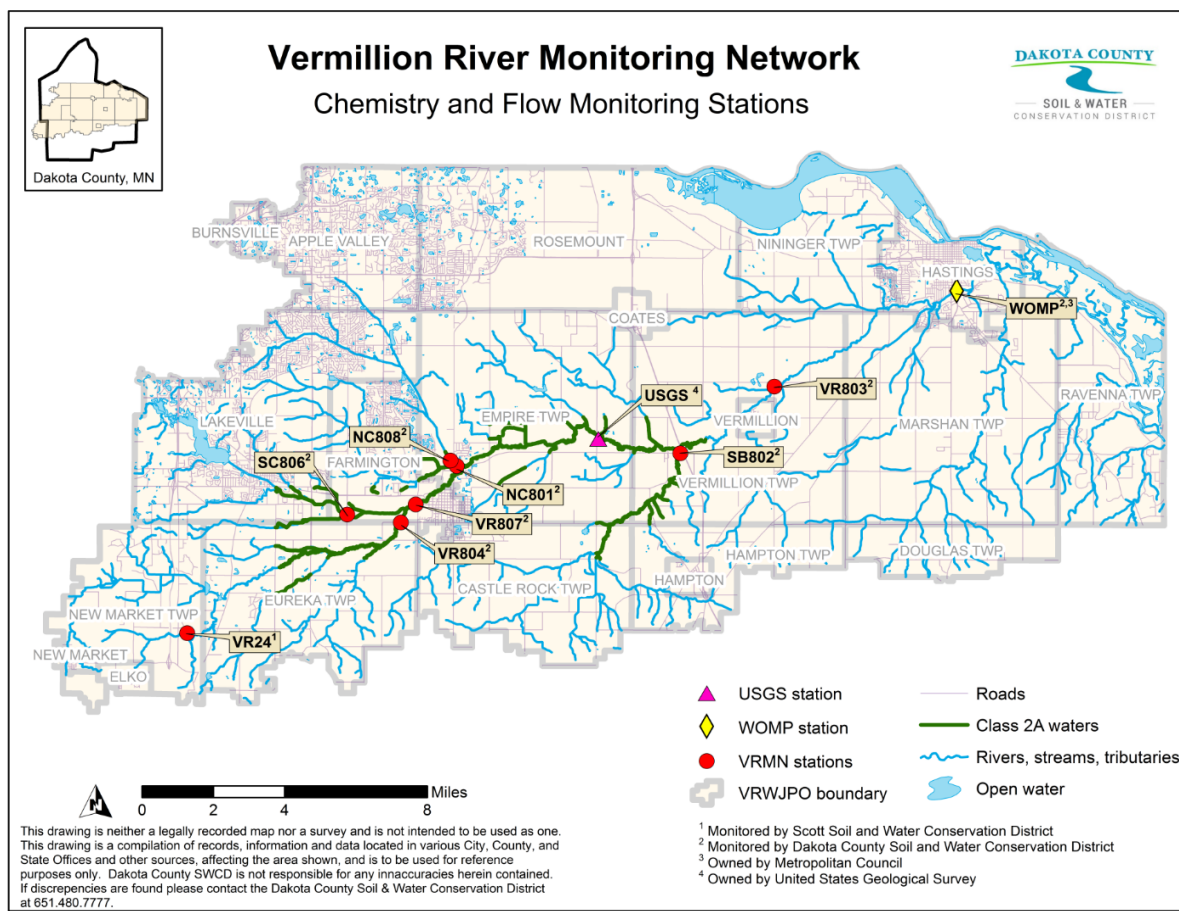


Figure 1. Vermillion River Monitoring Network station map.

## Nitrates

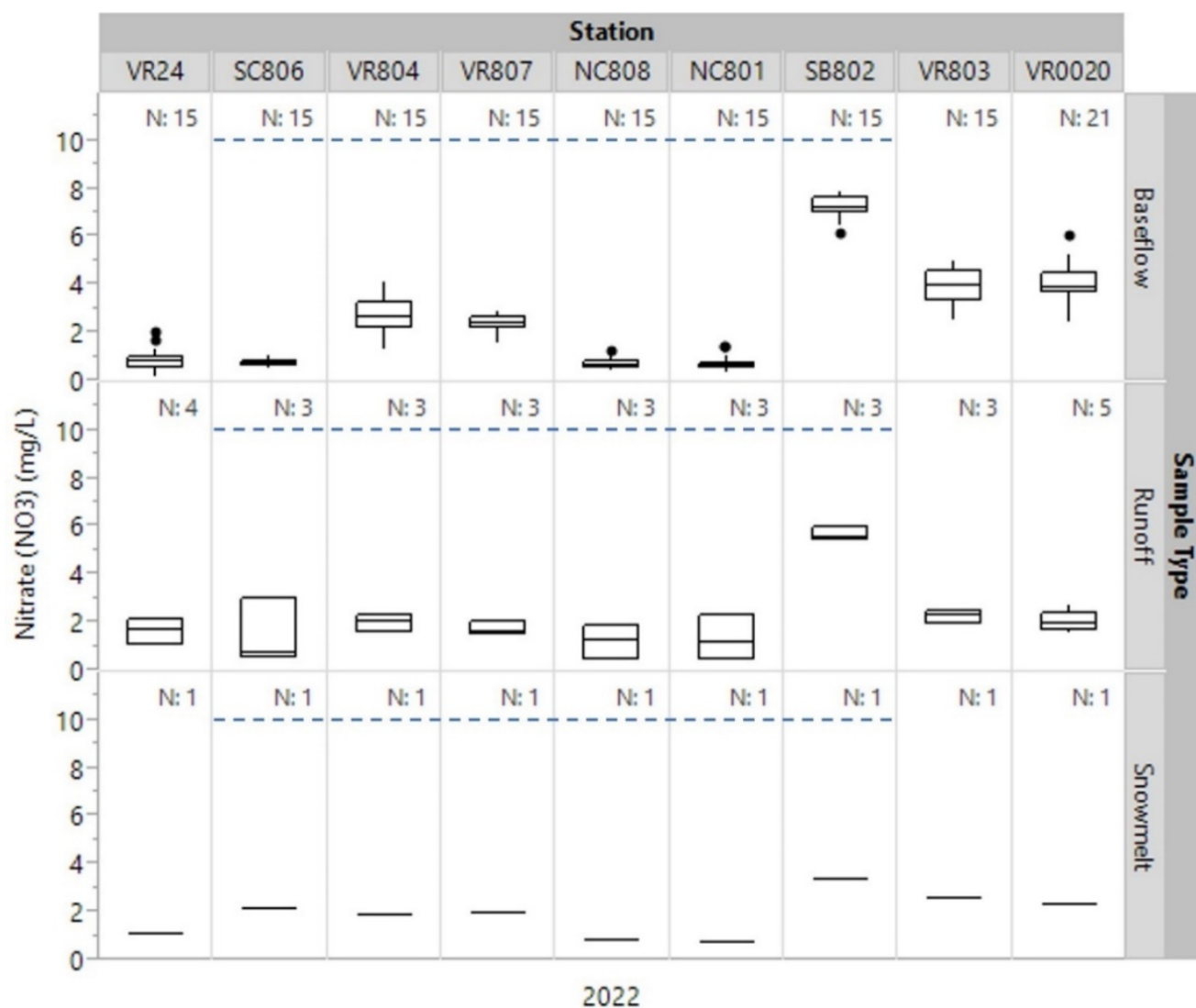


Figure 2. Nitrate nitrogen for each station, categorized by sample type, for 2022. Blue dashed line represents the domestic consumption state standard ( $\leq 10$  mg/L).

## Phosphorus

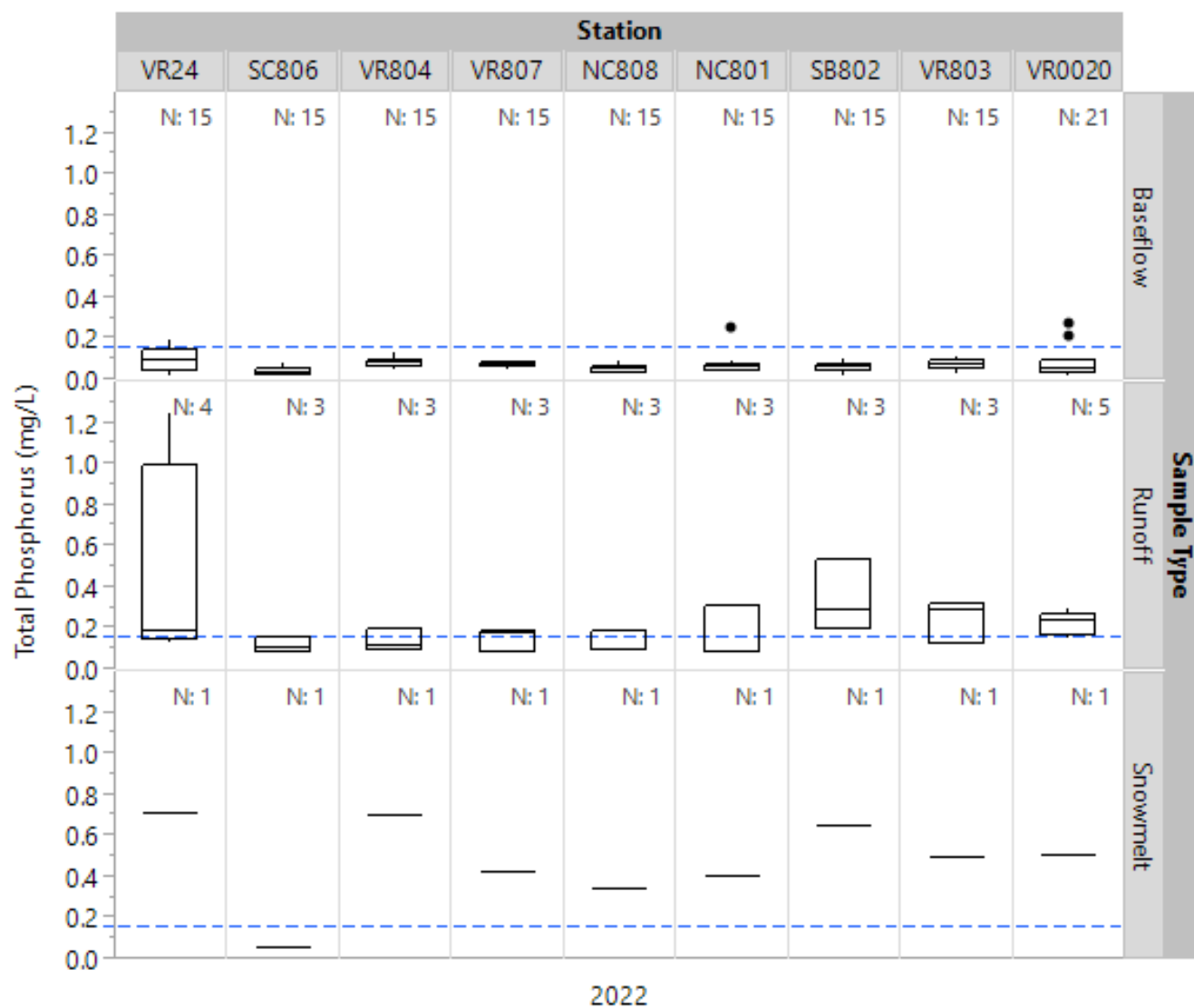


Figure 3. Total phosphorus (TP) for each station, categorized by sample type, for 2022. Blue dashed line represents the state standard for total phosphorus,  $\leq 0.15$  mg/L.

## Dissolved Oxygen

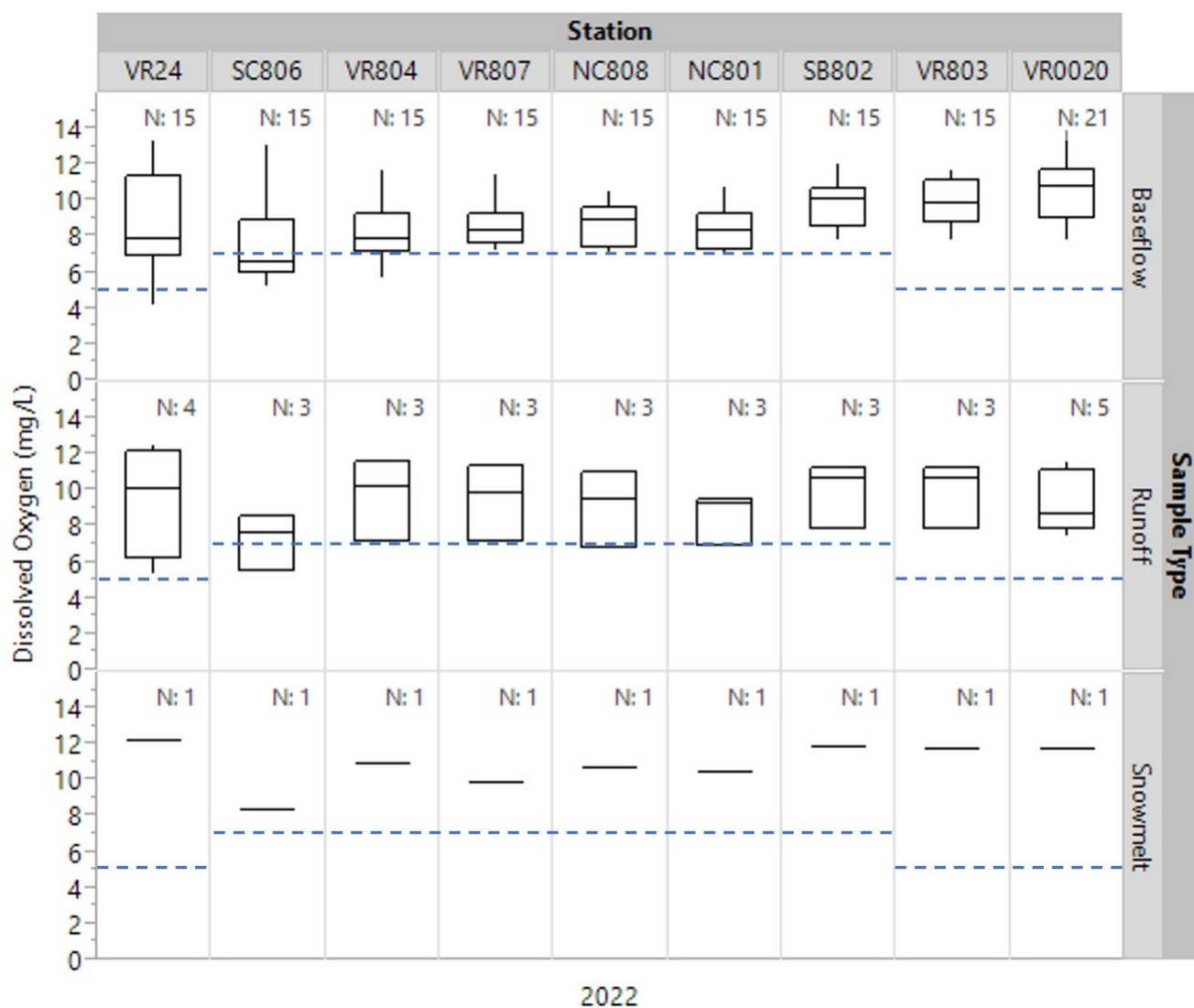


Figure 4. Dissolved oxygen for each station, categorized by sample type, for 2022. Blue dashed lines indicate standards with 7.0 mg/L (2A streams) and 5.0 mg/L (2B streams) as acceptable daily minimums.

## Total Suspended Solids

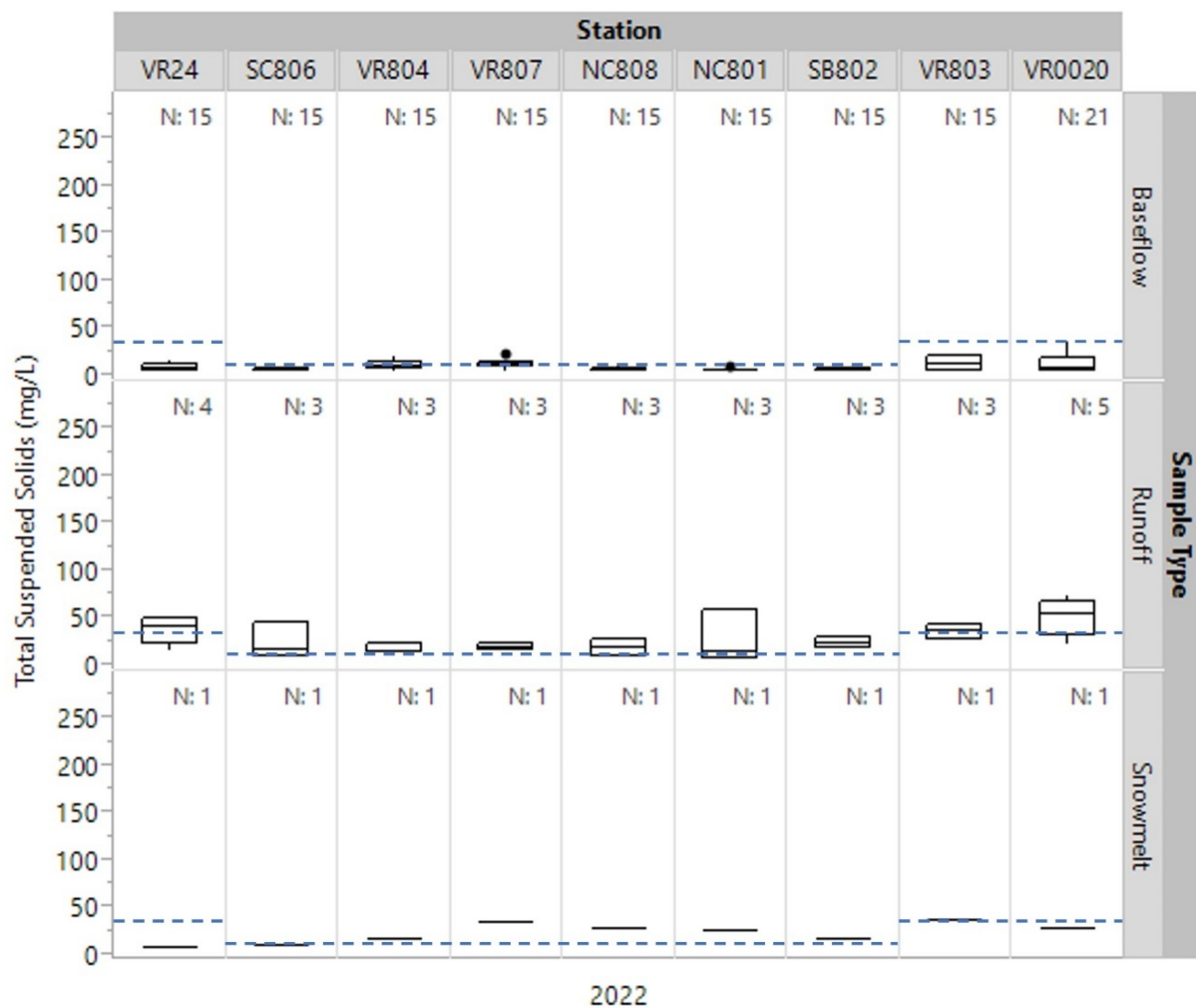


Figure 5. Total suspended solids categorized by sample type for 2022. Dashed lines represent the state standard for cold 2A ( $\leq 10$  mg/L) and warm 2B ( $\leq 30$  mg/L) waters.

## Chloride

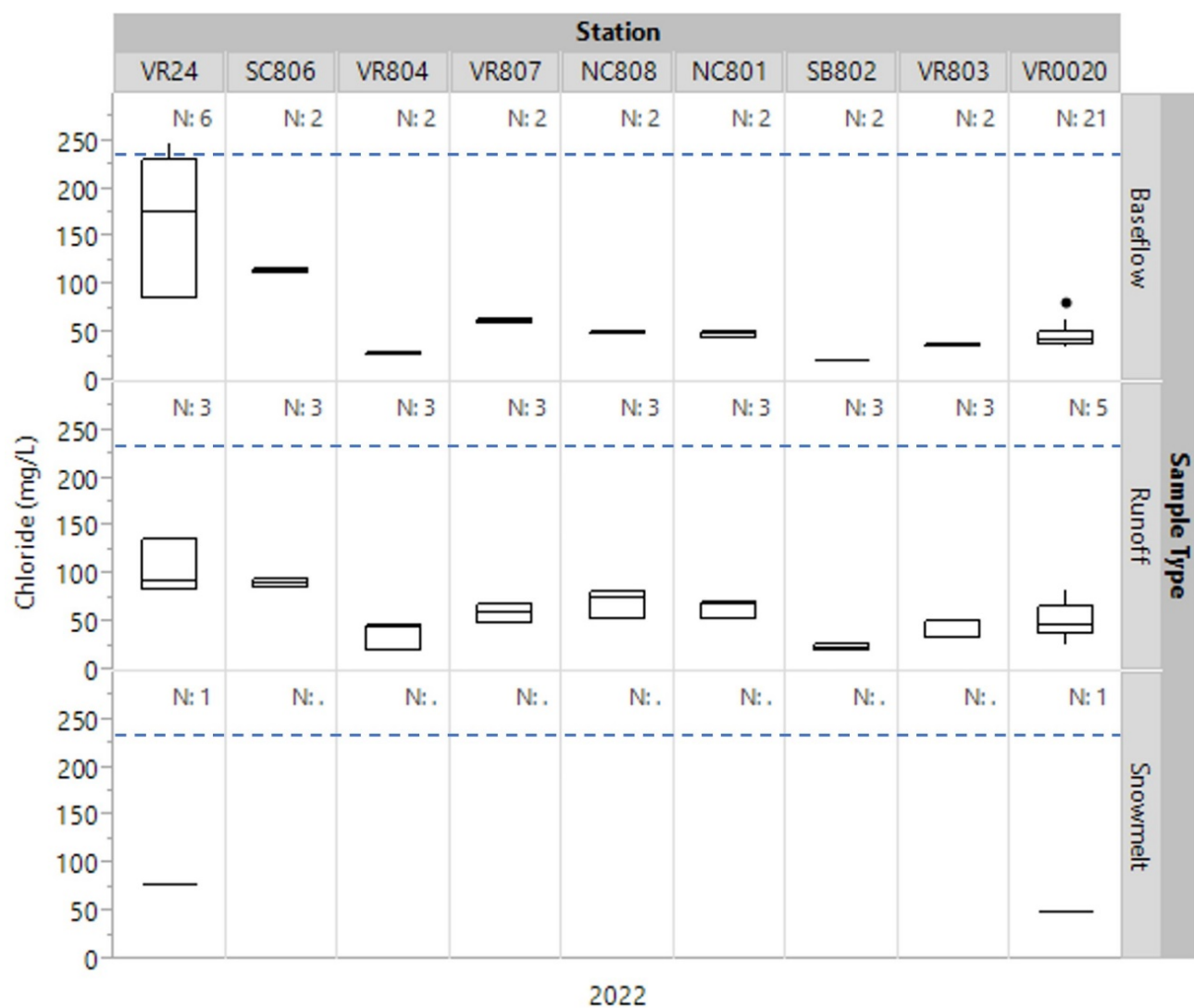


Figure 6. Chloride for each station, categorized by sample type, for 2022. Dashed lines represent the chronic state standard of 230 mg/L (two or more samples must exceed within a three-year period).



Chlorophyll-a

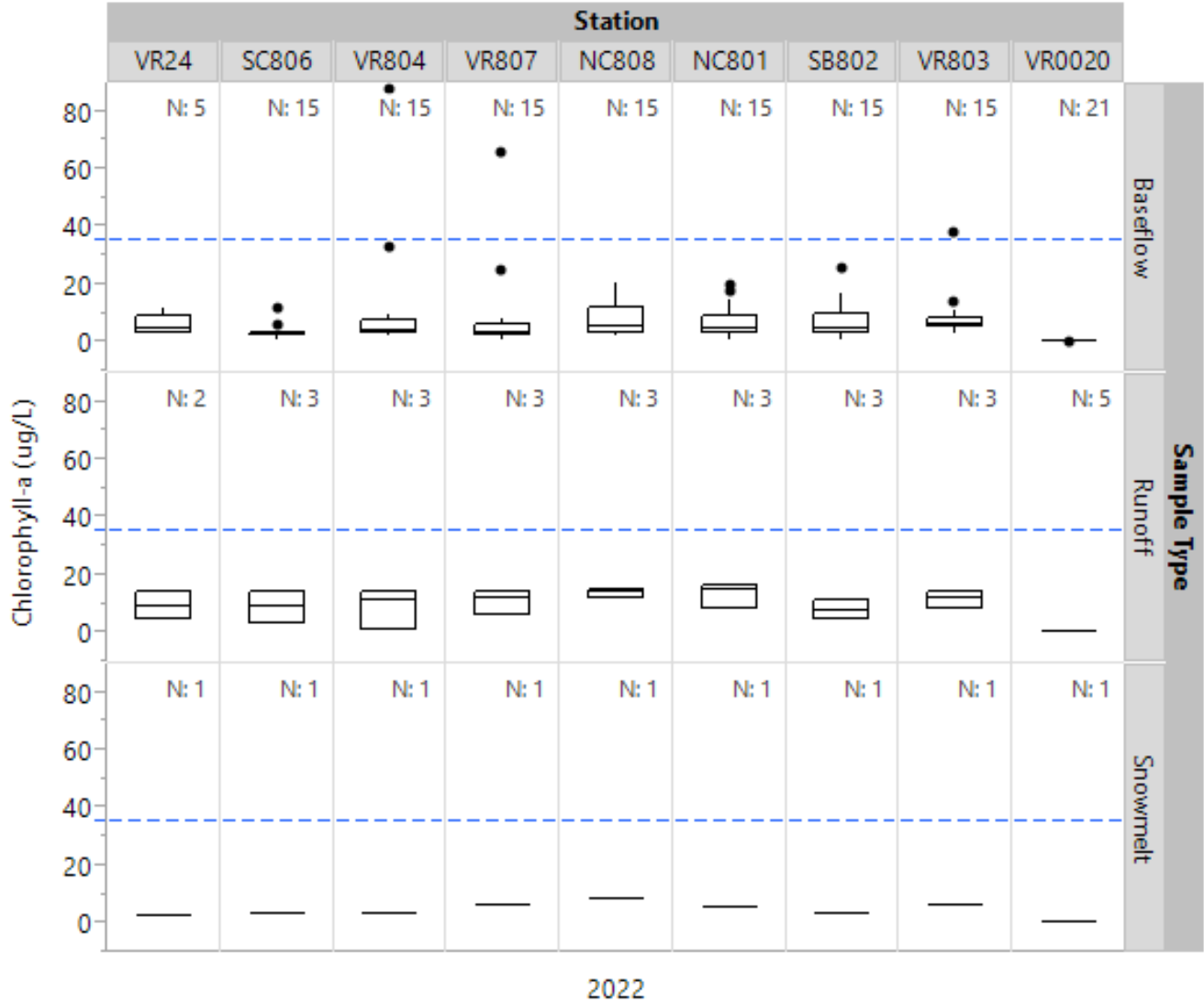
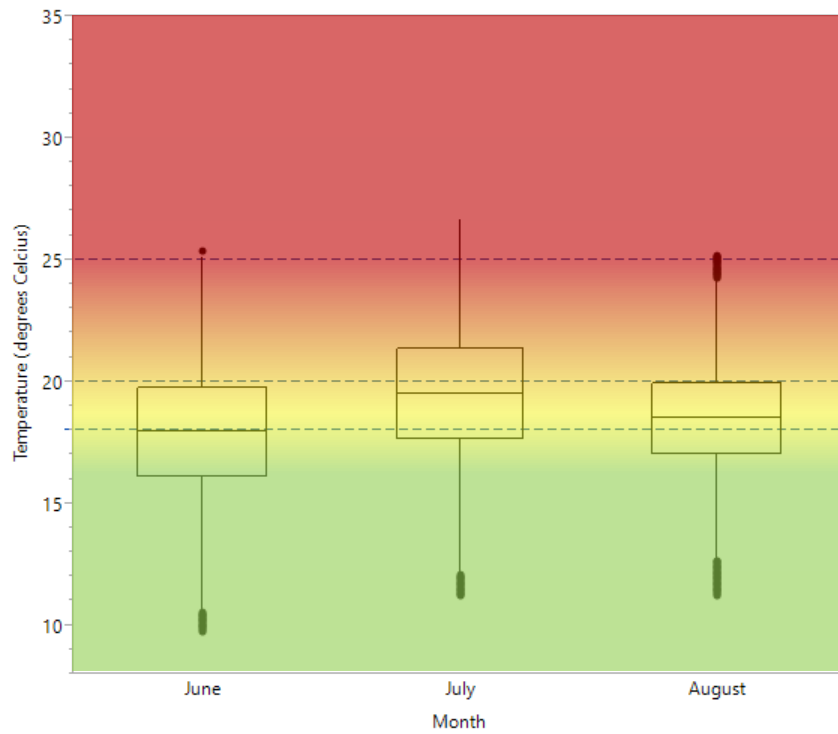


Figure 7. Chlorophyll-a, categorized by sample type, for 2022. Blue dashed lines represent the state standard of  $\leq 35$  mg/L.

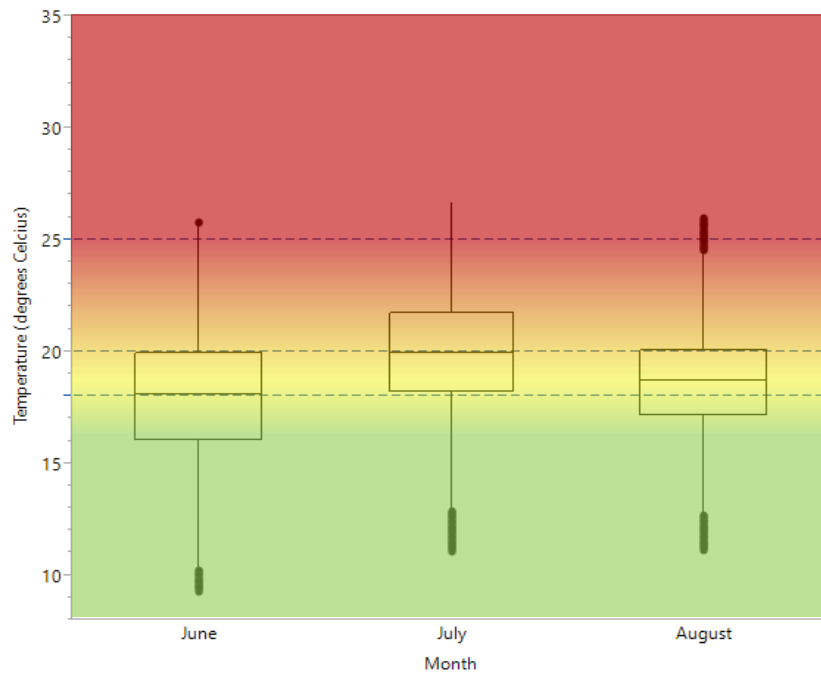
Temperature

Continuous temperature data, measured in 15-minute intervals, has been collected annually starting in 2005 for many of the sentinel monitoring stations in the Vermillion River monitoring network. The temperature data for 2022 for NC801 and NC808 shows temperature maximums were measured in the complete mortality range (red;  $> 25^{\circ}\text{C}$ ) during all summer months with the highest median water temperatures observed in July (Figures 8 and 9).

### NC801



### NC808



Figures 8 and 9. Continuous temperature data for NC801 and NC808 (coldwater stream sites) during the summer months from 2005-2022 (when available). Temperature ranges apply to adult brown trout. Optimal <18°C, tolerance 18-20°C, resistance 20-22°C, and complete mortality at 25°C (Coutant (1975), Gardner & Leetham (1914), Bell (2006))

## Bacteria

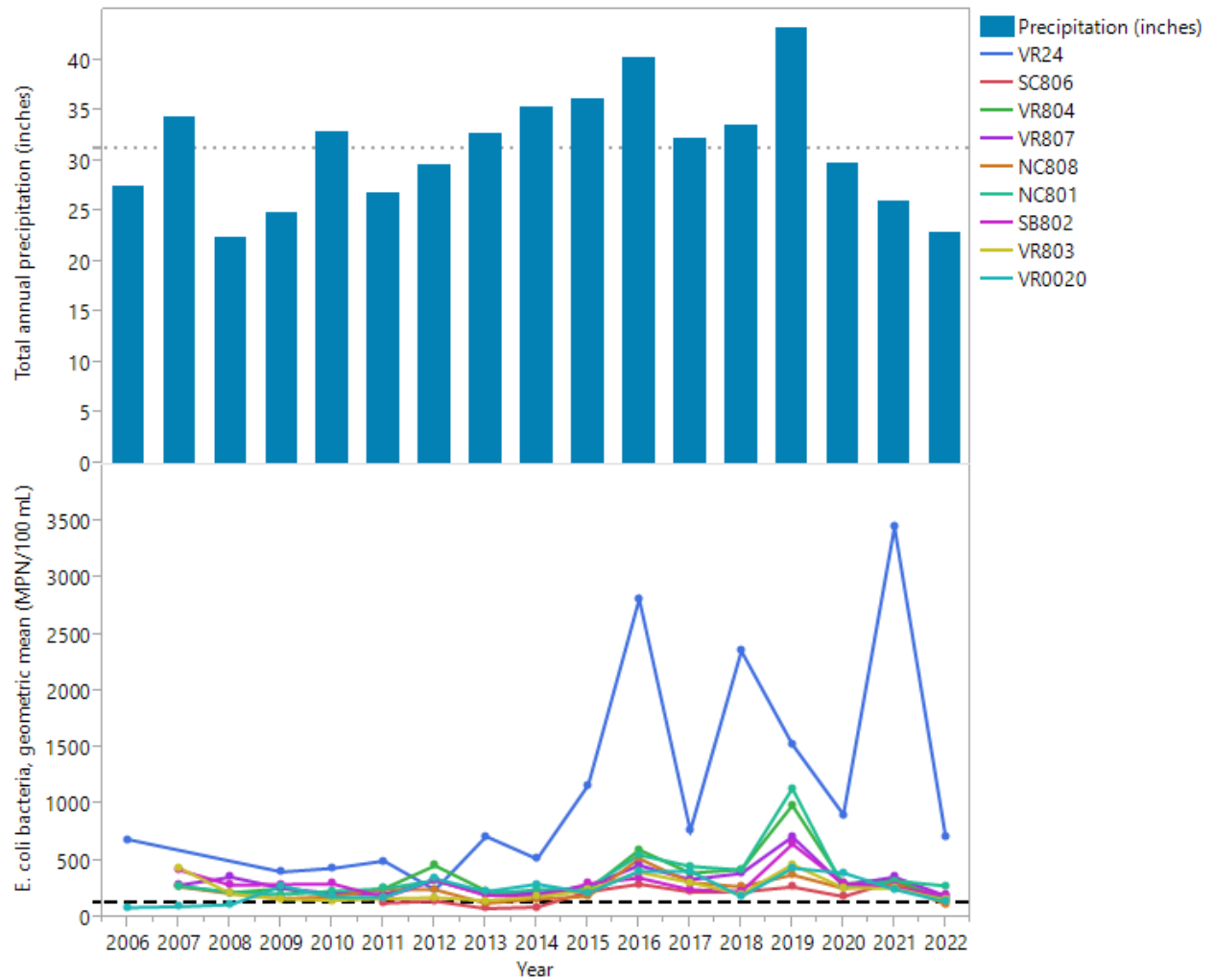
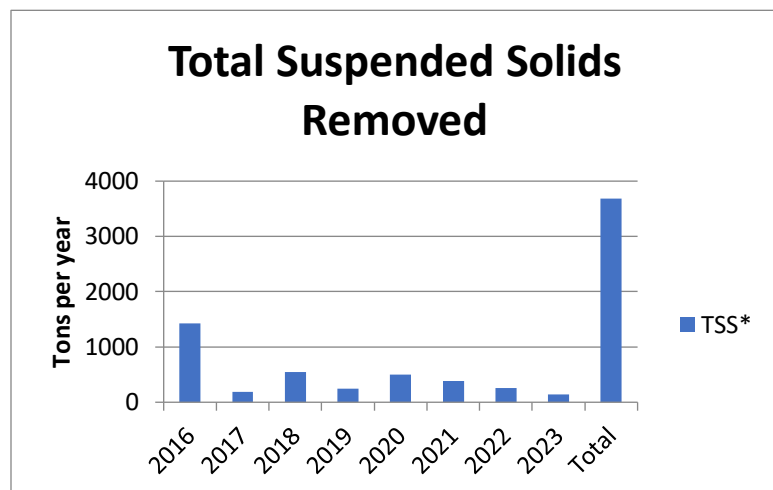


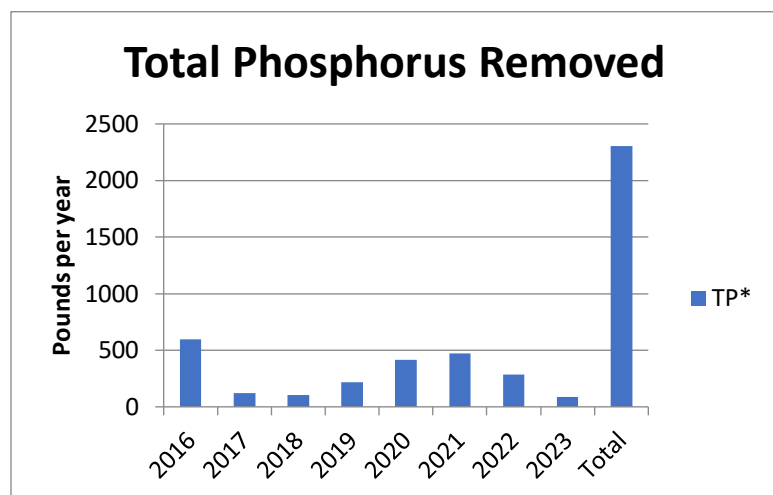
Figure 10. Annual geometric mean of *Escherichia coli* (E. coli) bacteria for all stations by year. MPN stands for most probable number of organisms. Black dashed line indicates the 30-day geometric mean standard (for data collected April through October) of  $\leq 126$  MPN/100 mL. Bars represent total annual precipitation for each year. Gray dotted line indicates the 30 year (1992-2021) total annual average precipitation at the Minneapolis – St. Paul airport weather station of 31.2 inches.

## 2. Reduce non-point source pollution, erosion, and sediment

**OUTCOME MEASURE: Document sediment and phosphorus reductions associated with best management practices supported by the VRWJPO**



\*Typical practices result in cumulative TSS removal



\*Typical practices result in cumulative TP removal

## 3. Protect and improve the River corridor

**OUTCOME MEASURE: Work with Dakota and Scott counties to annually document the DNR-protected waterways that have perennial vegetated buffers**

Dakota County: 236 parcels protected by buffers as of September 1, 2020, 6 parcels non-compliant with buffers as of May 18, 2022 (based on County ordinance not State Buffer law)

Scott County: 100% compliant with State Buffer Law as of June 2022

**OUTCOME MEASURE: Document areas that meet the VRWJPO buffer standard (both those that are triggered by the buffer standard and those that are not)**

Note: Only Lower, Upper, and Principle designated watercourses apply to State Buffer Law.

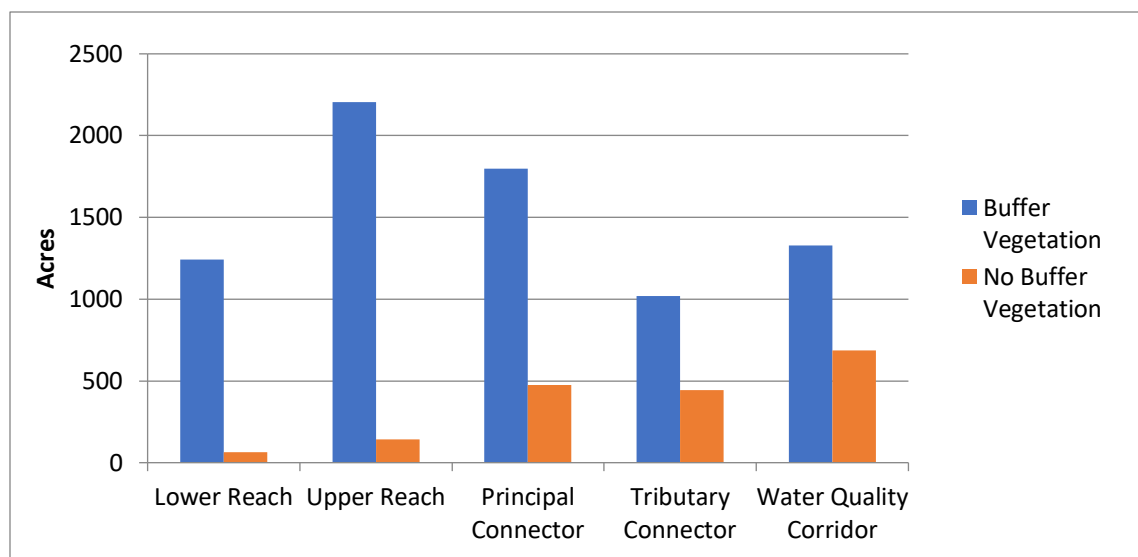
**Dakota County May 2023 (after MN State Buffer Law)**

Reach	Buffer Area (acres)	No Buffer Vegetation (acres)	Percentage Buffer Vegetation
Lower	1,240.4	61.9	95%
Upper	997.9	244	75.6%
Principle	1,797.4	593.3	67%
Tributary	1,018.7	492.2	51.7%
Water Quality Corridor	1,326.9	808.1	39.1%

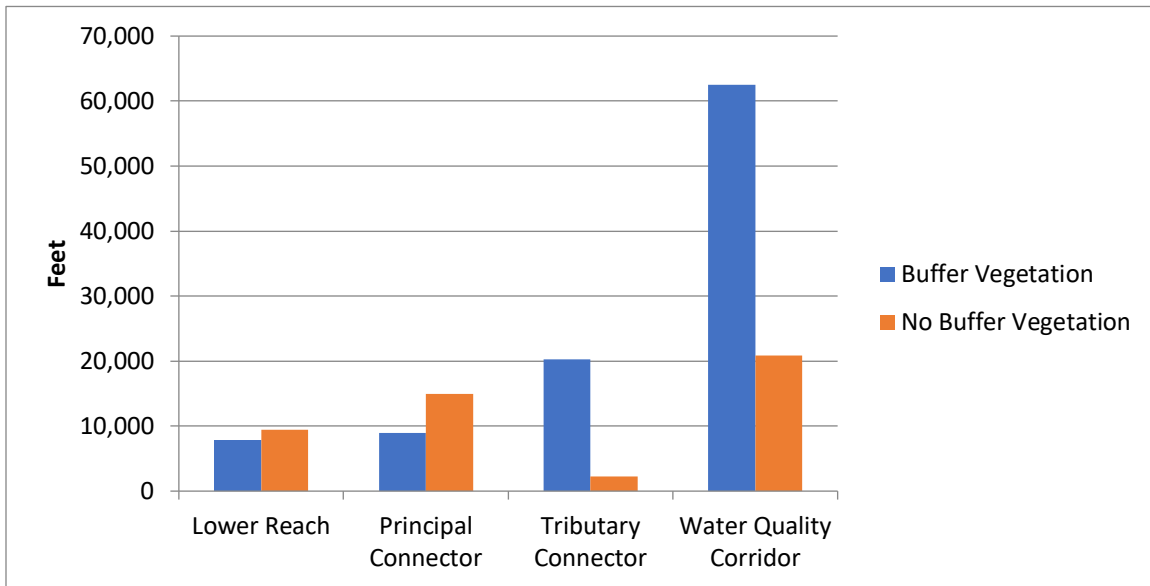
**Dakota County May 2022 (after MN State Buffer Law)**

Reach	Buffer Area (acres)	No Buffer Vegetation (acres)	% Buffer Vegetation
Lower	1,240.4	61.3	95
Upper	997.9	164.7	83.5
Principle	1797.4	521.4	70.9
Tributary	1,018.7	449	55.9
Water Quality Corridor	1,326.9	729.9	45

**Dakota County September 2017 (before MN State Buffer Law)**



Scott County February 2019 (most recent numbers were not available at this reporting)

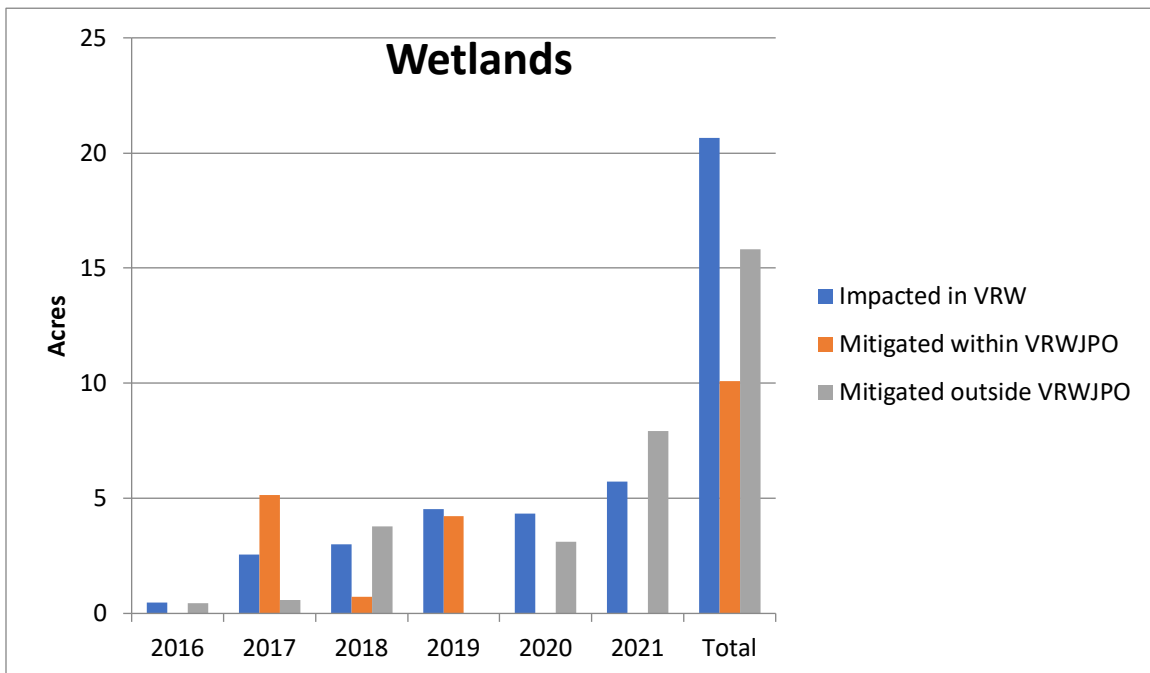


#### 4. Protect, enhance, and restore wetlands

**OUTCOME MEASURE: Document number and acres of wetlands restored**

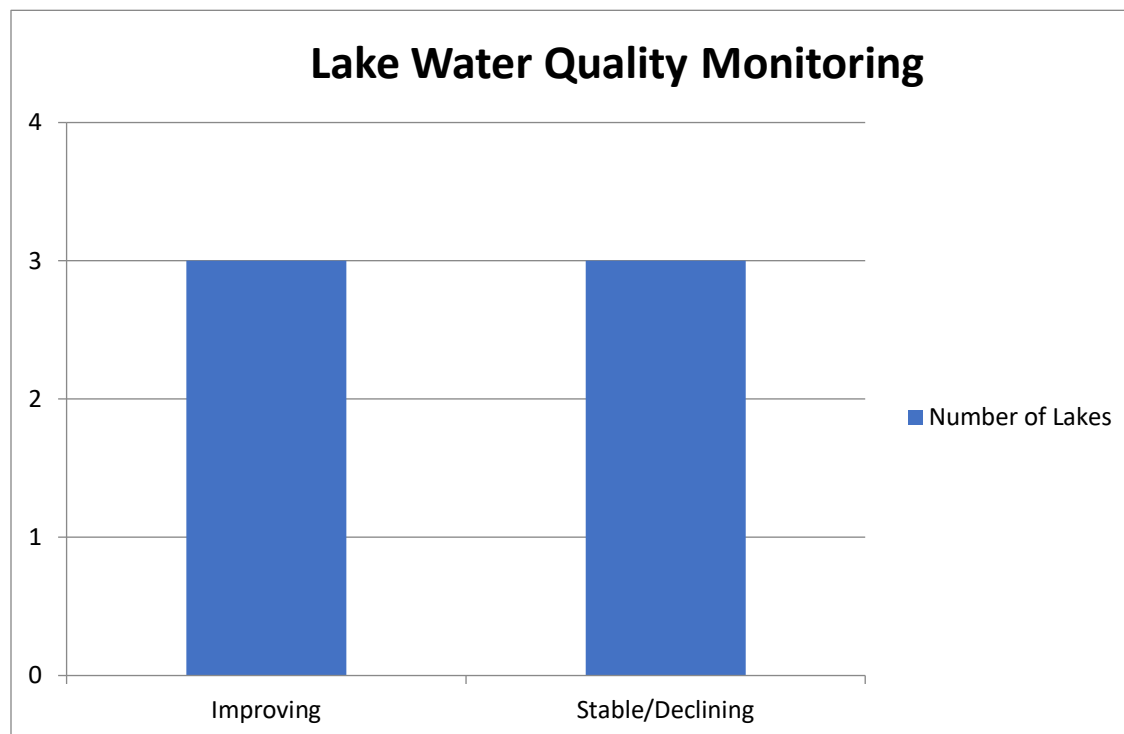
120 acres of wetlands restored in 2021

**OUTCOME MEASURE: Document number and acres of known wetlands lost, altered, or impacted**



## 5. Protect and enhance recreational lakes

**OUTCOME MEASURE:** Water quality monitoring of recreational lakes demonstrates a trend toward maintaining or improving water quality



\*Water quality monitoring within the watershed couples phosphorus levels and transparency to provide a beneficial water quality indicator.

## Goal B: Protect and restore groundwater quality

### 1. Track trends in groundwater quality

**OUTCOME MEASURE:** Compile existing information, assess its adequacy, and propose strategic improvements that will provide a comprehensive view of groundwater quality in the watershed in 2017 and 2022

[Ambient Groundwater Study 2019](https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/AmbientGroundwaterStudy2019.pdf)

(<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/AmbientGroundwaterStudy2019.pdf>)

[Ambient Groundwater Study Appendices.pdf](https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/AmbientGroundwaterStudyAppendices.pdf)

(<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/AmbientGroundwaterStudyAppendices.pdf>)

[Dakota County 2020-2030 Groundwater Plan Adopted](https://www.co.dakota.mn.us/Environment/WaterResources/Groundwater/Documents/2020-2030GroundwaterPlan.pdf)  
(<https://www.co.dakota.mn.us/Environment/WaterResources/Groundwater/Documents/2020-2030GroundwaterPlan.pdf>)

### Chloride in private wells (outside faucet)

Since 2016, three VRWJPO municipalities, Burnsville, Douglas Township, and Hampton Township, have had private well water samples test with the maximum chloride level (in milligrams per liter) above the Environmental Protection Agency's Secondary Maximum Contaminant Level (SMCL) of 250 mg/L for drinking water. While chloride levels have not typically been as high in the Vermillion River Watershed as in other parts of the Twin Cities Metro area, it's important to track it now and be aware.

### Dakota County Total Cyanazine Detections

Cyanazine is a pesticide that has not been permitted for use since 2002, yet it has continued to contaminate groundwater in Dakota County and is detected in some private wells. The Minnesota Department of Agriculture (MDA) conducted widespread sampling of private drinking water wells in Dakota County for cyanazine and cyanazine breakdown products in the summer of 2022. At the time of this reporting, the results of that sampling are not available.

### Nitrate conditions for selected communities in 2022

Municipality	Est. # households on private wells	Year Sampled	# of samples	Samples w/ nitrate detections	% w/ nitrate	Samples with nitrate exceedances (>10 mg/L)	Mean nitrate mg/L	Median nitrate mg/L	Maximum nitrate mg/L
Castle Rock Township	485	2022	112	52	46%	17	3	6.25	16.8
Ravenna Township	835	2022	228	158	69%	102	7.92	7.26	22.48

### Community Focused Sampling Program

Dakota County developed the [Community Focused Sampling Program](https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Pages/community-sampling-results.aspx) (<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Pages/community-sampling-results.aspx>) as part of the 2020-2030 Groundwater Plan to provide homeowners who rely on private drinking water wells with the opportunity to have their well water and drinking water tested for common contaminants, at no cost to them. The following communities in the VRWJPO have been included in the Community Focused Sampling, to date:

[Apple Valley 2020 Private Well Study](https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/AppleValleyPrivateWellStudy.pdf)  
(<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/AppleValleyPrivateWellStudy.pdf>)

[Douglas Township and Miesville 2020 Private Well Study](https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/DouglasMiesvillePrivateWellStudy.pdf)  
(<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/DouglasMiesvillePrivateWellStudy.pdf>)



Empire 2021 Private Well Sampling

<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/CommunitySummaryEmpire2021.pdf>

Hampton (City), Hampton Township, and New Trier 2020-21

<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/HamptonNewTrierCommunitySummary.pdf>

Lakeville 2019 Private Well Study

<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/LakevillePrivateWellStudy.pdf>

Marshan Township 2020 Private Well Study

<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/MarshanPrivateWellStudy.pdf>

Nininger Township 2021 Private Well Sampling

<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/CommunitySummaryNininger2021.pdf>

Rosemount and Coates 2020 Private Well Study

<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/RosemountCoatesPrivateWellStudy.pdf>

Vermillion and Vermillion Township 2020-21 Private Well Sampling

<https://www.co.dakota.mn.us/Environment/WaterResources/WellsDrinkingWater/Documents/VermillionWellsampling2021.pdf>

## 2. Protect groundwater quality from contamination

**OUTCOME MEASURE: Annual expenditure and cost sharing for groundwater quality protection best management practices**

Year	Project	Community	Subwatershed	Category	Cost	VRWJPO Funding	Grant	Partners
2016	Avonlea Wetland and Stream Restoration	Lakeville	Middle Creek	Stream Restoration	\$331,392	\$207,924		Lakeville, Mattamy Homes
2017	John Kimmel	New Market Township	Upper Mainstem	Well Decommission	\$1,220	\$384		Scott SWCD, Landowner, MDH
2018	South Branch Nitrate Treatment	Castle Rock Township	South Branch		\$188,432		\$412,000	Dakota County, BWSR

Year	Project	Community	Subwatershed	Category	Cost	VRWJPO Funding	Grant	Partners
2018	Bryant Stewart	New Market Township	Upper Mainstem	Well Decommission	\$1,240	\$441		Scott SWCD, Landowner, MDH
2018	Stephen Muscato	New Market Township	Upper Mainstem	Well Decommission	\$1,124			
2020	Tracy Knipp	Elko New Market	Upper Mainstem	Well Decommission	\$1,248	\$500		Scott SWCD, landowner
2020	South Branch Denitrifying Woodchip Bioreactor	Castle Rock Township	South Branch	Edge-of-field nitrate treatment	\$34,012	\$2,029	\$31,983	Dakota County, BWSR
2021	Webster Wetland Restoration	Elko New Market	Upper Mainstem	Wetland Restoration	\$71,762	\$0	\$64,586	Elko New Market, BWSR
2021	The Food Group	Eureka Township	Upper Mainstem	Cover Crop	\$2,125	\$2,125		Dakota SWCD, landowner
2021	Aronson Park Stormwater Reuse	Lakeville	South Creek	Stormwater Reuse Irrigation System	\$369,769	\$29,450		Lakeville, Dakota County, BWSR
2021	Braun Wetland Restoration	Castle Rock Township	South Branch	Wetland Restoration	\$1,348,134	\$500,000		Dakota County, Dakota SWCD, BWSR, landowner
2021	Jack Siebenaler	Hampton Township	Lower Mainstem	Native Prairie Restoration	\$1,175	\$881		Dakota SWCD, landowner, Dakota County
2021	Steve Devney	Lakeville	Upper Mainstem	Cover Crop	\$750	\$750		Dakota SWCD, landowner

Year	Project	Community	Subwatershed	Category	Cost	VRWJPO Funding	Grant	Partners
2021	Bryce Kimmes	Marshan Township	Mississippi Direct	Cover Crop	\$2,500	\$2,500		Dakota SWCD, landowner, Dakota County
2021	Jay Frandrup	Vermillion Township	Middle Mainstem	Cover Crop	\$3,500	\$3,500		Dakota SWCD, landowner, Dakota County
2022	Pat Maher	Marshan Township	Mississippi Direct	Cover Crop	\$2,500	\$2,500		Dakota SWCD, landowner
2022	Greg Fox	Rosemount	North Creek	Cover Crop	\$625	\$625		Dakota SWCD, landowner
2022	Greg Fox	Rosemount	North Creek	Cover Crop	\$1,000	\$1,000		Dakota SWCD, landowner
2022	Don Peterson	Marshan Township	Mississippi Direct	Cover Crop	\$2,500	\$2,500		Dakota SWCD, landowner

**OUTCOME MEASURE: Awareness about urban and rural land-use impacts on nitrate contamination in groundwater are increased, as measured through Dakota County resident survey every 2-3 years**

[2019 Residential Survey](https://www.co.dakota.mn.us/Government/Analysis/ResidentSurvey/Documents/2019ResidentialSurvey.pdf)

[\(https://www.co.dakota.mn.us/Government/Analysis/ResidentSurvey/Documents/2019ResidentialSurvey.pdf\)](https://www.co.dakota.mn.us/Government/Analysis/ResidentSurvey/Documents/2019ResidentialSurvey.pdf)

Highlights, p. 3:

- Residents voiced widespread support for using County funds to keep cities' drinking water sources free of contaminants.
- Dakota County is working on a long-range Groundwater Plan that could include various programs or regulations to protect and improve groundwater resources (the source of drinking water in Dakota County).
- Survey respondents were asked which potential programs or regulations they would support. Only 6% of respondents answered that they would not support any of them. The most popular option was using County funds to keep drinking water sources free of contaminants – 8 in 10 respondents supported this option.

- Just over half of respondents indicated they would support using County funds to protect land to limit contamination of groundwater supplies.

Groundwater Plan Stakeholder Engagement Findings and Direction, [Appendix B of Groundwater Plan, p. 169](#)

Agricultural Chemical Reduction Effort (ACRE) Plan Public Engagement Reports, 2021-2022: [Agricultural Chemical Reduction Effort | Dakota County](#)

### 3. Reduce existing levels of groundwater contamination

#### **OUTCOME MEASURE: Measure number and amount of cost share for alternative practices and cropping systems to reduce input levels**

Below is a list of cover crop contracts initiated with the Dakota County SWCD on land within the Vermillion River Watershed. VRWJPO provides funding to the SWCD to cost share these BMPs.

Year	Acres	Contract Duration	Payment*
2018	80	One Year	\$2,000
2018	100	Three Years	\$10,500
2018	65	Three Years	\$6,825
2018	24	Three Years	\$2,520
2019	69.4	One Year	\$1,735
2019	100	One Year	\$2,500
2020	68	One Year	\$1,700
2020	61	One Year	\$1,525
2020	60	One Year	\$1,500
2020	100	One Year	\$2,500
2020	58	One Year	\$1,450
2020	50	One Year	\$2,450
2020	52	One Year	\$1,300
2020	43	One Year	\$1,075
2020	88	One Year	\$2,200
2021	85	One Year	\$2,125
2021	120	One Year	\$3,500

Year	Acres	Contract Duration	Payment*
2021	106	One Year	\$2,500
2021	30	One Year	\$750
2022	134	One year	\$2,500
2022	25	One year	\$625
2022	253	One year	\$2,500
2022	40	One year	\$1,000

\*Payout timing can vary. Assuming all acres are planted per contract, the payments are listed above. Payments are \$25 per acre for a one-year contract and \$35 per acre for a three-year contract.

## Goal C: Maintain a sustainable water supply

### 1. Promote conservation of groundwater

**OUTCOME MEASURE: Track trends of overall water use per capita for municipal consumers, per acre usage for agriculture consumers, and number of gallons per day for industrial consumers**

Per person municipal      2016 = 94.6 gallons per day  
    2017 = 98.7 gallons per day  
    2018 = 92.4 gallons per day  
    2019 = 83.8 gallons per day

Per acre agriculture\*      2016 = 138,059 gallons per acre  
    2017 = 157,927 gallons per acre  
    2018 = 173,238 gallons per acre  
    2019 = 130,219 gallons per acre  
    2020 = 98,969.8 gallons per acre  
    2021 = 153,112.6 gallons per acre

\*Dakota County only

Per million gallon well installations\*\*:    2016 = 11,008 per year / 30.2 million gallons per day  
    2017 = 12,044 per year / 33 million gallons per day  
    2018 = 12,256 per year / 33.6 million gallons per day  
    2019 = 10,794 per year / 29.5 million gallons per day

\*\*includes: agriculture, livestock, commercial/industrial, non-crop irrigation, power generation, etc.

**From MPARS Public Water Supply, for Dakota County:**

677.2 million gallons per year industry  
 3,760.1 million gallons per year agriculture  
 6,181.7 million gallons per year water supplier services

**OUTCOME MEASURE: Document number of implemented projects targeted at the highest overall water users that promote or provide for groundwater conservation**

VRWJPO has worked with cities to conduct irrigation audits at various homeowner's associations (HOA) since 2018. Since most watershed communities rely on groundwater for public supply, this is one way we can measure groundwater use. The cities of Lakeville, Apple Valley, and Rosemount have participated so far.

**2. Protect high-capacity groundwater recharge areas and promote infiltration, where appropriate**

**OUTCOME MEASURE: Track the number of acres of critical recharge areas protected via partnerships or directly by the VRWJPO**

No partnered or sponsored protection projects occurred in critical recharge areas.

**3. Promote re-use of stormwater and treated wastewater, where appropriate**

**OUTCOME MEASURE: Document the number of implemented cost share projects that re-use stormwater or treated wastewater**

Year	Project Name	Community	Subwatershed	Project Type	Project Cost	VRWJPO Funding	Grant Funds	Project Partners	Reuse Vol. (MGY)
2016	King Park Reuse System Phase 2	Lakeville	North Creek	Stormwater Reuse System	\$157,280	\$39,390	\$75,000	Lakeville, BWSR	3.1
2021	Aronson Park Reuse System	Lakeville	South Creek	Stormwater Reuse System	\$369,769	\$29,450	\$70,550	Lakeville, Dakota County, BWSR	3,812,462

**Goal D: Address more intense fluctuations (up and down) in river flow rate and volume**

**1. Regulate intercommunity flows**

(No outcome measure determined)

## 2. Address sources of increased flows

**OUTCOME MEASURE:** Measure number of voluntarily implemented practices that address increased flows

Year	Projects	Acre-feet Reduction
2016	3	35.94
2017	0	0
2018	0	0
2019	1	?
2020	0	0
2021	2	175.8
2022	1	6.2

**OUTCOME MEASURE:** Measure the number of stormwater retrofits in urban areas developed prior to 2006

Year	Projects
2016	3
2017	1
2018	1
2019	3
2020	2
2021	2
2022	1

## 3. Protect floodplains and maintain the river floodway

**OUTCOME MEASURE:** Verify and document that all permitted activities intersecting with identified floodplains have no impacts

Zero activities permitted within VRWJPO floodplains. No impacts.

**OUTCOME MEASURE:** Complete research, analysis, and recommendations on water quality and quantity impacts of aggregate mining.

[The impact of aggregate mining in the Vermillion River Watershed, Minnesota](https://www.vermillionriverwatershed.org/wp-content/uploads/2018/12/Aggregate_Mining_white_paper.pdf)  
([https://www.vermillionriverwatershed.org/wp-content/uploads/2018/12/Aggregate\\_Mining\\_white\\_paper.pdf](https://www.vermillionriverwatershed.org/wp-content/uploads/2018/12/Aggregate_Mining_white_paper.pdf))

#### **4. Address erosion problem areas**

**OUTCOME MEASURE:** Track the number of stabilization projects addressing erosion

Number listed below.

**OUTCOME MEASURE:** Quantify the sediment reduction for stabilization projects addressing erosion

Year	# of Projects Completed	Estimated sediment reduction (tons/yr)
2016	9	1,412
2017	6	184.2
2018	5	539
2019	5	157.7
2020	16	488.61
2021	12	359.77
2022	9	258.02
2023	1	147
Cumulative	63	3,546.3

### **Goal E: Improve public awareness and stewardship of water resources**

#### **1. Increase awareness of the Vermillion River, tributaries, and other waters within the watershed as unique resources**

**OUTCOME MEASURE:** Measure people's awareness of the river, tributaries, and other waters on a regularly scheduled basis by conducting a follow-up survey to "Perspectives on Minnesota Water Resources: A Survey of Sand Creek and Vermillion River Watershed Landowners" that was completed in 2012 by the University of Minnesota

[Follow-up survey](https://www.vermillionriverwatershed.org/wp-content/uploads/2021/12/Pradhananga-VRWJPO-Board-presentation-120221.pdf) (<https://www.vermillionriverwatershed.org/wp-content/uploads/2021/12/Pradhananga-VRWJPO-Board-presentation-120221.pdf>) was completed in fall 2021 and funded by VRWJPO. A highlight of the results was that more than 70% of respondents said they trusted Soil & Water Conservation Districts and more than 60% said they trusted watershed management organizations like ours to help them make decisions about



conservation practices on their land. Respondents largely felt a sense of individual obligation to do what they can to protect water but were less likely to say they'd be willing to engage with other people about it.

## 2. Increase awareness of the VRWJPO and its services

**OUTCOME MEASURE: Annually track the public's use of the website**

Year	Average Session Duration*	Pages / Session**	Annual Users***	New Users
2016 (May-Dec)	3.46	2.86	2,565	2,325
2017	2.28	2.91	5,132	4,611
2018	1.67	3.78	7,594	7,012
2019	1.28	3.59	9,892	7,683
2020	1.5	3.67	10,437	10,331
2021	0.92	3.06	15,814	15,804
2022^	1.5	2.93	11,353	11,461

\*avg session duration = average length of time spent on site in minutes

\*\*pages/session = average number of pages viewed while on site

\*\*\*users = initiated at least one session

## 3. Maintain a clear watershed identity through consistency and quality in external communications

**OUTCOME MEASURE: Complete an annual update to the communications plan**

Update completed Fall 2022 and presented to the JPB.

**OUTCOME MEASURE: Report communications plan outcomes on an annual basis**

Measures in development

## 4. Ensure that watershed messages are available through multiple channels and media

**OUTCOME MEASURE: Track the number of different types of outlets used to convey messages**

Press Releases/Articles	# per year
2016	40
2017	36
2018	31
2019	34
2020	7

Press Releases/Articles	# per year
2021	23
2022	30
2023	22
Platform	Audience
Newsletter	1,174 subscribers
Facebook	356 followers
Twitter	259 followers
Instagram	484 followers

**5. Plan and host events, such as programs, training, and outreach activities, to motivate stakeholders to make choices that will improve water resources**

**OUTCOME MEASURE: Annually track the number and type of events and the number of participants at each event**

Year	Events	Participants*
2016	57	1,670
2017	61	2,065
2018	49	2,263
2019	36	2,350
2020**	6	1,068
2021**	9	1,249
2022	16	945

\*It is difficult to quantify all participants at events like the Dakota County Fair and are not included in participant totals. In each year, we reached more people than is listed. The numbers indicate how many were tracked.

\*\*Many events we typically attend were canceled due to COVID-19 or weather or switched to virtual.

## 6. Promote civic engagement and citizen-based action on water and natural resource issues

**OUTCOME MEASURE:** Annually track the number of events, groups, and participants engaged in VRWJPO supported activities

### Wetland Health Evaluation Program in the Vermillion River Watershed

Year	# of Volunteers	Volunteer Hours	# of Wetlands Monitored
2016	76	1,996	17
2017	83	2,171	16
2018	61	1,135	22
2019	70	1,280	14
2020	94	737	14
2021	81	1,248.75	17
2022	61	2,361 (countywide)	17

### Vermillion Stewards\*

Year	Events	Volunteers	Hours
2016	10	245	286.5
2017	9	177	337.5
2018	7	195	162
2019	7	115	134
2020	5	89	158

\*VRWJPO ended contract with Friends of the Mississippi River for co-management of Vermillion Stewards in 2021. The program still exists with FMR.

### Minnesota Water Stewards Participants from Vermillion River Watershed

Year	Participants*	Hours
2016-17	3	0 (volunteer hours not required in first year)
2017-18	6	0 (reported)
2018-19	8	68
2019-20	11	196

Year	Participants*	Hours
2020-21	11 (2 new registered, but both dropped out)	N/A
2022	12	
2023	13	1 currently going through curriculum

\*cumulative

#### Stewardship Grants

Year	Grants
2016	1
2017	0
2018	1
2019	0

No program budget from 2019-present.

#### VRWJPO Attendees at Public Meetings/Events

2016: Public Hearing for Draft 2016-2025 Vermillion River Watershed Management Plan - 35 estimated attendees

Public Hearing on the Draft VRWJPO 2017 Budget - 0 attendees

2017: Public Hearing on the Proposed Amendments to the VRWJPO Rules - 0 attendees

Public Hearing on the Draft VRWJPO 2018 Budget - 0 attendees

2018: Public Hearing on the Proposed Amendments to the VRWJPO Permit Program Fee and Security Schedule - 0 attendees

Public Hearing on the Draft VRWJPO 2019 Budget - 0 attendees

2019: Public Hearing on the Proposed Amendments to the VRWJPO Standards - 4 attendees

Public Hearing on the Draft VRWJPO 2020 Budget - 0 attendees

2020: Public Hearing on Proposed Amendments to VRWJPO Rules – 0 attendees

Public Hearing on the Draft VRWJPO 2021 Budget – 0 attendees

2021: Public Hearing on Proposed Modifications to the VRWJPO Permit Fee and Security Schedule – 0 attendees

Public Hearing on Proposed Amendment for Bemis Wetland – 0 attendees

Public Hearing on the Draft VRWJPO 2022 Budget – 0 attendees

2022: Public Hearing on Draft 2023 VRWJPO Budget – 0 attendees

Public Hearing on VRWJPO Proposed Plan Amendment – 0 attendees

## Drains Adopted in the Vermillion River Watershed

2019: 131  
2020: 116  
2021: 106  
2022: 99  
2023: 44

## Goal F: Improve watershed resilience to changing precipitation and temperature patterns

### 1. Seek to maintain pre-development hydrology

**OUTCOME MEASURE: Annually track cost-shared best management practices that increase storage or infiltration capacity**

Year	Projects	Acre-feet Reduction/yr
2016	4	36.94
2017	1	1.4
2018	3	4
2019	1	2.1
2020	1	0.11
2021	2	175.8
2022	1	6.2
<b>Cumulative</b>	<b>13</b>	<b>226.55</b>

**OUTCOME MEASURE: Report outcome of evaluation of standards compliance**

Beginning in 2017, the VRWJPO initiated a Standards Evaluation Program to review the application of local ordinances and validate community implementation of the VRWJPO Standards during the prior year (2016). The Standards Evaluation involves completion of an annual form summarizing water resources-related activities in each community as well as “spot-check” reviews of the permitting process applied by the local community on a sample of permitted projects.

The VRWJPO performed the Standards Evaluation covering the years 2016-2020 and will complete another period of evaluation years after the next Watershed plan update (expected in 2025-26).

Year	Community Compliance Checks
2016	16

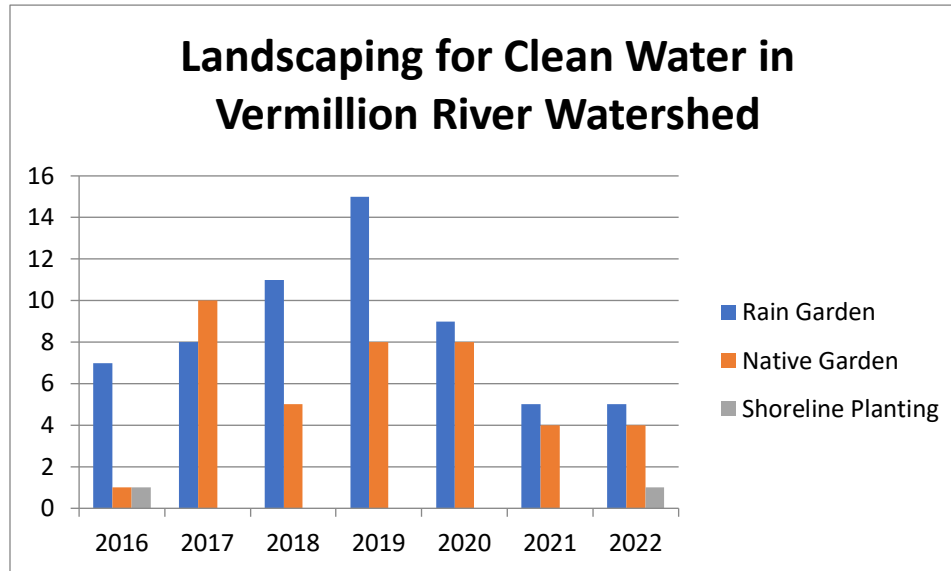
Year	Community Compliance Checks
2017	17
2018	2
2019	6
2020	4

**OUTCOME MEASURE: Annually track implementation of voluntary or innovative best management practices that mitigate thermal impacts**

Year	Project Name	Community	Project Type	Project Cost	VRWJPO Funding	Grant Source	Grant Funds	Project Partners	Temp. Reduction (deg. F)
2016	Hamburg Ave. Stormwater Retrofits	Lakeville	Underground Infiltration (Chambers)	\$206,794	\$140,000	BWSR CWF	\$50,000	Lakeville, SWCD	
2018	South Creek Temperature Reduction	Lakeville	Bank Resloping & Vegetation	\$224,000	\$35,066	BWSR CWF	\$153,868	Lakeville	17

## 2. Increase the resilience of the River corridor through vegetative protection & restoration techniques

**OUTCOME MEASURE:** Annually track the number and type of voluntary projects supported by the VRWJPO that retain or capture stormwater in the watershed



### Vermillion Corridor Acquisitions/Restorations

Year	Project Name	Project Type	County Interest	Acres	Vermillion River	Location
<b>Acquisition:</b>						
2022	Adelmann	County Park Conservation Area	Own Land	33	Main Stem	Farmington
2022	Adelmann	Greenway Corridor	Own Land	5	Main Stem	Farmington
2021	Wallin	County Park Conservation Area	Own Land	7	Main Stem	Hastings
2021	Wallin	Greenway Corridor	Own Land	5	Main Stem	Hastings
2017	Smith	Greenway Corridor	Own Land	5	North Creek	Lakeville
2017	Smith	Natural Area	Easement	7	North Creek	Lakeville
2016	Blair/Foley	County Park Conservation Area	Own Land	24	South Creek	Farmington
<b>Restoration:</b>						
2022	Ag Society	Natural Area	Easement	2	South Branch	Castle Rock

Year	Project Name	Project Type	County Interest	Acres	Vermillion River	Location
2022	Boucher	Natural Area	Easement	4	Main Stem	Vermillion
2022	Finden	Natural Area	Easement	4	Main Stem	Empire
2022	Hoffman/McNamara	Agricultural (tree nursery)	Easement	9	Main Stem	Vermillion

## Goal G: Protect or restore sensitive biological resources, such as plants, fish, insects, and wildlife

### 1. Monitor fish and macroinvertebrate populations in the river and tributaries

**OUTCOME MEASURE: Annually report Index of Biotic Integrity (IBI) data and track trends of fish and macroinvertebrate populations**

#### Fish Monitoring

The VRWJPO began a biomonitoring program in 2009 which samples the presence and abundance of species of **fish** annually. The results of this sampling provide a measure of the biological health of the stream system as indicated through an index of biological integrity (IBI). IBI is a biologically based, multi-metric method for measuring the integrity of aquatic systems. Values below the threshold indicate impairment.

Since 2016, site visits for fish population trend monitoring alternates every two or three years between sites. The Minnesota Department of Natural Resources (DNR) and the engineering firm Stantec provide this service. ([Web link to monitoring site map](#))

In 2022, we sampled four sites in the **Southern Coldwater Reach** – A3, A5, A7, and 13-1. All were below the IBI threshold of 50, indicating impairment. Over the long term, it appears that most coldwater sites indicate flat or slightly negative trends in IBI scores, with two trending positively but with only two years being sampled.

In 2022, we sampled one site in the **Southern Headwaters Reach** – A15. It was not impaired according to the IBI threshold of 55. Three sites have been sampled on a rotating basis since 2016. Over time, two Southern Headwaters sites show a negative trend and one shows a mostly flat trend in IBI scores.

In 2022, we sampled one site in the **Southern Stream Reach** – A14. It was not impaired according to the IBI threshold of 45. Since 2016, both Southern Stream sites have trended positively in IBI scores.

#### Macroinvertebrate monitoring

Since 2016, site visits for **macroinvertebrate** population trend monitoring alternates every two or three years between 18 sites. Five sites have shown positive trends in macroinvertebrate IBI (MIBI) scores over this period. The Dakota County Soil & Water Conservation District provides macroinvertebrate monitoring services for the VRWJPO.

As of this writing, the 2022 MIBI data is not yet available.



**OUTCOME MEASURE: Assess brown trout to determine population changes and annually report data**

Not Completed

**2. Use current research, long-range trend data, policies, and partnerships to protect habitat for native and sensitive aquatic species**

**OUTCOME MEASURE: Annually track riparian or instream habitat improvement projects supported by the VRWJPO**

Year	Number of Projects
2016	2
2017	3
2018	3
2019	2
2020	0
2021	3
2022	1