Executive Summary: 2016-2025 Vermillion River Watershed Management Plan Measurable Outcome Progress Update

As the Vermillion River Watershed Plan is implemented, a series of outcome measurements will be used to track progress against the Plan goals. These measures will be tracked and reported to the Vermillion River Watershed Joint Powers Board (VRWJPB) and the public. This is a fluid document, current as of June 16, 2022, and some numbers are not yet available.

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 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)*. Since 2016, site visits for fish population trend monitoring alternates every two or three years between sites.

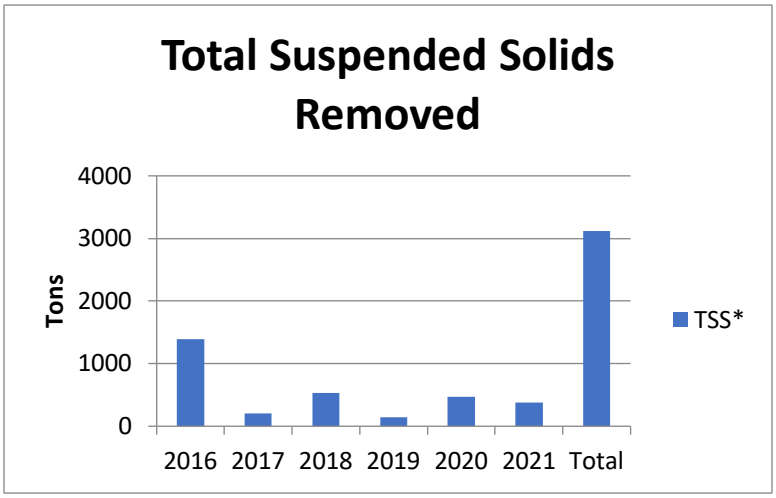
In 2020, we sampled 10 sites in the **Southern Coldwater Reach**. Four of them were impaired according to the IBI threshold. In 2021, we sampled five sites in this reach. Four of them were impaired, three of which overlapped from 2020's impairments. In two of the sites monitored in both years that turned out to be impaired, the IBI score decreased, which indicates decreasing impairment levels. Since 2016, 13 sites have been monitored on a rotating basis. Over the long term, it appears that seven sites are showing a positive trend in IBI scores and three sites are showing a negative trend in IBI scores. There are three sites showing a mostly flat trend in IBI scores.

In 2020, we sampled no sites in the **Southern Headwaters Reach**, and we sampled two sites there in 2021. Both were impaired according to the IBI threshold. Three sites have been sampled on a rotating basis since 2016. Over time, two sites show a negative trend and one shows a mostly flat trend in IBI scores.

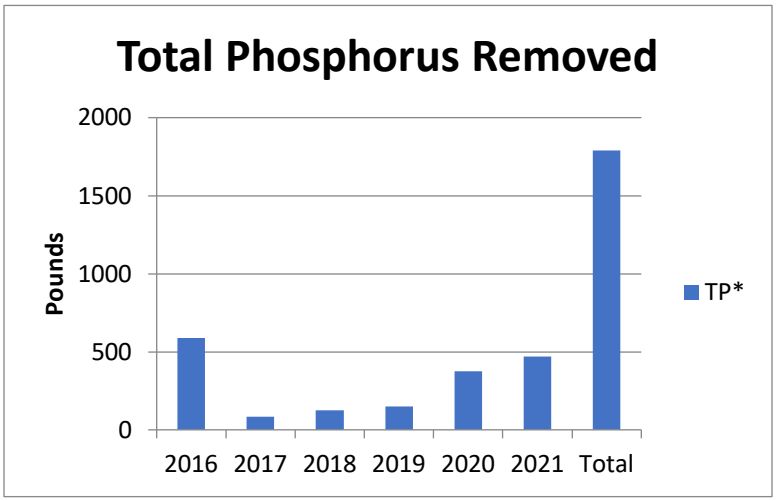
In 2020, we sampled two sites in the Southern Stream Reach, and none in 2021. The 2020 samples showed one site as impaired and one not impaired. Since 2016, one site has trended negatively and one positively in IBI scores.

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)

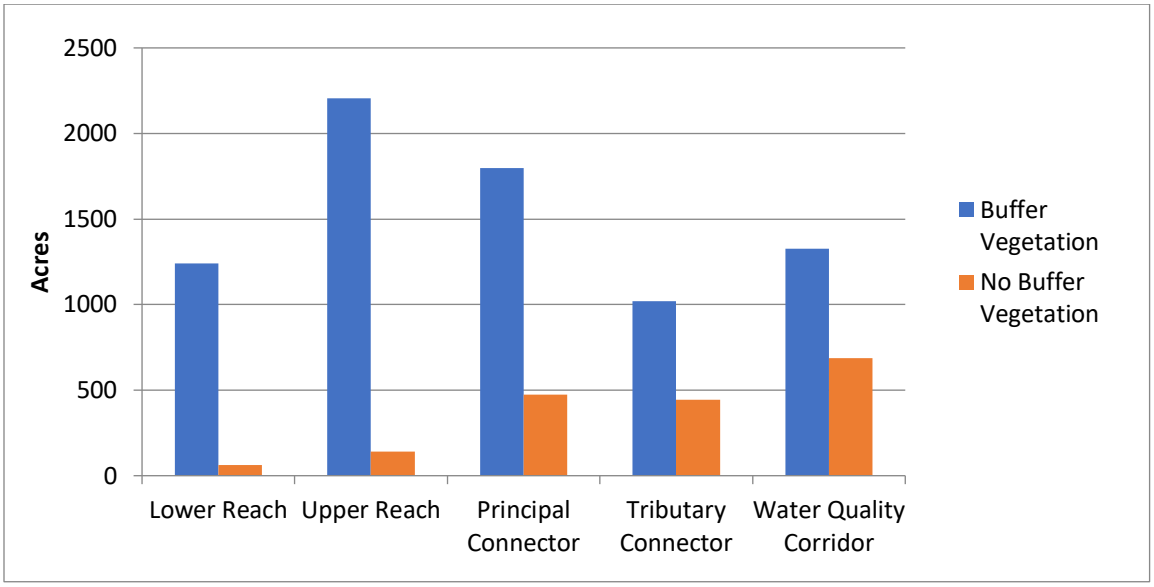
Scott County: 100% compliant with State Buffer Law as of June 2022

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

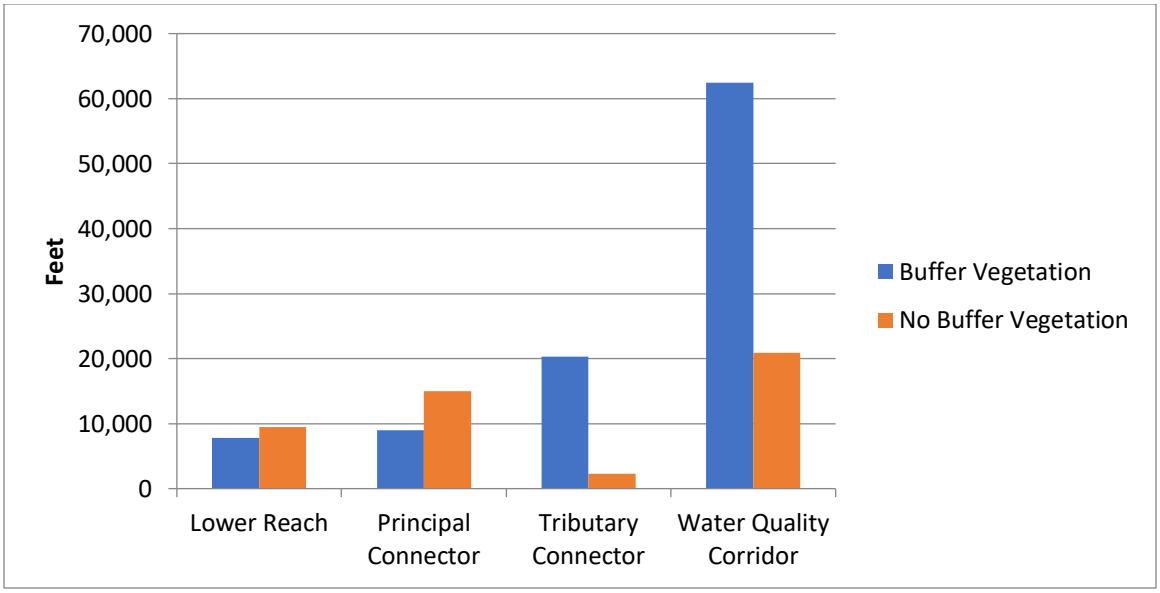
Dakota County May 2022 (after MN State Buffer Law):

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:

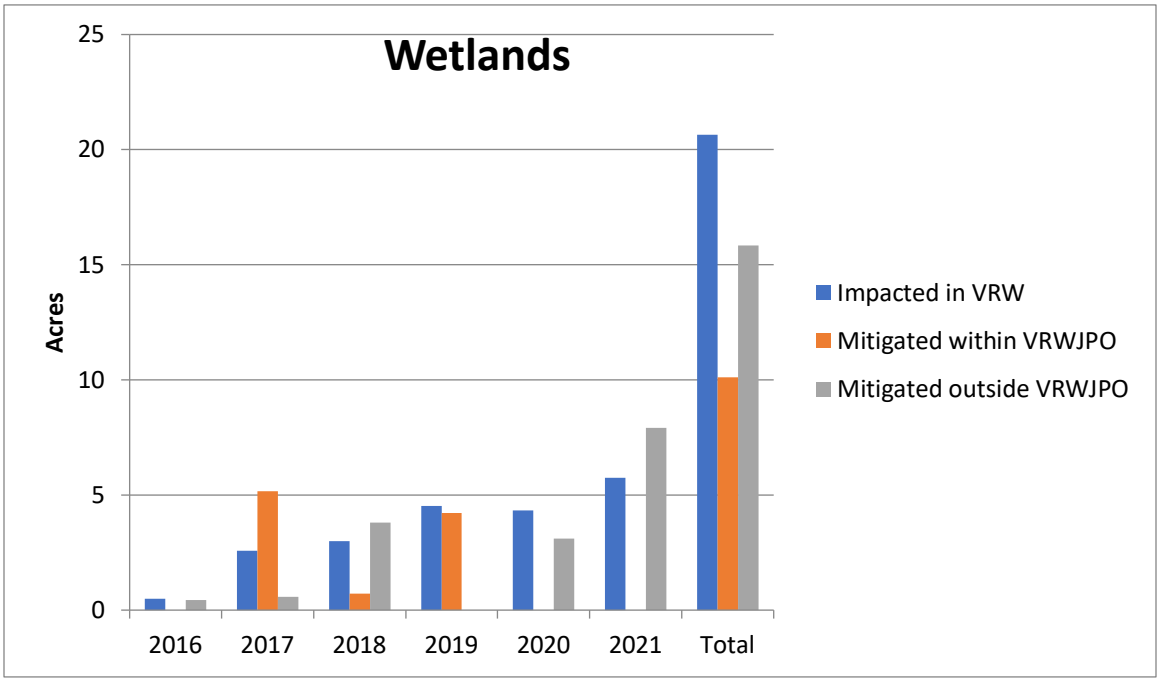


4. Protect, enhance, and restore wetlands

OUTCOME MEASURE: Document number and acres of wetlands restored

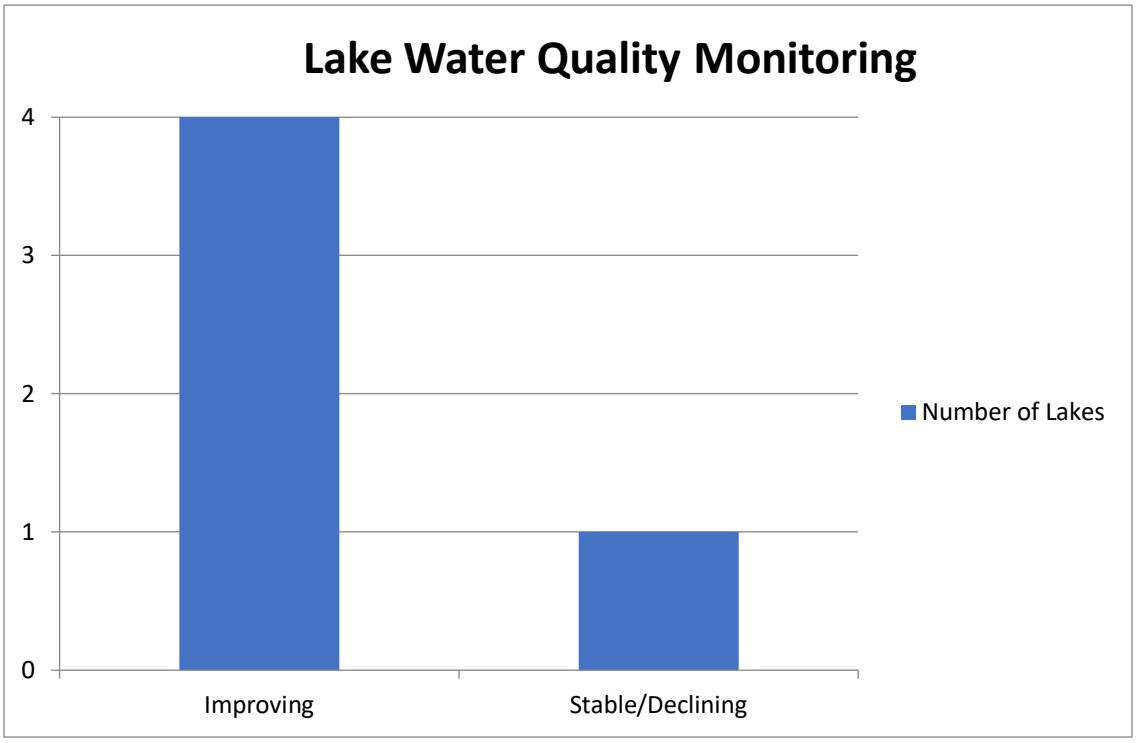
120 acres of wetlands restored in 2021

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 (dakota.mn.us) (AGQS)

Ambient Groundwater Study Appendices.pdf (dakota.mn.us)

Dakota County 2020-2030 Groundwater Plan Adopted

Chloride in private wells by municipality, 2016-2021

Chloride results (Outside faucet) – Three VRWJPO municipalities, Burnsville, Douglas Township, and Hampton Township, have had samples with the maximum chloride level (mg/L) exceed SMCL.

Dakota County Total Cyanazine Detections by Municipality and Year through 2020

Results are for the entire city or township, not just the portion in the Vermillion River Watershed. Per this study, 12 municipalities had some amount of samples that exceeded the guideline amount for total cyanazine.

The Minnesota Department of Agriculture (MDA) will be conducting widespread sampling of private drinking water wells in Dakota County for cyanazine and cyanazine breakdown products in the summer of 2022, which will significantly deepen the understanding of the extent and concentrations of cyanazine contamination the county.

In 2019, the MDA sampled 91 private drinking water wells in Scott County for cyanazine and cyanazine breakdown products. None of the wells sampled were within the Vermillion River Watershed. 17 of the 91 wells sampled (19%) exceeded the drinking water guideline for total cyanazine.

2. Protect groundwater quality from contamination

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

Year	Project Name	Community	Subwatershed	Project Category	Project Cost	VRWJPO Funding	Grant Funds	Project Partners
2016	Avonlea Wetland and Stream Restoration	Lakeville	Middle Creek	Stream Restoration	$331,392	$207,924	$0	Lakeville, Mattamy Homes
2018	South Branch Nitrate Treatment	Castle Rock Township	South Branch	Agricultural BMP	$188,432	in-kind	$412,000	Dakota County, BWSR
2020	South Branch Denitrifying Woodchip Bioreactor	Castle Rock Township	South Branch	Agricultural BMP	$34,012	$2,029	$31,983	Dakota County, BWSR
2021	Webster Wetland Restoration	Elko New Market	Upper Mainstem	Other	$71,762	$0	$64,586	Elko New Market, BWSR

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

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.

The 2022 survey results were presented to the Dakota County Board on June 21, 2022.

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

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

Year	Acres	Contract Duration	Payment*
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
2021	106	One Year	$2,500
2021	30	One Year	$750

*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
*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

Note: The DNR web page where these numbers are kept hasn't been updated since 2019. VRWJPO attempted to contact the staff person responsible for this but did not hear back.

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

Irrigation Efficiency Projects

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

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

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

4. Address erosion problem areas

OUTCOME MEASURE: Track the number of stabilization projects addressing erosion

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

Year	# of Projects	Estimated sediment reduction (tons/yr)
2016	8	1,384
2017	5	200
2018	5	558
2019	3	100*
2020	10	361
2021	6	236.14

*one project not calculated

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 was completed in fall 2021 and funded by VRWJPO. A highlight of the results was that more than 60% of respondents said that 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 (minutes)*	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

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

**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 2021

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
2021	23
Platform	**Audience (as of June 2022)**
Newsletter	1,073 subscribers
Facebook	334 followers
Twitter	237 followers
Instagram	372 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

Year	Events	Participants*
2018	49	2,263
2019	36	2,350
2020**	6	1,068
2021**	9	1,249

*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.

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

Vermillion Stewards*

Year	Events	Volunteers	Hours
2016	10	245	286.5
2017	9	177	337.5

Year	Events	Volunteers	Hours
2018	7	195	162
2019	7	115	134
2020	5	89	158

*VRWJPO ended contract with Friends of the Mississippi River for Vermillion Stewards in 2021.

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
2020-21	11 (2 new registered, but both dropped out)	N/A
2022	12	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

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

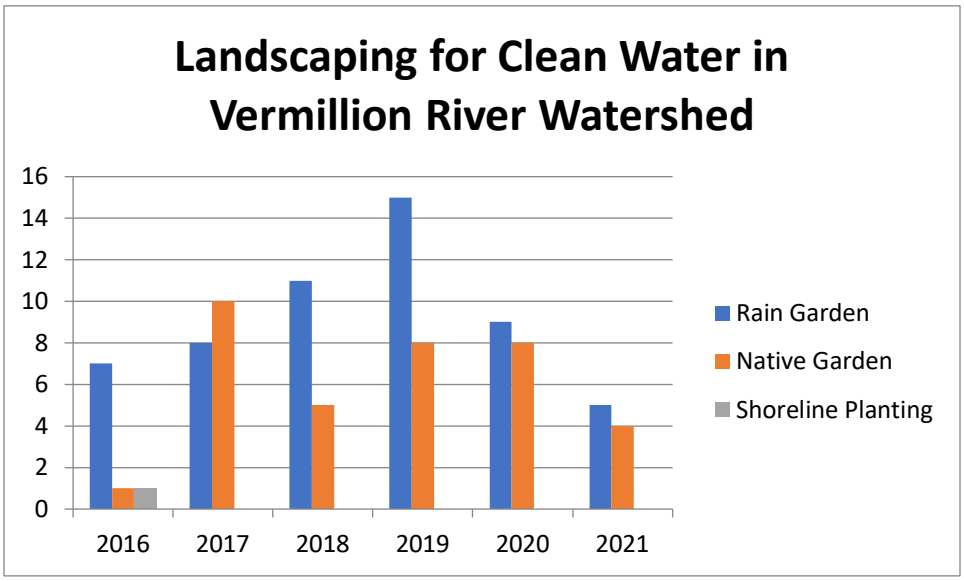
Year	Projects	Acre-feet Reduction
2016	3	35.94
2017	0	0
2018	0	0
2019	1	*
2020	0	0
2021	2	175.8

*Not yet calculated

OUTCOME MEASURE: Report outcome of evaluation of standards compliance*

Year	Community Compliance Checks
2016	16
2017	17
2018	2
2019	Data still coming in

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



Vermillion Corridor Acquisitions/Restorations

No partnered or sponsored protection acquisitions and/or restorations occurred in the Vermillion corridor.

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

*See Goal A Sub-Goal 1 for IBI and **fish** population trends.

Since 2016, site visits for macroinvertebrate population trend monitoring alternates every two or three years between the 18 sites. Five sites have shown positive trends in macroinvertebrate IBI scores over this period.

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	2
2018	2
2019	1
2020	0
2021	2