Welcome

Ag-Urban Partnership Forum

MINNESOTA

MINNESOTA WATER QUALITY CERTIFIED FARM

Agenda

9 a.m.	Welcome
9:15 a.m.	Keynote presentation
10 a.m.	Networking/break
10:15 a.m.	Successful partnership perspectives
10:55 a.m.	Small group discussions
11:45 a.m.	Summary of sessions
Noon	Adjourn

@MnPCA #MNAgUrban

Welcome

MPCA Commissioner

Katrina Kessler

@MnPCA

#MNAgUrban

Welcome

MDA Commissioner

Thom Petersen

@MnPCA #MNAgUrban

Welcome

BWSR Assistant Director
Of Regional Operations
Justin Hanson

@MnPCA #MNAgUrban

Keynote presentation

Coordination and collaboration for effective climate risk management in Minnesota

Heidi Roop, Ph.D., director
University of Minnesota Climate Adaptation Partnership

Networking/break

Return by 10:45 a.m.

@MnPCA #MNAgUrban

Municipal weatherproofing

Water-based infiltration and wetland restoration project

Tom Schneider, administrator/clerk/treasurer
City of Albany

A Discussion on the City **of Albany's Storm Water**

March 1, 2023

ALBANY
MINNESOTA ... WHERE FRIENDLY PATHS CROSS!

Agenda

1. Albany Storm Sewer Background
2. Improvement Location Map
3. Past Projects
4. Discussion & Questions

When it Rains, it Pours…

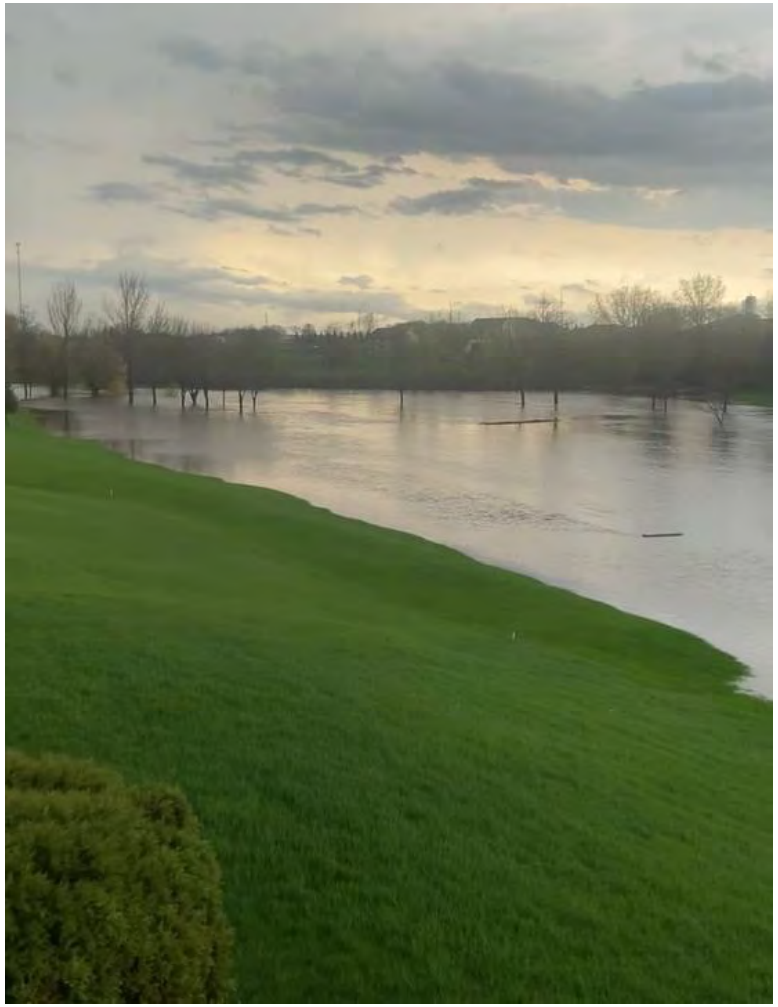
City of Albany Public Works & Wastewater Facility – May 2022

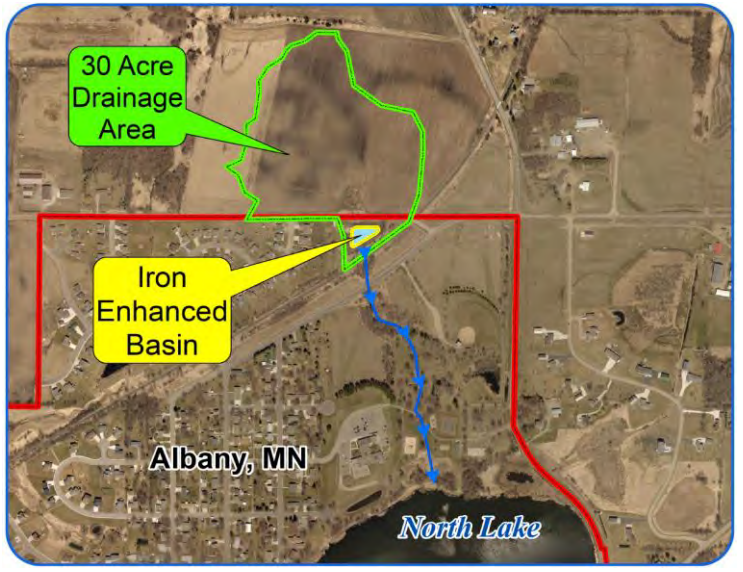
Localized Residential Flooding (Trunk Storm Sewer Overflow) – May 2022

Storm Sewer Ditch Outlet Structure Blockage during May ‘22 Rain Event

Albany Golf Course Flooding

(Multiple Rain Events over the years)





Drainage Area targeted for treatment

Water Quality Concerns

North Lake -2011

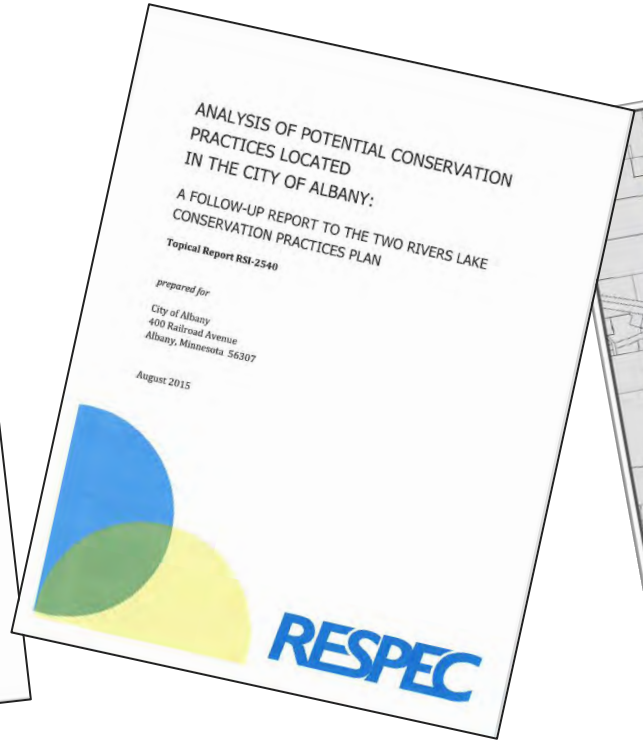
Storm Water Evaluation & Planning

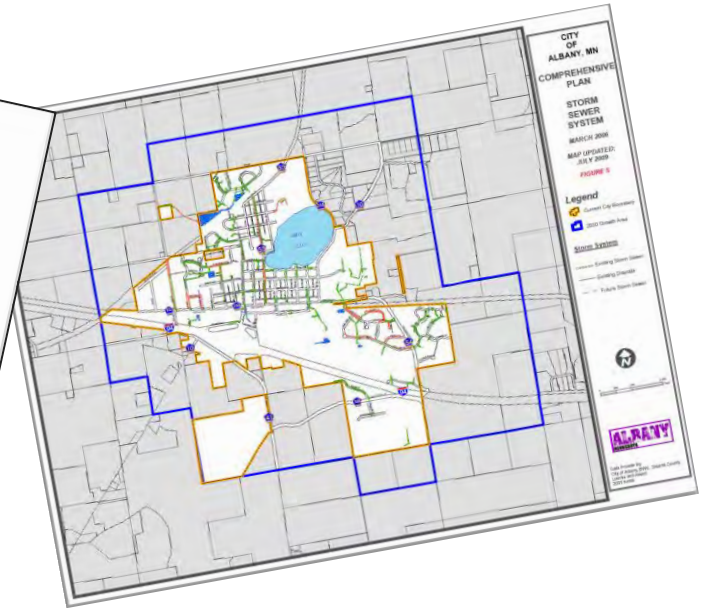
- Comprehensive Storm water mapping
- North Lake Aquatic Plant Management Plan
- Albany Storm water BMP Alternatives

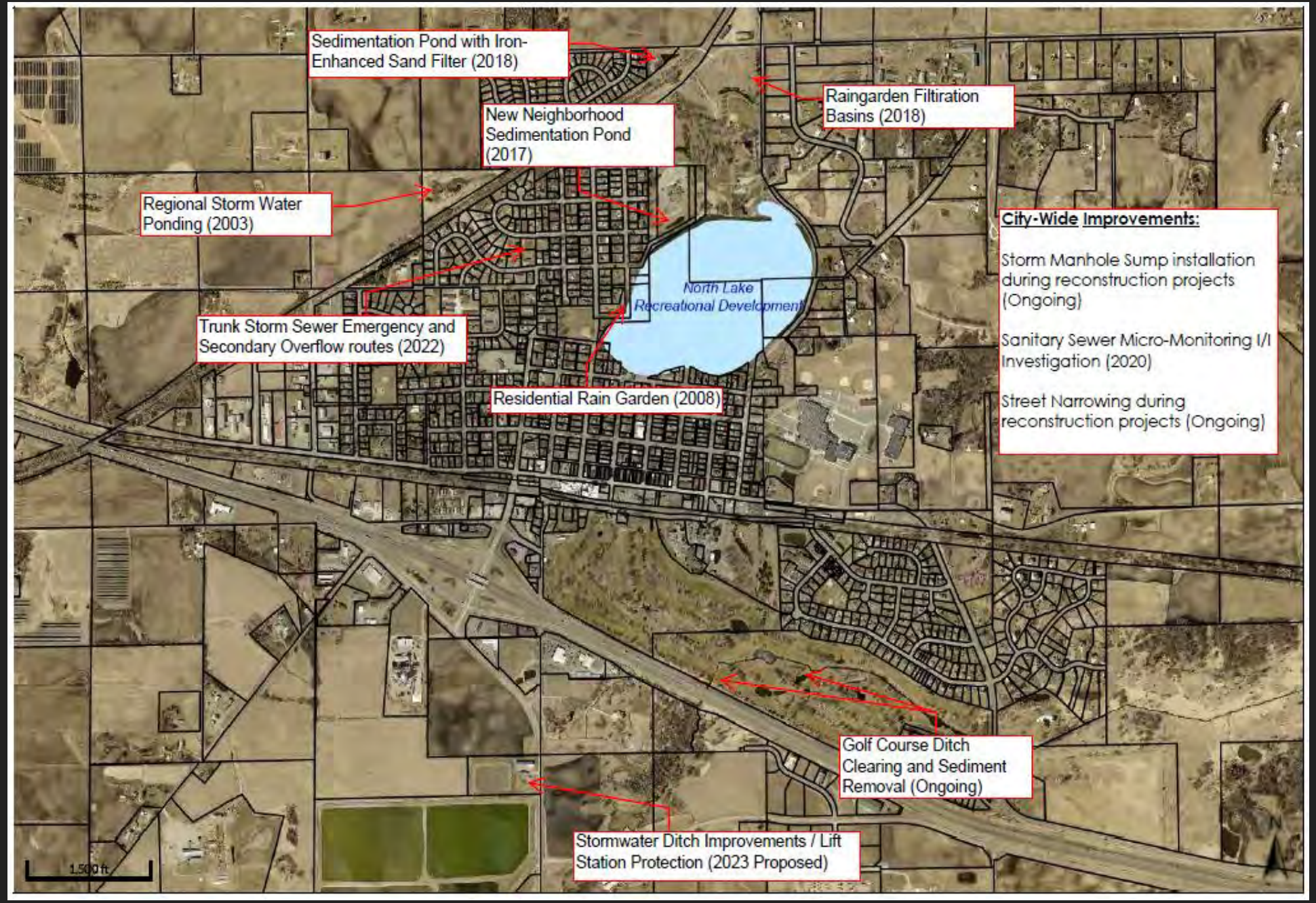
RESPEC

Table 2-1. Water Quality Samples Taken by the Minnesota Pollution Control Agency.

Stearns County Lakes Monitoring Program			
	Total Phosphorus (ug/L)	Chlorophyll-A (ug/L)	Secchi Depth (ft)
June 8, 2010	249	49	1.5
June 29, 2010	344	245	1.0
July 27, 2010	407	287	0.5
August 18, 2010	423	267	6.0
September 28, 2010	174	126	1.0
5-Sample Average	319	195	2.0
SHALLOW LAKE STANDARD	60-80	20-30	2.3-3.3



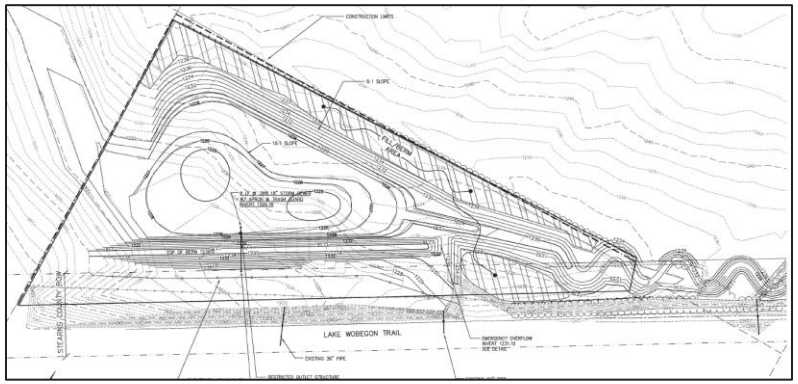


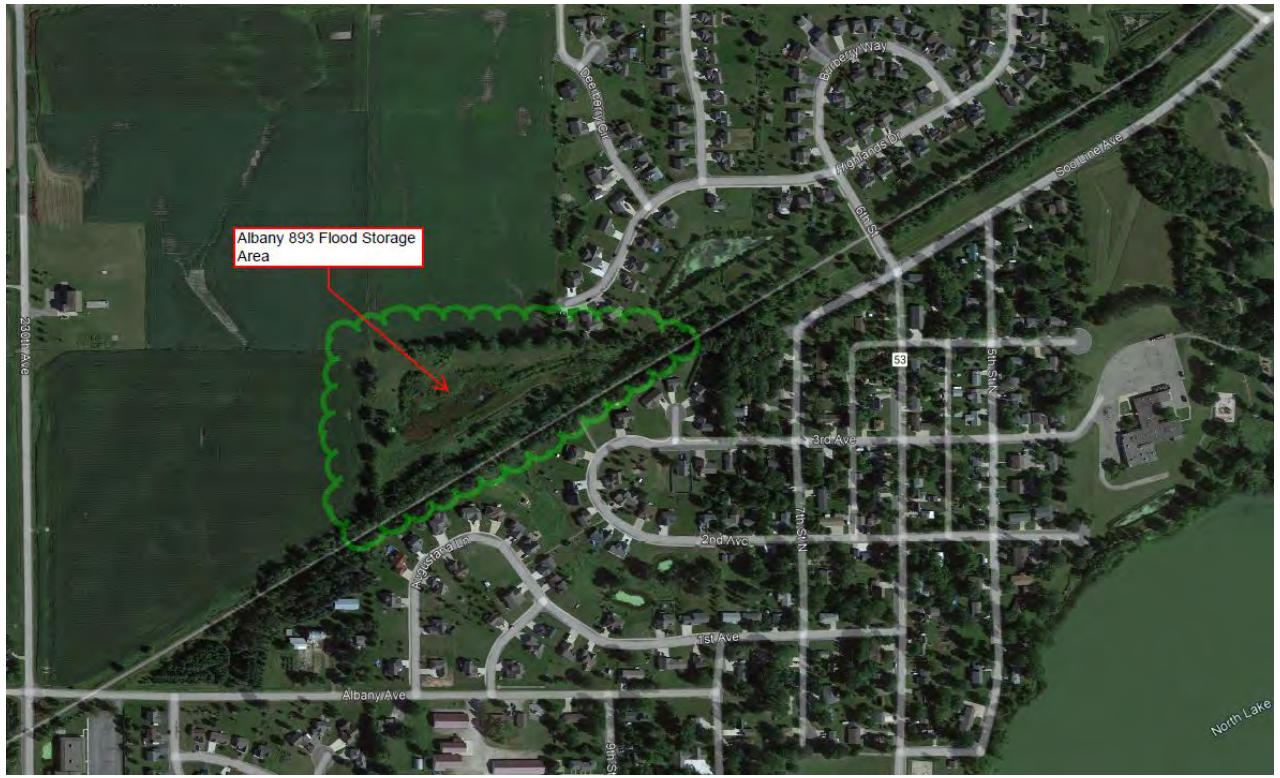


Storm Water Project Locations

Albany 893 Storm Water Ponding Project

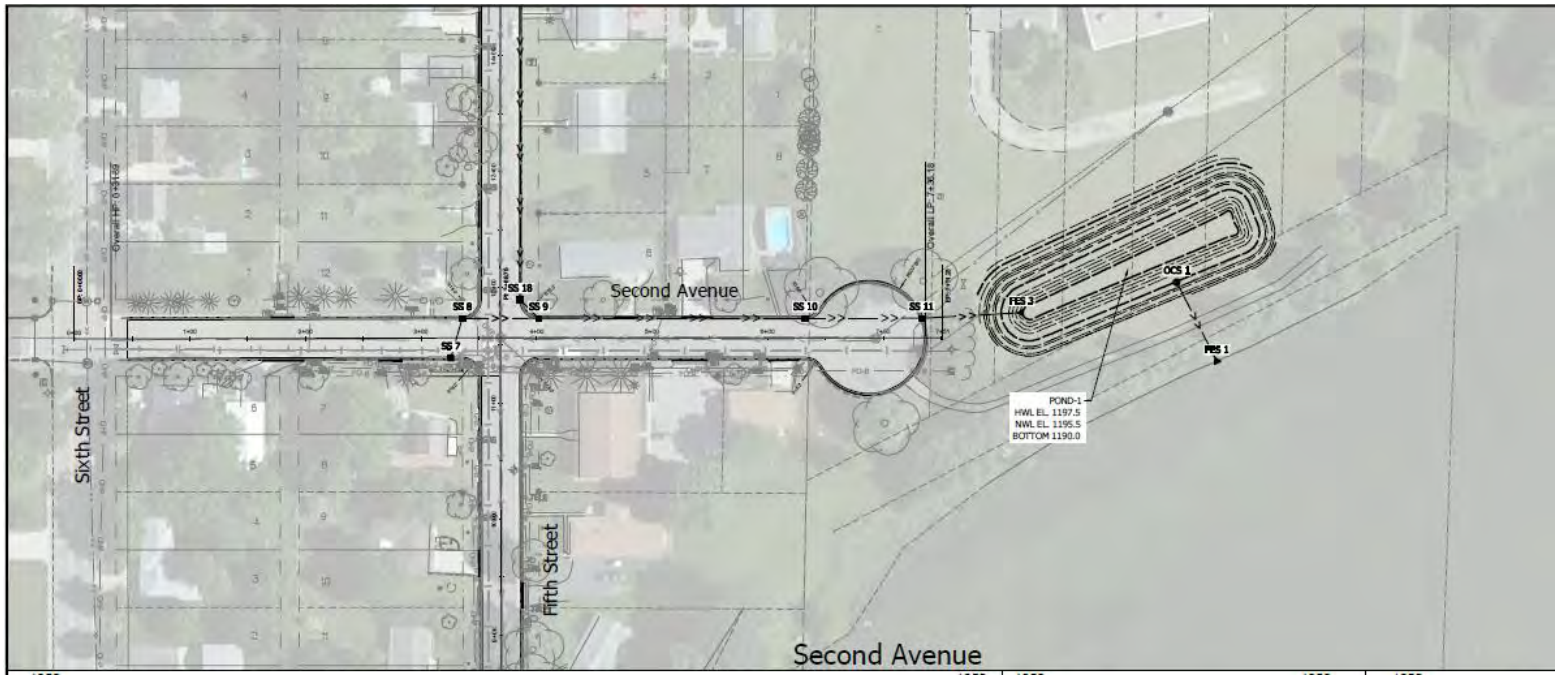
- 2003 trunk storm sewer ponding improvements, colleting drainage from 220 AC.
- Land acquisition - $35,000 (6 AC)
- Total Construction & Wetland costs - $89,400
- DNR Flood Damage Reduction Matching Grant -$62,200
- Approx. 45 Acre-Ft of storage
- Designed for future expansion as needed





New Sedimentation Pond During Neighborhood Reconstruction (2016)

Existing neighborhood runoff flowing straight into North Lake



Storm Water Flooding Improvements

Emergency overflow swale was constructed in 2023 to route flood water away from homes

Secondary overflow storm drain outlet created to help carry the flow during large events

Iron-Enhanced Sand Filter Pond – Upstream of North Lake (2018)

- Iron-enhanced sand mixture bonds with the dissolved phosphorus
- Suspended solids removed from runoff upstream of North Lake
- Extra storage slows flooding downstream

Iron-Enhanced Sand Filter Pond – Upstream of North Lake (2018)

Designed Removals

- Removal of 14.2 lbs. of Phosphorus/ Yr.
- Removal of 5,647 lbs. of Suspended Solids/Yr.

Filtration Basins upstream of North Lake (2018)

- Basins accept surface drainage and piped water from the adjacent TH 238 ditch.

- Basins constructed with drain tile below the basin, to balance water levels and convey treated water back to ditch.

Filtration Basins upstream of North Lake (2018)

Total Construction Costs for filtration basins and IE Sand Basin = $220,000

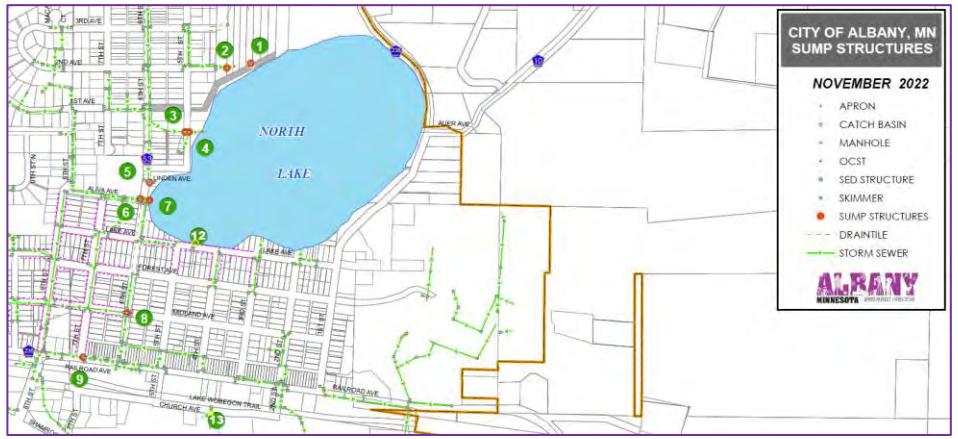
($147,000 Grant)

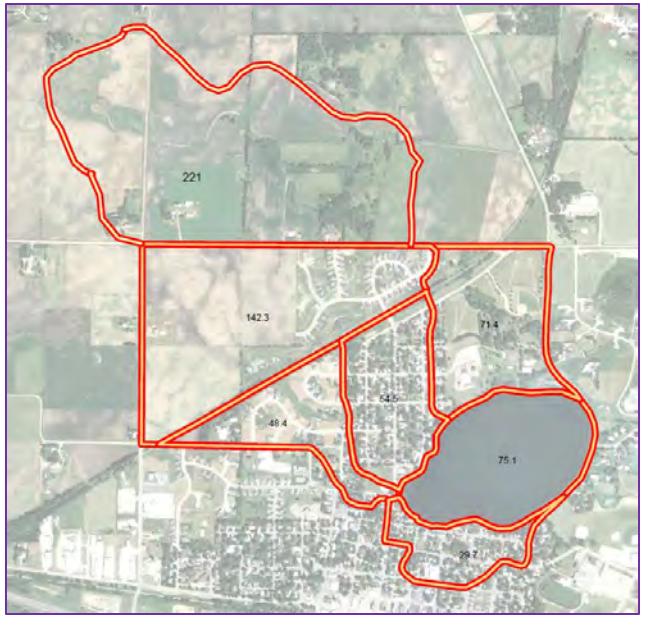
Storm Water Management Isn't Free!!

- $ Albany Utilizes a simple Storm Water Utility Fee. Collected bi-monthly with sewer and water billing, just $2 per account, per month. Even smaller amounts can add up to healthy balances!

- $ Grant Funding through Stearns County Soil & Water Conservation District and the Clean Water Fund (Legacy) grants, MN Board of Water and Soil Resources (BWSR) & the DNR.

- $ Phosphorus reducing projects can be used to help offset wastewater facilities permitting limits. Return on Investments!





Questions?

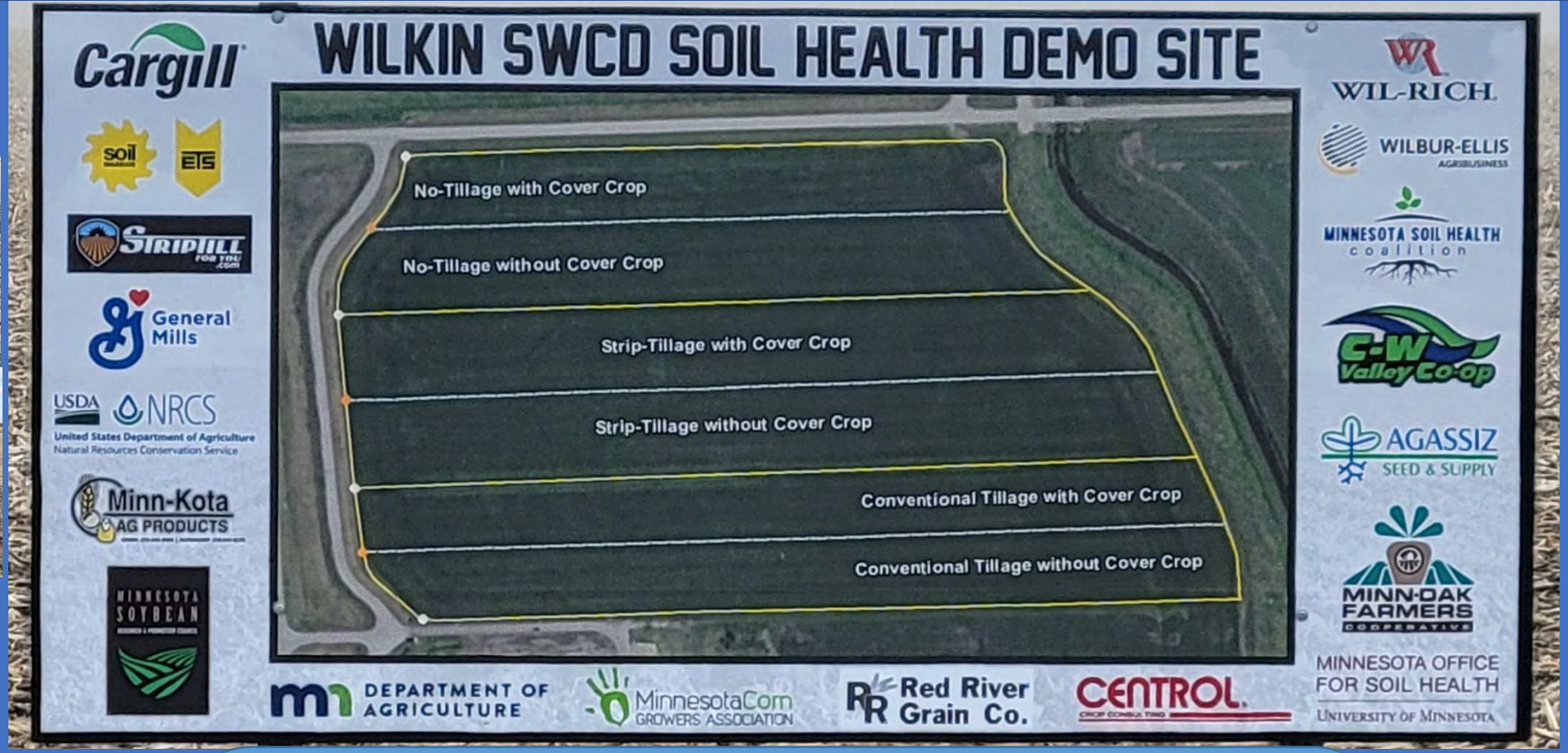
ALBANY
MINNESOTA ... WHERE FRIENDLY PATHS CROSS!

Building resiliency through soil health

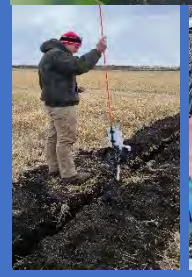
Wilkin County soil health project

Vance Johnson, producer

NRCS Monitoring Soil Properties



MDA Monitoring Soil Moisture



Goal 1 (Management Systems): Establish a minimum of six demonstration plots to compare the impacts of conventional tillage, strip-tillage and no-tillage, with and without cover crops, on soil health.

Goal 2 (Monitor & Measure): Annually monitor the physical, chemical, and biological properties of the soil, along with monitoring the soils moisture within every plot to measure soil health changes/trends.

Goal 3 (Economics): Quantify and communicate the risks and returns, for each management system, to help farmers better understand input costs and profits for each.

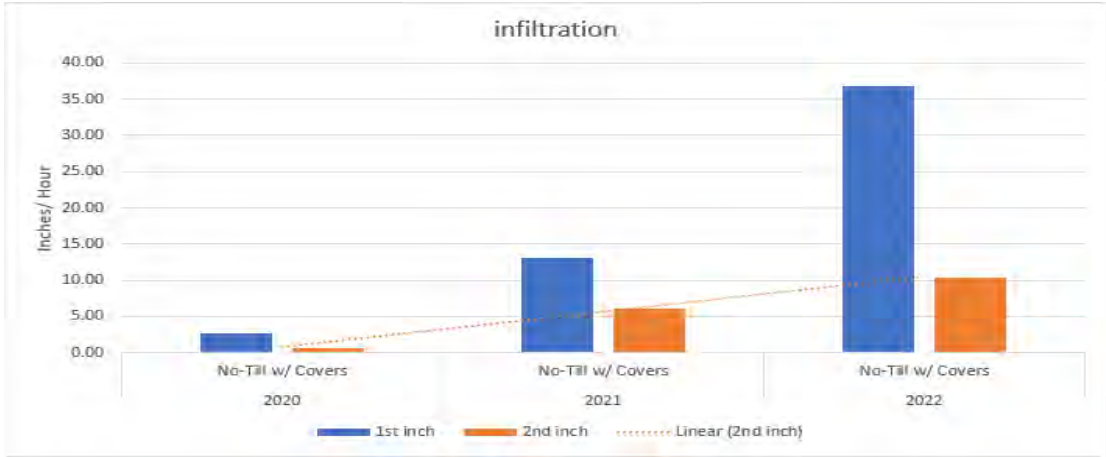
Goal 4 (Education): Hold a minimum of one field day annually for the public to increase adoption of soil health promoting practices.

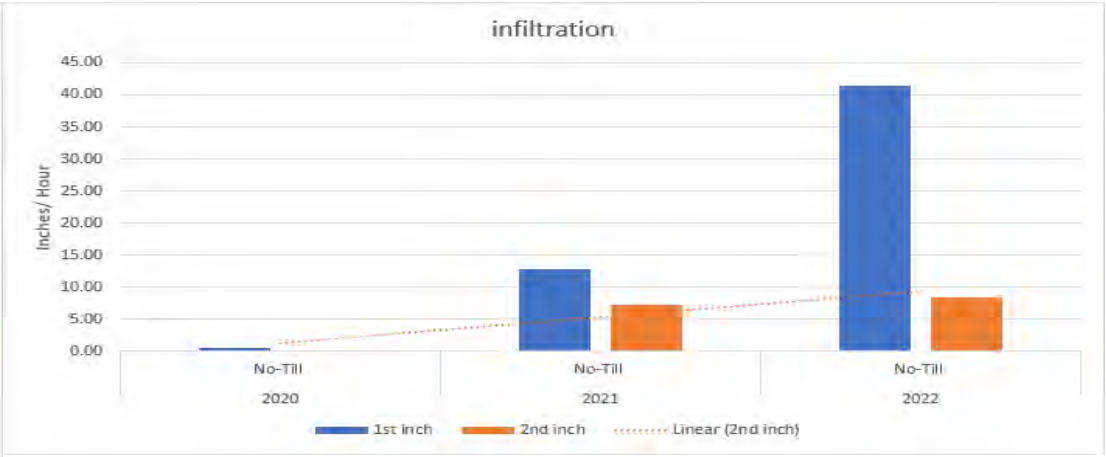
Goal 5 (Information Gaps): Work with soil health researchers and agency partners to identify research gaps and incorporate activities/measures where practical and feasible.

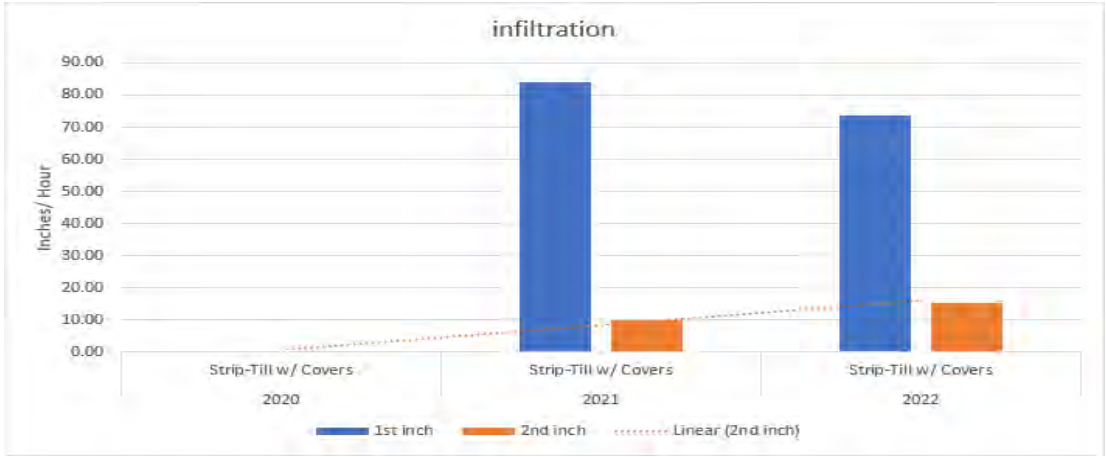
What we’re tracking

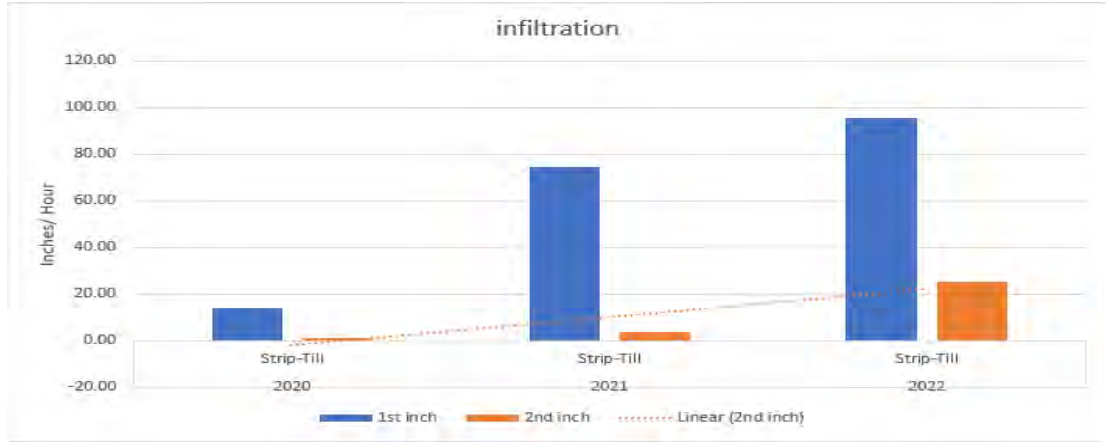
- Economics to each system (Input costs & final yields/Returns)
- Soil structure with Penetrometer readings
- Water infiltration rates
- Soil Temperature (2” & 4”) and Soil Moisture (14” & 24”)
- Soil fertility and Organic Matter changes (Standard & Haney soil tests)
- Biological diversity changes (PLFA test)

Water Infiltration Trends 2020 - 2022

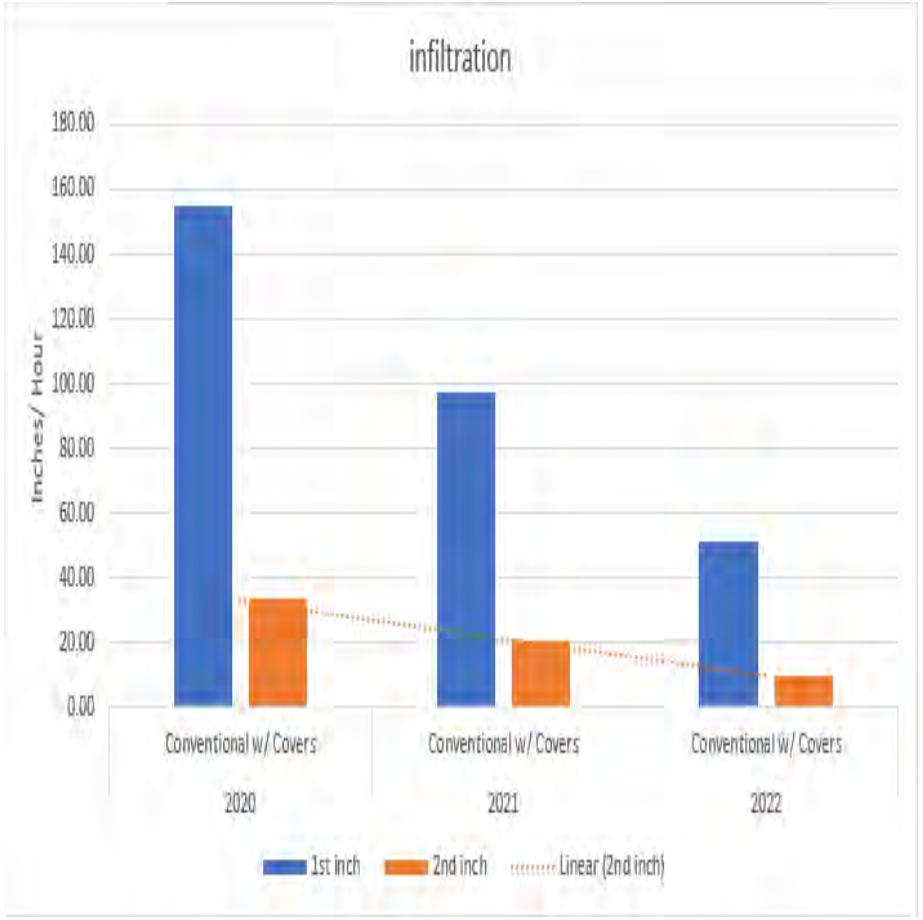


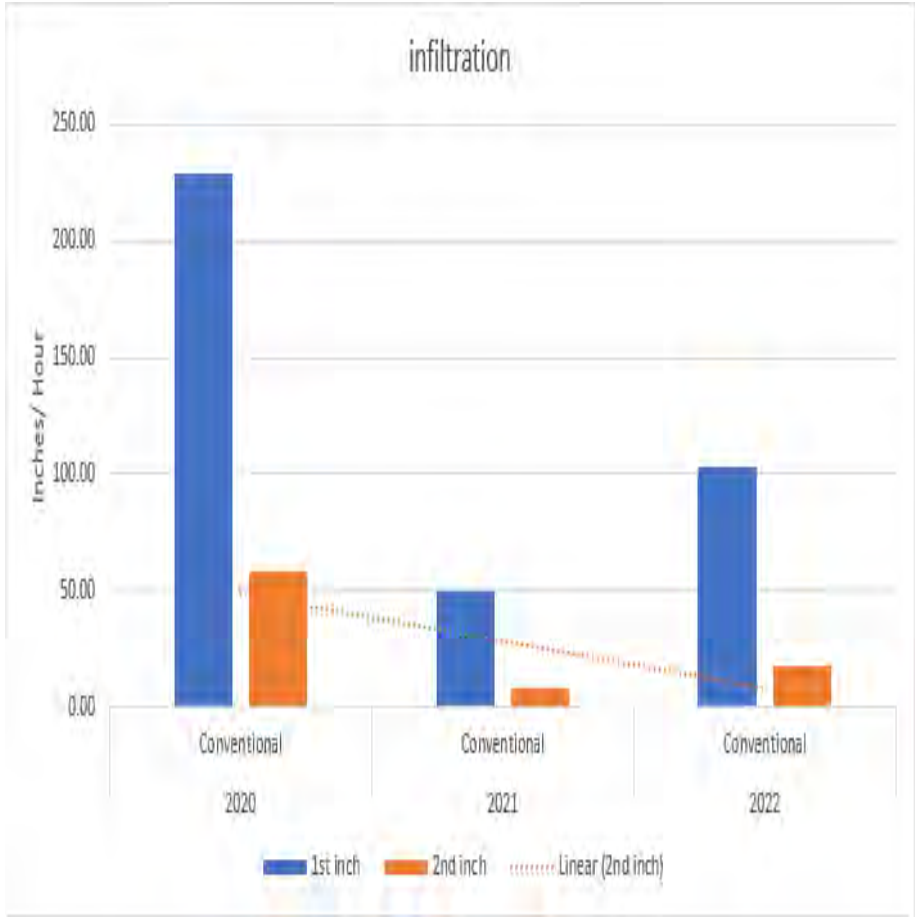






Water Infiltration Rates 2020 - 2022





Economics of Corn 2021

Wilkin County Soil Health Demonstration Site (SWCD Tillage x Cover Crop Soil Health Study)

Year:	2021			Planted:	5/7/2021
Crop:	Corn	Yields:	160/180/179/185/183/151	Harvest:	10/4/2021
Harv $:	**$5.11**				

** Frost event on 5/26/21. No-till corn took more damage than the Strip-Till. Conventional-Till showed no damage. **

Used NDSU 2020 Custom App Rate averages
Strip-till rate was a custom app rate
** *Strips ran 2x per first year reccomendation*

Fert applied in Fall '20: 110-80-0
Sidedress N applied: 10 gpa 28% + ATS
6 gal/ac 10-34-0 in-furrow starter

2020/2021 Plot Costs: 2021 Crop Year Inputs

Coventional Plot			Strip-Till Plot			No-Till Plot		
Date	**Input**	**Cost/Ac**	**Date**	**Input**	**Cost/Ac**	**Date**	**Input**	**Cost/Ac**
8/14/2020	Chiselplow 1x	$11.30	8/17/2020	Cover Crop Seed	$16.20	8/17/2020	Cover Crop Seed	$16.20
8/17/2020	Cover crop Seed	$16.20	8/17/2020	Cover Crop App	$10.00	8/17/2020	Cover Crop App	$10.00
8/17/2020	Cover Crop App	$10.00	10/25/2020	Strip-till (2x)	$50.00	11/6/2020	Fert	$64.56
9/19/2020	Chilesplow 2ndx	$11.30	10/25/2020	fert	$64.56	11/6/2020	fert app	$8.00
11/6/2020	fert	$64.56	5/7/2021	planting	$18.70	5/7/2021	planting	$18.70
11/6/2020	fert app	$8.00	5/7/2021	PRE App	$7.50	5/7/2021	PRE App	$7.50
11/6/2020	Field Cultivated	$9.27	5/7/2021	PRE + RUP	$31.95	5/7/2021	PRE + RUP	$31.95
5/6/2021	Field Cultivated	$9.27	6/7/2021	Post Herb	$14.52	6/7/2021	Post Herb	$14.52
5/7/2021	planting	$18.70	6/12/2021	Sidedress	$15.08	6/12/2021	Sidedress	$15.08
5/7/2021	PRE App	$7.50	10/4/2021	Harvest	$34.11	10/4/2021	Harvest	$34.11
5/7/2021	PRE	$27.75		Yield-No Covers	179/13.6%		Yield-No Covers	183/14.0%
6/7/2021	Post Herb App	$14.52		Yield-Covers	185/13.3%		Yield-Covers	151/13.2%
6/12/2021	Sidedress App	$15.08						
10/4/2021	Harvest	$34.11						
	Yield-No Cover	160/14.5%						
	Yield-Covers	180/14.7%						
	Covers plot	$257.56		Cover plot	$262.62		Cover plot	$220.62
	Non Cover plot	$231.36		**Non Cover plot**	$236.42		**Non Cover plot**	$194.42
				vs Conventional	$5.06		vs Conventional	-$36.94
				vs No-till	$42.00		vs Strip-till	-$42.00

2020/2021 Plot Economics with Yields

Conventional-Till Plot			Strip-Till Plot			No-Till Plot		
No Cover		**Covers**	**No Cover**		**Covers**	**No Cover**		**Covers**
160	Yield	180	179	Yield	185	183	Yield	151
14.5%	Moisture	14.7%	13.6%	Moisture	13.3%	14.0%	Moisture	13.2%
$5.11	Harvest Price	$5.11	$5.11	Harvest Price	$5.11	$5.11	Harvest Price	$5.11
$817.60	Gross Revenue	$919.80	$914.69	Gross Revenue	$945.35	$935.13	Gross Revenue	$771.61
$231.36	Expenses	$257.56	$236.42	Expenses	$262.62	$194.42	Expenses	$220.62
$586.24	Net	$662.24	$678.27	Net	$682.73	$740.71	Net	$550.99
5		4	3		2	1		6
			$703.27	if only 1x Stripper	$707.73			

** Corn Severely lodged in the Conventional, slightly better with covers (but still miserable to harvest). Standability was improved in the Stip-Till, and again improved with Covers in the Strip-Till. Standability/Lodging was minimal in the No-Till plot regardless of Covers or not.

Economics of Sugarbeets 2022

Wilkin County SWCD Soil Health Demonstration Site (Tillage x Cover Crop Soil Health Study)

Year:	2022			Planted	5/28/2022
Crop:	Sugarbeets	Yield:	12 t/a	Harvest:	10/6/2022
Harv $:	$0.15738/# sugar	Fertilizer:	70-15-0 & 110-15-0		

Used NDSU 2020 Custom App Rate averages

Strip-till rate was a custom app rate

2021/2022 Plot Costs:

Coventional Plot			Strip-Till Plot			No-Till Plot		
Date	Input	Cost/Ac	Date	Input	Cost/Ac	Date	Input	Cost/Ac
10/27/2021	Fert: 70-15-0	$74.07	8/23/2021	Cover Crop Seeded	$31.15	8/23/2021	Cover Crop Seeded	$31.15
10/27/2021	Fert App	$8.00	8/23/2021	Airplane App	$7.50	8/23/2021	Airplane App	$7.50
11/6/2021	Chisel Plow 1x	$11.30	11/9/2021	Fert: 110-15-0	$110.29	10/27/2021	Fert: 110-15-0	$110.29
11/8/2021	Cover Crop Seeded	$31.15	11/9/2021	Strip-Till App (1x)	$25.00	10/27/2021	Fert App	$8.00
11/8/2021	Coultered all 2nd pass	$10.00	5/23/2022	Roundup CC only	$18.92	5/27/2022	Roundup CC only	$18.92
5/26/2022	Coultered all 1x	$10.00	5/28/2022	Planting + Seed	$224.33	5/28/2022	Planting + Seed	$224.33
5/28/2022	Planting + Seed	$224.33	6/8/2022	Post Herb + App	$22.02	6/8/2022	Post Herb + App	$22.02
6/8/2022	Post Herb + App	$22.02	6/23/2022	Post Herb + App	$33.19	6/23/2022	Post Herb + App	$33.19
6/23/2022	Post Herb + App	$33.19	6/28/2022	Sprayed Waterhemp + App / Non CC area only	$24.30	7/15/11 - 8/25/22	Cecospera Apps (4x)	$117.82
6/28/2022	Sprayed Waterhemp + App/All	$24.30	7/15/22 - 8/25/22	Cecospera Apps (4x)	$117.82	10/6/2022	Harvest (Topping Lifting)	$68.73
7/15/22 - 8/25/22	Cecospera Apps (4x)	$117.82	10/6/2022	Harvest (Topping/Lifting)	$68.73	10/6/2022	Hauling CC	$69.97
10/6/2022	Harvest (Topping/Lifting)	$68.73	10/6/2022	Hauling CC	$56.58		Hauling No CC	$53.54
10/6/2022	Hauling CC	$66.32		Hauling No CC	$57.80		CC Yield (Tons)	13.8
	Hauling No CC	$60.84		CC Yield (Tons)	11.16		CC Yield (Sugar/ac)	4860.36
	CC Yield (Tons)	13.08		CC Yield (Sugar/ac)	3930.55		No CC Yield (Tons)	10.56
	CC Yield (Sugar/ac)	4649.04		No CC Yield (Tons)	11.4		No CC Yield (Sugar/ac)	3592.44
	No CC Yield (Tons)	12		No CC Yield Sugar/ac)	3930.55			
	No CC Yield (Sugar/ac)	4395.45						
	Covers plot	$701.23		Cover plot	$715.53		Cover plot	$711.92
	Non Cover plot	$664.60		Non Cover plot	$683.48		Non Cover plot	$637.92
				vs Conventional	$14.31		vs Conventional	$10.69
				vs No-till	$3.62		vs Strip-till	-$3.62

2021/2022 Plot Economics with Yields

Conventional-Till Plot			Strip-Till Plot			No-Till Plot		
No Cover		Covers	No Cover		Covers	No Cover		Covers
12	Yield (Tons)	13.08	11.4	Yield (Tons)	11.16	10.56	Yield (Tons)	13.8
20.19%	% Sugar	20.19%	19.40%	% Sugar	19.79%	19.40%	% Sugar	19.79%
4395.46	Sugar/Ac	4649.04	3930.55	Sugar/Ac	3930.55	3592.44	Sugar/Ac	4860.36
$0.15738	Harvest Price	$0.15738	$0.15738	Harvest Price	$0.15738	$0.15738	Harvest Price	$0.15738
$691.76	Gross Revenue	$731.67	$618.59	Gross Revenue	$618.59	$565.38	Gross Revenue	$764.92
$664.60	Expenses	$701.23	$683.48	Expenses	$715.53	$637.92	Expenses	$711.92
$27.16	Net	$30.44	-$64.89	Net	-$96.94	-$72.54	Net	$53.01
3		2	4		6	5		1

RANK

** There was considerable topper loss due to knocking beets out of the ground ahead of the lifter,as well as, tail snapping in all plots due to the excessivly dry/hard conditions. Because of this there was a large difference found between actual harvest results and the hand dug results as pulled just prior ro harvest.

** No harvestability differences were observed between treatments from the tractor. Ground conditions appeared to be very similar during harvest.

** When hand sampling was done, differences in ground conditions were observed between the various treatments. The beets were easily removed by hand in the No-till plots. It got slightly tougher to pull the beets in the Strip-till plots, and in the Conventional-till plots a shovel was needed to harvest the beets. There was also a lot of breaking of the sugarbeets in the conventional plots, even with the use of a shovel.

Results as Hand dug yield samples

Yield		% Sugar		% Purity		RST		RSA	
NTCC	27.7	CT	20.15	CT	92.10	CT	355.6	NTCC	9544
CTCC	26.2	CTCC	20.11	NT	92.02	CTCC	347.6	CTCC	9108
CT	24.0	STCC	19.85	STCC	91.32	STCC	346.5	CT	8686
ST	22.8	NTCC	19.80	ST	91.20	NTCC	344.1	ST	7726
STCC	22.3	ST	19.45	NTCC	91.00	NT	341.8	STCC	7714
NT	21.0	NT	19.40	CTCC	90.61	ST	338.1	NT	7106

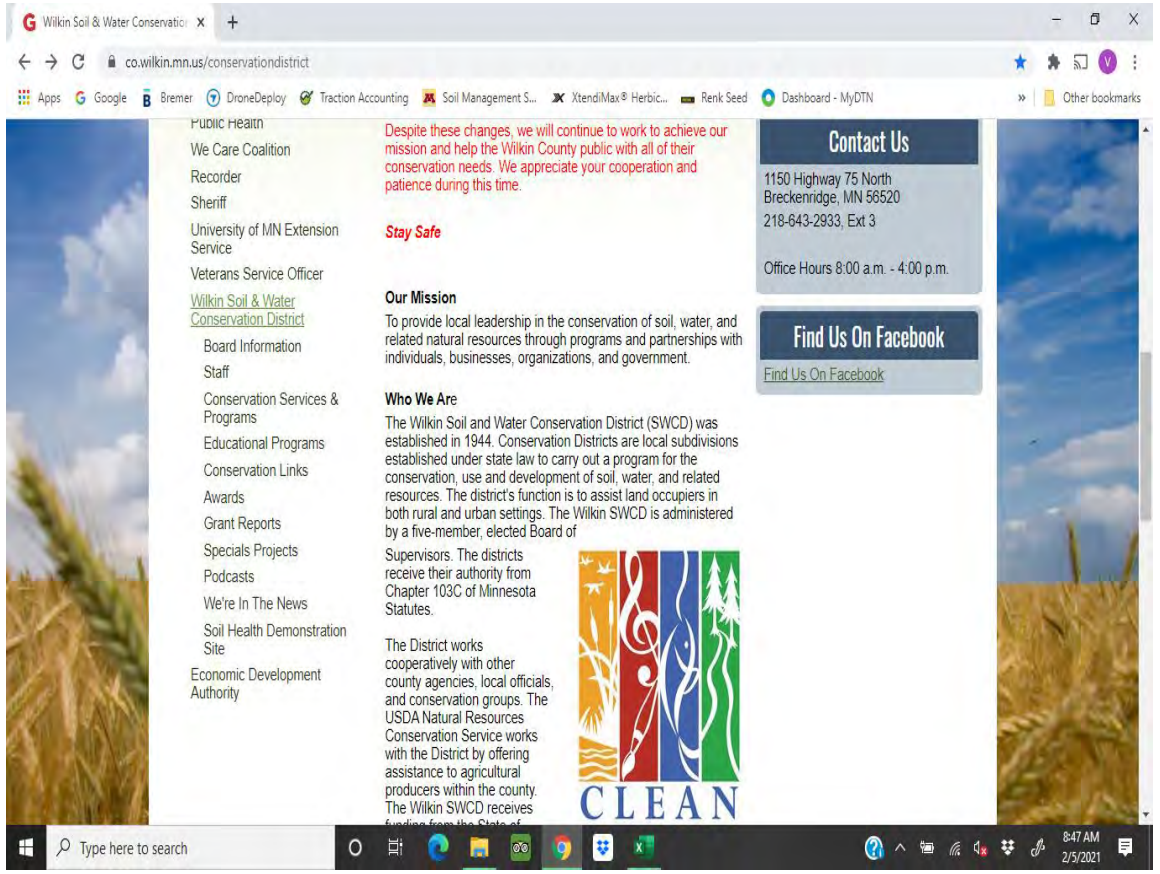
NTCC = No-till w/ Cover Crop
NT = No-till only
STCC = Strip-till w/ Cover Crop
ST = Strtip-till only
CTCC = Conventional-till w/ Cover Crop
CT = Conventional-till only

Take away's so far

- Only 2 years into a 5+ year project
- Not research. Demonstration/Observation only.
- Starting to see trends (minor at this point) towards improved water infiltration, cover crop influences, trafficability
- Every year there has been surprises. Good and Bad.
- Biggest hurdle so far is getting the help to process all the data.

Follow our Story

co.wilkin.mn.us/conservationdistrict



Water communities tackling climate change

Water communities tackling climate change through planning

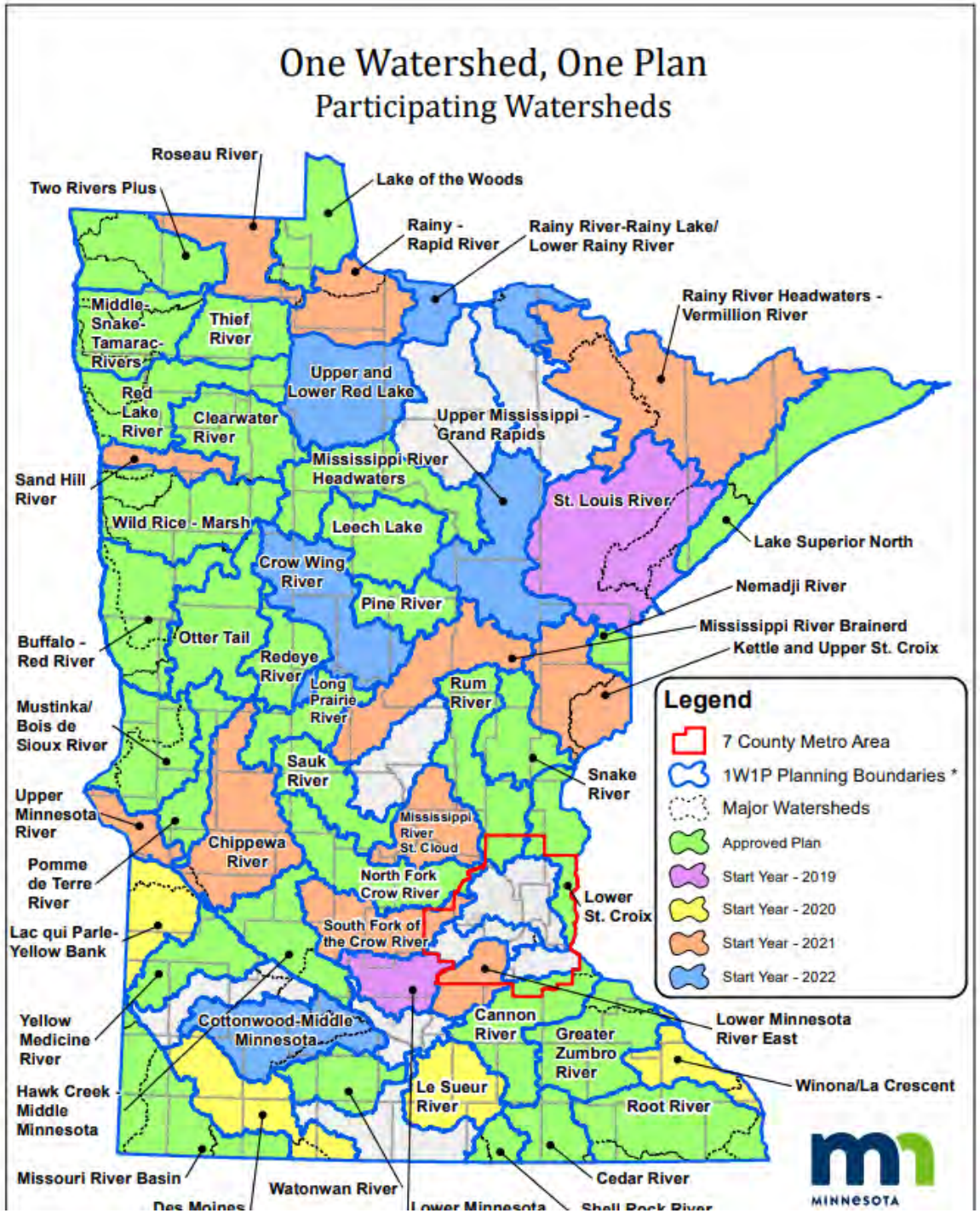
Henry Van Offelen, clean water specialist
BWSR

Comprehensive Watershed Management Plans (CWMPs)

- 32 approved
- 8 in review
- 14 in development
- 6 watersheds remain

(Authorized in MS 103B.801)

Implementation funded through Watershed Based Implementation Funding (WBIF) Grants

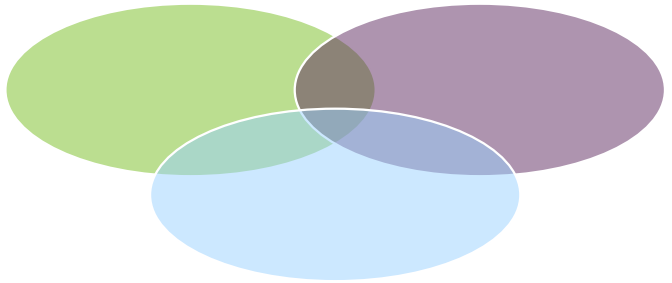


Comprehensive Watershed Management Plans – Three Big Ideas

Working together on local issues

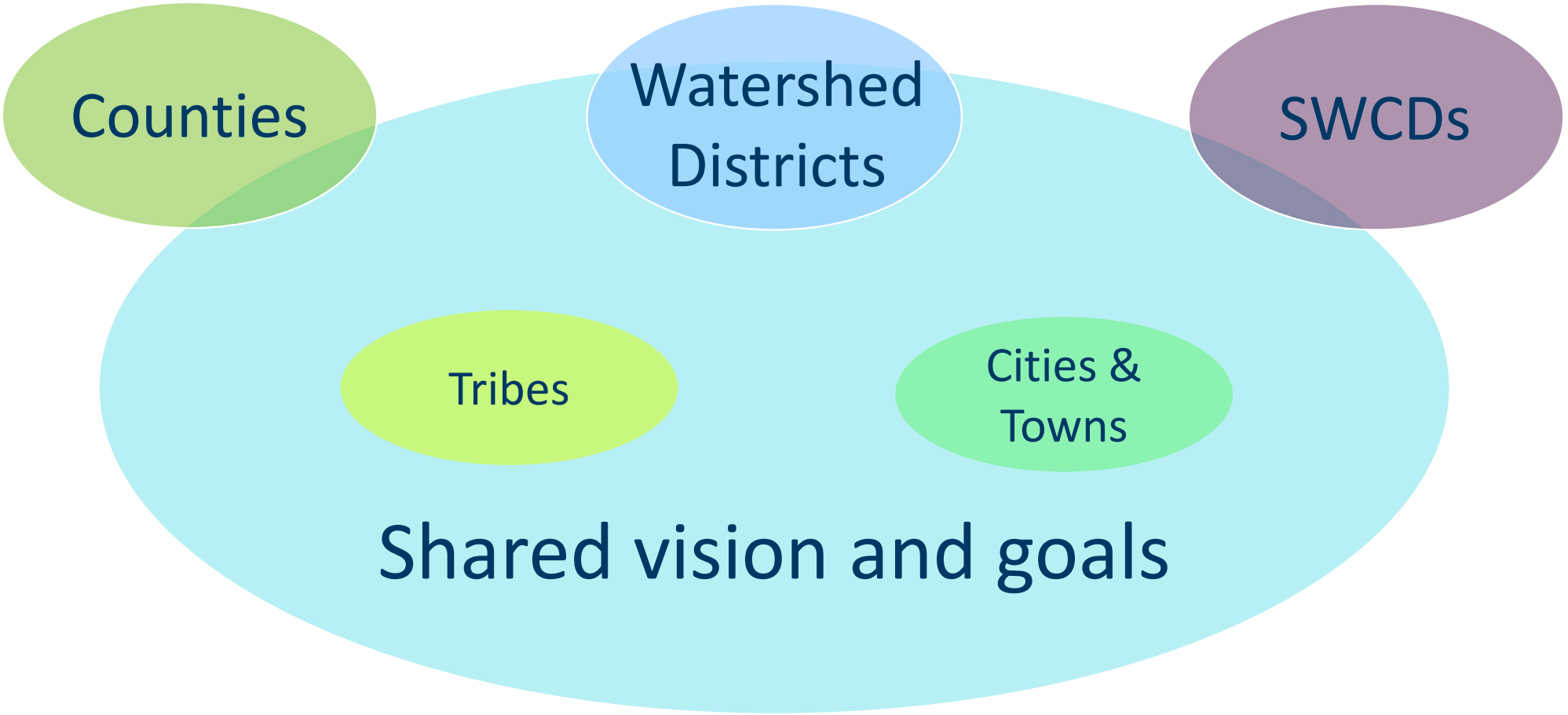
"Going with the flow"

Make choices that show results



P T M

Working Together on Local Issues



BOARD OF WATER AND SOIL RESOURCES

One Watershed, One Plan
Plan Content Requirements

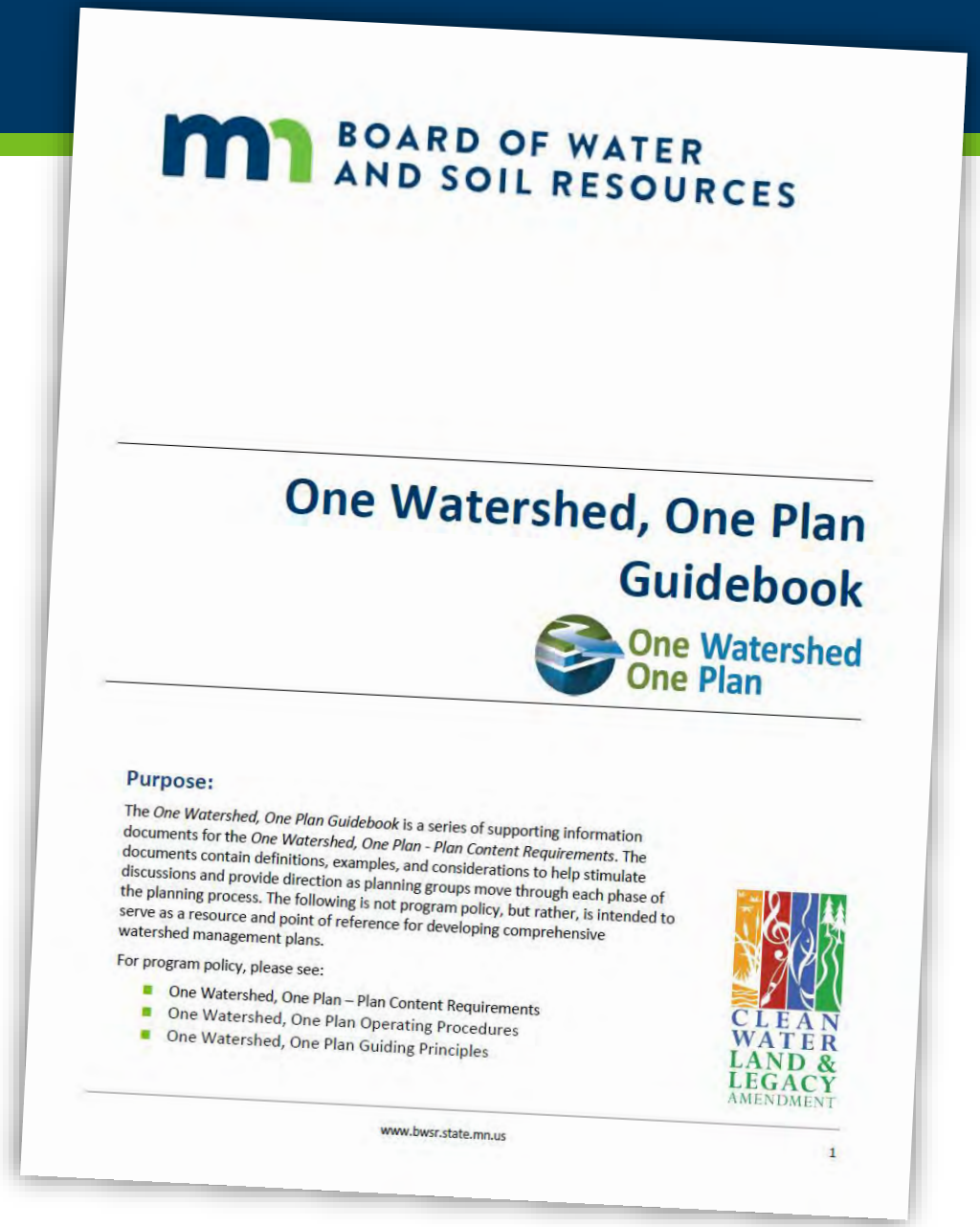
From the Board of Water and Soil Resources, State of Minnesota

Version: 2.00
Effective Date: 03/28/2018
Approval: Board Decision #18-14

Policy Statement

These are the minimum requirements for contents of a comprehensive watershed management plan developed through the Minnesota Board of Water and Soil Resources' (BWSR) One Watershed, One Plan program. The One Watershed, One Plan vision is to align local water planning on major watershed boundaries with state strategies towards prioritized, targeted, and measurable implementation plans. These procedures are based on the *One Watershed, One Plan Guiding Principles* adopted by BWSR on December 18, 2013.

Minnesota Statutes §103B.101 Subd. 14 permits BWSR to adopt methods to allow comprehensive plans, local water management plans, or watershed management plans to serve as substitutes for one another, or to be replaced with one comprehensive watershed management plan and requires BWSR to establish a suggested watershed boundary framework for these plans. Minnesota Statutes §103B.801 outlines the purpose of and requirements for comprehensive watershed management plans and directs BWSR to establish content requirements for plans.



BOARD OF WATER AND SOIL RESOURCES

One Watershed, One Plan Guidebook

One Watershed One Plan

Purpose:

The *One Watershed, One Plan Guidebook* is a series of supporting information documents for the *One Watershed, One Plan - Plan Content Requirements*. The documents contain definitions, examples, and considerations to help stimulate discussions and provide direction as planning groups move through each phase of the planning process. The following is not program policy, but rather, is intended to serve as a resource and point of reference for developing comprehensive watershed management plans.

For program policy, please see:

- One Watershed, One Plan – Plan Content Requirements
- One Watershed, One Plan Operating Procedures
- One Watershed, One Plan Guiding Principles

Required plan elements

1. Executive summary
2. Land and water narrative
3. Priority resources and issues
4. Measurable goals
5. Targeted implementation schedule
6. Plan implementation programs (includes budget)
7. Plan administration and coordination

BOARD OF WATER AND SOIL RESOURCES

One Watershed, One Plan
Plan Content Requirements

From the Board of Water and Soil Resources, State of Minnesota

Version: 2.2
Effective Date: 12/15/2022
Approval: Board Decision 22-54

Policy Statement

These are the minimum requirements for contents of a comprehensive watershed management plan deve
through the Minnesota Board of Water and Soil Resources' (BWSR) One Watershed, One Plan program. Th
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towards prioritized, targeted, and measurable implementation plans. These procedures are based on the
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replaced with one comprehensive watershed management plan and requires BWSR to establish a sugge
watershed boundary framework for these plans. Minnesota Statutes §1038.801 outlines the purpose of
requirements for comprehensive watershed management plans and directs BWSR to establish content
requirements for plans.

B. Other topics

The following topics, and others identified by planning partnerships, may also be addressed in the plan.

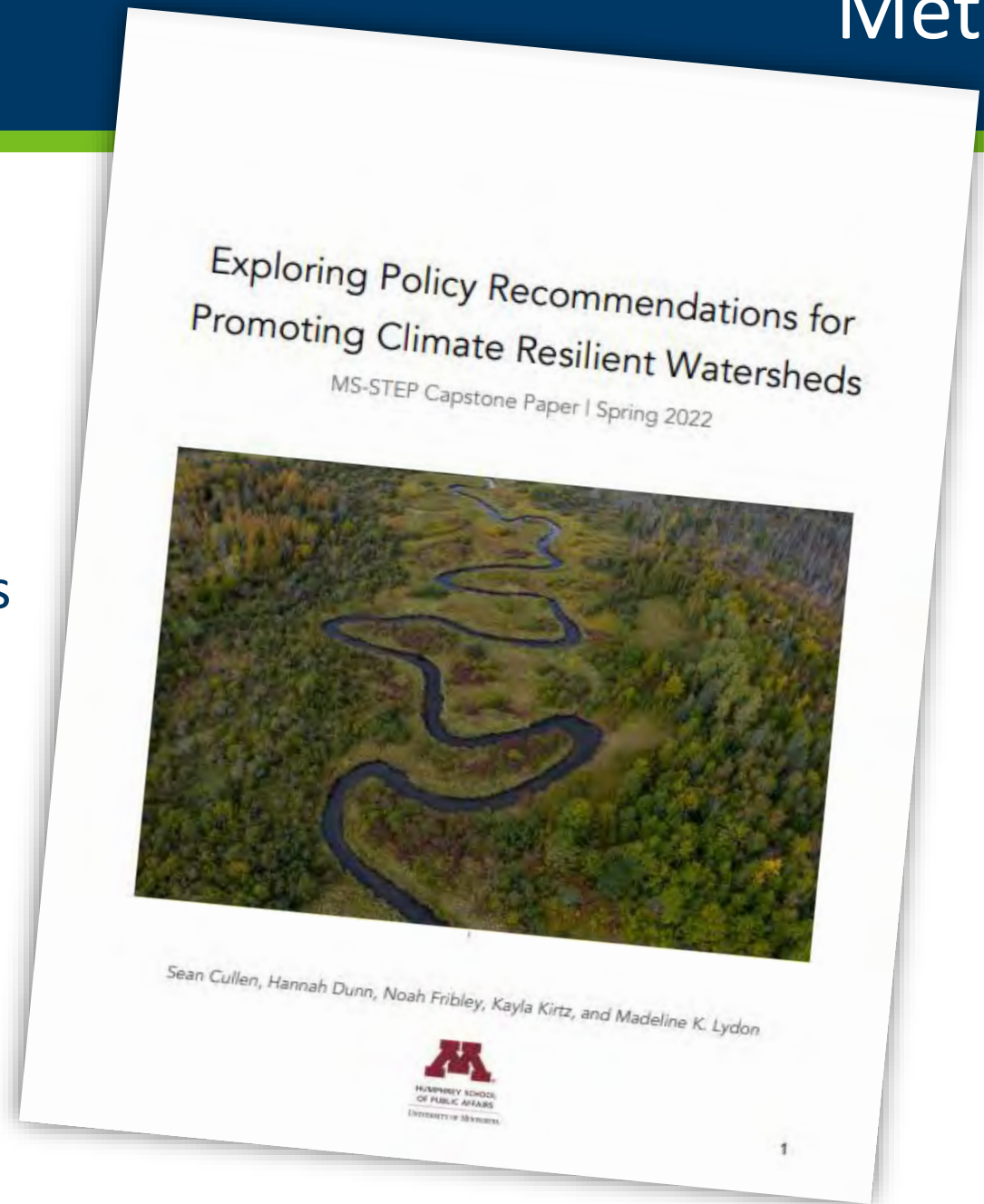
- Soil health
- Altered hydrology
- Maintenance of core services; understanding of local capacity
- Water supply (protect, provide, and conserve)
- Drinking water supply
- Drainage system management
- Wastewater management
- Storm water management
- Drought mitigation
- Education, outreach, and civic engagement
- Contaminants of emerging concern
- Emerging issues (e.g. land cover, climate change, etc.)
- Invasive species prevention and/or management
- Chlorides
- Administrative priorities (e.g. establishment of uniform local policies and controls in the watershed)
- Fiscal challenges (e.g. minimizing public capital expenditures in resolving problems in areas such as flood control or water quality protection)

C. Special consideration: extreme weather

Planning partnerships are strongly encouraged to consider the potential for more extreme weather events and their implications for the water and land resources of the watershed in the analysis and prioritization of issues. While these events cannot be predicted with certainty as to time and occurrence, the meteorological record shows increased frequency and severity of extreme weather events, which directly affects issues in local water planning.

Methods

- **Reviewed** literature
- **Analyzed** available plans as of winter 2022 (27 plans)
- **Surveyed** 225 planning partners
- **Interviewed**
  - planning consultants
  - BWSR staff
  - climate scientist



CWMP Analysis

Watershed	Climate change	Climate change goals/action items/intent	Climate change classified as an emerging issue	Resilience	Resilience goals/action items/intent	Changing precipitation patterns and extreme weather events	Precip/weather goals/action items/intent	NOAA Atlas 14	Future looking precipitation models
Root River	X	X	X	X	X	X		X	
Yellow Medicine River	X		X	X	X	X		X	
Lake Superior North	X	X		X	X	X	X	X	
Red Lake River	X			X				X	
North Fork Crow River	X		X	X	X	X	X	X	
Leech Lake River	X	X		X	X	X		X	
Lake of the Woods	X		X	X	X	X		X	
Pine River Watershed	X		X	X	X	X			X
Missouri River Watershed	X			X		X		X	
Cedar - Wapsipinicon						X		X	X
Thief River	X		X	X	X	X	X	X	
Cannon River	X	X		X	X	X		X	
Pomme de Terre River	X			X	X	X			
Leaf, Wing, Redeye	X			X	X	X			
Buffalo-Red River	X		X	X	X	X	X	X	
Lower St. Croix	X	X		X	X	X	X		
Nemadji	X	X		X	X	X	X		
Wild Rice - Marsh River	X	X	X	X	X	X	X		
Watonwan River	X		X	X	X	X	X	X	
Bois de Sioux and Mustinka Watershed	X		X	X		X		X	
Two Rivers Plus	X	X	X	X		X		X	
Sauk River	X		X	X	X	X		X	
Mississippi Headwaters Watershed	X			X	X	X		X	
Greater Zumbro	X	X		X	X	X	X	X	
Hawk Creek-Middle Minnesota	X	X		X	X	X			
Rum River	X	X	X	X	X	X	X	X	
Shell Rock - Winnebago	X		X	X		X	X	X	
Total	**26**	**10**	**14**	**26**	**20**	**26**	**11**	**20**	**2**
Percent	**96%**	**37%**	**52%**	**96%**	**74%**	**96%**	**41%**	**74%**	**7%**

Table 2: Consolidated CWMP Analysis

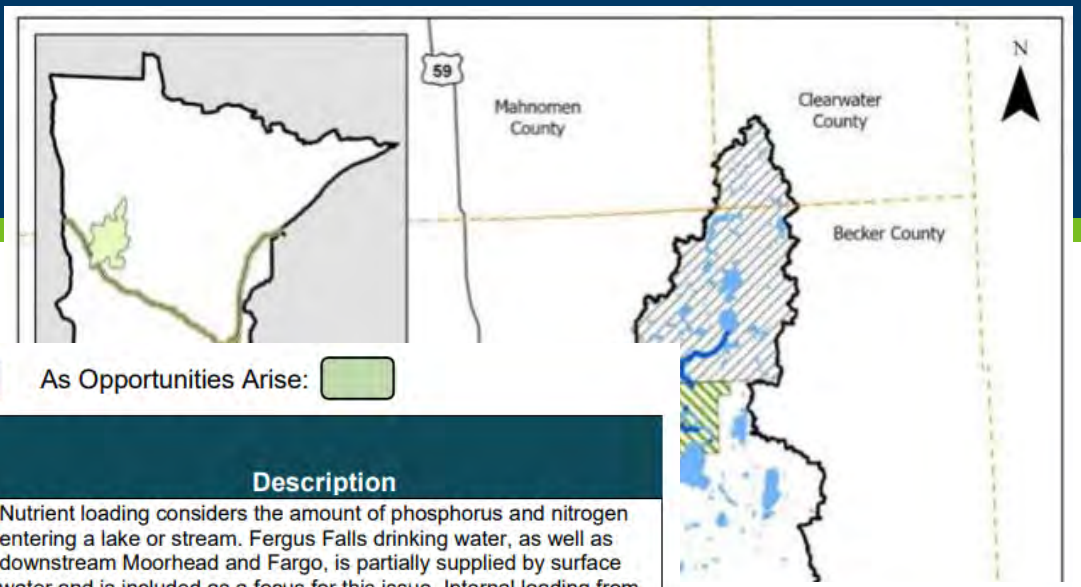
Key Takeaways

The CWMP analysis and survey results reveal:

- Discrepancies exist between discussions of climate change in CWMPs and associated priorities or goals to address climate change and climate resilience.
- Climate change remains a deeply divisive and polarizing topic amongst planning partners.
- Planning partners are using non-predictive tools for planning and there is a lack of tools and resources to address climate change and incorporate climate resilience.
- Planning partners express uncertainty about strategies to address climate change and associated impacts.

Otter Tail River

ONE WATERSHED
ONE PLAN



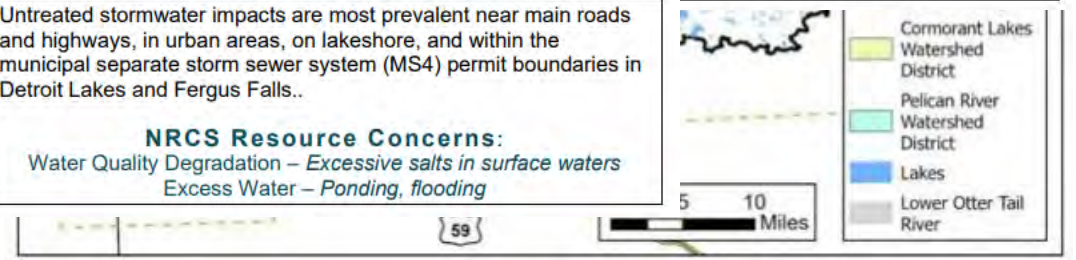
Planning Region Focus - Primary Focus: Secondary Focus: As Opportunities Arise:

Table 1.1. Primary Issues.

Resource Category	Resources Affected	Issue Statement	Planning Region Focus	Description
	Lakes, Streams, Drinking Water	**Nutrient loading** causes algal blooms and eutrophication.		Nutrient loading considers the amount of phosphorus and nitrogen entering a lake or stream. Fergus Falls drinking water, as well as downstream Moorhead and Fargo, is partially supplied by surface water and is included as a focus for this issue. Internal loading from legacy phosphorus in lake sediments is also included here. **NRCS Resource Concern:** Water Quality Degradation – *Excess nutrients in surface water*
	Lakes, Streams	**Wind and water erosion** impact water clarity, dissolved oxygen levels, and aquatic habitat.		This issue focuses on how much sediment is moving and being deposited across the landscape due to wind and water erosion. Excess sediment in waterbodies can impact water quality and also aquatic life through decreased dissolved oxygen levels and degraded aquatic habitat. **NRCS Resource Concerns:** Soil Erosion – *Wind, sheet, and rill erosion* Water Quality Degradation – *Excessive sediment in surface waters*
	Lakes, Streams, Wetlands, Forests, Prairies	**Sufficient protection** is needed for outstanding resources and sensitive species to maintain water and habitat quality.		Sufficient protection is needed for waterbodies that are designated supporting cisco or trout, as shallow lakes, as sensitive wetlands, or as containing wild rice. Protection is also a priority for forests and prairies as described in the Land Stewardship Plan. **NRCS Resource Concern:** Inadequate Habitat for Fish & Wildlife – *Habitat Degradation & Habitat Continuity*
	Lakes, Streams, Wetlands	**Untreated stormwater**, including chloride, impacts water quality.		Untreated stormwater impacts are most prevalent near main roads and highways, in urban areas, on lakeshore, and within the municipal separate storm sewer system (MS4) permit boundaries in Detroit Lakes and Fergus Falls.. **NRCS Resource Concerns:** Water Quality Degradation – *Excessive salts in surface waters* Excess Water – *Ponding, flooding*

Resources Affected	
Lakes, Streams, Drinking Water	Nu
Lakes, Streams	Wi aqu
Lakes, Streams, Wetlands, Forests, Prairies	Su to r
Lakes, Streams, Wetlands	Un
Aquifer, Drinking Water	Gr
Soil, Lakes, Streams, Wetlands	So res
Forests, Prairies	Fra imp
Lakes, Streams	Aq rec

nd stream geomorphology.
ses streambank erosion,
ding and reduced habitat
safe for recreation.
vater quality, lake and nities.
and loss of recharge.



Measurable Goals

Phosphorus Reduction

- 5% reduction in focus lakes and streams through agricultural practic
  stormwater manag
  shoreline stabiliza

Sediment Reduction

- 4% reduction in focus streams through agricultural

Soil Health

- 1,500 acres/year of soil health practices such as cover crops, no till, pasture management,
  conservation
  (15,000 acres

Groundwater Protection

- 690 acres/year groundwater protection practices such as nutrient management,

Aquatic Connectivity

- Modify 4 dams on the Pelican River to reconnect 81 river miles, and modify 4 dams on the Otter Tail River to reconnect 88 river miles.

Water Retention

- 0% change in watershed discharge while building resilience through agricultural practices, forest protection, stormwater retention, and wetland restoration.

Otter Tail River Subwatershed Implementation Table

Actions	Program	Targeting and Measuring: Focus Resources	Targeting and Measuring: 10-Year Output (*Water quality benefits are reported at field edge*)	Measurable Goals: Phosphorus Reduction	Sediment Reduction	Soil Health	Groundwater Protection	Land Protection	Bacteria Reduction	Aquatic Connectivity	Stream Stability	Water Retention	AIS Prevention and Mgmt	Responsibility: Responsibility/Partners (Bold = Lead)	Timeline: 2023-2024	2025-2026	2027-2028	2029-2030	2031-2032	Estimated Costs: Funding Level	Estimated Total 10-Year Cost
Soil Health Practices (cover crops, reduced tillage, perennial crops, conservation crop rotation, prescribed grazing)		Critical Soil Loss Acres	**8,885 acres** 8,770 lbs/yr phosphorus 14,218 tons/yr sediment 28,081 lbs/yr nitrogen	●	●	●	○		○			○		**SWCDs**, **NRCS**, BWSR, MDA	●	●	●	●	●	2*	$1,332,750
Groundwater Agricultural Practices (nutrient management, irrigation water management, precision irrigation technology)		Nitrogen Infiltration Risk, DWSMAs	**5,323 acres** 426 lbs/yr phosphorus 4,471 tons/yr sediment 5,536 lbs/yr nitrogen	●	●	○	●		○			○		**SWCDs**, **NRCS**, BWSR, RCPP, MDA	●	●	●	●	●	2*	$798,450
Drinking Water Protection Practices (Fergus Falls surface water intake protection activities, including nutrient reductions and spill response)		Hoot & Wright Lakes, Spill Response Area	Included in phosphorus and sediment reduction practices	●	●				○					**City of Fergus Falls, MDH,** SWCD	●	●	●	●	●	2*	Costs not available
Structural Agricultural Practices (sediment basins; grade stabilizations, filter strips)		Focus Lakes & Streams	1,530 lbs/yr phosphorus 1,745 tons/yr sediment (For resource goals, see pages 71, 72, 74).	●	●				○		○	●		**SWCDs**, **NRCS**, BWSR	●	●	●	●	●	2*	$570,000
Bacteria Reduction Projects (waste pit closures, manure storage, livestock fencing and crossing, agricultural waste systems, retention basins)		Impaired Streams	10 projects (1/year pace)	○	○		○		●					**NRCS**, **SWCDs**, MPCA, Counties, cities			●	●	●	2*	$500,000
Forest Stewardship Plans		Focus Lakes & Streams, LSP	3,306 acres, 27 plans	○	○		○	●						**SWCDs**, **DNR,** BWSR, Private Foresters		●	●	●	●	2*	$16,200
Forest, Prairie, and Land Protection (SFIA, 2c, Easements, Acquisition)		Focus Lakes & Streams, LSP	3,306 acres	○	○		○	●				○		**SWCDs**, BWSR, DNR, cities, counties, MDH, MPCA, BWSR (RIM), Tamarac NWR, USFWS		●	●	●	●	3	$1,256,000
Stormwater Management (storm sewer maintenance, street cleaning, construction stormwater treatment, rain gardens, green infrastructure)		Focus Lakes & Streams, Fergus Falls	439 lbs phosphorus/yr (For resource goals, see page 71)	●	●		○		○		○	○		**Cities, SWCDs**, Counties, COLA, Lake Associations, LIDs		●	●	●	●	2*	$4,390,000
Buffer and Shoreline Management (shoreline restoration, riparian buffers, riparian enhancement)		Focus Lakes & Streams	20 projects (2/year pace)	●	●				○		●	○		**SWCDs**, **Counties**, **DNR**, COLA, Lake Associations, LIDs	●	●	●	●	●	2*	$80,000
Stream and Ditch Stabilization		Focus Areas	1.4 miles	○	●				○		●			**SWCDs**, Counties, BWSR, DNR	●	●	●	●	●	2*	$130,000

7. Resiliency

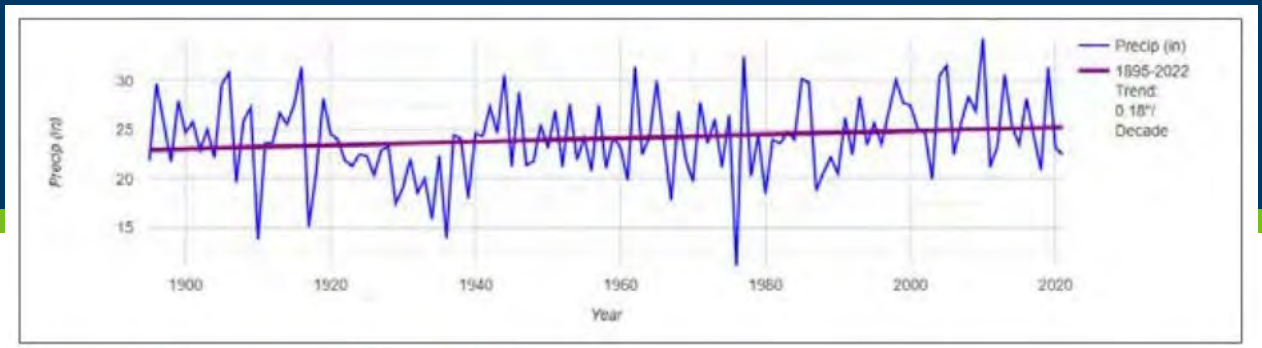
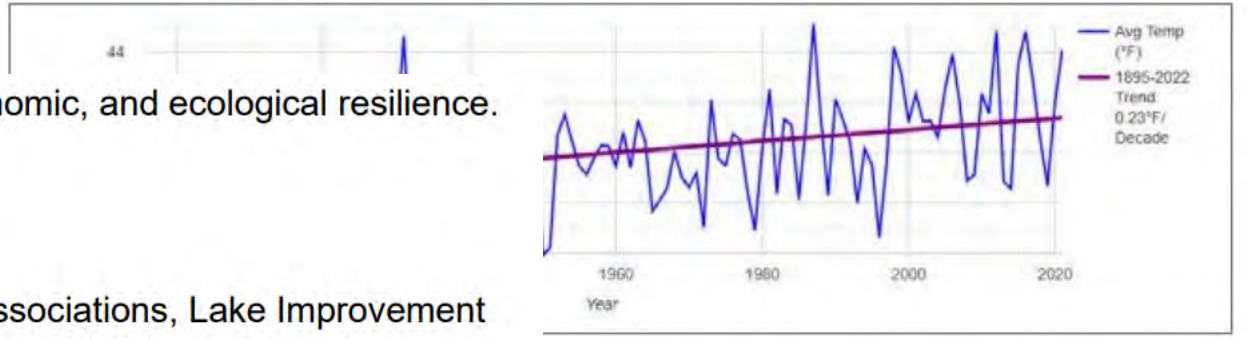


Figure 7.1. Precipitation trend in the Otter Tail Watershed.



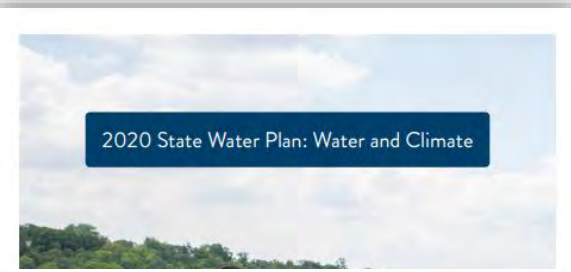
ershed.

This plan includes actions and programs that build social, economic, and ecological resilience.

- Social resilience programs and actions:
  - Regulatory program
  - Outreach and education program
  - Partnerships between planning partners, lake associations, Lake Improvement Districts, and other government agencies and organizations
- Economic resilience programs and actions:
  - Cost share incentives for practices
  - New state funding for local projects, which also supports local staff capacity, local contractors, and local consultants.
- Ecological resilience programs and actions:
  - Forest management and protection
  - Cover crops
  - Wetland restoration
  - Stormwater management

New developments since the 1W1P policy was created

Minnesot
Climate A



South Washington Watershed District
Climate Resiliency Plan

South Washington WATERSHED DISTRICT

ate Change Trends and Action Plan

September 2022

would extend more opportunities for collaboration to partners outside of BWSR's traditional clientele of local governments.

- **Wetland banking policy updates:** Proposed policy changes would refine and improve the state's valuable wetland banking program, which generates mitigation credits to offset negative impacts to wetlands.

Proposed Fiscal Changes

- **Funding for FTE Tribal Liaison ($265,000 from the general fund):** This action aligns with recent laws enacted that codify government-to-government relations and consultation between Minnesota state agencies and Tribal Nations.
- **Natural Resources Block Grant (NRBG) funding increase ($2.5 million from the general fund):** These grants are available to Minnesota Co programs designed to protect and improve water resources via conservation prac restoration and wetland mitigation and enhancement. To be eligible for the NRBG locally adopted and Board of Water and Soil Resources (BWSR) approved compre management plan.

Contact

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(612) 616-5112

COMFORT LAKE FOREST LAKE
CLFLWD
WATERSHED DISTRICT
2023
MINNESOTA CLIMATE ADAPTATION AWARDS

CLIMATE ACTION FRAMEWORK
Building a resilient watershed for current and future generations

DECEMBER 2022

MINNEHAHA CREEK
WATERSHED DISTRICT

Take Home Messages

- “Climate change” and “Resiliency” are being mentioned and discussed to varying extents in all plans *
- “Climate change” and to a lesser extent, “Resiliency” can be very divisive terms in the watershed planning process.
- Implementation schedules (the most important part of these plans) include actions to achieve multiple goals that directly and indirectly relate to climate change and make the landscape more resilient.

Questions

Facilitators

Sadie Wunder & Kim Behrens

@MnPCA #MNAgUrban

Participation looks like . . .

- Receiving each response **equally** regardless of position or title.
- Allowing for **diverse perspectives**.
- Making a respectful and **positive contribution**.

Focus on/focus off

- **Inquiry**… rather than advocacy
- **Dialogue**… rather than debate
- **Conversation**… rather than argument
- **Understanding**… rather than defending

Small group discussion

Select one person to be the spokesperson for the table.

1. What is your name and what is **one word** that describes you outside of work? Why did you select that word?

2. What is **one thing** you heard today that piqued your curiosity?

3. What do you wish people knew about your experience when extreme weather events occur? How do they affect you?

4. What are proactive ways that we could partner with each other when it comes to these extreme weather events? *Use the sheets of paper and sharpies to write 2-3 ideas at each table. One idea per sheet.*

Summary

@MnPCA #MNAgUrban

Thank you

Ag-Urban Partnership Forum

MINNESOTA

MINNESOTA WATER QUALITY CERTIFIED FARM