MINNESOTA ASSOCIATION OF WATERSHED DISTRICTS, INC

Land and Water Shall be Preserved

Emily Javens, Executive Director

Mark Doneux, Administrator
Capitol Region Watershed District

Jerome Deal, Manager
Bois de Sioux Watershed District

www.mnwatershed.org

History

1955
MN Watershed Act

1982
Metro Surface Water Management Act

- New special purpose unit of government
- Formed by petition
- Regulatory authority
- Finance water resource improvements
- Property tax levies, assessments

Specific Purposes for Establishment

103D.201 Subdivision 2.

(1) to control or alleviate damage from **floodwaters**;

(2) to improve stream channels for drainage, **navigation**, and any other public purpose;

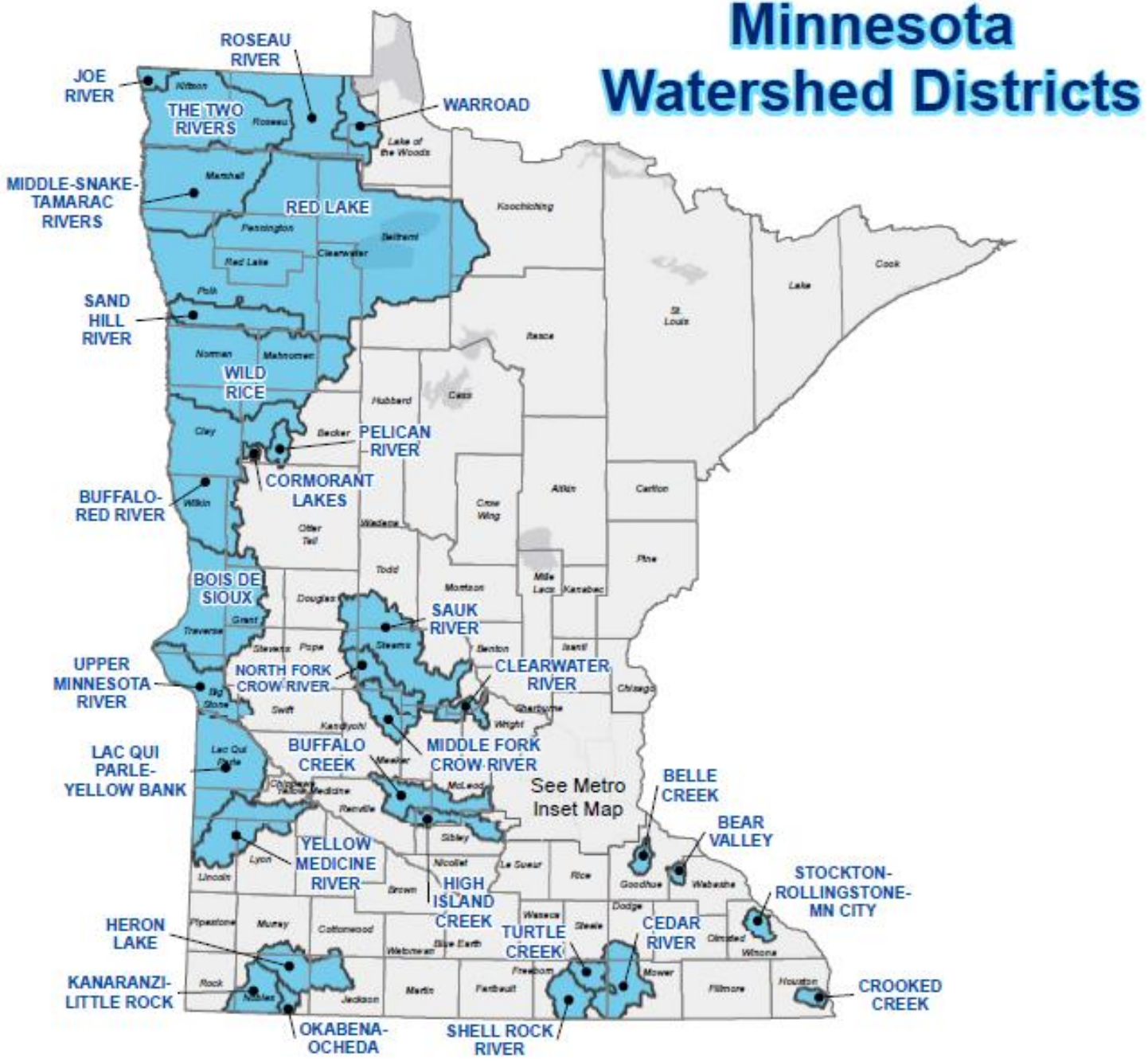
(9) to repair, improve, relocate, modify, consolidate, and abandon all or part of **drainage systems** within a watershed district;

(11) to regulate improvements by riparian property owners of the beds, banks, and shores of **lakes, streams, and wetlands** for preservation and beneficial public use;

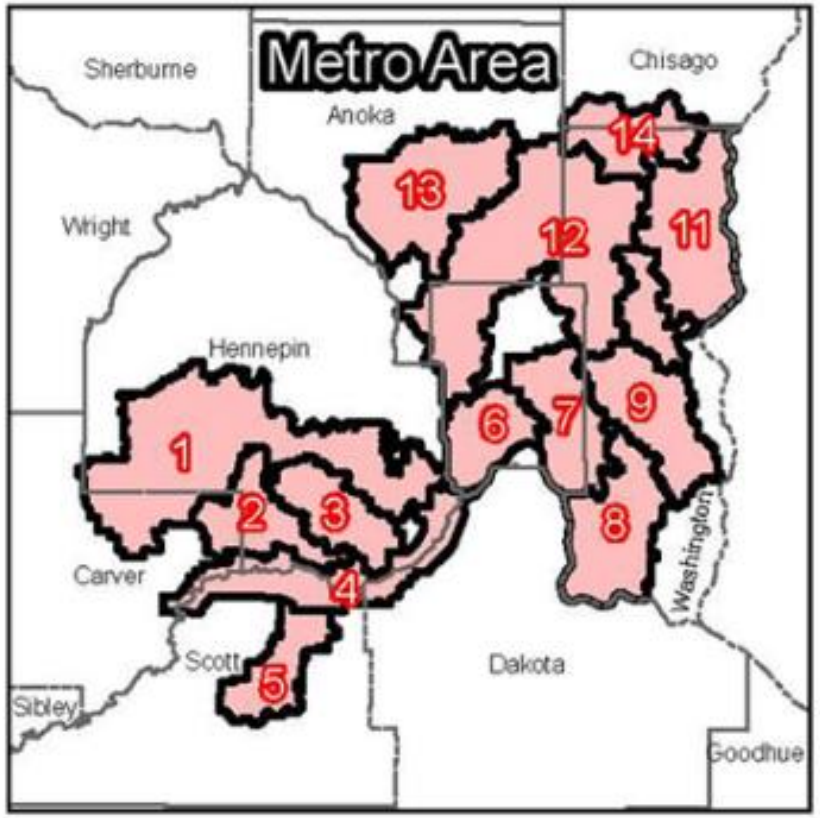
(13) to protect or enhance the **water quality** in watercourses or water basins;

(14) to provide for the protection of **groundwater** and regulate its use to preserve it for beneficial purposes.

Non-metro Watershed Districts



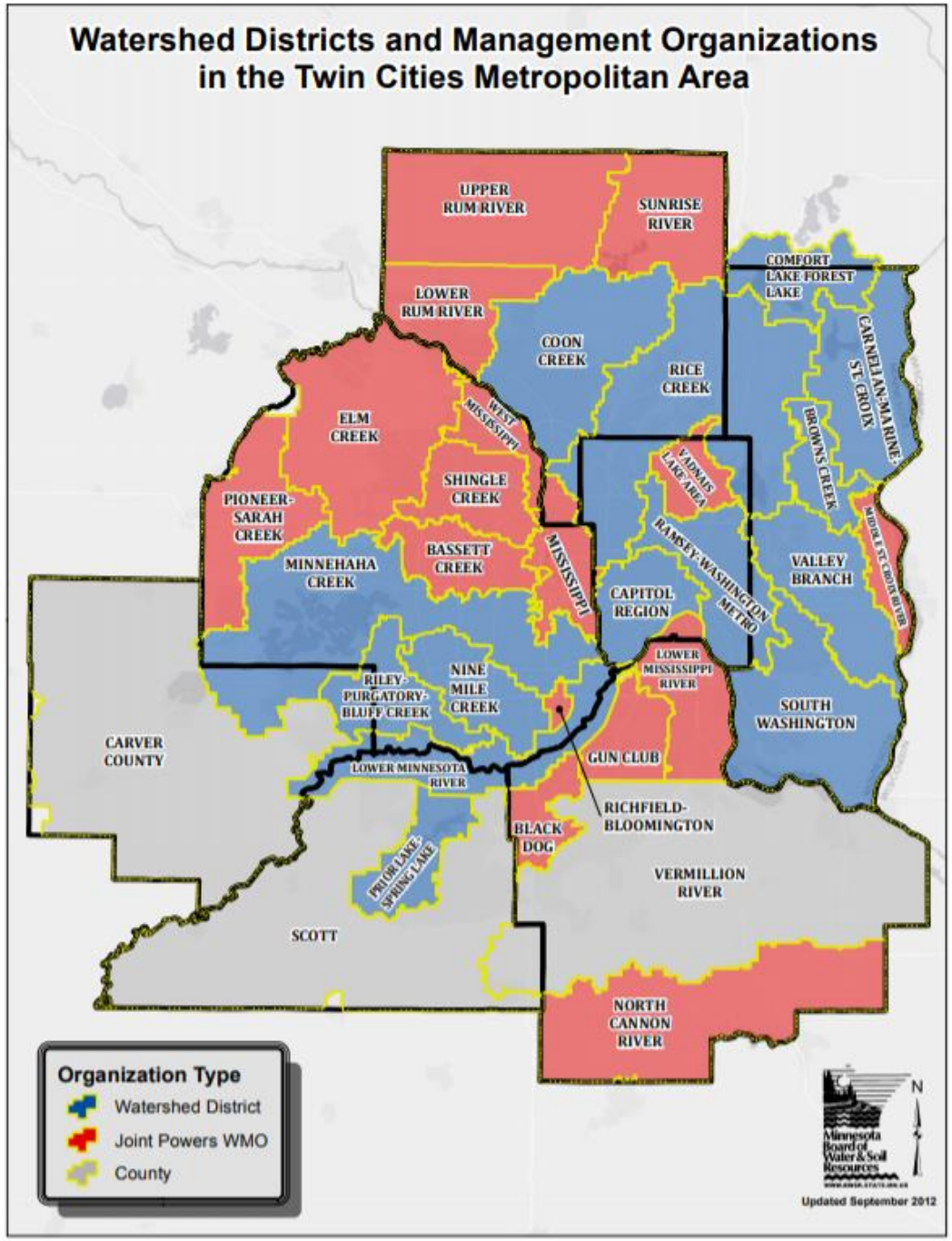
Metro Watershed Districts



Metro Watershed Districts

1, MINNEHAHA CREEK
2, RILEY-PURGATORY-BLUFF CREEK
3, NINE MILE CREEK
4, LOWER MINNESOTA RIVER
5, PRIOR LAKE-SPRING LAKE
6, CAPITOL REGION
7, RAMSEY-WASHINGTON-METRO
8, SOUTH WASHINGTON
9, VALLEY BRANCH
10, BROWNS CREEK
11, CARNELIAN-MARINE-ST. CROIX
12, RICE CREEK
13, COON CREEK
14, FOREST LK-COMFORT LK

Water Management Organizations (WMOs)



General Purpose

103D.201 Subdivision 1.

To conserve the natural resources of the state by land use planning, flood control, and other conservation projects by using sound scientific principles for the protection of the public health and welfare and the provident use of the natural resources

General Powers

103D.355 Subdivision 1.

A watershed district has the power, to the extent necessary for lawful conservation purposes:

(1) to sue and be sued;

(2) to incur debts, liabilities, and obligations;

(3) to exercise the power of eminent domain;

(4) to provide for assessments and to issue certificates, warrants, and bonds; and

(5) to perform all acts expressly authorized, and all other acts necessary and proper for the watershed district to carry out and exercise the powers expressly vested in it.

Powers – Drainage

MN Statute 103D.355

Subd. 8. **Ditch and watercourse work.**
The managers may construct, clean, repair, alter, abandon, consolidate, reclaim, or change the course or terminus of any public ditch, drain, sewer, river, watercourse, natural or artificial, within the watershed district.

Subd. 15. **Take over drainage system.** The managers may take over when directed by a drainage authority all joint county or county drainage systems within the watershed district, together with the right to repair, maintain, and improve them.

Subd. 9. **Water control works.**
The managers may acquire, operate, construct, and maintain dams, dikes, reservoirs, water supply systems, and appurtenant works.

Powers – Land Ownership

MN Statute 103D.355

Subd. 11. **Acquiring property.**
The managers may acquire by gift, purchase, taking under the procedures of this chapter, or by the power of eminent domain, necessary real and personal property. The watershed district may acquire property outside the watershed district where necessary for a water supply system.

Subd. 22. **Projects in other states.**
The managers may purchase, lease, or acquire land or other property in adjoining states to secure outlets, to construct and maintain dikes or dams or other structures for the purposes of this chapter.

Powers - Regulation

103D.341 Subdivision 1.

MN Statute 103D.341
Subdivision 1. **Requirement.** The managers must adopt rules to accomplish the purposes of this chapter and to implement the powers of the managers.

Subd. 10. **Water use and conservation.**
The managers may regulate, conserve, and control the use of water within the watershed district.

Subd. 23. **Metropolitan watershed districts.**
… a watershed district located entirely within the metropolitan area may regulate the use and development of land…

Watershed Management Planning

103D.401 WATERSHED MANAGEMENT PLAN.

Subdivision 1. **Contents.** The managers must adopt a watershed management plan for any and all of the purposes for which a watershed district may be established.

The watershed management plan may include a separate section on proposed projects.

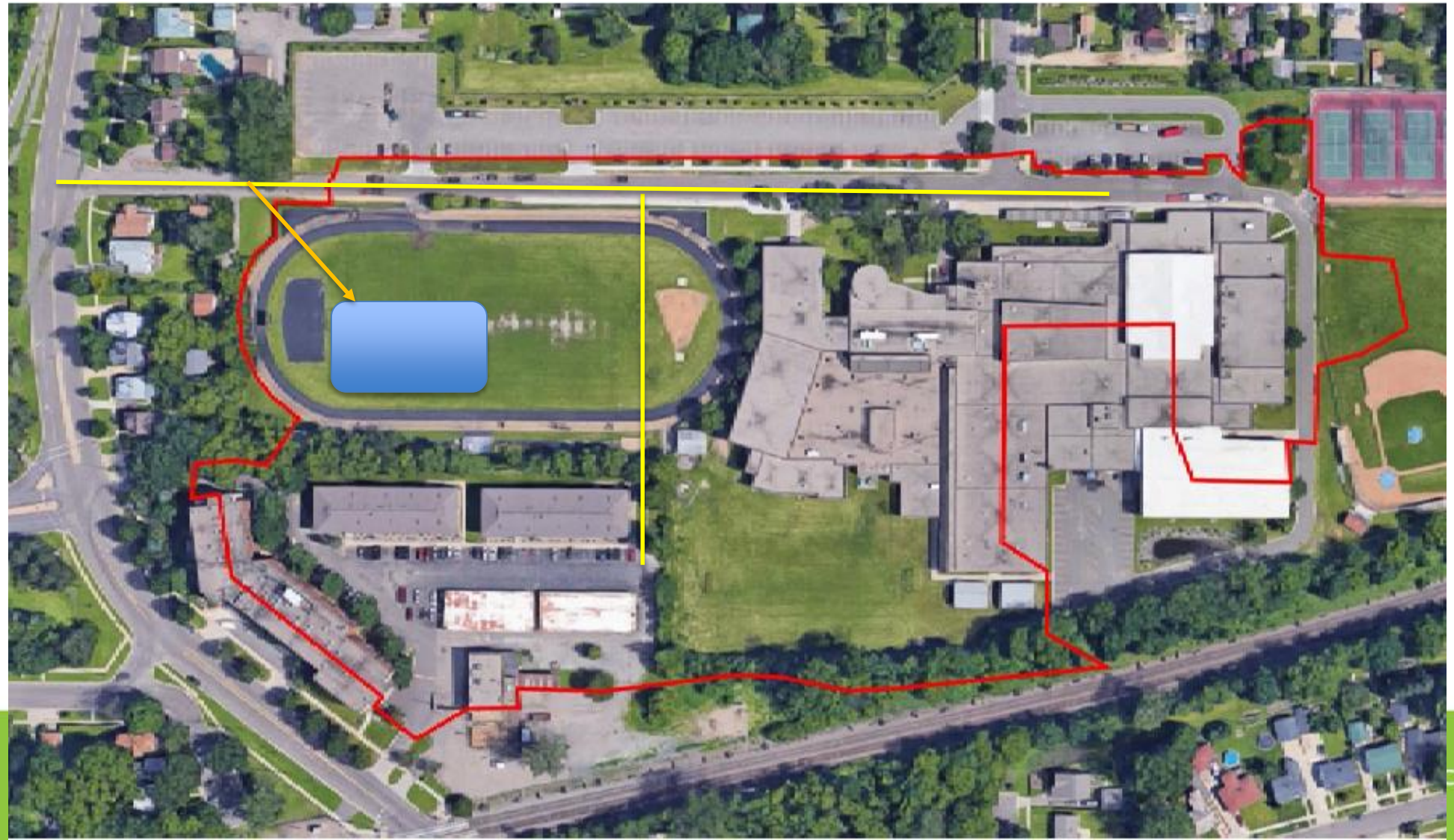
103B.231 WATERSHED PLANS.

Subdivision 1. **Requirement.**
A watershed management plan is required for watersheds comprising all minor watershed units wholly or partly within the metropolitan area.

Capitol Region Watershed District

- Retain water on the land
- Improve water quality
- Reduce flooding
- Conserve potable water and groundwater
- Engage our partners
- Leverage local funds and resources
- Provide multiple benefits
- Incorporate technology

Como Park HS – St Paul
Shared Stormwater



Como Park HS Shared Stormwater

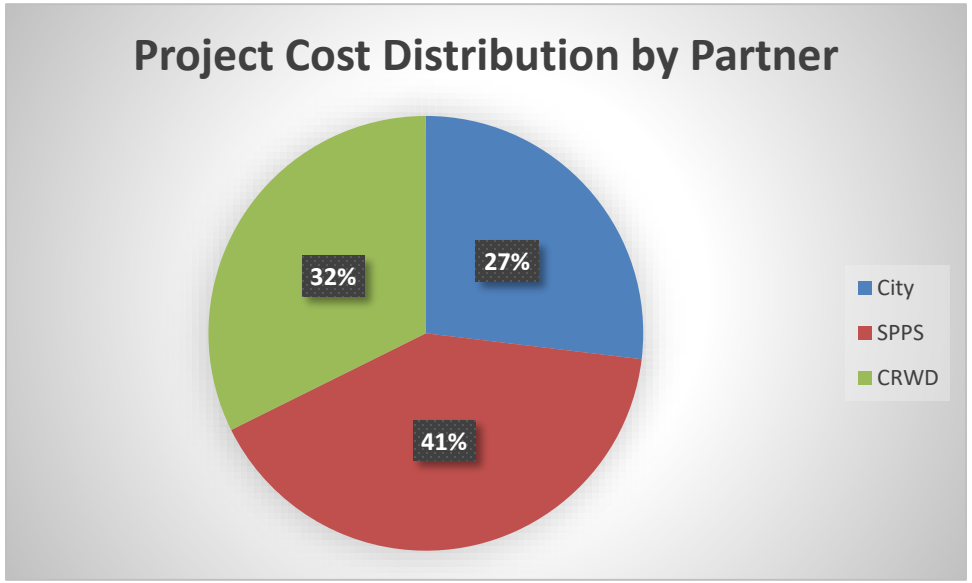
Como Park HS Shared Stormwater

Cooperative Construction Agreement

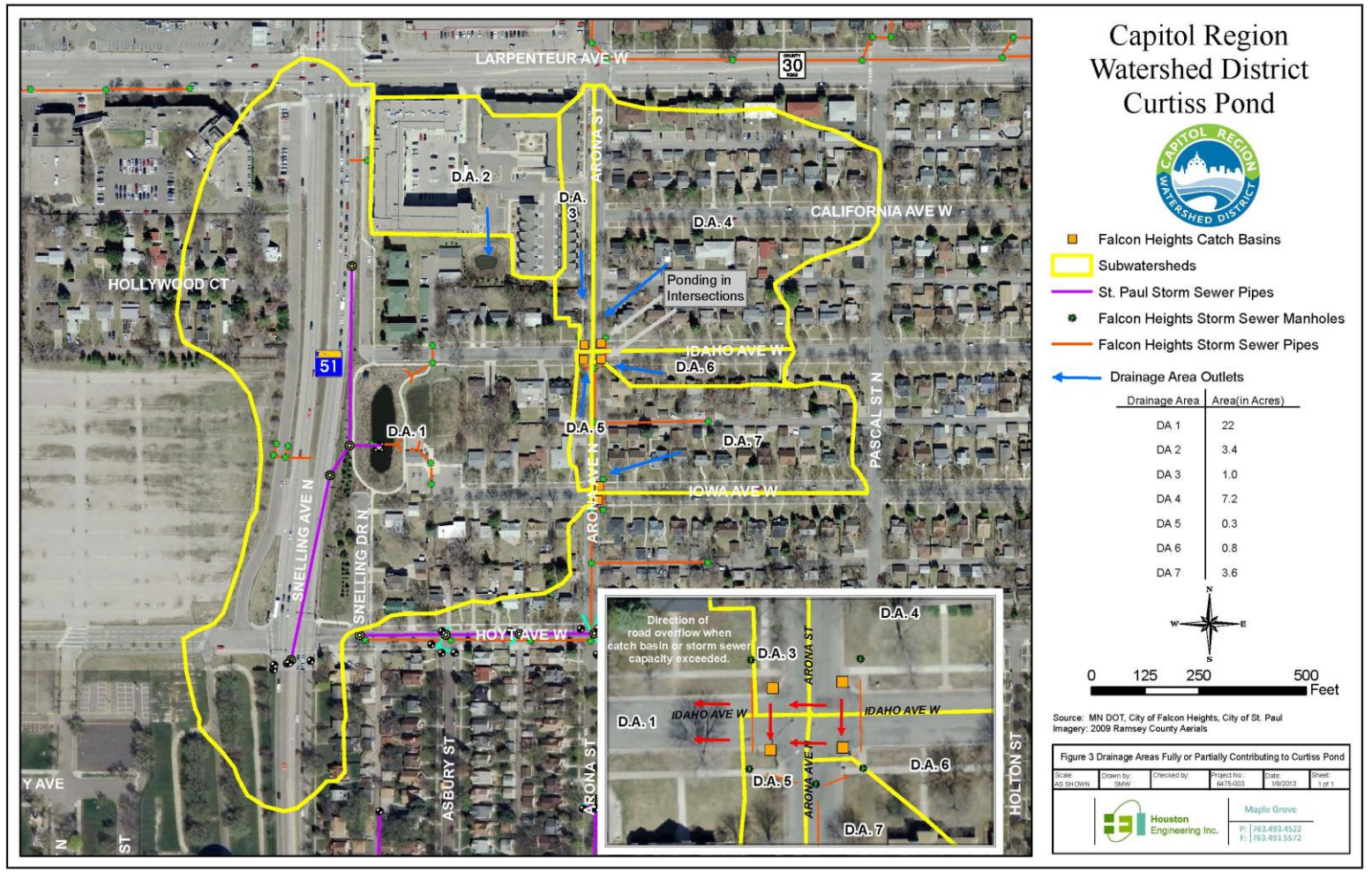
City of Saint Paul	Saint Paul Public Schools	CRWD
• Allow installation of diversion structure • Provide 30 years routine maintenance of pre-treatment ($48,000) in exchange for credits • Contribute $150,000 in exchange for credits	• Provide space for installation of regional BMP in exchange for credits ($50,000) • Manage construction • Contribute funds to meet regulatory requirements ($183,000) • Contribute additional funds for credits ($67,000) • Own and maintain BMP for 30 years	• Design funds • Issue volume credits to City (19,120 CF) and SPPS (7,672 CF) for cash and in-kind contributions • Contribute up to $220,000 for construction • Reimburse SPPS 50% up to $50,000 for future damage to BMP or SPPS property due to BMP failure

Project Cost and Partner Contribution

Task	Cost
Feasibility/Design	$37,940
Construction	$600,000
Land	$50,000
Maintenance (30years)	$48,000
Total	**$735,940**



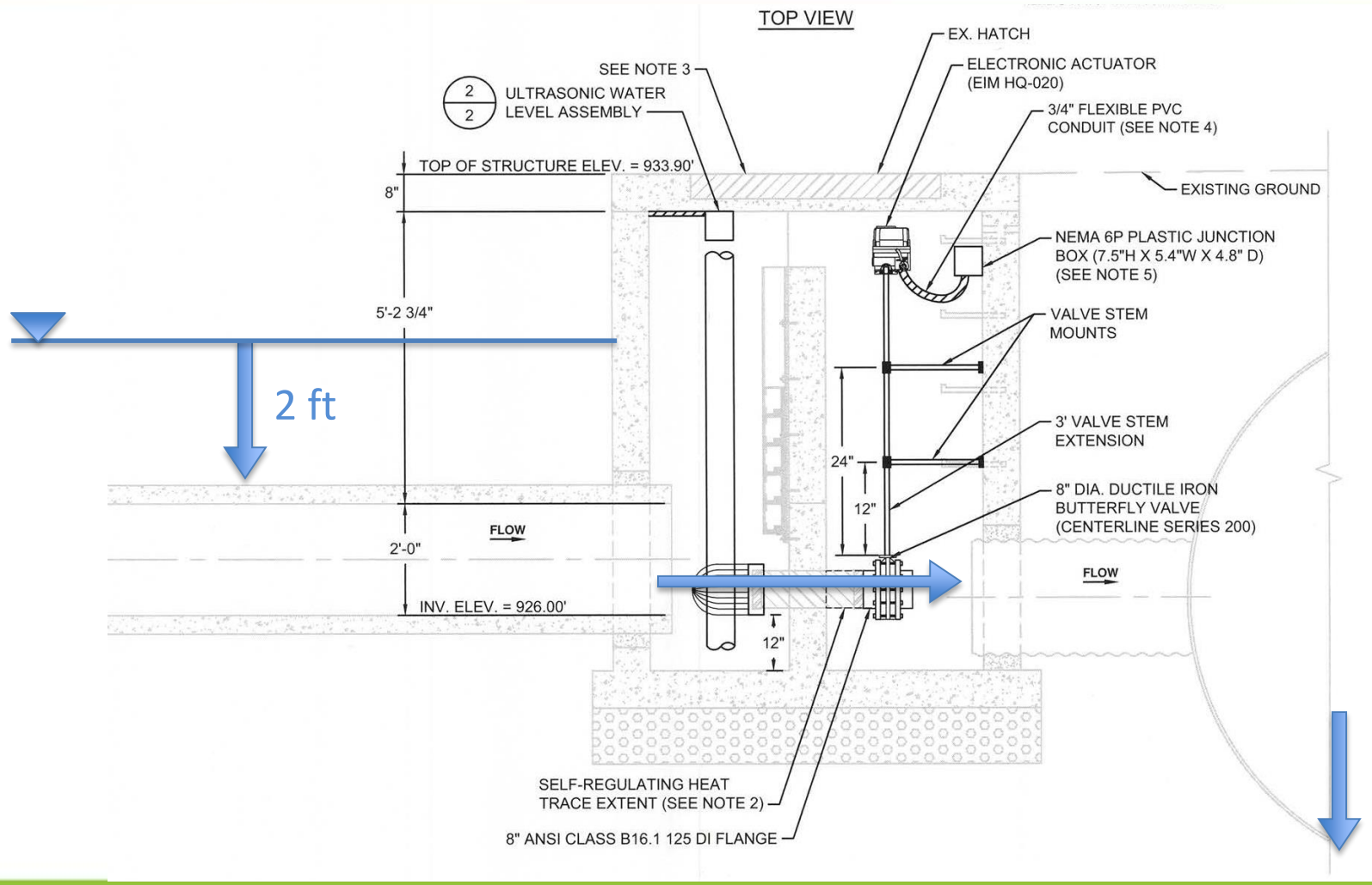
Curtiss Pond – Falcon Heights



N WATERSHED DISTRICT

Pipe Installation

12-24 hours prior to Storm



Real-Time Automated Control (Opti-RTC)

Assumption: Drop Pond 2 feet from NWL prior to storm. (930--928)

Storage volume achieve:	17,772	cu ft
Equivalent Volume of 10' pipe:	226	ft

Cost of 226 feet pipe installation

	units	unit cost	cost
Pipe (LF)	226	410	$92,660
Common Excavation (CY)	1694	16	$27,104
Washed Rock (CY)	437	35	$15,308
Filter Fabric (SY)	934	3	$2,801
			$137,872

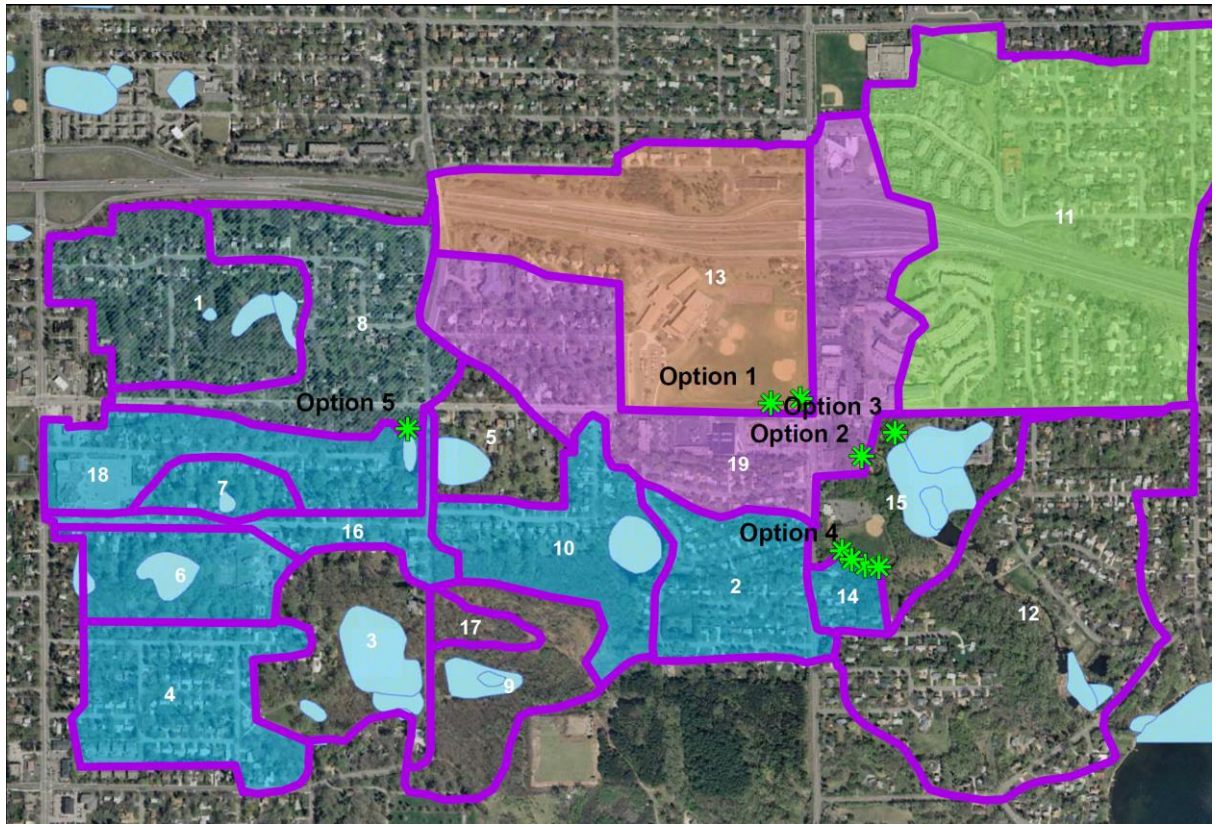
Opti-RTC Cost--$70,000

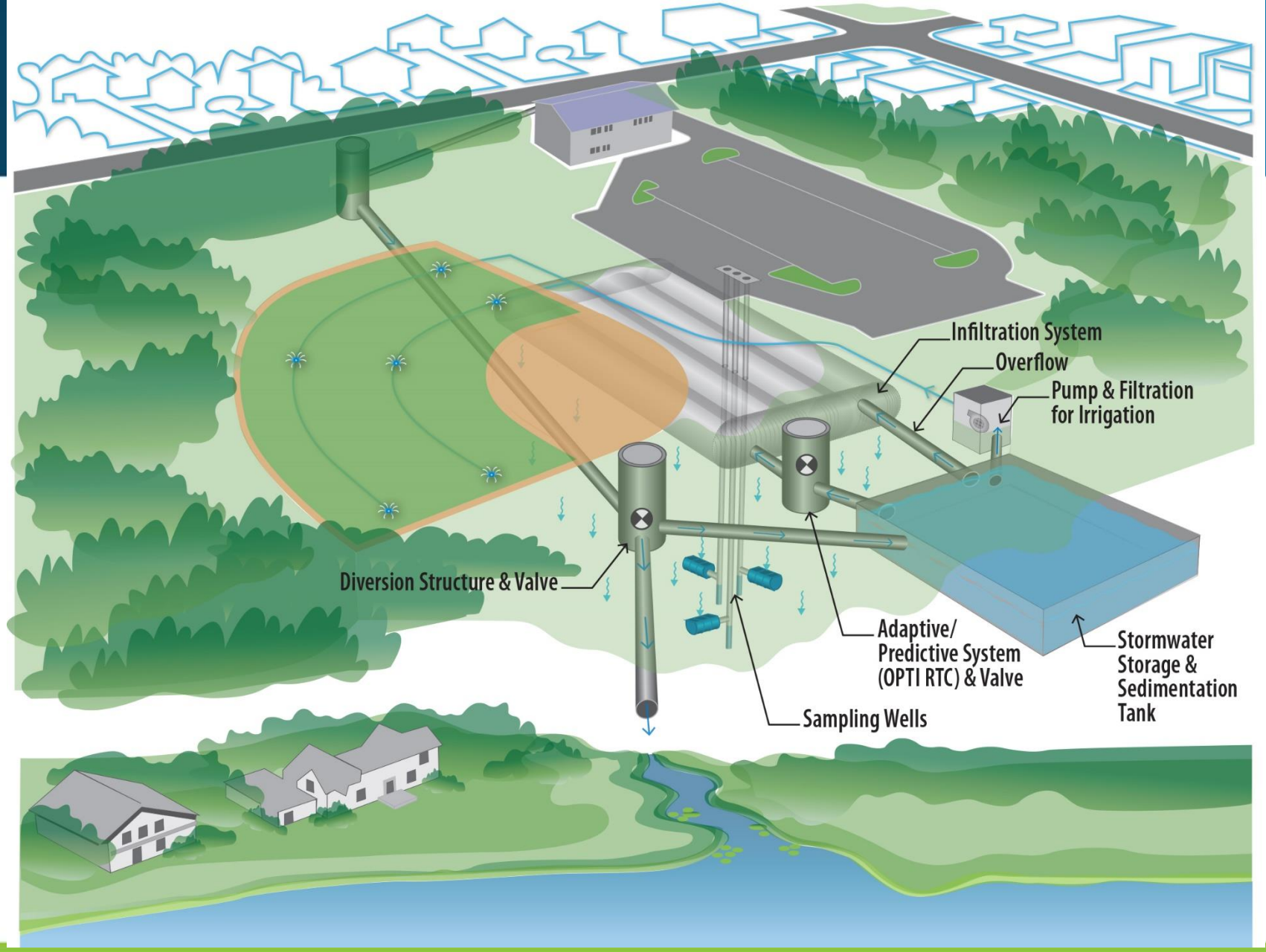
Project Costs and Financing

Costs		Budget	Actual
	Construction, Contingency	$424,000	$392,275
	Base Engineering (Houston Eng. Inc.)	$81,600	$92,800
	Design and Installation--OptiRTC (Geosyntec)	$70,000	$72,500
	Total	$575,600	$557,575
Financing	CRWD	$375,600	$362,424
	Falcon Heights	$200,000	$195,151
	Total	$575,600	$557,575

Upper Villa Park Project - Roseville

- CRWD received $275K MPCA grant to identify, design, and construct volume reduction BMPs
- Five BMP options ranging from $300K to $1.5M
- Prioritized by effectiveness and land ownership

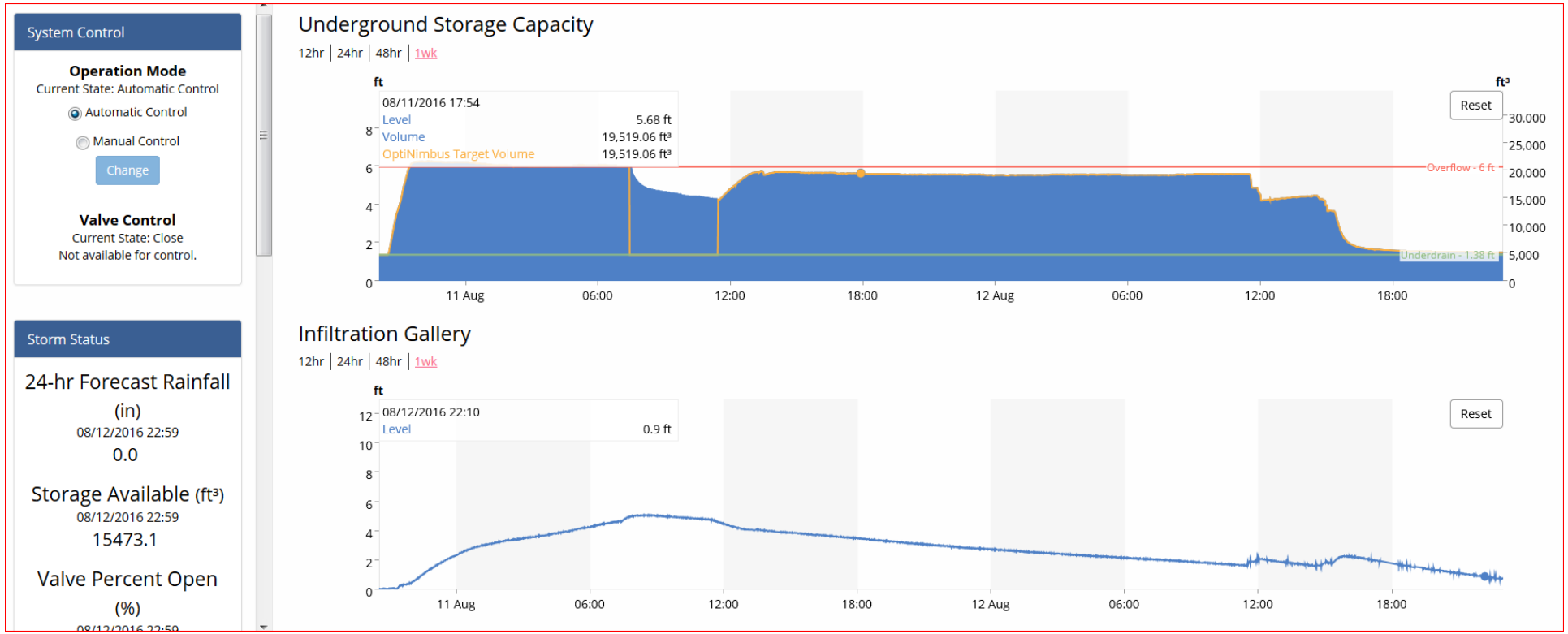



Infiltration System
Overflow
Pump & Filtration for Irrigation
Diversion Structure & Valve
Adaptive/ Predictive System (OPTI RTC) & Valve
Stormwater Storage & Sedimentation Tank
Sampling Wells

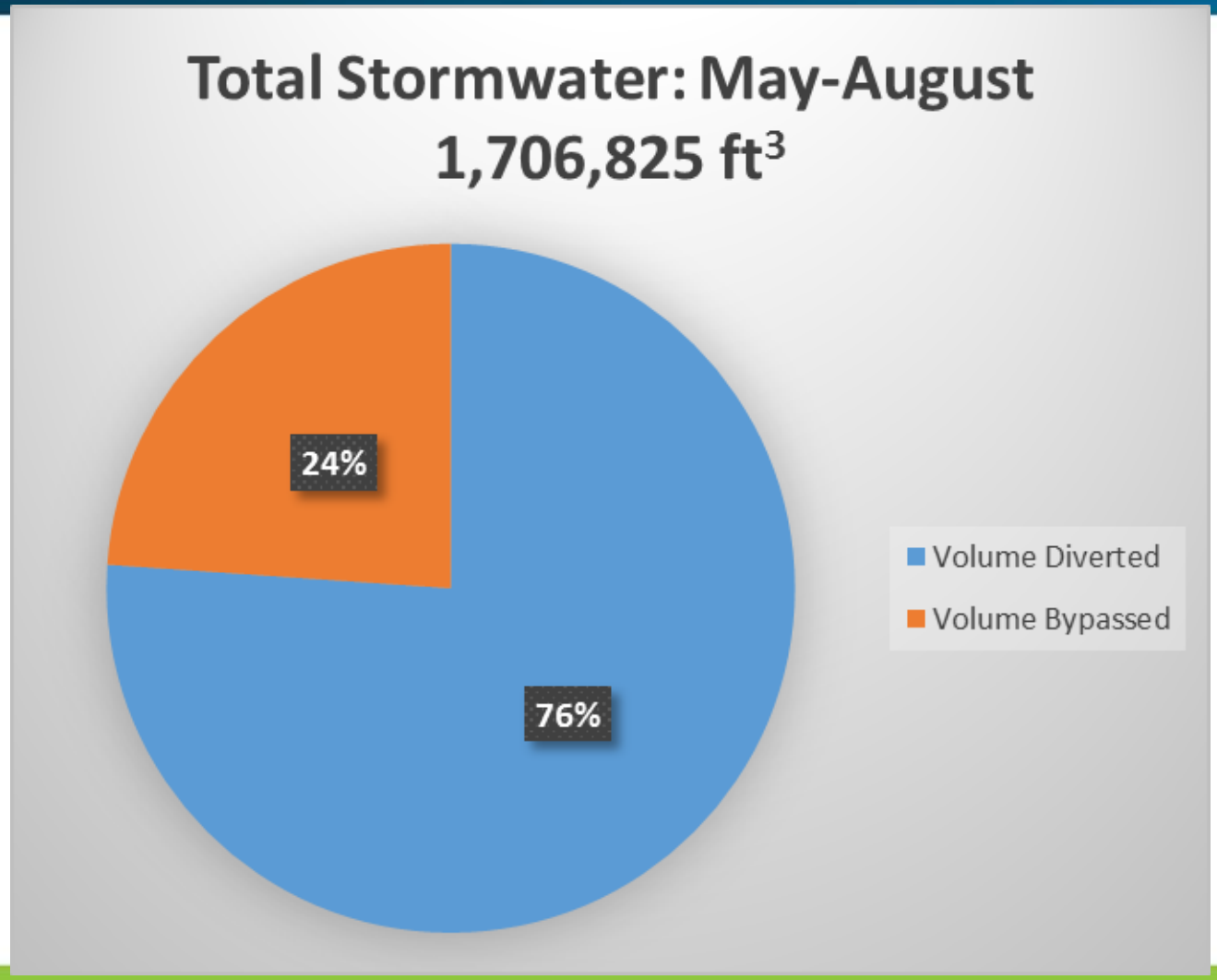

CONTROL POWER
OFF ON
VALVE POSITION
OPEN CLOSE AUTO
VALVE TRAVEL
STOP RUN AUTO
VALVE FULLY OPEN
VALVE OVER TORQUE
VALVE FULLY CLOSED

OptiRTC

OptiRTC


System Control
Operation Mode
Current State: Automatic Control
Automatic Control
Manual Control
Change
Valve Control
Current State: Close
Not available for control.
Storm Status
24-hr Forecast Rainfall (in)
08/12/2016 22:59
0.0
Storage Available (ft³)
08/12/2016 22:59
15473.1
Valve Percent Open (%)
Underground Storage Capacity
12hr | 24hr | 48hr | 1wk
ft
ft³
08/11/2016 17:54
Level 5.68 ft
Volume 19,519.06 ft³
OptiNimbus Target Volume 19,519.06 ft³
Reset
Overflow - 6 ft
Underdrain - 1.38 ft
11 Aug
06:00
12:00
18:00
12 Aug
Infiltration Gallery
12hr | 24hr | 48hr | 1wk
08/12/2016 22:10
Level 0.9 ft

Preliminary Results



- 1.3M cf volume reduction
- 24 lbs TP
- 4,900 lbs TSS

Upper Villa Park Costs and Funding		Preliminary Estimates	Actual Costs	
Costs	Engineering and Bidding*	$ 200,000	$ 202,000	
	Contract Amendment #1-Reuse Study		$ 16,104	
	Contract Amendment #2-Reuse Design		$ 29,384	
	Contract Amendment #3 Exfiltration		$ 60,435	
	Engineering Subtotal		$ 307,923	
	Construction	$ 800,000	$ 851,467	
	Change Order #1- Exfiltration		$ 23,400	
	Change Order #2 Ag-lime Field		$ 7,208	
	Actual Quantities		$ 25,426	
	Construction Subtotal		$ 907,501	
	Project Total	**$ 1,000,000**	**$ 1,215,424**	
Funding				Percent of Total
	MPCA Grant	$ 275,000	$ 275,000	23%
	BWSR Grant	$ 360,000	$ 360,000	30%
	Total Grant	**$ 635,000**	**$ 635,000**	52%
	CRWD	$ 182,500	$ 372,466	31%
	Roseville**	$ 182,500	$ 207,958	17%
	Total Local Match	**$ 365,000**	**$ 580,424**	48%
	Project Total	**$ 1,000,000**	**$ 1,215,424**	

* Actual Design costs inlcude $129,000 SRF contract and $73,000 Geosyntec contract

**Per Construction Agreement- Additional 10% cost overrun contingency plus $7,208 for CO#2

North Ottawa Project
Bois de Sioux Watershed District

Jerome Deal, BdSWD Manger

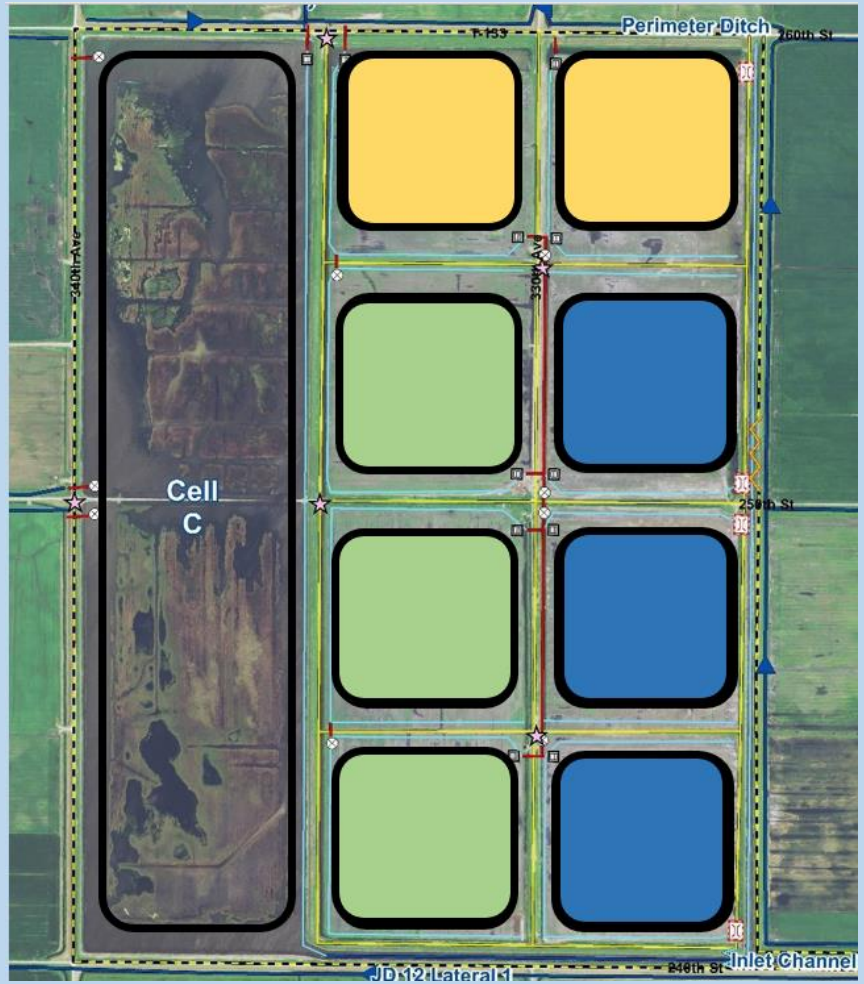
Bois de Sioux
Watershed District

RED RIVER BASIN
COMMISSION

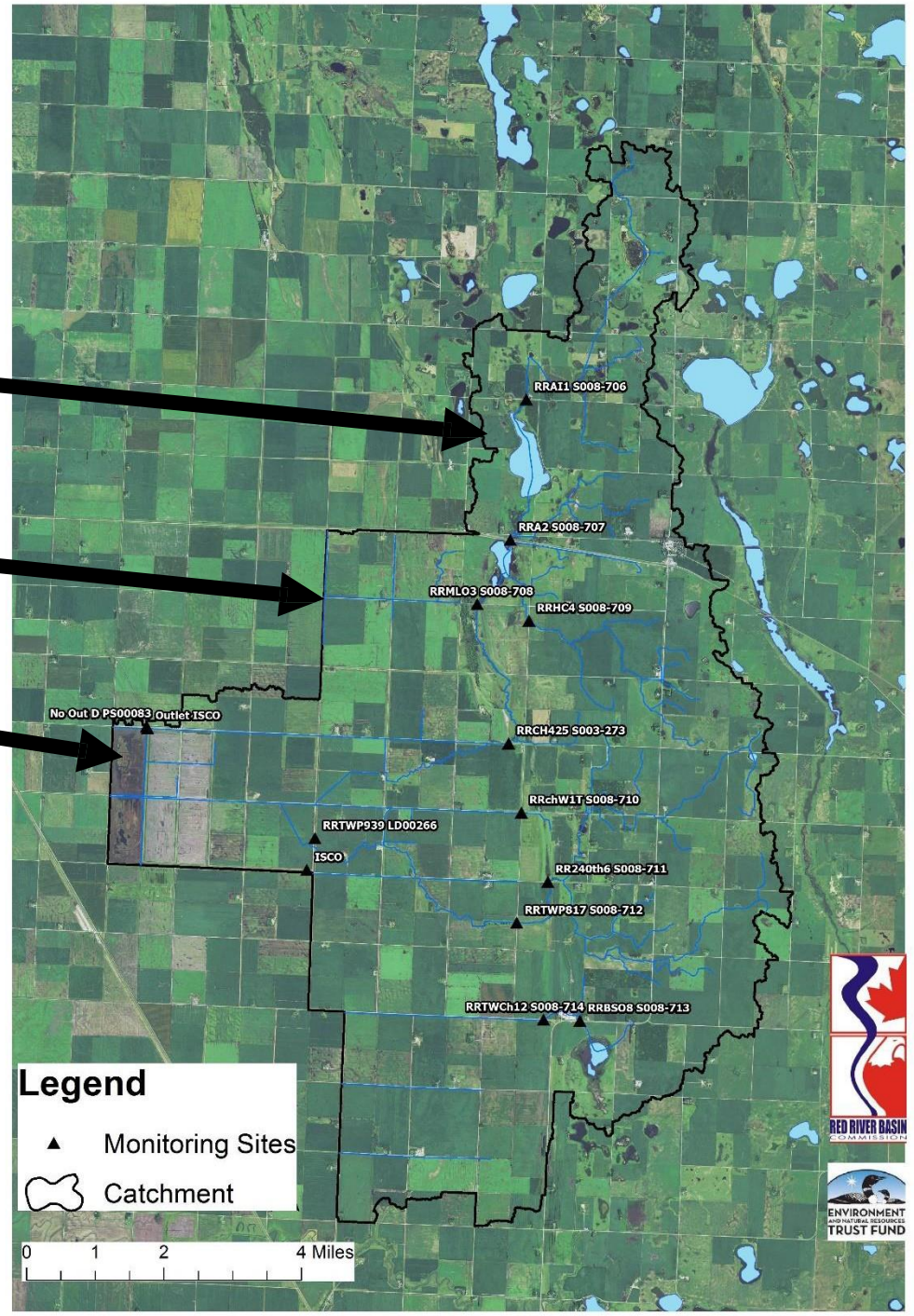

North Ottawa Impoundment

Pre-project: The Problem

North Ottawa Project Site



- 75 square mile drainage basin
- 10 mile diversion ditch
- 3 square mile impoundment
- 2 primary flood storage cells (C)
- 8 interior diked storage cells (A&B)



North Ottawa Impoundment Operation Plan

- Flood Damage Reduction – 16K ac-ft Gated Storage = 4” runoff event
- Water Quality – Sedimentation and nutrient uptake by vegetation
- Habitat Enhancement – Moist Soils Management for migrating waterfowl and shorebirds
- Agricultural – Rotation of conventional cropping for O&M costs

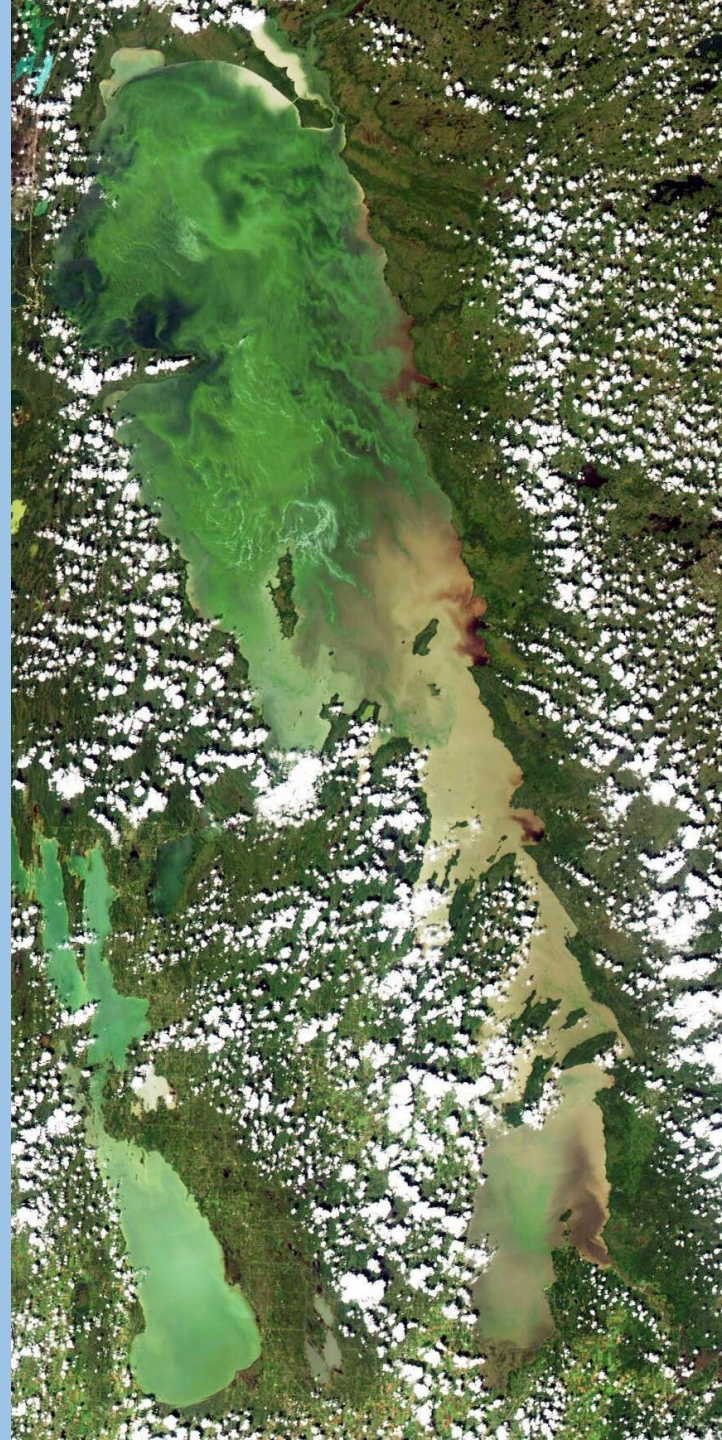
October 2016

Interior Diking Network

- Water level manipulation
  - Habitat
  - Sedimentation
  - Nutrient uptake

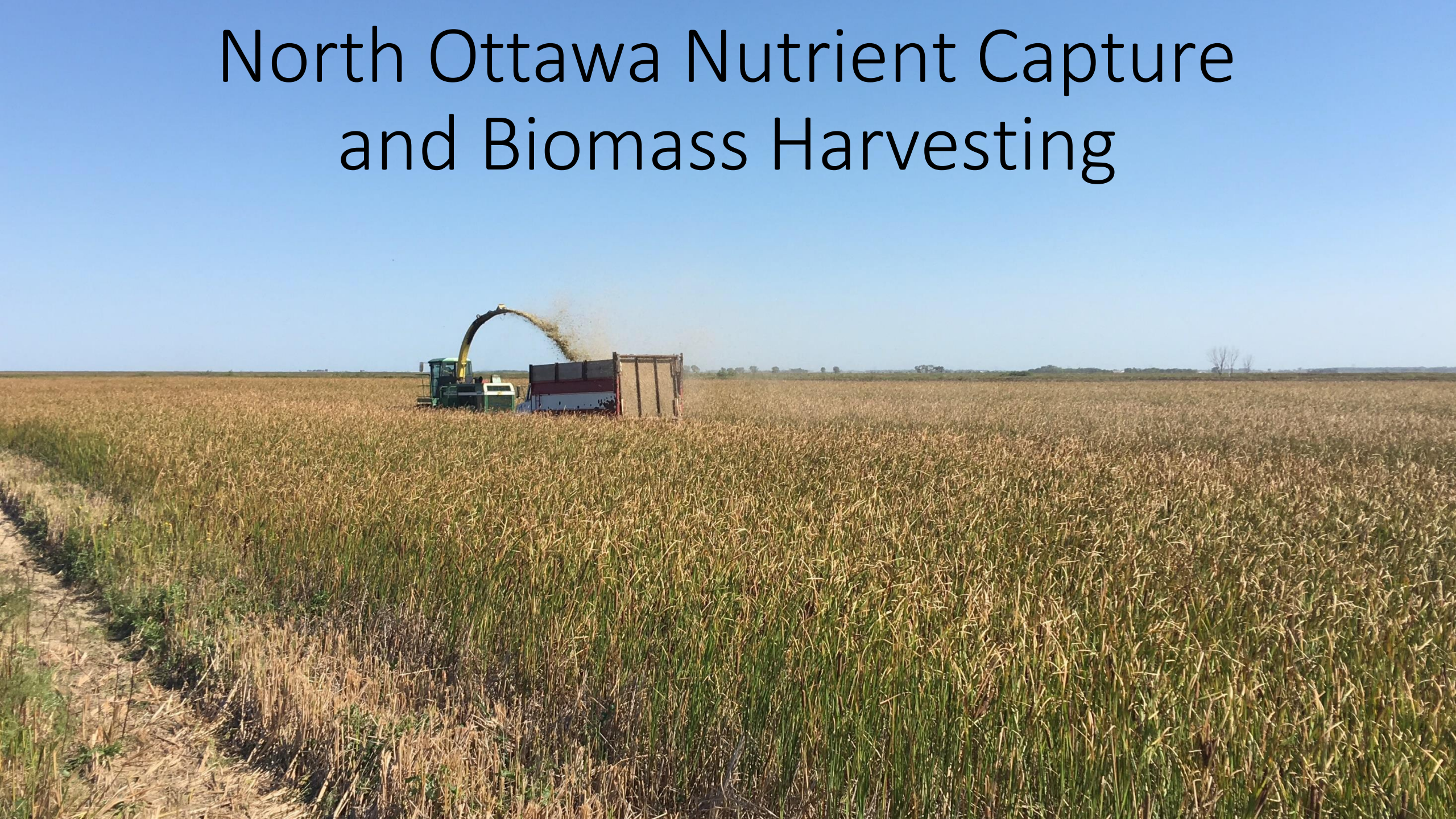
Nutrient Reduction Need

- RRBC working with International Red River Board - excess nutrients is one of greatest water quality issues for Red River Basin
- Excess nutrients increase frequency and severity of algae growth that affect drinking water, use of beaches, damage fish and aquatic life
- Red River delivers 15% water but 60% phosphorus
- USGS Long-term monitoring (1990-2008)
    - 50% Increase Total Dissolved Solids
    - 60% Increase Total Phosphorus
    - 70% Increase Total Nitrogen




Legend
Perimeter Levee Dike
Interior Levee
Internal Flowpaths
Inlet Weir
Emergency Spillway
Culvert
Control Structure
Inlet Structure
Gate Control
Monitoring Equipment
Cell B1
Cell A1
Cell B2
Cell A2
Cell C
Cell B3
Cell A3
Cell B4
Cell A4
JD 12 Lateral 3
T-125
T-133
Perimeter Ditch
260th St
340th Ave
330th Ave
WD 3
JD 12 Lateral 2
T-200
CR-93
250th St
CR-42
MN TH 9
T-34
T-148
JD 12 Lateral 1
240th St
Inlet Channel
Perimeter Ditch

North Ottawa Nutrient Capture and Biomass Harvesting



North Ottawa A/B Cell System 2016 Load Reductions

TP Load Reduction	852 lbs	TP % Load Reduction	66%
TN Load Reduction	14,976 lbs	TN % Load Reduction	73%
TSS Load Reduction	41,129 lbs	TSS % Load Reduction	42%

North Ottawa C Cell 2016 Load Reductions

TP Load Reduction	157 lbs	TP % Load Reduction	27%
TN Load Reduction	3,212 lbs	TN % Load Reduction	51%
TSS Load Reduction	26,306 lbs	TSS % Load Reduction	57%

Significant WQ Benefits and Further Opportunities…

- Holding time to achieve sedimentation
- Slower drawdown rates to limit sediment export
- Wetland plant management to take up nutrients
- Biomass harvesting to prevent nutrient saturation

Harvesting Biomass for Nutrient Recovery

Harvested Biomass	Captured Nitrogen	Captured Phosphorus	Captured Potassium
4.76 tons / acre	47.64 lbs N / acre	6.61 lbs P / acre	48.86 lbs K / acre

Target Nutrients	2016 Nutrient Loads	Cattail Capture Capacity
Nitrogen	26,727 lbs	561 Acres
Phosphorus	1,871 lbs	283 acres

Biomass Utilization

- Agricultural Soil Amendment – Green Manure
- Bioenergy – Fuel Pellets
- Biocomposites and products – Added Value

Biomass Utilization
Agricultural Soil Amendment
Green Manure

Birds are using the impoundment

Build it (manage it) and they will come

Birds Observed

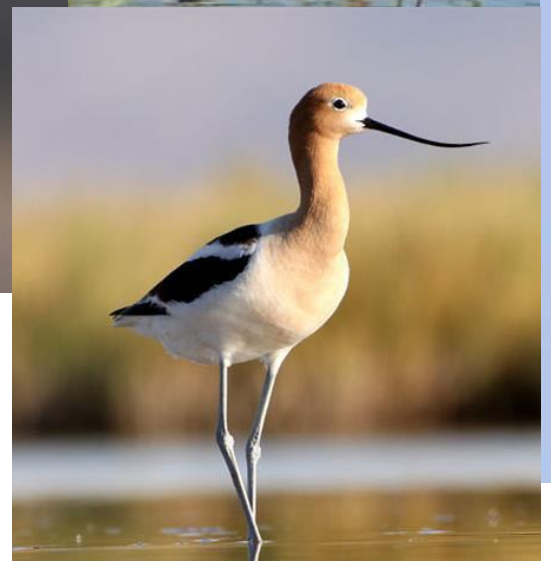
	Birds	Species	END	THR	SPC	SGCN
Shorebirds	931	13	0	1	1	4
Wading birds	1,230	14	1	0	1	4
Waterfowl	27,557	17	0	0	1	2
TOTAL	**29,718**	**44**	**1**	**1**	**3**	**10**

END = Endangered
THR = Threatened
SPC = Special Concern
SGCN = Species of Greatest Conservation Need

Breeding Observations

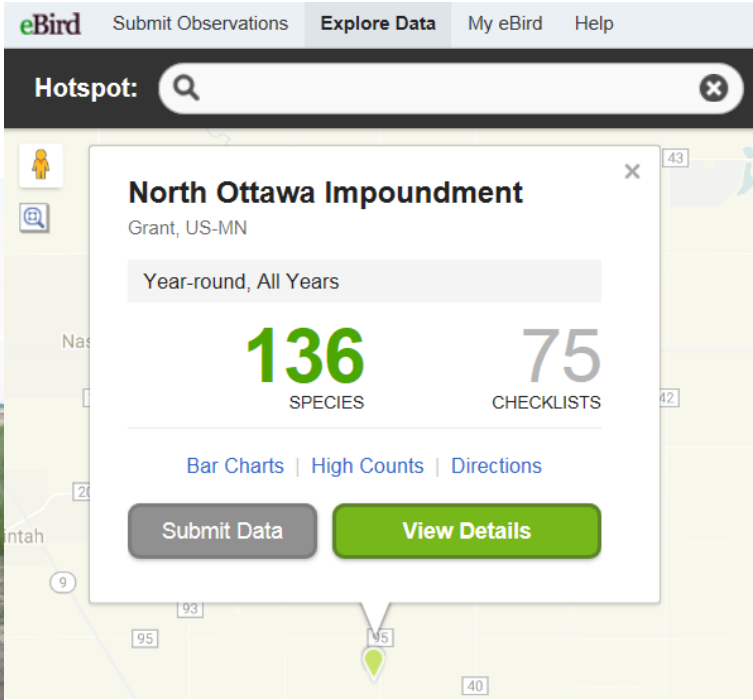
- Young of 6 species
  - Mallard – 6/1 to 7/28
  - Blue-winged teal – 2 broods
  - Northern pintail – 1 brood
  - Wood duck – many young
  - Killdeer – 1 brood
  - Upland sandpiper – 1 brood

Rare/Unusual Species



Fish Eating Birds

People Are Using it Too!



Minnesota's Pine To Prairie BIRDING TRAIL

Acknowledgements

- Funded by the MN DNR Nongame Wildlife Program, MN LCCMR Environment and Natural Resource Trust Fund, MPCA/EPA 319 and The Bush Foundation
- Project partners; MN DNR Glenwood Area Wildlife staff, RRBC, BdSWD

DEPARTMENT OF NATURAL RESOURCES

NONGAME WILDLIFE PROGRAM • MINNESOTA DEPARTMENT OF NATURAL RESOURCES •

BUSH FOUNDATION

Bois de Sioux Watershed District

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND

RED RIVER BASIN COMMISSION