One Watershed One Plan – Thief River Watershed

Pennington County, Minnesota

MARSHALL SWCD

PENNINGTON SOIL & WATER CONSERVATION DISTRICT

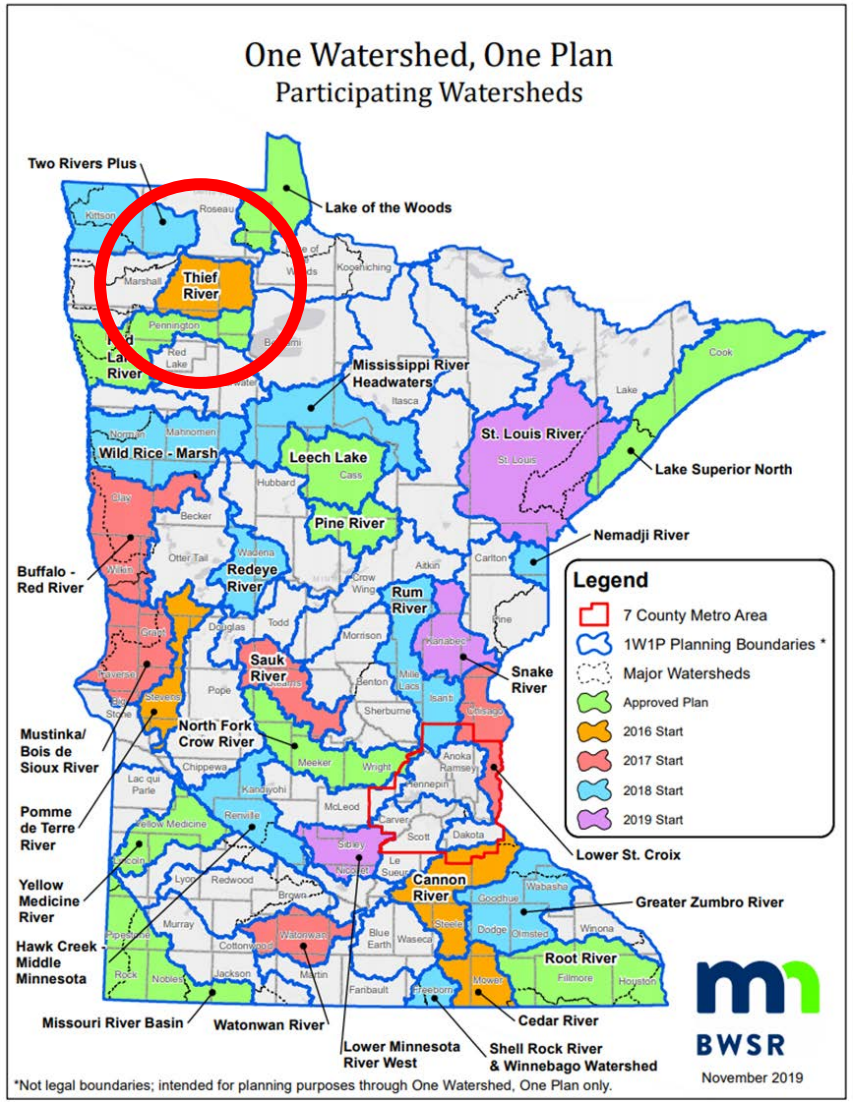
BELTRAMI SOIL & WATER SWCD CONSERVATION DISTRICT

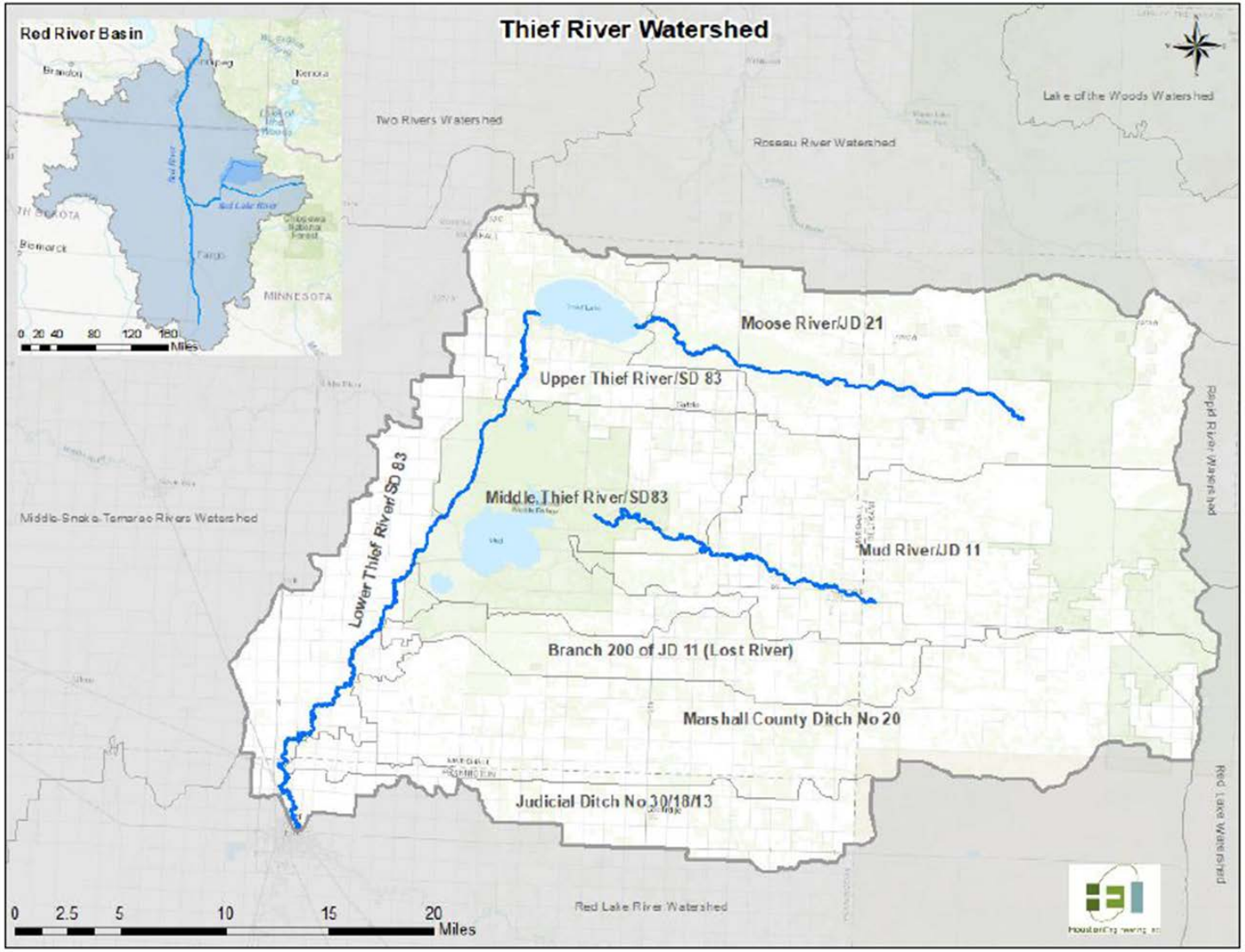
Beltrami County

MARSHALL COUNTY MINNESOTA

Red Lake Watershed District

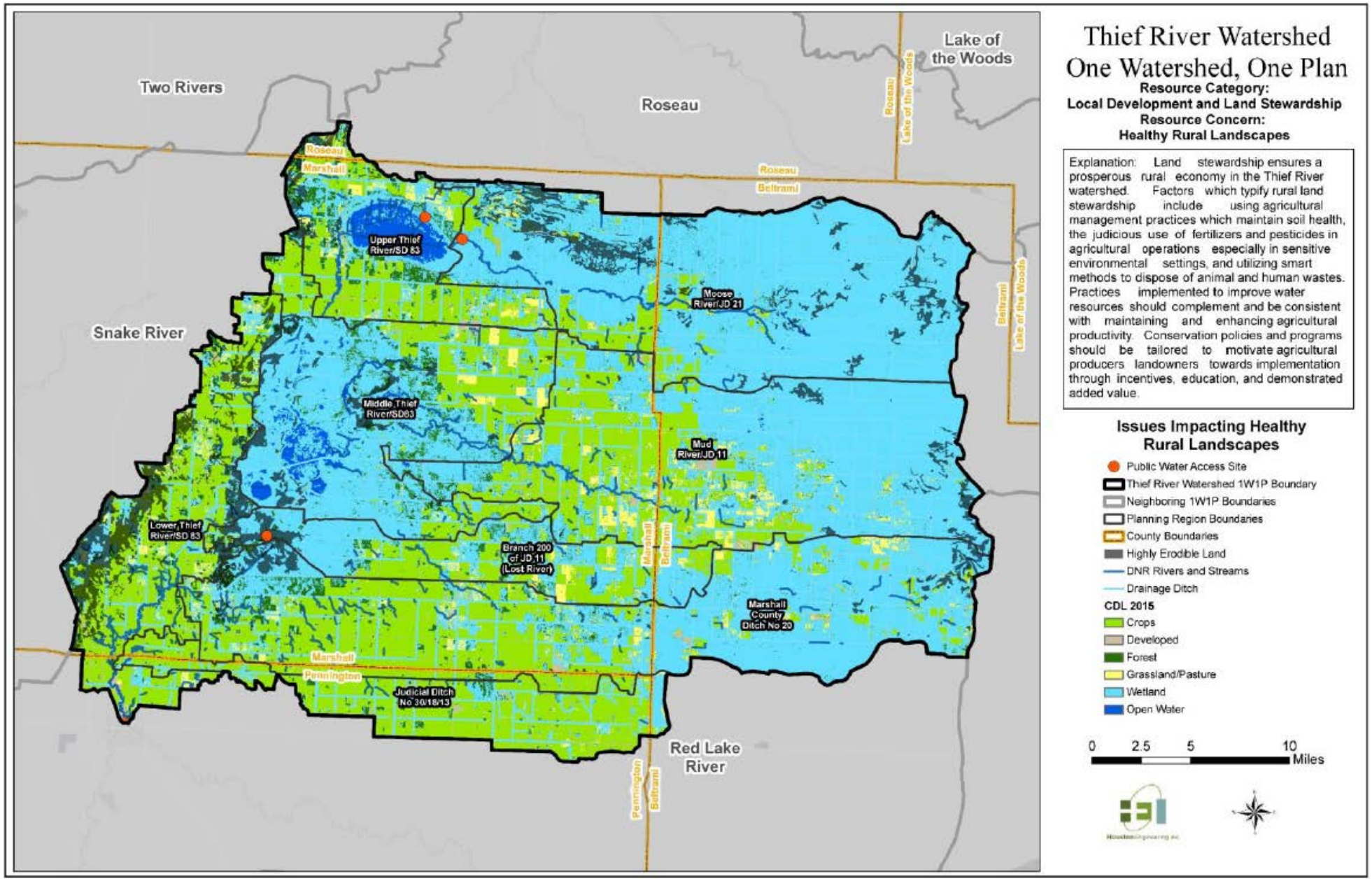
One Watershed One Plan


One Watershed, One Plan
Participating Watersheds
Two Rivers Plus
Lake of the Woods
Thief River
Mississippi River Headwaters
St. Louis River
Lake Superior North
Wild Rice - Marsh
Leech Lake
Pine River
Nemadji River
Buffalo - Red River
Redeye River
Rum River
Sauk River
Snake River
Mustinka/ Bois de Sioux River
North Fork Crow River
Pomme de Terre River
Lower St. Croix
Yellow Medicine River
Cannon River
Greater Zumbro River
Hawk Creek Middle Minnesota
Root River
Missouri River Basin
Watonwan River
Lower Minnesota River West
Shell Rock River & Winnebago Watershed
Cedar River
Legend
7 County Metro Area
1W1P Planning Boundaries *
Major Watersheds
Approved Plan
2016 Start
2017 Start
2018 Start
2019 Start
BWSR
November 2019
*Not legal boundaries; intended for planning purposes through One Watershed, One Plan only.


Thief River Watershed
Red River Basin
Two Rivers Watershed
Lake of the Woods Watershed
Roseau River Watershed
Moose River/JD 21
Upper Thief River/SD 83
Middle Thief River/SD83
Lower Thief River/SD 83
Mud River/JD 11
Branch 200 of JD 11 (Lost River)
Marshall County Ditch No 20
Judicial Ditch No 30/18/13
Middle-Snake-Tamarac Rivers Watershed
Red Lake River Watershed
Rapid River Watershed
0 2.5 5 10 15 20 Miles
0 20 40 80 120 160 Miles

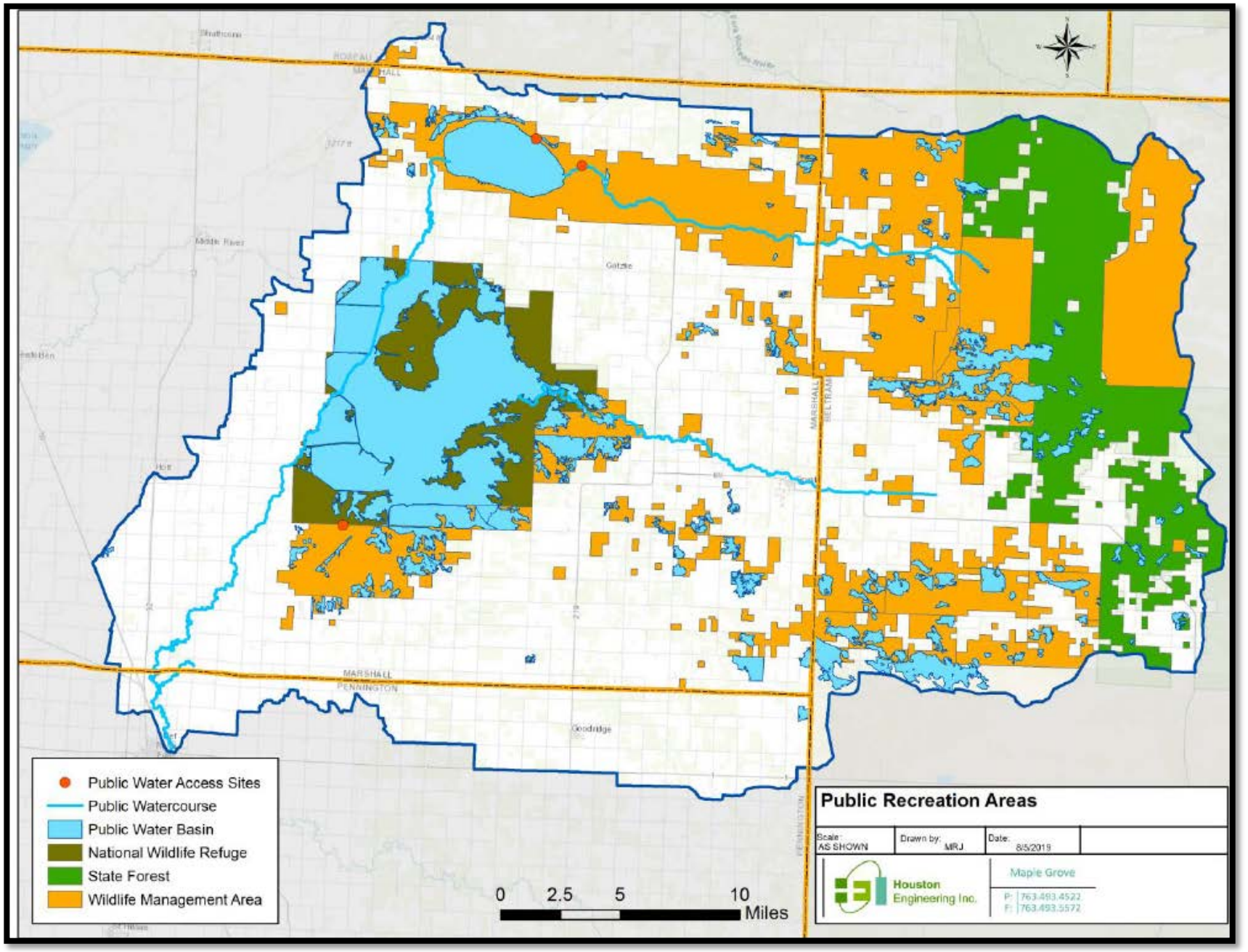
Land Use

- ❑ 45% wetlands
- ❑ 36% cropland



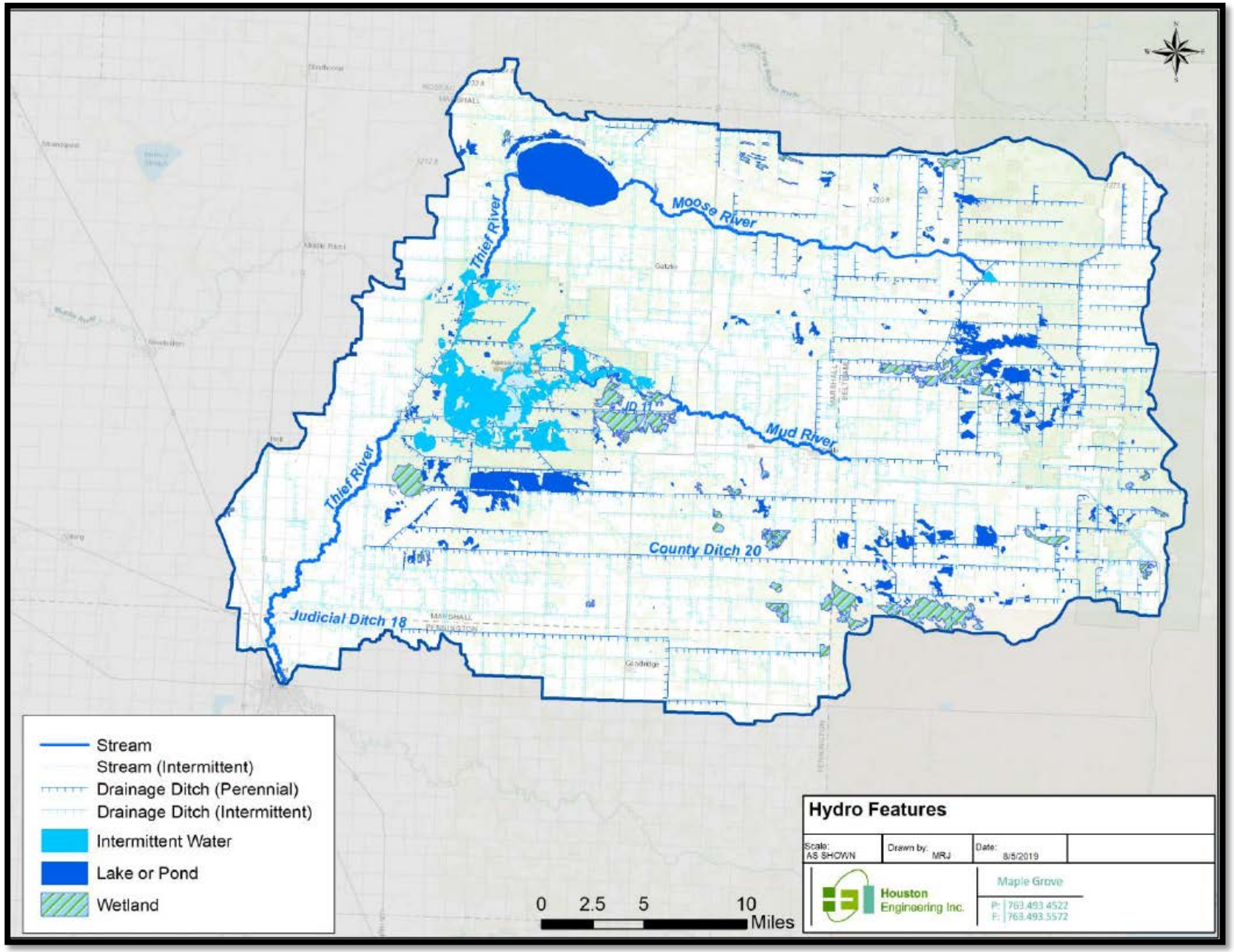
Public Lands

- ❑ Agassiz National Wildlife Refuge
- ❑ Beltrami Island State Forest
- ❑ Thief Lake WMA
- ❑ Moose River WMA
- ❑ 33 WMAs



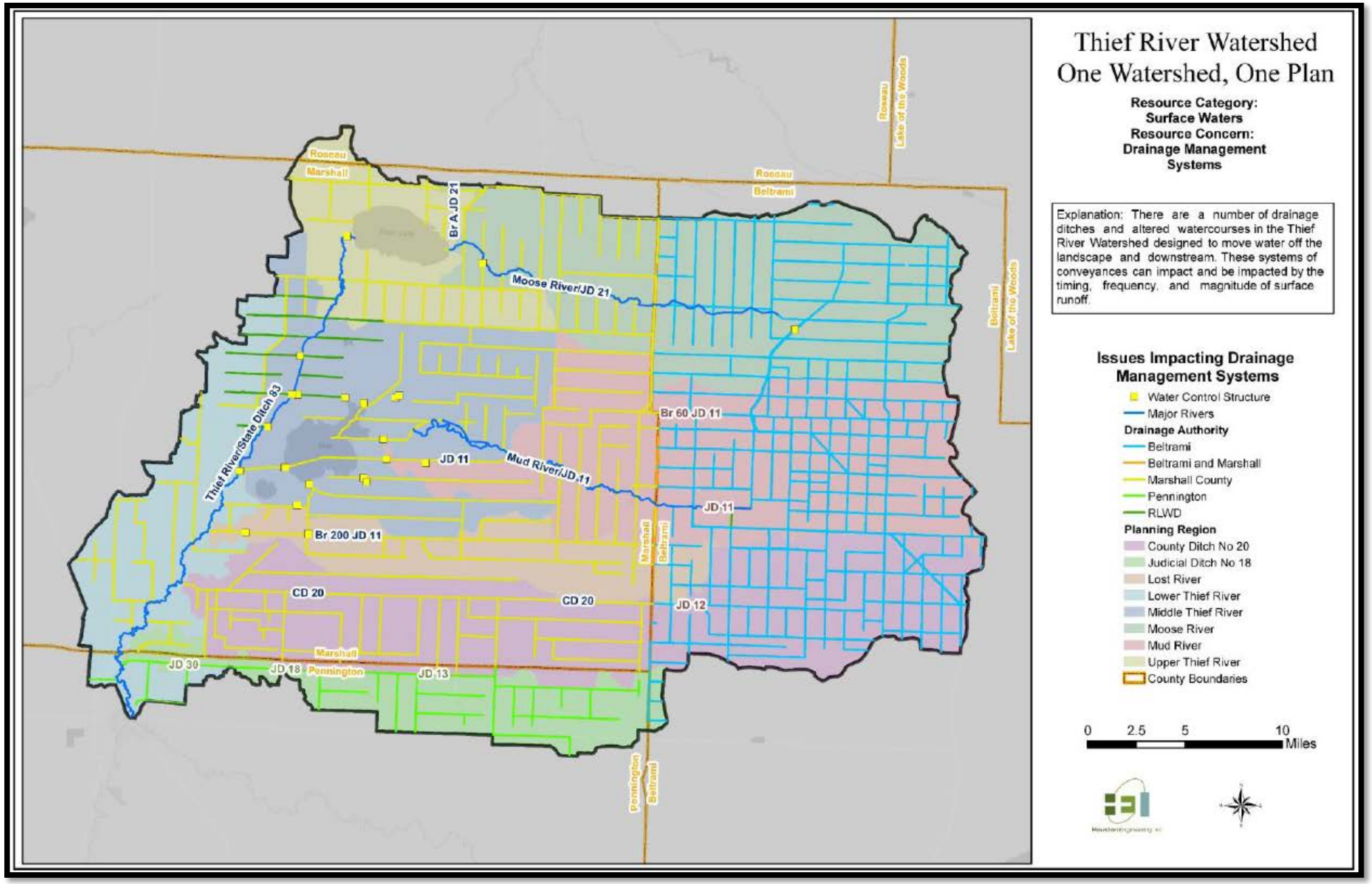
Hydrology

- 1,248 miles of legal ditches
- 3rd most channelized in the State



Water Control Structures

- 30 Impoundments
- Most in Agassiz NWR
- Moose River Impoundment



Plan Timeline

- Grant Executed – July 2017
- Notice of Plan Initiation – August 2017
- Public Meetings - January 2018
- Plan composed January 2018 to July 2019
- Public Hearing on Draft Plan – December 2019

Plan Overview

- ❑ Executive Summary
- ❑ Section 1 – Introduction
- ❑ Section 2 – Prioritization of Resources, Concerns, and Issues
- ❑ Section 3 – Measurable Goals
- ❑ Section 4 – Targeted Implementation
- ❑ Section 5 – Implementation Programs
- ❑ Appendices – Land and Water Resources Inventory

Priority Issues

- Issues – Factors such as a pollutant or stressor impacting a resource
- 27 Issues Identified
  - 12 Issues in Tier A (Highest Priority)
  - 15 Issues in Tier B

Priority Tier	Rank of issue votes as a fraction of total votes
Tier A	Above 70th percentile
Tier B	40th – 70th percentile
Tier C	Below 40th percentile
Unranked	No votes received

Priority Issues

Resource Category	Resource Concern	Issue – Priority Tier A
2. Surface Waters: Water resulting from excess precipitation leaving the landscape and collecting in ditches, streams, rivers, creeks, wetlands, lakes and ponds.		
2. Surface Waters	2.1 Aquatic Life and Recreation	2.1.1: Water Quality: Elevated concentrations of suspended solids, sediment, and total phosphorus approaching (protection) or exceeding (restoration) water quality standards for aquatic life, which can lead to aquatic life impairments.
		2.1.2: Water Quality: Elevated concentrations of bacteria approaching (protection) or exceeding (restoration) water quality standards for aquatic recreation, which can impact beneficial uses.
		2.1.7 Water Quality: Decreased stream channel stability driven by hydrologic changes that increase erosion and sediment transport, which can decrease beneficial uses of streams, rivers, and lakes.
	2.2 Surface Runoff and Flooding	2.2.1: Water Quantity: Changes in natural water storage and vegetative cover on the landscape, including natural depressional areas, wetlands, loss of vegetative cover and soil organic matter, which can cause an increase in the volume of runoff, peak discharges, and water levels, causing flooding and flood damages to agricultural land, wildlife habitat, transportation systems, buildings, and structures.
		2.2.2: Water Quantity: High peak flows causing flood damages to agricultural land and public infrastructure, homes and other structures, rerouted flows, and accelerated bank erosion to artificial and natural waterways; low flows which can impact aquatic life and aquatic recreation.

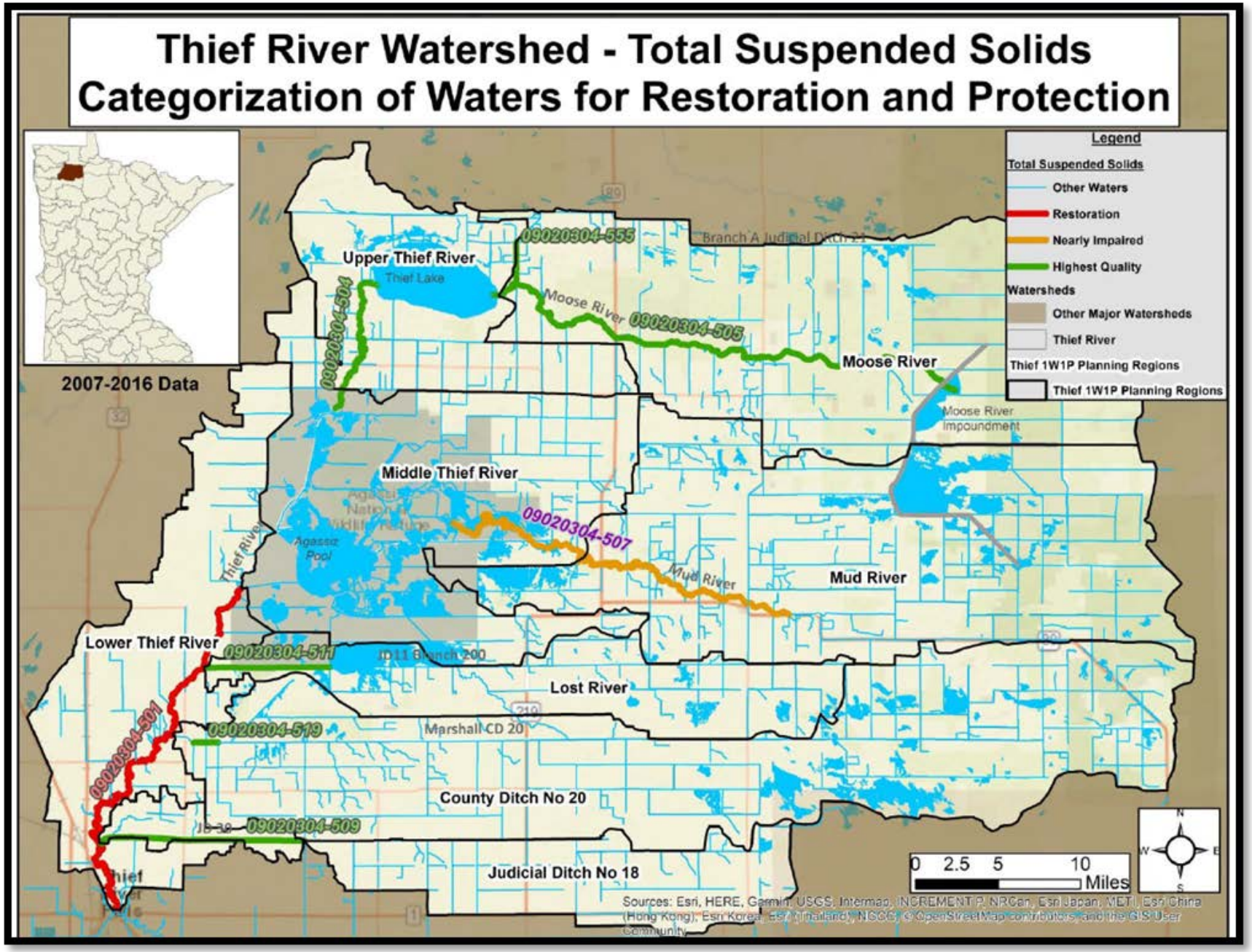
Water Management Classes

- ❑ Impaired – Restoration
- ❑ Nearly Impaired – Protection
- ❑ Highest Quality – Protection
- ❑ Completed for each AUID
- ❑ Organized by Planning Region

Planning Region	Assessment Unit ID	Waterbody Name	Reach Description	River Nutrient Region (Applied to Local Planning)	Total Suspended Solids	*E. coli* Bacteria	Dissolved Oxygen	Total Phosphorus and River Eutrophication	Index of Biological Integrity
Lower Thief River	09020304-501	Thief River (Natural)	Agassiz Pool to Red Lake R	Central	Restoration (Impaired)	Nearly Impaired	Highest Quality	Highest Quality	Nearly Impaired
	09020304-501	Thief River (SD 83)		Central					Nearly Impaired
	09020304-550	Lat 1 JD 23	Headwaters to Thief River	Central					Nearly Impaired
	09020304-551	Main JD 23	Lat 2 JD 23 to Thief River	Central					Potential Impairment
	09020304-558	Marshall CD 35	Br 11 SD 83 to Thief River	Central					Nearly Impaired
Upper Thief R.	09020304-504	Thief River	Thief Lake to Agassiz Pool	Central	Highest Quality	Highest Quality	Highest Quality	Highest Quality	Nearly Impaired
Moose River	09020304-505	Moose River	Headwaters to Thief Lake	North	Highest Quality	Highest Quality	Restoration (Impaired)	Potential Impairment	Potential Impairment
	09020304-555	Branch A of JD 21	Br 6 of JD 21 To Moose River	North	Highest Quality	Nearly Impaired	Highest Quality	Highest Quality	Nearly Impaired
	09020304-557	Branch A of JD 21	410th Ave NE to Br 29 of JD 21	North					Nearly Impaired
Mud River	09020304-507	Mud River	Headwaters to Agassiz Pool	North	Nearly Impaired	Restoration (Impaired)	Restoration (Impaired)	Potential Impairment	Nearly Impaired
	09020304-527	Tributary to Branch 95 of JD 11	Unnamed ditch to Branch 95 of JD 11	North					Highest Quality
	09020304-521	Judicial Ditch 11	S. Pool outlet of Moose R. Imp. to unnamed ditch along Benville Rd	North			Highest Quality		
	09020304-535	Judicial Ditch 11	330th Ave NE (Mud R) to 290th Ave NE	North			Highest Quality		

Protection and Restoration for Total Suspended Solids

- ❑ Red Impaired
  - ❑ 15% Reduction Goal
- ❑ Orange Nearly Impaired
  - ❑ 10% Reduction Goal
- ❑ Green Highest Quality
  - ❑ 5% Reduction Goal



Measurable Goals

- 13 Measurable Goals Categories
- Goals for each planning region (HUC 10)
- Goals address one to multiple priority issues
- Developed by WRAPS, TMDL, existing plans, studies, and 1W1P process

Goals - Sediment

- Protection (Highest Quality): Lost River: 5% or 34 tons/yr.
- Restoration (Impaired): Lower Thief River/SD 83: 15% or 2,335 tons/yr.
- Protection (Highest Quality): Marshall County Ditch 20: 5% or 128 tons/yr.
- Restoration (Potential Impairment): Middle Thief River/SD 83: 15% or 653 tons/yr.
- Protection (Highest Quality): Moose River/JD 21: 5% or 49 tons/yr.
- Protection (Nearly Impaired): Mud River/JD 11: 10% or 290 tons/yr.
- Protection (Highest Quality): Upper Thief River/SD 83: 5% or 103 tons/yr.
- Protection (Highest Quality): Judicial Ditch 30/18/13: 5% or 70 tons/yr.
- These goals address 6 priority issues identified in Section 2

Goals – Surface Runoff and Flooding

Short-Term Goal(s):

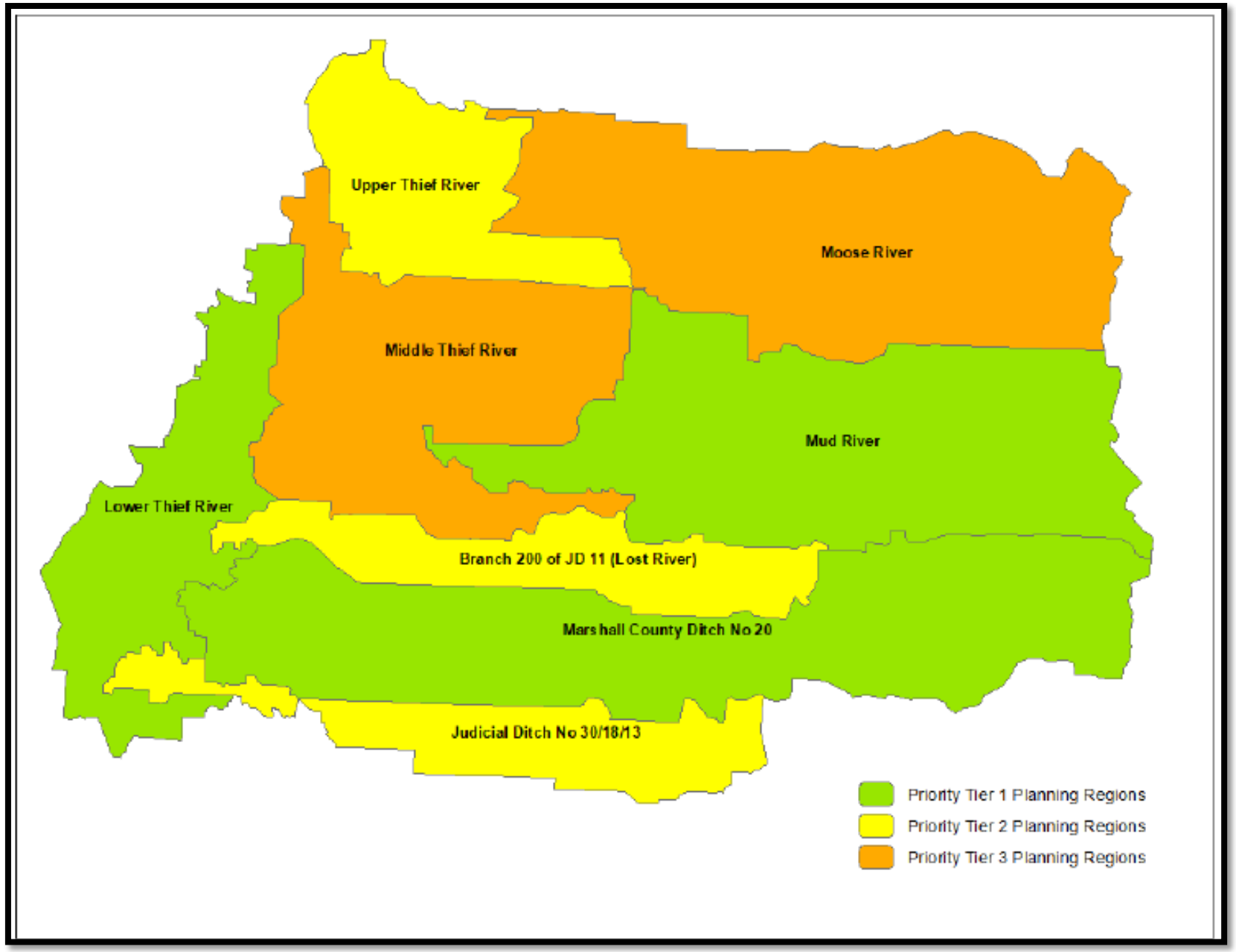
- ❑ Judicial Ditch 30/18/13: Reduce average annual runoff by 0.125 inches (442 ac-ft)
- ❑ Lower Thief River/SD 83: Reduce average annual runoff by 0.125 inches (649 ac-ft)
- ❑ Lost River: Reduce average annual runoff by 0.125 inches (438 ac-ft)
- ❑ Marshall County Ditch 20: Reduce average annual runoff by 0.125 inches (1396 ac-ft)
- ❑ Middle Thief River/SD 83: No net increase in average annual runoff
- ❑ Moose River/JD 21: No net increase in average annual runoff
- ❑ Mud River/JD 11: No net increase in average annual runoff
- ❑ Upper Thief River/SD 83: No net increase in average annual runoff

Priority Planning Regions

Tier 1 Planning Regions (Rank 1-3) Tier 2 Planning Regions (Rank 4-6) Tier 3 Planning Regions (Rank 7-8)	Lower Thief	JD 30/18/ 13	Marshall CD 20	Lost River	Middle Thief	Upper Thief	Mud River	Moose River
Tier A Total	11	7	8	6	5	7	10	6
Tier B Total	5	5	5	7	6	5	8	4
Total	16	12	13	13	11	12	18	10
Planning Region Rank	2	5	3	3	7	5	1	8
*No weighting applied. Tiers based on total count of H's and M's for both Tier A and Tier B issues.								
Tier A Total	11	7	8	6	5	7	10	6
Tier A Total Weighted x 2	22	14	16	12	10	14	20	12
Tier B Total	5	5	5	7	6	5	8	4
Tier B Total Weighted x 1	5	5	5	7	6	5	8	4
Weighted Total	27	19	21	19	16	19	28	16
Planning Region Rank	2	4	3	4	7	4	1	7
*Tier A issues weighted at 2x the value of Tier B issues (Preferred Ranking).								

Priority Planning Regions

- ❑ 3 Tiers
- ❑ Tier 1
  - ❑ Lower Thief
  - ❑ CD20
  - ❑ Mud River



Implementation Table

Location: Lower Thief River/SD 83 Planning Region																										
Priority: Tier 1 Planning Region																										
Action Level	PTMApp Treatment Group	Implementation Actions: Management Practices	Measurable Output	Metric	Estimated Cost	Timeline					Implementation Responsibilities		Measurable Goals													
						2020-21	2022-23	2024-25	2026-27	2028-29	Lead Entity	Partner	MGC 3.2.1	MGC 3.2.2	MGC 3.2.3	MGC 3.2.4	MGC 3.2.5	MGC 3.2.6	MGC 3.2.7	MGC 3.2.8	MGC 3.2.9	MGC 3.2.10	MGC 3.2.11	MGC 3.2.12	MGC 3.2.13
B	*Source Reduction*	Implement practices that are focused on and maintain soil health, including but not limited to conservation tillage and residue management, crop rotation methods, and/or the use of cover crops	2,490 acres with management practices; 1,428 tons/yr. sediment reduction; 269 lbs./yr. TP load reduction	# acres; annual tons sediment and lbs. TP load reduction	$76,858	x	x				SWCD	MDA, NRCS, Crop Advisors, Landowner		x		x	x	x	x		x			x	x
1	*Source Reduction*	Implement additional practices that are focused on and maintain soil health, including but not limited to conservation tillage and residue management, crop rotation methods, and/or the use of cover crops	7,939 acres with management practices; 1,957 tons/yr. sediment reduction; 1,208 lbs./yr. TP load reduction	# acres; annual tons sediment and lbs. TP load reduction	$245,067	x	x	x			SWCD	MDA, NRCS, Crop Advisors, Landowner		x		x	x	x	x		x			x	x
2	*Source Reduction*	Implement additional practices that are focused on and maintain soil health, including but not limited to conservation tillage and residue management, crop rotation methods, and/or the use of cover crops	11,608 acres with management practices; 3,101 tons/yr. sediment reduction; 1,380 lbs./yr. TP load reduction	# acres; annual tons sediment and lbs. TP load reduction	*N/A: Action Level 2 Implementation Funding Required*						SWCD	MDA, NRCS, Crop Advisors, Landowner		x		x	x	x	x		x			x	x

Targeted Implementation Profiles

- ❑ Each Planning Region
- ❑ Measurable Goals
- ❑ BMPs
- ❑ PTMApp
  - ❑ Sediment
  - ❑ Nutrients
  - ❑ Land Surface – not in channel

Targeted Implementation Profile: Lower Thief River

MEASURABLE GOAL

Goals and Loading Source: Thief River Watershed TMDL/HSPF

Existing Sediment Load at Planning Region Outlet: 15,566 tons/yr.

Targeted Sediment Load Reduction at Outlet: 2,335 tons/yr.

Existing Total Phosphorus Load at Planning Region Outlet: 101,823 lbs./yr.

Targeted Total Phosphorus Load Reduction at Outlet: 5,091 lbs./yr.

Estimated Funding Needed to Meet Sediment Goal: $253,428

Estimated Funding Needed to Meet Total Phosphorus Goal: $10,847,528

TARGETING APPROACH

Management Practices:

- Sediment Reduction > 0.5 tons/yr.
- Total Phosphorus Reduction > 0.5 tons/yr.
- Size > 10 acre

Structural Practices:

- Filtration Practices: Total Phosphorus Reduction > 0.5 lbs./yr.; contributing drainage area > 40 acres
- Protection Practices: Contributing drainage area > 40 acres
- Storage Practices: Sediment Reduction > 0.5 tons/yr.
- Biofiltration Practices: Total Phosphorus Reduction > 0.5 lbs./yr.; contributing drainage area > 40 acres

All Practices:

- Surface Area of Practice > 0.5 acres
- Treat > = 50% of runoff to practice

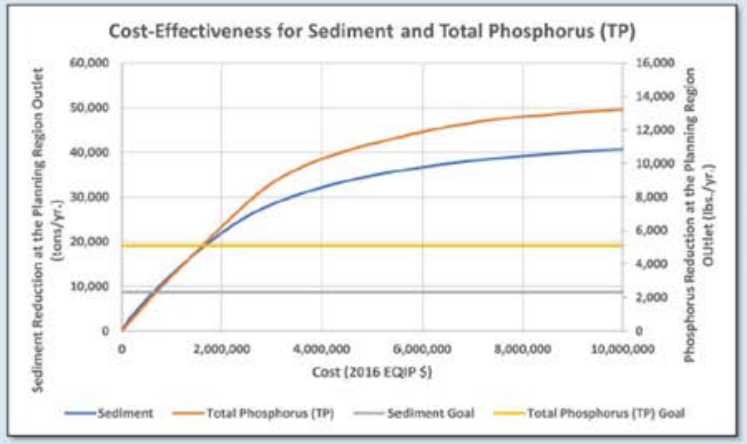
EVALUATING CONSERVATION GOALS

The Cost-Effectiveness Curve shows the optimal efficiency for implementation of actions to achieve load reduction goals. The curve is based on the most cost-effective and efficient management and structural practices as estimated by PTMApp. The curves show that it is possible to achieve load reduction goals through implementation of the targeted approach.

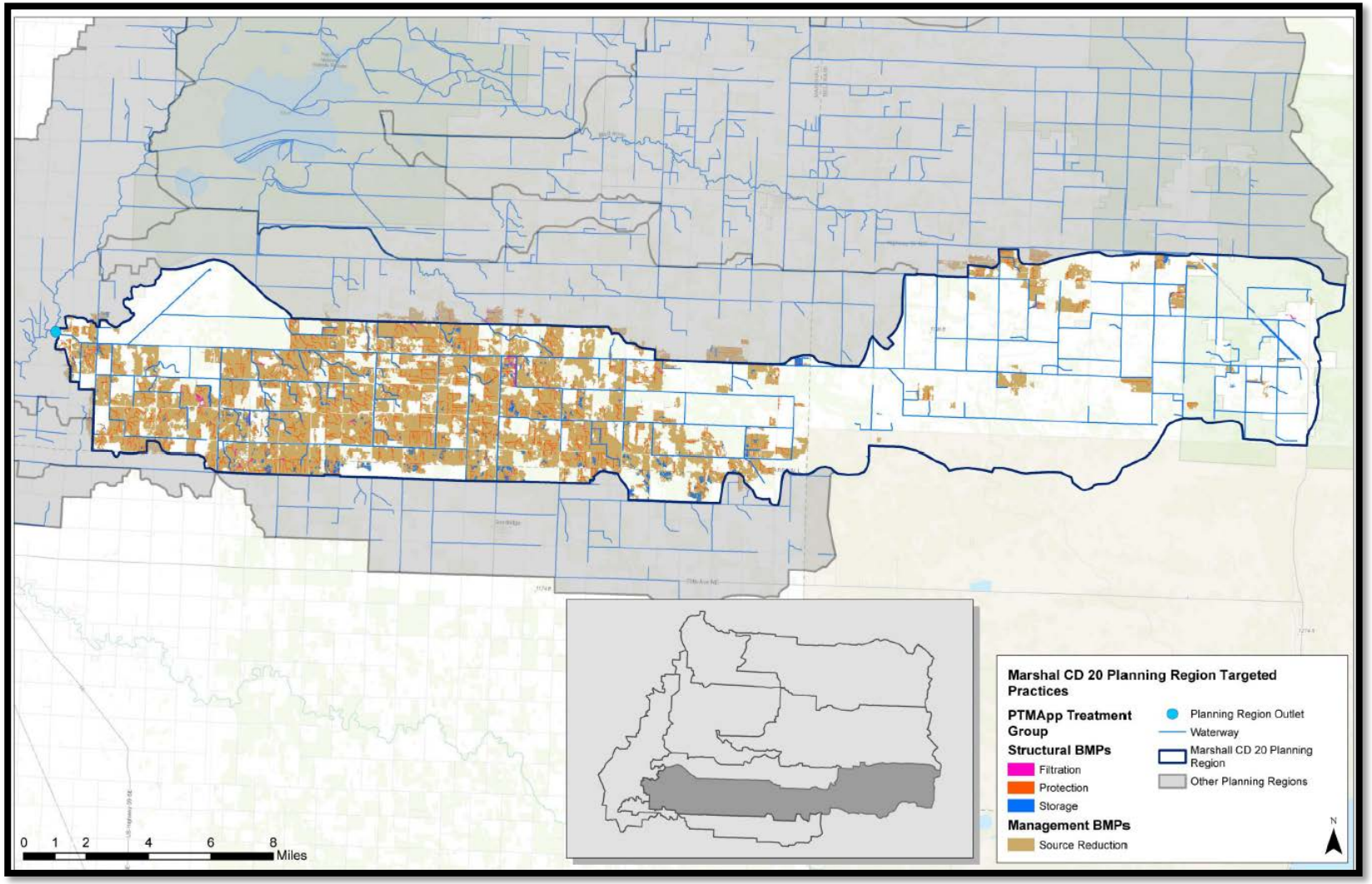
PRACTICE SUMMARY

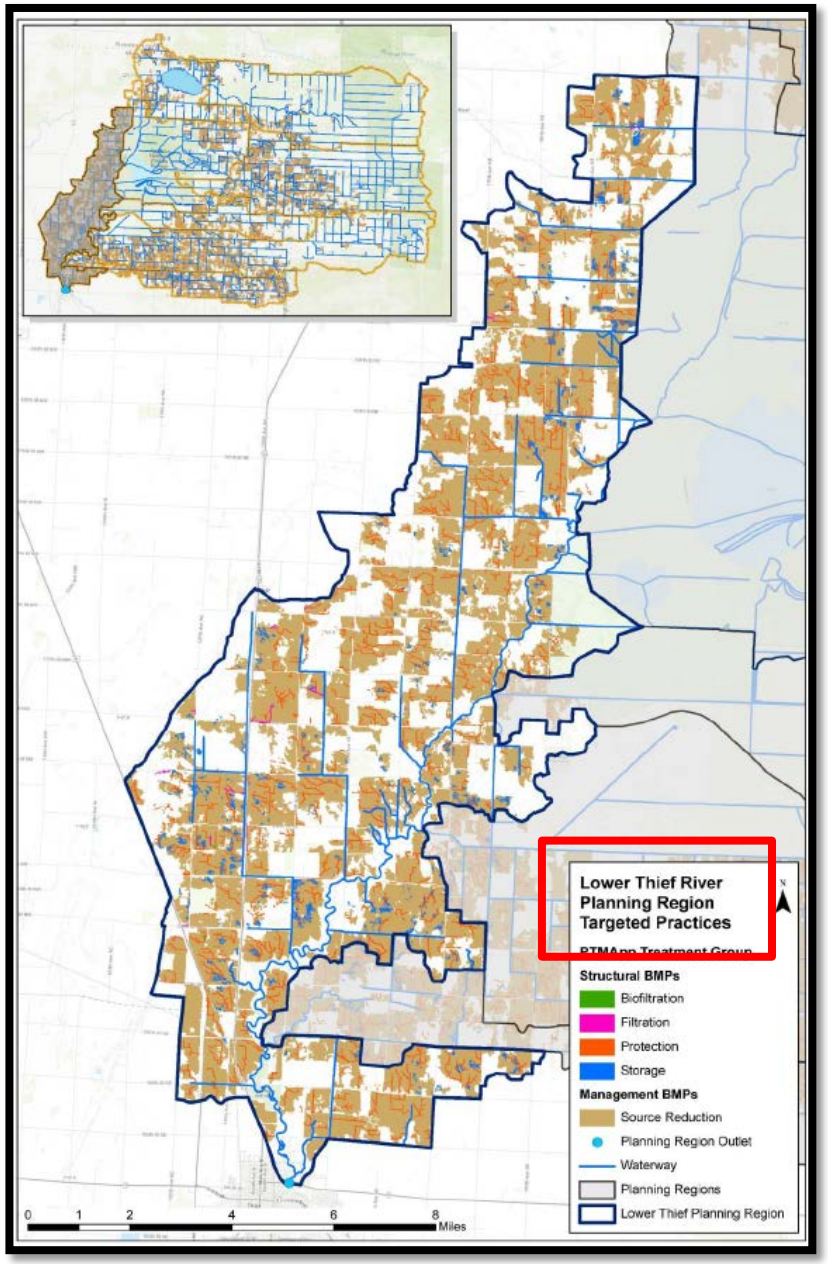
Below is a summary of targeted conservation practices based on aggregated individual benefits and costs, and the specific types of practices that will be targeted within treatment groups.

	Treatment Group					
	Biofiltration	Filtration	Protection	Storage	Source Reduction	Totals
Count	6	166	453	956	601	2,226
Sediment Reduction (tons/yr.)	74	1,086	2,228	5,181	6,486	15,055
Total Phosphorus Reduction (lbs./yr.)	37	226	793	1,361	2,857	5,274
Avg. Cost-Effectiveness ($/tons of sed/yr.)	3,748	554	3,486	1,072	162	1,290
Standard Deviation of Cost Effectiveness	3,042	742	2,972	1,864	293	2,207
Practice Types	Saturated Buffer	Conservation Cover; Cover Crop; Filter Strips; Grassed Waterway; Riparian Buffers	Critical Area Planting; Grad Stabilization Structure; Tree/Shrub Establishment; Well Sealing; Septic System Upgrades; Upland Wildlife Habitat Management; Restoration and Management of Rare/Declining Habitat; Prescribed Burning; Gravel Pit Reclamation	Drainage Water Management; Wetland Restoration; Water Control Structures; Water and Sediment Control Basins; Diversion	Residue and Tillage Management; Nutrient Management	



PTMApp - CD20 and Lower Thief River





Budget

Implementation Program	Local		State		Federal		NGOs		All Sources	
	Annual	Total	Annual	Total	Annual	Total	Annual	Total	Annual	Total
Projects and Practices[1]	$47,026	$470,026	$92,725	$927,250	TBD	TBD	TBD	TBD	$139,751	$1,397,276
Regulatory[2]	$28,736	$287,360	$34,667	$346,670					$63,403	$634,030
Research and Monitoring	$24,826	$248,260	$780	$7,800					$25,606	$256,060
Education and Outreach	$17,553	$175,530	$1,115	$11,150					$18,668	$186,680
Plan Administration[3]	$19,272	$192,720	$15,429	$154,290					$34,701	$347,010
Capital Improvements[4]	$76,277	$762,277	$25,000	$250,000					$101,277	$1,012,770
TOTAL	**$213,690**	**$2,136,173**	**$169,716**	**$1,697,160**	-	-	-	-	**$383,406**	**$3,833,333**

[1] Projects and Practices Cost Share amount based on current amount for all counties, and includes baseline costs for management practices and structural BMPs

[2] Assumes local fiscal support of local implementation of statutory obligations and ordinances remains unchanged.

[3] Plan administration budgets like current local expenditures by individual counties. Estimated at 10% of annual baseline implementation budget. Does not include staffing for Research and Monitoring; Education and Outreach

[4] Capital Improvement program includes expenditures for operations and maintenance of drainage ditches and impoundments.

Table 5-7: Level 1 Funding Summary

Level 1 Funding Summary	
Program	Total
Projects and Practices[1]	$8,480,189
Research and Monitoring	$531,500
Education and Outreach	$10,000
Capital Improvements[2]	$12,591,393

[1] Projects and Practices Cost Share amount based on current amount for all counties, and includes baseline costs for management practices and structural BMPs

[2] Capital Improvement program includes expenditures for operations and maintenance of drainage ditches and impoundments

* Collaborative grants assumed to be provided to the Thief River Watershed 1W1P as one or more non-competitive implementation block grant

Next Steps

- ❑ Appoint Fiscal Agent and Coordinator
- ❑ Adopt the final plan
- ❑ Finalize the development of 2 year workplan
- ❑ Continuation of Committees
  - ❑ Policy Committee
  - ❑ Advisory Committee
  - ❑ Planning Workgroup