

A Watershed Approach for Water Quality Improvement in Wisconsin's Lakes and Rivers



Stantec

Erik Joost

Watershed Manager
City of Oconomowoc

Sarah Majerus

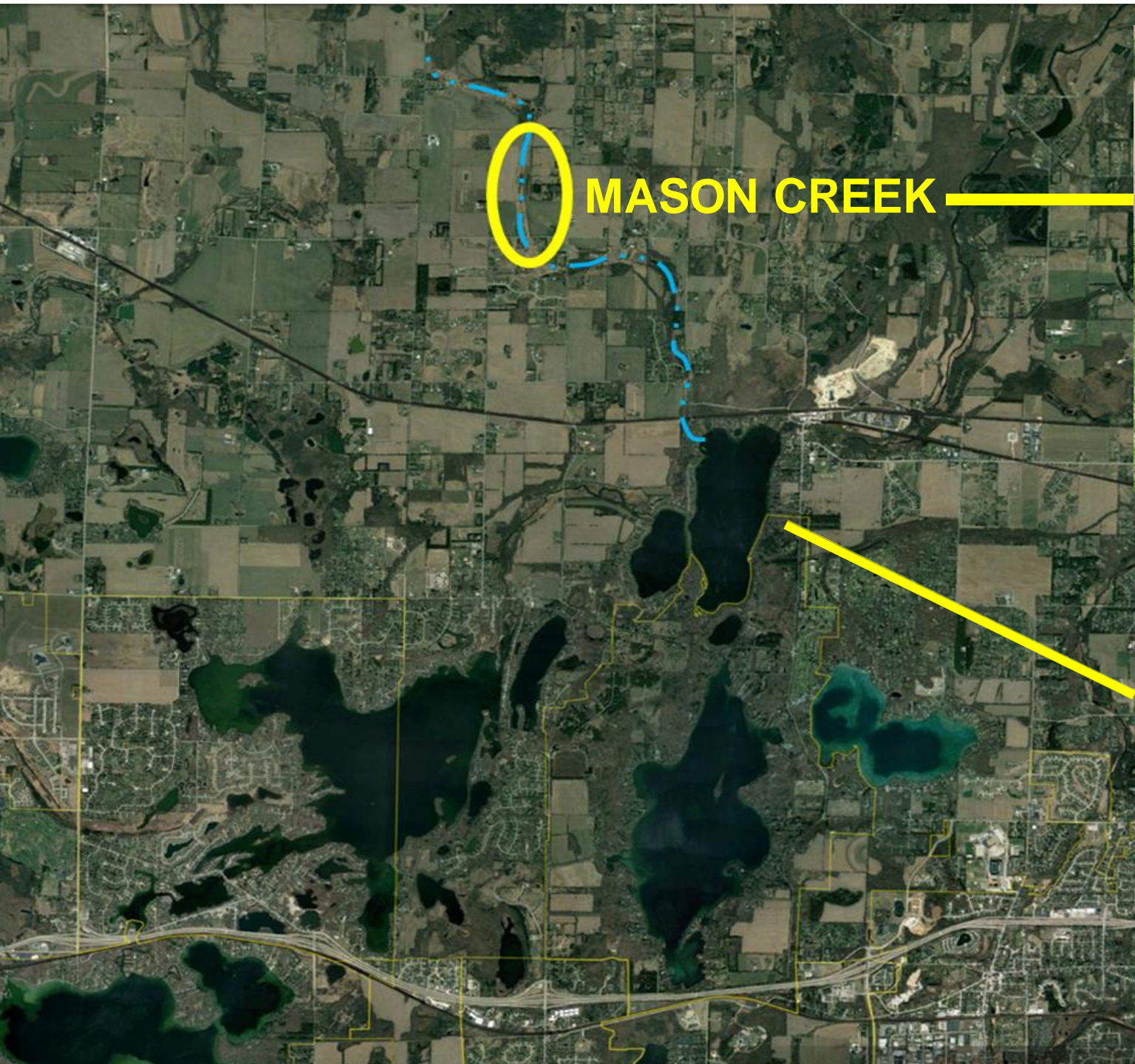
Senior Scientist

Stantec

Partnerships Make It Happen







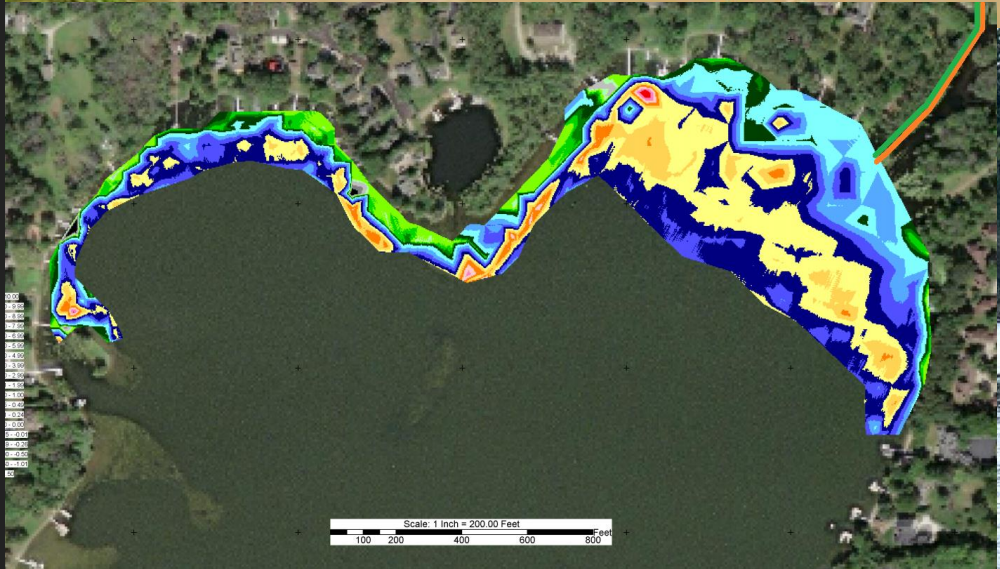
MASON CREEK

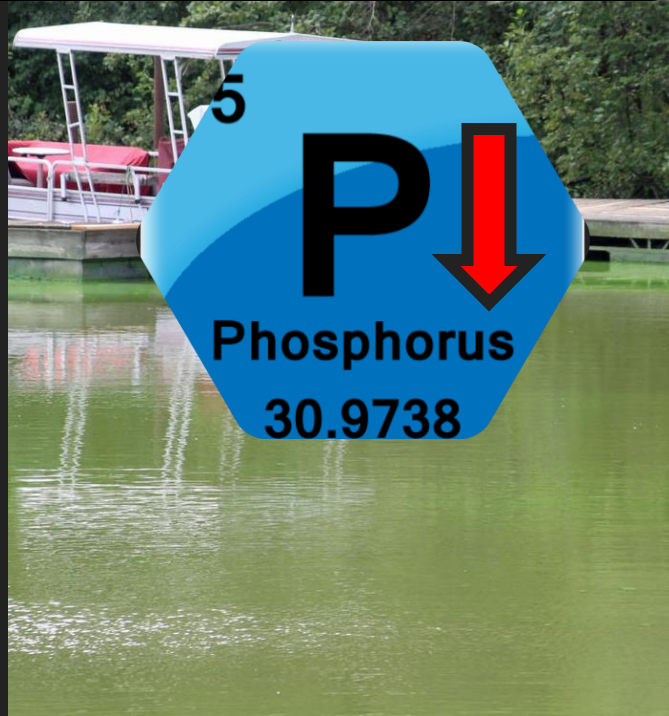


North Lake



Excessive sediment load being transported to North Lake





**Adaptive
Management**



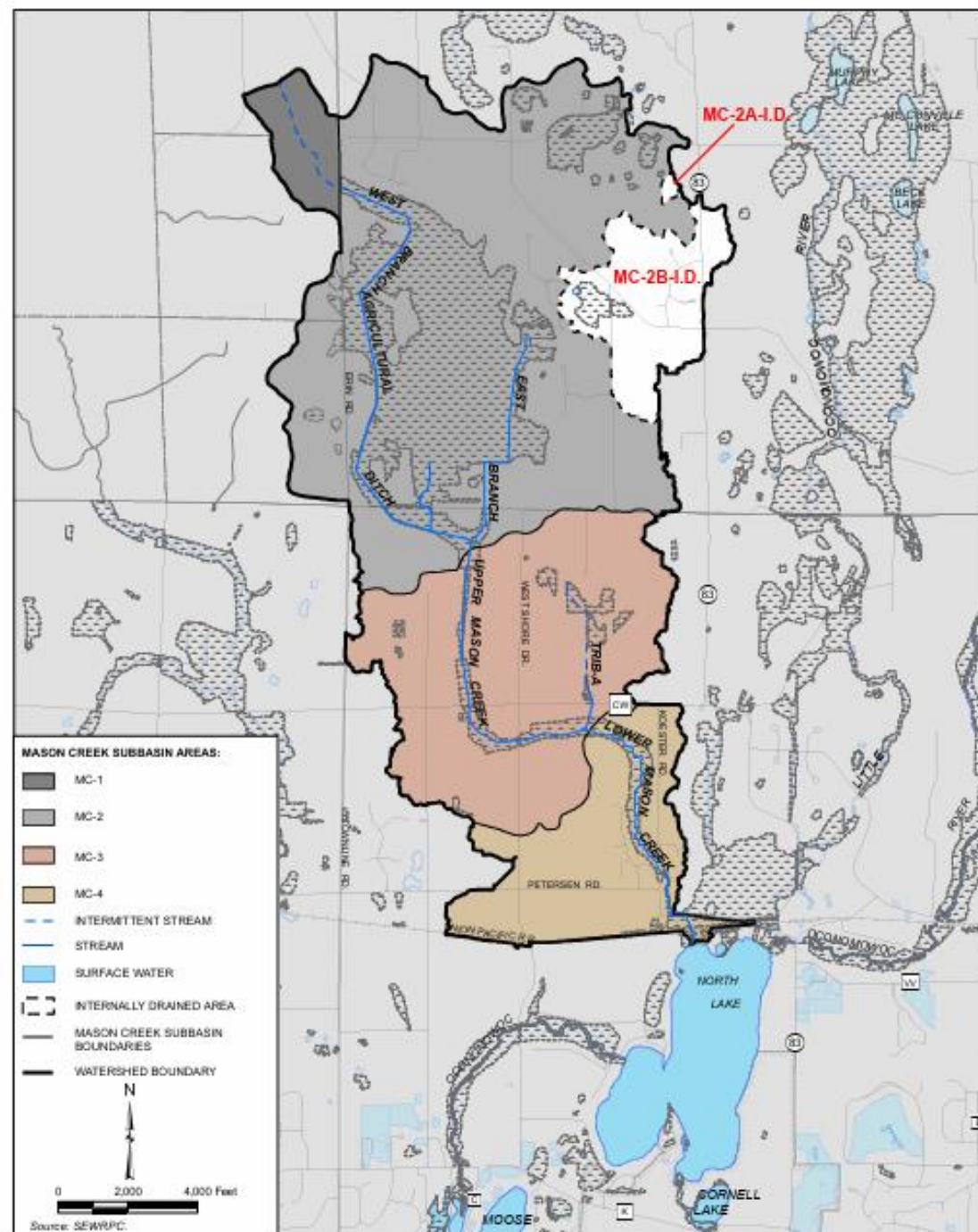
City of Oconomowoc opting to participate in Adaptive Management created the **Oconomowoc Watershed Protection Program**

The Goal:

To **reduce nonpoint source pollution** from urban storm water, construction sites, and agricultural land to improve water quality.

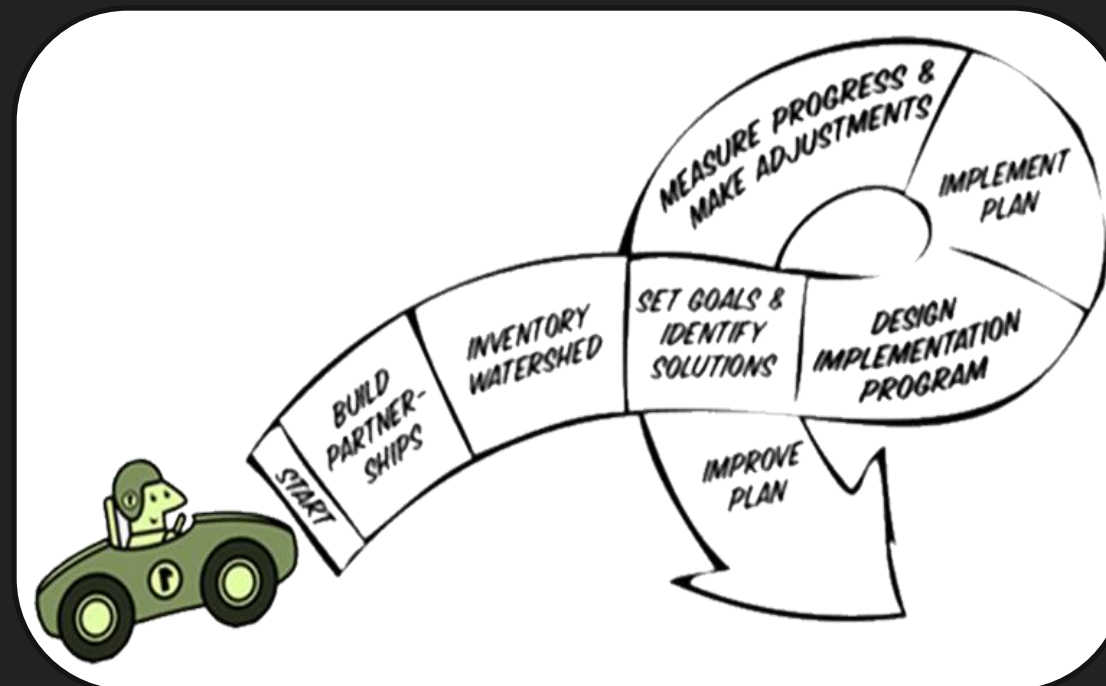
The Result:

The **program will improve** soil health throughout the watershed, reduce algal blooms, enhance local wildlife habitat and ecology, and control excessive aquatic plant growth.



Mason Creek Watershed Protection Plan

- Southeastern Wisconsin Regional Planning Commission, 2018
- EPA 9-Key Element Plan



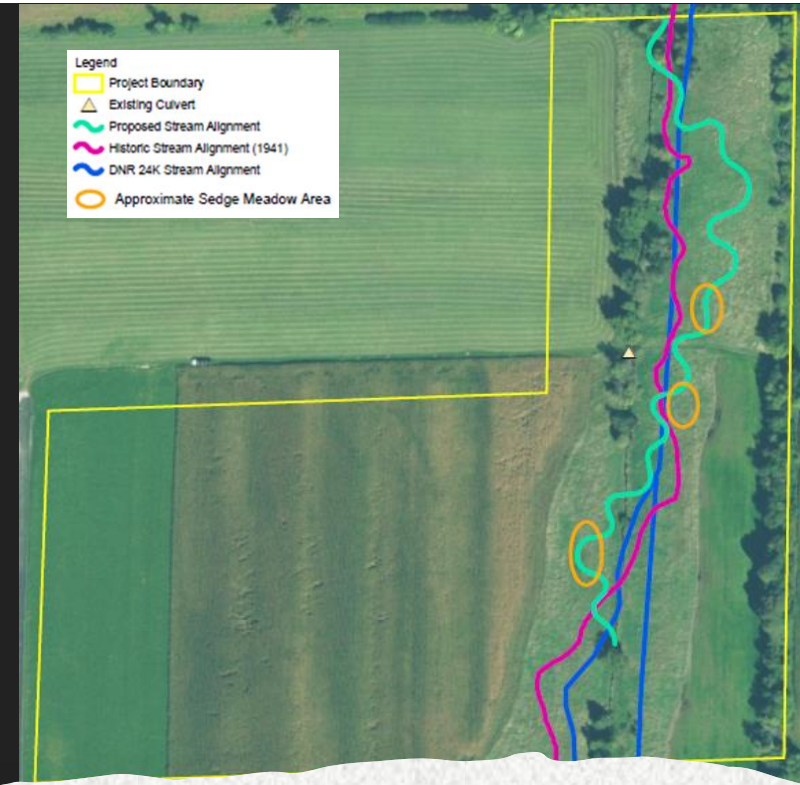
Mason Creek Project Goals

- Strengthen partnerships
- Reduce nutrient loading
- Improve floodplain connectivity
- Enhance fishery
- Restore degraded riparian habitat
- Remove barriers



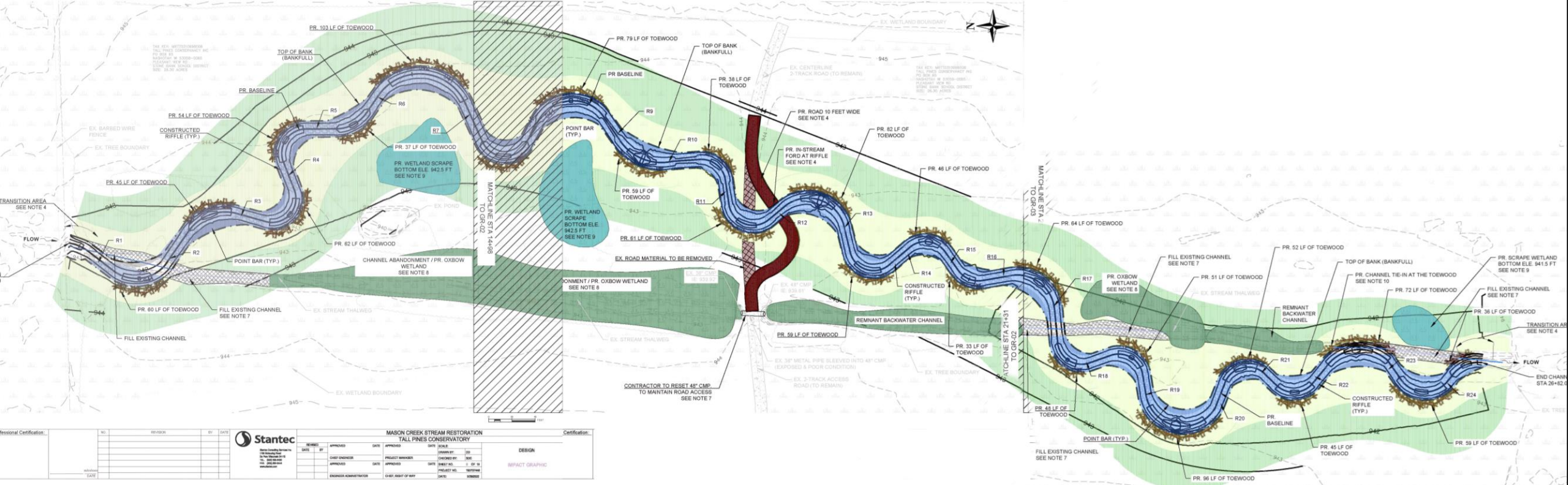
Target Annual Nonpoint Source Load Reduction Goals for Mason Creek:

92% or 5,355 (lbs)
Total Phosphorus and
93% or 883 (tons)
Total Suspended Solids



Mason Creek Pre-Construction

- High sediment & phosphorus loading
- Channelized stream reach, likely excavated
- Adjacent buffers in progress



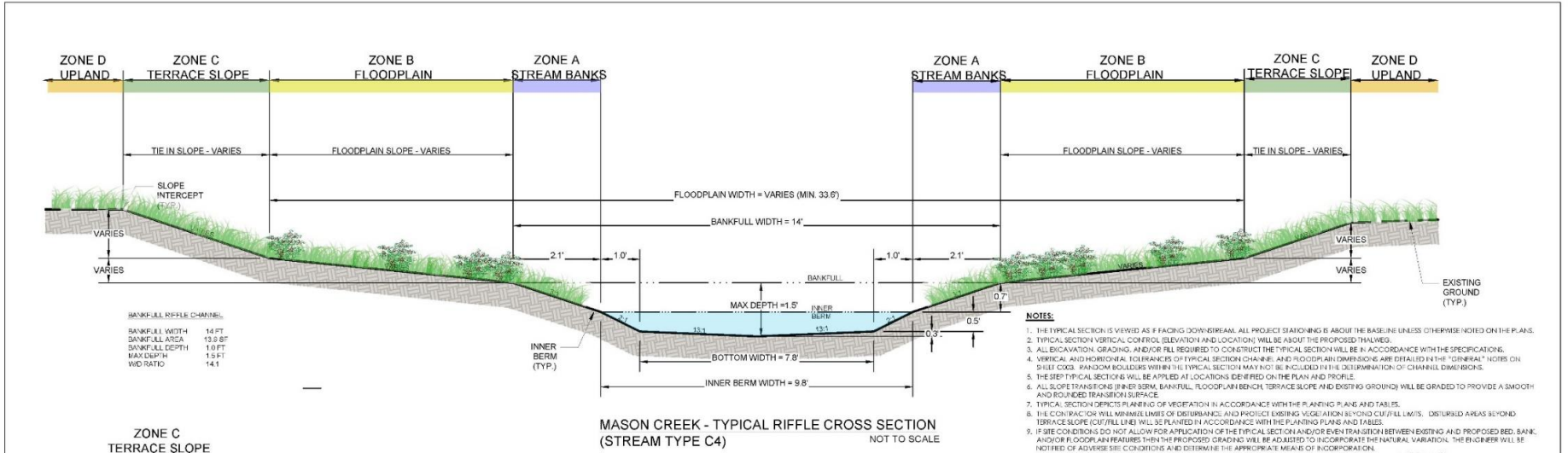
Design for Water Quality

- Abandon existing channel
- Stream realignment to low-gradient, meandering, riffle-pool-run-glide stream
- Vegetated banks (toe wood and sod mats)
- Wetland scrapes
- Floodplain connectivity

After →

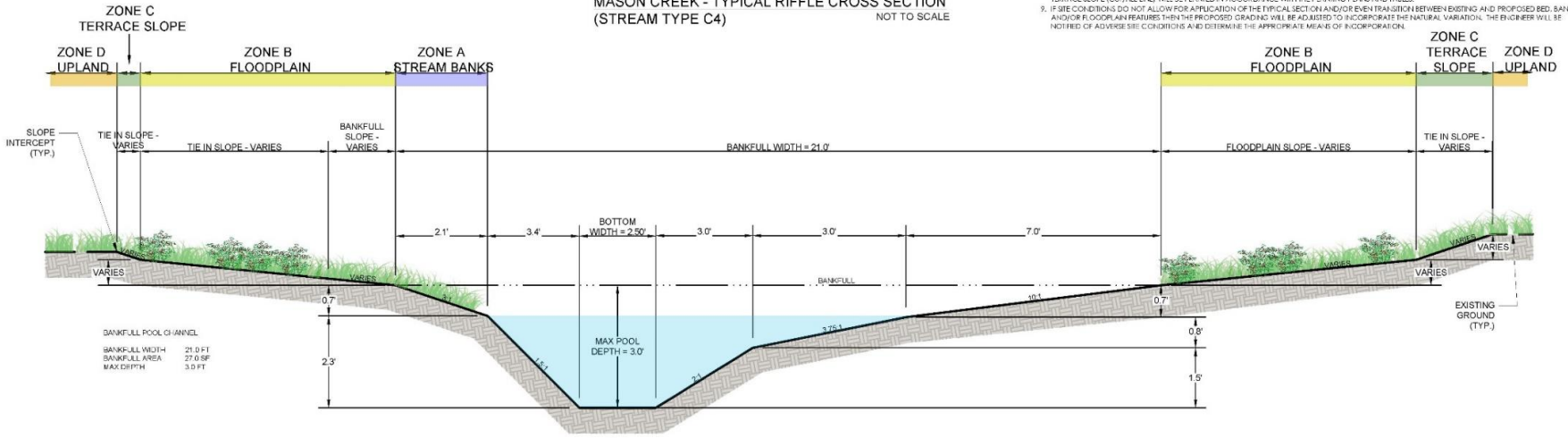
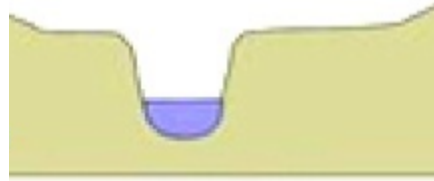
Typical Sections

Before →



- NOTES**
1. THE TYPICAL SECTION IS VIEWED AS IF FACING DOWNSTREAM. ALL PROJECT STATIONING IS ABOUT THE BASELINE UNLESS OTHERWISE NOTED ON THE PLANS.
 2. TYPICAL SECTION VERTICAL CONTROL (ELEVATION AND LOCATION) WILL BE ABOUT THE PROPOSED THALWEG.
 3. ALL EXCAVATION, GRADING, AND/OR FILL REQUIRED TO CONSTRUCT THE TYPICAL SECTION WILL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
 4. VERTICAL AND HORIZONTAL TIE BANKS OF TYPICAL SECTION CHANGE AND PROPORTIONAL DIMENSIONS ARE DEALT WITH IN THE "CORRECTION" NOTES ON SHEET C603. RANDOM Boulders WITHIN THE TYPICAL SECTION MAY NOT BE INCLUDED IN THE DETERMINATION OF CHANNEL DIMENSIONS.
 5. THE SHIP TYPICAL SECTION WILL BE APPLIED AT LOCATIONS DETERMINED ON THE PLAN AND PROFILE.
 6. ALL SLOPE TRANSITIONS (INNER BERM, BANKFULL, FLOODPLAIN, TERRACE SLOPE AND EXISTING GROUND) WILL BE GRADED TO PROVIDE A SMOOTH AND ROUNDED TRANSITION SURFACE.
 7. TYPICAL SECTION DEPICTS PLANTING OF VEGETATION IN ACCORDANCE WITH THE PLANTING PLAN AND TABLE.
 8. THE CONTRACTOR SHALL MINIMIZE UNNECESSARY DISTURBANCE TO EXISTING VEGETATION BEYOND CUT/FILL LIMITS. DISTURBED AREAS BEYOND TERRACE SLOPE (CUT/FILL LINE) WILL BE PLANTED IN ACCORDANCE WITH THE PLANTING PLAN AND TABLE.
 9. IF SITE CONDITIONS DO NOT ALLOW FOR APPLICATION OF THE TYPICAL SECTION AND/OR EVEN TRANSITION BETWEEN EXISTING AND PROPOSED BED, BANK AND/OR FLOODPLAIN REQUIRES THEN THE PROPOSED GRADING WILL BE ADJUSTED TO INCORPORATE THE NATURAL VARIATION. THE ENGINEER WILL BE NOTIFIED OF ADVERSE SITE CONDITIONS AND DETERMINE THE APPROPRIATE MEANS OF INCORPORATION.

MASON CREEK - TYPICAL RIFFLE CROSS SECTION (STREAM TYPE C4) NOT TO SCALE



MASON CREEK - TYPICAL POOL CROSS SECTION (STREAM TYPE C4) NOT TO SCALE

File Path: \usr\bin\dwg\proj\307\civil\887074\04.dwg Date: 08/26/2021 12:29pm

Professional Certification	NO.	REVISION		BY	DATE

SEAN D. COLLINS
E-37326-S
STATE OF WISCONSIN
REGISTERED PROFESSIONAL ENGINEER

DATE: 08/26/2021

Stantec
Sustainable. Collaborative. Data-driven.
1000 S. University Road
Omaha, Nebraska 68106
TEL: (402) 552-8100
FAX: (402) 552-8111
www.stantec.com

MASON CREEK STREAM RESTORATION						TALL PINES CONSERVATORY					
REVISED	APPROVED	DATE	APPROVED	DATE	SCALE	DESIGN					
	BY					TYPICAL SECTION & PLANTING PLANS C600					
	CHEF ENGINEER		PROJECT MANAGER		DRAWN BY: DD						
	APPROVED		APPROVED		SHEET NO. 15 OF 18						
	ENGINEER ADMINISTRATOR		CHEF, RIGHT OF WAY		PROJECT NO. 189707448 DATE: 2/1/2021						

Riffle Section

(view during
construction,
prior to channel
activation)





Watershed Approach to Construction

- Stakeholder Participation
- Weekly Meetings & Water Quality Monitoring
- Adaptive Erosion Control to Address Rain Events & Active Spring Activity

Construction
Solutions

Lots of Water!



Construction Solutions

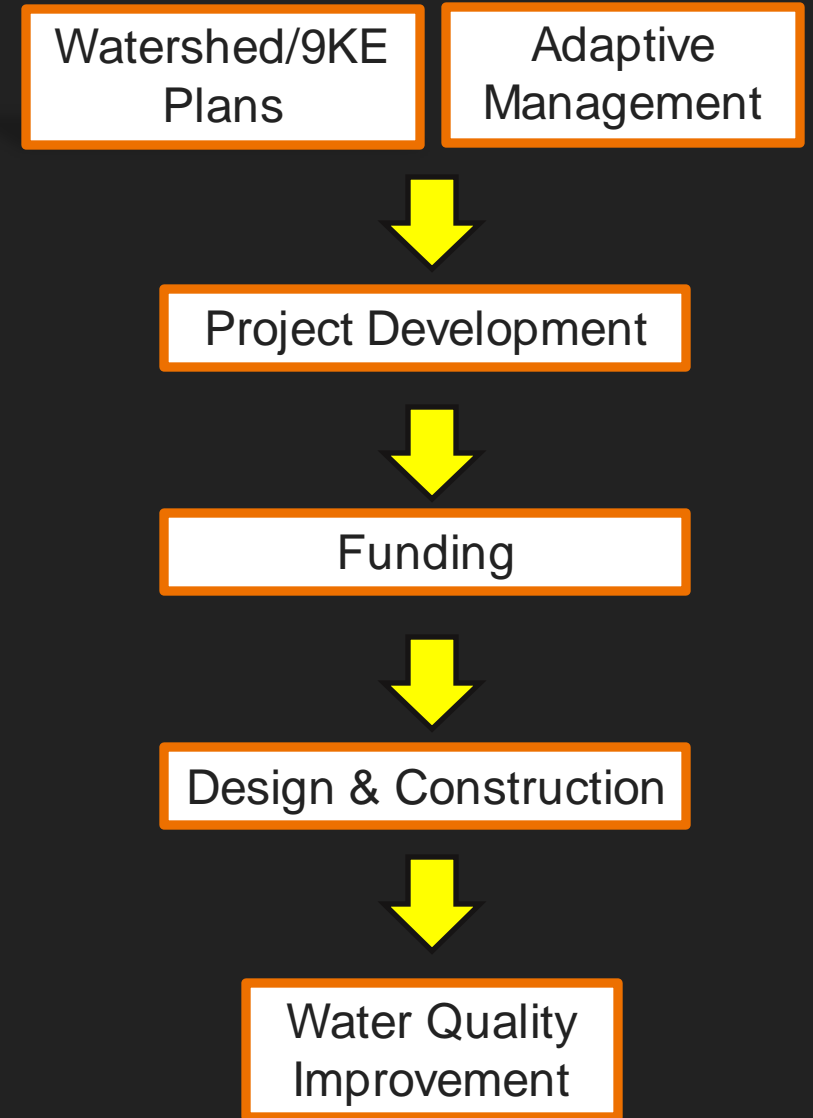
Adaptive Approach to Erosion Control



Lessons Learned



- Identify project goals for all partners
- Early engagement of technical advisors & funding agencies
- Maintain open communication with agency staff (County, Town, FEMA)
- Weekly construction meetings
- Water quality monitoring for community outreach
- Contingency plans for high water and erosion control



Next Steps & Outcomes

- **Monitoring by TPC & OWPP**

IMPROVED BIOTICS

Return of Native Macroinvertebrates
Establishment of Native Macrophytes
Higher Oxygen Levels

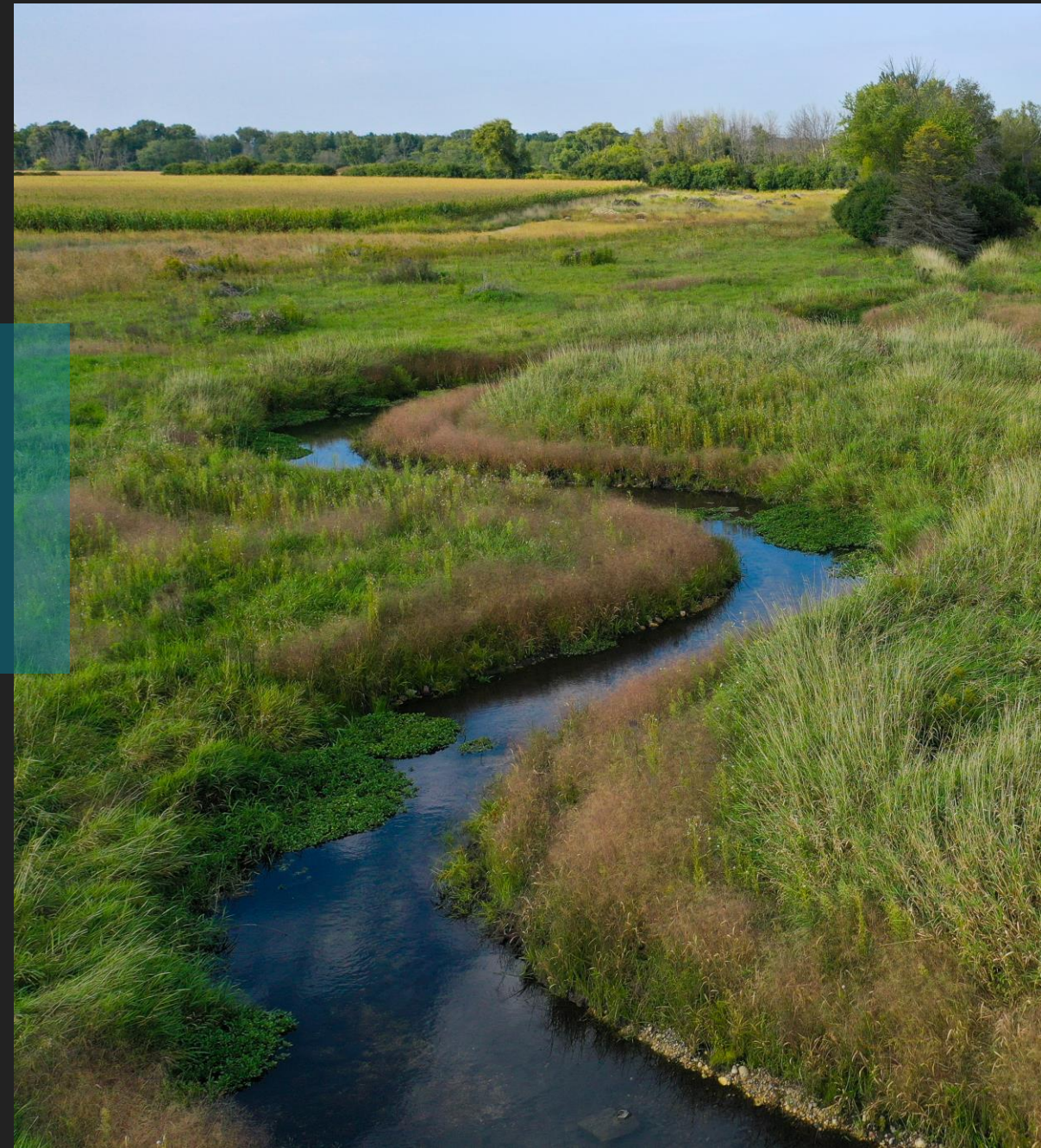
IMPROVED WATER QUALITY

Water Clarity
Reduced Sedimentation
Reduced Phosphorous

IMPROVED HABITAT

Improved Trout Habitat
Native Prairie and Wetland Restoration
Observed Fauna/Flora

- **Community Exposure**
- **Document & Share Success!**



An aerial photograph of a winding river in a snowy, mountainous landscape. The river flows through a valley, with snow-covered hillsides and patches of brown vegetation. The river's path is clearly visible, curving through the terrain. The bottom right corner of the image is overlaid with a semi-transparent blue rectangle containing text.

THANK YOU

Sarah Majerus, PWS – Senior Scientist – Stantec

Sarah.majerus@stantec.com

Erik Joost – Watershed Manager - OWPP

ejoost@oconomowoc-wi.gov