

# Yahara WINs

Rock River Recovery

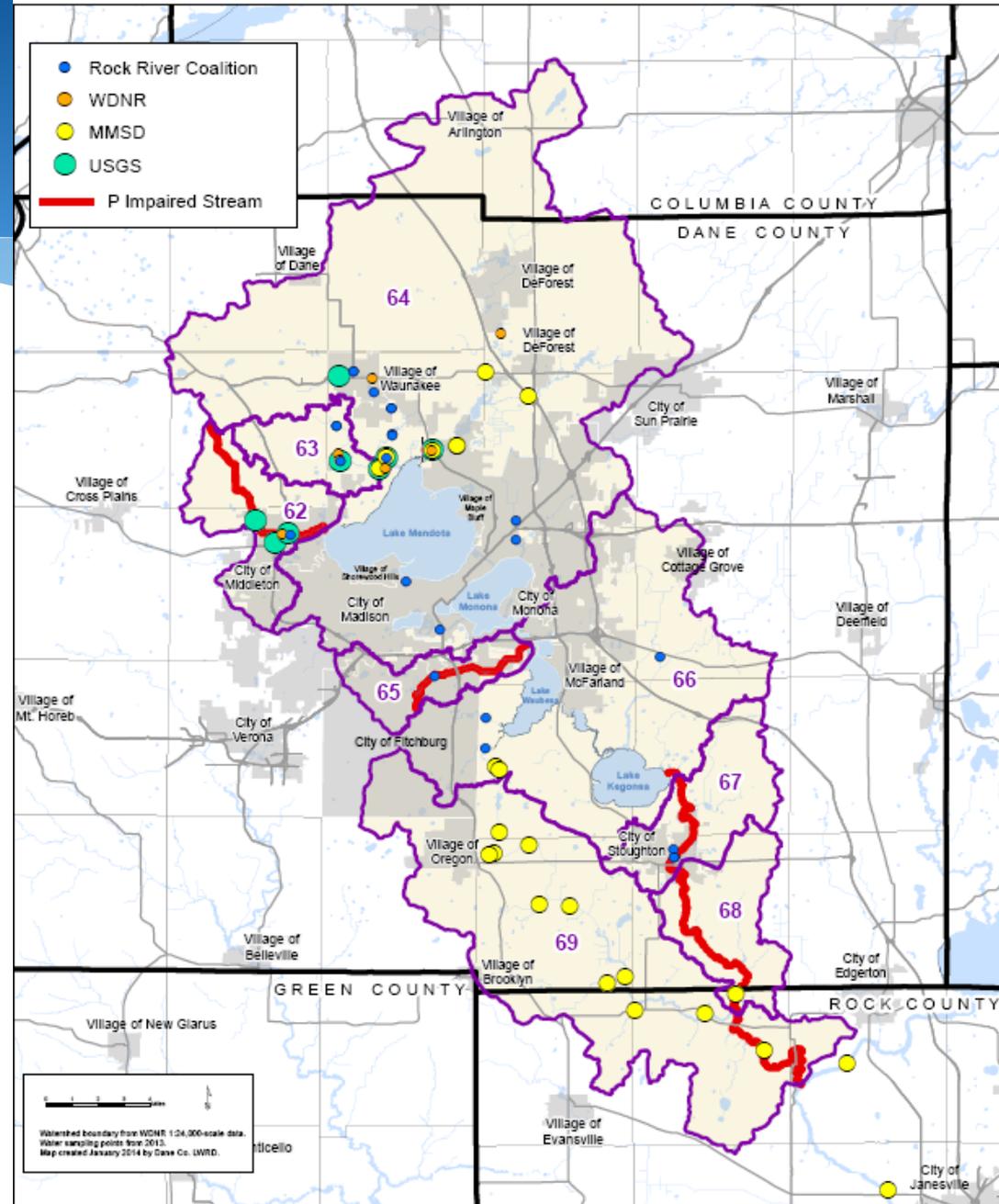
February 7, 2014

# Yahara River Basin

- \* Focus of many previous efforts:
  - \* Well studied and understood watershed
  - \* Various improvement efforts
  - \* Lake Mendota Priority Watershed Project,” -2008
  - \* 9000+ acres of practices since 2008
- \* Part of Rock River TMDL
  - \* Impaired Reaches
  - \* Sediment and Phosphorus

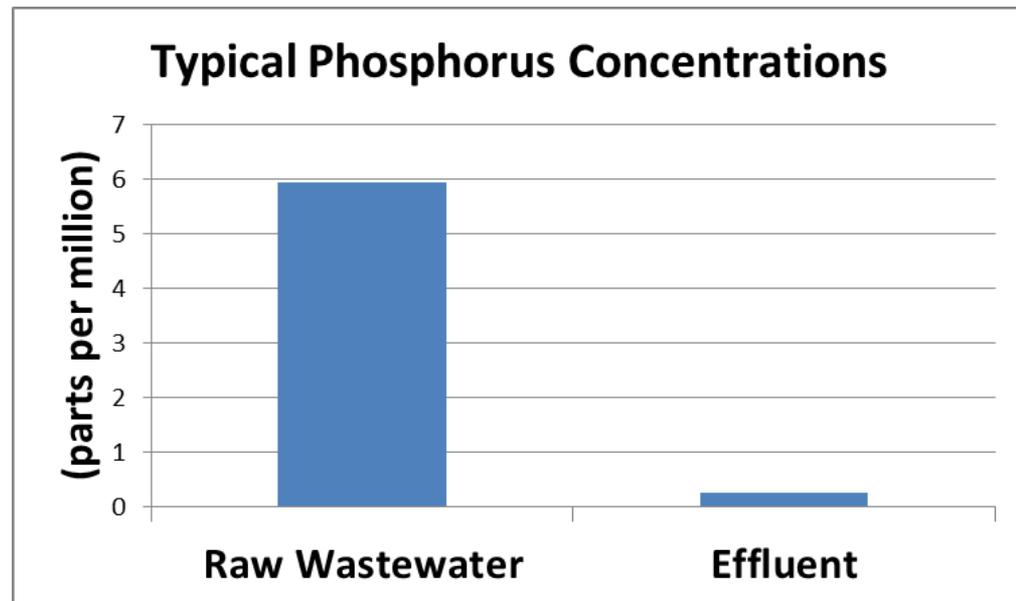
## Active Surface Water Sampling Sites with Water Chemistry\*

\*Active indicates that sites have been sampled for water chemistry at least once in the last two years

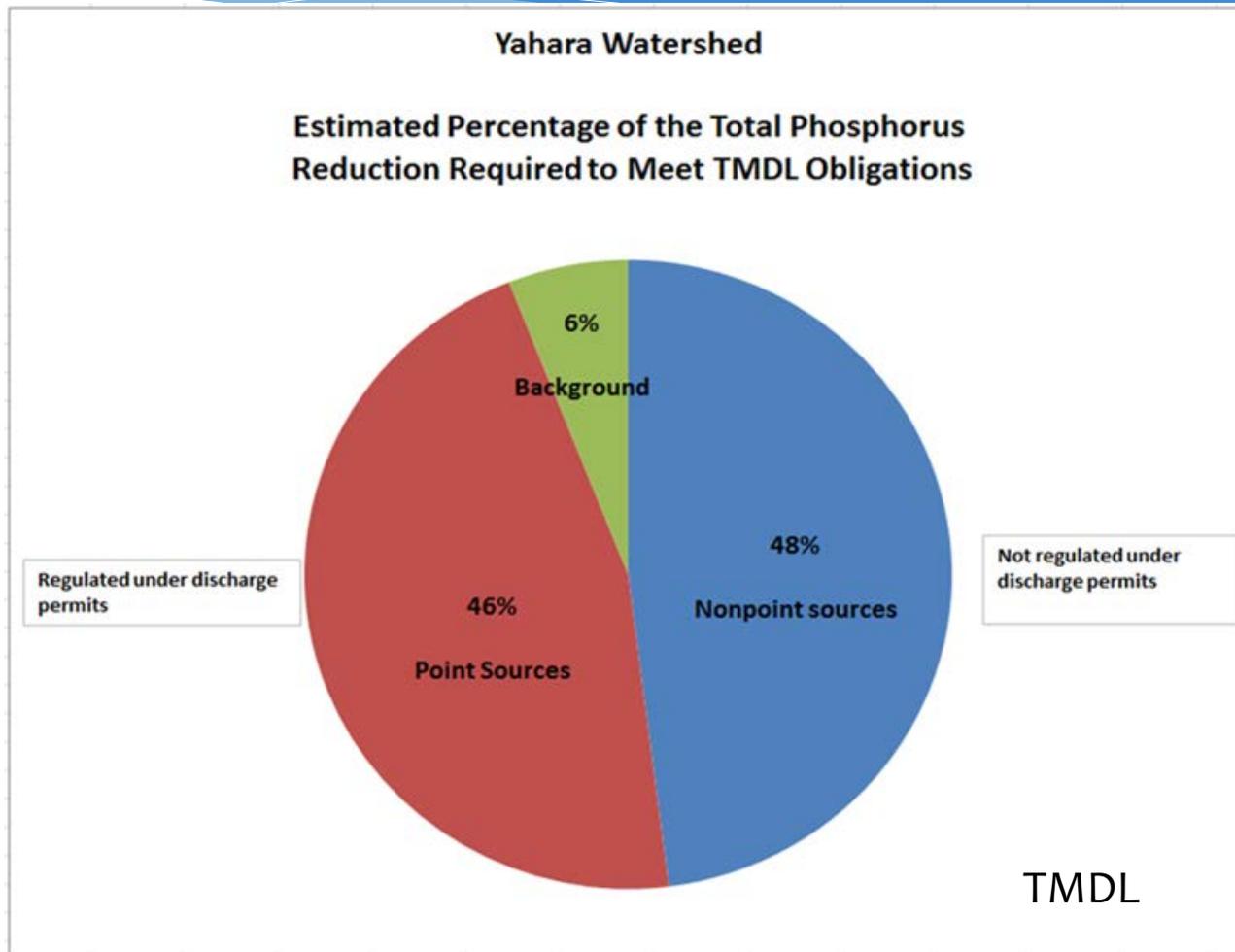


# Existing Treatment - MMSD

- ❖ MMSD achieves > 95% Removal
- ❖ New regulatory obligations require further reductions in watershed
  - ❖ 50% - 70% further reduction in load
  - ❖ Filtration - \$79-124 million
  - ❖ Other options: Trading, AM
- ❖ WQC more restrictive than TMDL



# Reductions req'd from all sources



# The Adaptive Mgt Difference

- \* Driven by Regulation
  - \* WPDES permit compliance
- \* Requires working together in the watershed
  - \* Partners
- \* Funding resources without as many “strings”
  - \* Allows innovation
- \* Low-cost mix of urban and rural practices
  - \* Partnerships
- \* Focus on water quality improvement
  - \* Monitoring

# Yahara WINS – Pilot Project

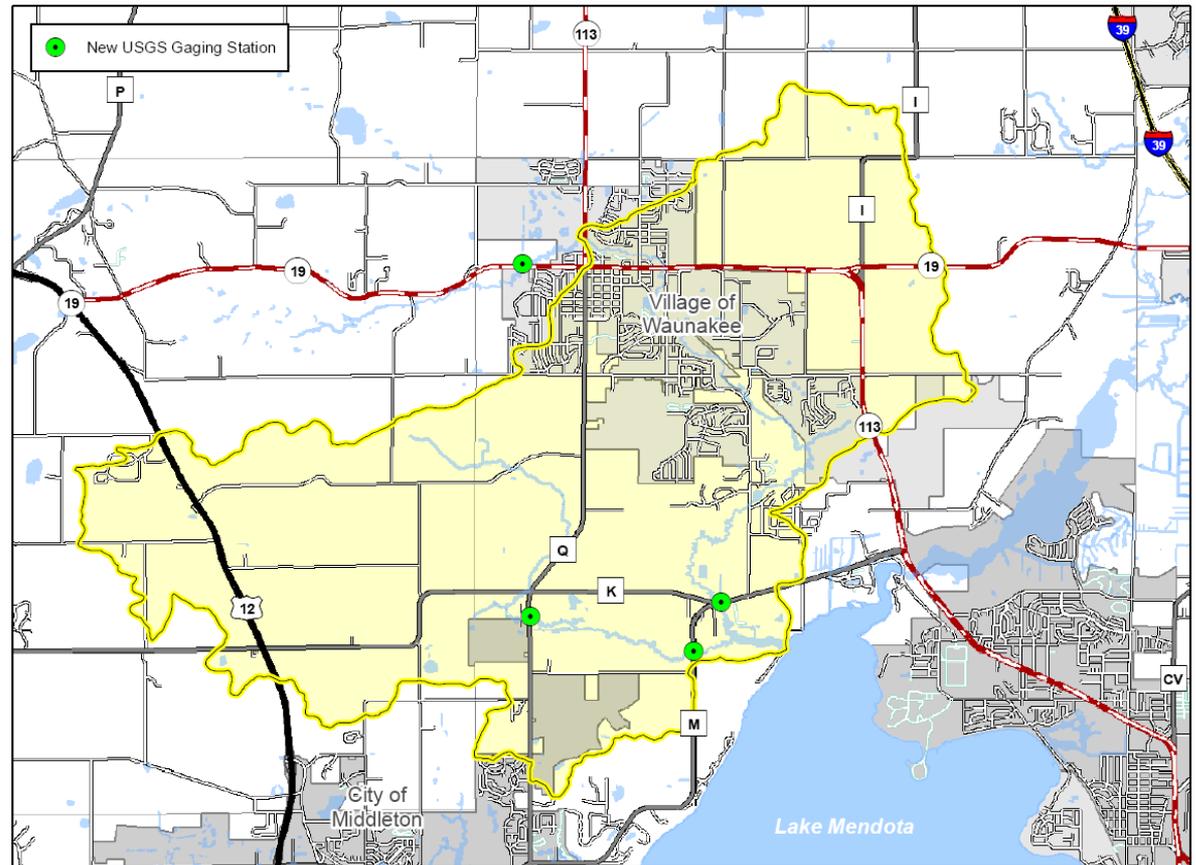
- \* Test Watershed Adaptive Management
- \* Reduce inputs of **Phosphorus** and **Total Suspended Solids** to the Yahara River Basin through the low-cost mix of practices to implementing the Rock River TMDL and meet water quality standards.

# Pilot Project Organization

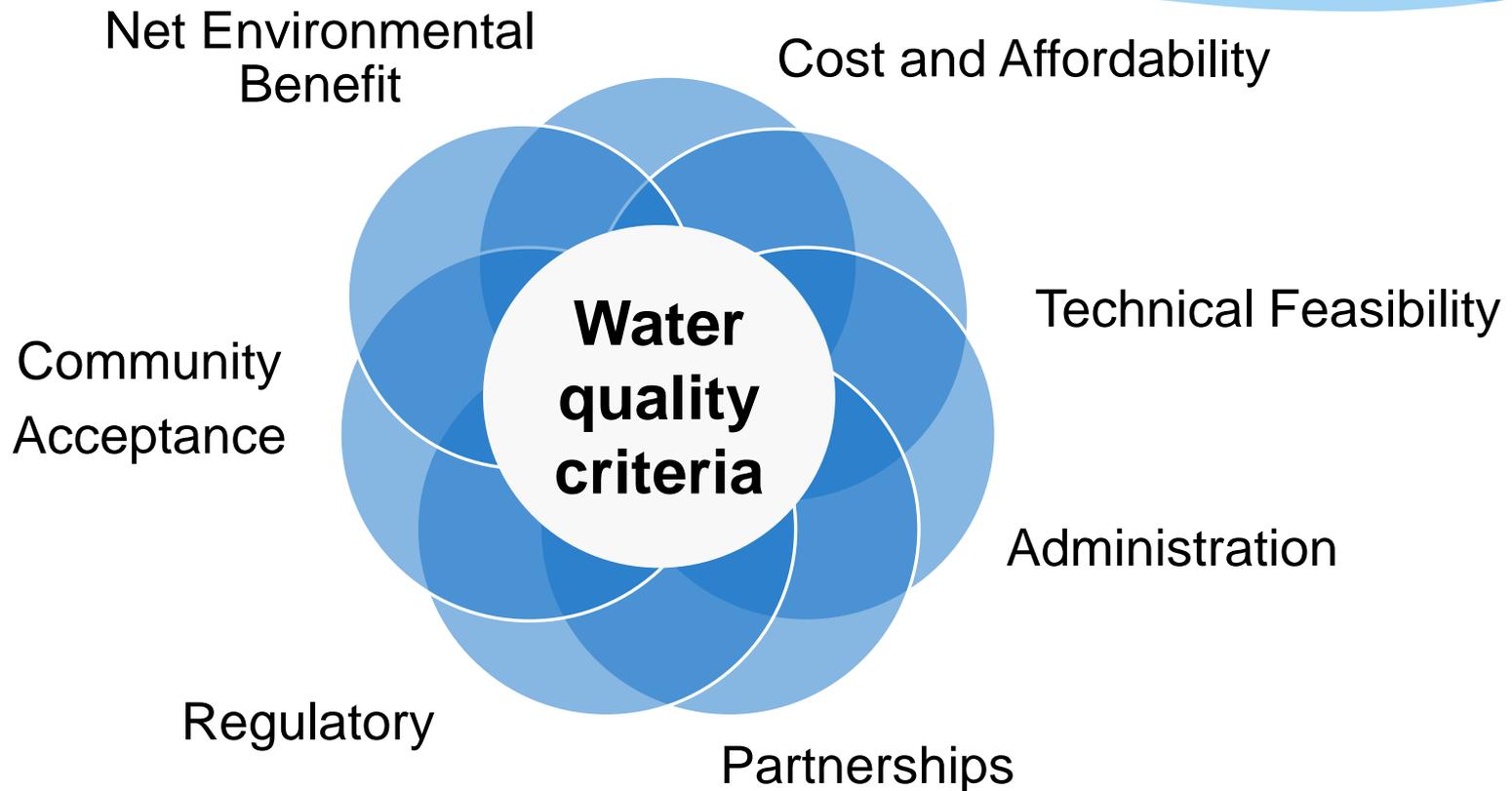
- \* Purpose: Layout framework for AM Pilot in Yahara Basin
- \* Administration:
  - \* Project guided by SPW and Ex Com.
  - \* Broker: Dane Co. Land Conservation
- \* Financing:
  - \* Partners invoiced in 2013, 2014, 2015 proportional to P reduction required after subtracting out additional funding sources
  - \* Other funding from USGS, Sand County Foundation, MRBI, Clean Wisconsin, Clean Lakes Alliance and others.

# Pilot Project

- \* Improve tools/tool box
- \* Monitoring/verification
- \* Lay foundation to transition to full scale



# What Does Success Look Like?

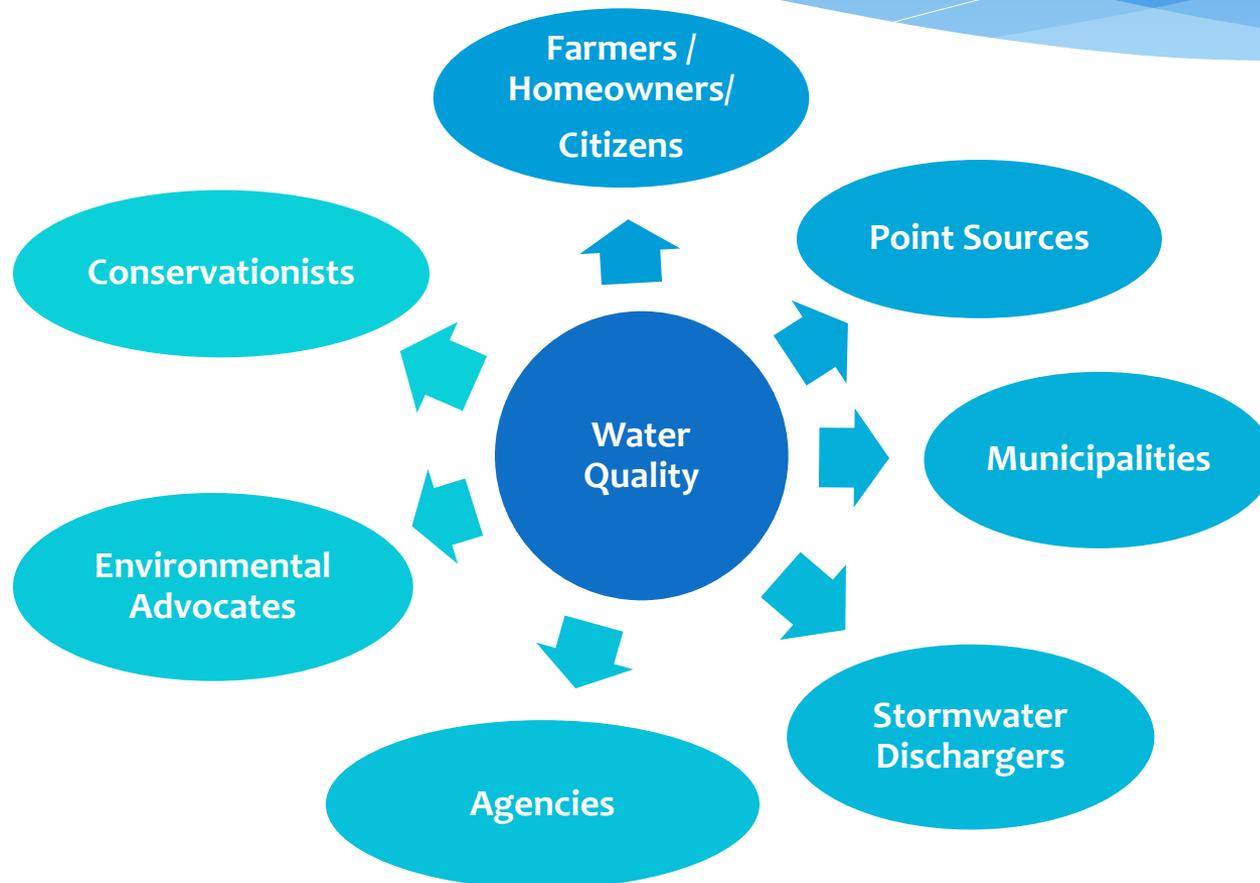


# Comprehensive Cooperation

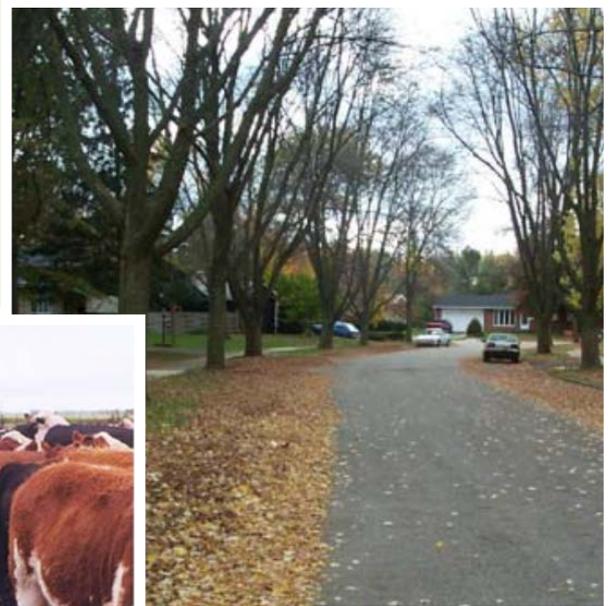
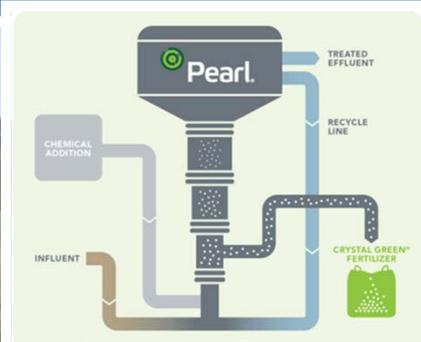
## Current Participants

<b>Towns</b>	<b>Villages</b>	<b>Cities</b>	<b>Other</b>
Blooming Grove	Arlington	Fitchburg	Clean Lakes
Bristol	Cottage Grove	Madison	Alliance
Burke	DeForest	Middleton	Clean Wisconsin
Cottage Grove	Maple Bluff	Monona	MG&E
Dunn	McFarland	Stoughton	MMSD
Westport	Oregon		Sand County
Windsor	Shorewood		Foundation
Middleton	Hills		Stoughton Utilities
	Waunakee		USGS
			Yahara Pride
			Wisconsin DNR

# Working together brings challenges



# Partnerships Focus Resources

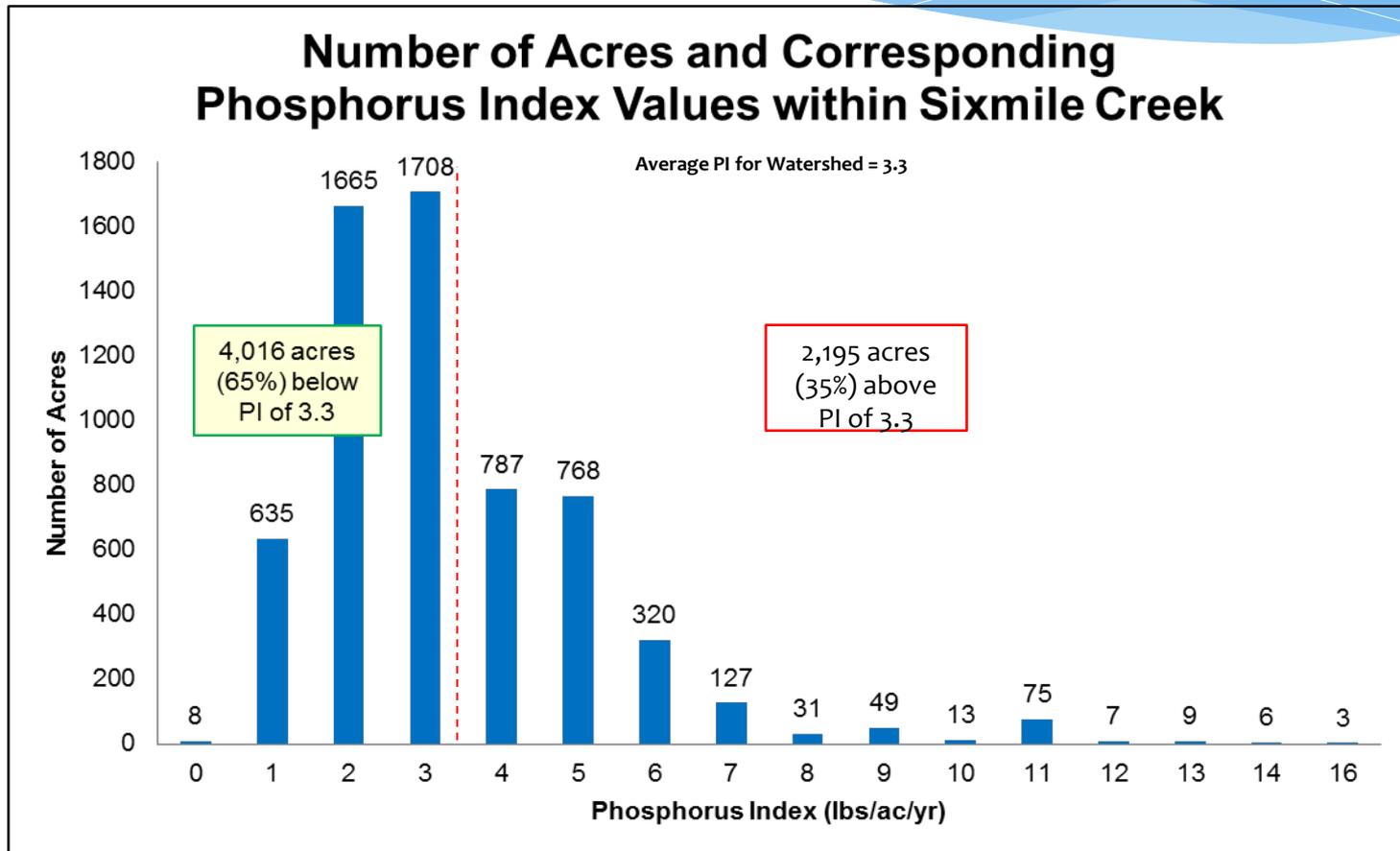


# Work Plan - Purpose

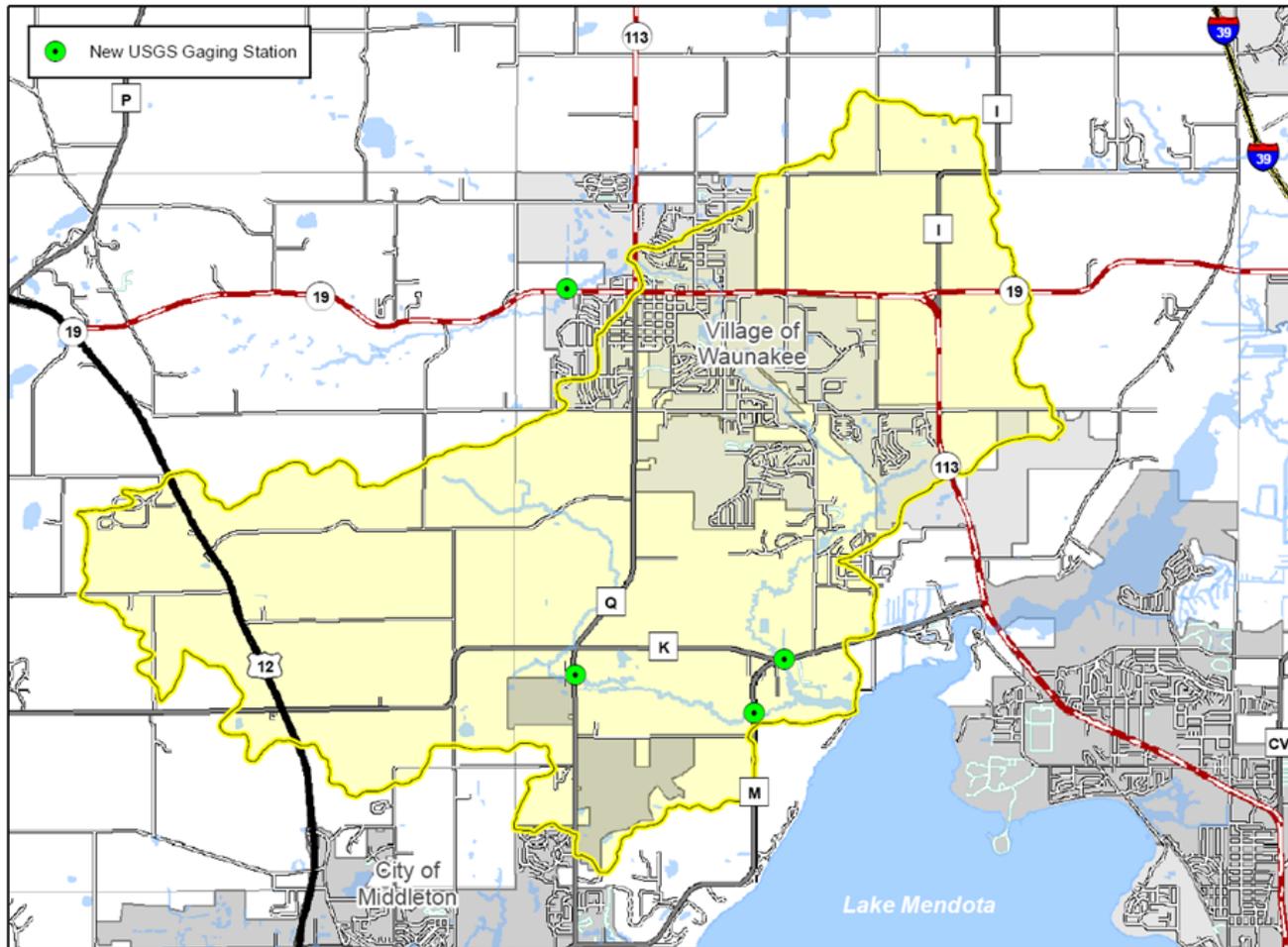
Guide us to cost-effective phosphorus reducing practices:

- \* Baseline phosphorus loads
- \* Defining the procedures that will be used to inventory nonpoint sources of phosphorus in the pilot project area
- \* Identifying and targeting high priority areas
- \* Implementing phosphorus reduction practices
- \* Verifying the effectiveness of those practices.

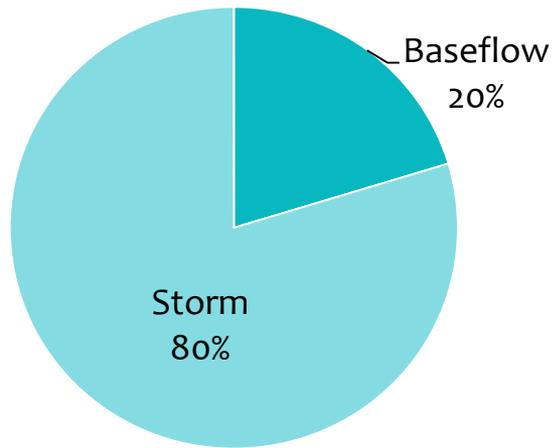
# Preliminary Inventory Results



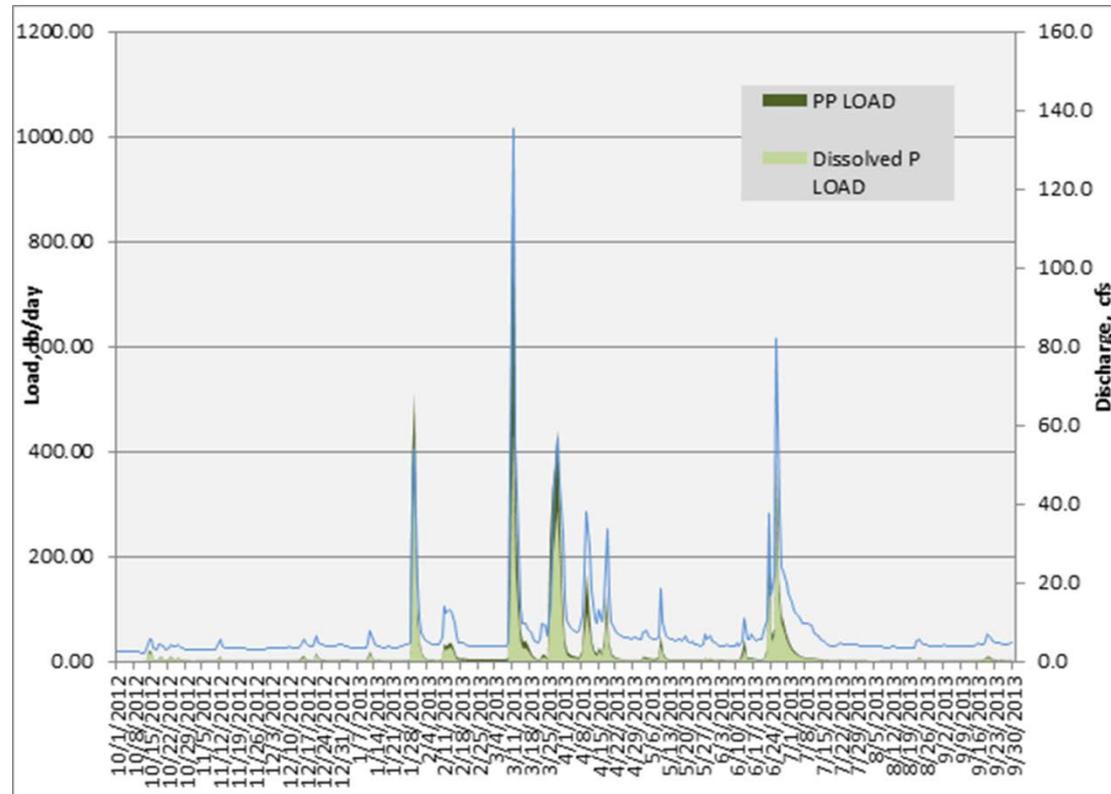
# Water Quality Monitoring



# Total Phosphorus – 1 Subbasin

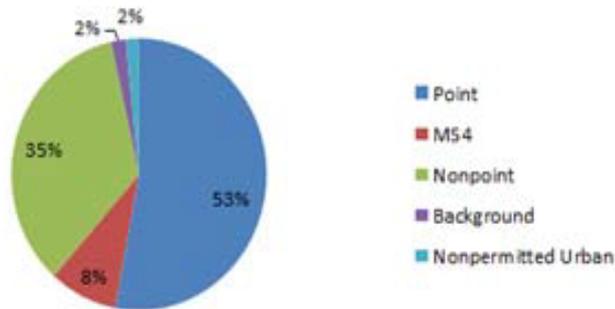


TP (lbs/acre)	
Baseflow	0.27
Storm	1.05
<b>Total</b>	<b>1.32</b>

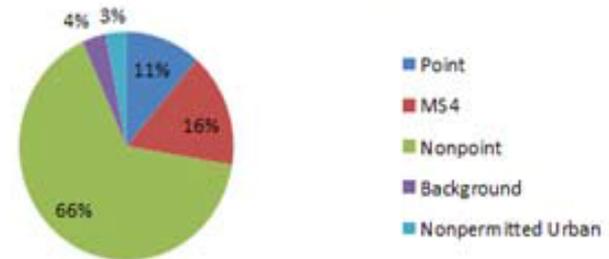


# Updated Baseline

Load Reduction as Percentage of Total With No Adjustment to Baseline



Load Reduction as Percentage of Total With Adjustment of Point Source Baseline Only



# USDA/NRCS-MRBI

- \* Dane County was awarded a \$1.3-million Mississippi River Basin Healthy Watersheds Initiative grant to implement practices in the Pilot Watershed.
- \* Complements two existing MRBI watersheds



# UW-Soils: USDA/NRCS CIG Grant

- \* More accurate assessment of contributions of snowmelt runoff and winter manure applications
- \* 4 fields monitored.
- \* Estimate annual P delivery to streams from winter and spring thaw events
- \* Inform existing models.



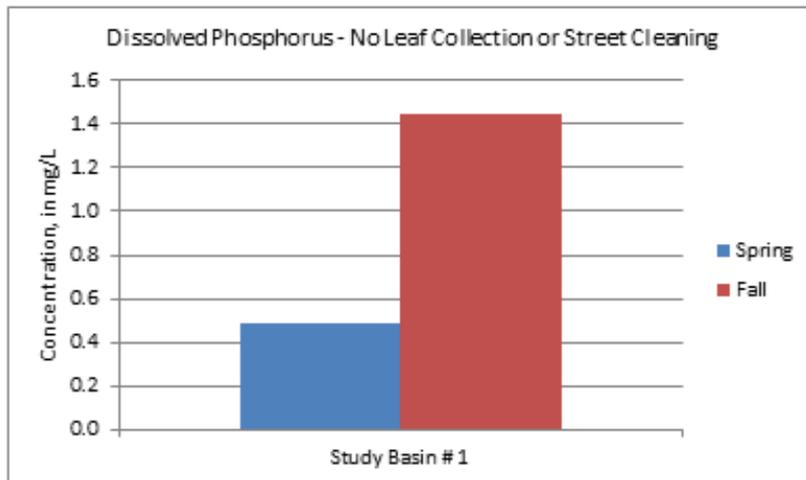
# UW- Soils: P-runoff

- \* Night Pastures, barnyards, exercise lots
  - \* Lead to more accurate assessment and ranking of the phosphorus loading
    - \* One concrete
    - \* Two soil
  - \* Monitoring for P, N, TSS
  - \* Update/improve models



# USGS, DNR, City of Madison, Fund for Lake MI, Yahara WINs

- \* Leaf management practices
  - \* Paired-basin study
  - \* Water quality monitored
  - \* Solids collected/weighed
  - \* Inform policy and existing models.



USGS photo

# Yahara Pride

- \* 300 Acres – Vertical Manure Injection
- \* 80 acres vertical tillage
- \* 200 acres strip tillage
- \* 2375 acres cover crop
- \* Working with UW-Soils, UW-Extension to determine phosphorus reductions



# 2013 Yahara Pride Farms Fall Field Demonstration Days

Nearly 200 producers came out to the fields to check out the new technologies available in the watershed

# 2013 Fall Field Demonstration Days

## All technologies shown:

- Work to protect topsoil
- Reduce nutrient runoff
- Improve soil & water quality



# 2013 Fall Field Demonstration Days

**New, cutting-edge technologies!**

**Attendees got a first-hand look at:**

Vertical Manure Injection

Strip Tillage

Vertical Tillage

Cover Crop Plot Demonstration



# Vertical Manure Injection

- High speed spreading in all types of residue
- Minimal soil disturbance
- Reduces orders
- Maximizes nutrients
- Lower tillage costs





# Strip Tillage

- One trip tillage
- Saves time & fuel
- Faster soil warming in spring
- Optional nitrogen application
- Maximizes soil moisture



# Vertical Tillage

- Maximizes root development
- Increases soil moisture
- Increases soil stability
- Maintains surface residue
- One trip tillage



# Cover Crop Test Plot



# Cover Crop Test Plot

- 9 species
- 4 planting dates
- No-till planting method



# Cover Crop Test Plot

## Planting Dates

The cover crop species and mixes are:

Cereal rye

Annual ryegrass

Oats

Barley

Cereal rye/ Tillage Radish™

Barley/ Tillage Radish™

Cereal rye/Barley

Cereal rye/ Austrian pea/ Tillage Radish™

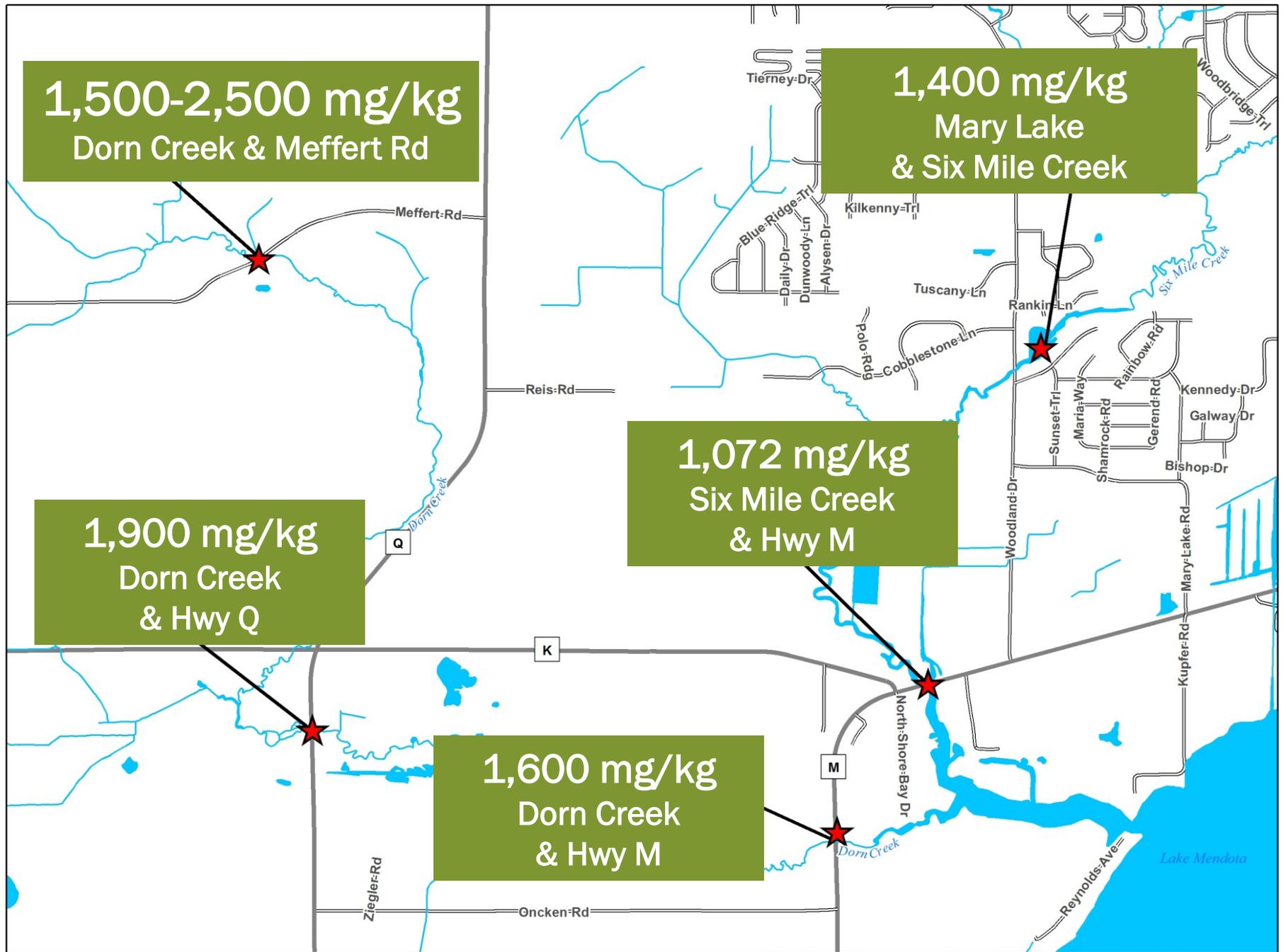
### **Planting dates:**

- September 9
- September 23
- September 30
- October 10

# UW-Nelson Institute -WRM

- \* Year long – graduate team research project
- \* Found high phosphorus and sediment concentrations
- \* Identified mitigation options – including floodplain restoration and dredging.





Total Phosphorus and Channel Sediment Results - Overview Map

# Further Investigate Dredging at bridges

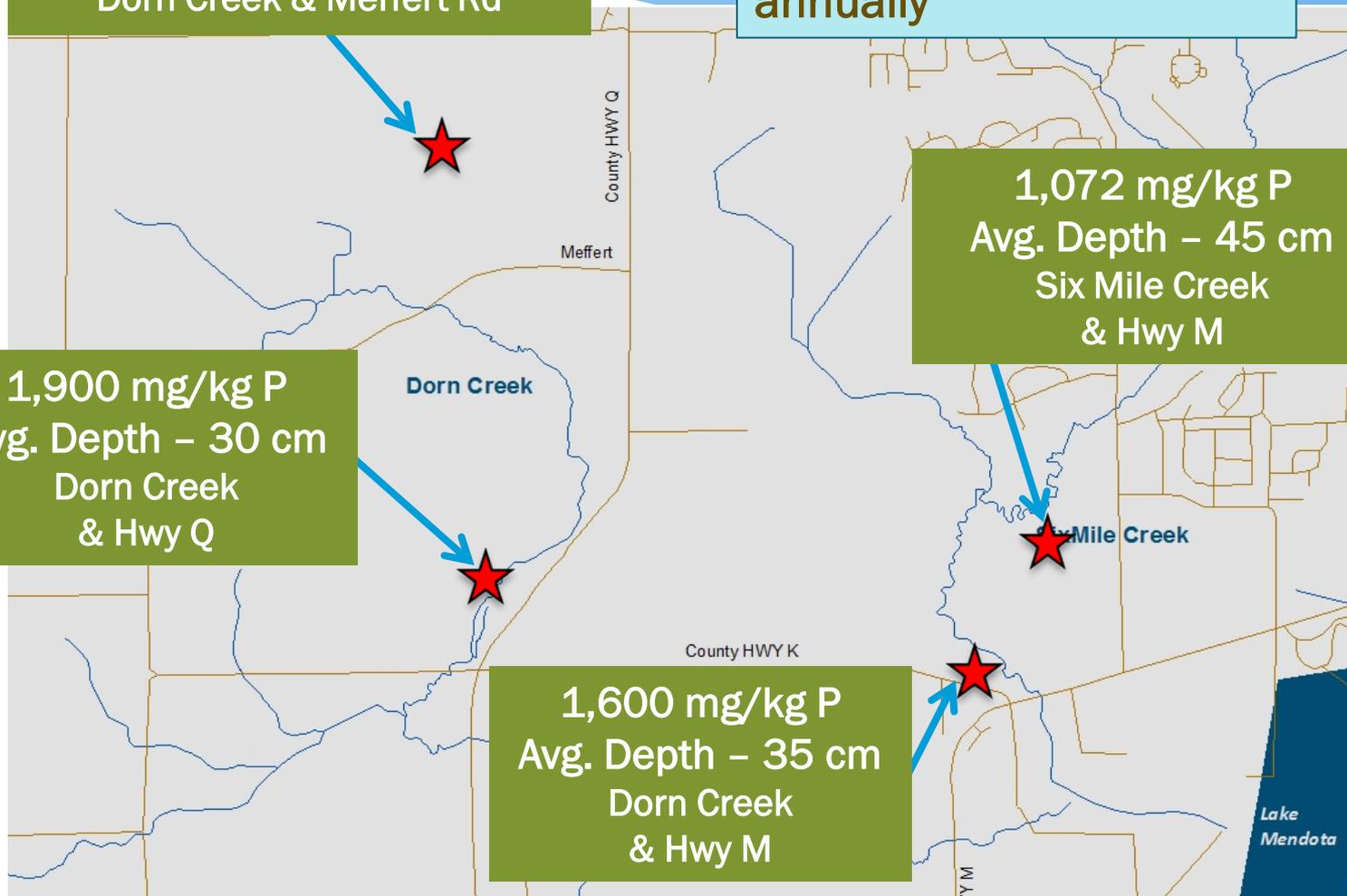
1,500-2,500 mg/kg P  
Avg. Depth – 60 cm  
Dorn Creek & Meffert Rd

~700lbs of P removed  
annually

1,072 mg/kg P  
Avg. Depth – 45 cm  
Six Mile Creek  
& Hwy M

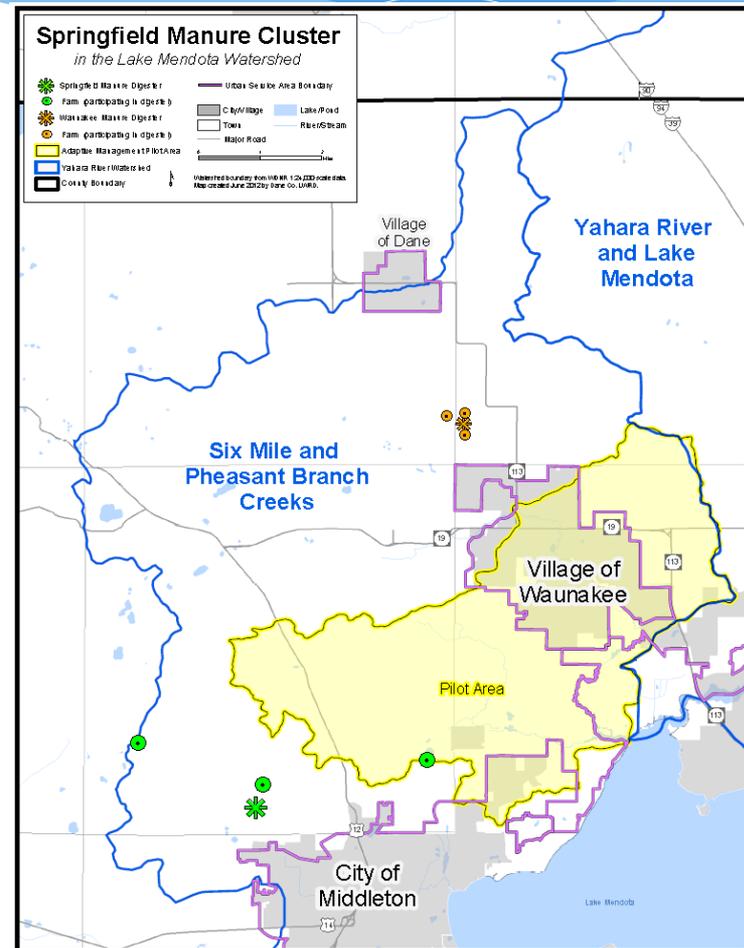
1,900 mg/kg P  
Avg. Depth – 30 cm  
Dorn Creek  
& Hwy Q

1,600 mg/kg P  
Avg. Depth – 35 cm  
Dorn Creek  
& Hwy M



# Community Manure Digester – Additional Nutrient Reduction

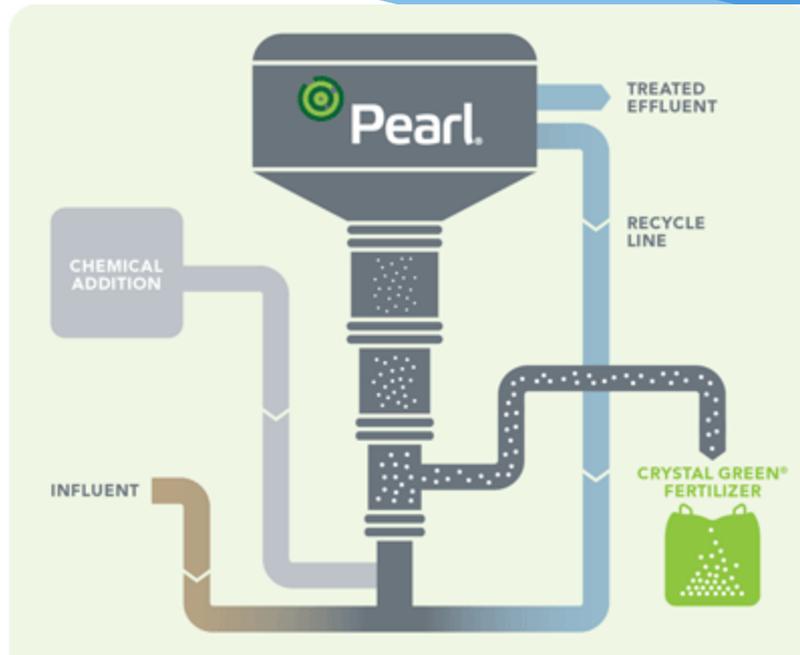
- \* Part of the second digester – proposed in Town of Springfield
- \* Yahara WINS is partially funded a feasibility analysis
- \* RFP in 2014 to install this nutrient concentration system on the water side of the digester
- \* Goal is to improve profitability and replicability



# A Jumpstart on NPS Control Practices (Phosphorus Harvesting)



Uncontrolled phosphorus precipitation



Controlled phosphorus precipitation



Phosphorus fertilizer

# Rock River Coalition Citizen Monitoring

- \* Started in 2013
- \* Expanding in 2014
- \* Complements existing monitoring
- \* Engages citizens



# Tentative Timeline

10/1/2015	6/30/2017	6/30/2018	10/1/2020	10/1/2025	10/1/2030
<ul style="list-style-type: none"><li>• WPDES Permit Reissued</li></ul>	<ul style="list-style-type: none"><li>• Submit Adaptive Management Request Form to DNR</li></ul>	<ul style="list-style-type: none"><li>• Submit Adaptive Management Plan to DNR</li></ul>	<ul style="list-style-type: none"><li>• WPDES Permit reissued</li><li>• Potential Start of Adaptive Management Clock</li></ul>	<ul style="list-style-type: none"><li>• WPDES Permit Reissued</li></ul>	<ul style="list-style-type: none"><li>• WPDES Permit Reissued</li><li>• Includes compliance schedule if water quality criterion are not met.</li></ul>

- \* Partners review all options
- \* Partners update their modeling

# The Reality

- \* Stopping inputs – probably not realistic.
- \* Reducing inputs – yes, with:
  - \* Behavior change
  - \* Realistic expectations
  - \* Everyone working together
- \* Success requires a watershed approach...

# Website:

<http://www.madsewer.org/Programs-Initiatives/Yahara-WINs>

Madison Metropolitan Sewerage District



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**every**  
drop.

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At the District we believe in enriching life through clean water and resource recovery. We are a passionate team of experts who work to recover resources and clean wastewater for return to nature 365 days a year through our innovative engineering, conservation leadership, and recovery expertise.

News

 MMSD comes in 2nd in  
Dane County Bike

Yahara WINs

Commission

Next meeting will be held on

Public Education

 Every

# Questions

Kathy Lake

Madison Metropolitan Sewerage District

[Kathyl@madsewer.org](mailto:Kathyl@madsewer.org)

608-222.1201 ext. 278