Success: Producer Implemented Water Quality Improvement in the Driftless Area

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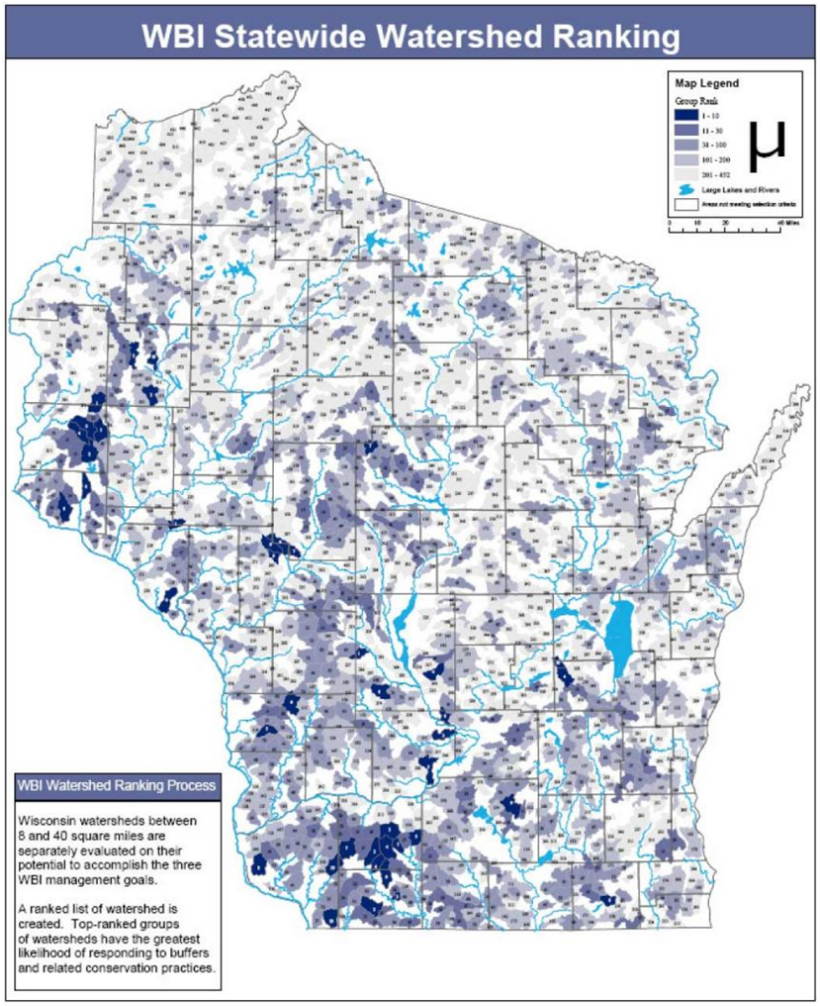
Messages

- Possible for producers to change stream phosphorus loads
- Nutrient management planners can play a valuable role in water quality projects

2005: Wisconsin Buffer Initiative Report



Watersheds ranked for their potential to meet three management goals:

(1) Improve stream water quality

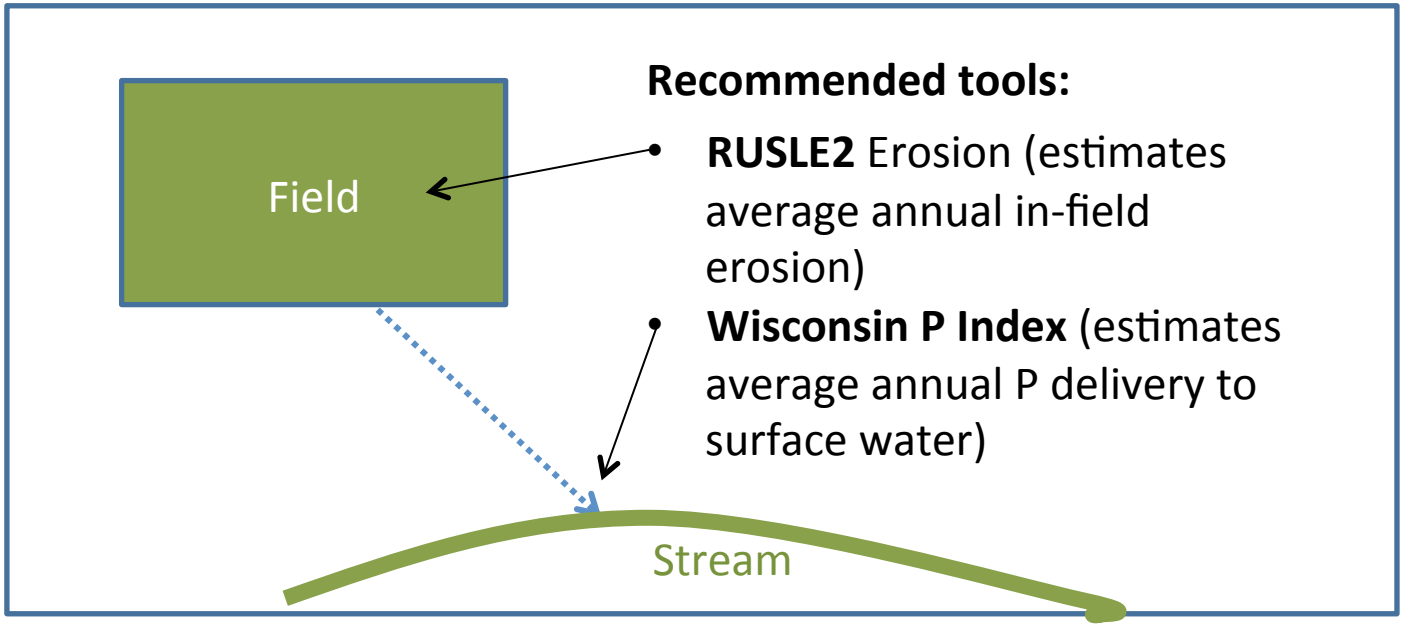
(2) Protect and enhance biological communities

(3) Sustain lake water quality

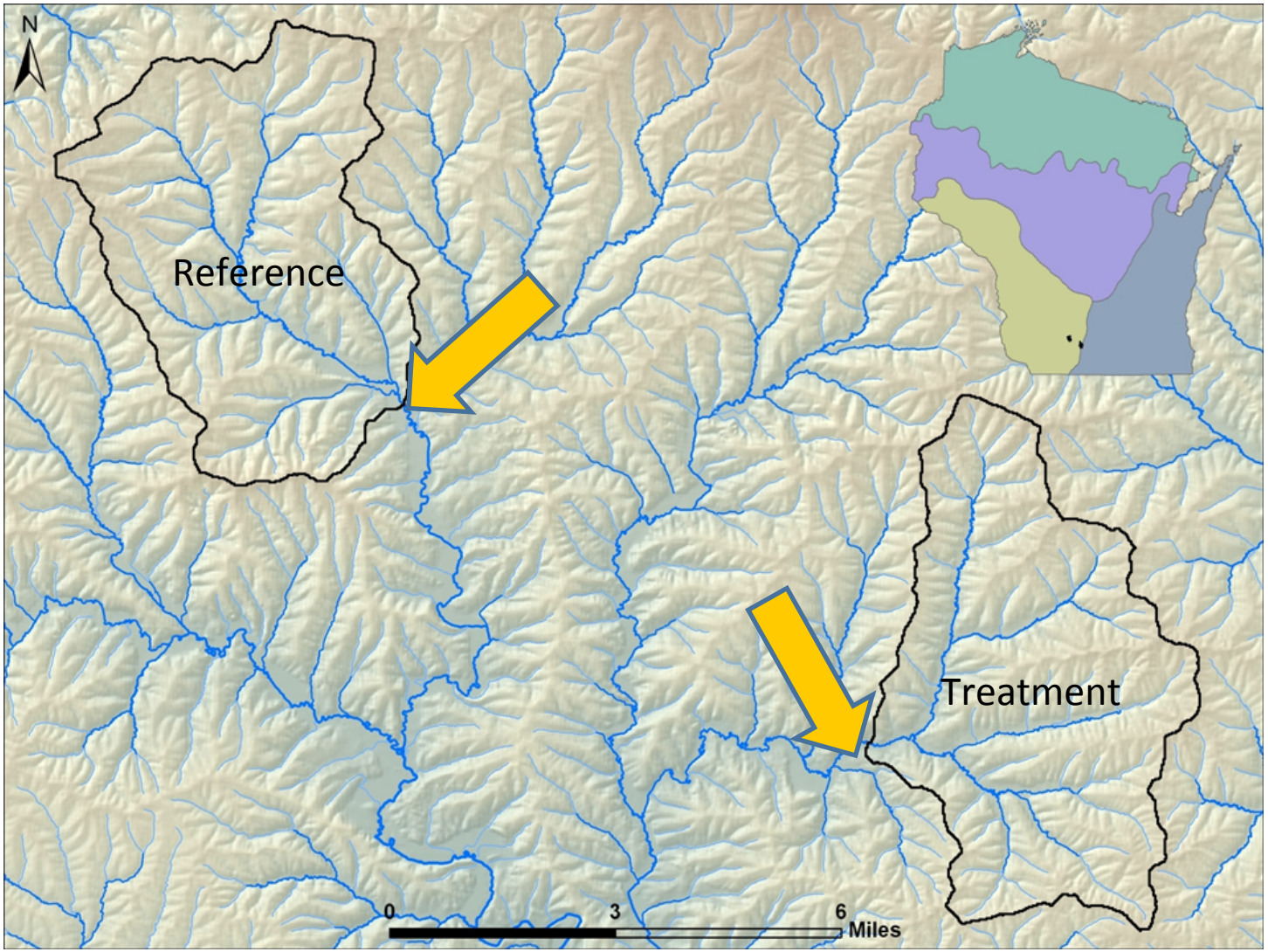
WBI Recommendations for Targeting Conservation in Watersheds

Focus efforts on fields contributing highest amounts of sediment and nutrients to surface water.

Use assessment tools that quantify runoff losses to identify high loss fields



2006: Paired watershed study began



2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015

Stream monitoring, sediment and P budgeting

Partners: US Geological Survey, University Wisconsin, WI Department of Natural Resources, The Nature Conservancy

Additional funding: USDA-NIFA

Inventory and Assessment

Partners: Dane County Land Conservation Department and Univ. of Wisconsin

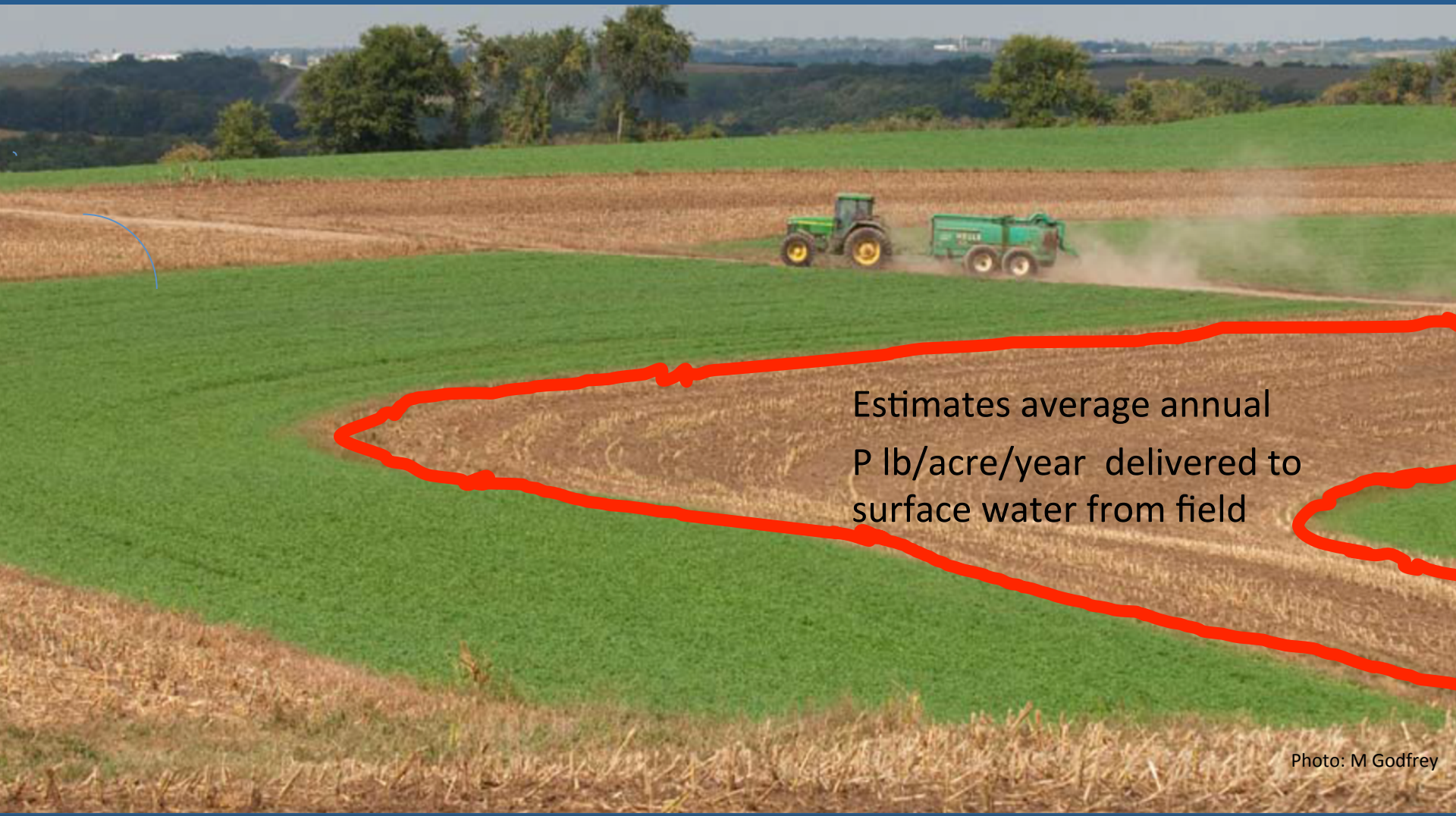
Additional funding: The Nature Conservancy

Implementation

Partners: Producers, Dane County Land Conservation Department, NRCS, UW-Extension

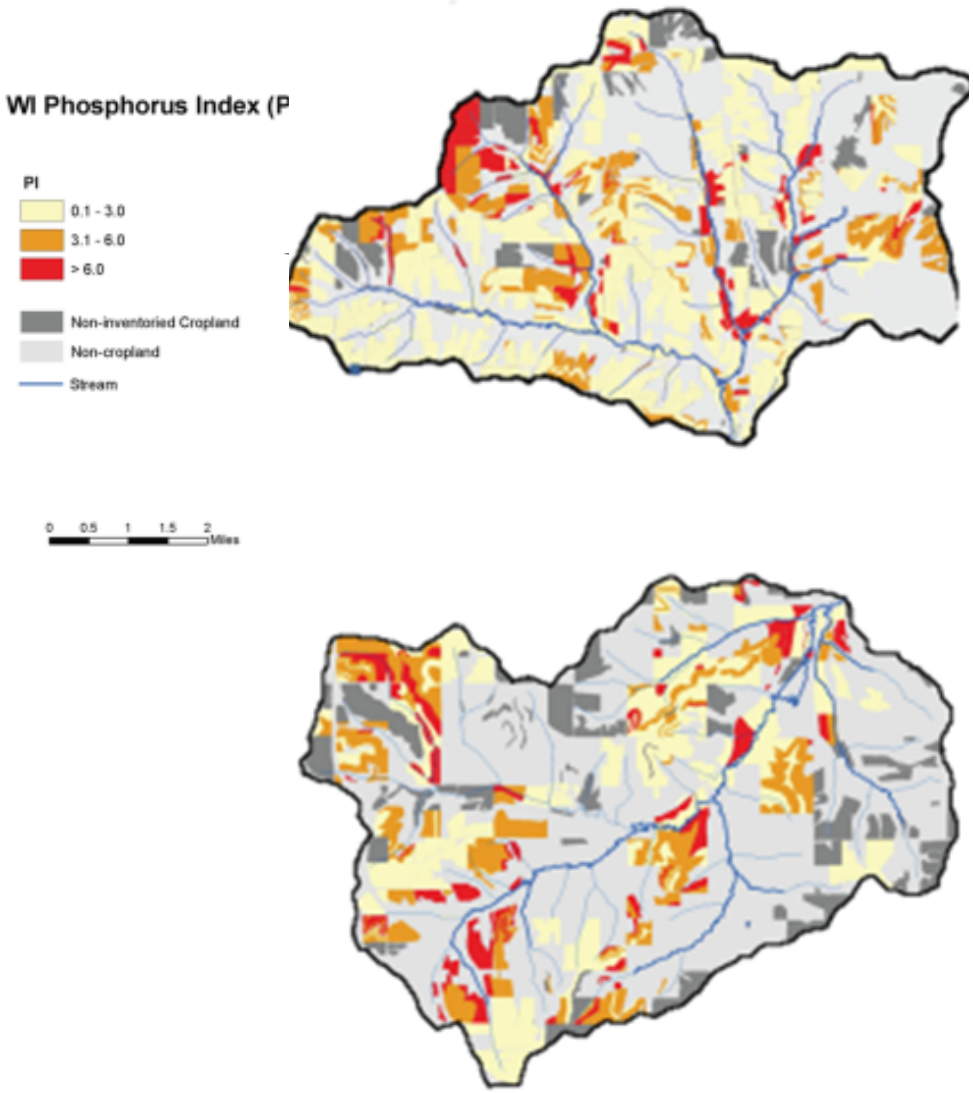
Practice funding: NRCS, The Nature Conservancy

Wisconsin P Index used as targeting tool



Developed for use in Nutrient Management Planning, uses “conservative” assumptions

Baseline P Index Distribution



Project Watershed

P Index

Average: 3.7

Range: 0.1 – 23

Soil test P

Average: 45 ppm

Range: 3 – 383 ppm

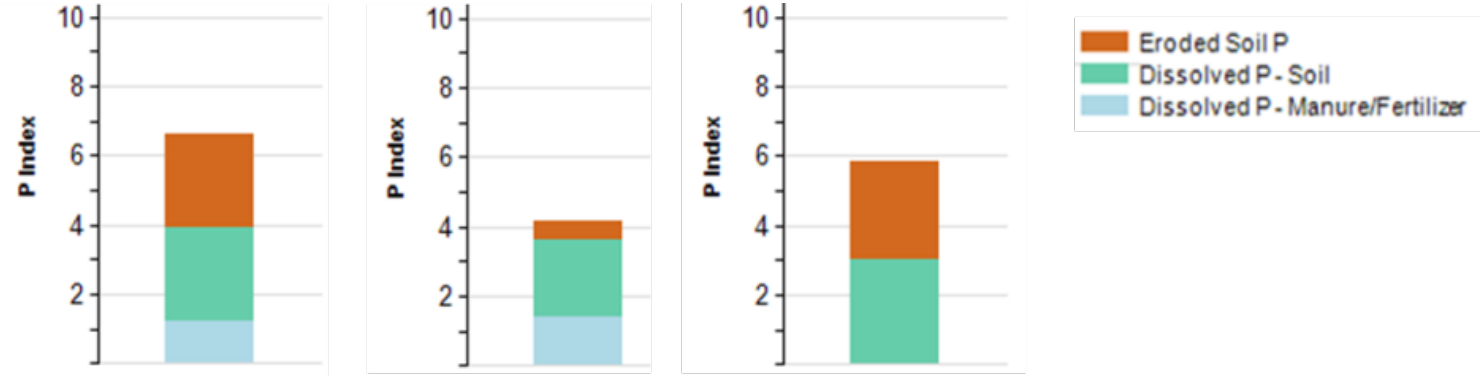
Erosion

Average: 1.8 t/ac/yr

0 – 22.7 t/ac/yr

Example High P Loss Field

Flat field (1% slope) in continuous corn silage with excessively high soil test P (200 ppm)



Original

Spring chisel
Winter solid manure
46 lb P_2O_5 commercial

Alternative A

No-till,
Same manure and fertilizer

Alternative B

Same tillage,
no manure,
Starter fertilizer

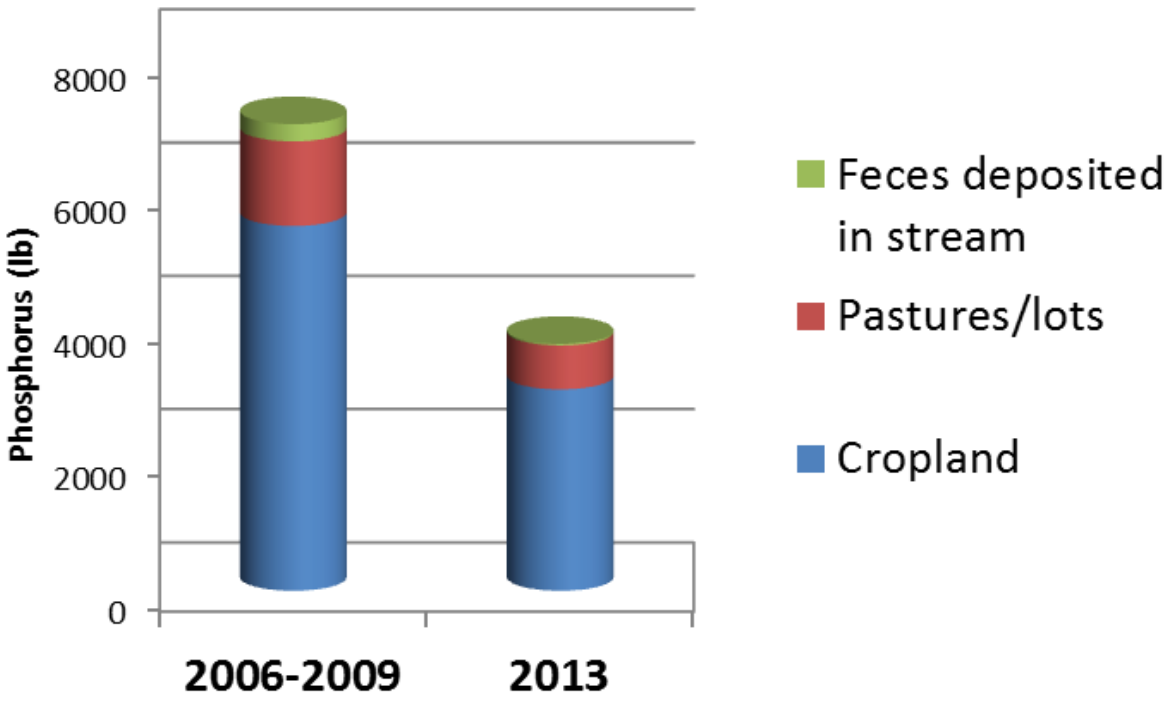
Participating Farms Reduced Runoff P Loss and Erosion

Estimated average annual runoff P and erosion reductions in Pleasant Valley from cost-shared managements in the implementation period (2010-2013) compared to baseline (2006-2009)

		Acres	P reduction (lb/yr)	Erosion reduction (ton/yr)
	No-till/reduced till/residue management	**1840**	**3300**	**2000**
	Pasture systems (stream crossings, fencing, seeding)	**315**	**1100**	**100**

Participating farms cut runoff P losses in half

Estimated average annual runoff P losses for participating farms, baseline (2006-2009) and 2013



Constructed Practices

- Small water control structures
- Barnyards/feeding areas
  - BARNY reductions: 550 lb P/yr
- Stream bank protection

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Photos: Curt Diehl, Dane LCD

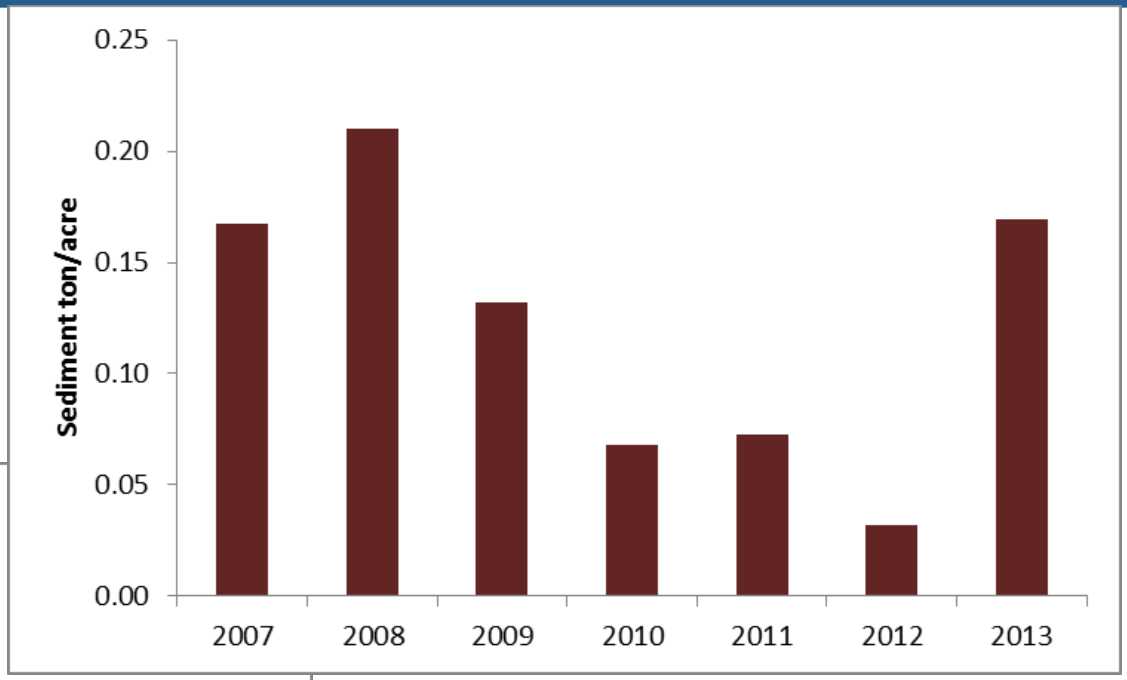
Stream Banks as a Source of Sediments and Nutrients

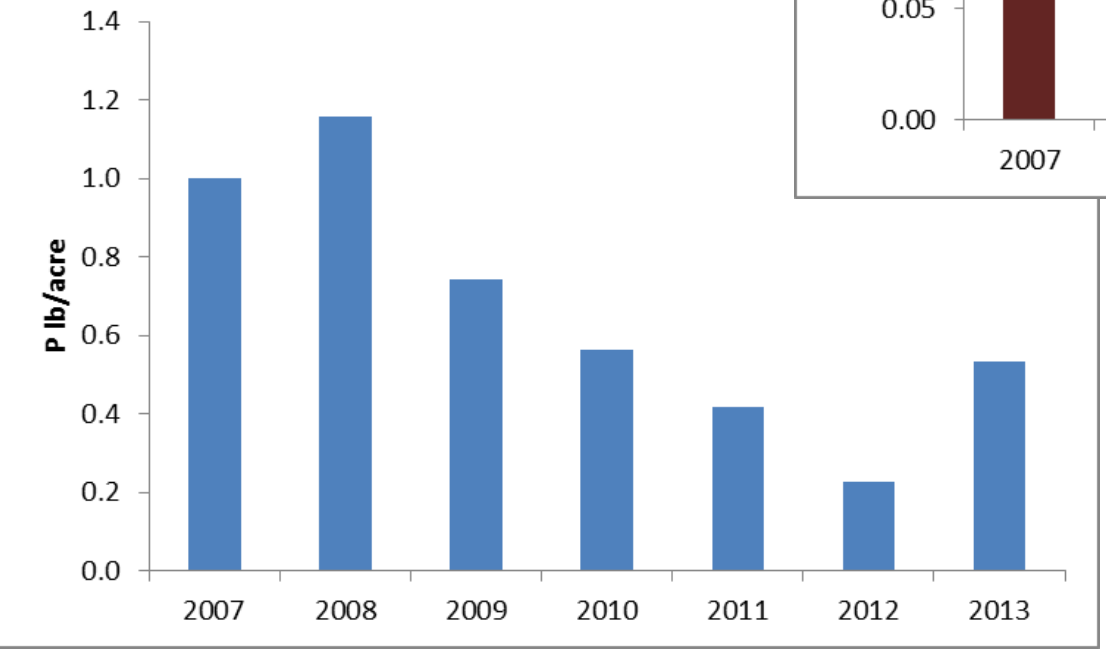
Sediment from stream banks negatively proportional to percent of agriculture in subwatersheds

Installing in-stream sediment samplers

Sediment at outlet:
30% from stream banks
70% from croplands and pastures

Measured Sediment and Phosphorus





Targeted Implementation Worked

Farmers responded

Water quality improved

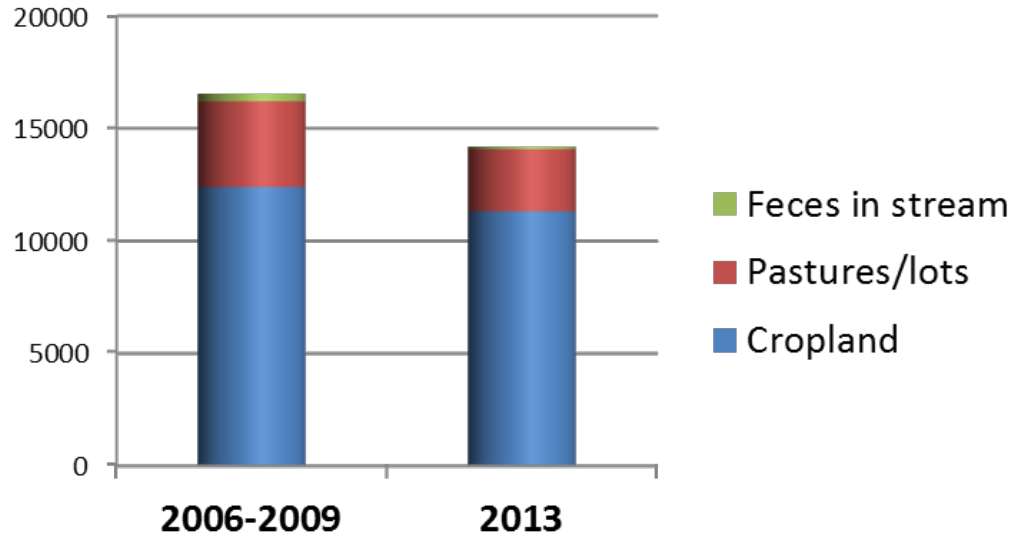
Reduction in stream phosphorus loads in 2013 storms and snowmelt

Becky Carvin at USGS stream water sampling station

37%

Runoff P losses increased on non-targeted farms

Estimated P delivery from all agricultural land in Pleasant Valley



Land use trends similar in Treatment and Control watersheds

CRP conversion to cropland, tilled:

P

Declining animal units:

?

Farmer Survey on NMP

Most:
Made changes due to NMP
Relied on consulting agronomist to implement fertilizer plan
Saw plan as useful in beginning

Some :
Felt NMP unnecessary after beginning years (grain farmers)

Tips for Future Projects

- Bring in farm consultants from the beginning
- Give farmers as much time as possible for making decisions and flexibility in reaching goals
- Plan for plenty of staff. Projects that need to help farmers implement and document on-farm phosphorus or sediment reductions annually can be very labor-intensive

Summary

- Targeted conservation projects can reduce stream phosphorus loads

- Nutrient management planners have tools to help producers find appropriate alternative management systems

SnapPlus

Not a one-size-fits-all solution.