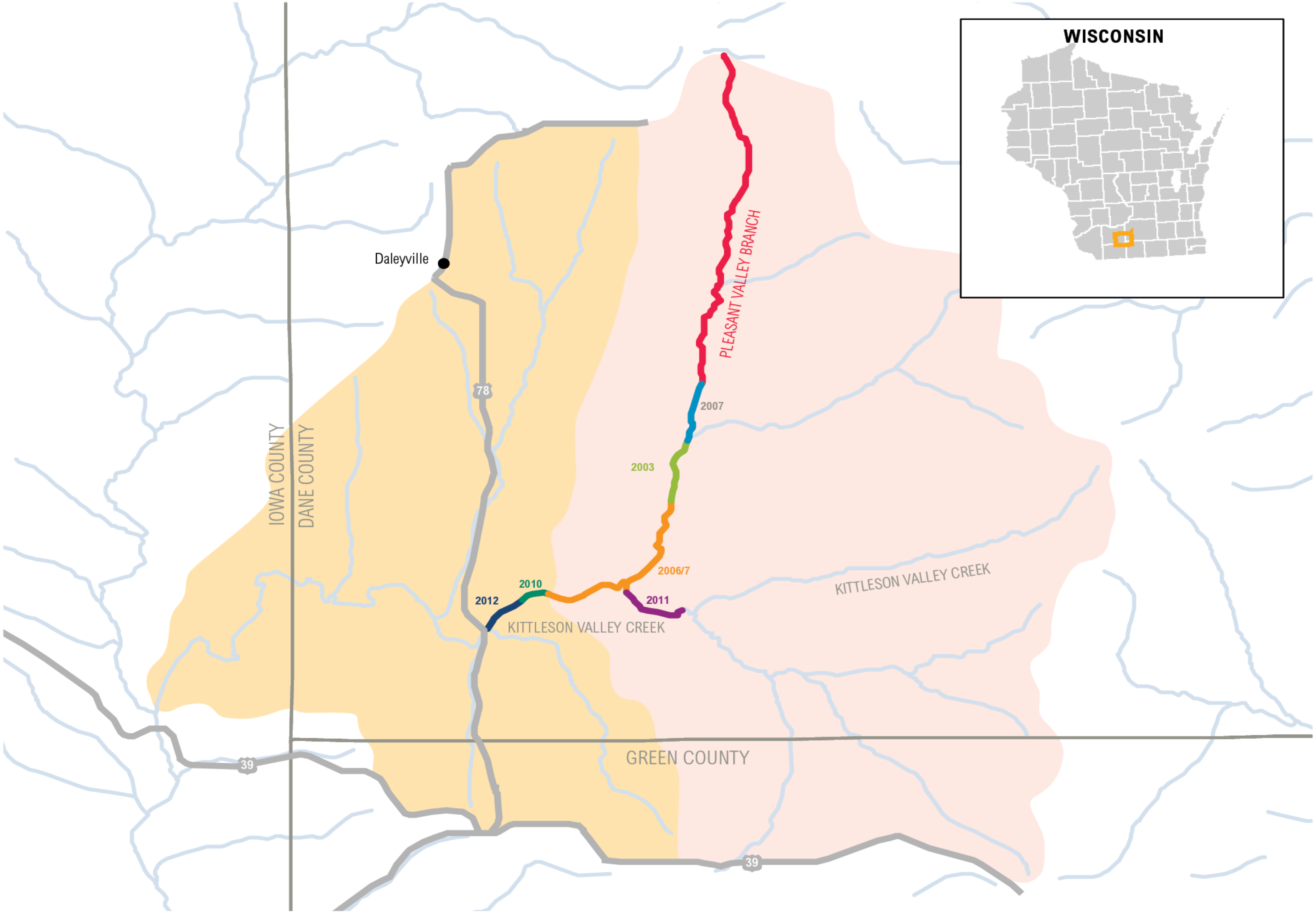
# Farmers Make a Difference and Water Quality Improves in a Pecatonica River Watershed

Steve Richter, Wisconsin Chapter TNC

## Map of the Wisconsin Pleasant Valley Stream Rehabilitation Project




Pleasant Valley Branch subwatershed (shaded pink), the Kittleson Valley subwatershed (shaded gold), and the stream bank rehabilitation projects that were conducted on various stream reaches. Stream rehabilitation projects on Pleasant Valley Branch occurred in 2003, 2006–07, and 2007 while additional projects were conducted on Kittleson Valley Creek in 2010, 2011, and 2012. The Pleasant Valley Branch was listed as impaired in 1998 for degraded habitat due to sedimentation.

*Source:* WRI, with data provided by Curt Diehl, Dane County Land Conservation Division.

# Stream Banks & Riparian Areas Before, During, & After Stream Rehabilitation Project

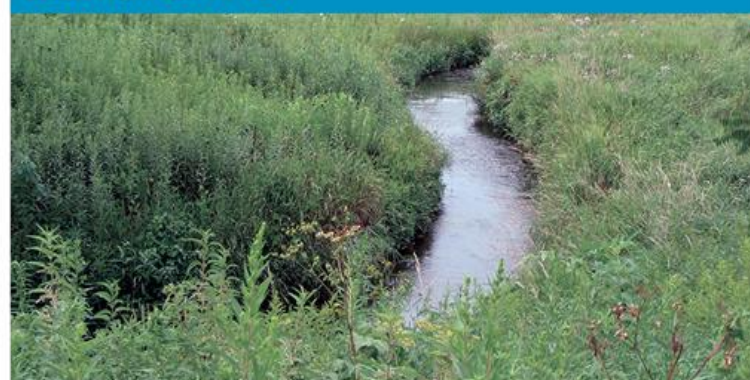
LOCATION 1: BEFORE

LOCATION 2A: DURING

LOCATION 2B: AFTER

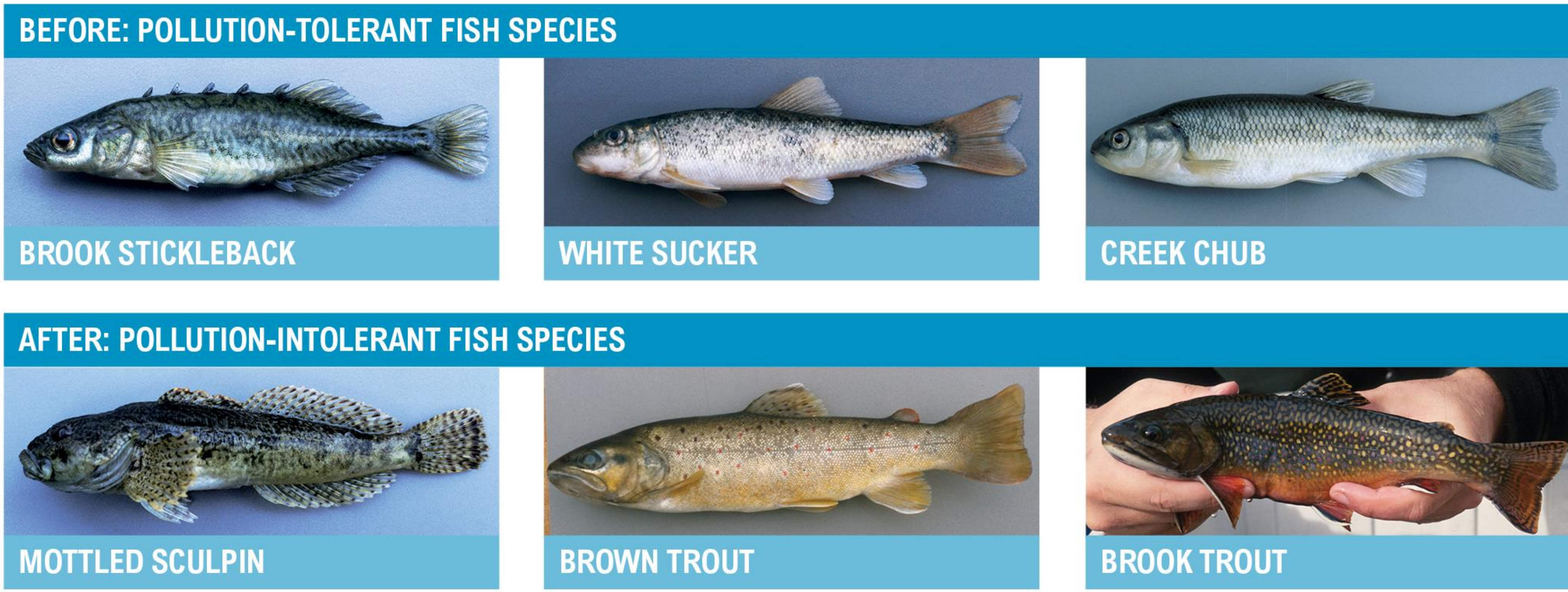
LOCATION 3A: DURING

LOCATION 3B: AFTER



*Source:* Jim Amrhein, Wisconsin Department of Natural Resources.

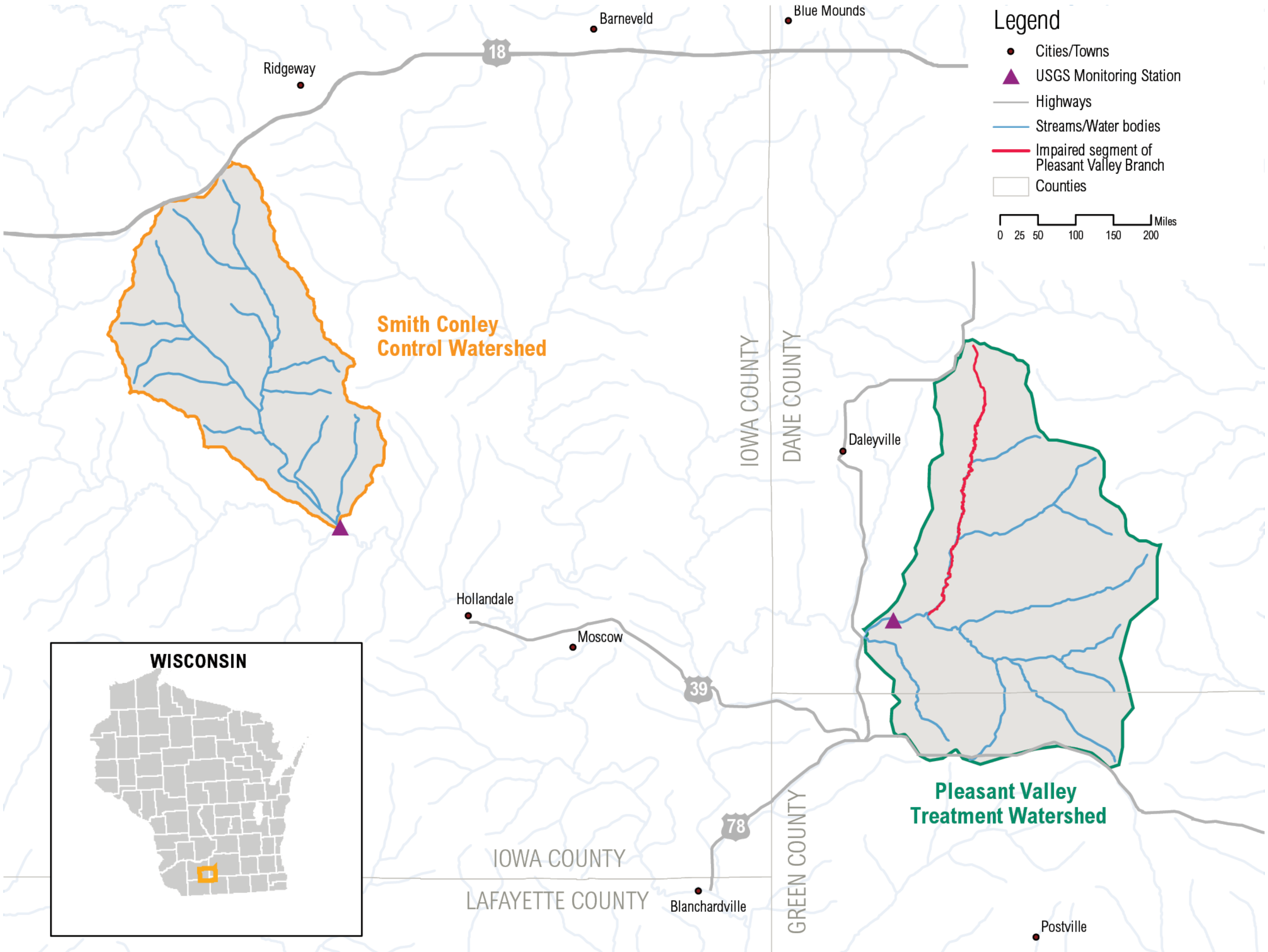
# Fish Before & After
# Stream Rehabilitation Project




Before the project, the stream was dominated by species tolerant to disturbed habitat (suckers and stickleback). After the project, the fishery represented a healthy cold water resource with mottled sculpin, brown trout, and brook trout.

*Source:* Jim Amrhein, Wisconsin Department of Natural Resources. Photo credit: John Lyons, Wisconsin Department of Natural Resources.

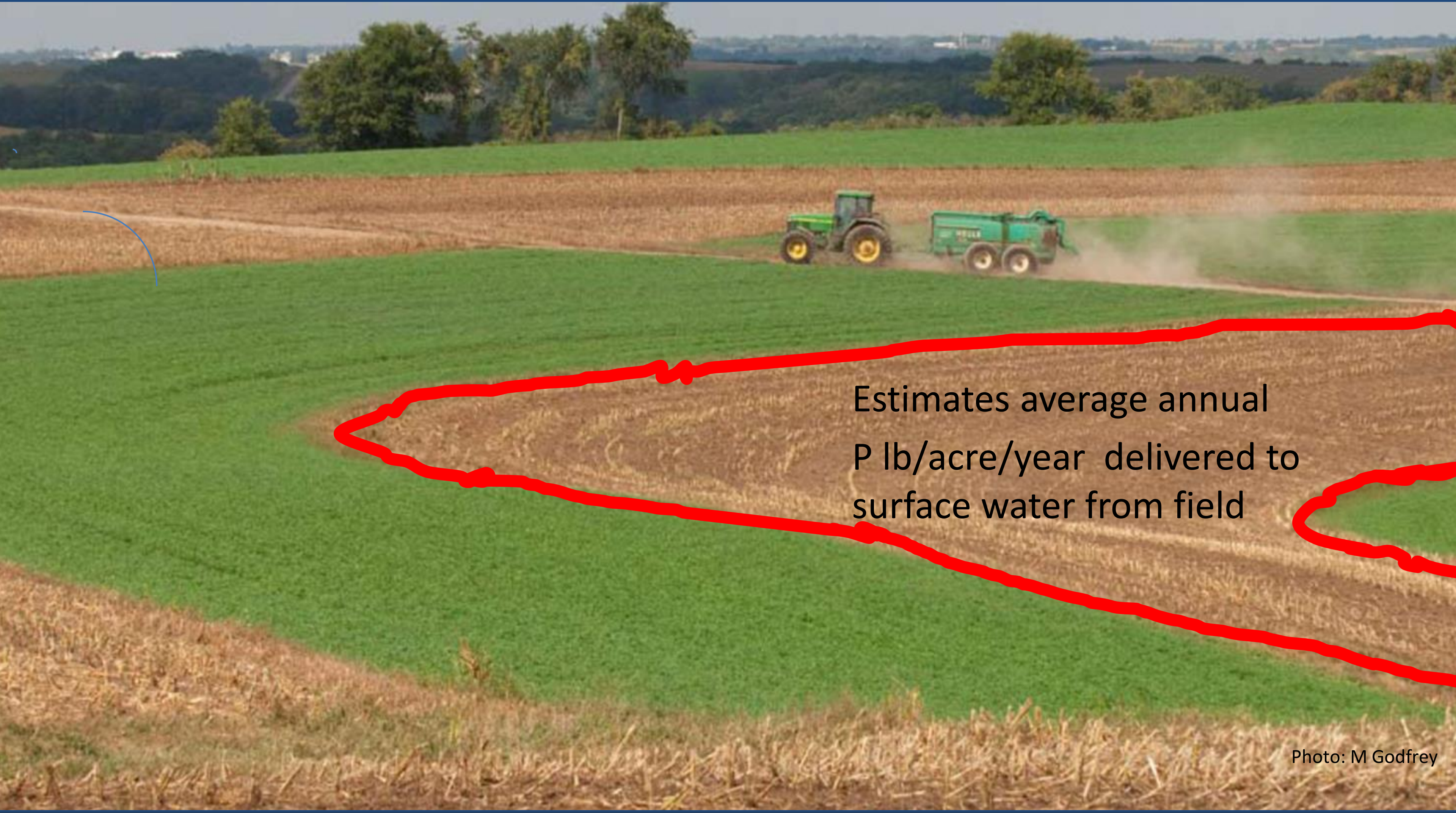
## Map of the Wisconsin Pleasant Valley On-Farm Phosphorus and Sediment Reduction Project




Pleasant Valley treatment watershed and Smith Conley control watershed for the phosphorus and sediment reduction project.

*Source:* WRI, with data provided by Laura Good, University of Wisconsin–Madison, and Steve Richter, The Nature Conservancy.

# Wisconsin P Index used as targeting tool




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

| 2006-7 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

## 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

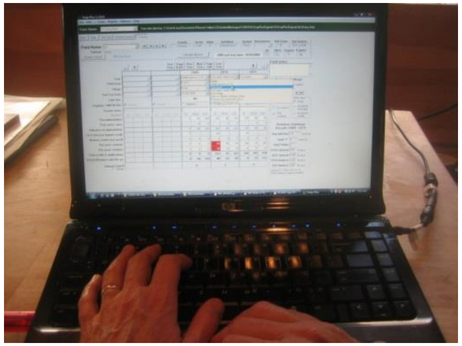
Additional funding: The Nature Conservancy

## Implementation

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

Practice funding: NRCS, The Nature Conservancy

# Inventory



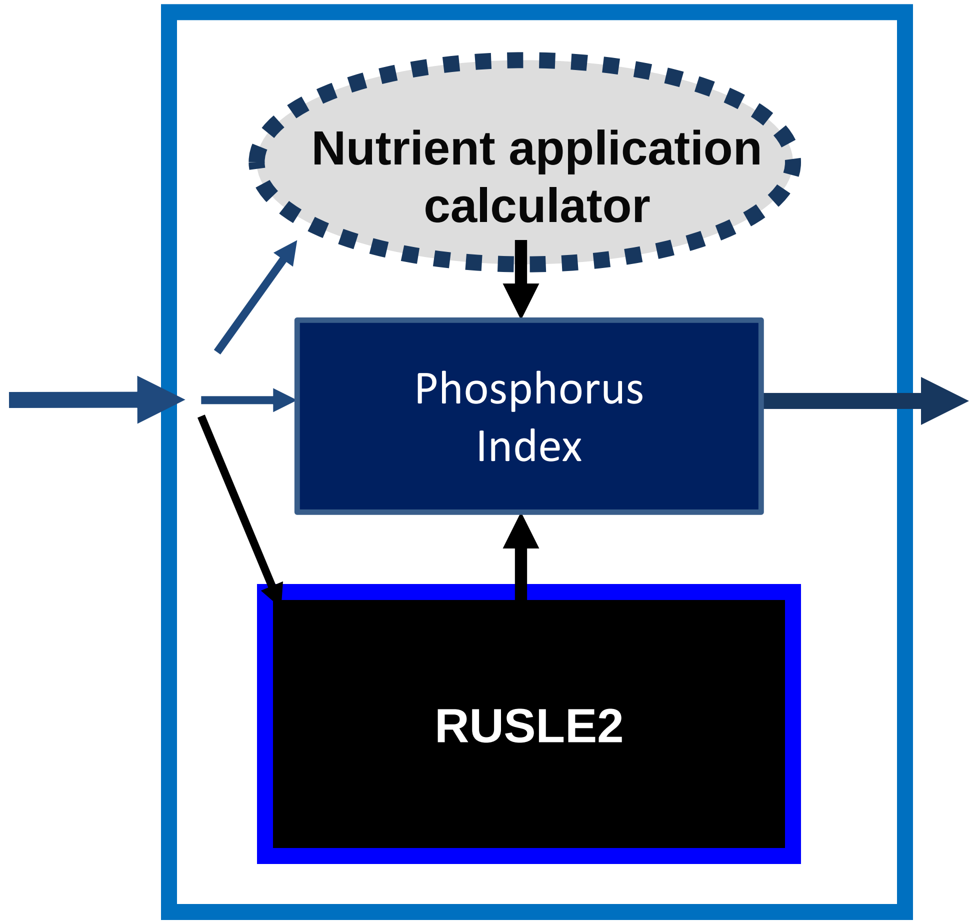
## Baseline Inventories for Erosion and Runoff and P Loss Assessment

- Interview farmers to find out crops, fertilizer, manure inputs and field management (ex, tilling)
- Soil sample fields (routine analysis for crops)
- Calculate soil loss and P Index in SnapPlus

# SnapPlus Inputs and Outputs

**Inventory Information**

- Soil Type
- Soil Test P and Organic Matter
- Field Slope
- Field Slope Length
- Tillage
- Rotation crops and yields
- Manure Applications
- P Fertilizer Applications
- Downfield Slope to Surface Water
- Distance to Surface Water



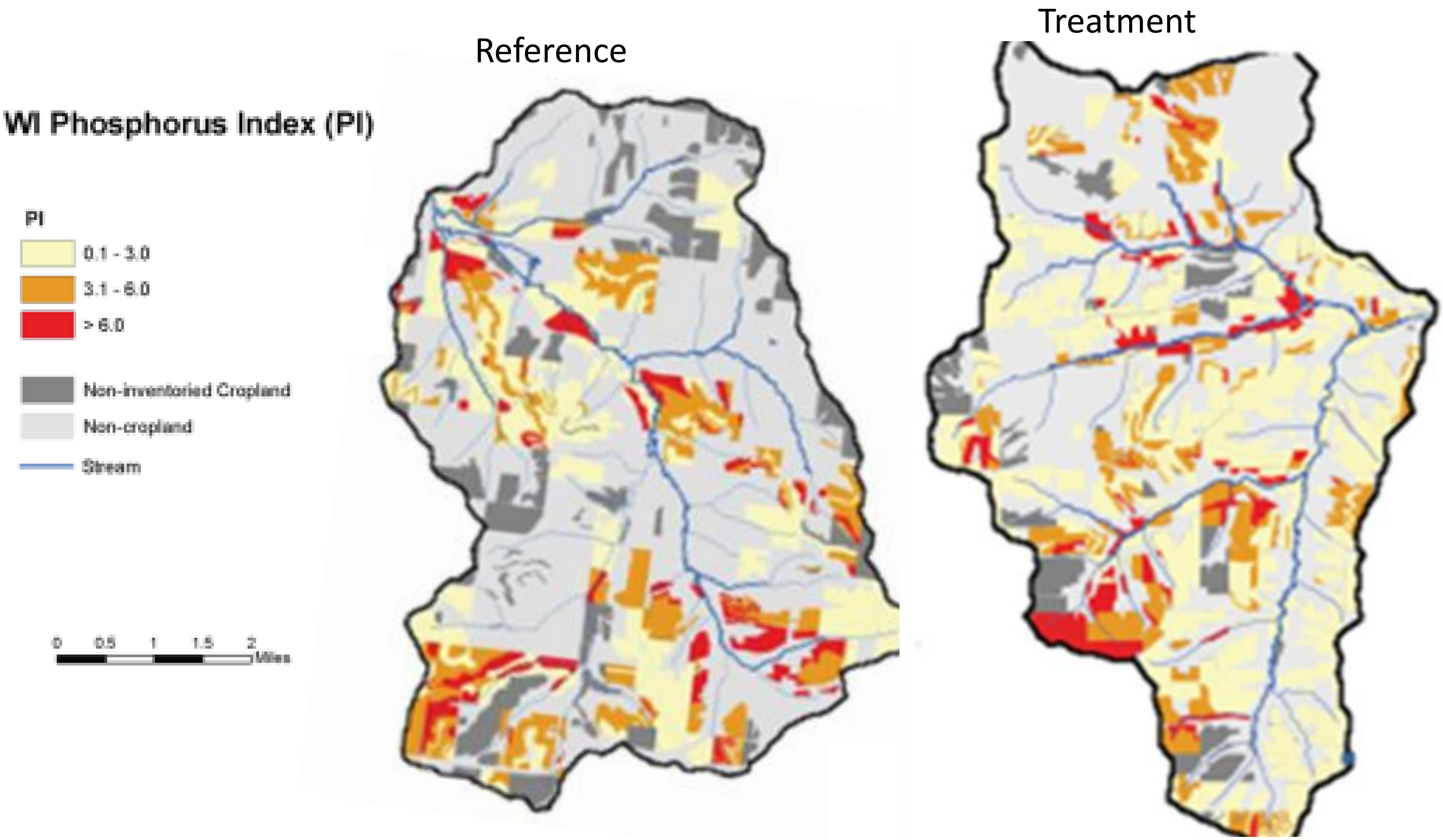

## Calculations

**P Index:**
- **Rotation Average**
- **Annual**
  - Dissolved
  - Particulate

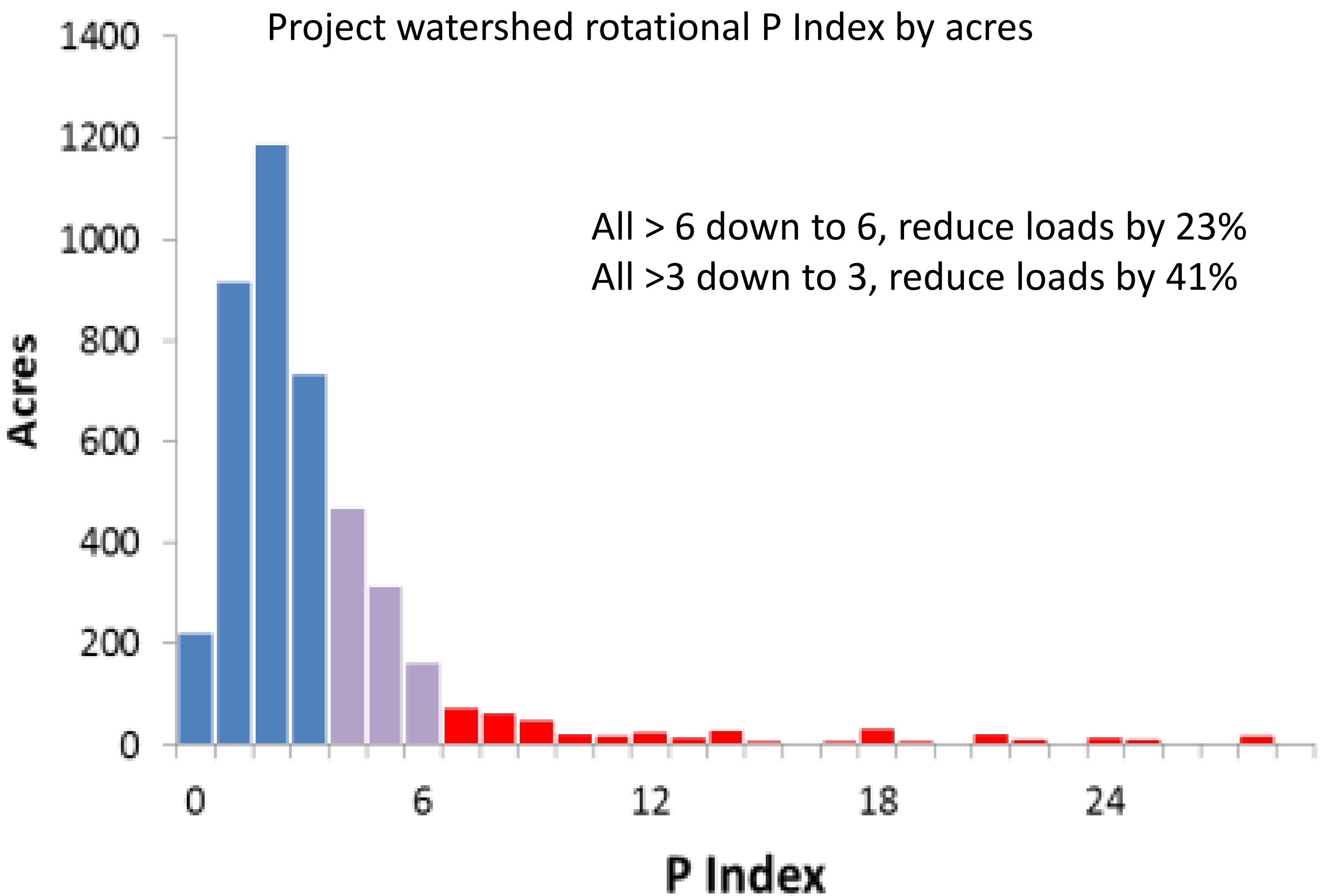
**Erosion**

Now also have P Trade Report

# Baseline  P Index Distribution



# Baseline P Index Distribution



# Local land conservation staff key to project

- Fields and pastures for 87 landowners were inventoried.
- 13 farmers selected because of high P delivery risks. 12 joined.
- 3 more selected for medium riskus. Worked with 15 farmers

# Management Practices

Cropland practices:
- No-till, reduced till
- Forage crops after silage
- Rotation change
- Nutrient management planning

Pasture practices:
- Pasture management, reseeding

# Reductions went below runoff standards

First targeting: Fields with P Index above 6 lb/ac/yr

Second targeting: Fields with P Index b/w 3 and 6 lb/ac/yr


Reality: Farmers applied practices across many fields, not just high P Index fields

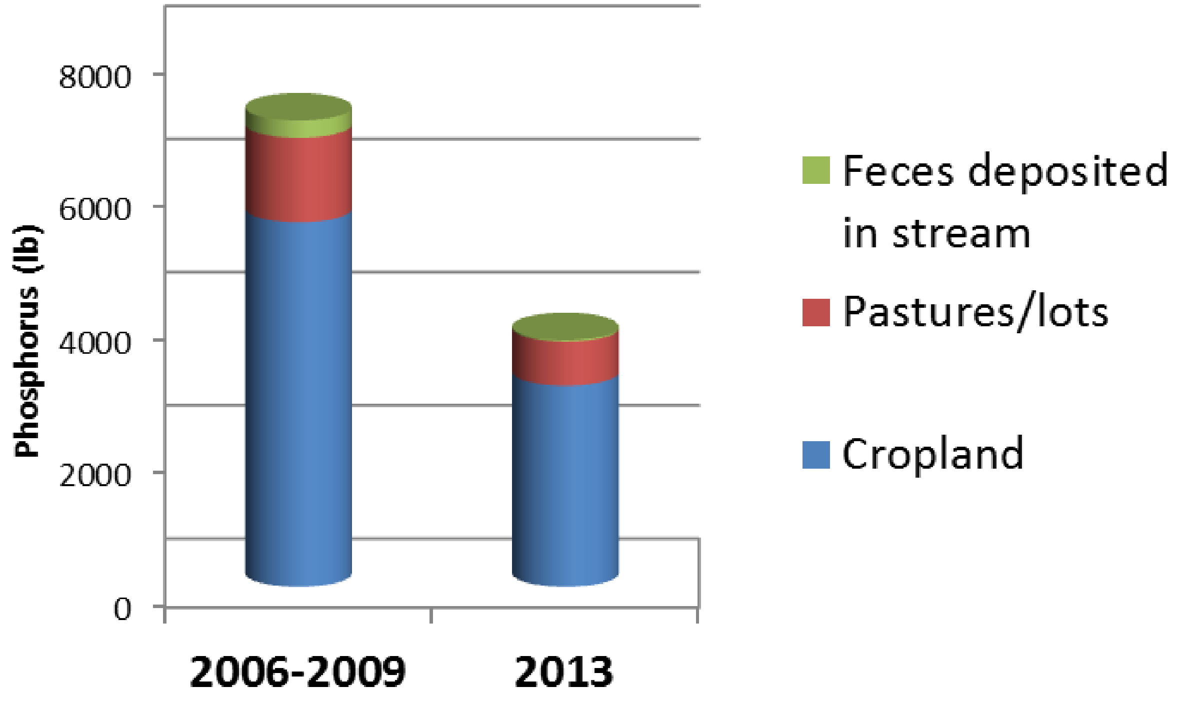
# “Hard” Practices

Barnyard runoff,
Stream crossings,
Small water control projects

Streambank restoration

# Participating farms cut runoff P losses in half

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



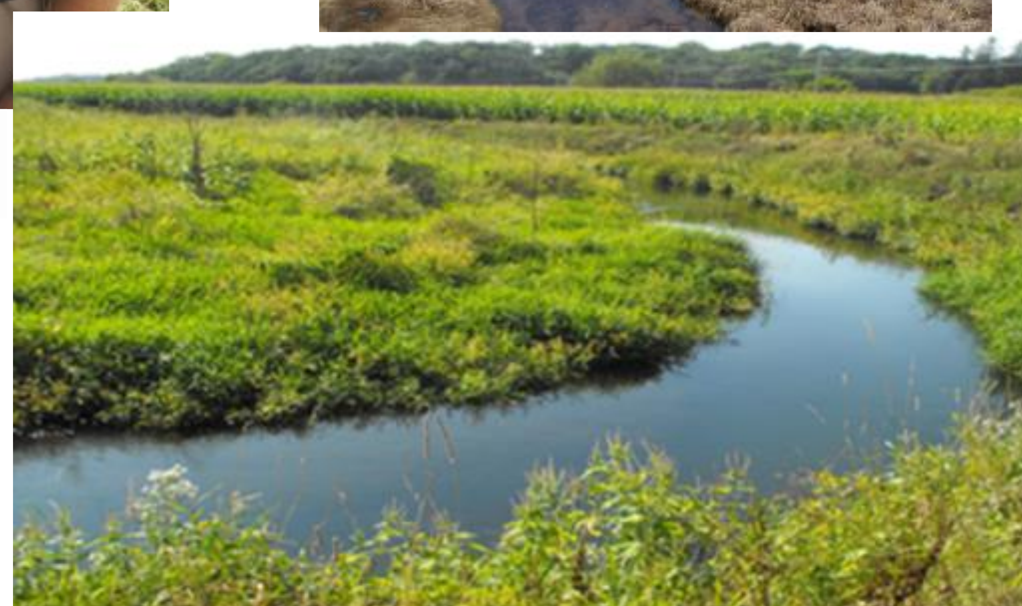

# Stream Banks as a Source of Sediments and Nutrients in the Watershed

More agriculture in a subwatershed = greater proportion of sediment from agricultural land


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

# Reduction in phosphorus loads: 2013-2016 storms and snowmelt

Becky Carvin at USGS stream water sampling station

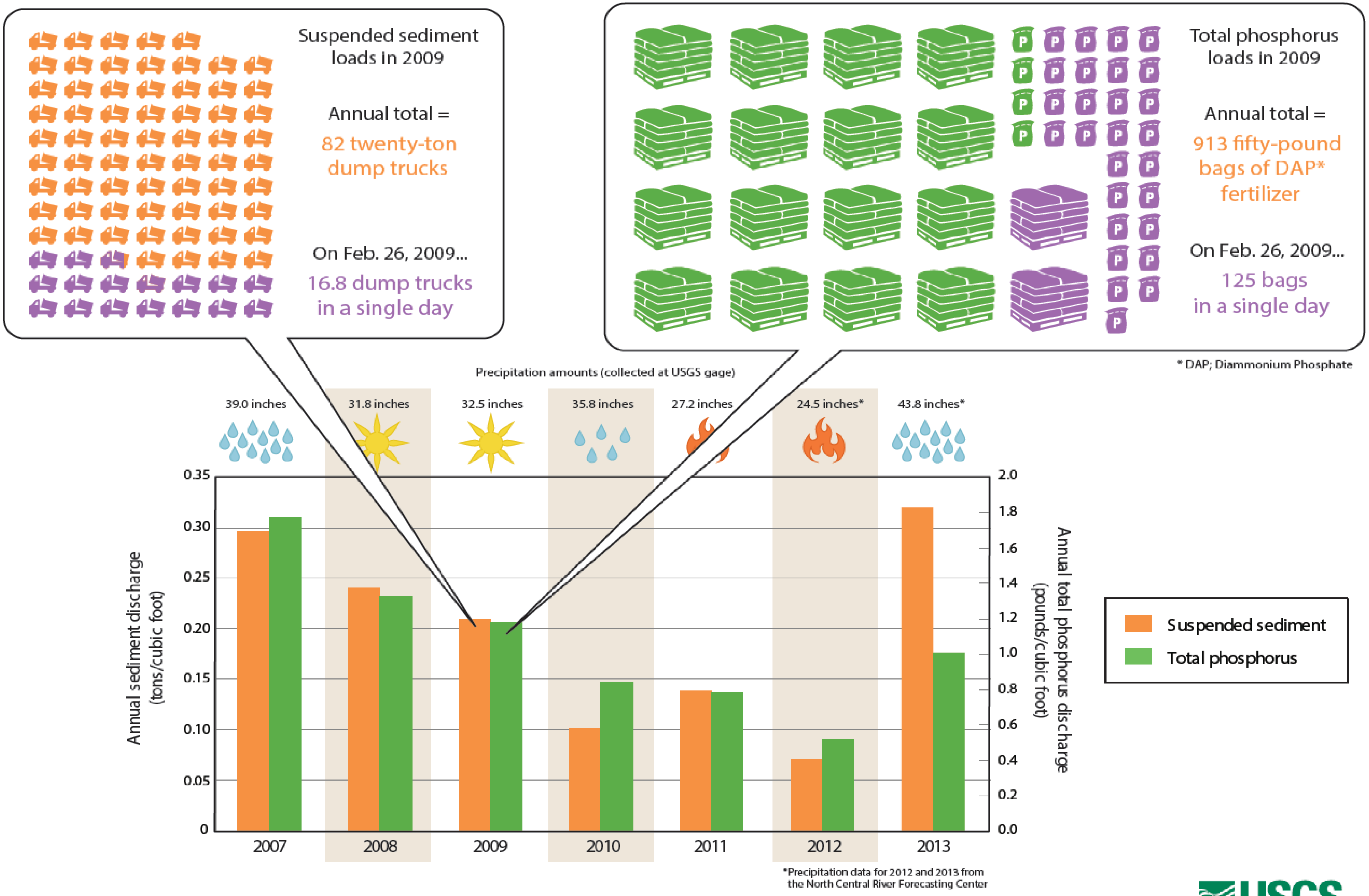


55%

95% confidence

# Sediment and Phosphorus Loads from 2007 to 2013

## for Pleasant Valley, Wis.




U.S. Geological Survey, 2012.Discharge, loads, and precipitation data for USGS site 05432927 available online http://waterdata.usgs.gov/nwis

# Targeted Implementation Worked

Farmers responded, addressed 73% of the fields with PI>6 and 66% of those PI 3 to 6

Water quality improved

# $ per pound of Phosphorus reduction: How to measure outcomes

Cropland management practice cost-share expenditures per unit reduction in estimated average P delivery and erosion for three farms

| | **P Index** | **Erosion** |
|---|---|---|
| | *$ per lb* | *$ per ton* |
| Dairy farm | 5 | 8 |
| Beef farm | 7 | 30 |
| Cash grain | 19 | 32 |

Adding in costs of technical assistance and verification could add $10 -100 per pound P