Producer-Led Watershed
Protection Grant Program

2019 CONSERVATION BENEFITS REPORT

Producers of Lake Redstone

TABLE OF CONTENTS

Group Summary..... 1

Soil and Water Quality Modeling..... 2

Model Inputs..... 3

Results: Grain Operations..... 5

Grain Rotations Explained..... 6

Modeled Effects of Grain Rotations on Soil Erosion..... 7

Modeled Effects of Grain Rotations on Phosphorus Loss..... 8

Results: Dairy Operations..... 9

Dairy Rotations Explained..... 10

Modeled Effects of Dairy Rotations on Soil Erosion..... 11

Modeled Effects of Dairy Rotations on Phosphorus Loss..... 13

Soil Conditioning Index..... 14

Soil Conditioning Index Comparison: Dairy and Grain..... 15

Producers of Lake Redstone Conservation Dashboard..... 16

Potential Sediment and Nutrient Reductions..... 17

Potential Reductions: Grain Rotations..... 18

Potential Reductions: Dairy Rotations..... 19

Producers of Lake Redstone Future Work..... 20

The Producers of Lake Redstone are

focused on improving water quality and soil health in the watershed, with particular interest in:

- Developing viable ways to interseed cover crops,
- Developing a community manure application/ sharing system, and
- Using cover crops to meet late-season nutrient needs of crops.

SOIL & WATER QUALITY MODELING

Farmer-led groups are demonstrating and promoting conservation practices and rotations that can help reduce soil erosion and improve soil quality.

Reducing the amount of soil lost from farm fields and improving the ability of soils to function is connected to water quality. The degree of benefits that we see from each of these farmer-led groups' conservation projects is dependent upon the unique climate conditions, soil types, and farming practices used in the particular watersheds where they farm.

→ Using SnapPlus nutrient management planning software, potential soil quality benefits were estimated for solely cropland practices implement by the Dodge County Farmers HSHW.

→ These practices include primarily cover crops and reduced tillage.

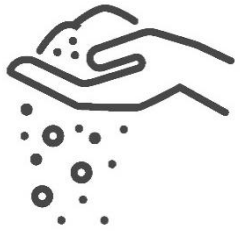
→ Crop rotations with varying levels of conservation integration were modeled to estimate the potential phosphorus and sediment reductions, and soil organic matter building potential that can occur from adopting different practices.

→ Rotations were selected that **best reflect the practices used by farmers in this watershed area,**

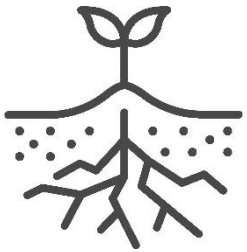
→ These estimations do not consider other conservation practices that may be present in a field such as a grassed waterway, water and sediment control basin, or buffers.

ESTIMATING SOIL & WATER QUALITY BENEFITS | Model Inputs

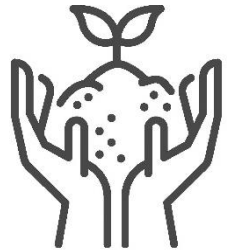
Dominant soil types of watershed + corresponding organic matter percentages (NRCS Web Soil Survey)



County average yields

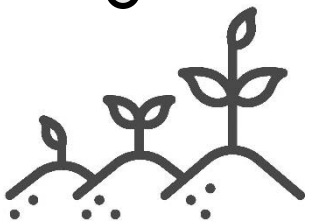


Average plant and harvest dates of crops for Wisconsin (NASS)



1 2 3 4 5

The lower quartile, median and upper quartile soil test P levels for the appropriate county as provided by DATCP soil laboratory results summaries.



Farm operation type representative of watershed and conservation crop rotation scenarios

GENERALLY SPEAKING…

+ Greater **risk of soil erosion on fields** under corn-soybean and corn-silage systems relying on chisel plowing
+ Adding winter wheat back into corn-soybean systems may decrease **phosphorus loss from fields**
+ Higher Soil Conditioning Index (**soil building potential**, in simple terms) as conservation practices are integrated into grain and dairy systems
+ Hay/grass systems experience **lowest soil erosion and phosphorus loss** on farm fields

Let's break it down→

Modeling Results:
GRAIN OPERATIONS

CROP ROTATIONS: Grain

The majority of farm operations in this watershed project area are either dairy or cash grain operations. For each operation type, crop rotations for three different levels of conservation were identified for the purpose of modeling soil and water conservation benefits:

Conventional Rotation

Corn grain- Soybeans
Fall chisel plowing
No cover crops

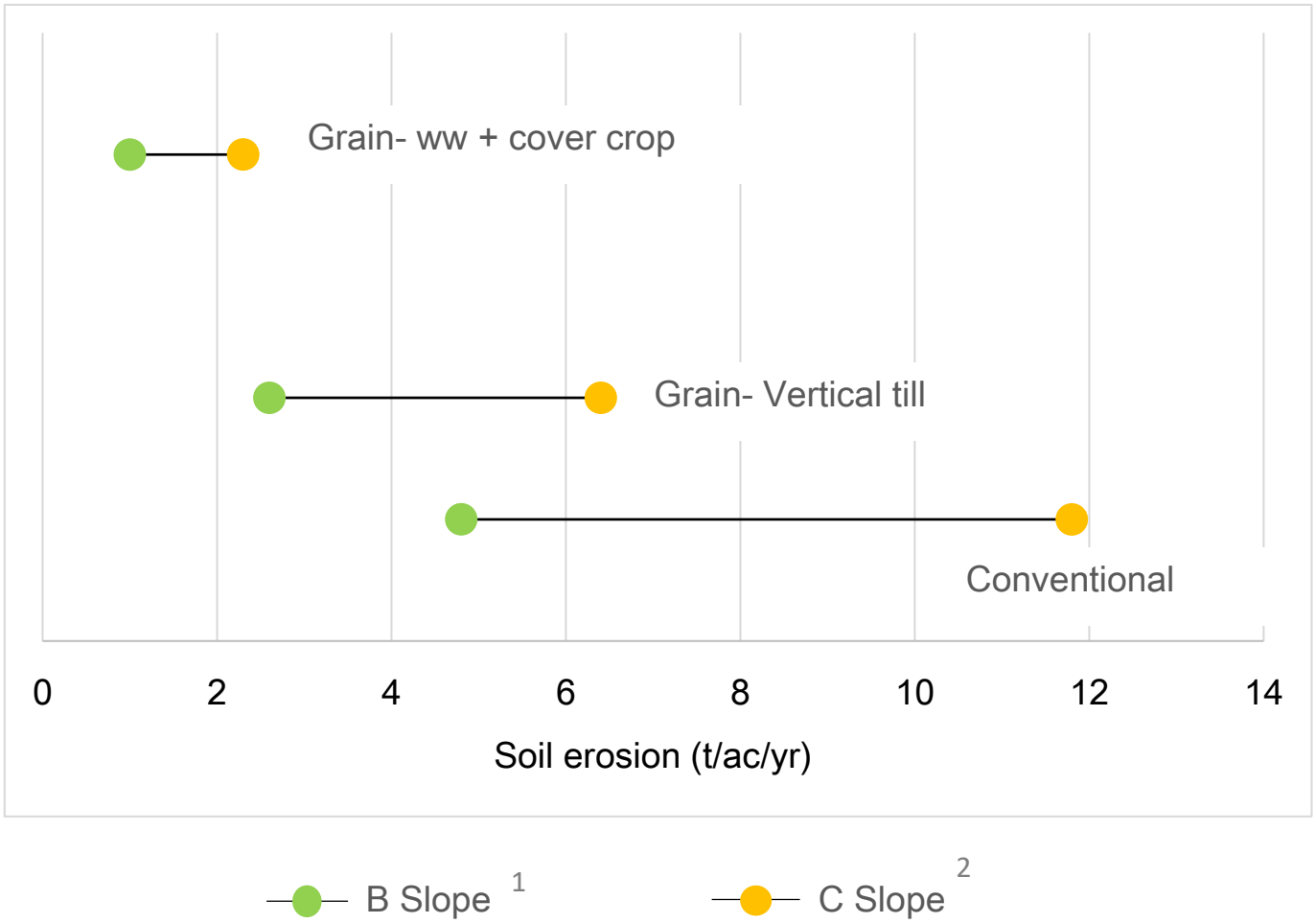
Intermediate- Vertical Tillage (VT)

Corn grain (2 years)- Soybeans
Fall vertical tillage;
No cover crop

Conservation Rotation- Winter wheat + cover crops

Corn grain- winter wheat
Multi-species cover crop after wheat
Corn planted green into cover crop

Less variability in soil erosion across fields with different slopes when using conservation practices



1.3 t/ac/yr

Difference in soil loss from the dominant C-slope soils in this watershed compared to B-slope soils when farmers include winter wheat and plant cover crops

COMPARED TO

7 t/ac/yr

Difference in soil loss on C-slope soils compared to A-slope soils with fall chisel plowing in a corn-soybean rotation without cover crops.

Soil Loss in this publication refers to the amount of soil lost from a field in t/ac/year over a set rotation as calculated by RUSLE2[1]. This value takes into account factors including field slope, soil type, climate, and ground cover.

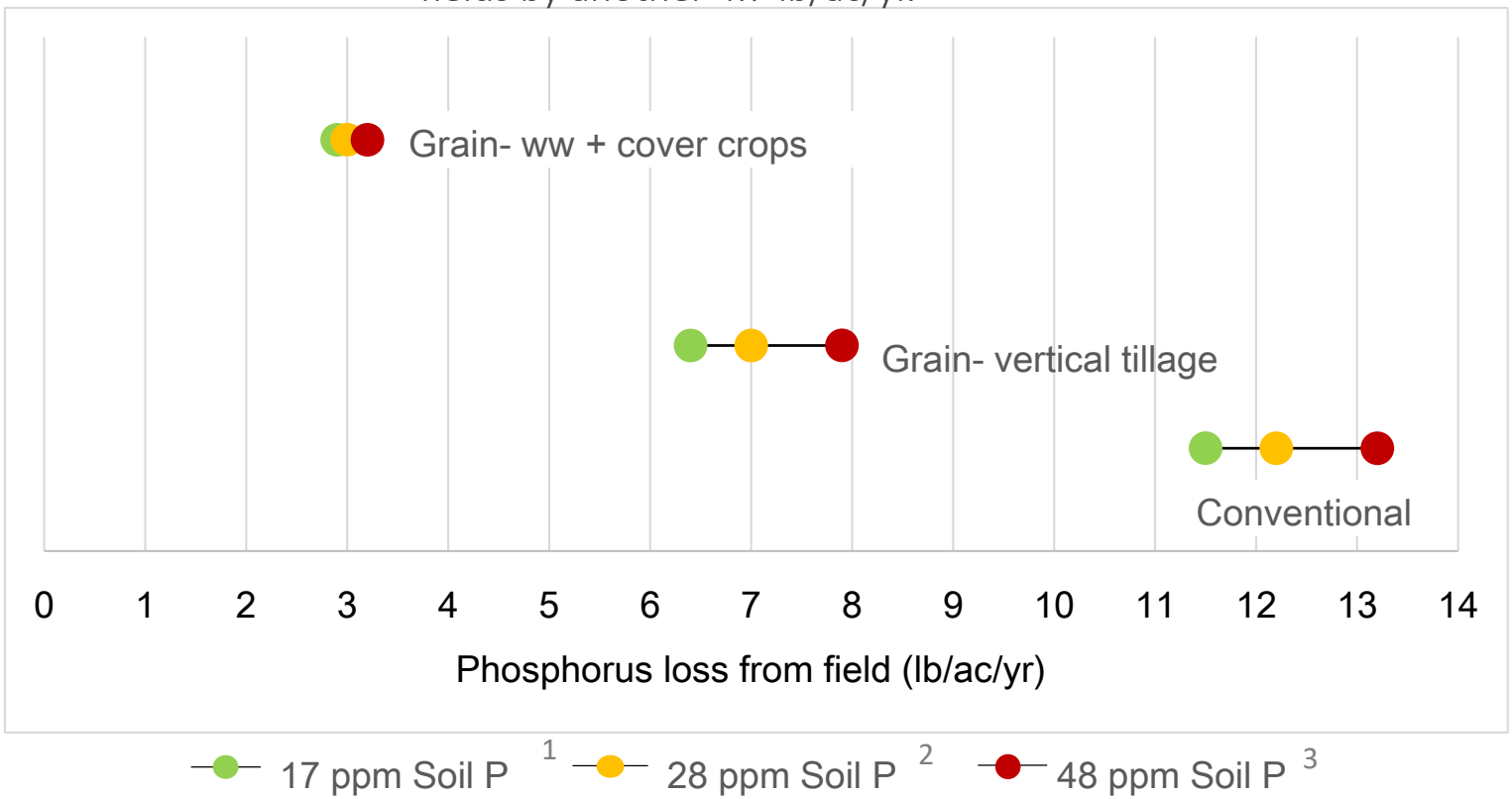
1 'B slope' refers to the soil types in this watershed with slope of 2-6%

2 'C slope' refers to the soil types in this watershed with slope of 6-12%

Higher phosphorus loss from fields in corn-soybean, chisel plow systems

5.3 lb/ac/ yr — At a soil test level of 48 ppm P using a Vertical Till implement instead of a chisel plow to prep soil for planting can reduce phosphorus loss by 5.3 lb/ac/yr.

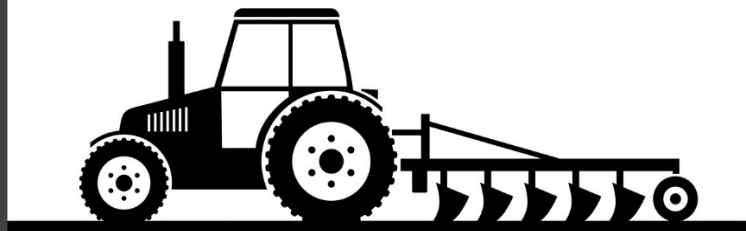
4.7 lb/ac/ yr — At the High P level, transitioning from Vertical Till to planting green into living covers can decrease phosphorus loss from fields by another 4.7 lb/ac/yr.



The Wisconsin Phosphorus Index (PI) estimates the average annual runoff P from a farm field based on: manure application rate and timing, P fertilizer additions, soil test P, crop rotation and field operations.

1 Lower quartile of the Juneau County soil test P soil data summary
2 Median of the Juneau County soil test P soil data summary
3 Upper quartile of the Juneau County soil test P soil data summary

Modeling Results:
DAIRY
OPERATIONS



CROP ROTATIONS: Dairy

Dairy Rotation - Conventional

Corn silage (3 years) - Alfalfa Hay (3 years)
Spring disk
8,000 gallons/acre spring manure application,
Incorporated; No cover crop

Dairy Rotation – No-till

Corn silage (3 years) - Alfalfa Hay (3 years)
No-till
8,000 gallons/acre spring manure surface application

Dairy Rotation – No-till + cover crops

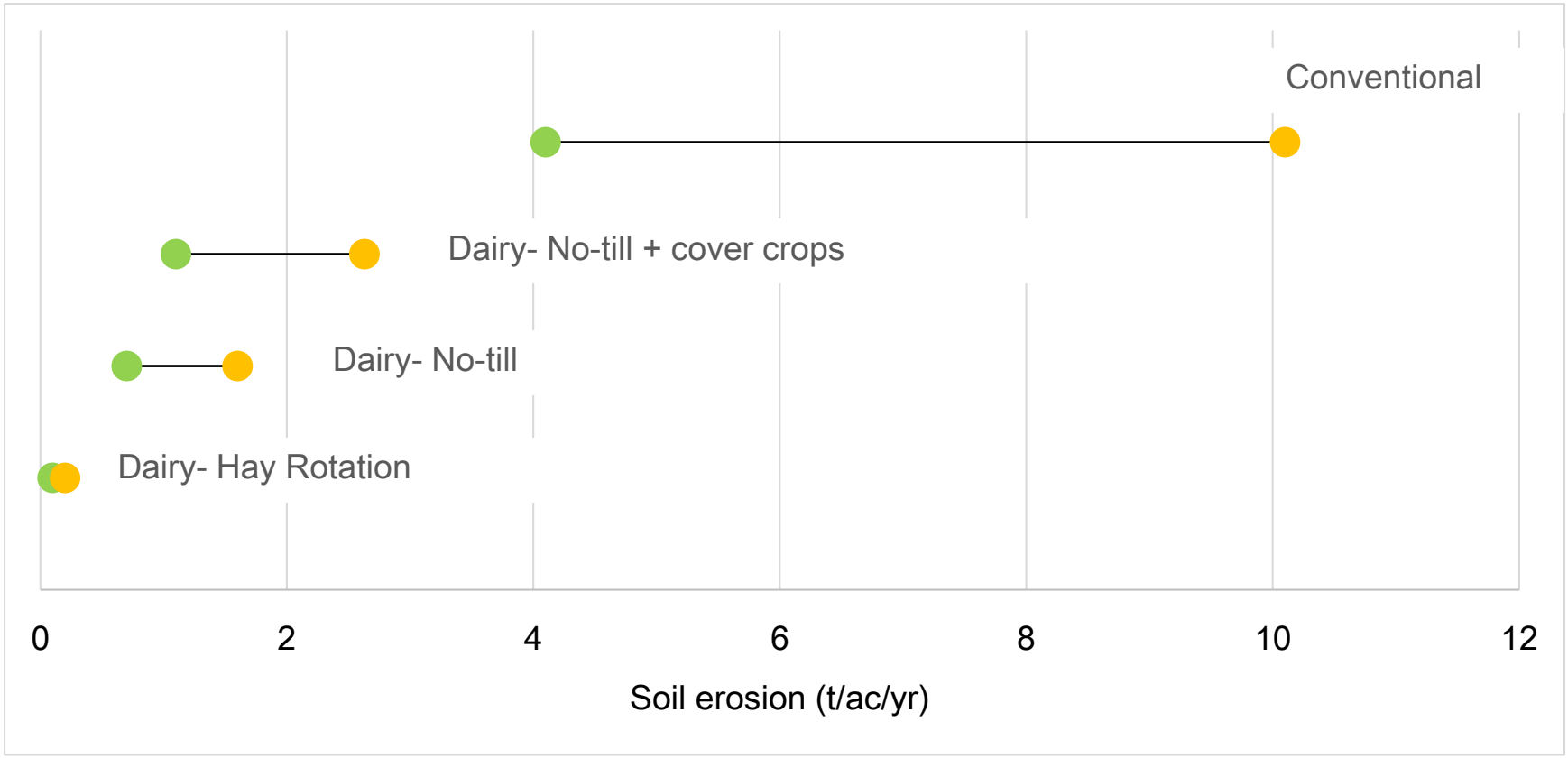
Corn silage (3 years) - Alfalfa Hay (3 years)
Spring disk
8,000 gallons/acre spring manure surface application, Rye cover crop after corn silage

Dairy Rotation - Hay

Straight alfalfa/grass crops
Tillage only in seeding years

7.5
t/ac/ yr

Soil erosion can be reduced by 7.5 t/ac/yr on certain soils in this watershed area with the use of cover crops after corn silage and introducing no-till into dairy systems

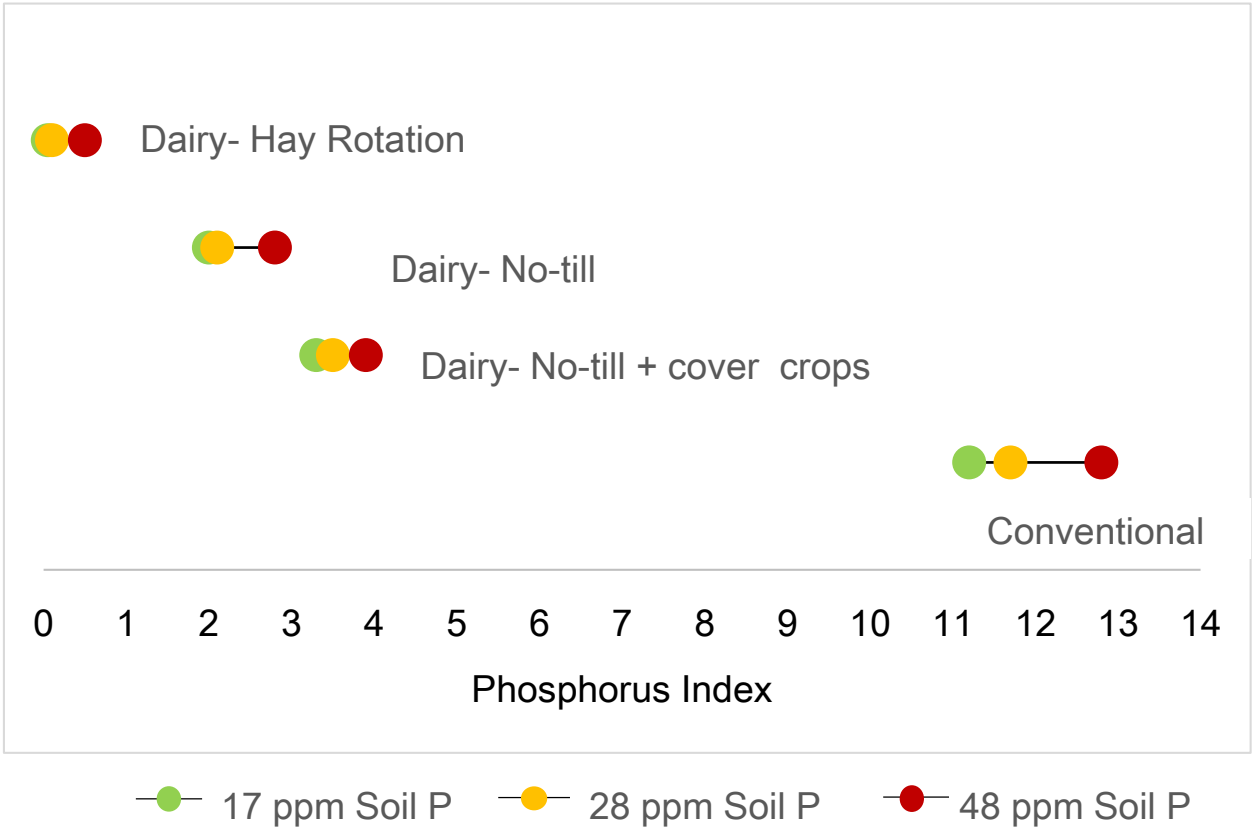


Higher risk of phosphorus loss from fields in dairy rotations when disking in the spring and incorporating manure using tillage

On dairy operations, **manure is an important part of the system**. Some fields may receive more frequent or higher volume manure applications than others on a regular basis, leading to a variability in soil test P levels across the farm.

Conservation practices can not only **lower risk of P losses** from the field, but also **reduce the *variability* in phosphorus losses** across fields with different soil phosphorus concentrations.

Decreasing tillage in dairy systems can lower phosphorus loss from fields.



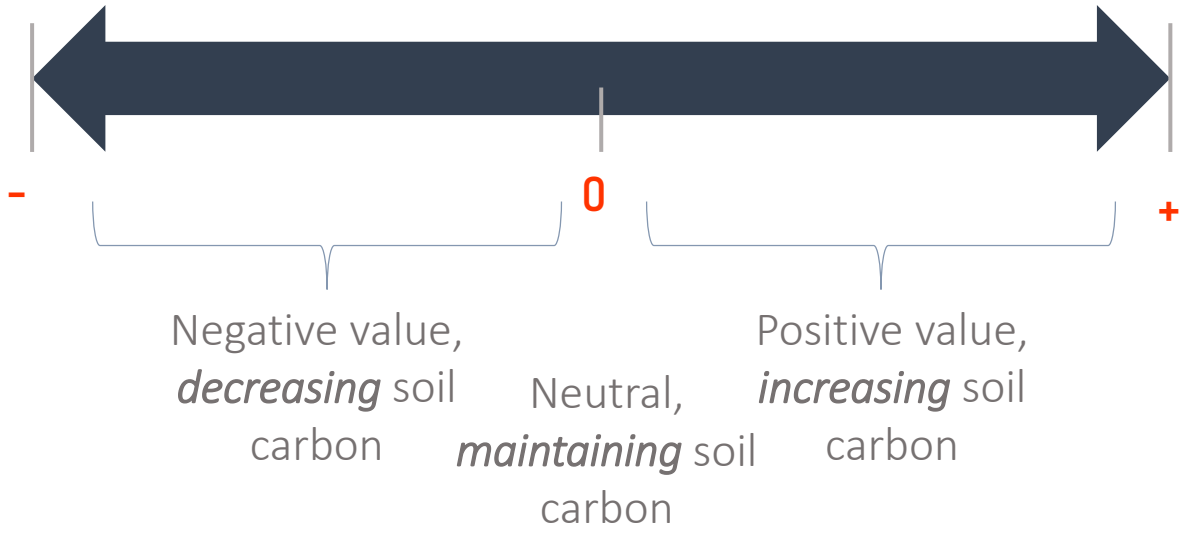
8.9 lb/ac/ yr

At a soil test level of 48 ppm P, no-till planting corn crops instead of using conventional tillage can reduce phosphorus loss by 8.9 lb/ac/yr on average on soils in this watershed.

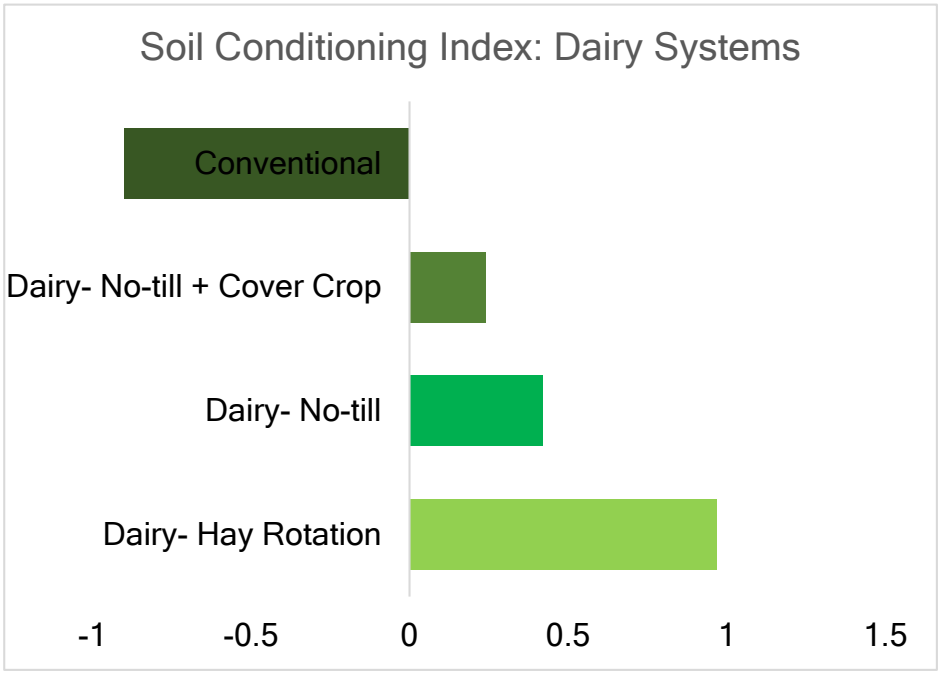
1.1 lb/ac/ yr

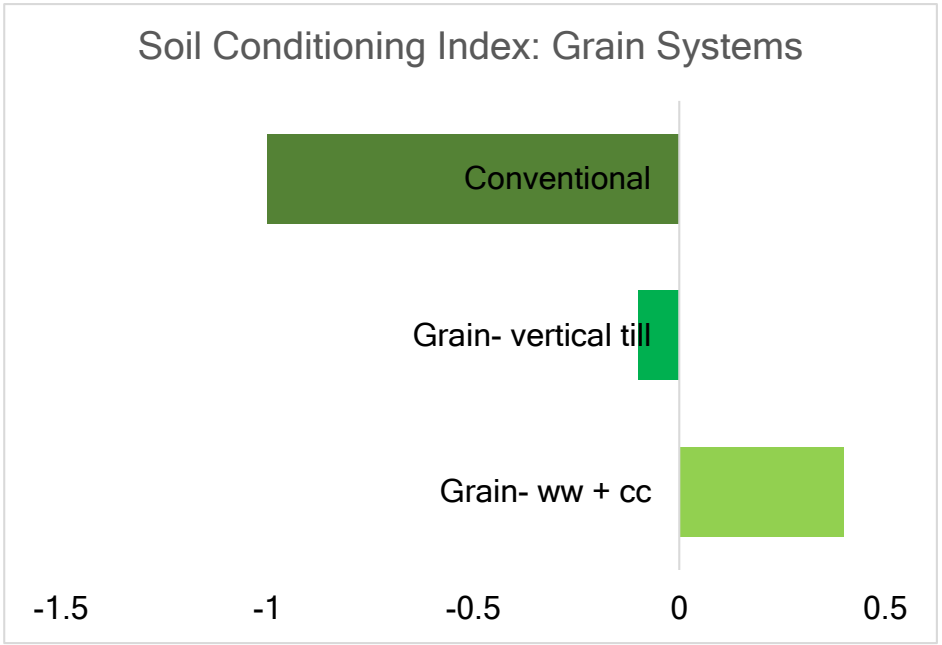
Sometimes additional disturbance from either tillage or the drill when planting a cover crop after corn crops *may* increase P losses from the field, however not always; on average on these soils, by 1.1 lb/ac/yr.

A higher Soil Conditioning Index means farming practices are encouraging the building of soil organic matter



The SCI predicts whether field soil is **gaining or losing carbon.** Values indicate direction of soil carbon building based off management practices like tillage. It does not reflect the actual quantity of carbon stored in the soil and **a value near zero doesn't necessarily indicate good management** if soil carbon levels have already degraded and they are being maintained at a low level.





+ Reducing tillage,
+ Increasing surface residues left on the field
+ Integrating cover crops into a rotation

will often raise the SCI

PRODUCERS OF LAKE REDSTONE

Conservation Dashboard

3,211 acres

Covered by participating farms in 2019

240 acres

Of cover crops planted across 6 farms through the group's cost-share incentive program.

118 acres

Receiving soil testing to help inform soil nutrient needs.

PRODUCERS OF LAKE REDSTONE CONSERVATION PROGRESS

Potential Sediment + Nutrient Reductions

Conservation efforts can reduce sediment and phosphorus from reaching waterways.

Here we apply the reductions we've modeled for the different scenarios on 3,000 acres of cropland to get an idea of potential impacts to water quality.

Currently the group membership covers 3,211 acres. Many producer- led watershed groups seek to expand their farmer participation in their group, while promoting these practices in their communities.

PRODUCERS OF LAKE REDSTONE CONSERVATION PROGRESS

Potential Sediment + Nutrient Reductions

3,000 acres of cropland managed under a **grain system** could experience the following reductions* when switching from a **corn-bean system with chisel plowing** to:

Vertical Tillage →
- 14,322 Tons Sediment
- 15,539 Pounds of P

No-till and cover crops →
- 25,115 Tons Sediment
- 27,692 Pounds of P

*Estimates based on numbers averaged across rotation years, all dominant soil types in watershed, slope classes and soil test P values. Actual reductions will vary based on practice particulars and placement on landscape

PRODUCERS OF LAKE REDSTONE CONSERVATION PROGRESS

Potential Sediment + Nutrient Reductions

3,000 acres of cropland managed under a **dairy system** could experience the following reductions* when switching from **silage and alfalfa rotations with spring disking and manure incorporation** to:

No-till + cover crops → 19,631 Tons Sediment; 25,000 Pounds of P

Perennial forage system → 26,130 Tons Sediment; 35,076 Pounds of P

*Estimates based on numbers averaged across rotation years, all dominant soil types in watershed, slope classes and soil test P values. Actual reductions will vary based on practice particulars and placement on landscape

Looking ahead, the Producers of Lake Redstone are looking to expand their activities and outreach through partnerships with UW Discovery Farms and neighboring Producer-Led groups.

They will continue to develop their manure sharing program and learn more about how to make cover crops a viable practice in their systems.

If you have questions regarding this report, contact Dana Christel, Conservation Specialist:

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