

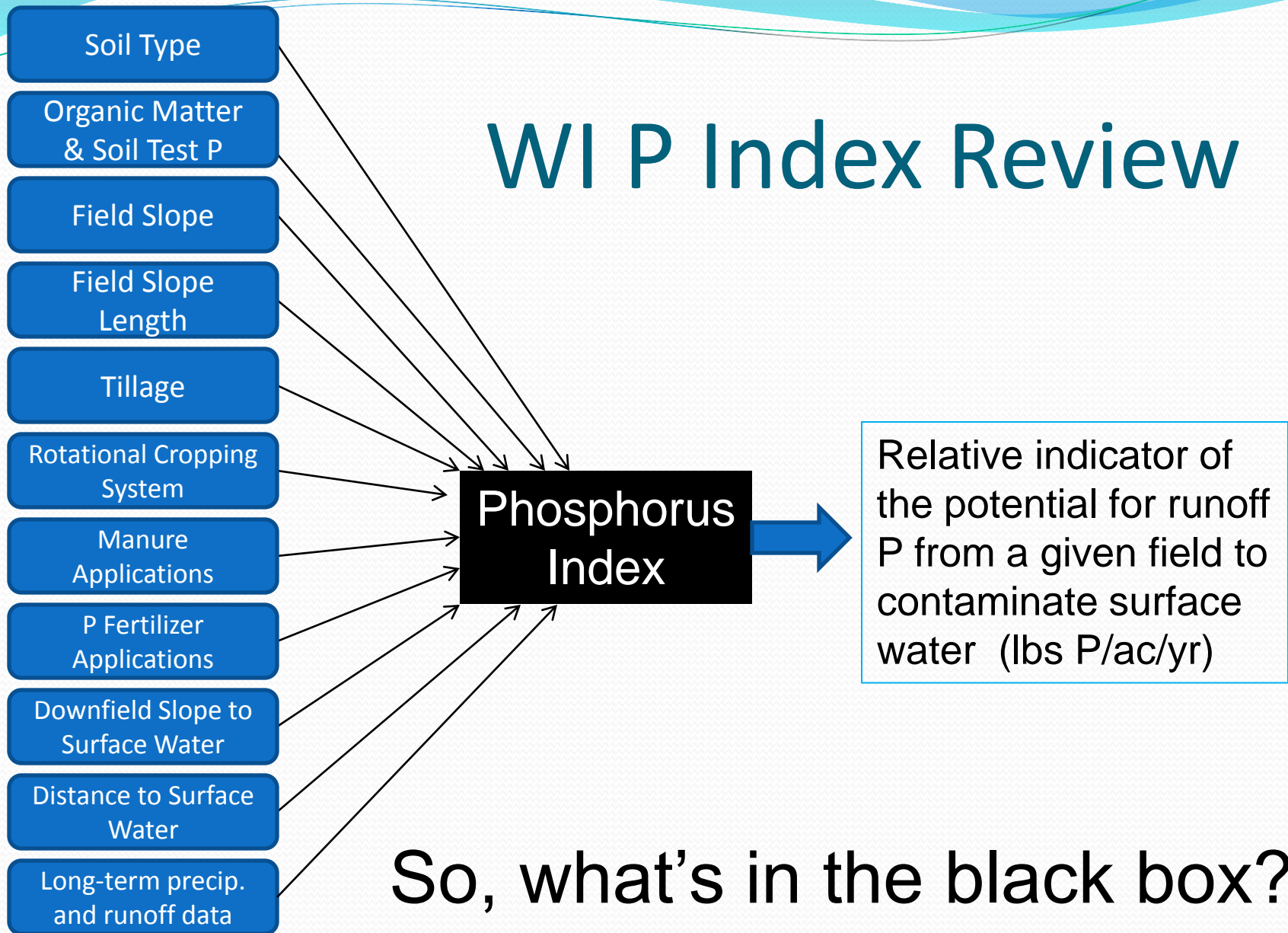
Watershed P Index Inventories

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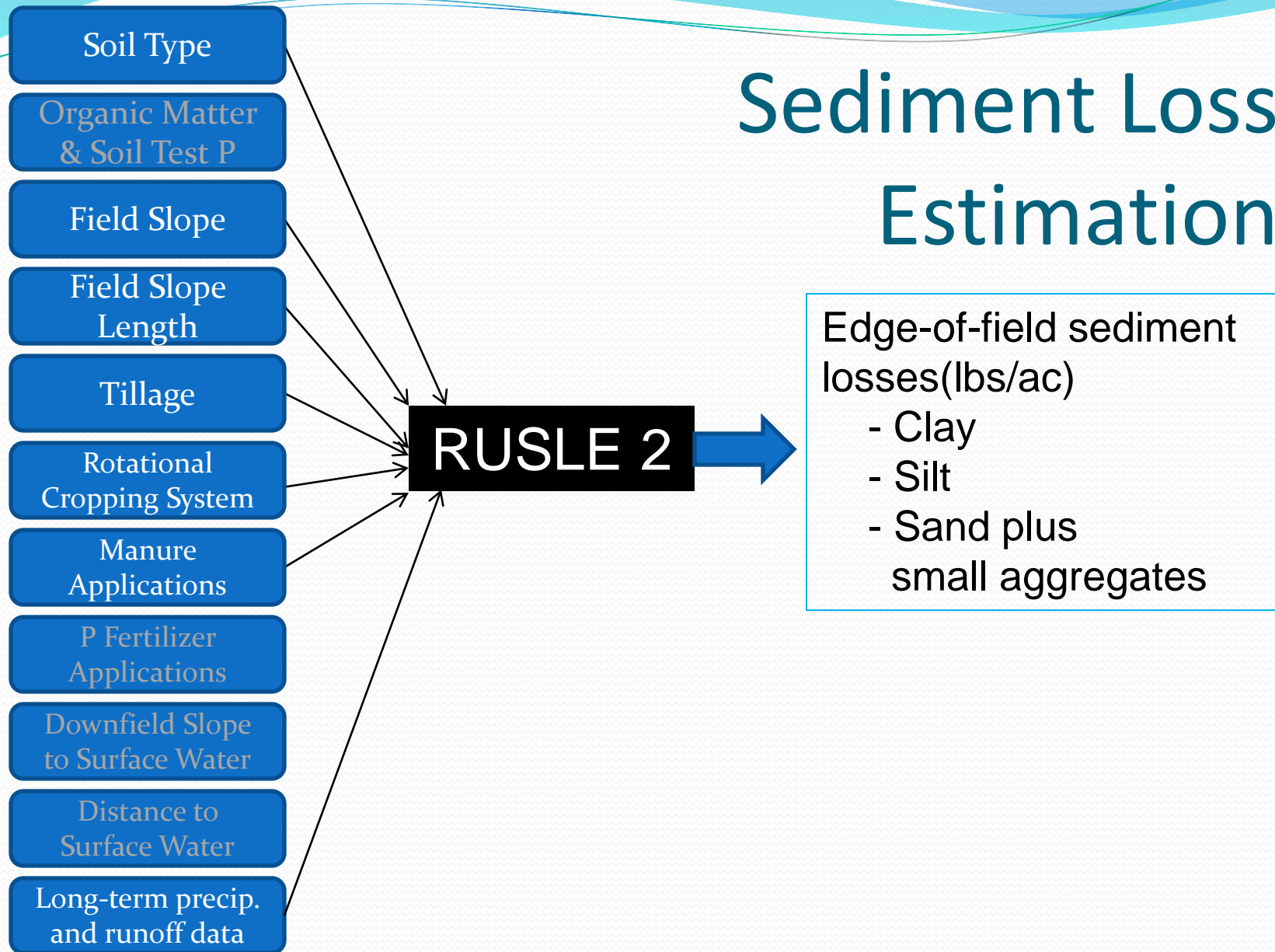
Outline

- Dissecting the Wisconsin Phosphorus Index
- P Index distribution in existing inventories
- Uses of P Index inventories

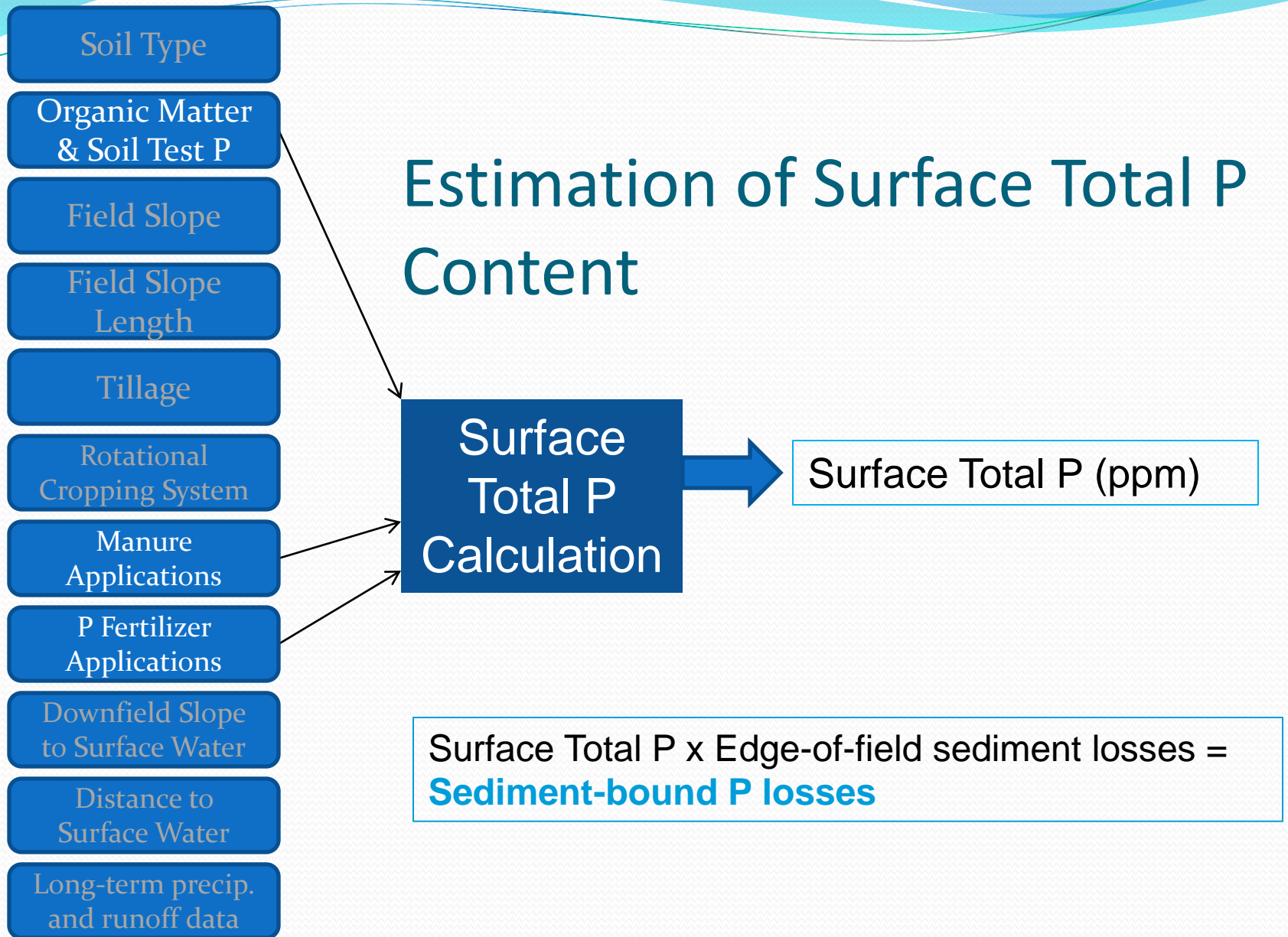
WI P Index Review



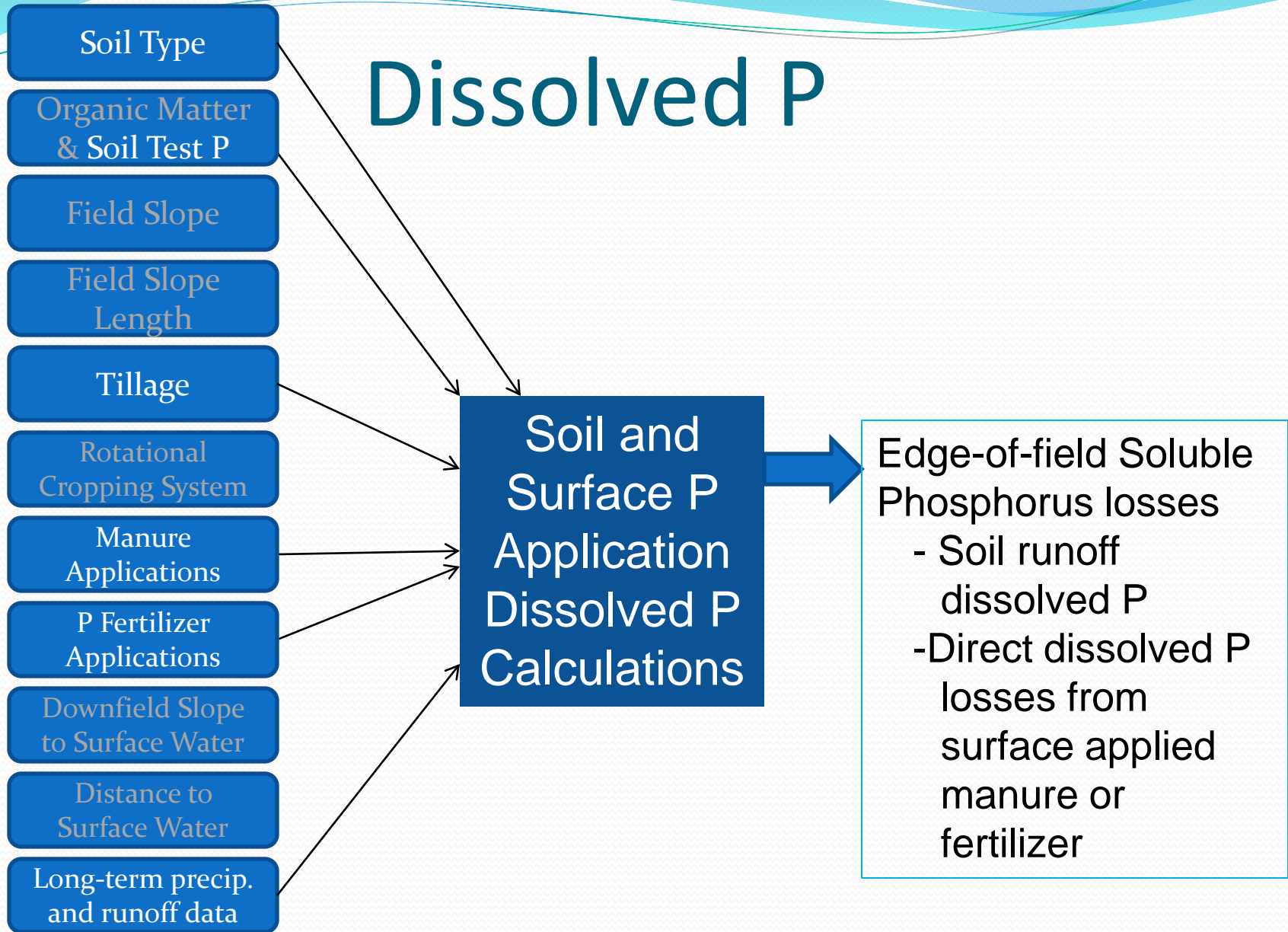
Sediment Loss Estimation



Estimation of Surface Total P Content



Dissolved P



Total P Delivery Ratio

- Soil Type
- Organic Matter & Soil Test P
- Field Slope
- Field Slope Length
- Tillage
- Rotational Cropping System
- Manure Applications
- P Fertilizer Applications
- Downfield Slope to Surface Water
- Distance to Surface Water
- Long-term precip. and runoff data

Pull-down menu options for Snap-Plus

Dominant slope	Distance from stream	TP delivery factor
0-2%	0- 300 ft	1
	300 -1,000 ft.	0.95
	1,001-5,000 ft	0.87
	5,001 -10, 000 ft	0.72
	10,001 - 20,000 ft.	0.55
	> 20,000 ft.	0.45
2-6%	0- 300 ft	1
	300 -1,000 ft.	0.96
	1,001-5,000 ft	0.91
	5,001-10, 000 ft	0.79
	10,001 - 20,000 ft.	0.65
	> 20,000 ft.	0.56
6-12%	0- 300 ft	1
	300 -1,000 ft.	0.98
	1,001-5,000 ft	0.92
	5,001-10, 000 ft	0.81
	10,001 - 20,000 ft.	0.69
	> 20,000 ft.	0.61
> 12%	0- 300 ft	1
	300 -1,000 ft.	0.98
	1,001-5,000 ft	0.93
	5,001-10, 000 ft	0.83
	10,001 - 20,000 ft.	0.71
	> 20,000 ft.	0.64

Total P Delivery Ratio

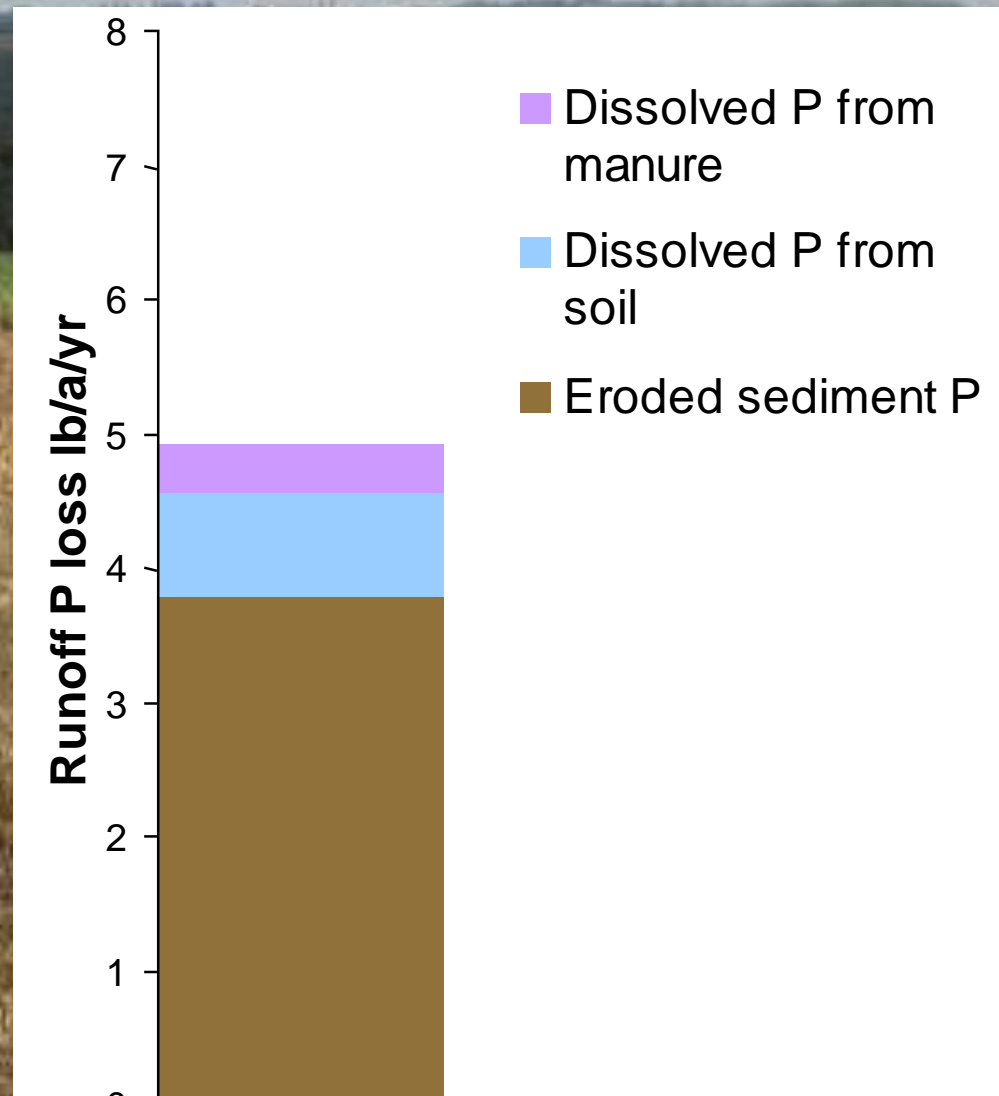
WI P Index annual runoff P loss estimates

- Sediment-bound P
- Dissolved P from soil
- Dissolved P from manure/fertilizer

P delivery factor

A diagram illustrating the P delivery factor. A white horizontal line represents the ground surface. A blue arrow points downwards from the line to a stream. A cyan arrow points from the stream back towards the left, representing runoff. A white box labeled 'P delivery factor' is positioned near the stream, with a cyan arrow pointing to the stream.

Example field:
3.5 T/a/yr soil loss
Bray P: 70 ppm
10,000 gallon/acre in
fall before corn



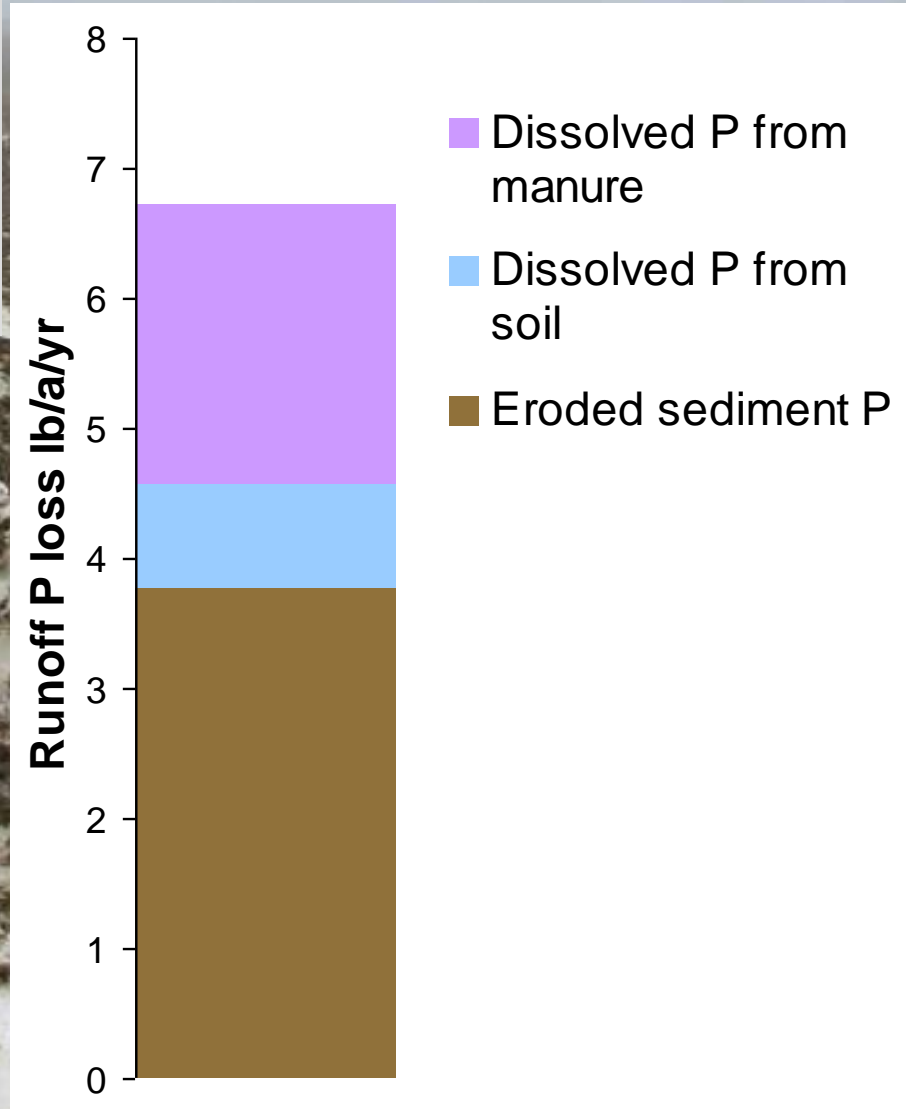
Example field with winter manure:

3.5 T/a soil loss

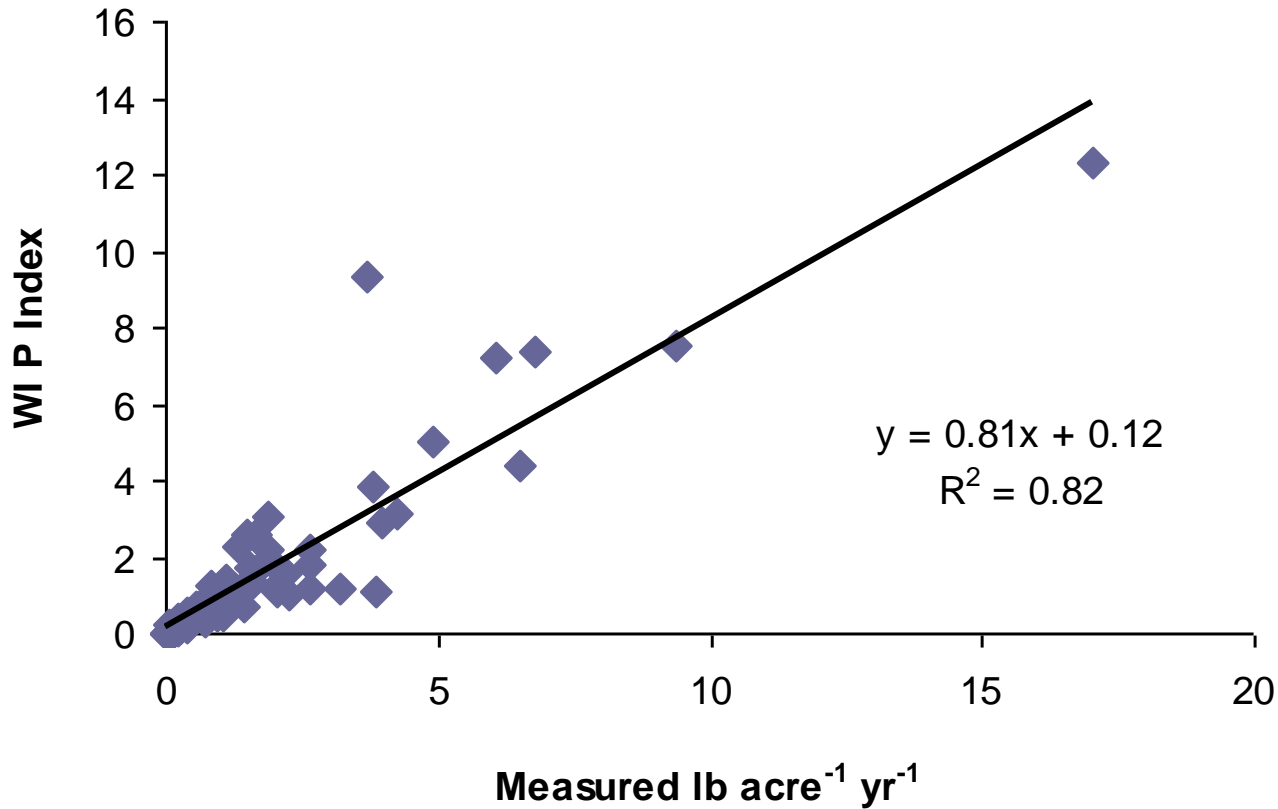
Bray P 70 ppm

5000 gallon/acre in winter,

5000 gallon/acre in fall



WI Total P Index compared to measured runoff losses

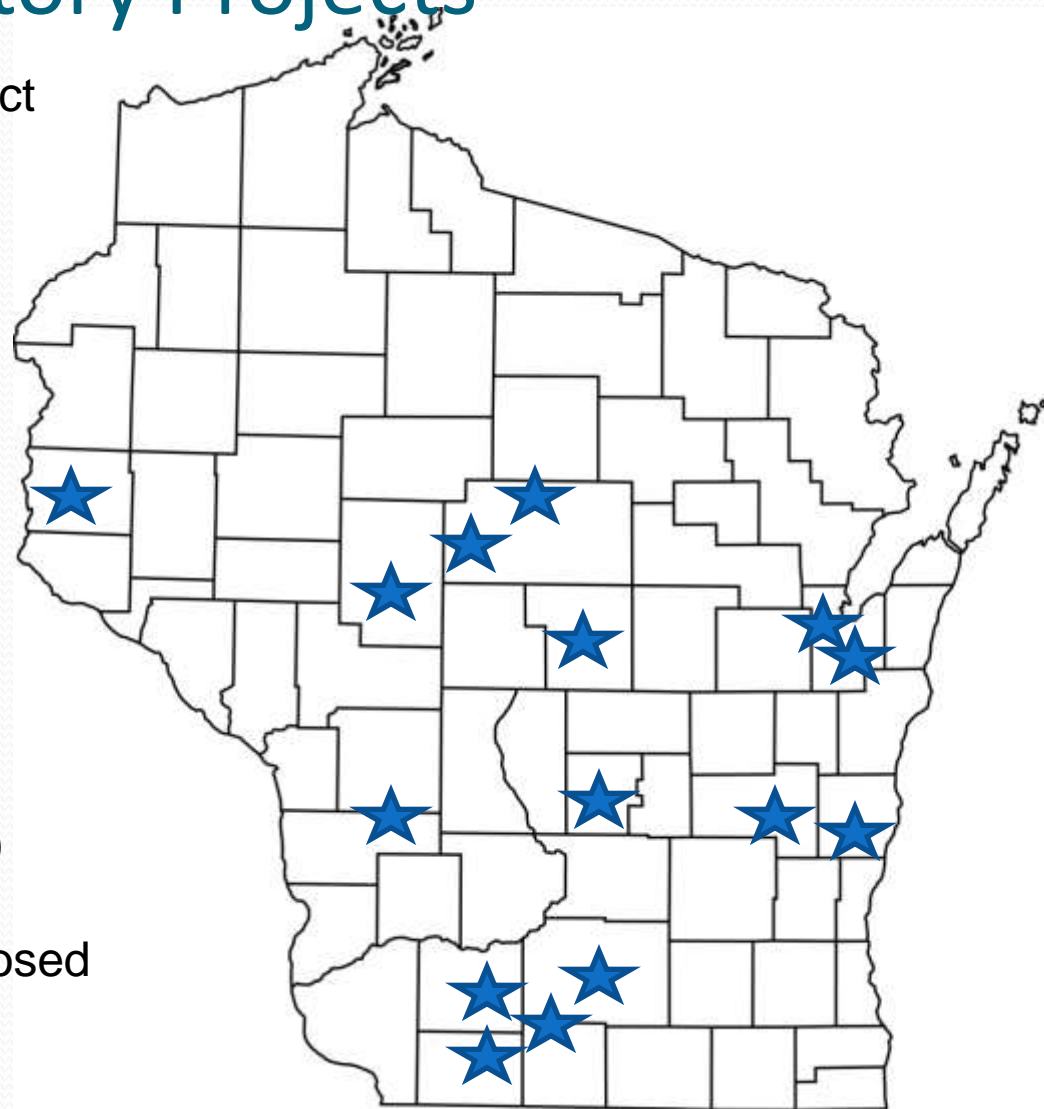


86 field years on Wisconsin fields

Measured runoff volume and sediment used in P Index calculation

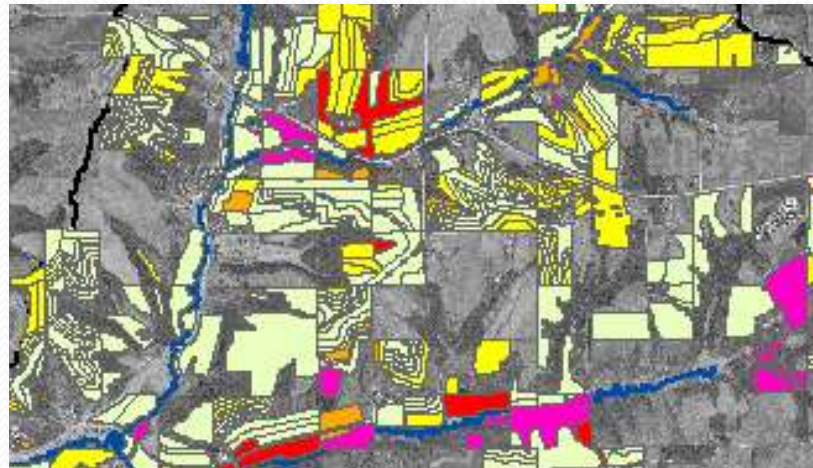
Watershed PI Inventory Projects

- Pecatonica Paired Watershed Project (Dane, Iowa, Green)
- Lake Mendota (Dane)
- Jersey Valley Lake (Vernon/Monroe)
- Dry Run Creek (Willow R.)
- West Branch Milwaukee River (Fond du Lac)
- Mead Lake (Clark)
- Montello Lake (Marquette)
- Mill Creek (Portage)
- Lower Fox River (Brown)
- Plum Creek (Brown)
- Big Eau Pleine and Wisconsin River Watersheds (Marathon, Clark, Taylor)
- Silver Spring Creek (Lafayette)
- Fisher and Grandma Creeks – Proposed Sheboygan County



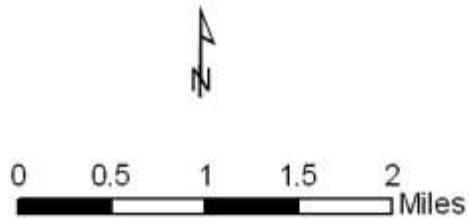
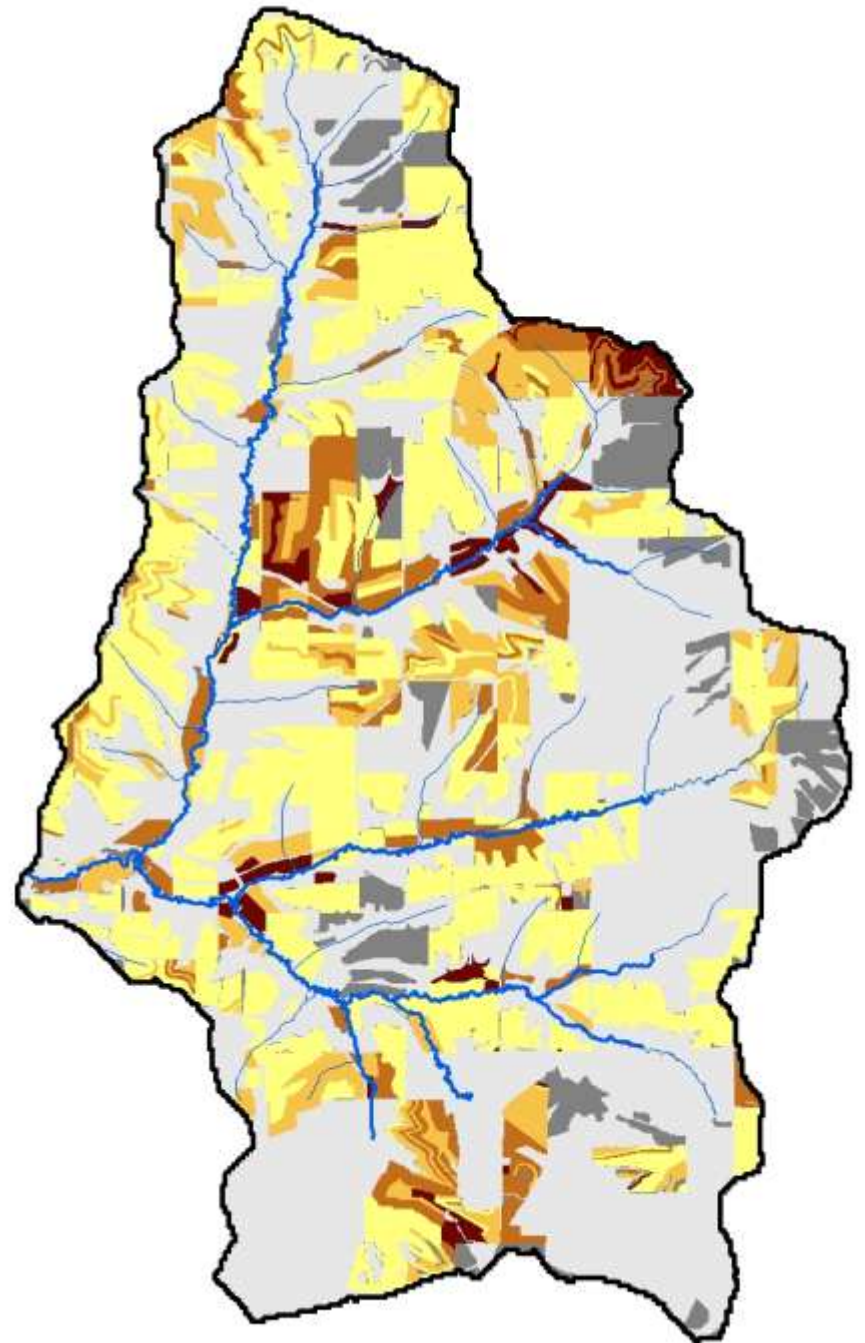
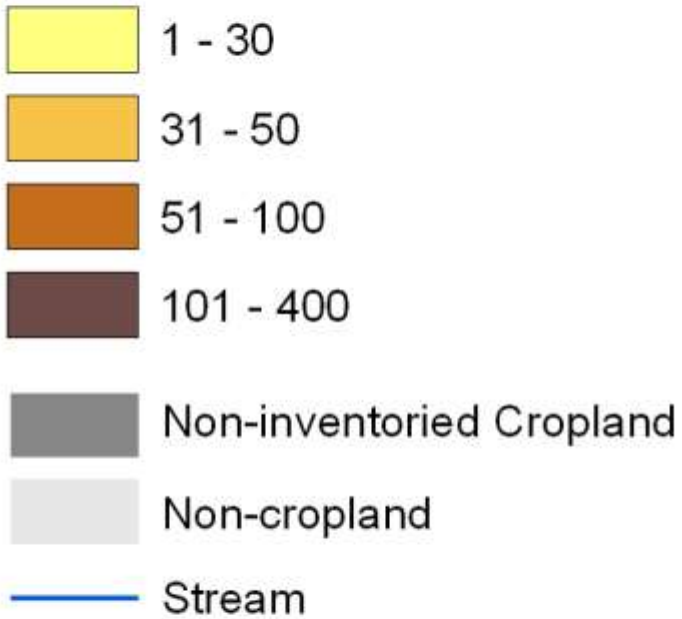
Inventory

- Collect Soil Samples
- Interview Operators
- Calculate Soil Loss and P Index
- Map Results

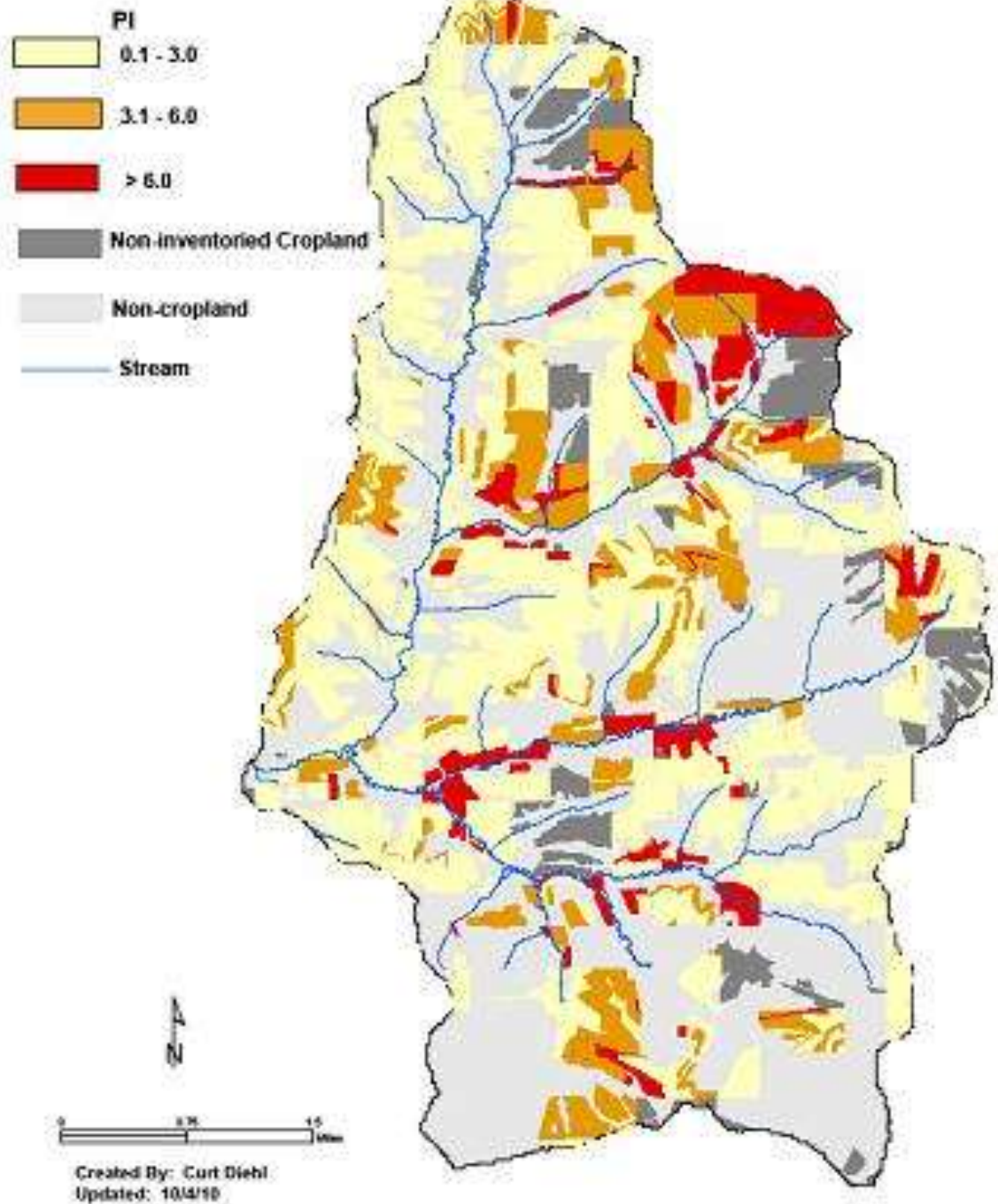


Soil Test Phosphorus

Soil Test P (ppm)



Phosphorus Index



Soil test P is important, but it's not everything

It does not account for:

- transport potential – erosion and runoff
- Direct losses from manure applications

If all of your targeting just addresses reducing soil test P, you will make progress, but it will be slow.

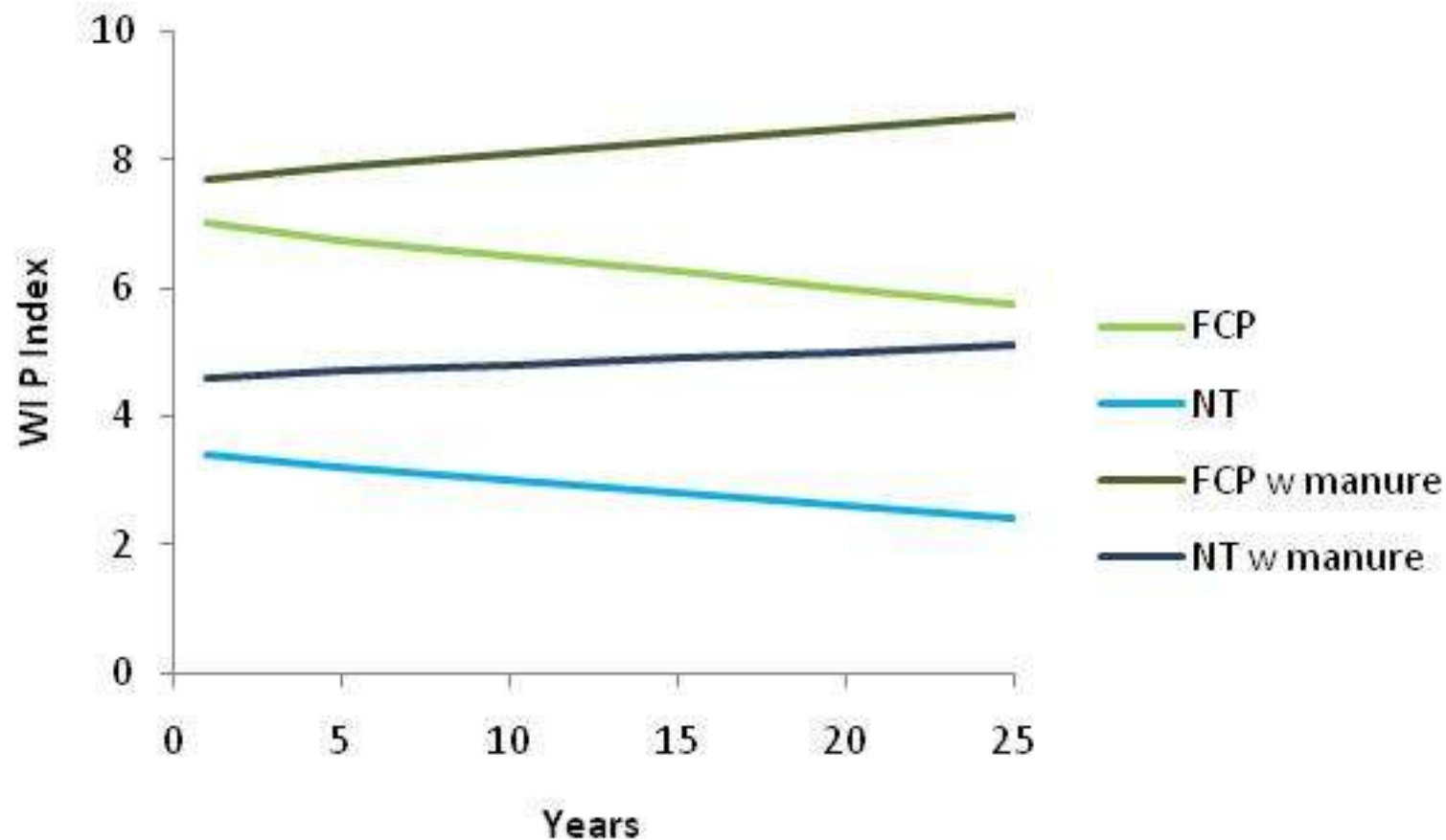
P Index over time with continuous corn silage

Marathon County, Loyal silt loam, 4% slope.

Initial soil test P is 100 ppm.

Corn silage, 18 in rows. Fall chisel plowed or no-till.

With and without 12,000 gallons/acre liquid dairy manure in Fall.



Dane County

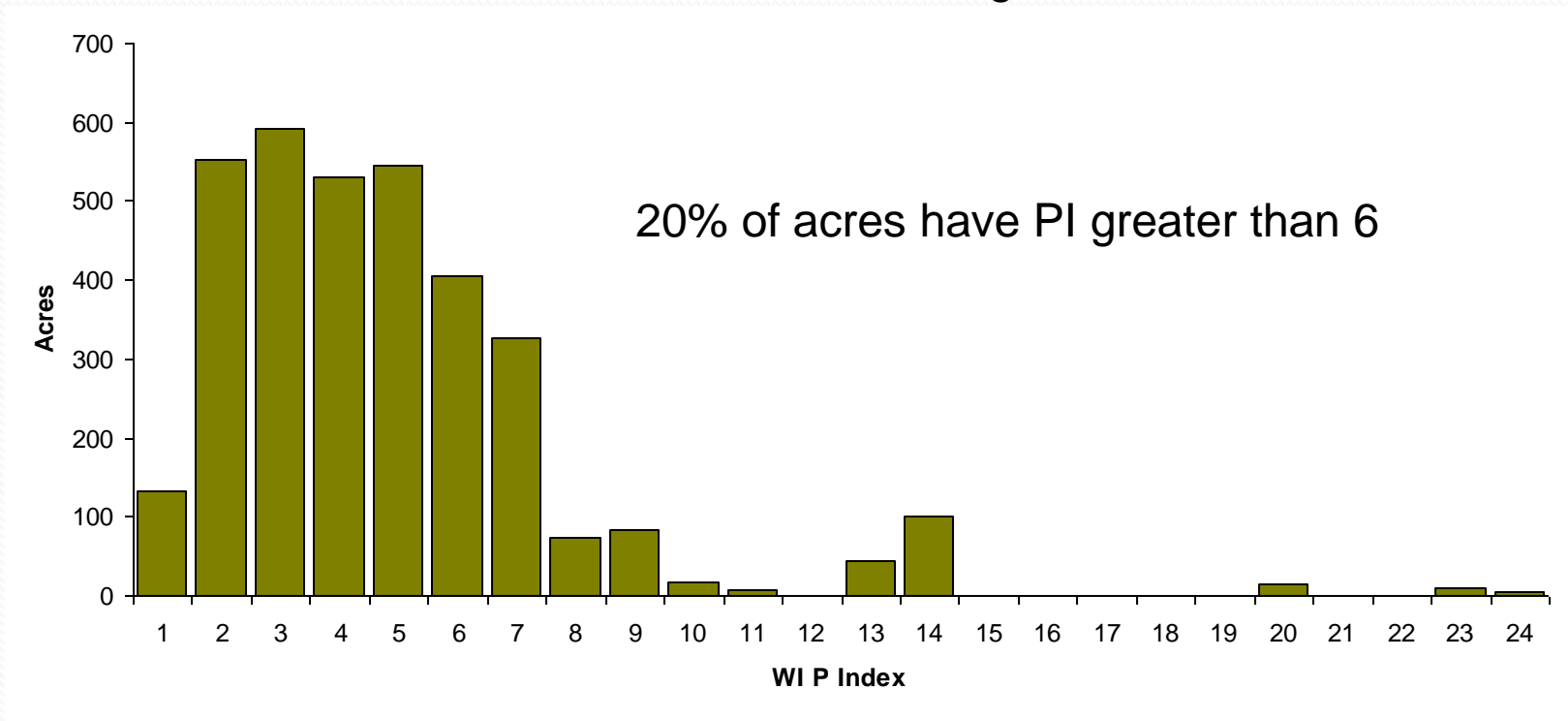
N. Fork Pheasant Branch

Cropland from N-based nutrient management plans

Average soil test P: 93 ppm

Average soil loss: 2.5 T/acre/yr

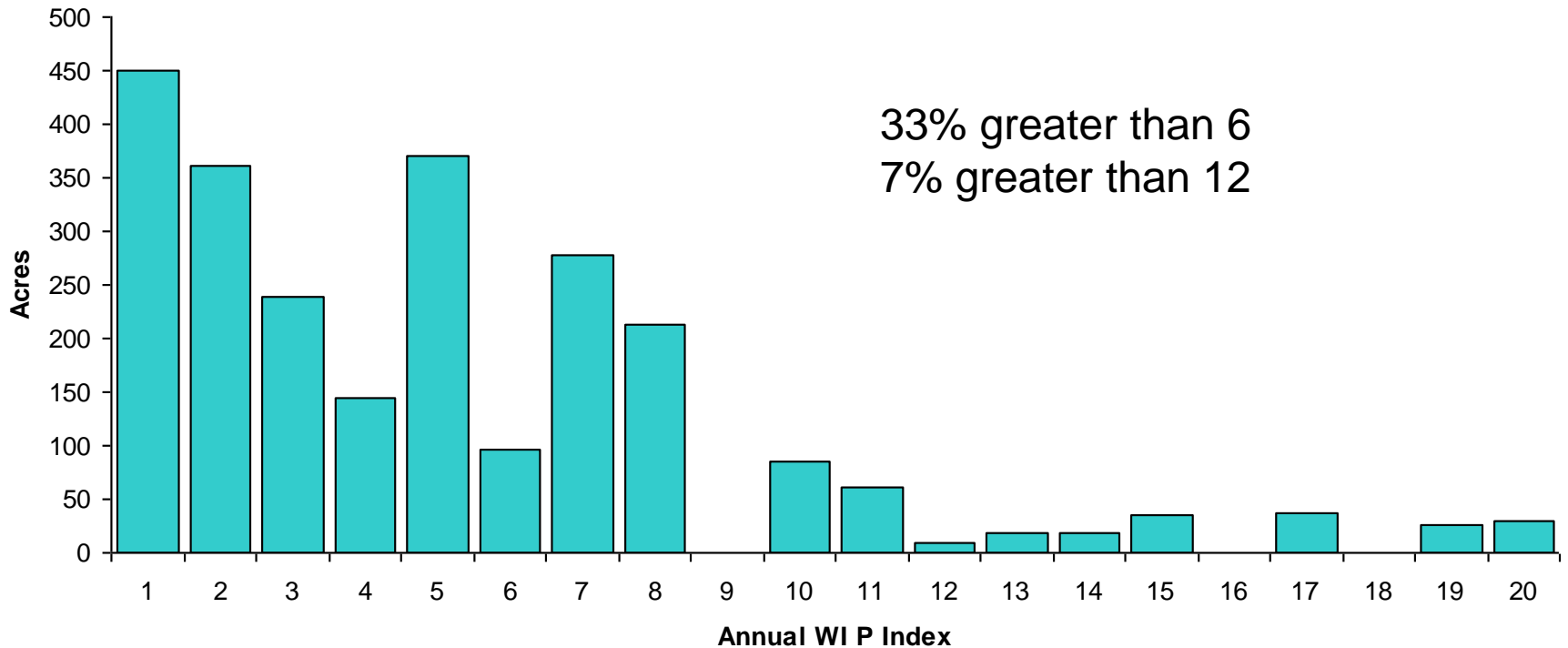
Average P I: 4



Source: Corey Anderson

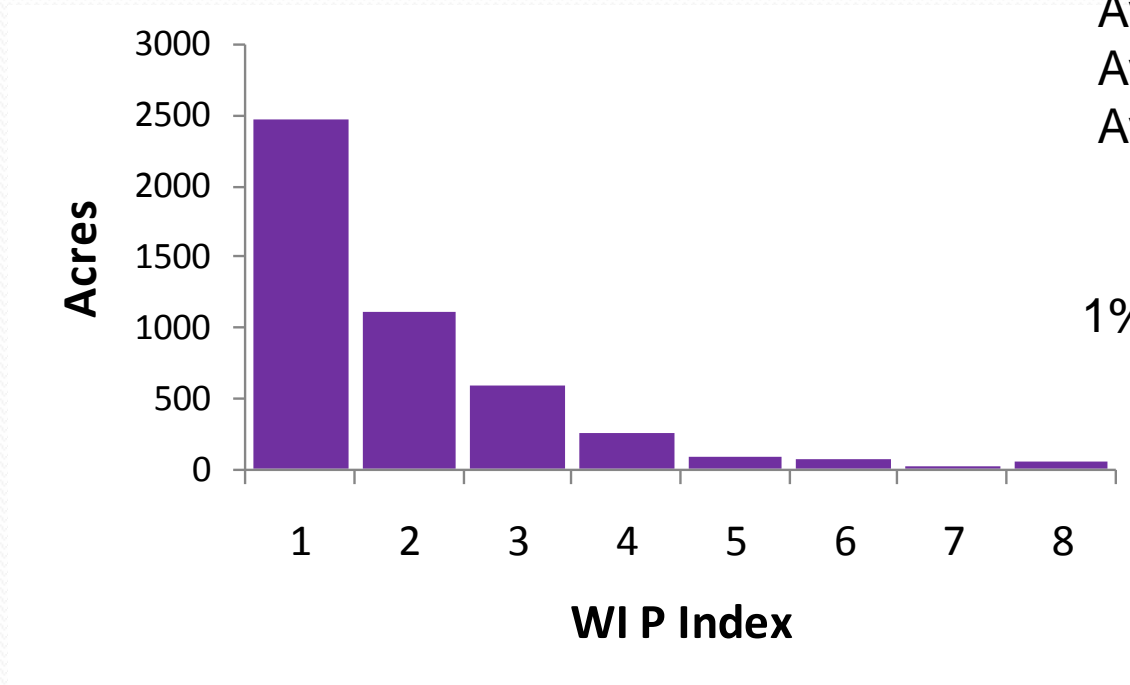
Mead Lake, Clark County

Annual P Index values for cropland 2500 acres



Lake Montello , Marquette County

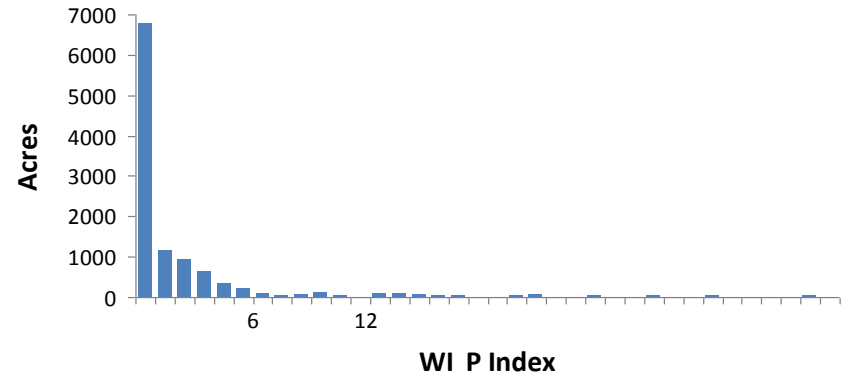
4600 acres cropland



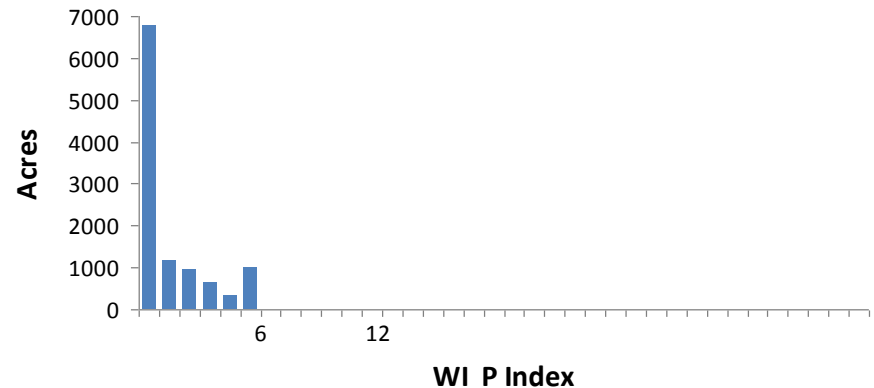
Avg. erosion - 1.2 T/a/yr
Avg. soil test P – 64 ppm
Avg. WI P Index – 1.4

1% of acres are over 6

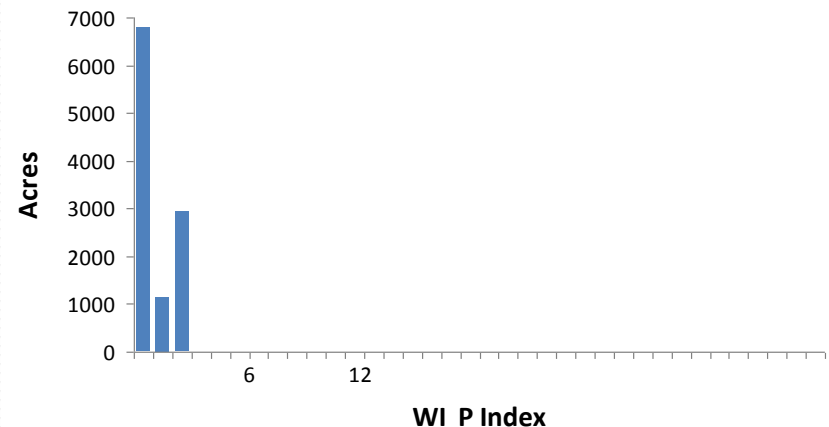
Baseline distribution, all acres



If all P Index values brought down to 6, estimated P delivery for watershed reduced by 26%

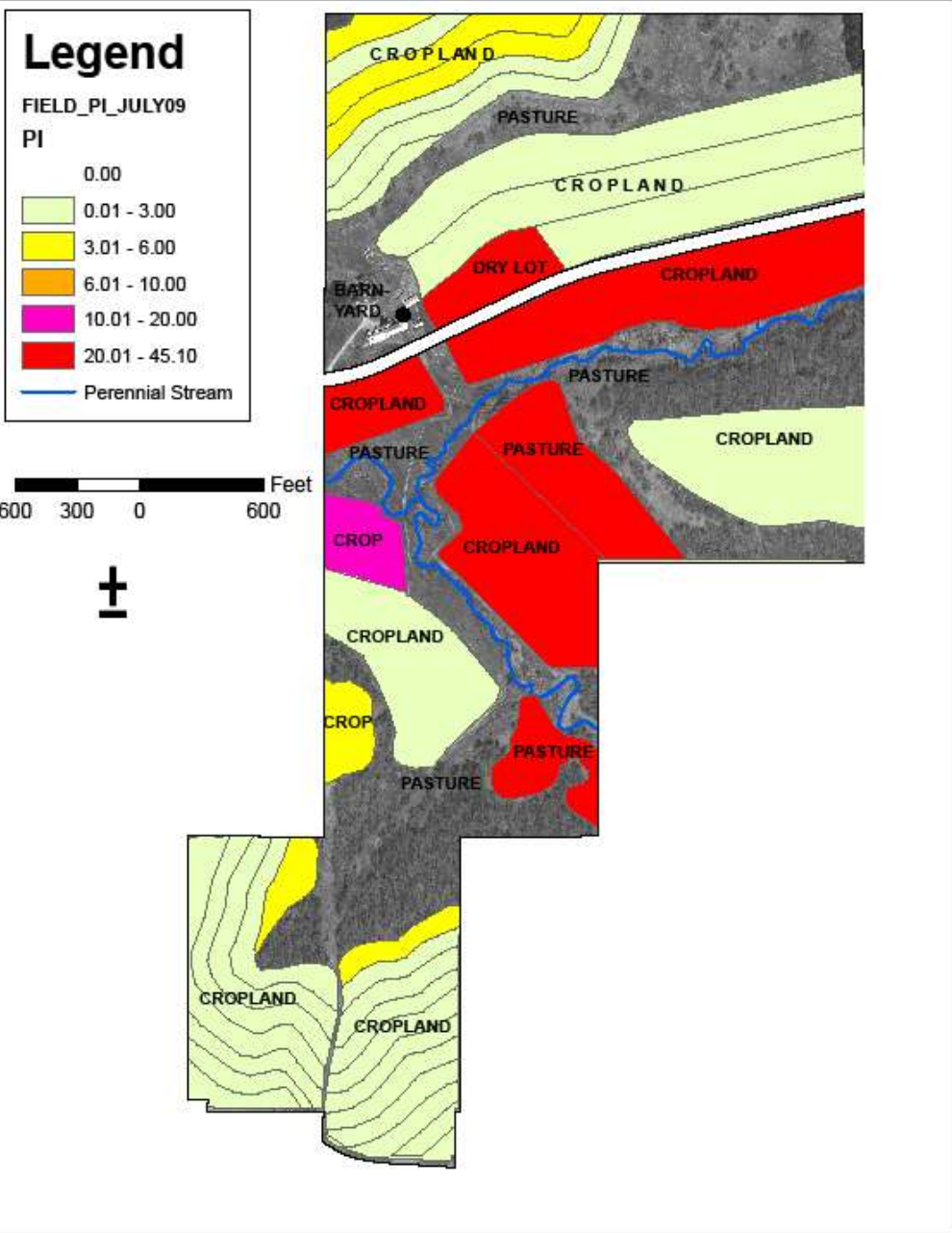


If all P Index values brought down to 3, estimated P delivery for watershed reduced by 44%



Field PI Values Example Farm

Need to address the whole farm



Phosphorous Delivery to the Stream by Land Use

Cropland	73%
Pasture	15%
Dry lot	5%
Barnyard	7%

How can the inventories be used?

- Locating problem areas
- Identifying areas where management practices can be changed
- Quantifying proportionate load reductions with changing practices

For use in determining proportionate loads, need to quantify other sources of P delivery to stream

- Soft sediment contribution to baseload
- Dry lots, night pastures
- Barnyards
- Cattle in stream channels
- Phosphorus sorption and release from sediments
- Tile drains





Questions???