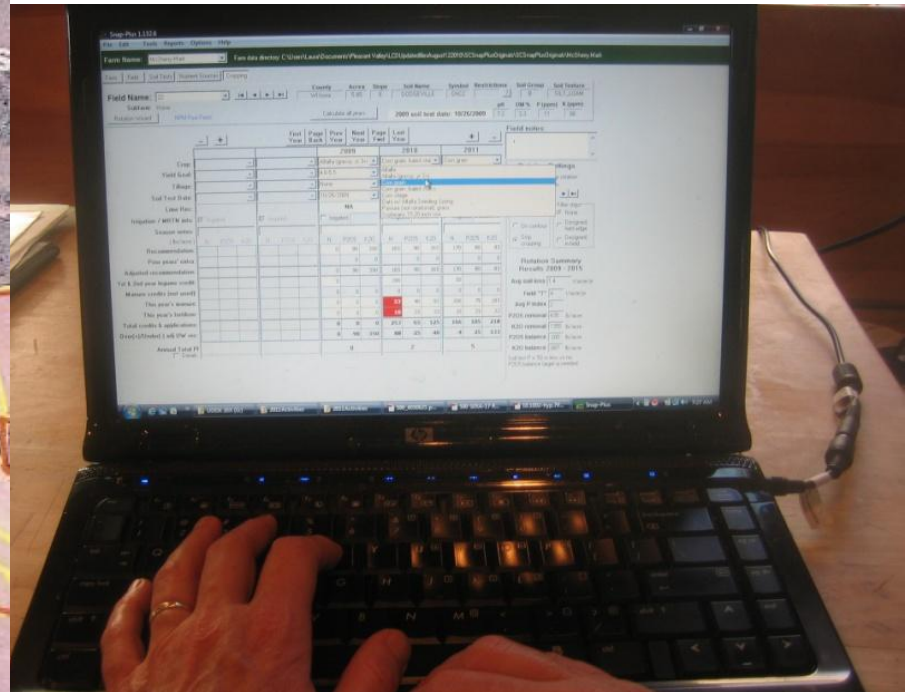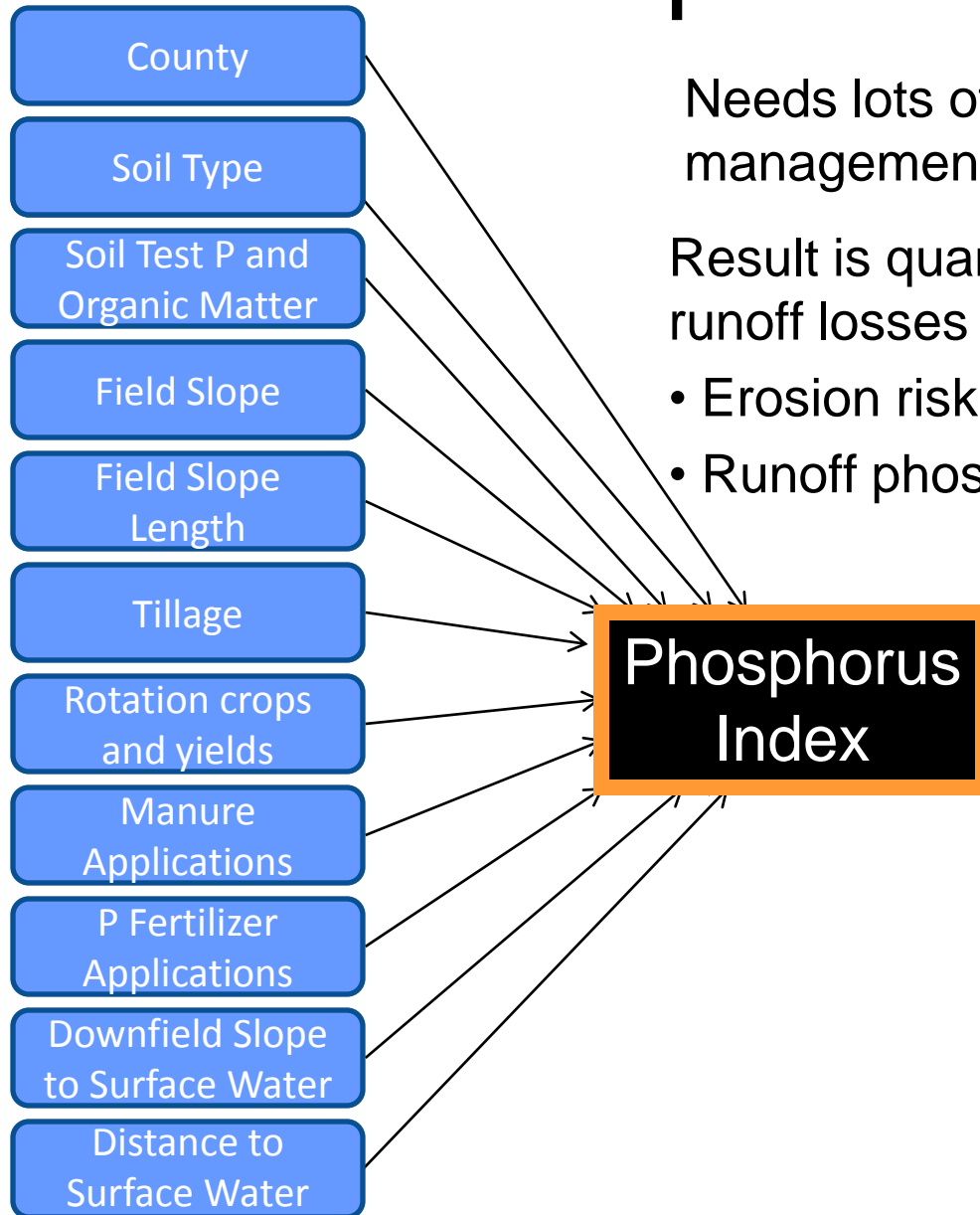# The Inventory:
What is it good for?

Laura Ward Good
UW-Madison Soil Science Department

Snap-Plus Inventory

County

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

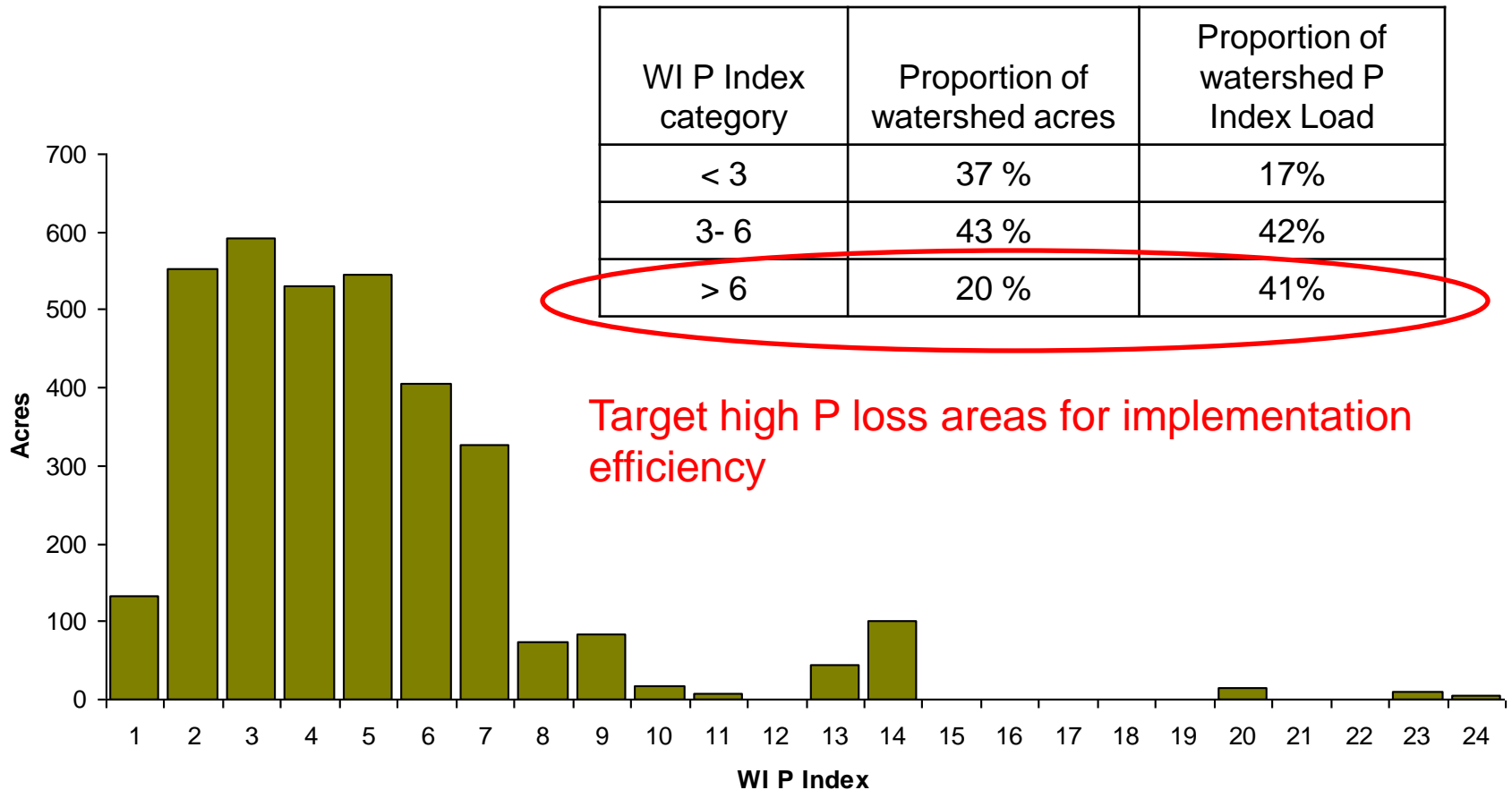Distance to Surface Water

Phosphorus Index

Needs lots of data about field conditions and management

Result is quantitative ranking for comparison of runoff losses from cropland, pasture, dirt lots

- Erosion risk
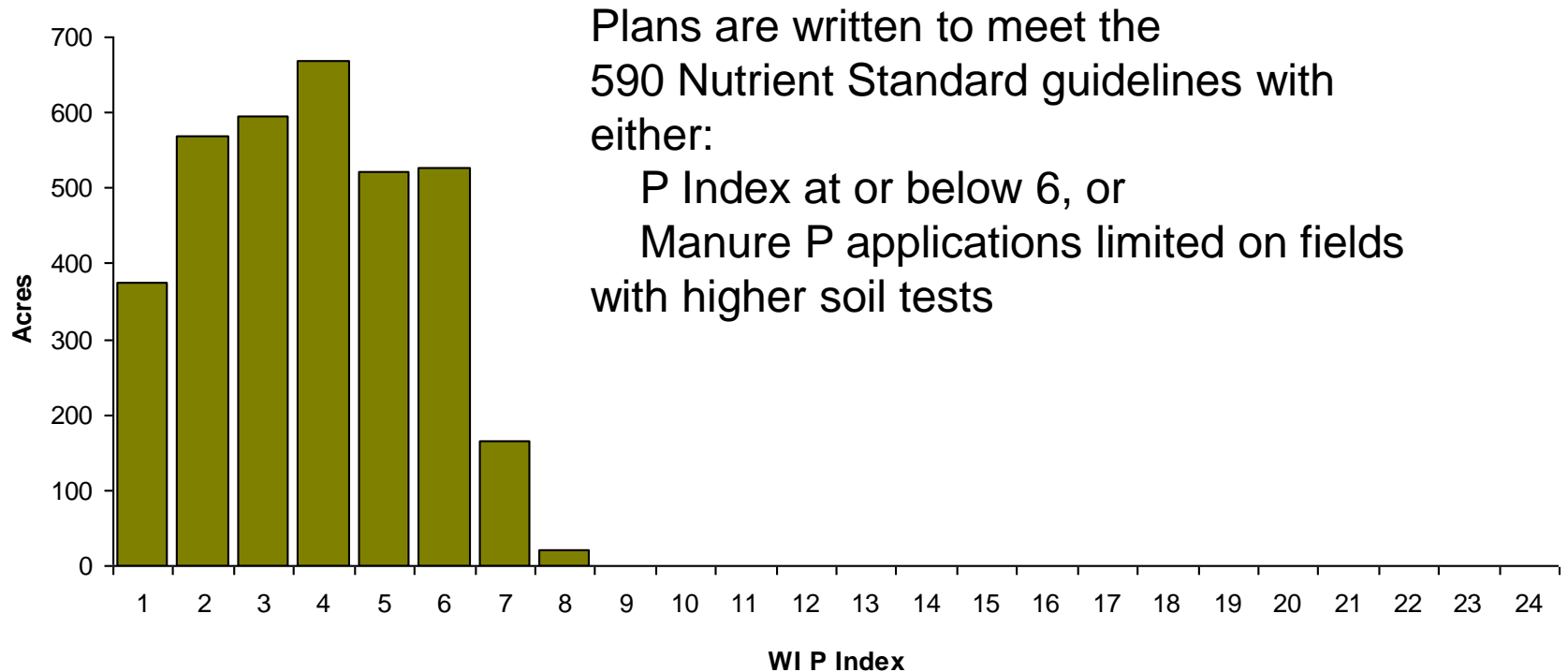- Runoff phosphorus delivery risk (P Index)

Common Baseline Inventory Result for P Index Distribution Across Landscape

Southwest and South Central Wisconsin

WI P Index category	Proportion of watershed acres	Proportion of watershed P Index Load
< 3	37 %	17%
3- 6	43 %	42%
> 6	20 %	41%

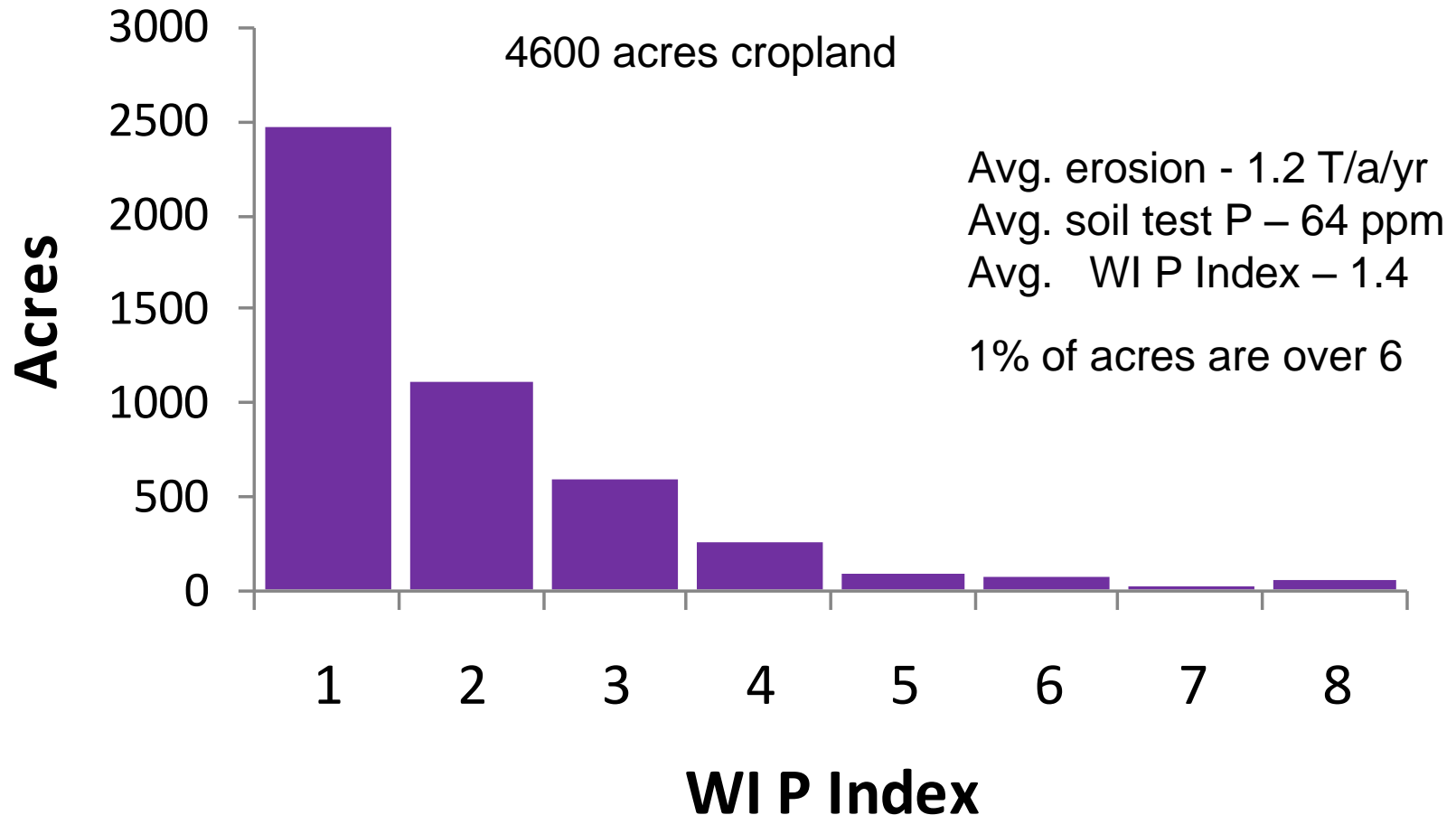Target high P loss areas for implementation efficiency

In inventories, SNAP-Plus is used for calculating P Index with existing conditions.

Expected distribution of P Index values from nutrient management plans

Plans are written to meet the 590 Nutrient Standard guidelines with either:
   P Index at or below 6, or
   Manure P applications limited on fields with higher soil tests

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

Acres

WI P Index

In some landscapes that produce comparatively low amounts of surface runoff, it is rare to get higher P Index values, even with higher soil test P. If water quality goals are not being met, it is still a reasonable approach to target management changes to the highest P loss fields, even if they have P Index values less than 6.

The P Index is used to estimate runoff P delivery from agricultural land

We want to protect the water quality in the stream

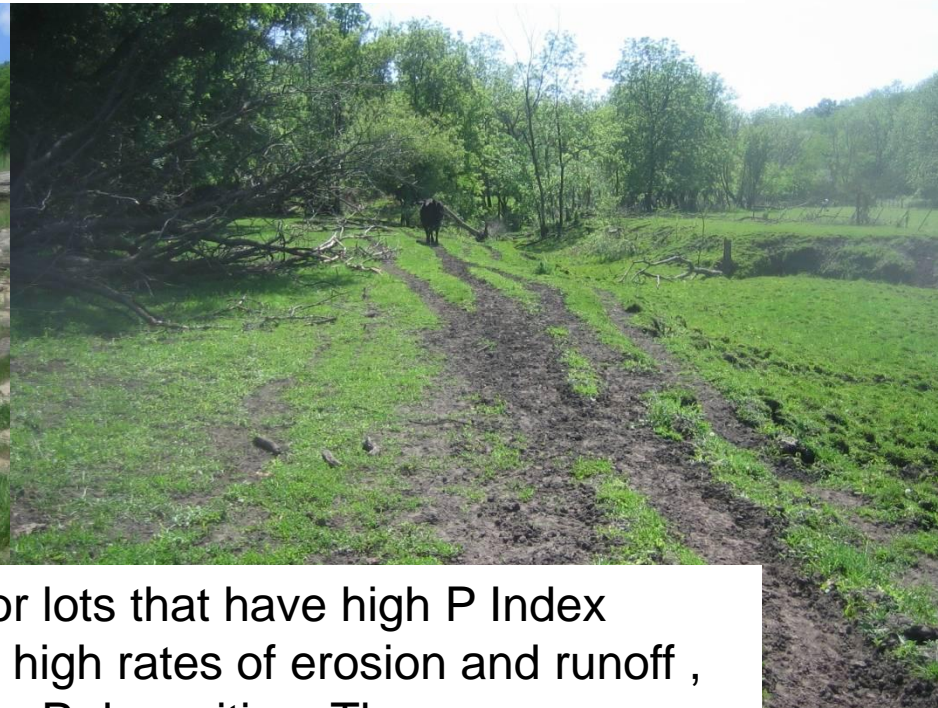We need to understand the relationship between P Index and stream water quality.

Not all P delivered to a stream can be accounted for by the P Index

Not quantified in a
 P Index inventory:

- Bank erosion

- Gully erosion

- Barnyards

- Grazed woods

- Groundwater
  contributions

A little discussion on "pastures" and dry lots found in some project areas….

These pictures are of exercise areas or lots that have high P Index values because of bare soil leading to high rates of erosion and runoff , a high soil P, and a high rate of manure P deposition. These areas are sometimes referred to as pastures by farmers even if they are not providing much nutrition for the cows.
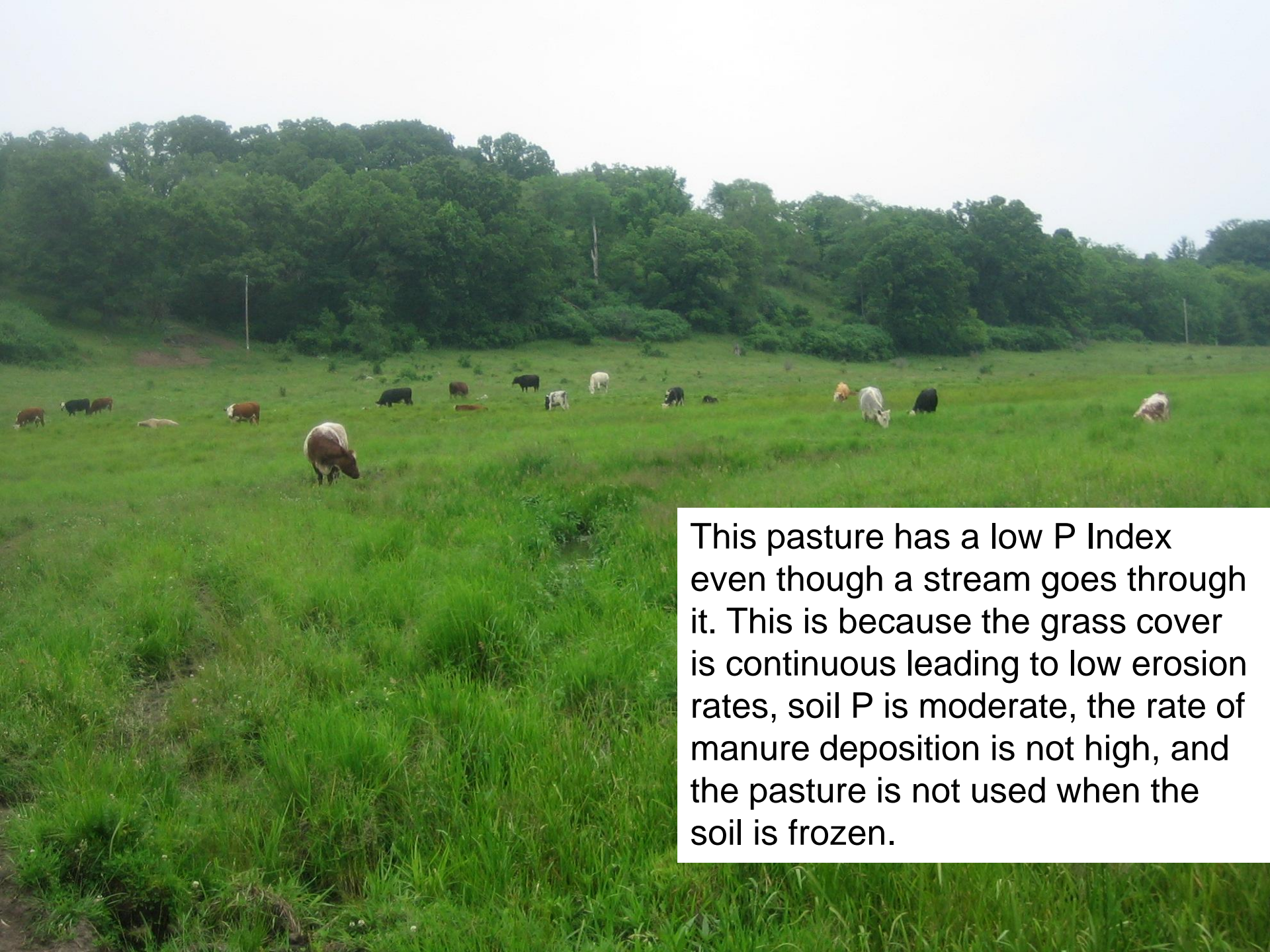
This pasture has a low P Index even though a stream goes through it. This is because the grass cover is continuous leading to low erosion rates, soil P is moderate, the rate of manure deposition is not high, and the pasture is not used when the soil is frozen.
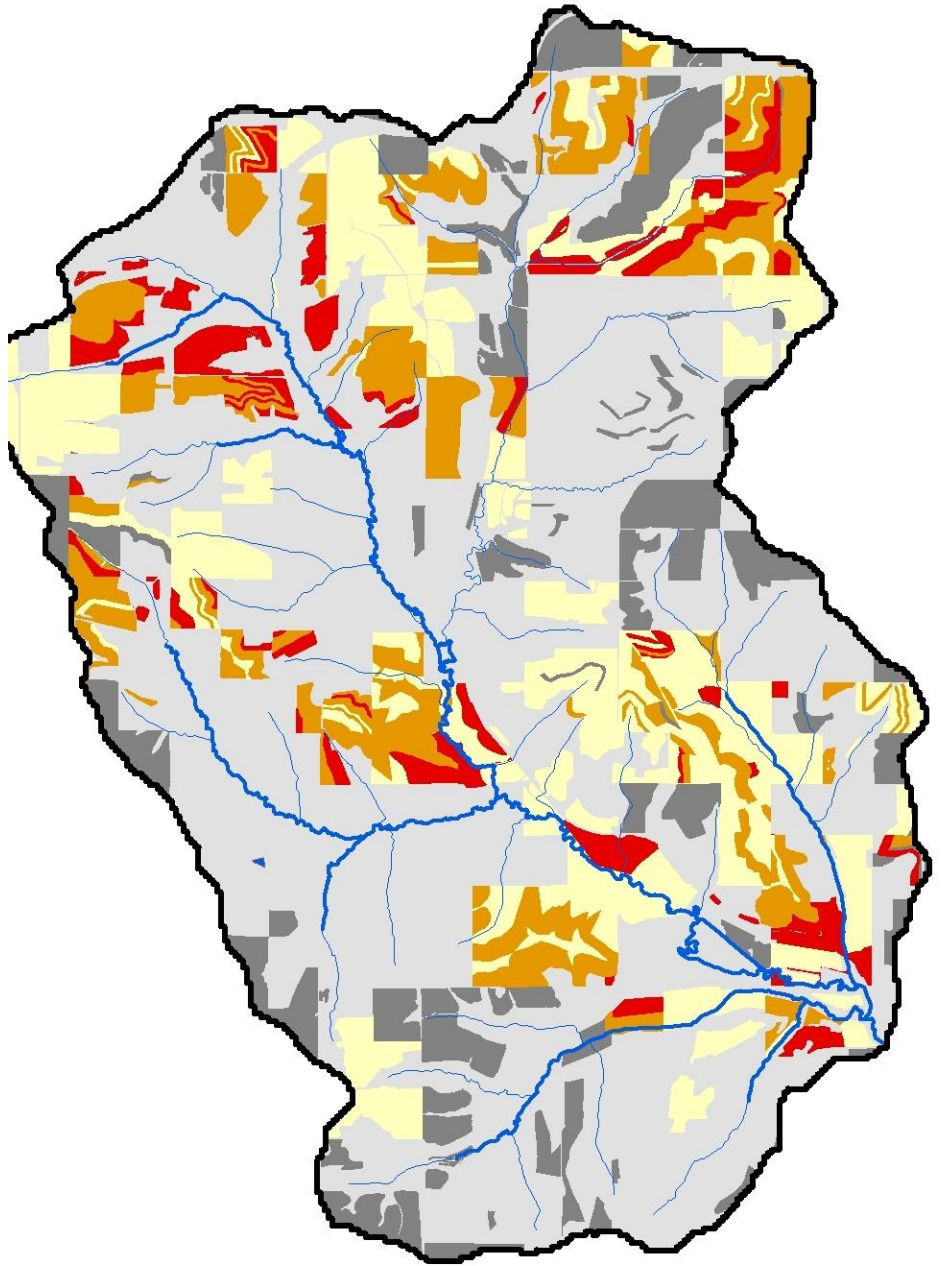
Moderate PI

High PI

In watershed projects intended to relate P Index values to monitored stream water quality and stream P loads we need to document changes in management that lead to changes in P Index values in over the monitoring period in the watershed.

How to handle all of the data?

Stay digital

Maintain information in SNAP-Plus database files.
Ask planners for files, not paper reports.

MergeFarm Tool

Any number of SNAP-Plus farm databases can be merged into one database for cross-watershed analysis. Allows field ownership information to be removed before analysis.

D:\Baseline

File   Edit   View   Favorites   To

Back

Address   D:\Baseline

Name ▲

MergedFarms.11.30.11.sqlite
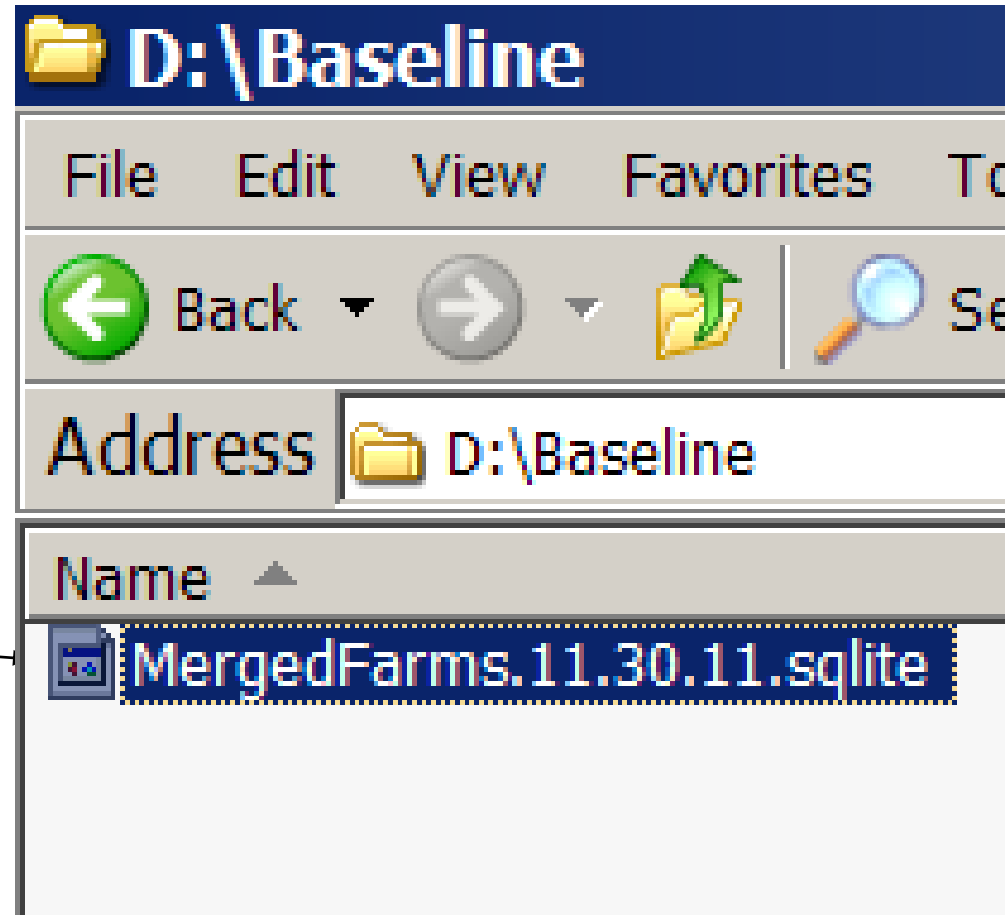
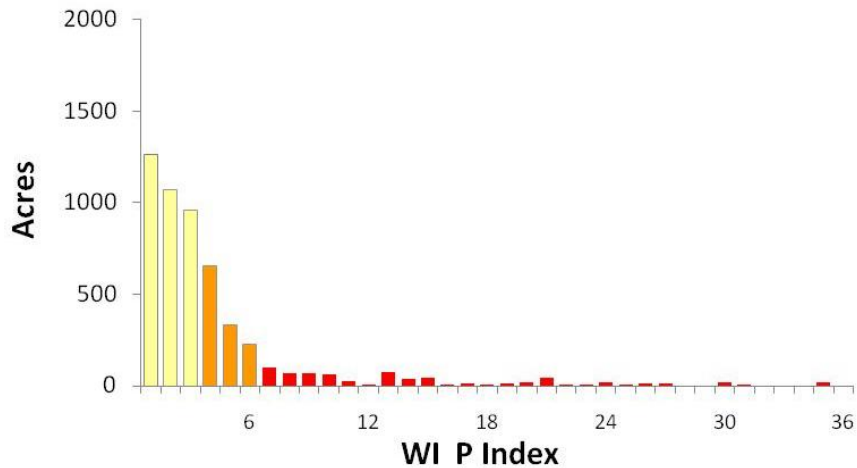Tools for managing inventory data are available at: http://nonpoint.cals.wisc.edu/

Merged database allows analysis of rotational and annual P Index information across a watershed

Example: 4000 acres in 2007 in SW WI watershed:
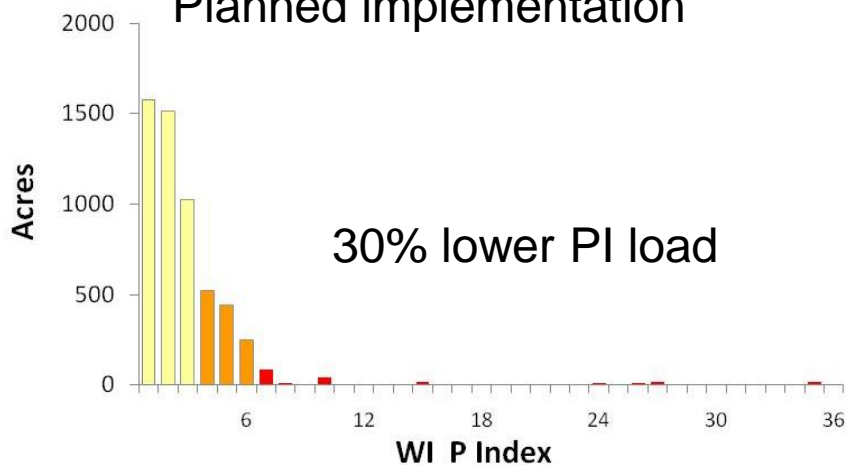Average annual P I load
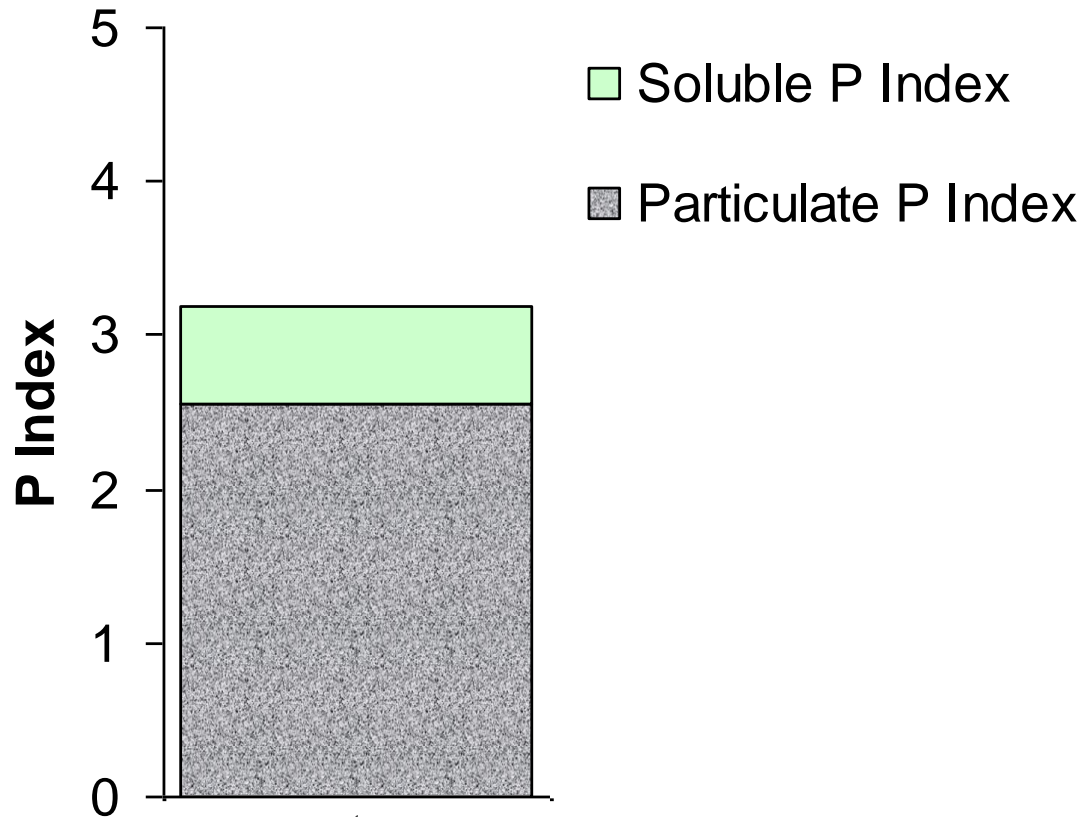
Important project question:
Will implemented practices change watershed P loads enough to measure?

Baseline

Planned implementation

30% lower PI load

Inventory Recommendations:

Stay digital

Develop a process for maintaining and comparing updated inventories

Reality check: Weather-driven variations in P yields will make establishing a relationship between watershed average P Index values and P delivery to the watershed outlet challenging.

Example: P yields during the pre-implementation data collection phase for project with paired 12,000 acre agricultural watersheds in SW WI
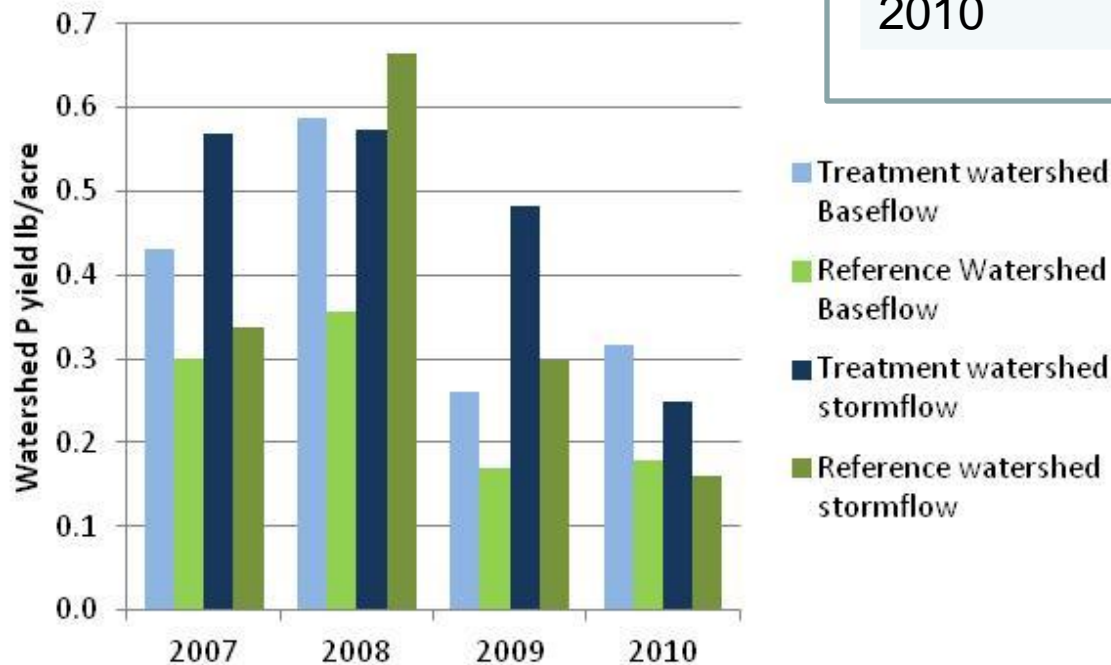
Total Watershed P Yield in lb/acre

	Treatment	Reference
2007	1.0	0.6
2008	1.2	1.0
2009	0.7	0.5
2010	0.6	0.3

Legend:
- Treatment watershed Baseflow
- Reference Watershed Baseflow
- Treatment watershed stormflow
- Reference watershed stormflow