Using Runoff Monitoring Data to Refine the Wisconsin Phosphorus Index

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Proposed Final Draft WI 590 Nutrient Management Standard management planning options addressing P water quality problems:

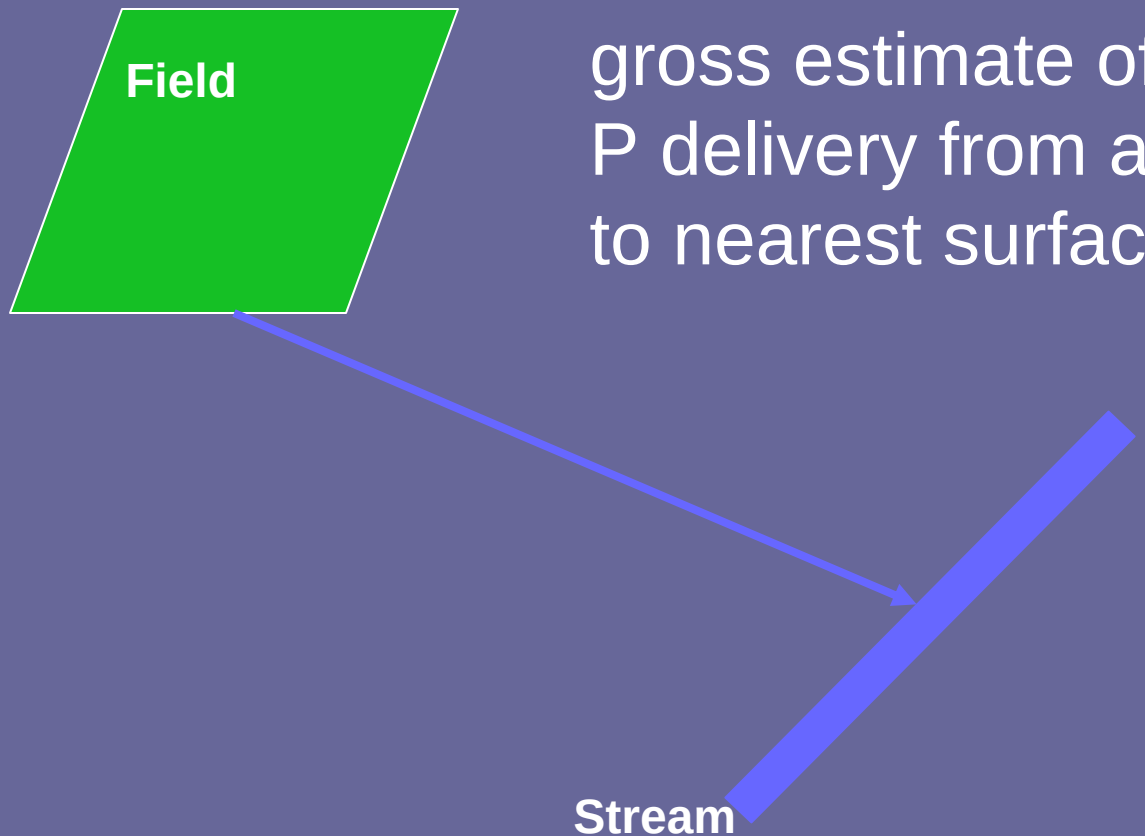
- Soil test P
- P Index

WI P Index is a planning tool:

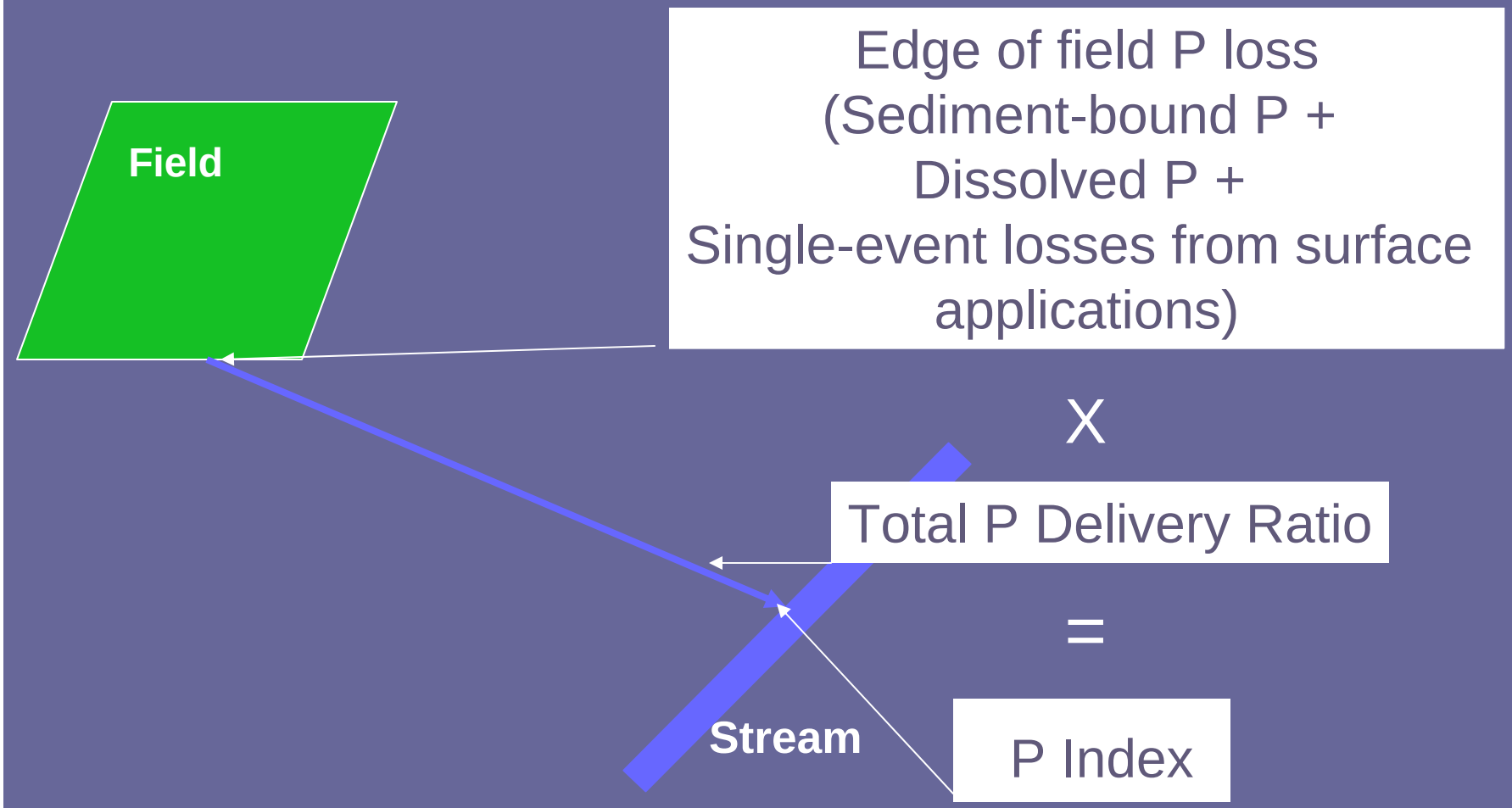
- Directly addresses water quality problems
- Provides management flexibility for users

Wisconsin P Index

The P Index calculates a gross estimate of total annual P delivery from a given field to nearest surface water



P Index Components



P Index accounts for P in field and likelihood of runoff

Runoff P content

x

Amount transported

=

P delivered

P Index allows comparison of potential P losses with varying management

WI 590 Nutrient Management Standard planning goal:
Maintain rotation average P Index below 6 on manured fields

Does not dictate how to reach goal.

Continuous field runoff monitoring in Wisconsin

- Discovery Farms
- Pioneer Farm
- Others

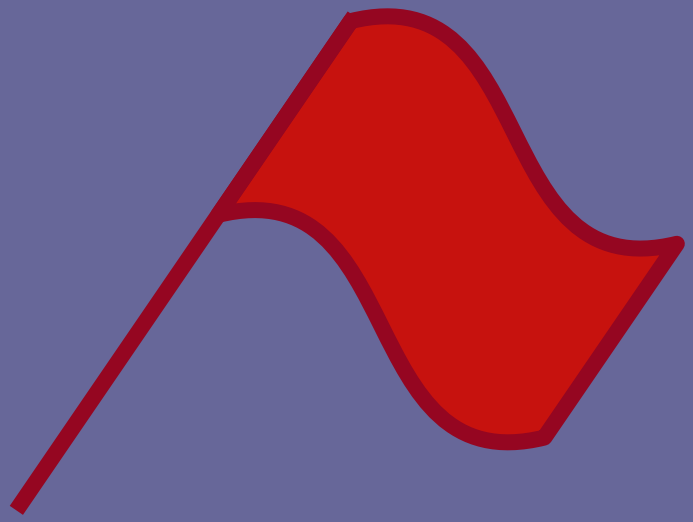
Runoff Measurements:
Rainfall
Rainfall/snowmelt runoff amounts
Dissolved P
Sediment
Sediment-bound P

Documented field characteristics

- Soil test P
- Fertilizer/manure applications
- Crop and yield
- Tillage
- Soil type
- Field slope & slope length

For monitored fields can:

- Compare P Index edge-of-field delivery to measured P
- Assess P Index ability to identify relative risks of P losses



Have just a single year of runoff data for any set of management practices on any field

Weather variability can interfere with looking at relative effects of management practices with a single year of data

Runoff P content

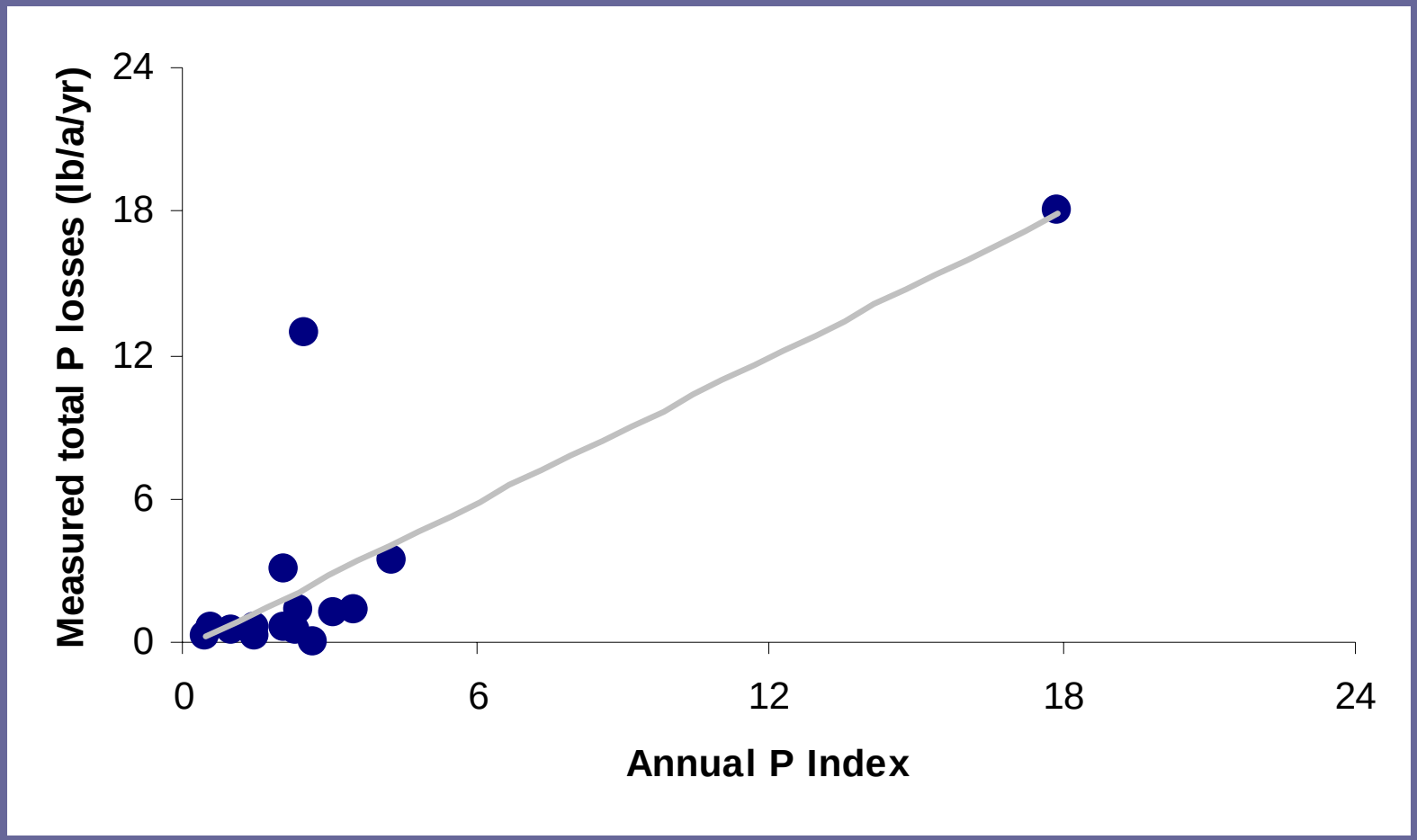
x

Amount transported

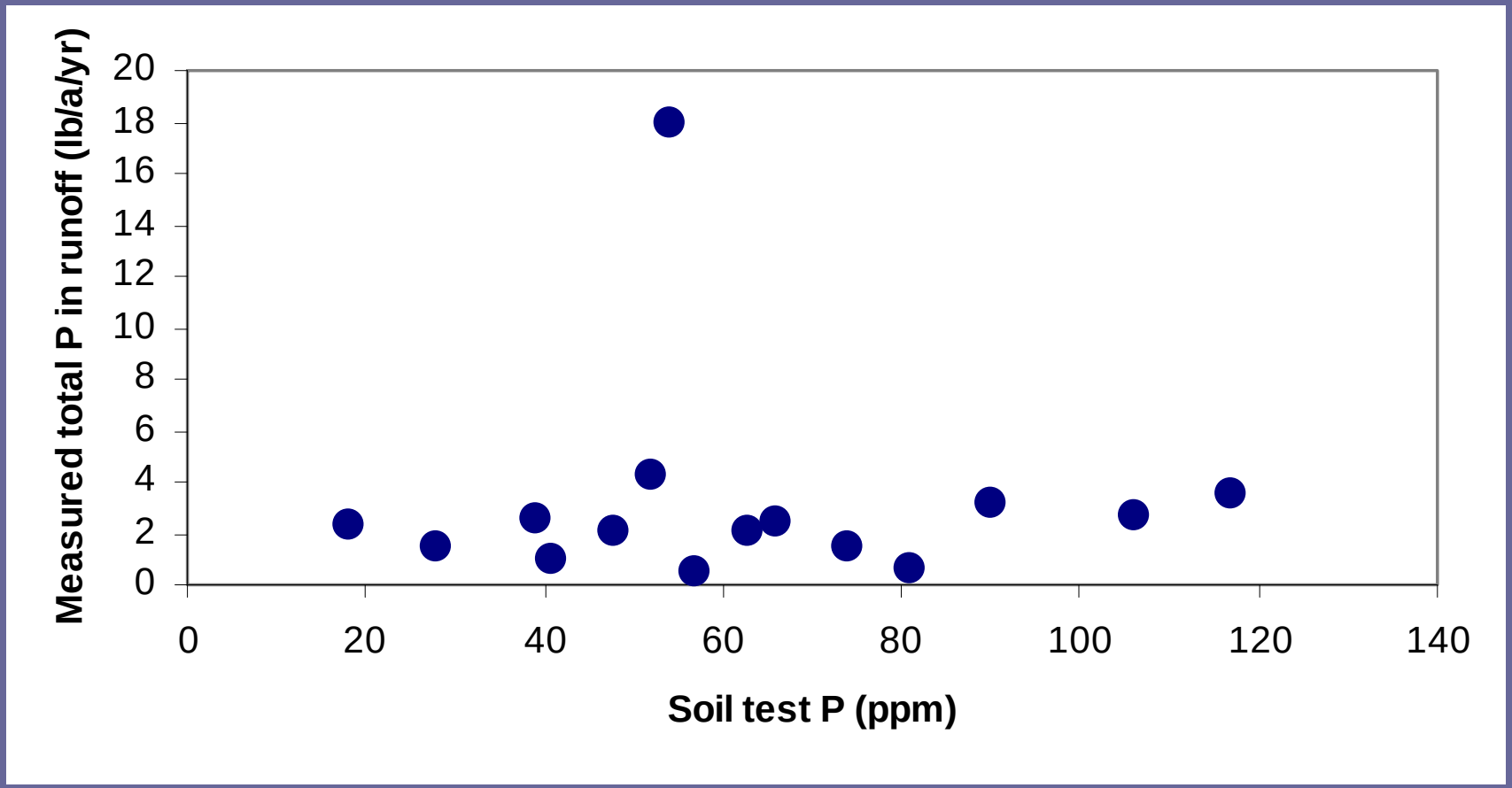
=

P delivered

P Index vs. Total Annual Runoff P

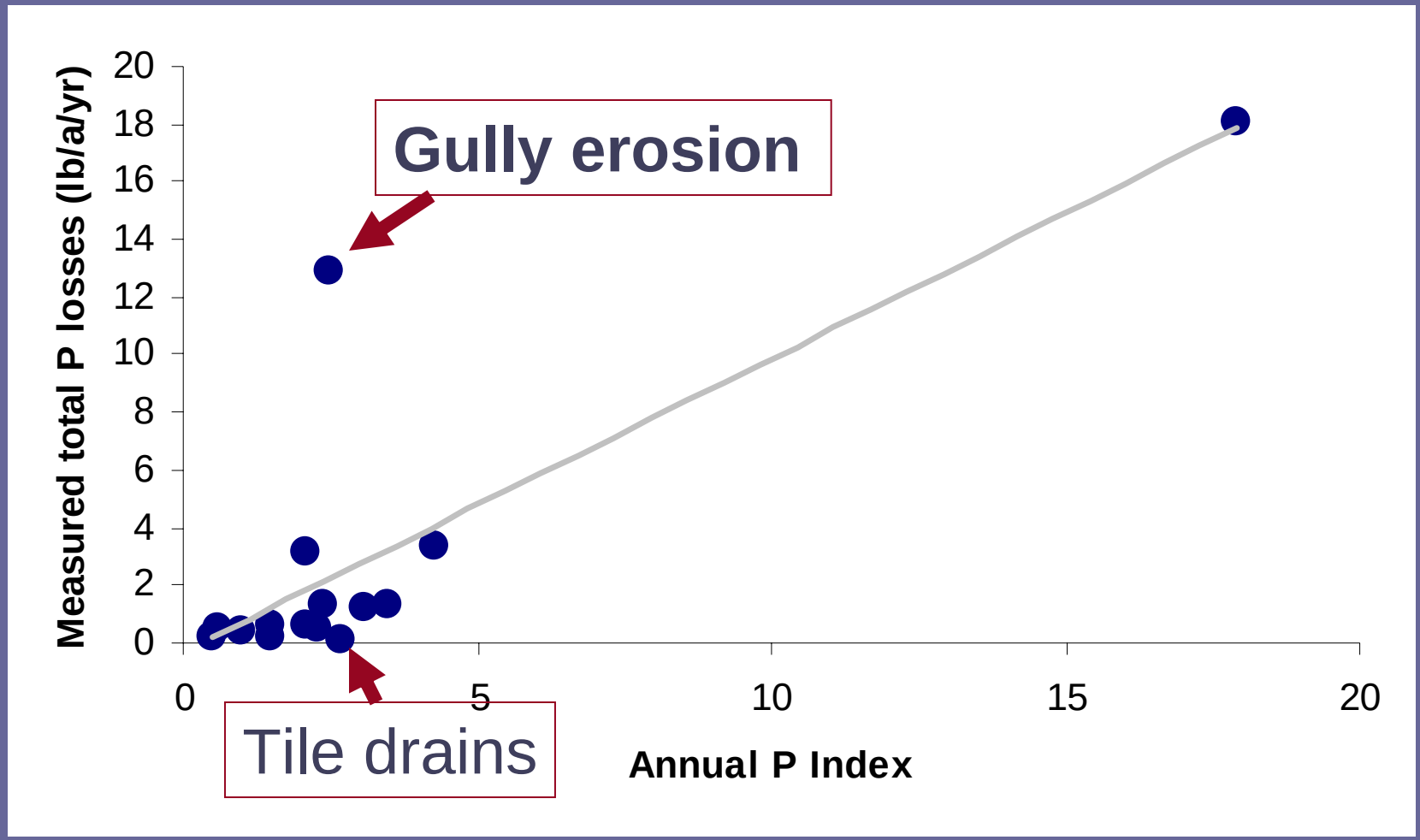


Soil Test P vs. Total Annual Runoff P

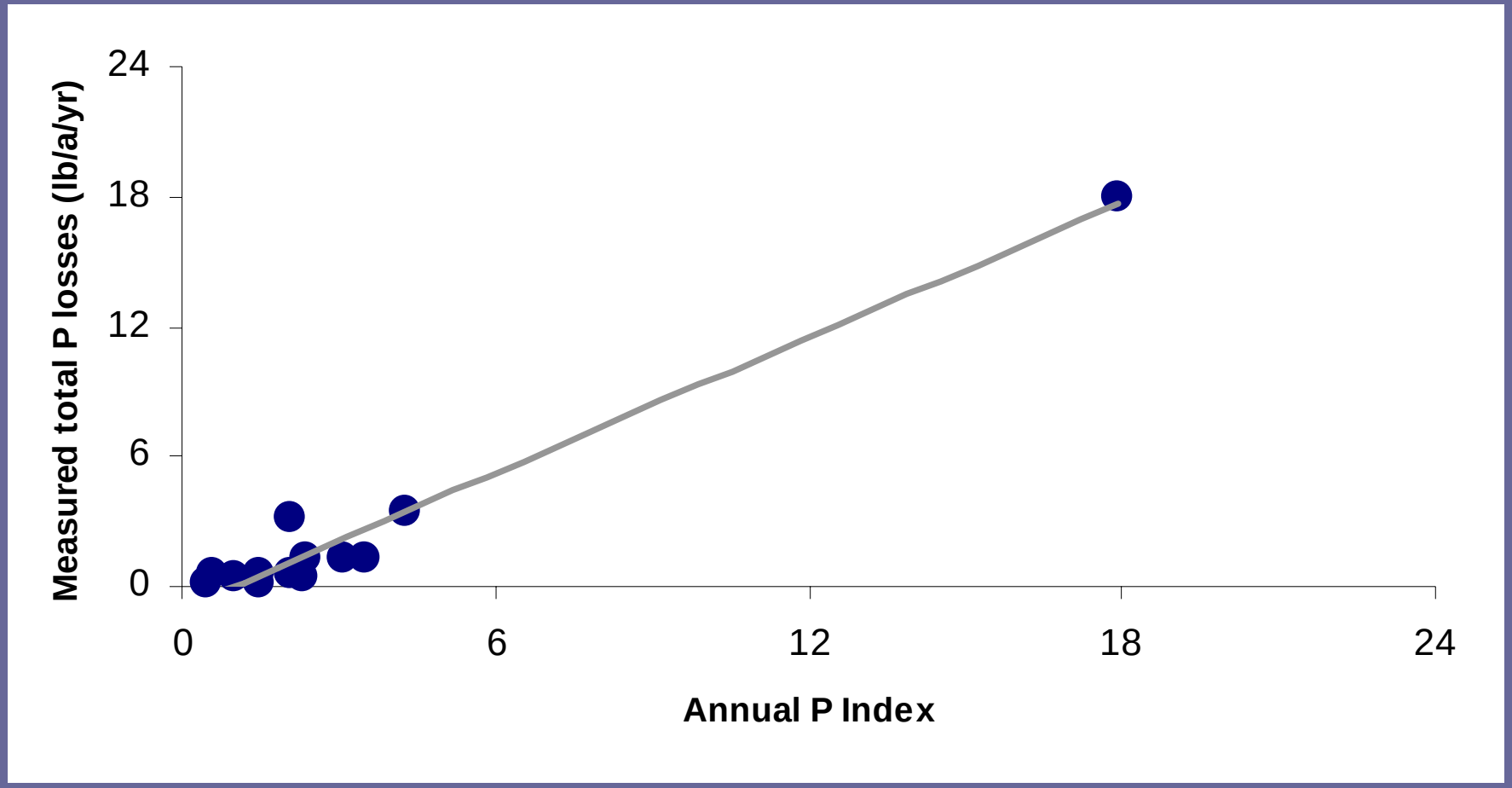


Runoff data helps identify field conditions that significantly affect P delivery but are not accounted for in the P Index

P Index vs. Total Annual Runoff P



P Index vs.Total Annual Runoff P



Can use monitoring data to refine concentration components of P Index calculations

Runoff P content

x

Amount transported

=

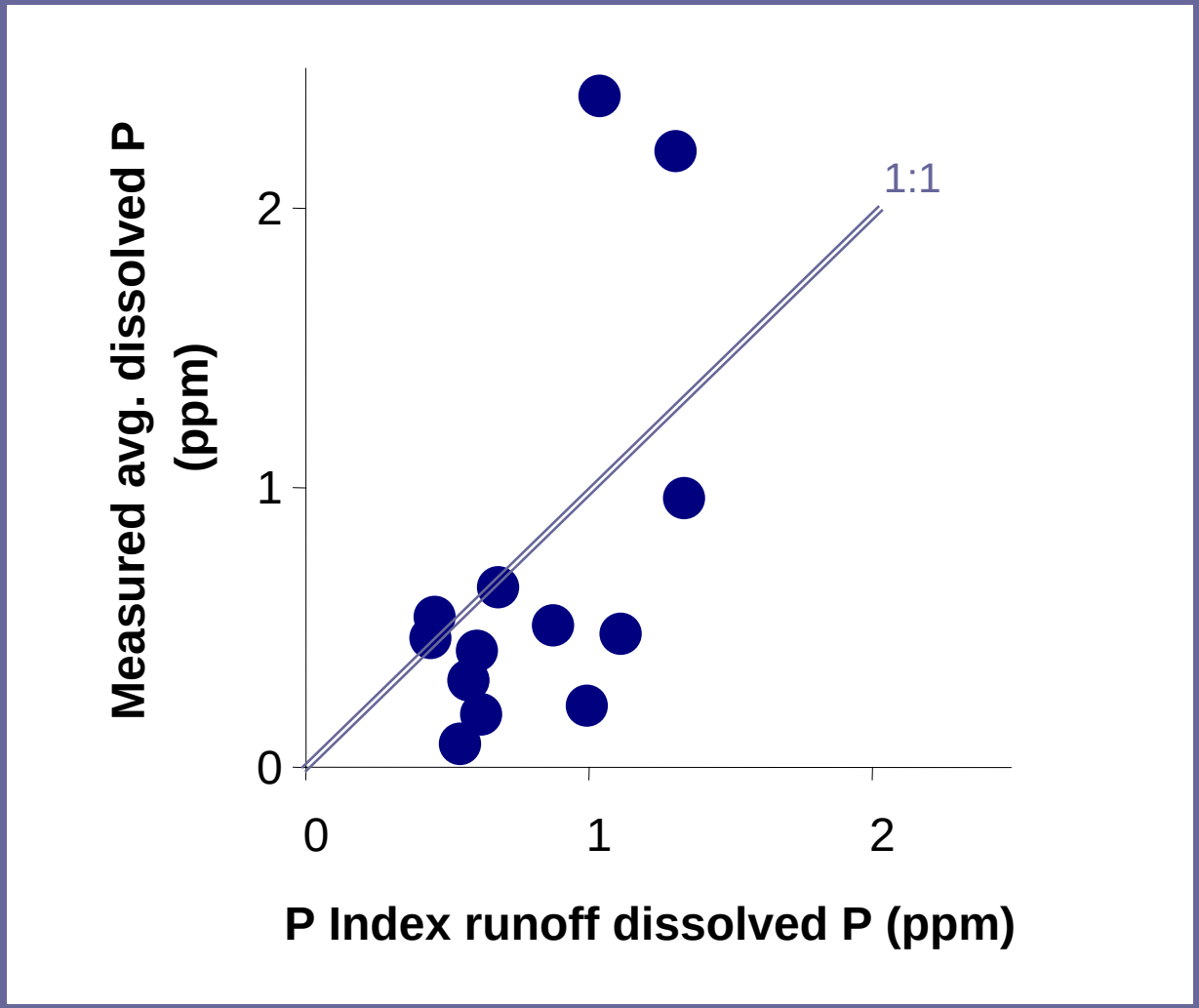
P delivered

Example:
Estimating runoff dissolved P

Characteristics used in P Index calculations:

- Soil test P
- P applications
- Soil type

Average Dissolved P in Runoff P Index vs. Measured



Wisconsin P Index

- Allows management flexibility
- Identifies potential for P losses better than soil test P
- Risk assessment capability will be improved with monitoring data.