PROGRESS ON THE WISCONSIN P INDEX

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The Wisconsin Phosphorus Index has been developed through the efforts of

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Wisconsin P Index Development

- Initial version used index values for P source and transport factors (Lemunyon & Gilbert)
- Current P index uses a modeling approach to predict P loss (similar to Iowa P index)
- Provides more flexibility to include parameters affecting P loss in runoff

The Wisconsin P Index

- Indicates potential of a field to deliver P to surface water
- P index values used to rank fields for P loss
- Identifies management options for reducing P loss

The Wisconsin P Index

- The P index is a work-in-progress
- Expect changes as more information becomes available

The Phosphorus Index web site

http://wpindex.soils.wisc.edu

Where does the P Index fit in nutrient management planning?

Components of Revised Nutrient Management Standard - P Management

- Options for P applications:
  - Use Wisconsin P index
  - Rates based on soil test P values

Components of the Phosphorus Index (PI):

PI = PP + SP + LP

PI = Total P index

PP = Particulate P

SP = Soluble P

LP = Leached P

Variables affecting the P Index

- Soil erosion (RUSLE 2)
- Soil test P (Bray P-1)
- P delivery (field to water body)
  - Sediment delivery ratio
  - Enrichment ratio
  - Buffer effectiveness
- Manure/fertilizer management

Particulate P (PP) Component

Depends on:

- Erosion (RUSLE 2)
- Fraction of eroded particles delivered to stream (Sediment delivery ratio)
- P concentration of the soil particles (Enrichment ratio)

Soluble P (SP) Component

Depends on:

- **Amount of runoff (RUSLE 2)**
- **P concentration in the soil (Bray P test)**
- **Soluble P concentrations in P-containing amendments/fertilizers**
- **Extraction efficiency**

The Interpretation of the Wisconsin PI - field basis

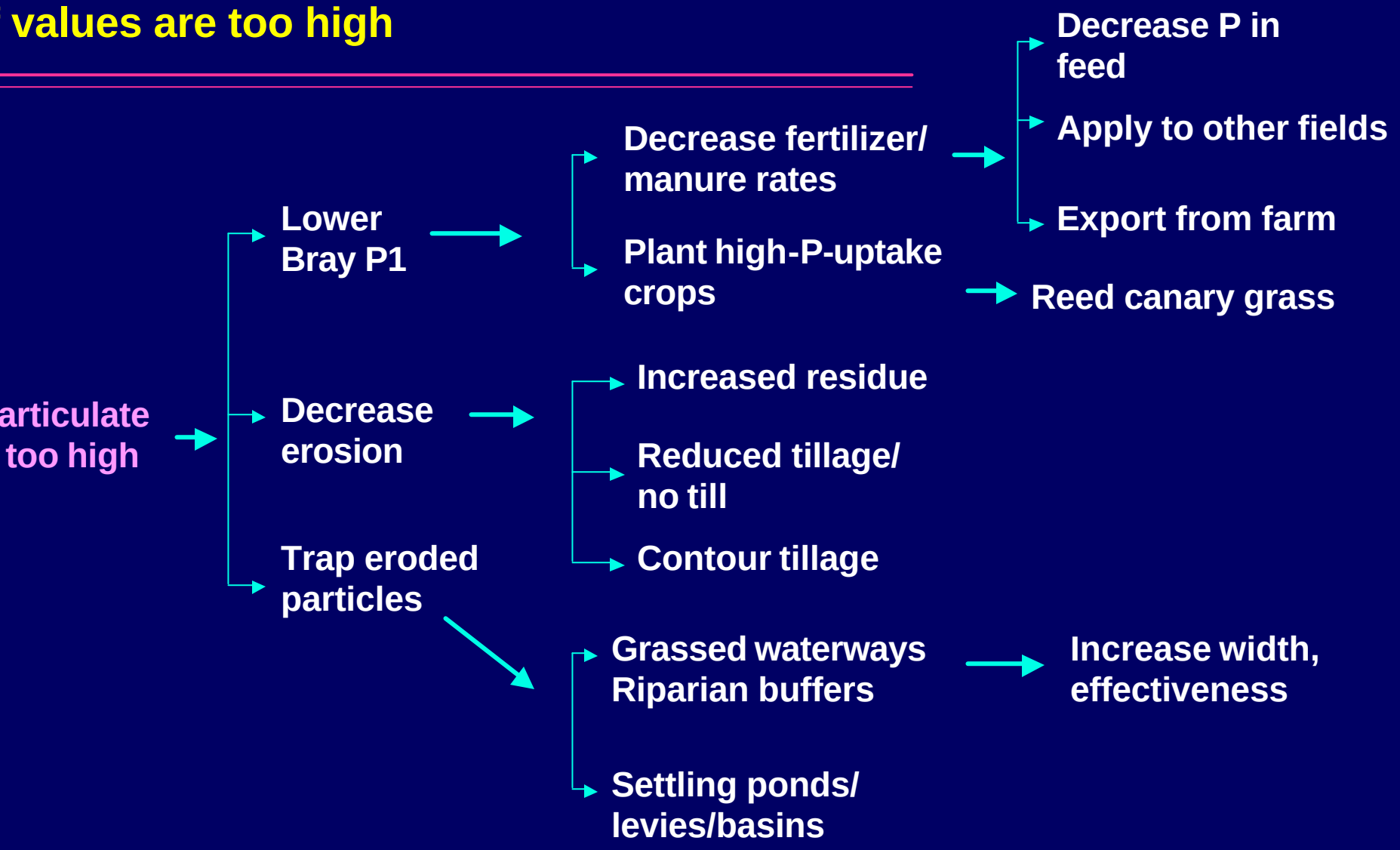
0 - 2: Minimal risk, N-based management

2 - 6: PI should not increase over 4 years or length of average rotation

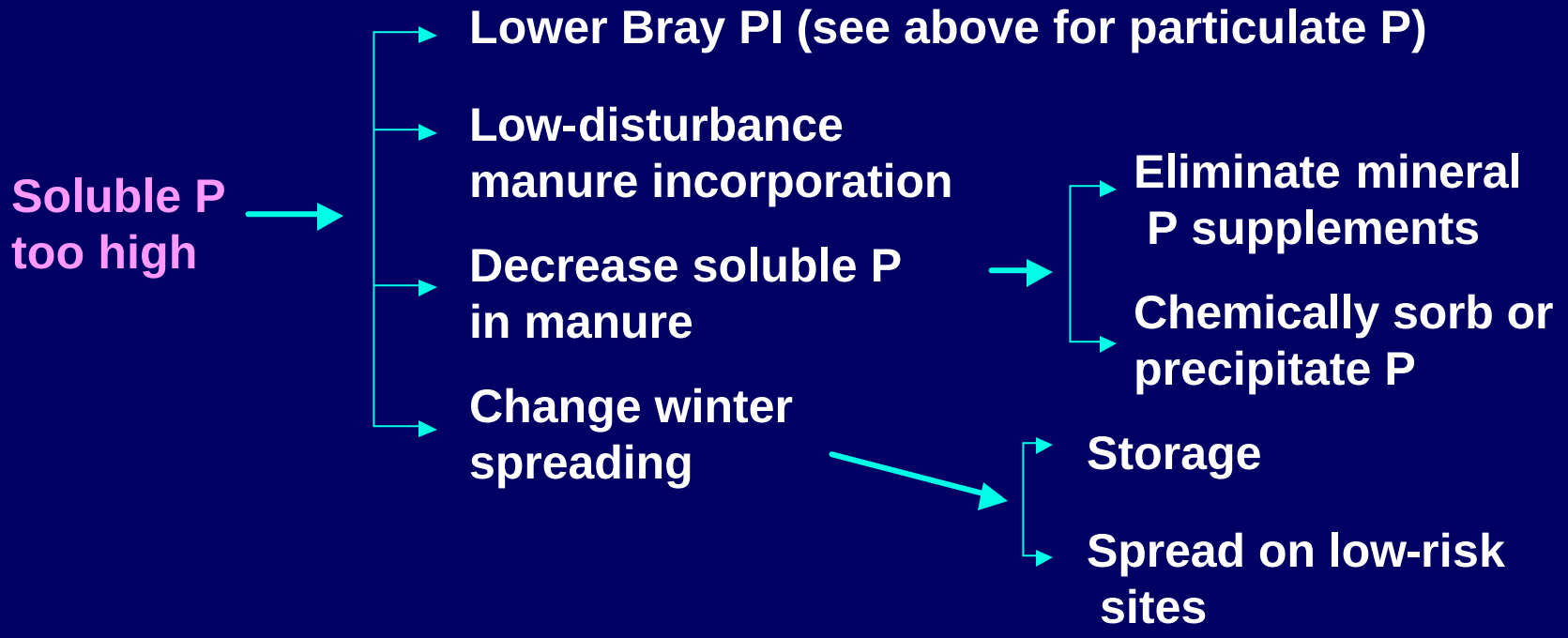
6 -10: Implement plans to decrease PI to <6 over two rotations or 5 years

> 10: Implement plans to decrease PI to <6 over three rotations or 8 years

mproved management practices to decrease PI
values are too high



Improved management practices to decrease PI if values are too high



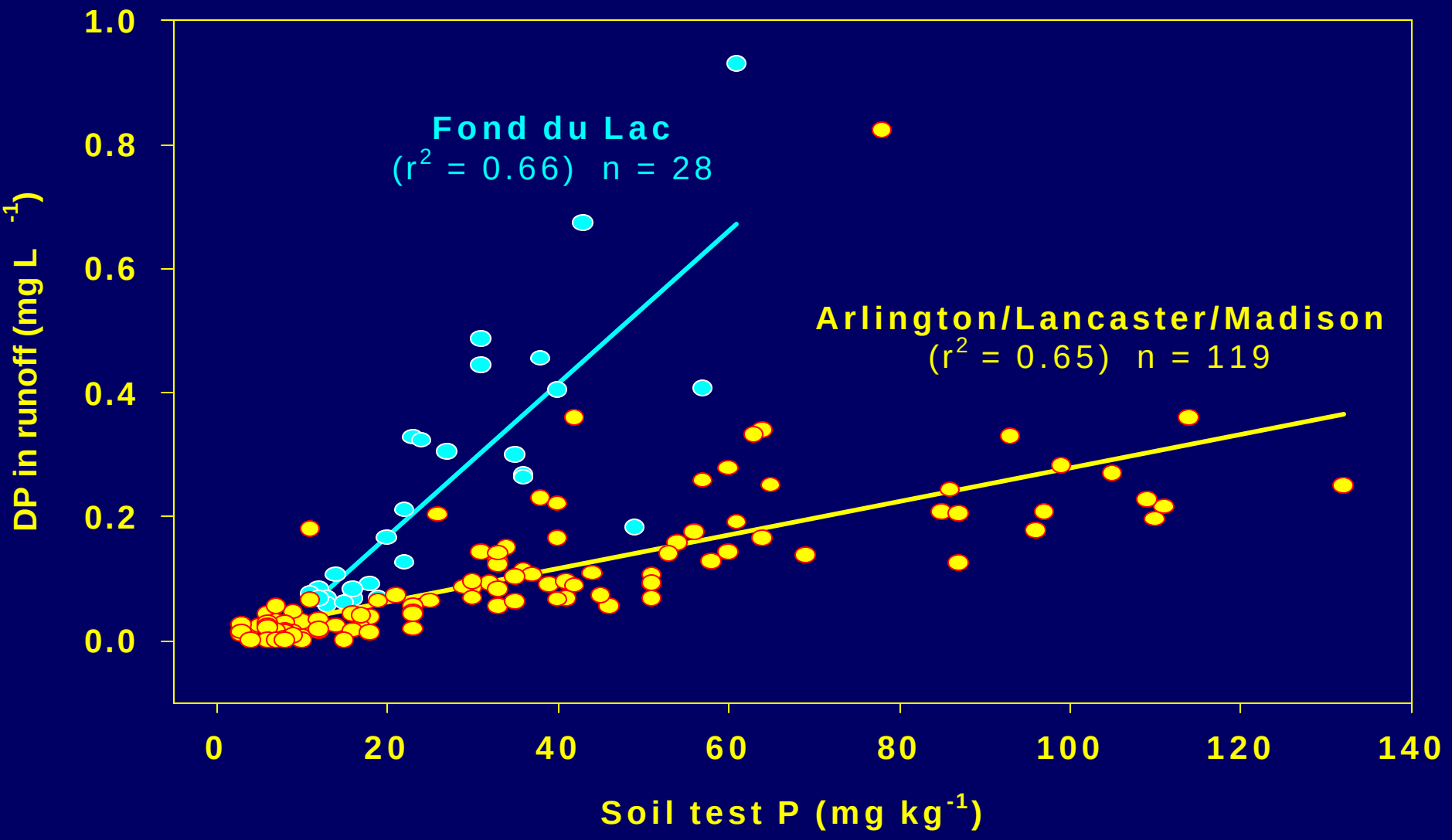
Potential Refinements to the P Index

- Account for soil-specific differences in:
  - Fraction of precip.contributing to runoff
  - Permeability effects (extraction efficiency)
  - Effects of soil P, tillage, & manure on runoff P
  - Bray P – Total P relationships

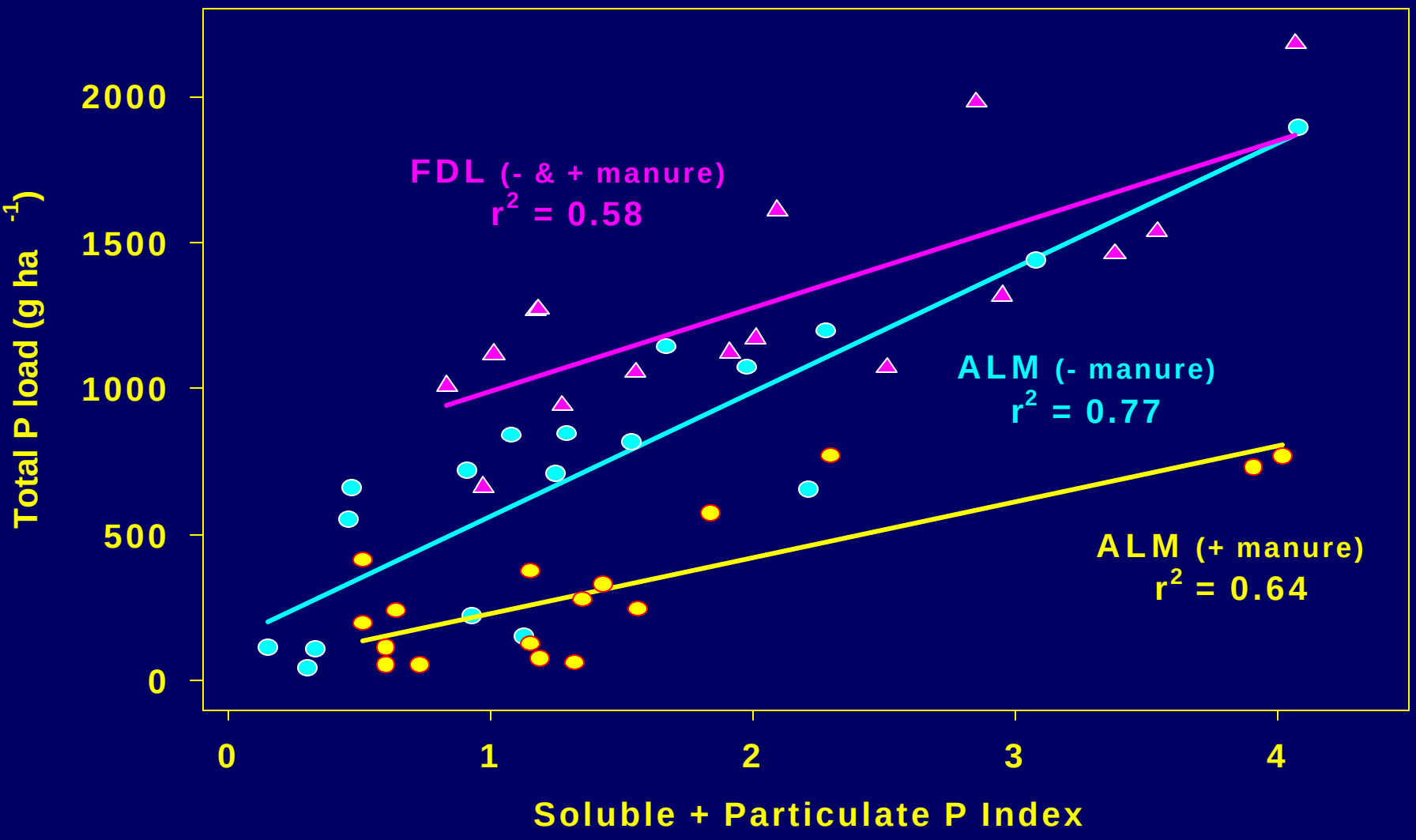
Characteristics of Field Study Locations

Location	Soil name	Soil texture			Average infiltration rate
		Sand	Silt	Clay	
		%			% of applied
Lancaster	Rozetta	11	73	16	87
Arlington & Madison	Griswold - Plano	16	62	22	73
Fond du Lac	Manawa - Kewaunee	20	42	38	24

Relationship between STP and DP concentration in runoff without spring applied manure.



Effect of location and spring manure on the relationship between the (*Soluble + Particulate P Index)* and TP load in runoff.



Potential Refinements to the P Index

- Timing (fall,winter,spring) of tillage and manure application effects on runoff P
- Buffer effectiveness factor
- Diet effects on soluble P in manures
- Linking P index with SNAP and Rusle2

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