

IDAHO
IDA
dairymen's association

**Idaho Phosphorus
Site Index Rule**

January 2018

Regulatory Timeline

- In 2000 & 2001, the Idaho legislature amended I.C. § 37-401 to require dairy farms to have Nutrient Management Plans (NMPs) (SB 1437 (2000), SB 1040 (2001)).
- Those laws put into place the Phosphorus Threshold of 40 ppm in the first foot of soil.
- This is the first proposed major revision to that Nutrient Management Standard since it was enacted.
- Animal agriculture is the only sector of agriculture that is regulated on its nutrient applications.

Why did IDA Petition the ISDA for Moving from a Phosphorus Threshold to Phosphorus Indexing?

- Phosphorus index assesses the risk of phosphorus loss rather than an arbitrary soil test value.
- Multiple ag fields across the state, both dairy and non dairy, have soil test P above 40, but animal agriculture is the only ones regulated.
- Phosphorus Indexing is scientifically defensible, counter to an arbitrary number that treats all fields equally regardless of their potential to lose phosphorus to the environment.
- Scientifically based risk of P loss evaluated using the most current information.
- Gives flexibility to producers while protecting the environment.
- If our standard is scientifically defensible, it enhance a producer's ability to be legally defensible in a litigation case.

Managing Phosphorus

- While Phosphorus Indexing is widely used, each state or region has an index catered to their soil and climatic conditions.
- Regulating agriculture utilizing Phosphorus Indexing is not new, the first Phosphorus Index was created in the Chesapeake Bay Watershed over 20 years ago.
- Several states currently employ Phosphorus Indexing including:
 - Washington, Oregon, Maryland, Delaware, Pennsylvania, Iowa, Arkansas, New York, Wisconsin, California, New Mexico, Minnesota, Texas, etc (8 of 10 top dairy states)

What is a P Index?

- Fields are evaluated on an individual basis using **transport and source factors, including Soil Test P**, to assess the risk of P loss.
- Matrix used to determine a risk rating - There are four risk rating categories that a field can receive: Low, Medium, High, and Very High.
- Scientifically based risk of P loss evaluated using the most current information.
- Gives flexibility to producers while protecting the environment.
- Allows producers to focus on managing the risk of phosphorus loss rather than the soil test phosphorus.

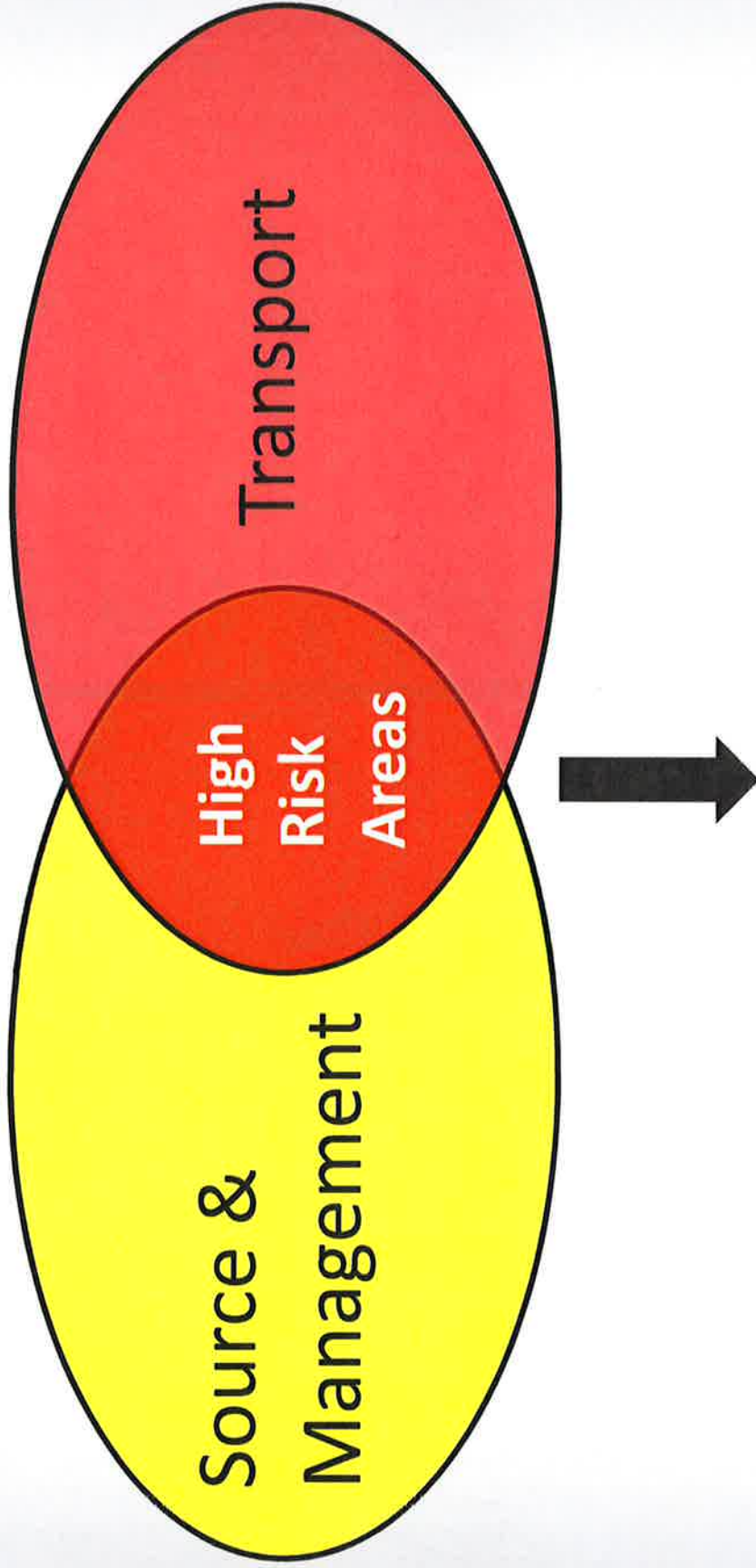
Idaho Phosphorus Index Developed BY

- Dave Bjorneberg, PhD – ARS*
- April Leytem, PhD – ARS*
- David Tarkalson, PhD – ARS*
- Stephanie Kulesza, PhD – IDA Consulting Services, Inc.**
- Marsha Neibling – Neibling Environmental Consulting**
- Bob Ohlensehlen – O&H Associates**
- Matt Thompson, PE –Partner at Ag Tech**
- Rick Naerebout – Idaho Dairymen’s Association
- Bob Naerebout – Idaho Dairymen’s Association

* Author of *The Phosphorus Site Index*

** Certified Nutrient Management Planner in Idaho

Phosphorus Site Index Concept

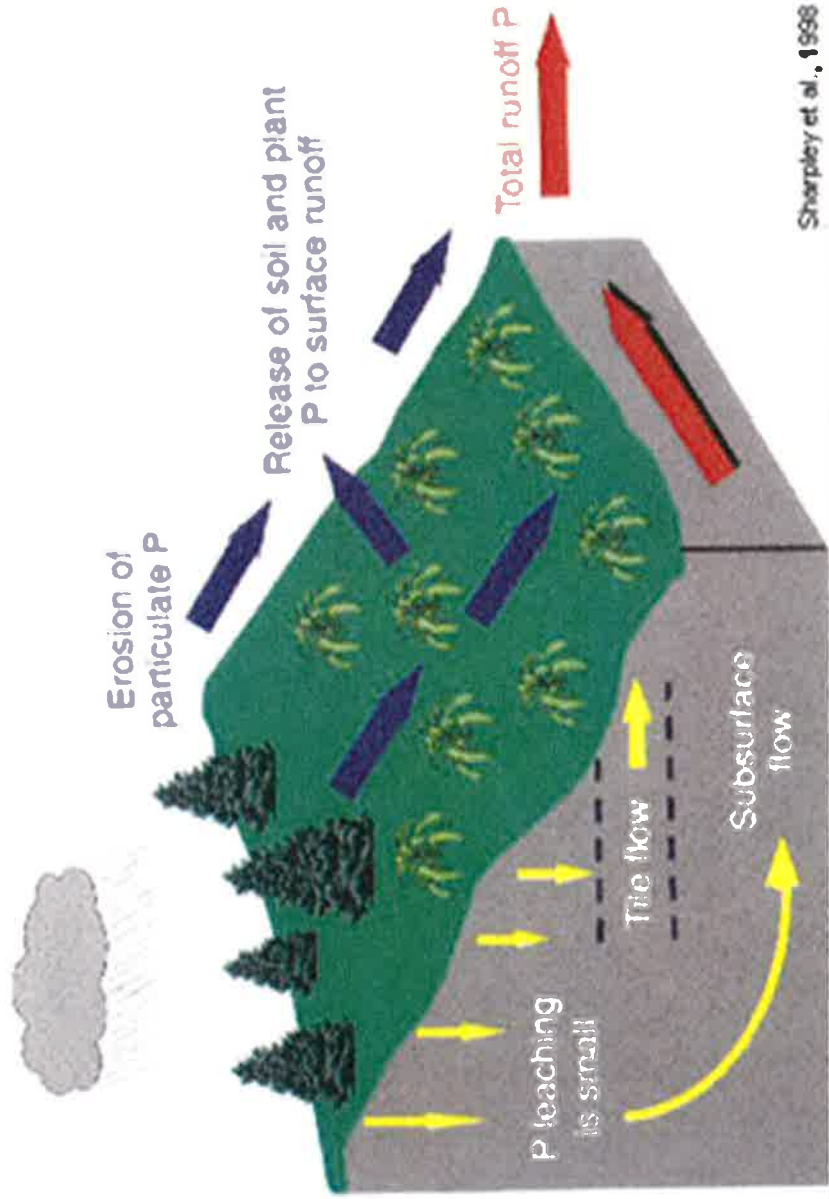


Overall rating for the potential P loss
from a site

Transport Factors

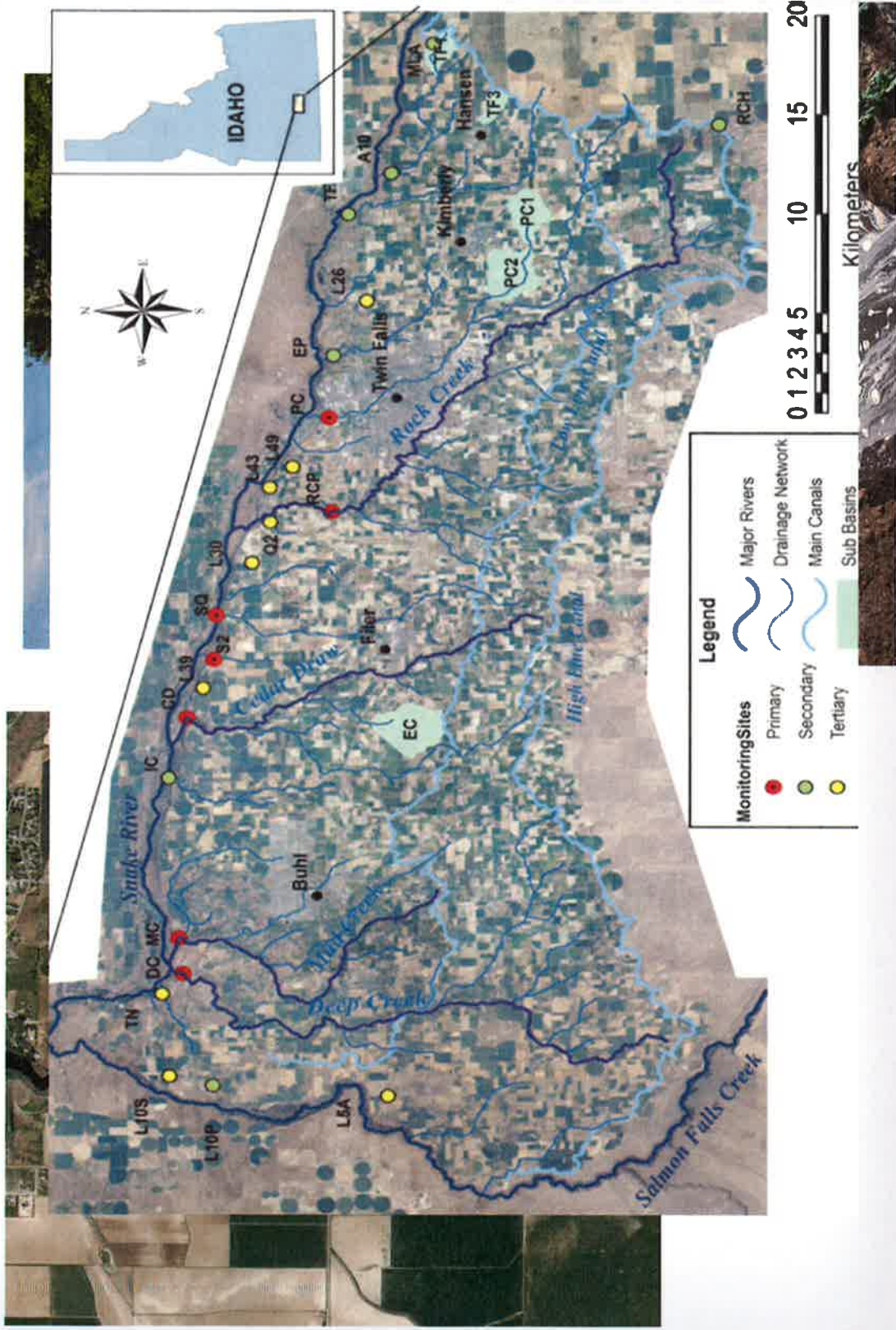
- Soil Erodibility
- Soil Surface Runoff Index
 - Surface Irrigated
 - Sprinkler or Non Irrigated
- Leaching Potential
- Distance from Edge of Field to Surface Water

Phosphorus Transport - losses occur when water moves across the landscape



Sharpley et al., 1998

Connectivity to surface water



Source Factors

- Phosphorus Soil Test
- Phosphorus Application Rate
- Phosphorus Application Method and Timing

Best Management Practices

Management Practice	Reduction in Transport Score %
Contour Farming	20
Cover & Green Manure Crop	30
Dike or Berm	40 or 80
Drip Irrigation	80
Filter Strip	35
PAM - Furrow Irrigation	60
PAM - Sprinkler Irrigation	30
Residue Management/Conservation Tillage	30
Sediment Basin	30
Tailwater Recovery & Pumpback Systems	80
Established Perennial Crop	50

Reducing P movement by BMP's



Filter Strips



This is your irrigated furrow.

This is your furrow on PAMI!

Dike or Berm



Sediment Basin



Tail water recovery with pump-back

Determining the P Index Rating

- Sum Transport and Source Separately
- Multiply Transport, Source, and BMP Reduction Coefficient
- Use the P Index Value to determine the field Risk Rating

$$\begin{aligned} & \underline{\text{Transport Total}} \\ & \quad \times \underline{\text{Source Total}} \\ & \quad \times \underline{\text{BMP Reduction Coefficient}} \\ & \quad = \underline{\text{P Index Value}} \end{aligned}$$

Field Scoring Example

$$\begin{aligned} & \text{Transport Total} \\ & \times \text{Source Total} \\ & \times \text{BMP Reduction Coefficient} \\ & = \text{P Index Value} \end{aligned}$$

Without BMP

$$13 \times 10 = 130 \text{ (Medium)}$$

With BMP (perennial crop)

$$13 \times 10 \times 0.5 = 65 \text{ (Low)}$$

P Site Index Value	Generalized Interpretation of the P Site Index Value
< 75	<p>LOW potential for P movement from this site given current management practices and site characteristics. There is a low probability of an adverse impact to surface waters from P losses from this site. Nitrogen-based nutrient management planning is satisfactory for this site. Soil P levels and P loss potential may increase in the future due to N-based nutrient management planning</p>
75 - 150	<p>MEDIUM potential for P movement from this site given current management practices and site characteristics. Practices should be implemented to reduce P losses by surface runoff, leaching and erosion. Phosphorus applications should be limited to the amount expected to be removed from the field by crop harvest or soil test-based P application recommendations, whichever is greater. Testing of manure P prior to application is required</p>
151 – 225	<p>HIGH potential for P movement from this site given the current management practices and site characteristics. Phosphorus applications should be limited to 50% of crop P uptake. Testing of manure P prior to application is required.</p>
> 225	<p>VERY HIGH potential for P movement from this site given current management practices and site characteristics. No P should be applied to this site.</p>

Educational Process

- **Membership.**
 - Information was distributed to Idaho dairy producers over the past 18 months in membership letters and the IDA Dairy Focus, electronically and through USPS.
 - Phosphorus management and an introduction to phosphorus indexing were the main topics of the 2017 IDA District meetings.
 - Idaho's Phosphorus Index is the main topic of the 2018 IDA District meetings.
- **Impacted Organizations, State and Federal Agencies**
 - The authors and contributors of the Idaho Phosphorus Index Nutrient Management Standard made no fewer than 11 detailed Phosphorus Indexing presentations to at least 13 state organizations, state associations, and state and federal agencies who ultimately supported this effort.

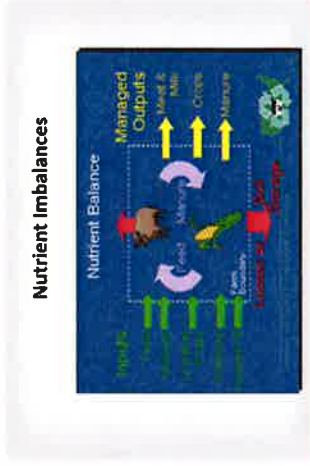
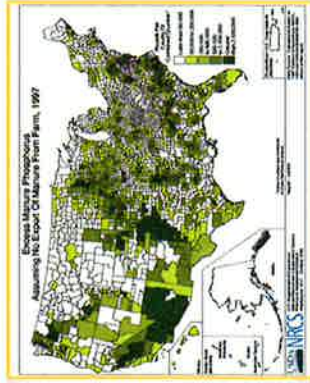
Concerns Expressed by Dairy Producers in Educational Meetings

- Additional Cost –
 - ISDA no longer provides NMP's to producers, which was a free service through the department. This decision was independent of these requested rule changes.
 - ISDA is developing a website to replace the old Idaho One Plan nutrient management planning software, which could be utilized by producers if they choose to develop their own NMP.
 - There are multiple private individuals and companies who provide nutrient management planning services to producers. It will be their prerogative to maintain or change their current pricing practices if the Phosphorus Indexing Rule is approved.
 - IDA Consulting, which is solely owned by the membership of IDA, does not plan to change their pricing structure for development of NMP's.
 - 5 year implementation time frame, which is part of the rule. This gives the industry additional time to assess what, if any, increase in cost the new rule has created, what those increases were contributed to and identify avenues to reduce those costs.

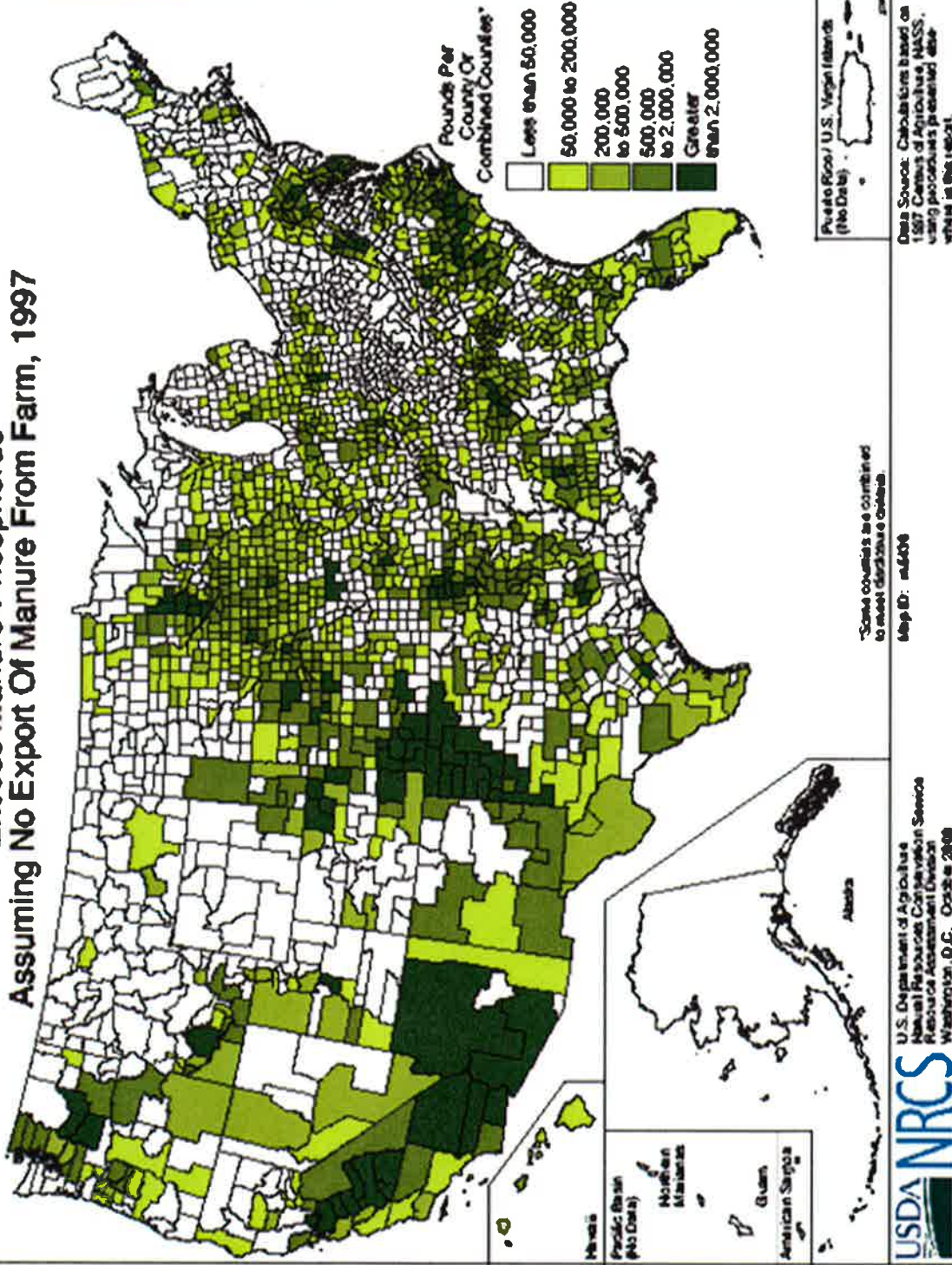
IDA Consulting Cost for Development of a NMP

- One Time Fee:
 - \$3000 base price
 - \$20 for each field over 25
- Three Year Option:
 - \$1500 - \$2500 per year, depending on number of fields
 - Includes annual NMP checkup, recordkeeping assistance, manure application recommendations, and fertilizer recommendations

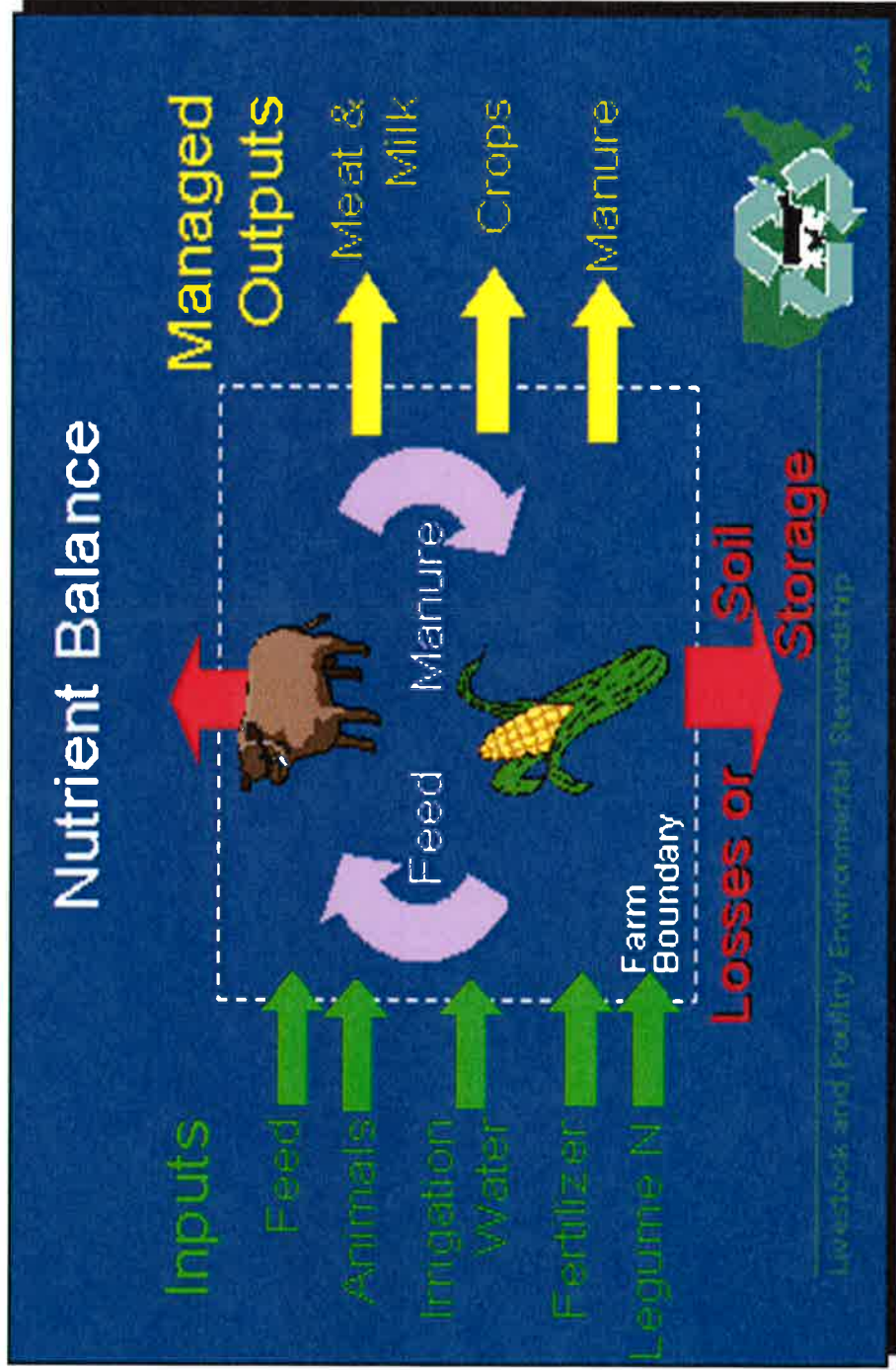
The Importance of Center for Agriculture, Food and the Environment (CAFE) to Idaho and the Nation



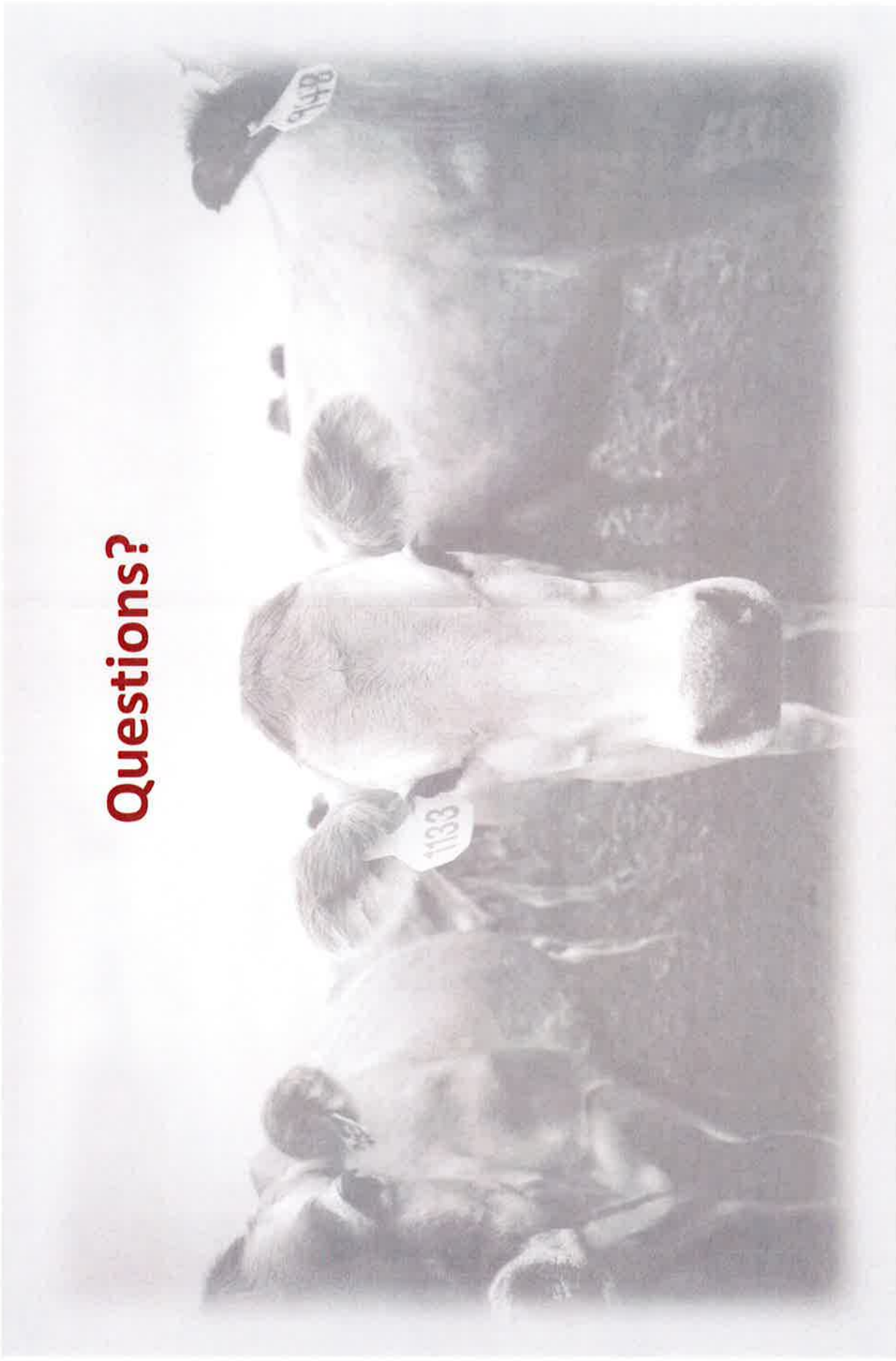
Excess Manure Phosphorus Assuming No Export Of Manure From Farm, 1997



Nutrient Imbalances



Questions?



Example!

- This year's crop = 30 t/ac corn silage
- Soil Test P = 80 ppm
- Application Rate = 100 lbs/acre
- Incorporated in 5 days
- Soil Hydrologic Group C
- Average Slope = 3%
- Pivot Irrigated
- Bedrock > 24" below soil surface
- Water drains through ditches west of field
- $K_w = 0.39$



Results of Index

Soil Test P Score	App Rate Score	App Method Score	Runoff Index Score	Soil Erodability Score	Distance to Surface Water Score	Leaching Potential Score	Total Source Score	Total Transport Score	Overall Score	BMP Implemented	BMP Implemented	Final Score	Category	Allowable Application
4	2	2	1	2	8	2	8	13	104			104	Medium	P Rate
4	4	1	1	2	8	2	9	13	117	Green Manure Crop	Filter Strip	53.235	Low	N Rate
4	4	2	1	2	8	2	10	13	130	Perennial Crop		65	Low	N Rate

- Risk Rating was a Medium, which means manure application must be limited to crop uptake
- Field Management and BMP's can greatly affect this score
 - Growing alfalfa can reduce the score to a Low category
 - Incorporating manure within 2 days, adding a filter strip, and adding a cover crop would reduce the score to a Low category