

Catchment Programs

Getting Changes on the Land that Improve Water Quality

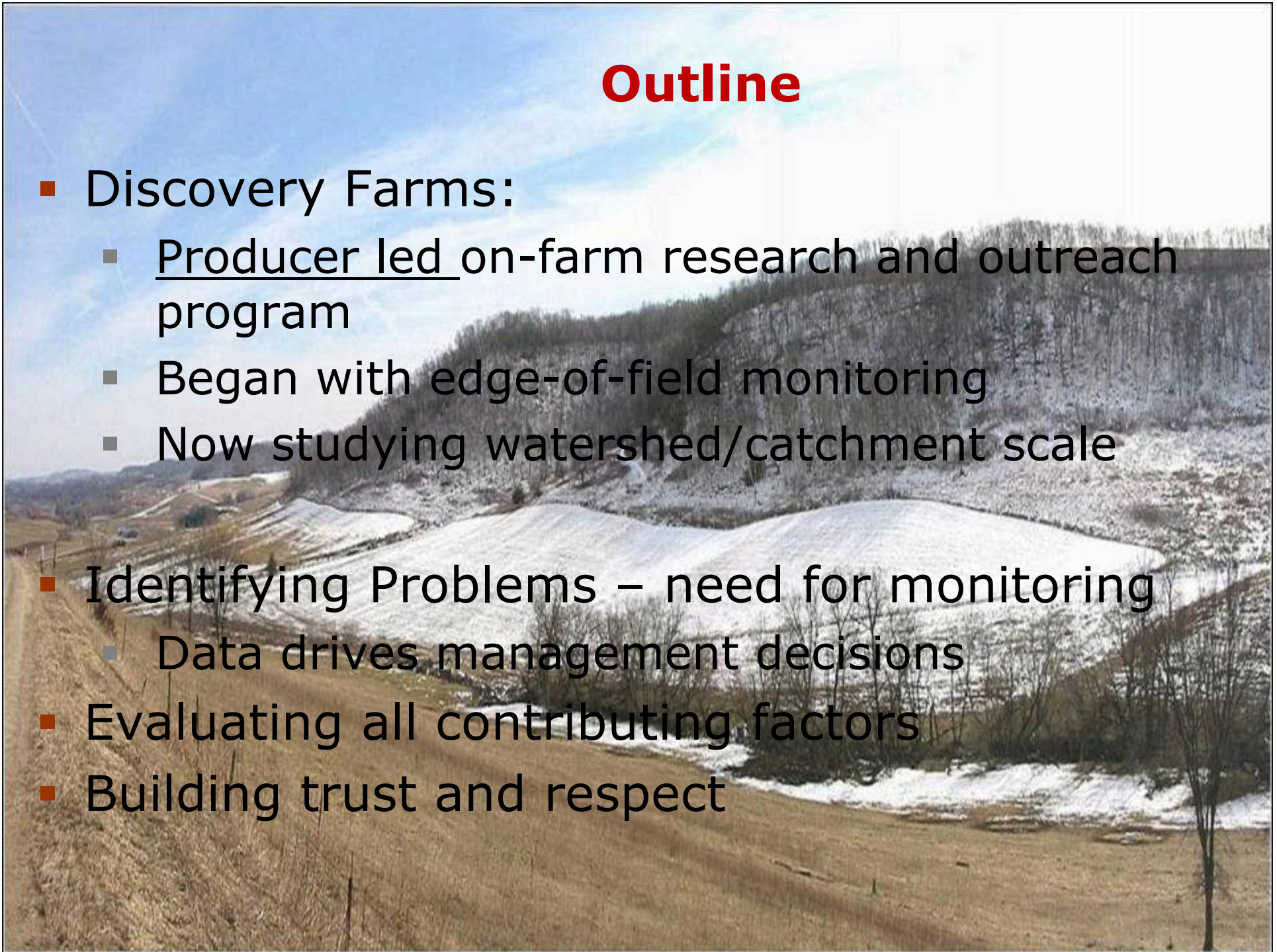
Dennis R. Frame

Director U.W. – Discovery Farms
Professor U.W. - Extension



Outline

- Discovery Farms:
 - Producer led on-farm research and outreach program
 - Began with edge-of-field monitoring
 - Now studying watershed/catchment scale
- Identifying Problems – need for monitoring
 - Data drives management decisions
- Evaluating all contributing factors
- Building trust and respect



Topics for this session

What is the
Discovery Farms
Program?

Discovery Farms?



Real farms in different geographic areas facing different environmental challenges.

Goal - to identify and reduce the sources of nitrogen, phosphorus, sediment, and other factors that may impair surface and groundwater.

On farms:

- ✓ 5 to 7 years with monitoring (provide annual data updates to farms and community)
- ✓ 1 – 2 years for graduation report development

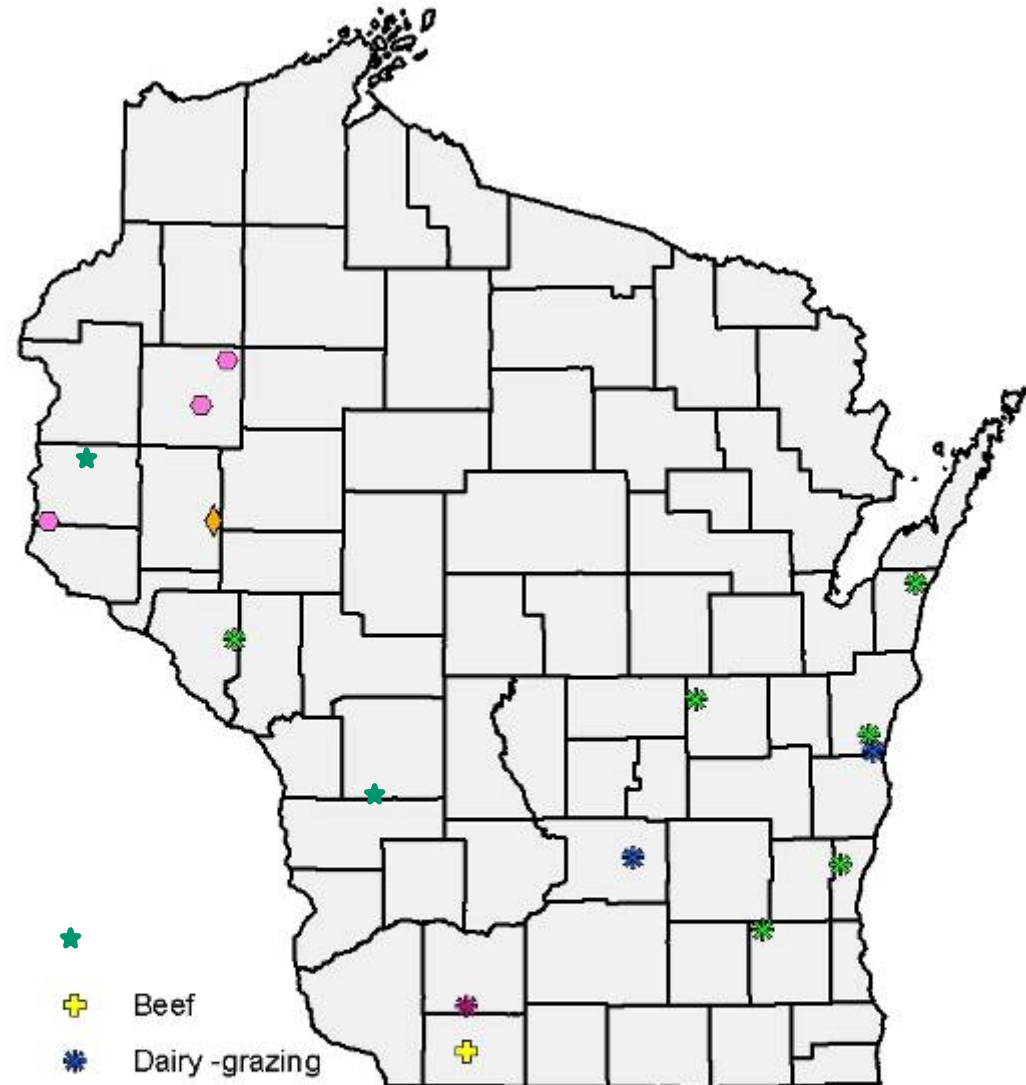
Main Vision



- Our goal is to identify, understand and solve agricultural water quality problems.
- We believe that the only way to solve problems is to engage the people running the land; and
- Involve farmers in identifying the problems as well as the solutions

Location of Discovery Farms Projects

- ▶ **1 Beef**
- ▶ **1 Swine – odor**
- ▶ **3 Poultry-stacking**
- ▶ **2 dairy – grazing**
- ▶ **1 Dairy - grazing/organic**
- ▶ **6 Dairy - confinement**
- ▶ **2 Watersheds**

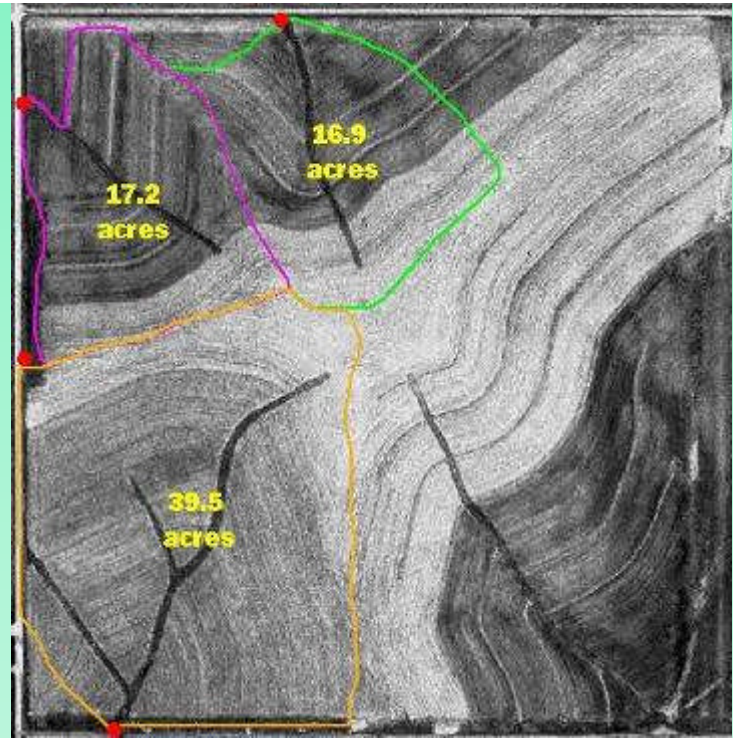


- ★ Dairy - grazing
- ✚ Beef
- ✳ Dairy - grazing
- ✳ Dairy - grazing/organic
- ✳ Dairy - confinement
- ◇ Swine
- Poultry

University of Wisconsin - Extension

DISCOVERY
F A R M S

University of Wisconsin - Madison



...the brains of the operation



Data Collection

- Remote Field Sites
- Two-Way Communications
- Robust Sampling Equipment
- Flumes
- Adjustable Sampling Sequences
- **ON-FARM INFORMATION**



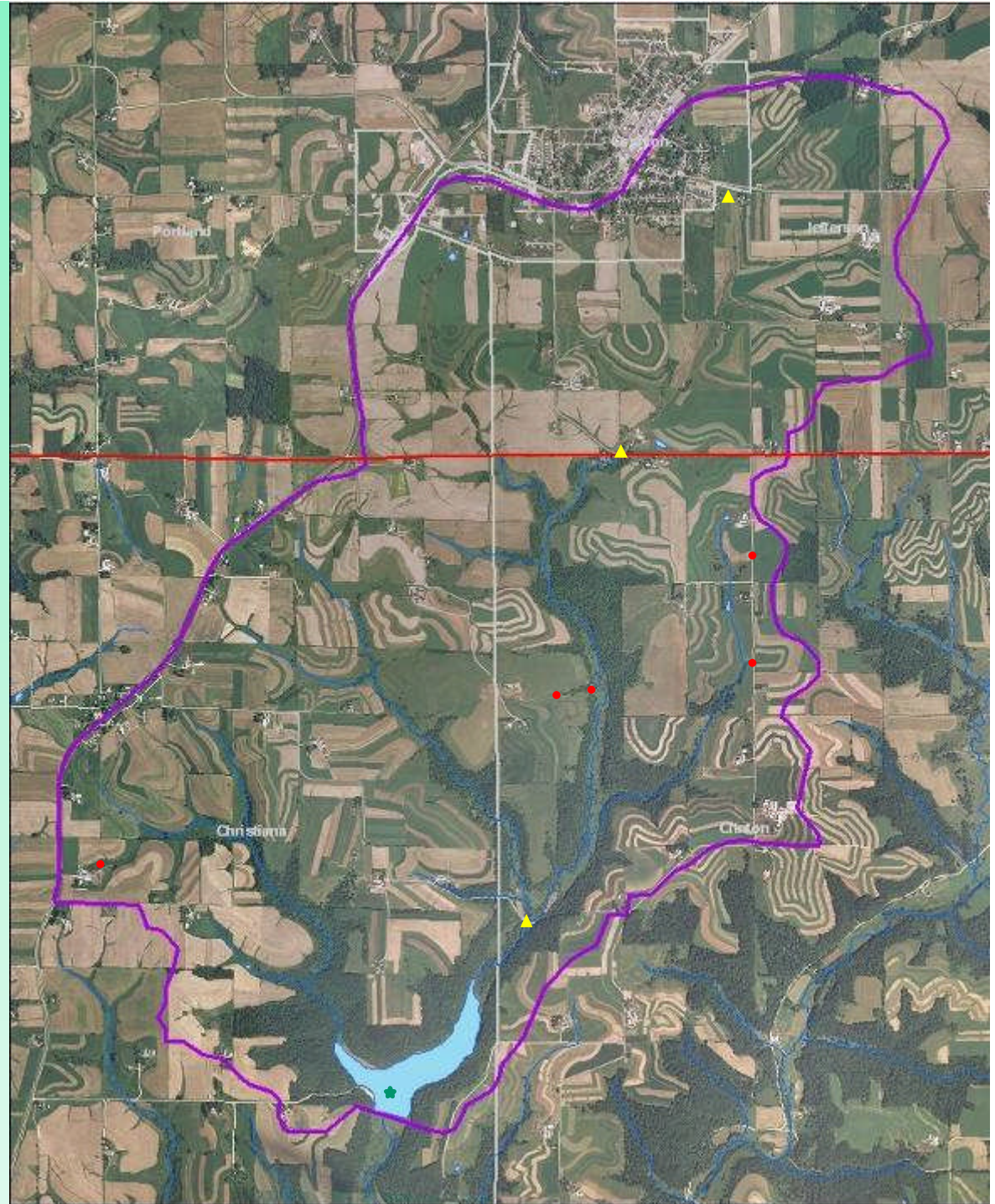
Monitoring Runoff in the Winter



- **Relatively few research studies**
- **Potentially long duration runoff events (both rain and snowmelt events)**
- **Runoff during the day and freezing at night**
- **Multiple site visits**

Jersey Valley

- Small catchment
 - Mostly ag
 - Dairy
 - Non-farm land steep
- Lake at base
- Fish kill 2005
- Installed 5 field sites
- Installed 3 stream
- Lake sampling



Identifying Problems

Data drives
management
decisions

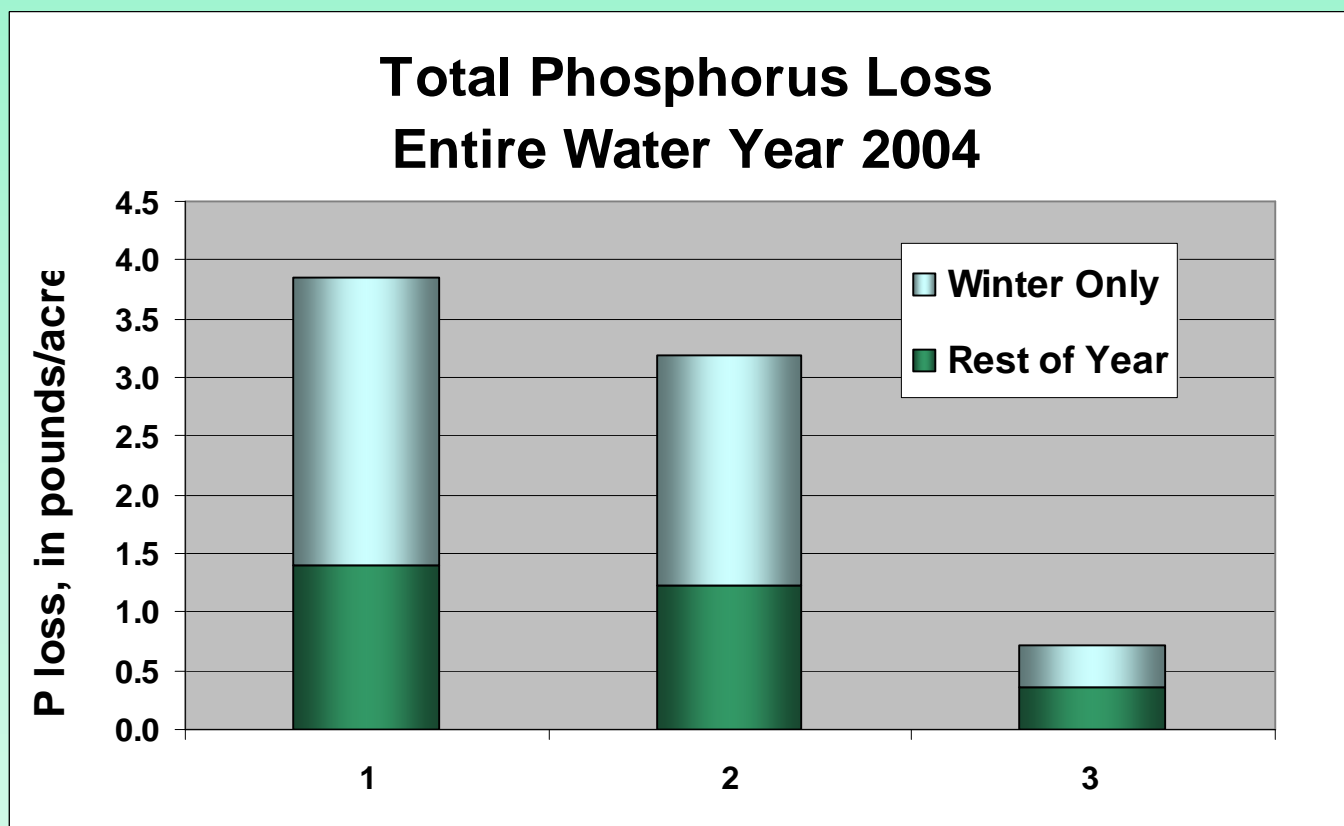
Critical periods

- Our work has identified critical time periods when the risk of runoff is very high:
 - Snowmelt, rain on snow/frozen ground
 - Non-frozen soils that are close to saturation.

Timing – Critical Runoff Periods

	Mean-Monthly Runoff	Mean-Monthly Runoff as a Percentage of Annual Runoff	Runoff Frequency	Total Precip	Mean-Monthly Runoff as a Percentage of Total Precip
October	0.07	3%	23%	2.32	3%
November	0.02	<1%	15%	2.22	1%
December	0.04	1%	35%	1.73	2%
January	0.10	4%	50%	1.68	6%
February	0.41	16%	58%	1.48	28%
March	0.87	34%	100%	2.22	39%
April	0.11	4%	54%	3.42	3%
May	0.32	12%	38%	3.70	9%
June	0.48	19%	42%	3.83	13%
July	0.07	3%	42%	3.90	2%
August	0.07	3%	19%	3.55	2%
September	<0.01	<1%	19%	2.76	<1%

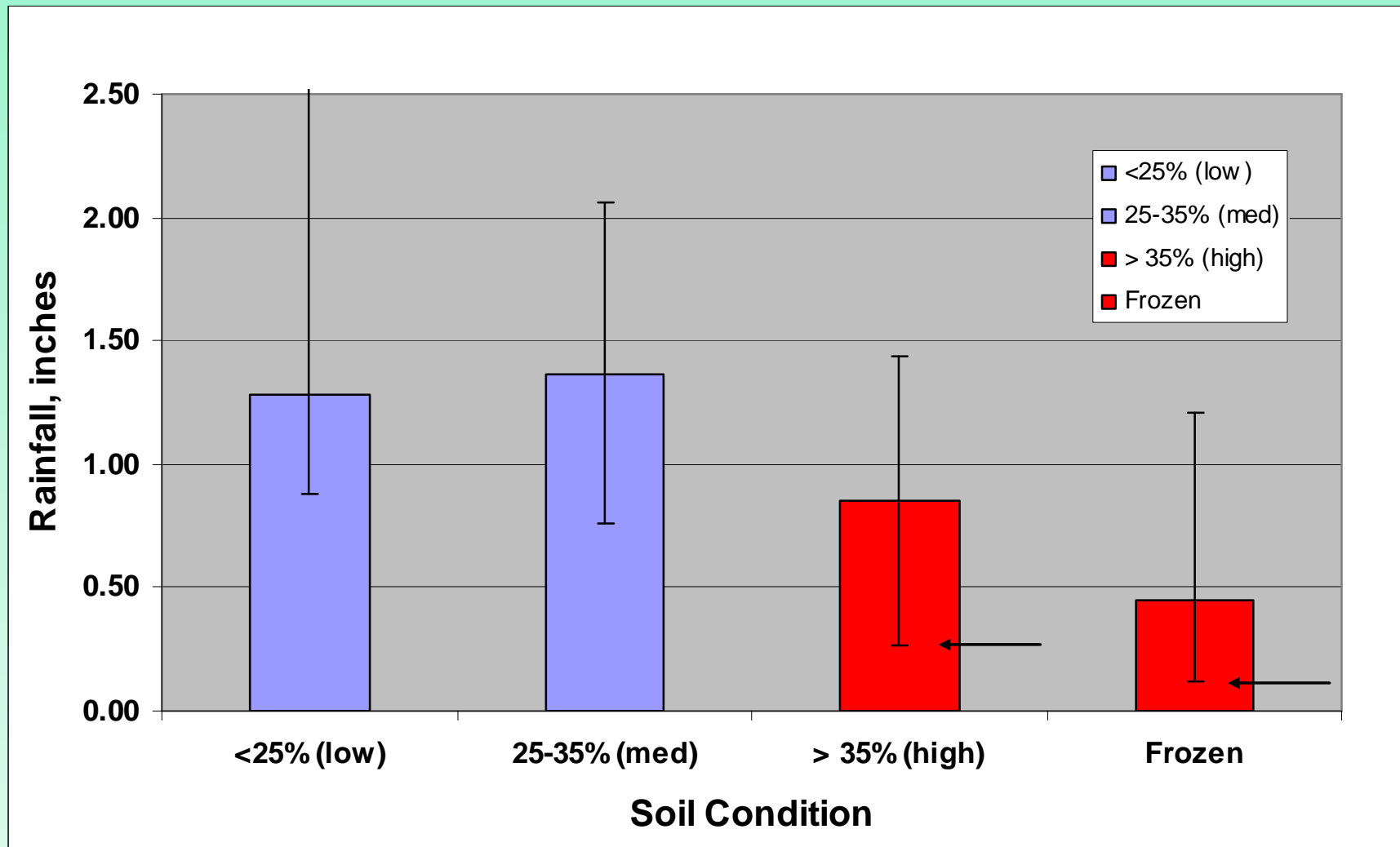
P Losses for Entire 2004



A manure management decision can have a big impact to annual nutrient losses

How much rain does it take to produce runoff for a given soil condition?

Example: No-till farm in SW Wisconsin (2003-2008)



Focus on the minimum rainfall needed to produce runoff

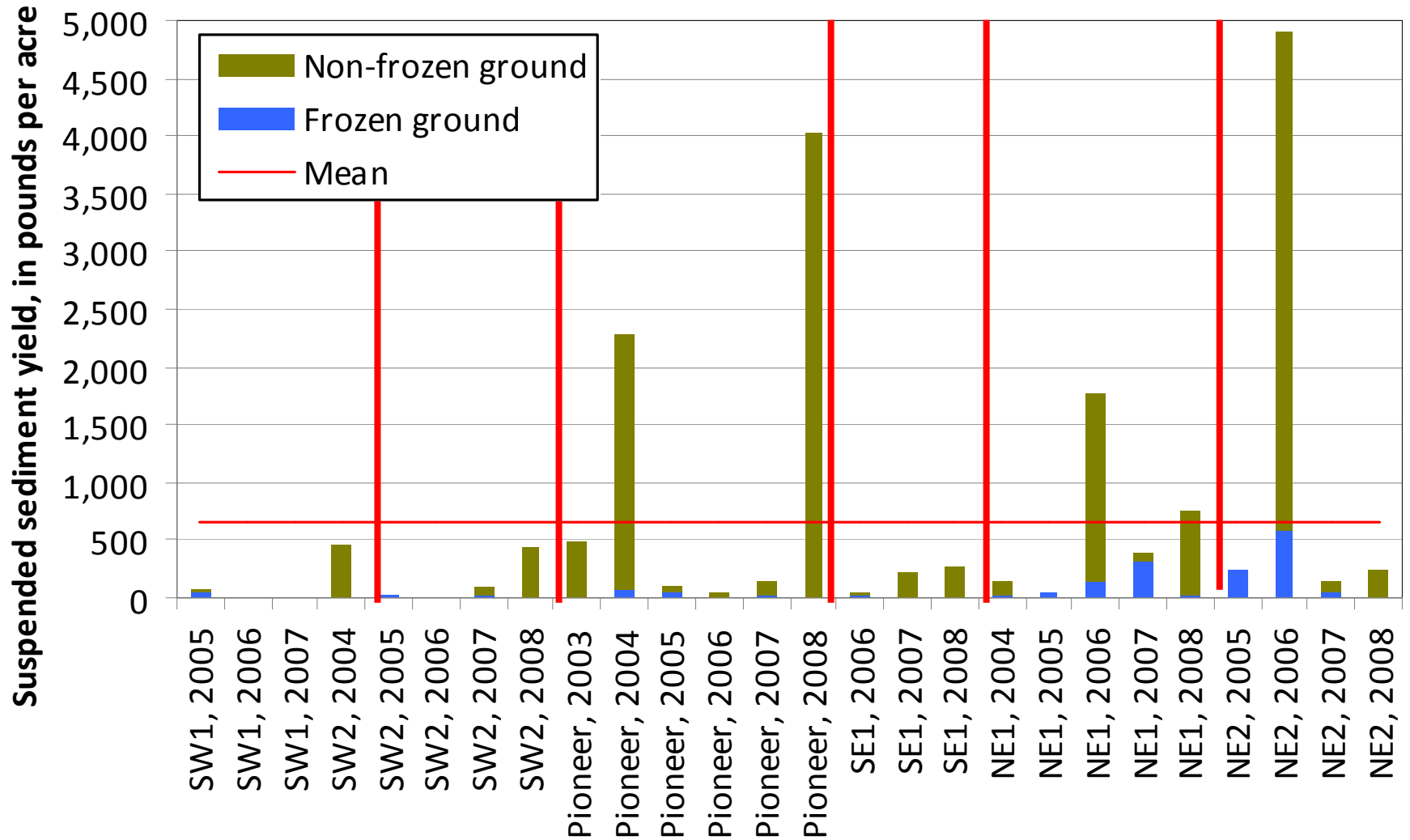
Topics for this session

**Evaluating all
contributing factors**

Collaboration



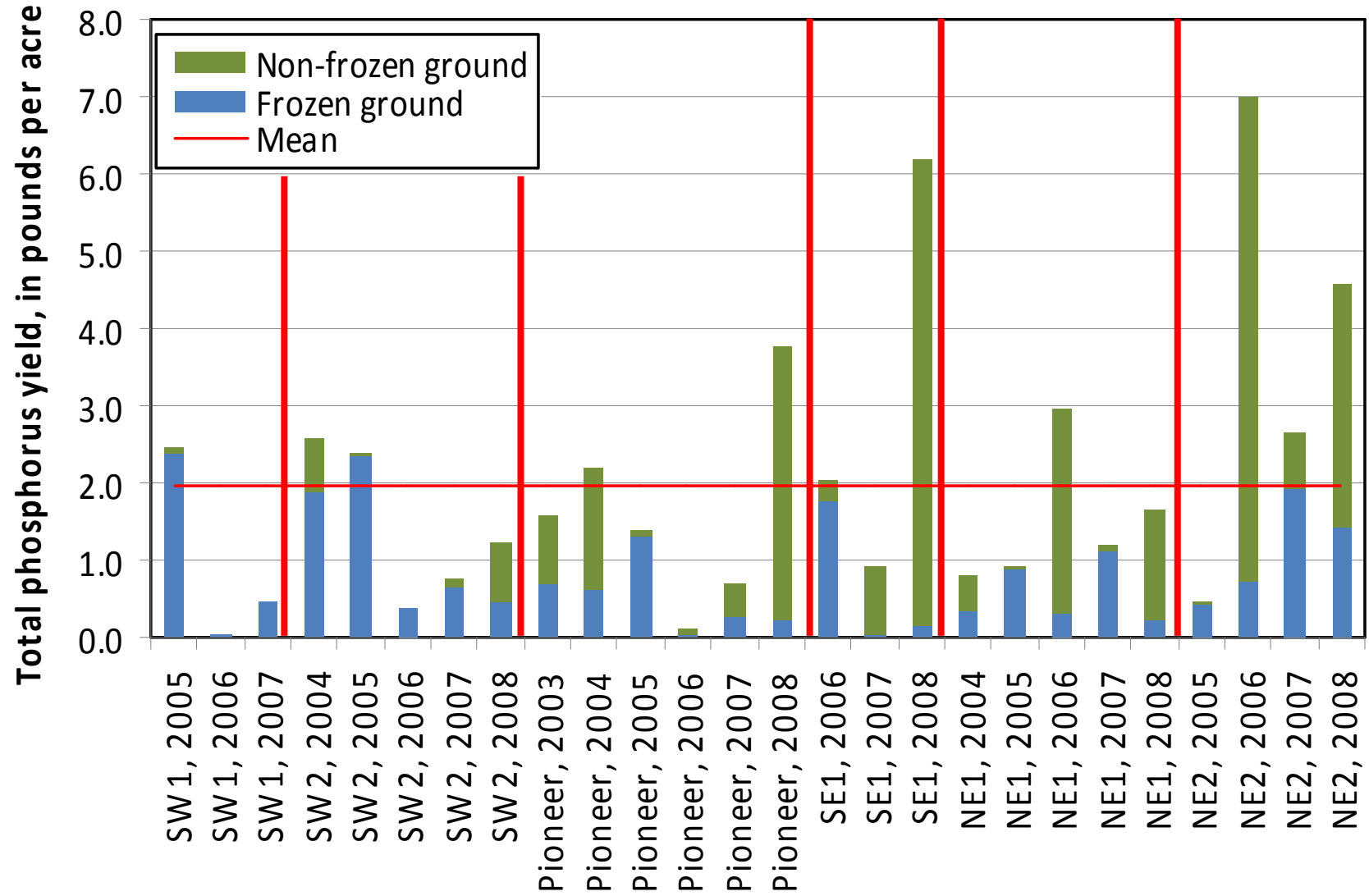
- Water quality cannot be improved without everyone being involved and being part of the solution.
- Every acre counts!
- Every source matters!!!



- **Suspended Sediment Loss**

- Average across all farm years of data was **670 lb/ac**

Phosphorus Loss - Summary



Collaboration



- Focusing on one portion of the problem causes people to get defensive:
 - Septic systems
 - Barnyards
 - Fields
 - Non-farmed land
 - Point sources

Topics for this session

Building Trust and Respect

Stay Focused On Goals

- **What are you trying to achieve?**
 - **Graduate students, published papers**
 - **Promote programs, practices or regulations**
 - **Work with farmers to identify what is happening on their farms. If their farm has negative impacts, work with them to identify solutions.**

People Must Trust You/Program

- You are sincerely interested in their farm and/or their community.
- You want to help them resolve any environmental issues and remain profitable.
- You respect their farming system and seek to find acceptable alternatives to their current farming practices.

Be Open and Honest

- **Participants need to know that you are going to use the data correctly.**
- **However, you must show all the data and make sure that you can put it into context as it relates to their farming system and geophysical settings.**

- **Producers have to be engaged in the identification of practices that can reduce losses**
 - **Have to fit into farming system**
 - **Have to fit into beliefs and values**

Discovery Watersheds



- We are committed to working with the producers, agency personnel and citizens to better understand the issues
- We are committed to identifying what is currently happening in the watershed
- We are here to provide unbiased research and outreach in this region

Quote



- **There is no nation so powerful, as the one that obeys its laws not from principals of fear or reason, but from passion.**
- **Author:** Charles De Montesquieu 1689-1755,

French Jurist, Political Philosopher

Questions???

WWW.uwdiscoveryfarms.org