

The Effects of Animal Waste on The Public Trust (with emphasis on Fish Communities)

For presentation to the 2006 WI Fertilizer, Aglime, and Pest Management Conference

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Fisheries Manager – Dane County



When you say ***WISCONSIN*** ...





State of Wisconsin
Department of Natural Resources
Madison, Wisconsin 53707

License Fee: \$7.50

120923

1984 RESIDENT FISHING LICENSE

Form 8400-A
Issued pursuant to Section 20.09 and 20.54B Wis. Stats. (Increase of your license security number is voluntary and is required under the authority of Section 20.09, Wis. Stats. Refuse to disclose your valid security number will not affect your application for license. If declined, your valid security number will appear on your license and may be used to determine your residence.)

Resident Security Number: 393 54 2346

Last Name (MUST BE PRINTED): WELKE
First Name: KURT
Middle Name: LE
Street or Route: 4319 9 CT A
City: ORISHOW State: WI Zip Code: 53075

Date of Birth: 10-16-56
Color Eyes: HA
Color Hair: BR
Weight: 67
Height: 183

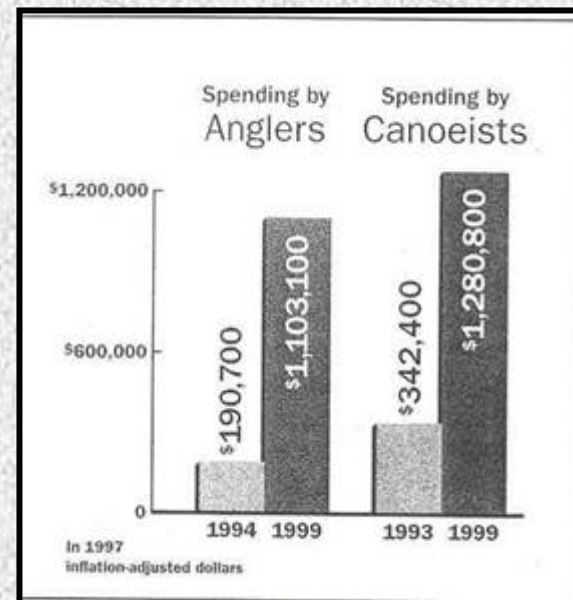
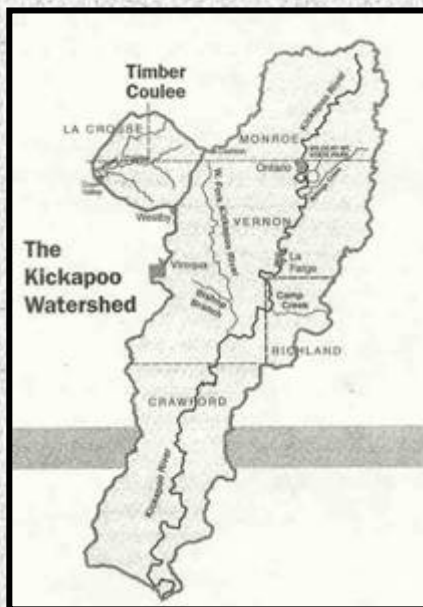
Sex: ☒ Male ☐ Female

Signature of Licensee: Kurt Welke Date issued: 6-3-84
Issued by: L. Fox Stone
DEPARTMENT OF NATURAL RESOURCES
Carol D. Buechler
Secretary

This License Expires December 31, 1984.
License must be carried on person at license while fishing and exhibited to a conservation warden on demand.

2 in license sales nation-wide

The price an average trout fisherman is willing to pay = **\$135/trip**



A...B...C's...

- What
- Why
- When & Where
- How

Examples and Alternatives



WHAT ...?

...an event that results in the death of fish



Manure in Surface Waters affects.....

- Aquatic & Riparian communities
- Habitat impacts
- Public investments - \$
- Recreation
- Health and welfare issues

**PUBLIC
TRUST**





The Public Trust Doctrine

Wisconsin State Constitution

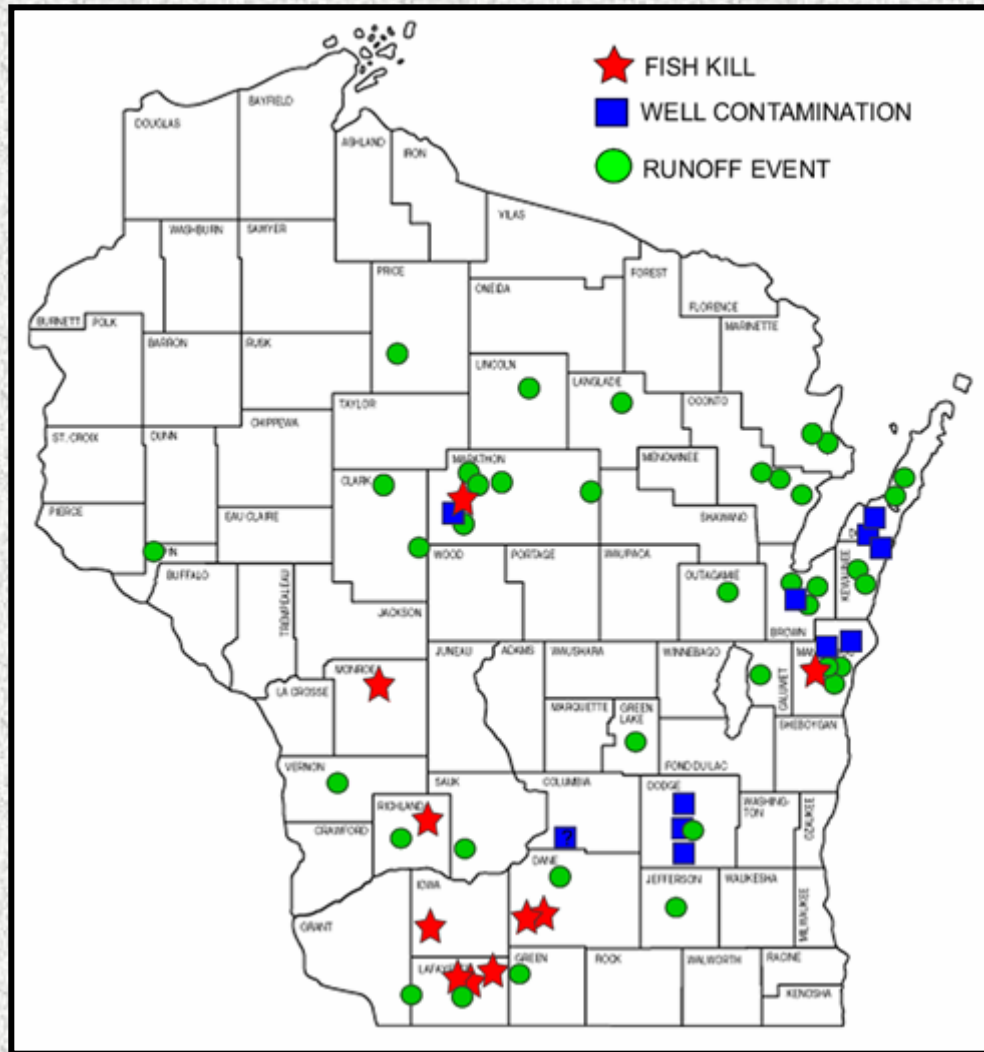
“All Wisconsin citizens have the right to boat, fish, hunt, ice skate, and swim on navigable waters, as well as enjoy the natural scenic beauty of navigable waters, and enjoy the quality and quantity of water that supports those uses.”

The public's right supersedes those of the individual



The State is required to intervene to protect the public's rights

Why be concerned ?



- Frequency



- Severity



- Distribution



52 * events 7/01/04 through 6/30/05

When & Where...

Whenever and wherever the conditions and necessary pieces are in place: Democratic perturbation

Source (product)

Conduit - conveyance

“Push” ...gravity, rain, melt

Receiving water



HOW ?

Natural...

O₂ depletion....decaying biomass

Pathogens...columnaris

Physical ...super saturation, thermal

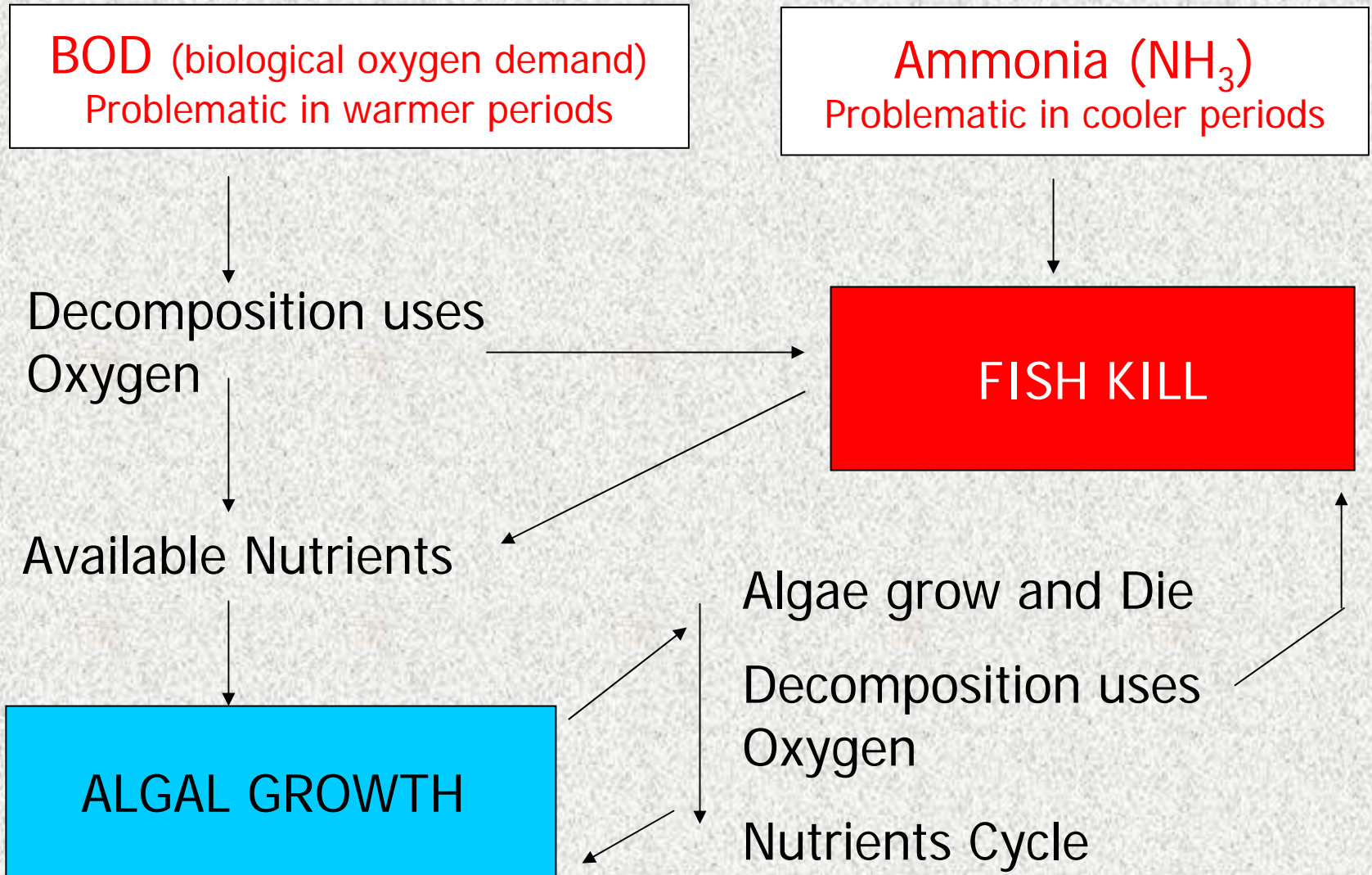


Induced...

Chemical toxicity...point and non-point



The Fate of Manure in Surface Water





TOXICITY to Fish

- Acute (elimination, reductions in size, number & type)
- Chronic (simplification, replacement, loss of habitat)

Kill is driven by :

- * Volume of pollutant
- * Concentration of pollutant
- * Efficacy of the delivery conduit
- * Tolerance of organisms
 - * Chemistry...temperature, pH

Acute Effects

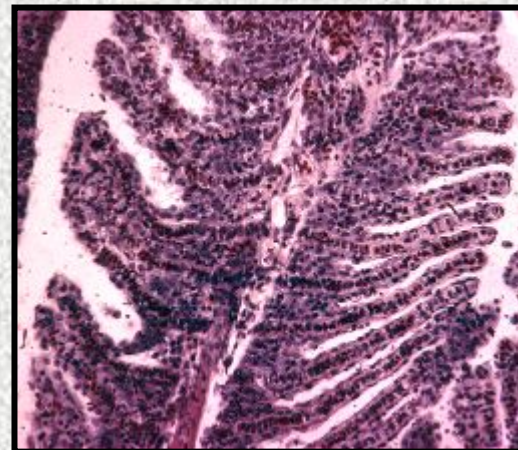
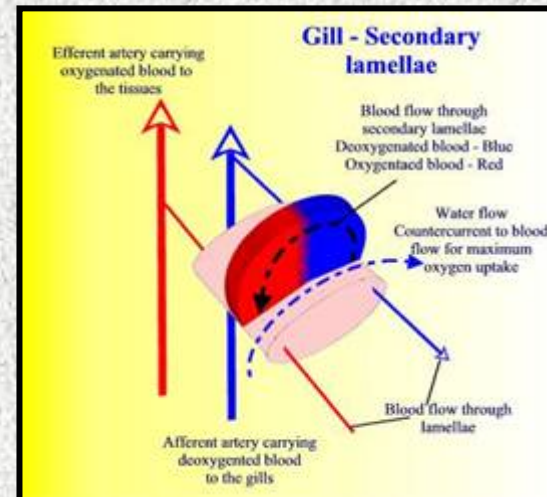
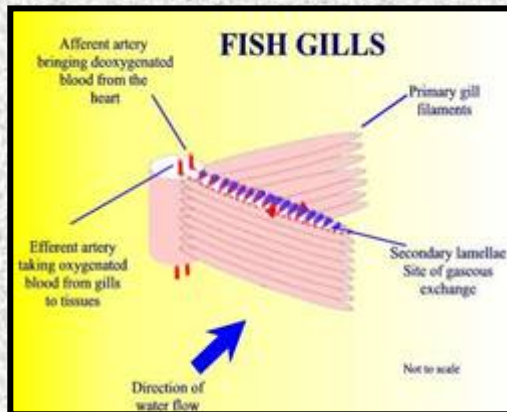


| Temperature | pH | NH3- Acute | NH3 - Chronic |
|-------------|-------------|-------------|---------------|
| 10.0 | 5.0 | 38.7 | 4.0 - 10.0 |
| 10.0 | 6.5 | 32.6 | 4.0 - 10.0 |
| 10.0 | 7.0 | 24.1 | 4.0 - 10.0 |
| 10.0 | 7.5 | 13.2 | 4.0 - 10.0 |
| 10.0 | 8.0 | 5.6 | 4.0 - 10.0 |
| 10.0 | 8.5 | 2.1 | 4.0 - 10.0 |
| 10.0 | 8.35 - 8.47 | 45.0 - 71.0 | |

Gill Hyperplasia;

fr. **L** *hyper-* **2 b:** **excessive**

fr. Gk *plasis* **molding** : development, formation



Chronic Effects



One Runoff Event Compared to County Phosphorus Ban

- Urban load is 3,740 lbs annually
 - Best estimate is 50% effective
 - **1870 lb reduction from 450,000+ people (projected over 1 year)**
- Dorn Creek runoff event
 - 6000 g/a on the land = 30 lbs/acre of P x 80 acres
 - **2400 lbs P delivered (delivered from 1 event)**



Note:

1 lb of phosphorous produces 500 lbs of algae

The Naked Truth

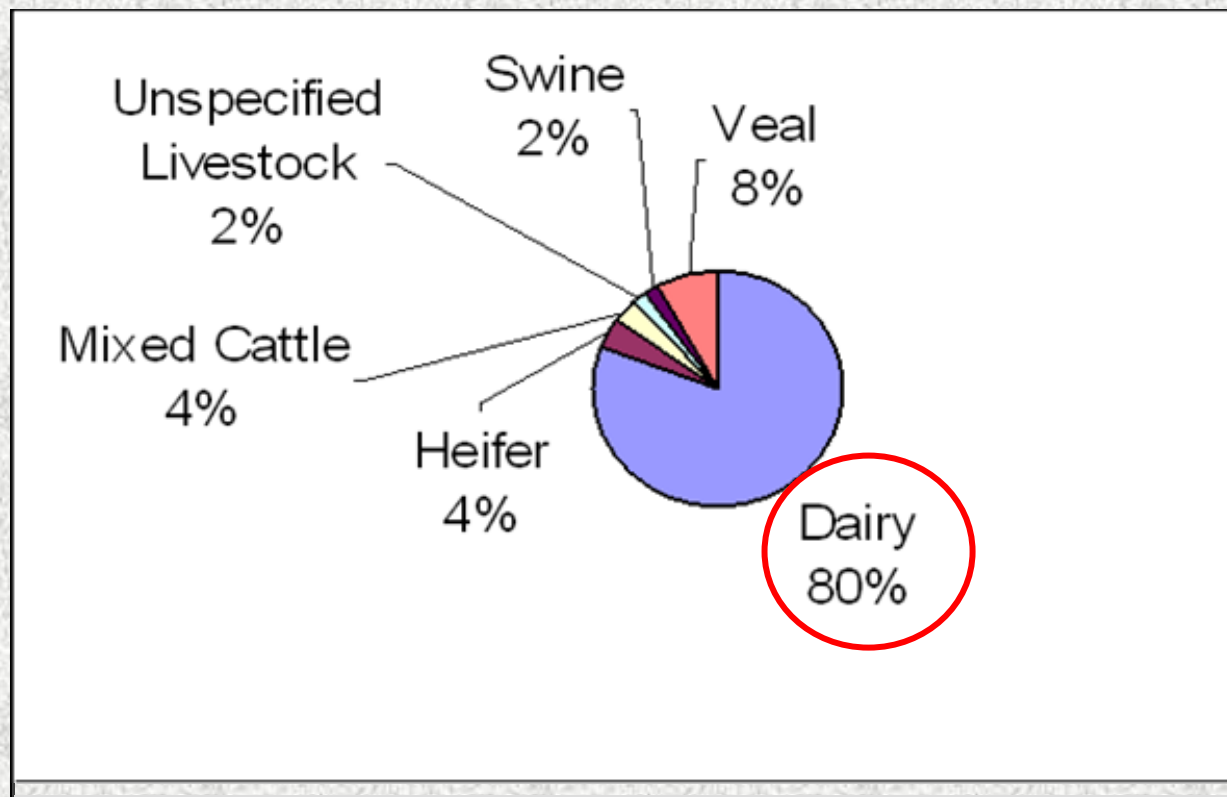




Operation Types

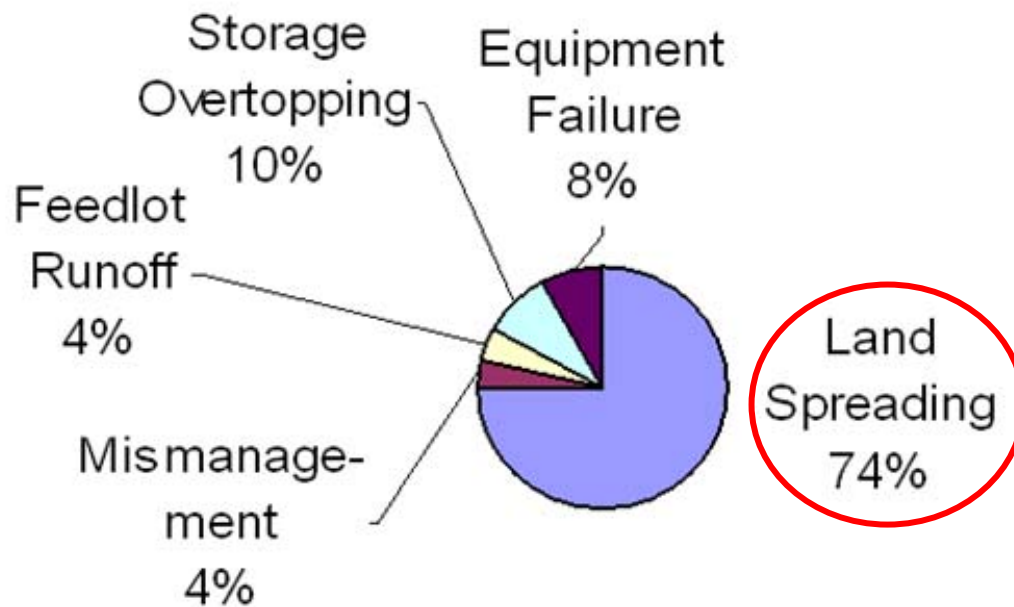
from which manure runoff events were reported

Animal Type





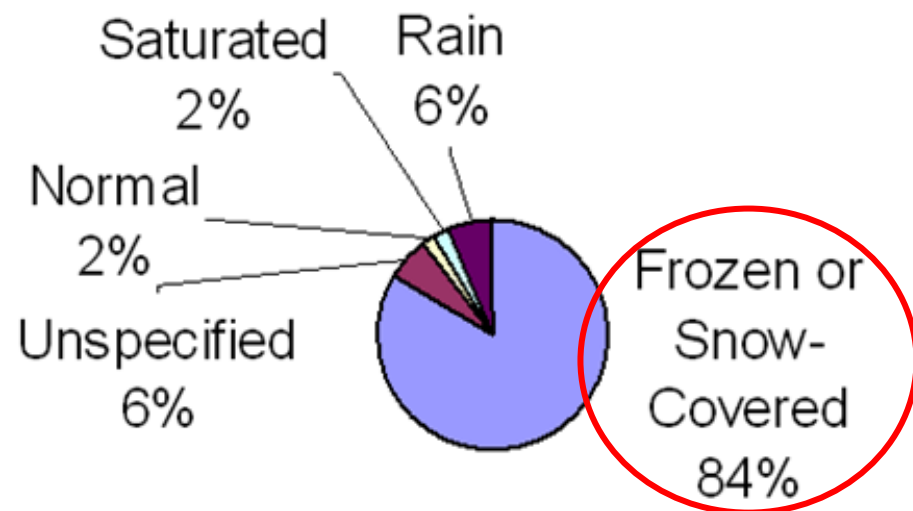
Causes of Manure Runoff Events





Manure Runoff Events due to Landspreading

Soil Conditions during Landspreading Resulting in Manure Runoff Events



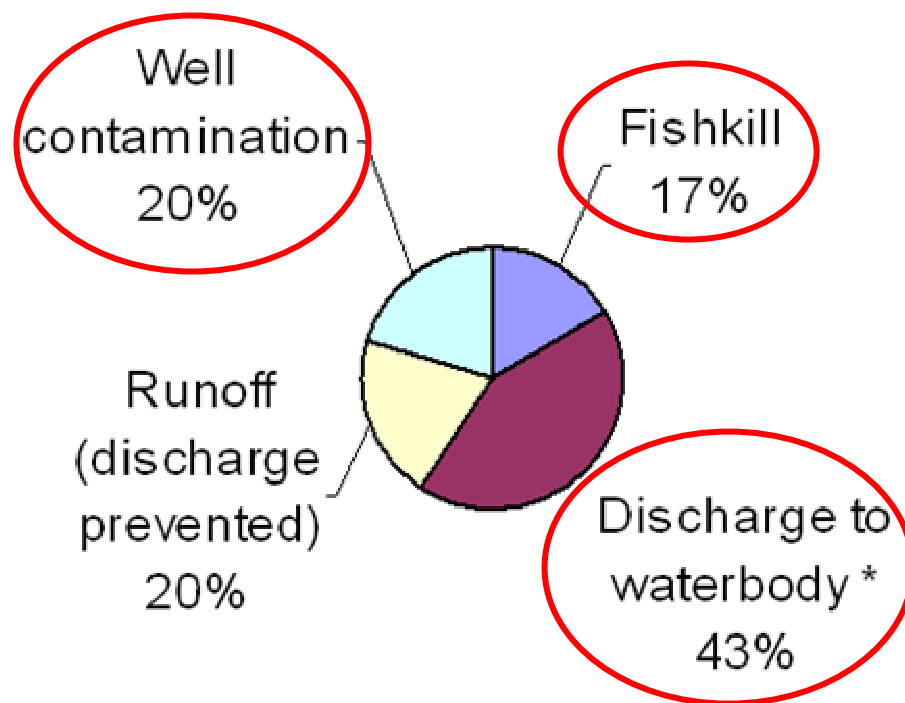
Liquid vs. Solid Applications Resulting in Manure Runoff



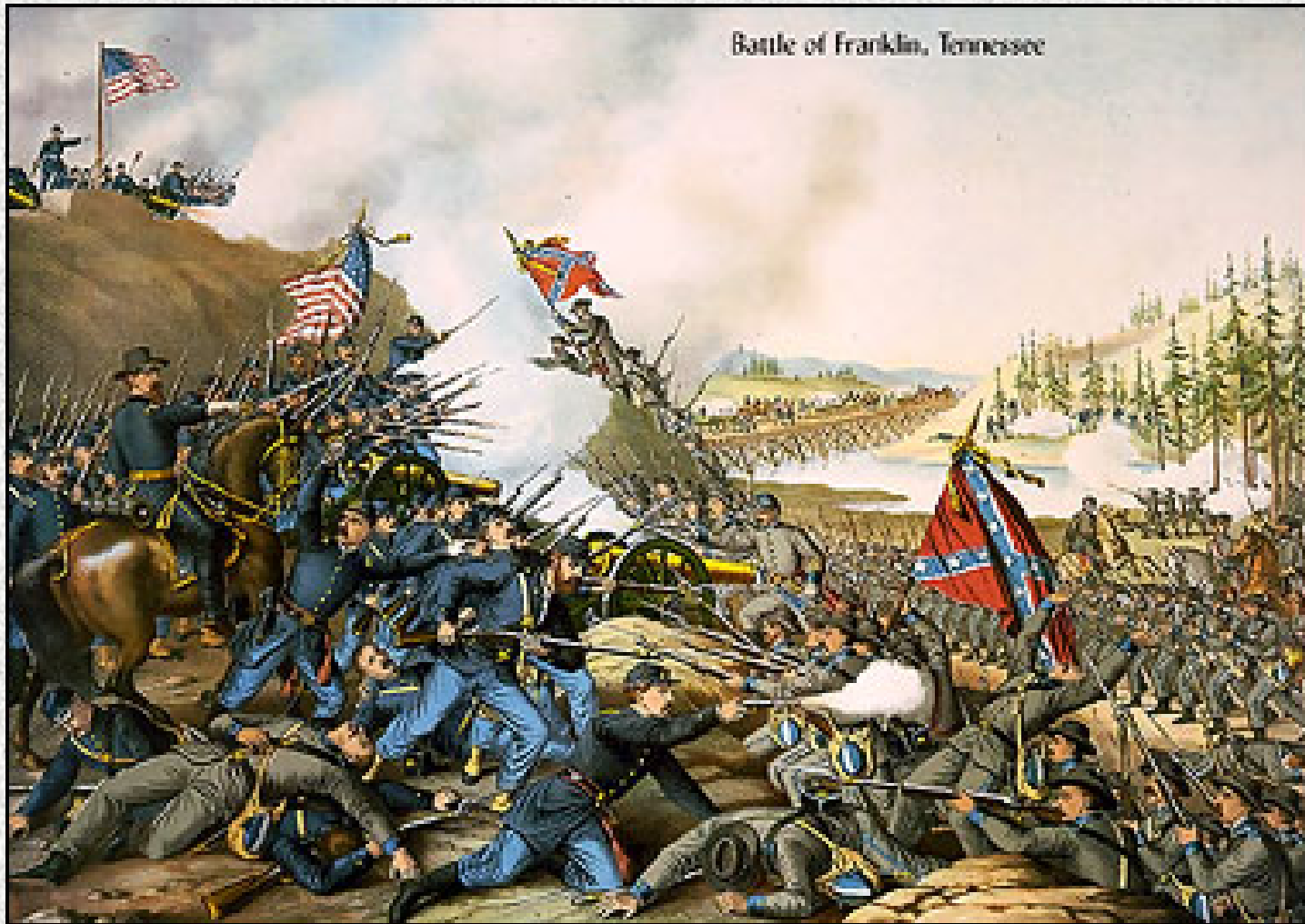


Results of Manure Runoff Events

- Some events resulted in multiple impacts
- Data only include acute impacts, not chronic effects from repeatedly elevated levels



We do it this way ...



...because it's the way we have always done it



This is **NOT** your grandfathers' farm or his economic model of dairy



Field "A"



Field "B"



Field "C"

West Branch Sugar River Fish Kill Dane Co., Feb. 24 - Mar. 5, 2005

Field "B"
slopes 1-10%

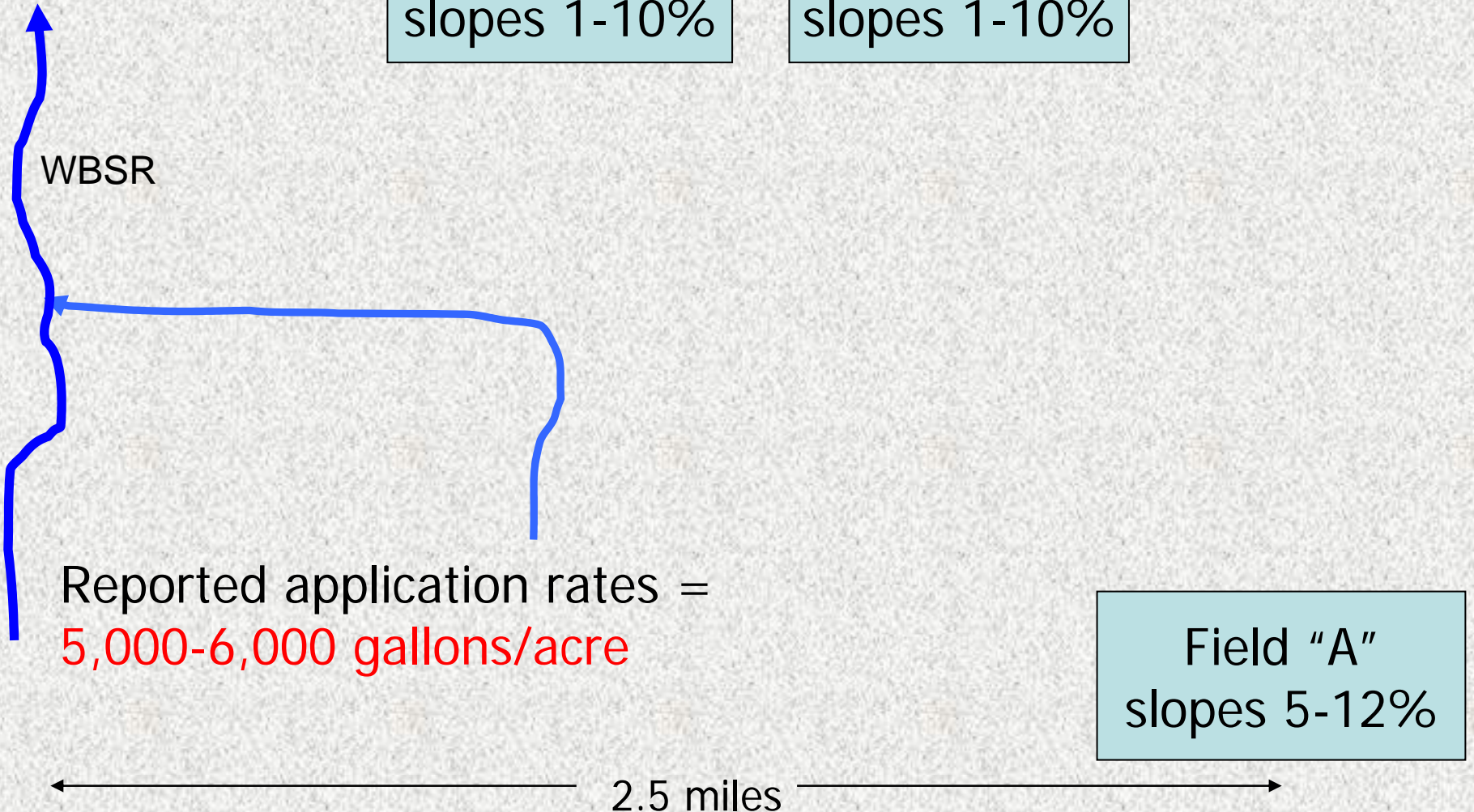
Field "C"
slopes 1-10%

WBSR

Reported application rates =
5,000-6,000 gallons/acre

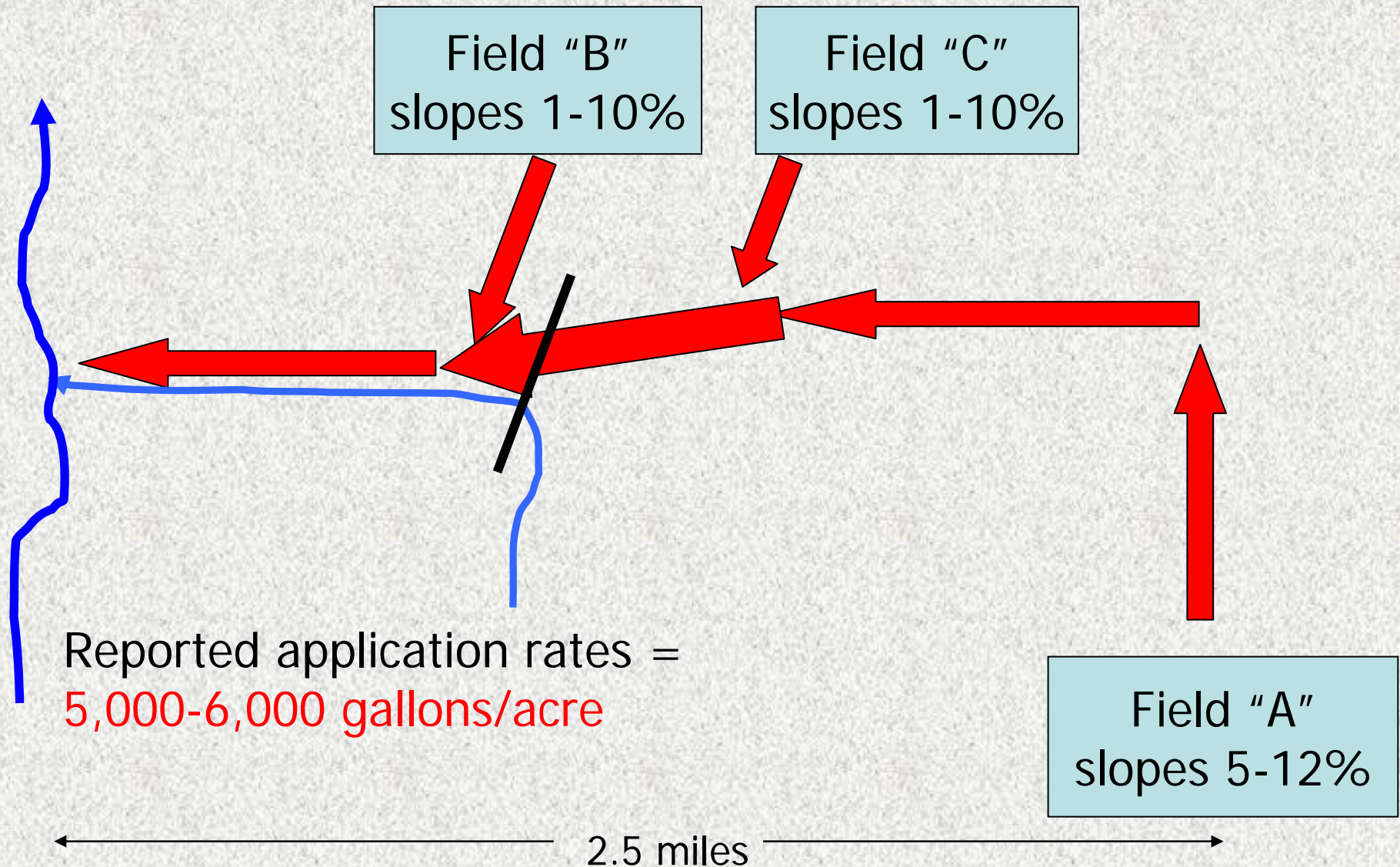
Field "A"
slopes 5-12%

2.5 miles





West Branch Sugar River Fish Kill Dane Co., Feb. 24 - Mar. 5, 2005



Emergency Responses



Dam Construction



Ditch Plug

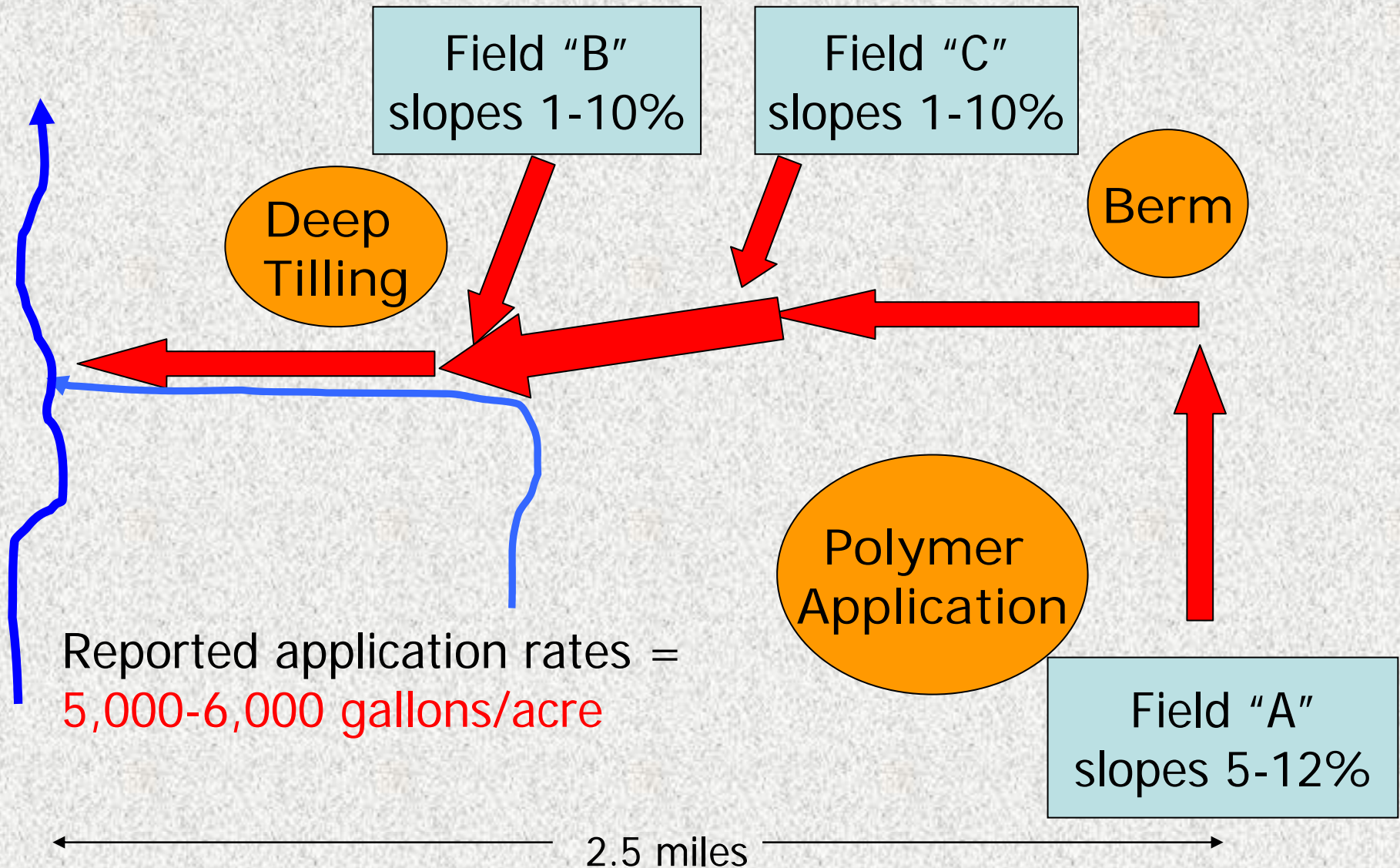


Deep Tilling

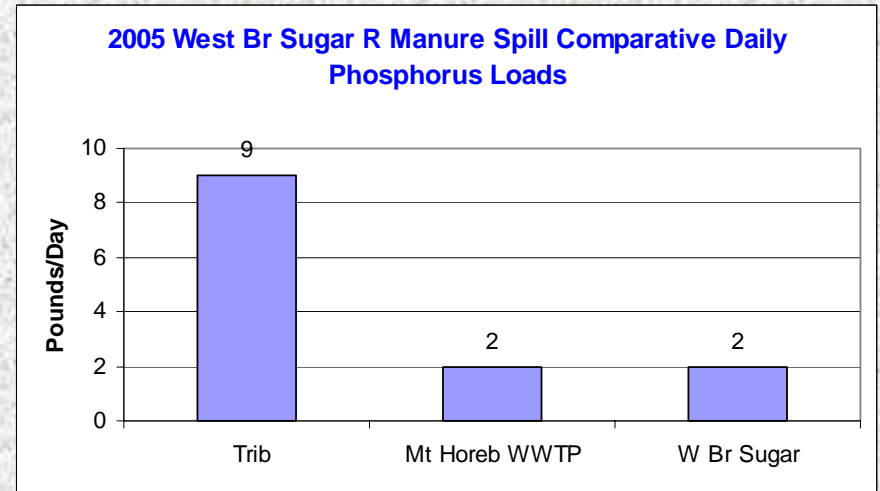
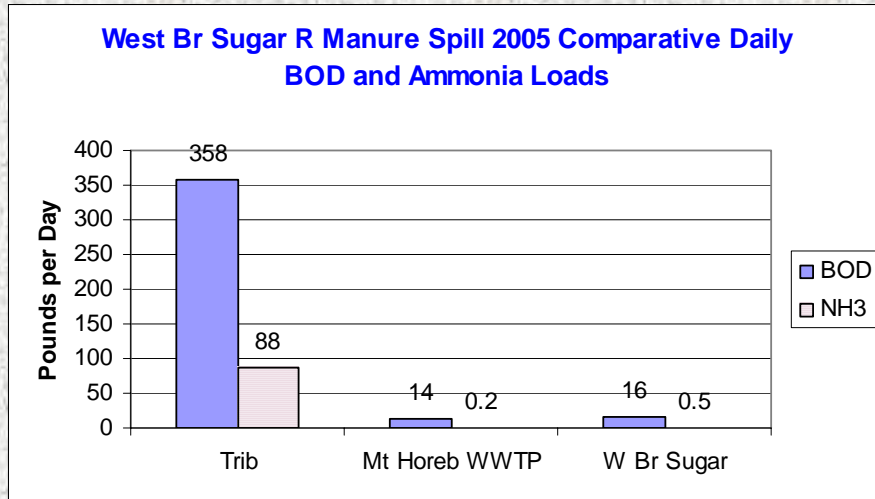


Polymer Application

West Branch Sugar River Fish Kill Dane Co., Feb. 24 - Mar. 5, 2005

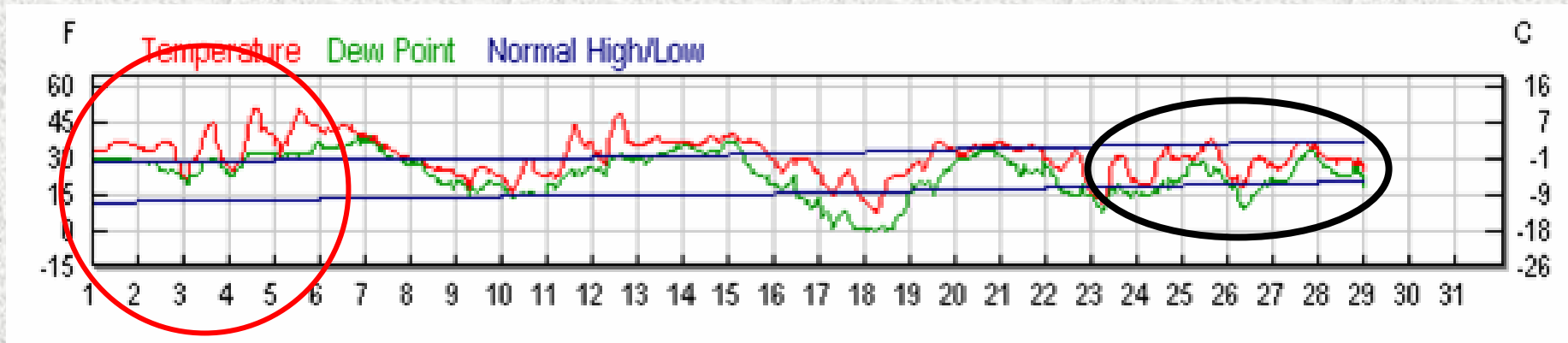


Context

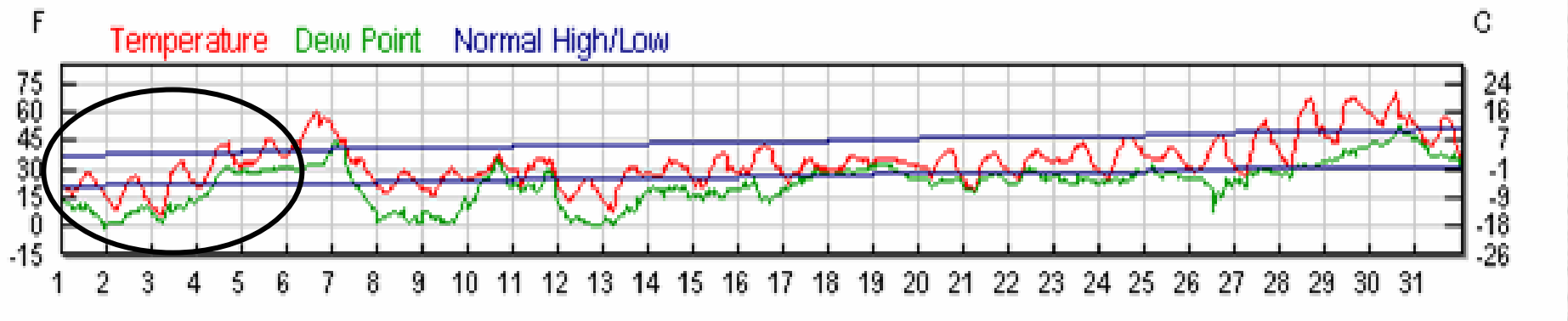


- **440 X** the ammonia of the STP
- **25 X** the BOD of the STP
- **4.5 X** the P of the STP

Atypical weather ?



February 2005



March 2005

Truths ...

- Dairy agriculture is here to stay !
- Dairy agriculture is a necessary element of Wisconsin's' social and economic fabric
- Agricultural landscapes provide necessary environmental services
- Solutions are going to cost \$
- Doing nothing has unacceptable costs as well
- Having manure = having risk
- No guarantees; slope, distance from water, rate...all can go wrong

Risk Management

- Timing is critical...avoidance (know your weather)
- Know where you are in relation to water resources (*)
- Use separation
- Lower application rates
- Incorporate
- Implement a NMP
- Have an emergency response plan



Additional resources...

- New technologies ...digesters et al
- Non-traditional partners ...strange bedfellows
- Meaningful political action (New Dane County Ordinance)
- Differential “*Niche*” Marketing (Green Tier – fit for IAG’s)

Additional needs...

with all this good science, what is the fix ?

- Rural sociology – someone to bridge the gap
- County agent link ...local decisions require local players
- Revisit the cost share requirements
- Level the field – set timelines and thresholds
- Develop the true economic cost

and on the 7th day he rested and saw...



“that it was good”