

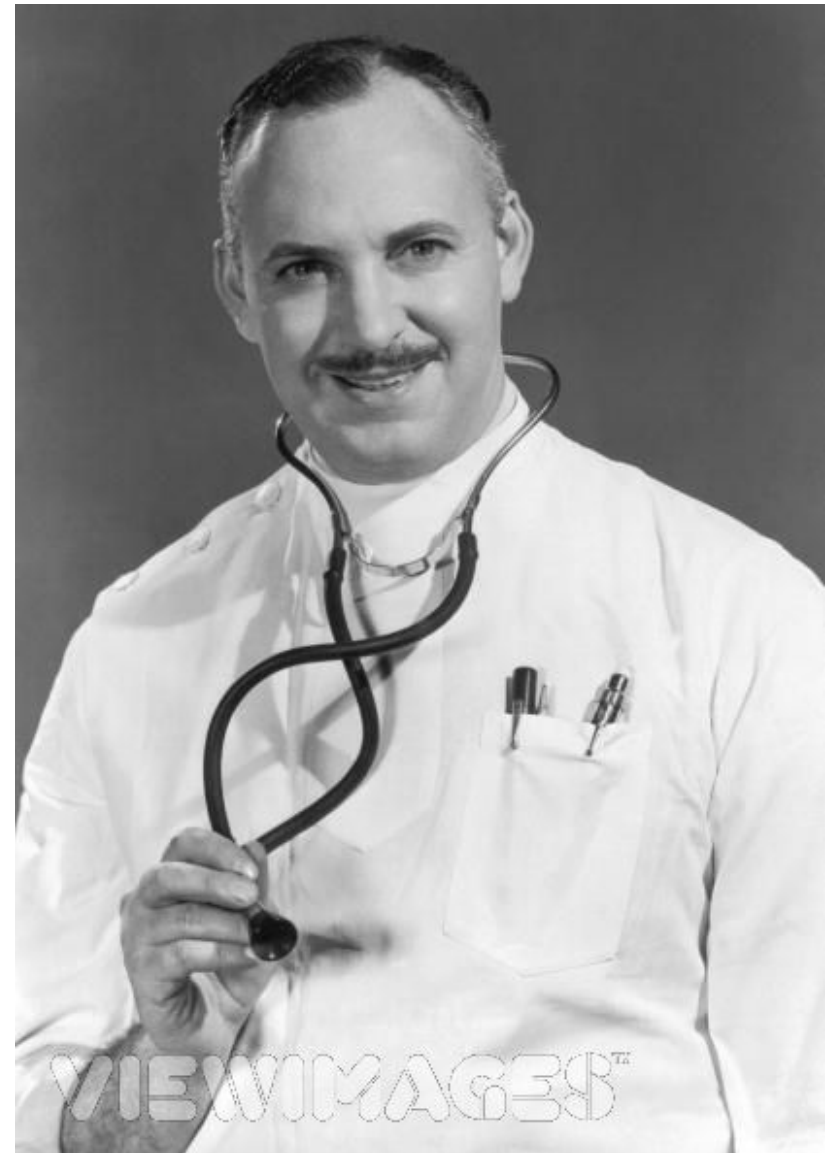
Nitrogen deficiency: the **yellow plague** of 2008

Peter Scharf
University of Missouri

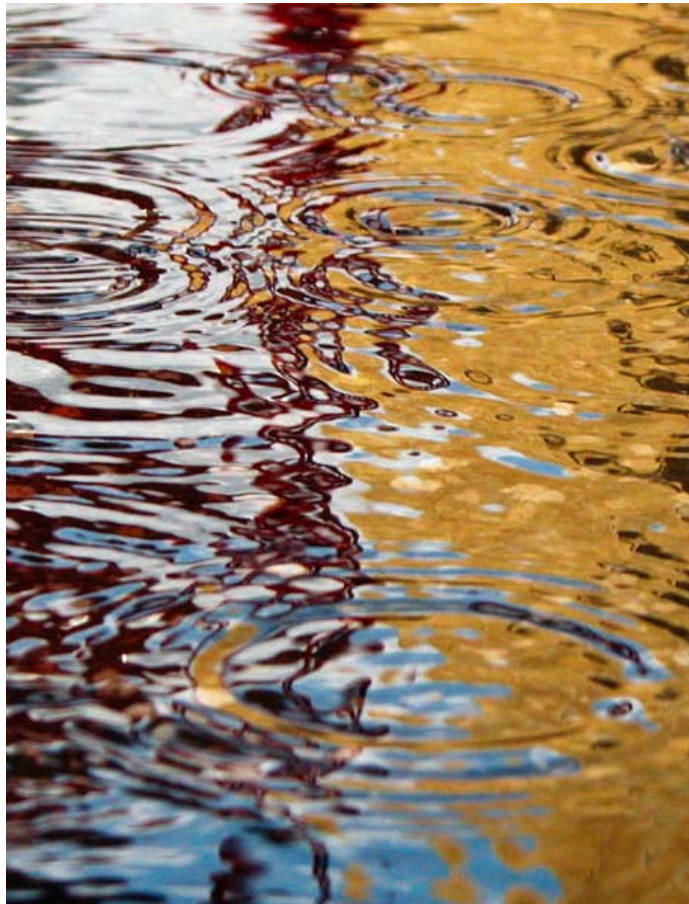


If there's a plague...

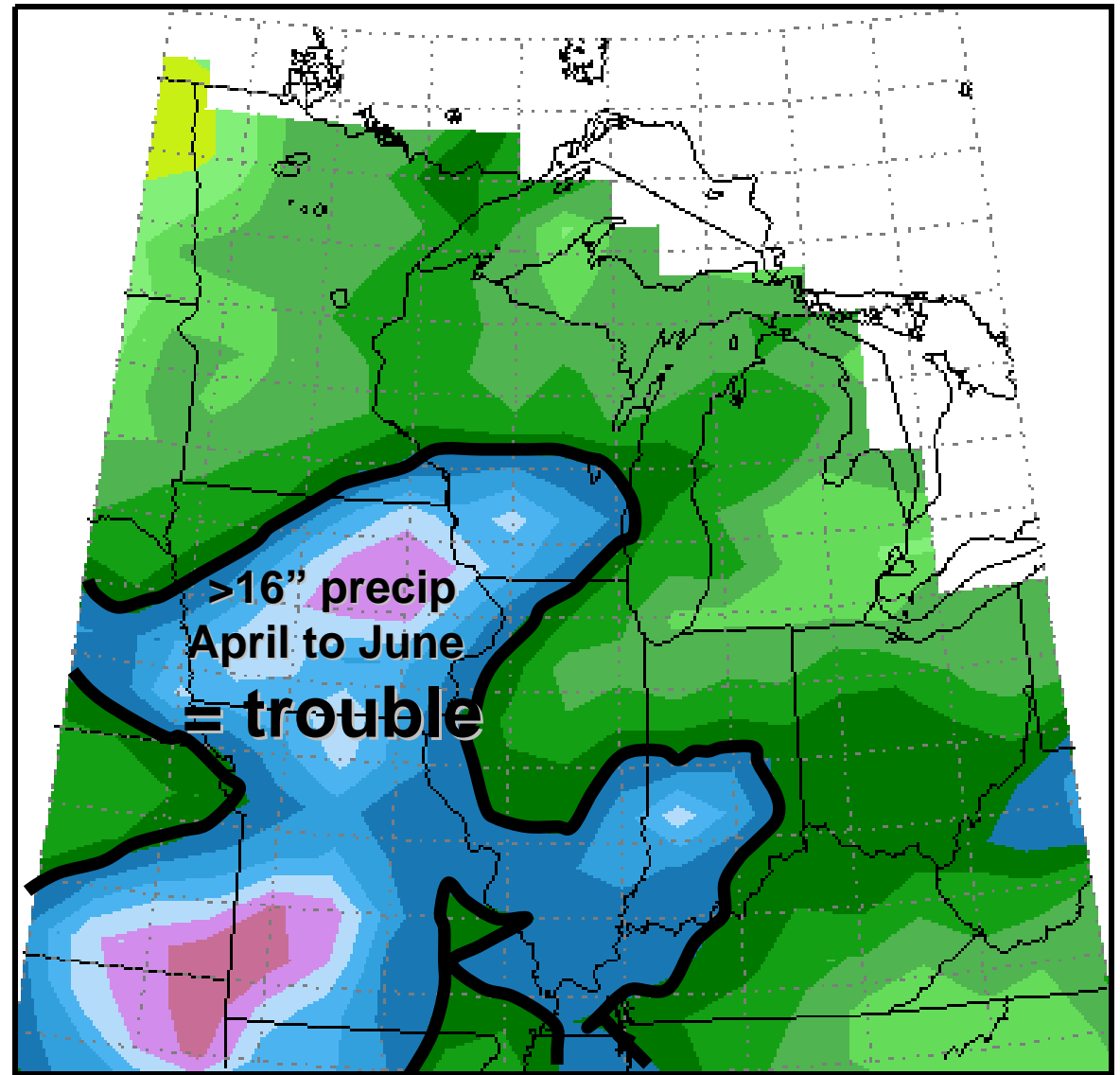
- **The Cause**
- **The Symptoms**
- **The Damage**
- **Prevention**
- **Diagnosis**
- **The Cure**



The Cause



Total Precipitation in Inches
April 1, 2008 to June 30, 2008





The Symptoms

1. Yellow corn!!

Much more this year
than any of the past
11 years

2. STREAKS

Central Iowa late August







Central Iowa early August

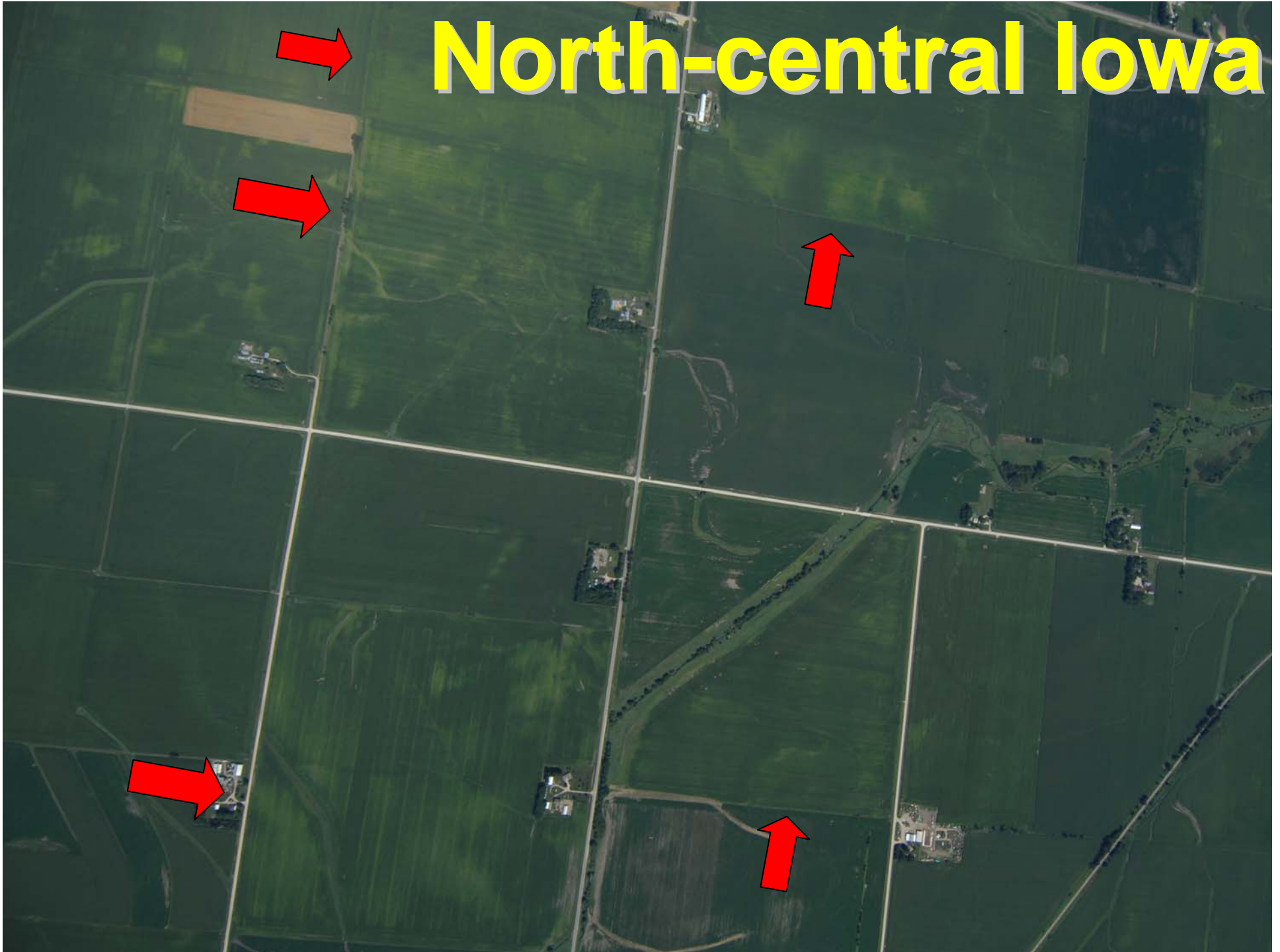








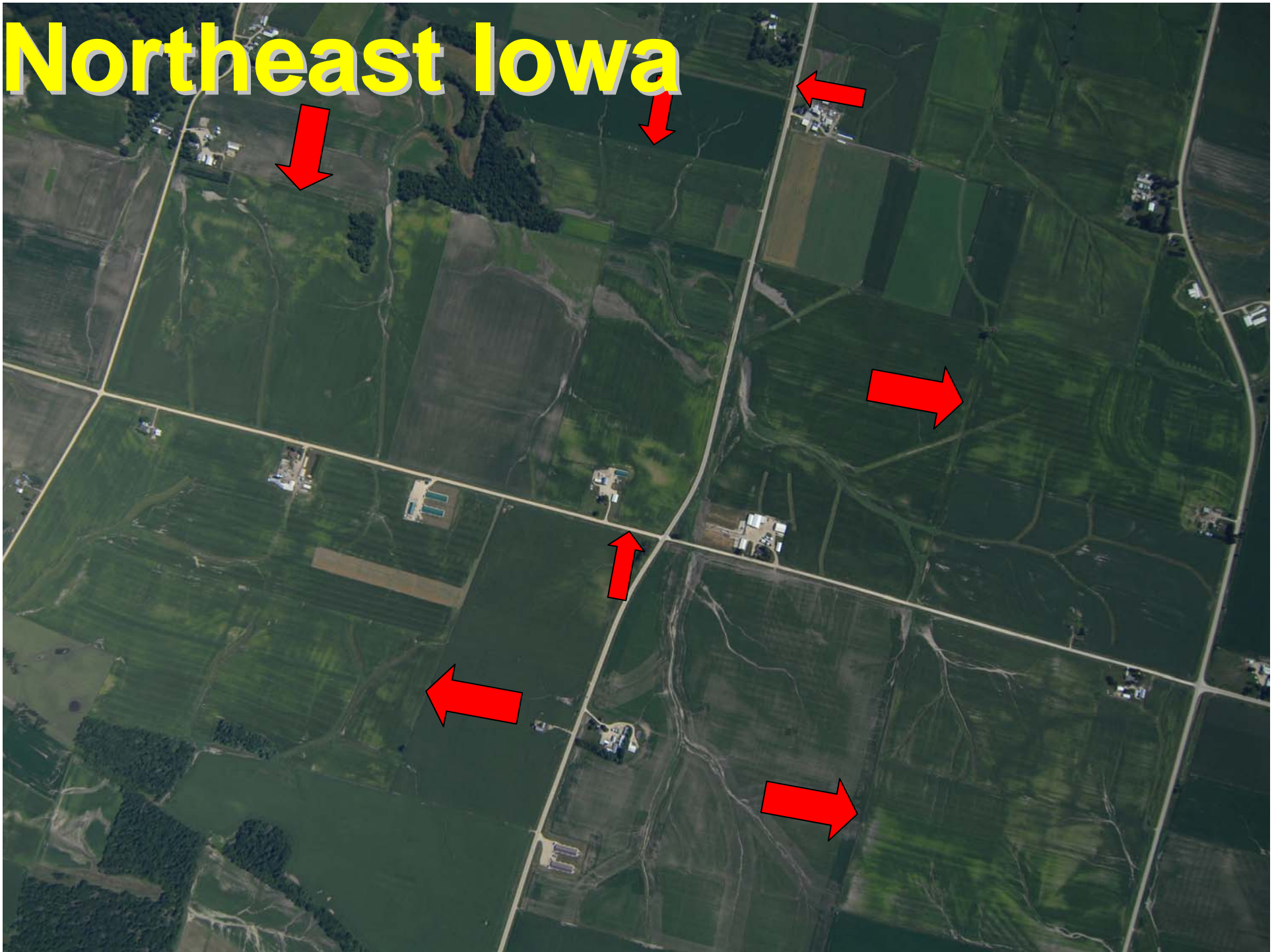
North-central Iowa



Northeast Iowa



Northeast Iowa

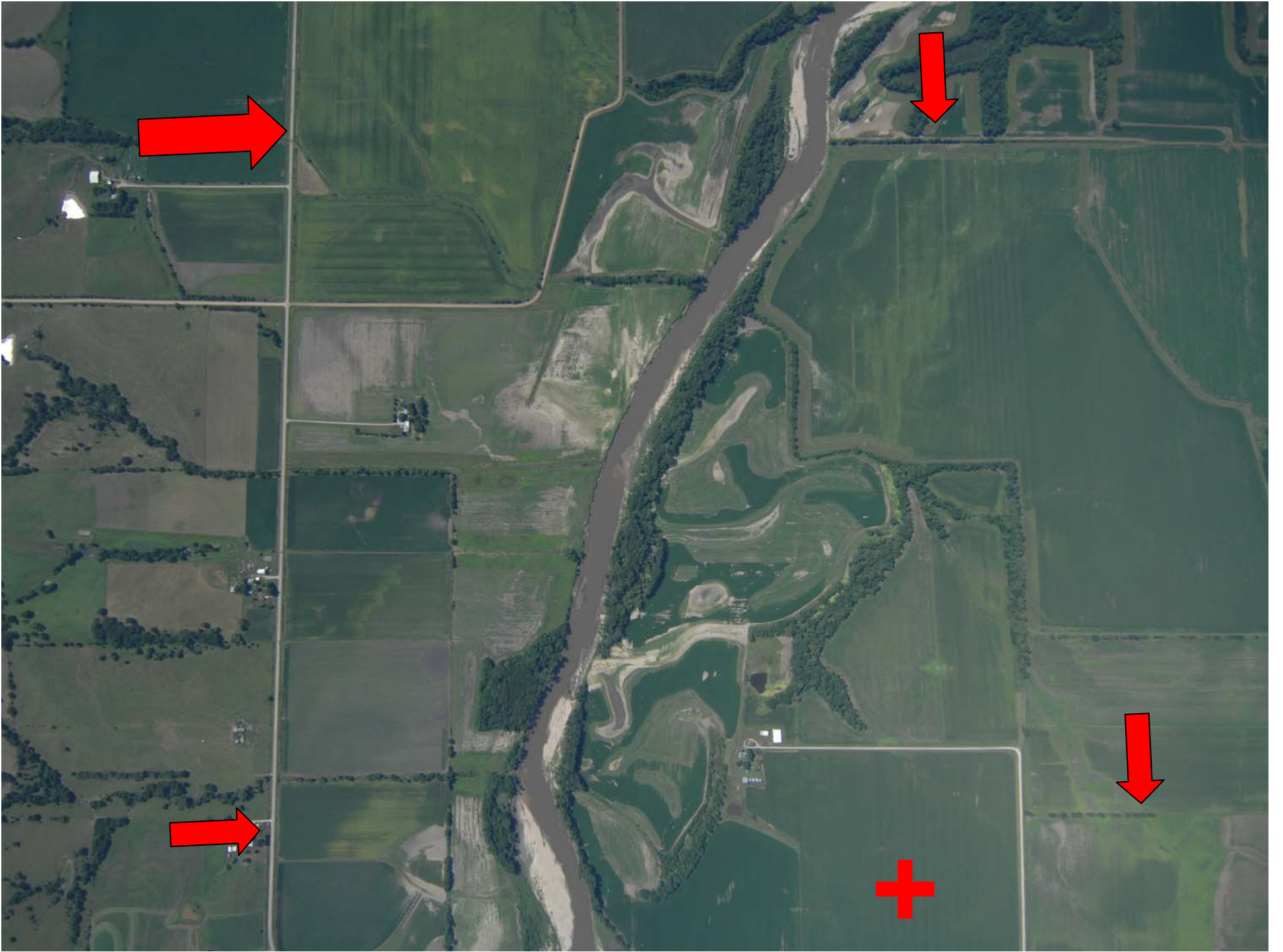


Eastern Iowa



Southwest Iowa





Northwest Missouri













Central Missouri

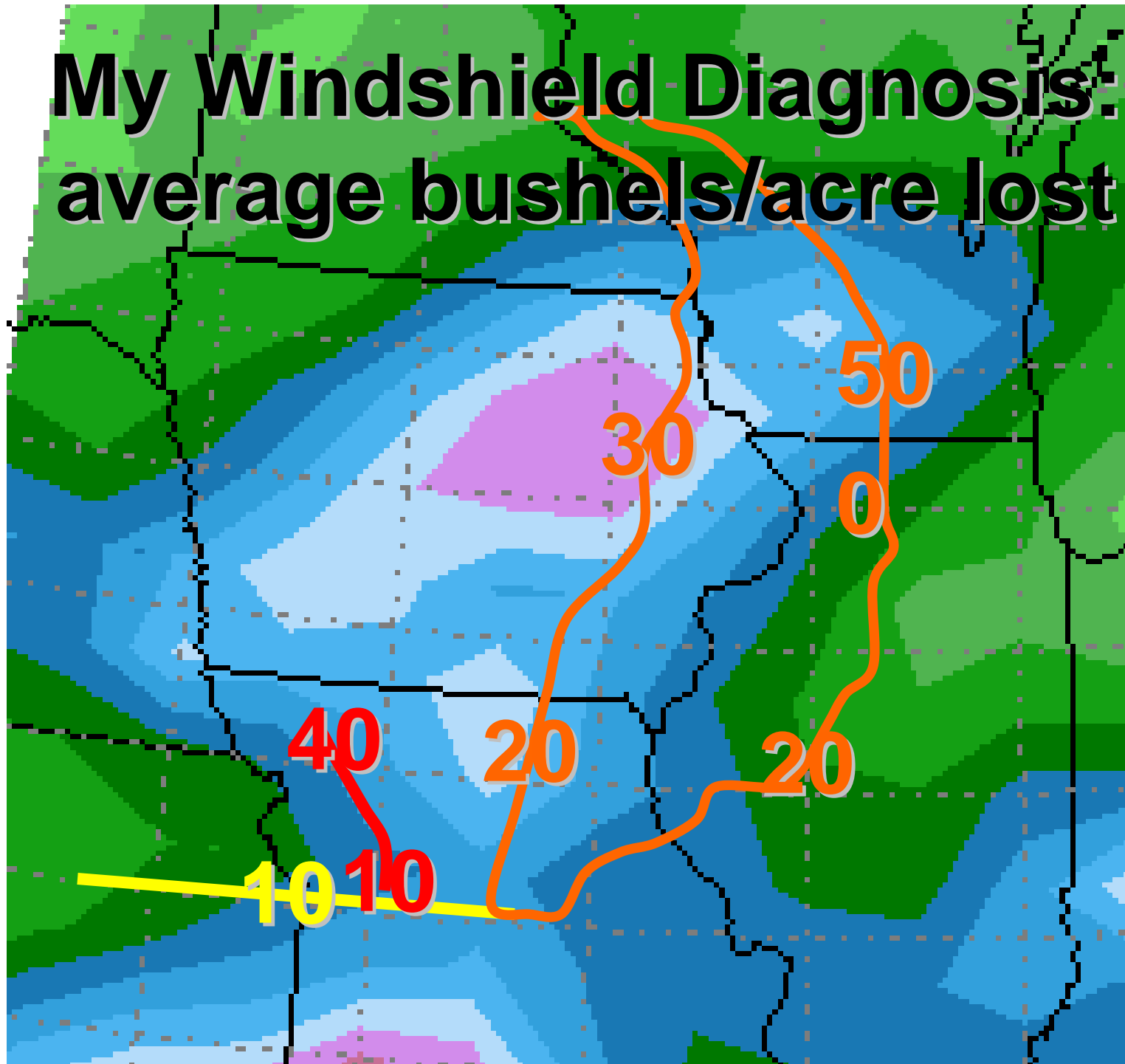


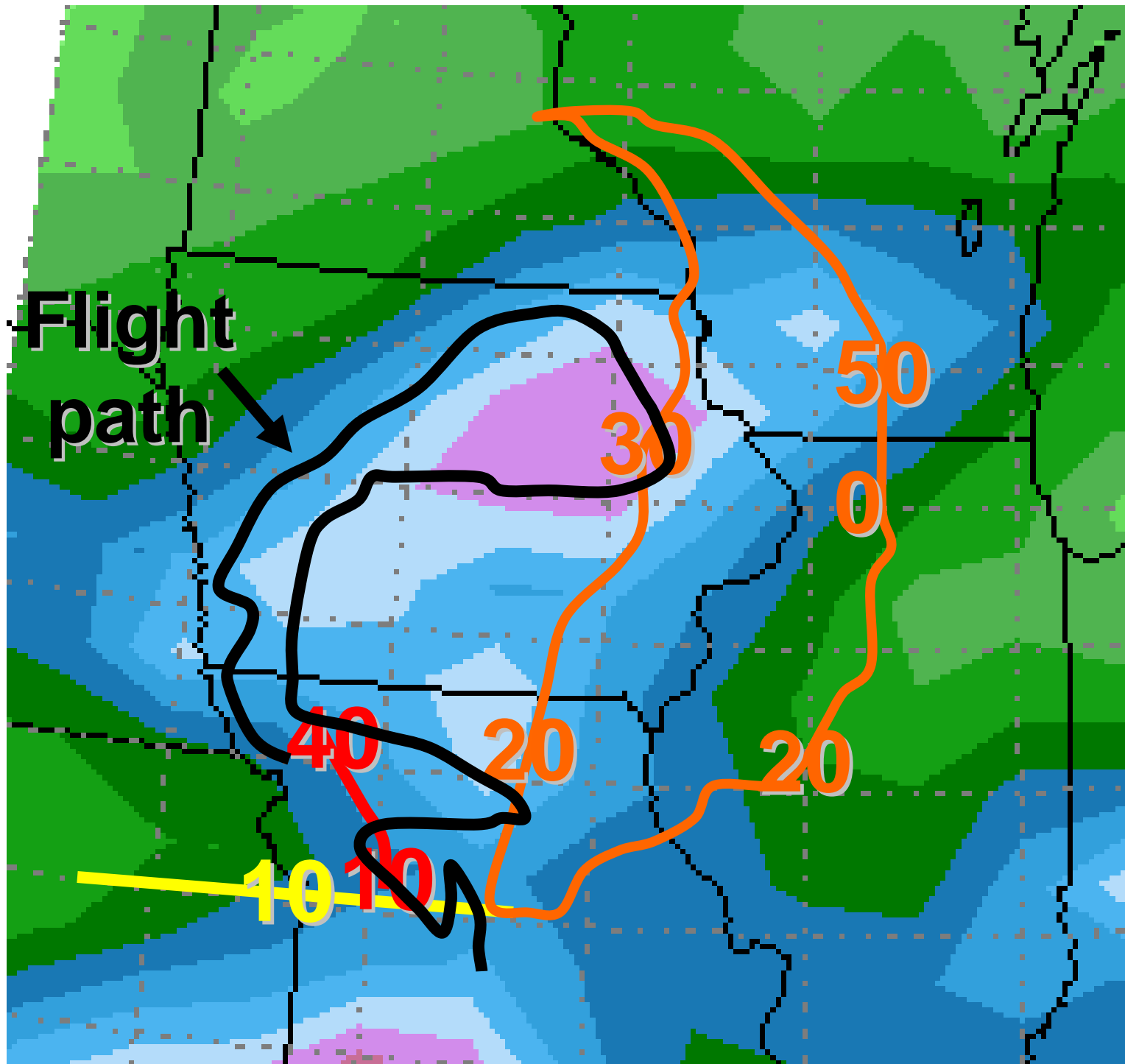


Western Illinois

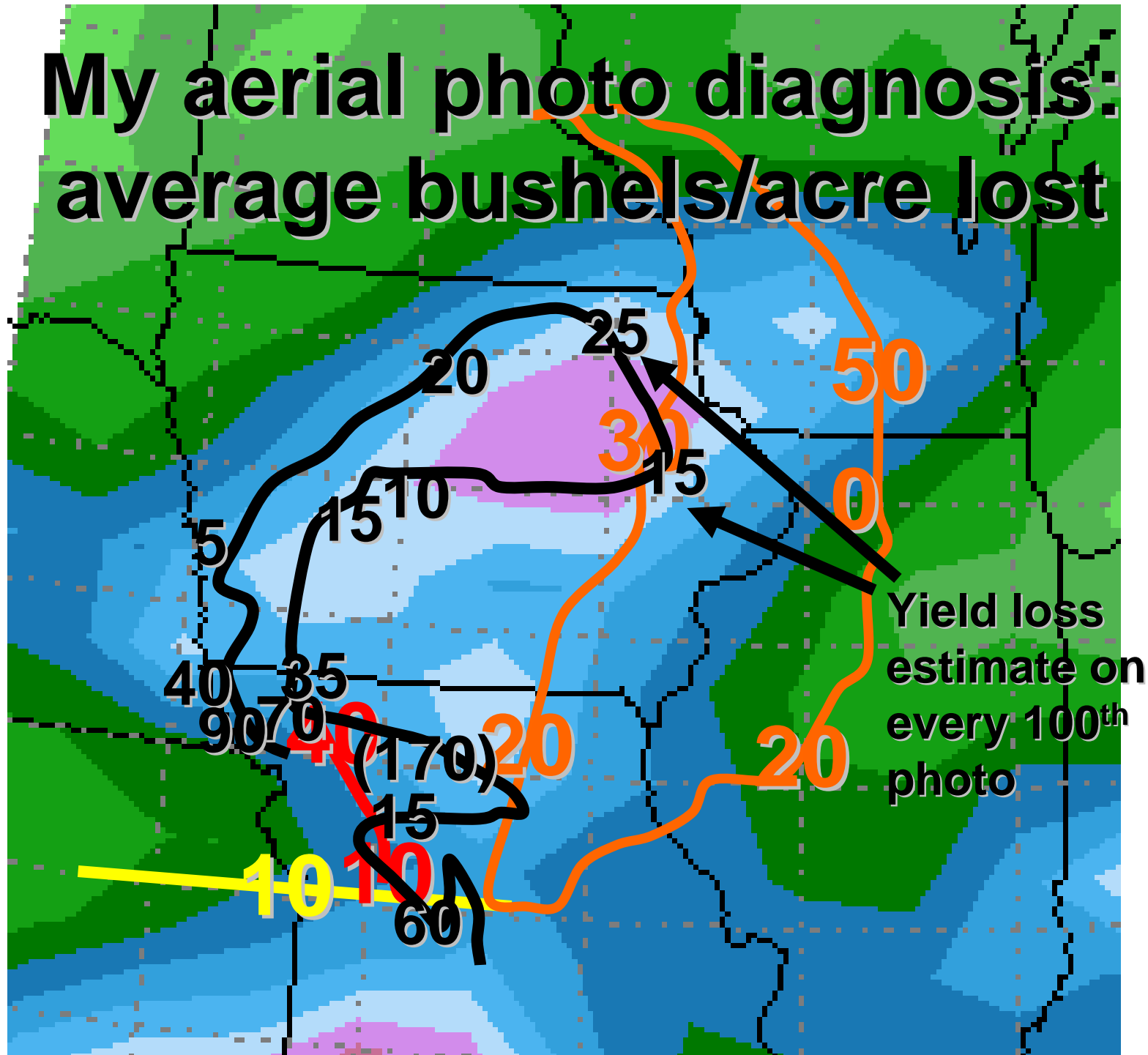


My Windshield Diagnosis: average bushels/acre lost

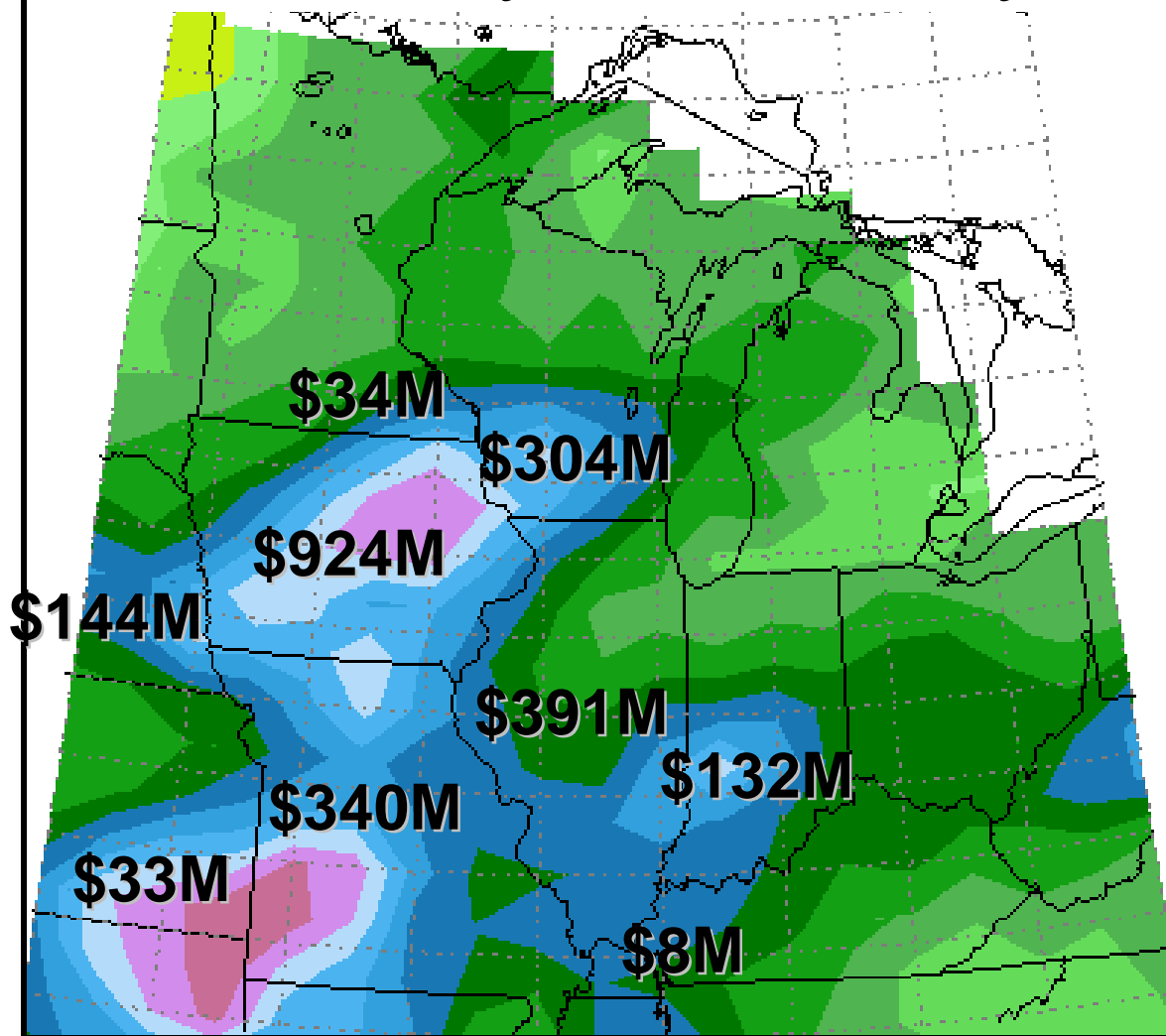




My aerial photo diagnosis: average bushels/acre lost



Dollars lost in 2008 due to N deficiency: My estimates by state



Total 9 states:
\$2.3B

- Some yields are very good anyway
- Many could have been better



Prevention??

- Spring anhydrous?
- N-Serve?
- DCD (SuperU)?

Prevention: Later application



180 N
at planting



110 N
sidedress V7.

The image shows two corn plants lying horizontally on a bed of reddish-brown gravel. The plants are positioned one above the other. The top plant is labeled '110 N sidedress V7.5' and the bottom plant is labeled '180 N at planting'. Both plants have green leaves and visible root systems. The background consists of a patch of green grass.

110 N sidedress V7.5

180 N at planting

Diagnosis

- Aerial photos
 - Quantify potential yield loss
 - Prioritize fields (how severe?)
 - Diagnose a lot of fields quickly
 - Not until corn is waist high
- Computer models (Adapt-N in New York)
 - More regional, less accurate
 - Can diagnose the problem earlier

Diagnosis: an example



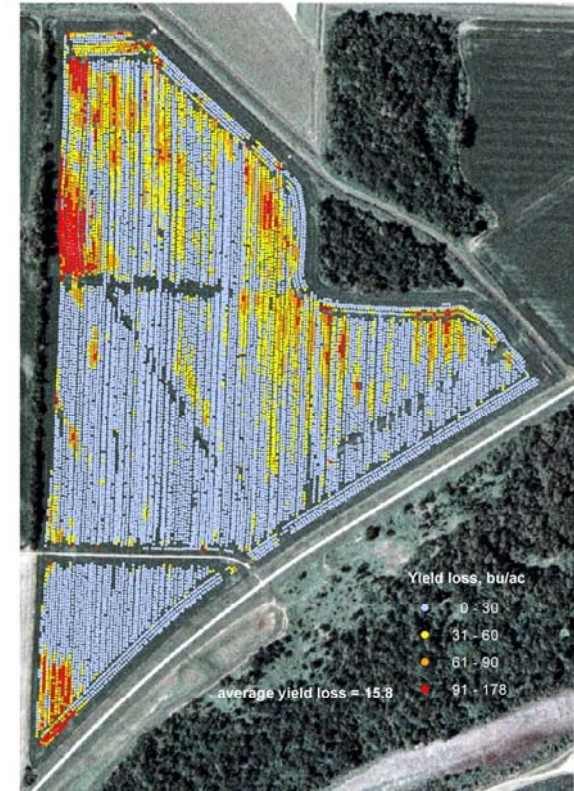
June 24 aerial photo

Banks46 2004 Predicted Yield Loss Map (RG = 68.5 from darkest 20% of polygons; green/red < 1.0; using equation derived from seven fields)



Yield loss map predicted from June 24 aerial photo

Banks46 2004 Actual Yield Loss Map (RY = 199.5 from darkest 20% of polygons; green/red < 1.0)



Yield loss map based on yield monitor data (September 30)

The Cure



July 16, 2005

Alternating 100' strips w/ and w/o 12 gal 32% UAN (6/29)

Can rescue N really work?

Miami County, Kansas



Same field

with extra N

without extra N



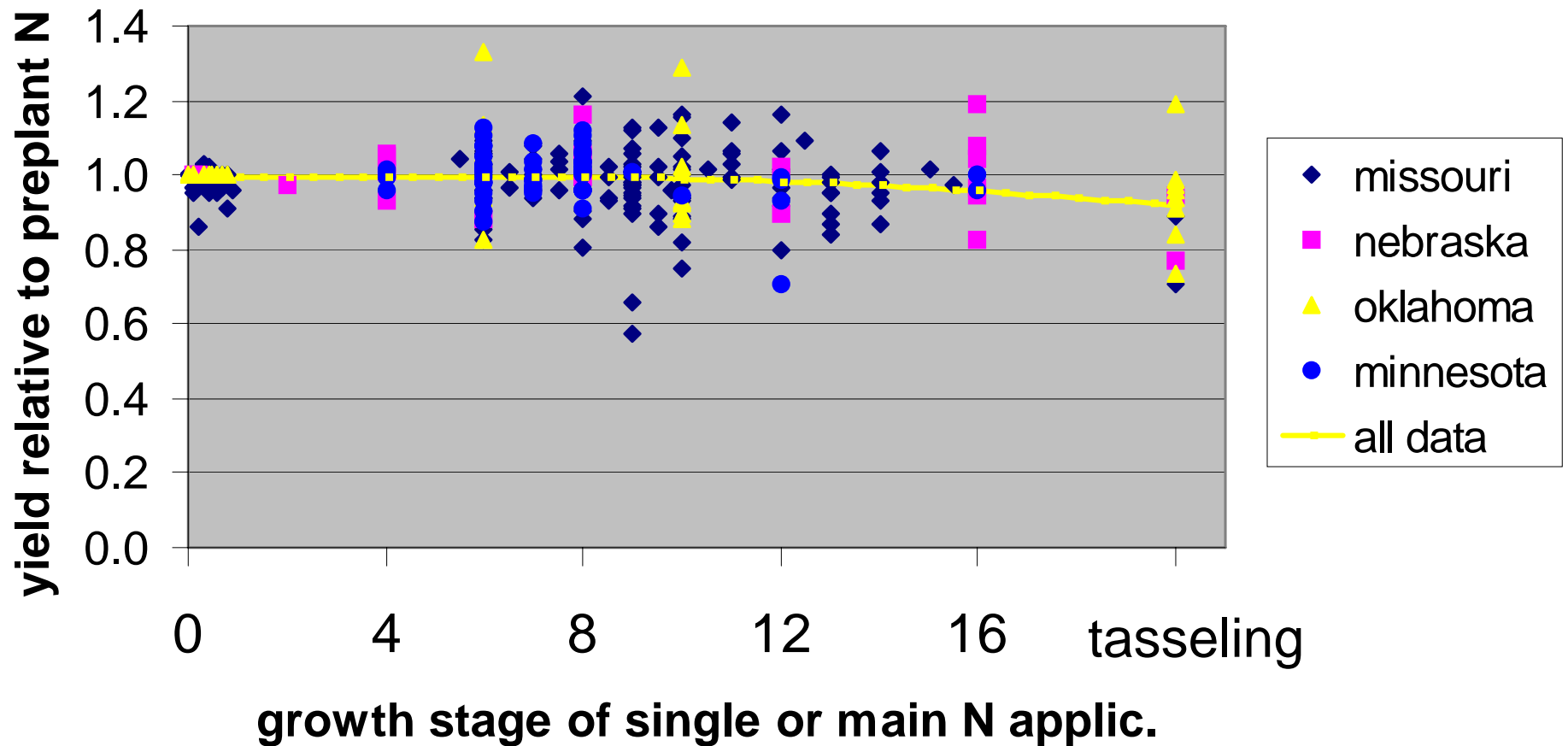
Photo: Andy Holzwarth



Yield response:

- 35 bu where stress is visible
- 2 bu where no stress is visible

The Cure—how late?



N loss scenario

- I've had wet weather
- The corn doesn't look so good, I think I've lost N
- But the corn is chest high, so it's too late— isn't it?
- **NO, it's not too late**

Delivering the Cure

- High-clearance applicators
- Aerial application
- Fertigation

Delivering the Cure



Delivering the Cure



06/08/2006

Delivering the Cure



Delivering the Cure



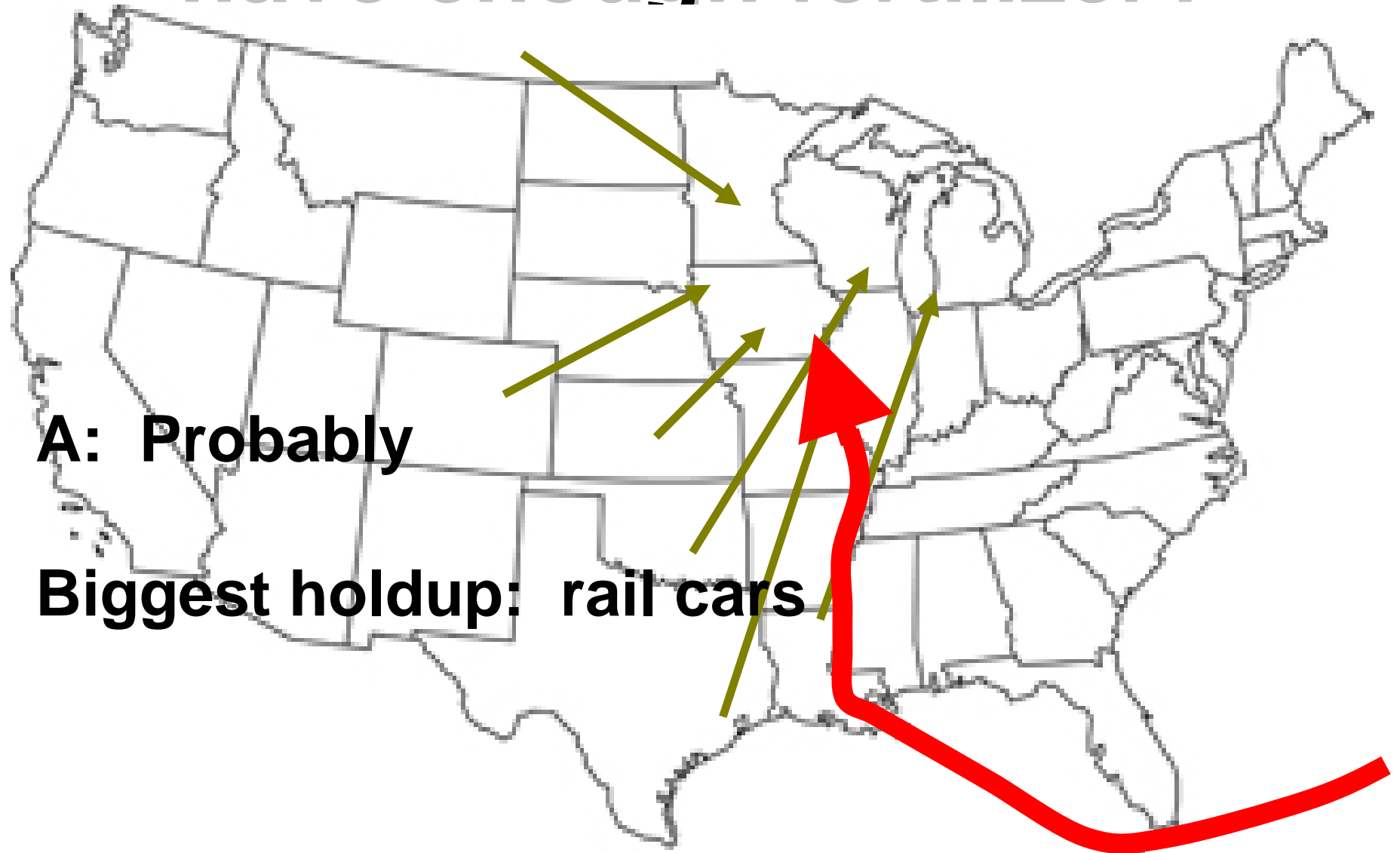
Delivering the Cure— Do we have enough equipment?

- My estimate: 14.6 million acres in 2008 needed N
- Comparison: about 12 million acres in 2007 got fungicide

Delivering the Cure— Do we have enough fertilizer?



Delivering the Cure— Do we have enough fertilizer?



A: Probably

Biggest holdup: rail cars



Summary of this plague

- **The Cause:** high April to June rainfall over a large area
- **The Symptoms:** yellow corn, streaky fields
- **The Damage:** \$2.3 billion



Summary of this plague

- **Prevention:** sidedress application, spring NH₃, N-Serve
- **Diagnosis:** aerial photos, computer models
- **The Cure: Nitrogen fertilizer** by 1 week after tassel