Advancing Nitrogen Management

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TOPICS

- 2026 review and 2027 outlook
- MRTN changes
- New Minnesota PSNT guidelines
- Upcoming regulation changes

2025

- Growing conditions were ideal for most of the growing season
- Ample mineralization of N and little N stress visible
- Bigger story was leaf diseases
- Fall was long and had favorable weather for fertilizer application

2026

- General moisture deficit in the soil profile
- Biggest questions are economic
- Corn economics and per acre input cost interaction
- Fertilizer availability
- Fertrilizer pricing

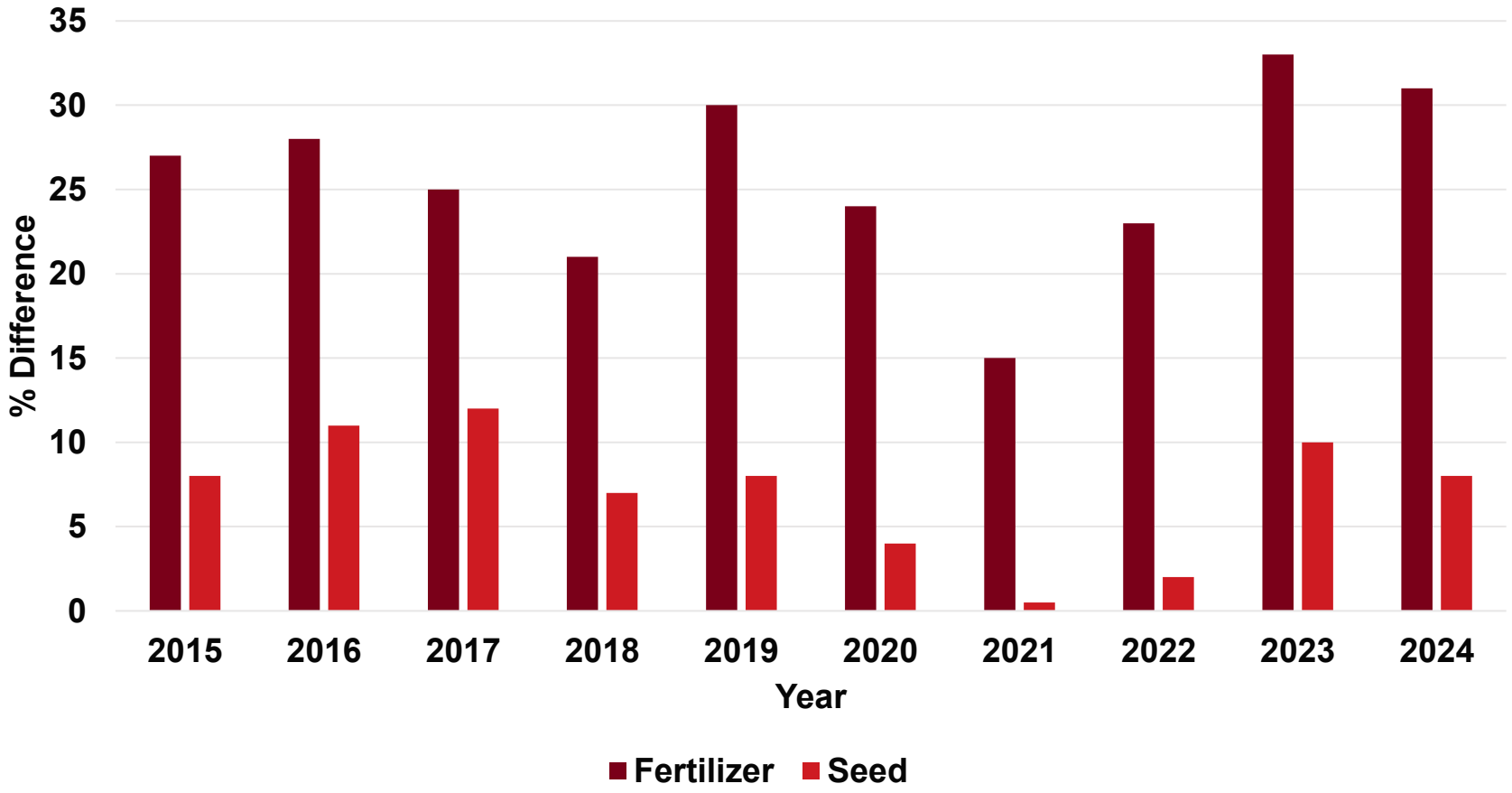
THE MOST PROFITABLE FARMS

- www.finbin.umn.edu
- Compare crop budgets for the 20% most profitable farms vs. the 20% least profitable
- WC, SW, SC, SE MN
- Manure users excluded

THE NUMBERS

- The 20% most profitable farms spent an average of $170/A on fertilizer in 2024
- The 20% least profitable farms spent an average of $224/A on fertilizer in 2024
- This is a 31% difference
- Compares to only 8% for seed cost
- 2025 data will not be available until March

THE 20% MOST PROFITABLE VS. THE 20% LEAST PROFITABLE



WHAT ABOUT NW MN?

- Corn is $145 vs. $170 – 17%
- Wheat is $113 vs. $143 – 18%
- Not enough acres to do Sugar Beets
- Not enough data for other N using crops

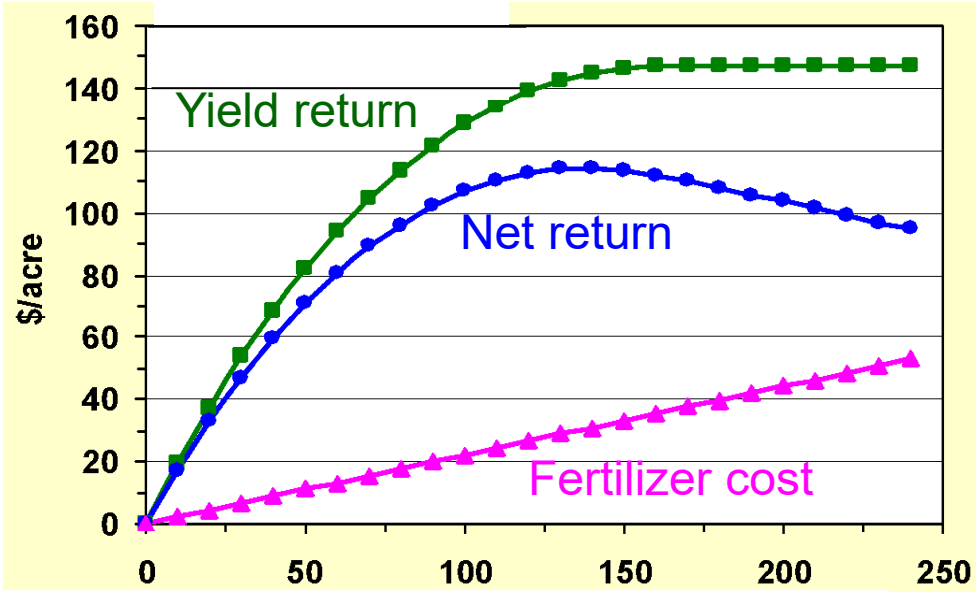
- No data for SD and ND

WHAT EXPLAINS THIS?

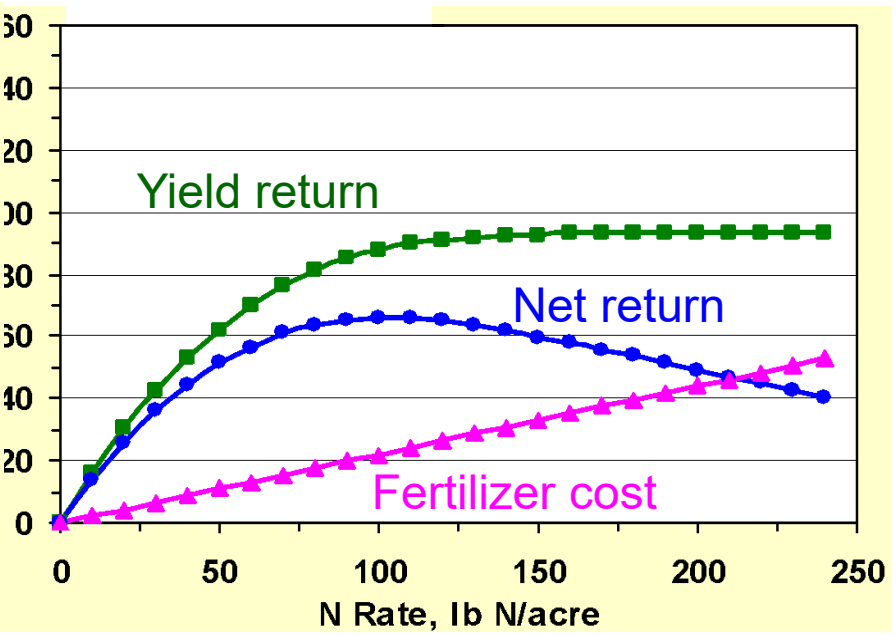
- Too high of N rate
- Crop removal when there is already high fertility levels
- Split application that doesn't pay
- "Premium" fertilizer products
- Variable Rate application that isn't paying for itself

Understanding MRTN

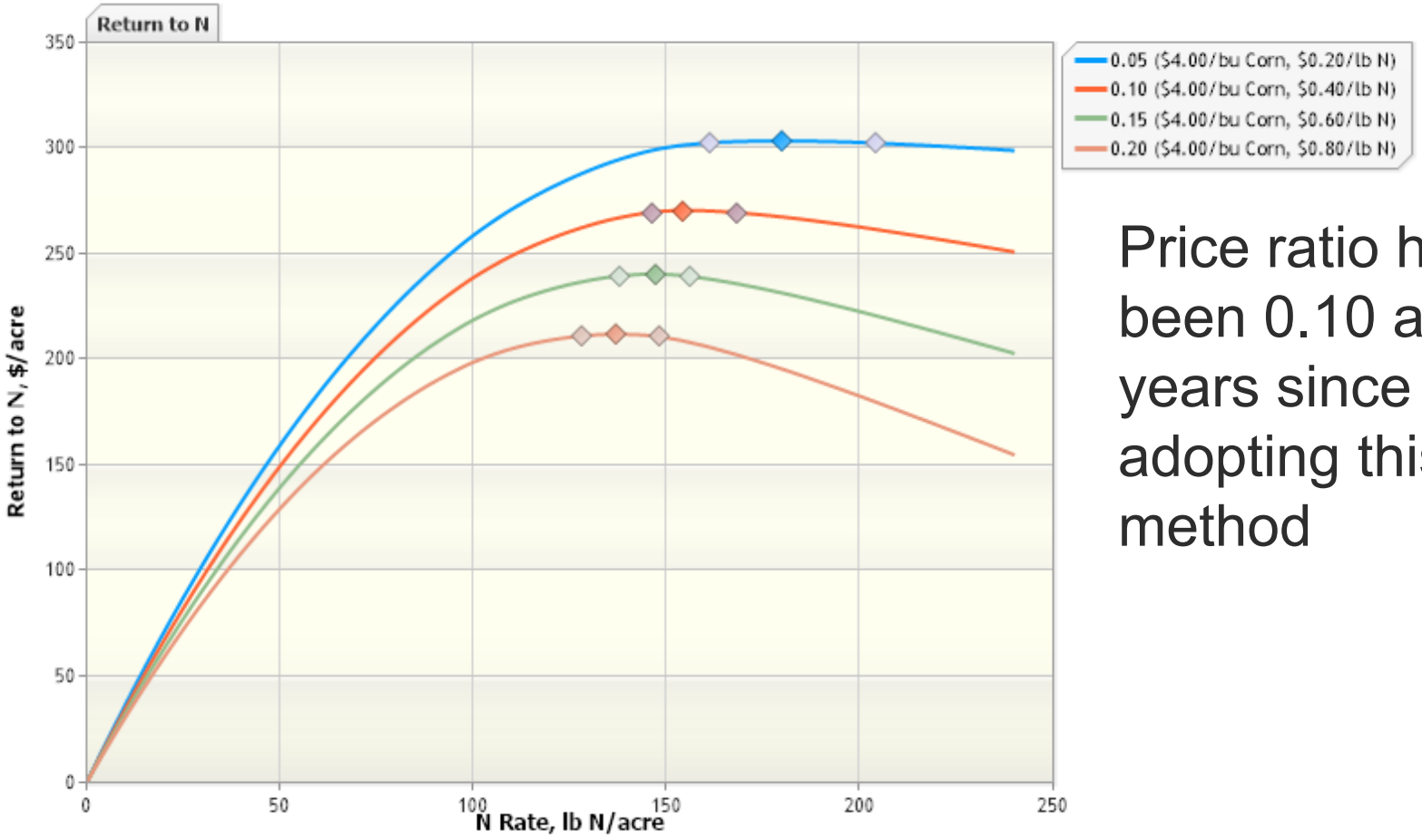
Corn after corn



Corn after soybeans

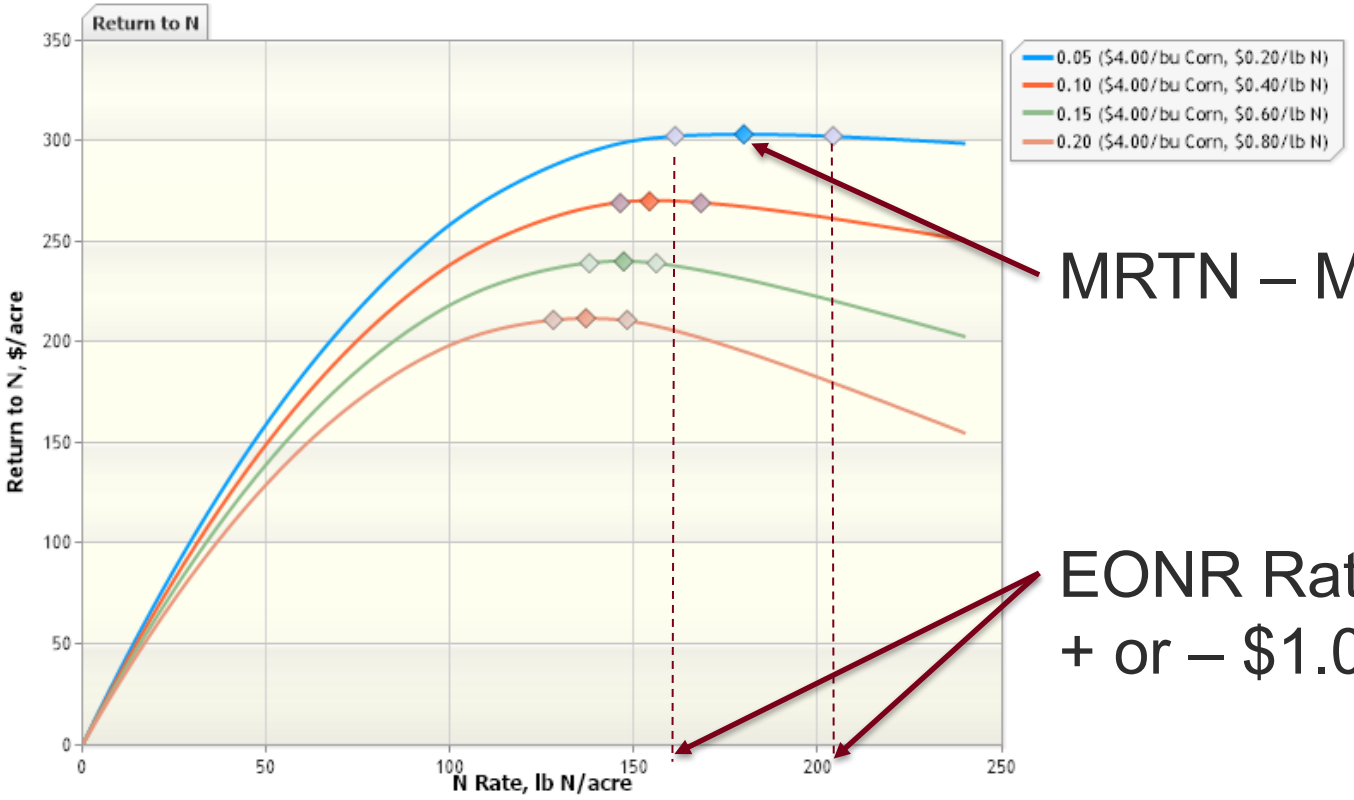


ADD PRICE RATIOS



Price ratio has been 0.10 all but 4 years since adopting this method

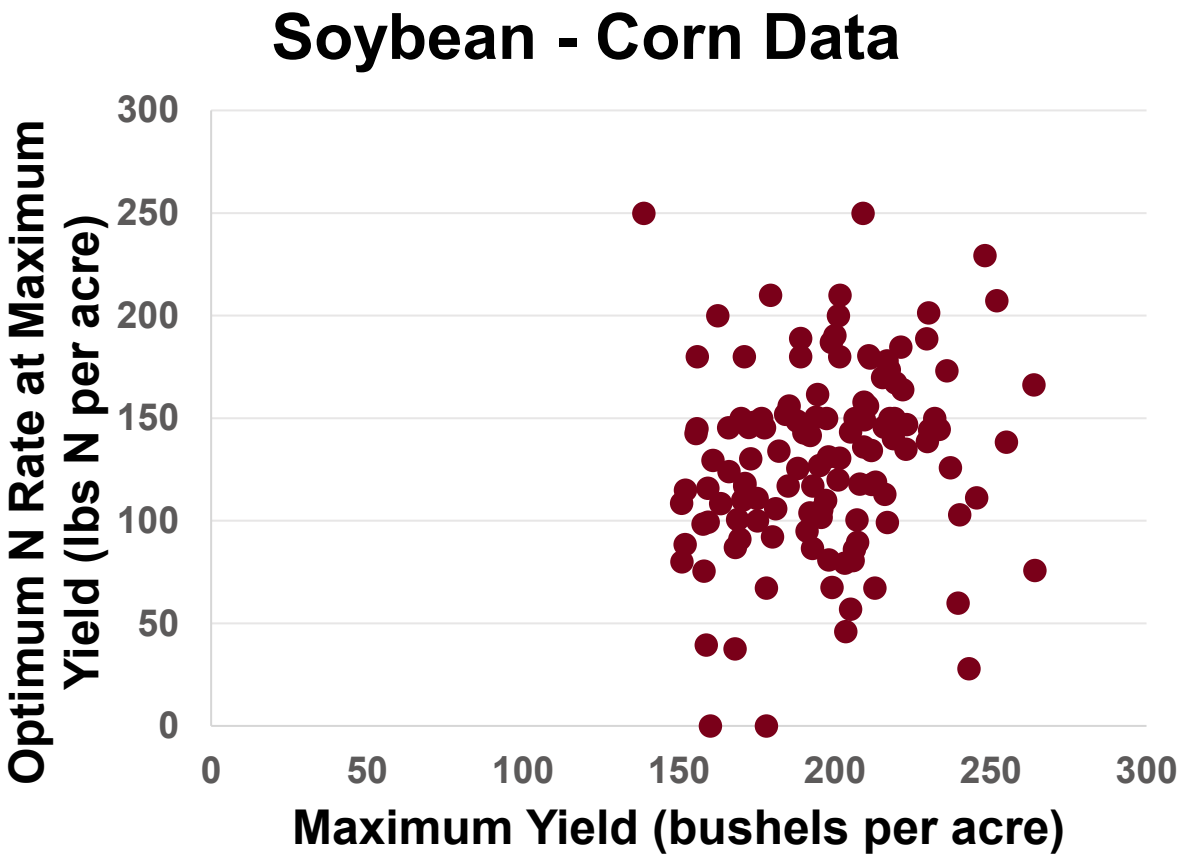
EONR – ECONOMIC OPTIMUM N RATE



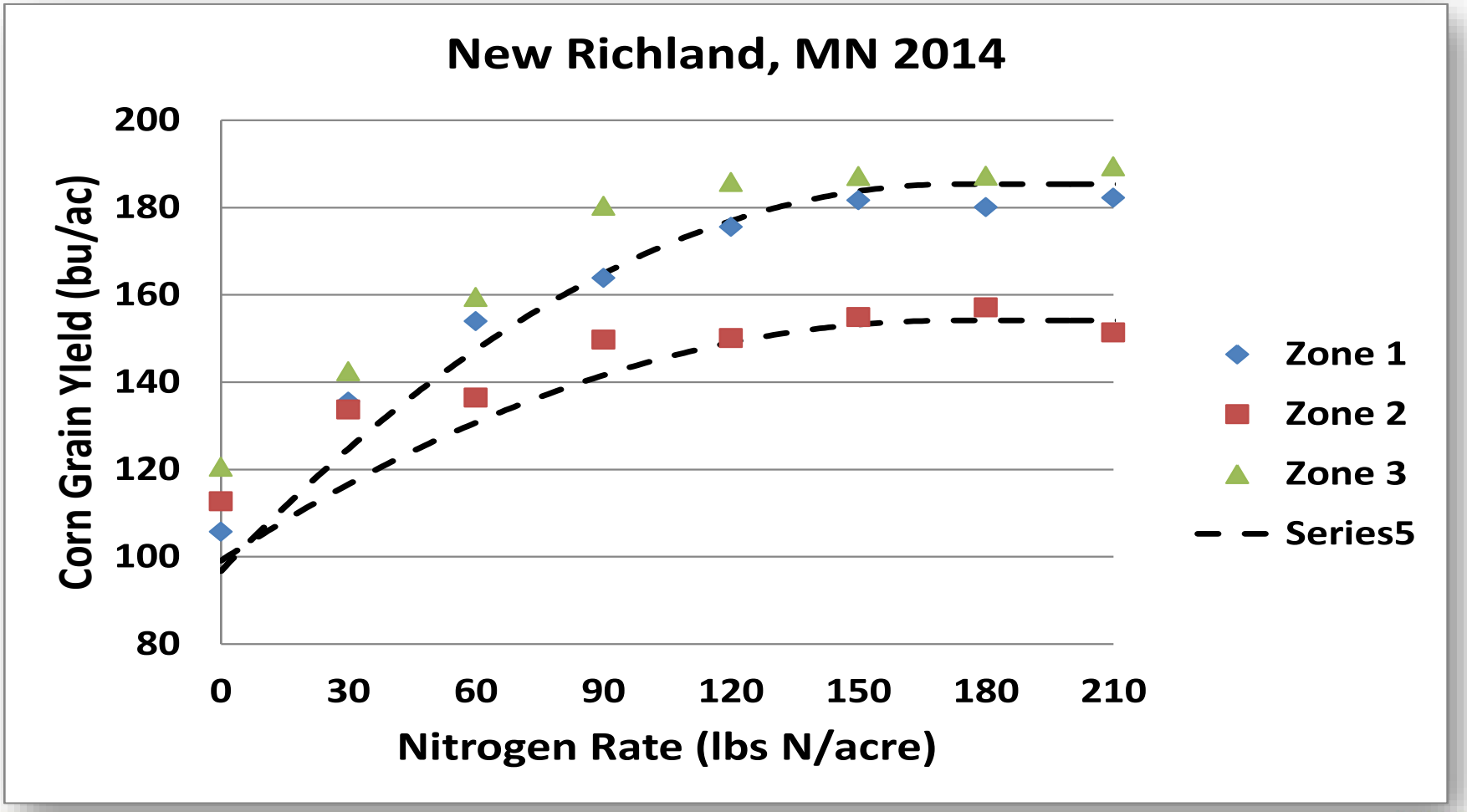
MRTN – Maximum Profit

EONR Rate Window – + or – $1.00

RATE TRIALS AND MRTN



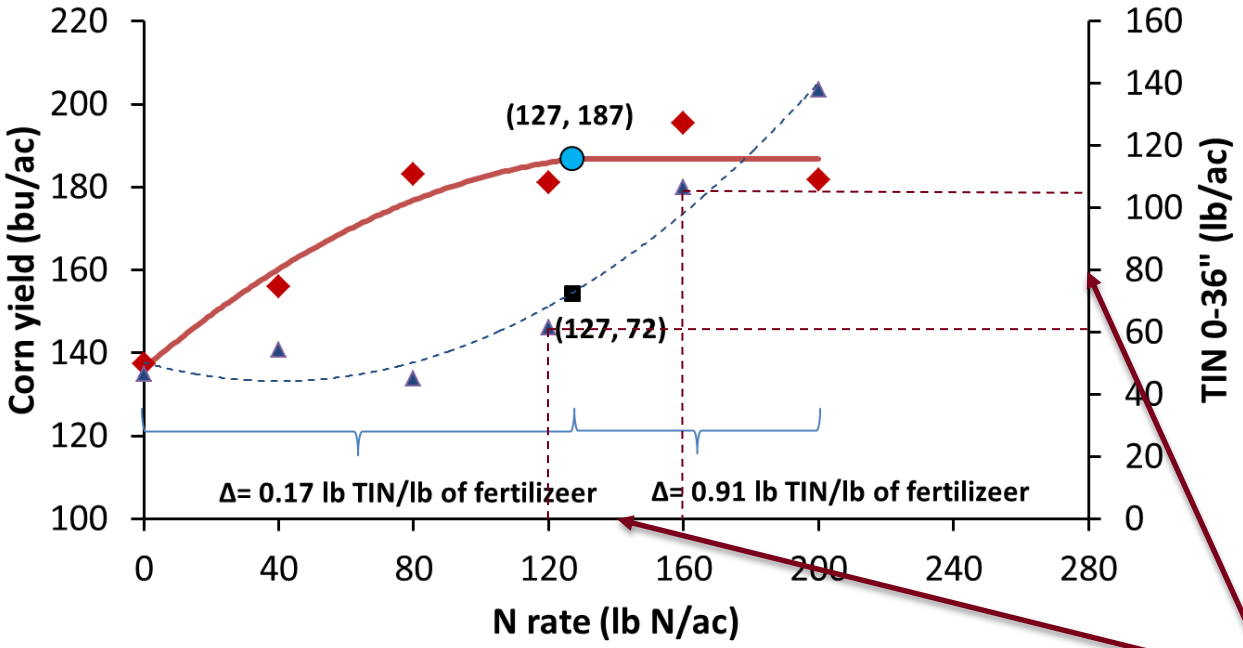
RELATIVE YIELD VS. N RESPONSE



N ADVISORY VR TECHNOLOGY

Plot	Treatment	Yield	N rate
104	Encirca	255.7	51.0
201	Encirca	233.0	51.4
302	Encirca	244.3	48.6
402	Encirca	244.6	55.3
501	Encirca	276.6	53.5
101	FR	241.6	69.0
204	FR	245.4	68.9
301	FR	241.1	68.8
403	FR	267.2	69.0
502	FR	243.6	69.0
103	NN	254.6	73.6
203	NN	238.5	72.9
303	NN	246.7	72.0
401	NN	252.3	72.9
504	NN	250.2	66.2
102	R7	251.9	65.1
202	R7	256.0	64.1
304	R7	266.9	62.6
404	R7	243.9	63.8
503	R7	252.0	63.6

EXCESS N IS LEFT BEHIND



40 lbs.!

Fernandez, 2014

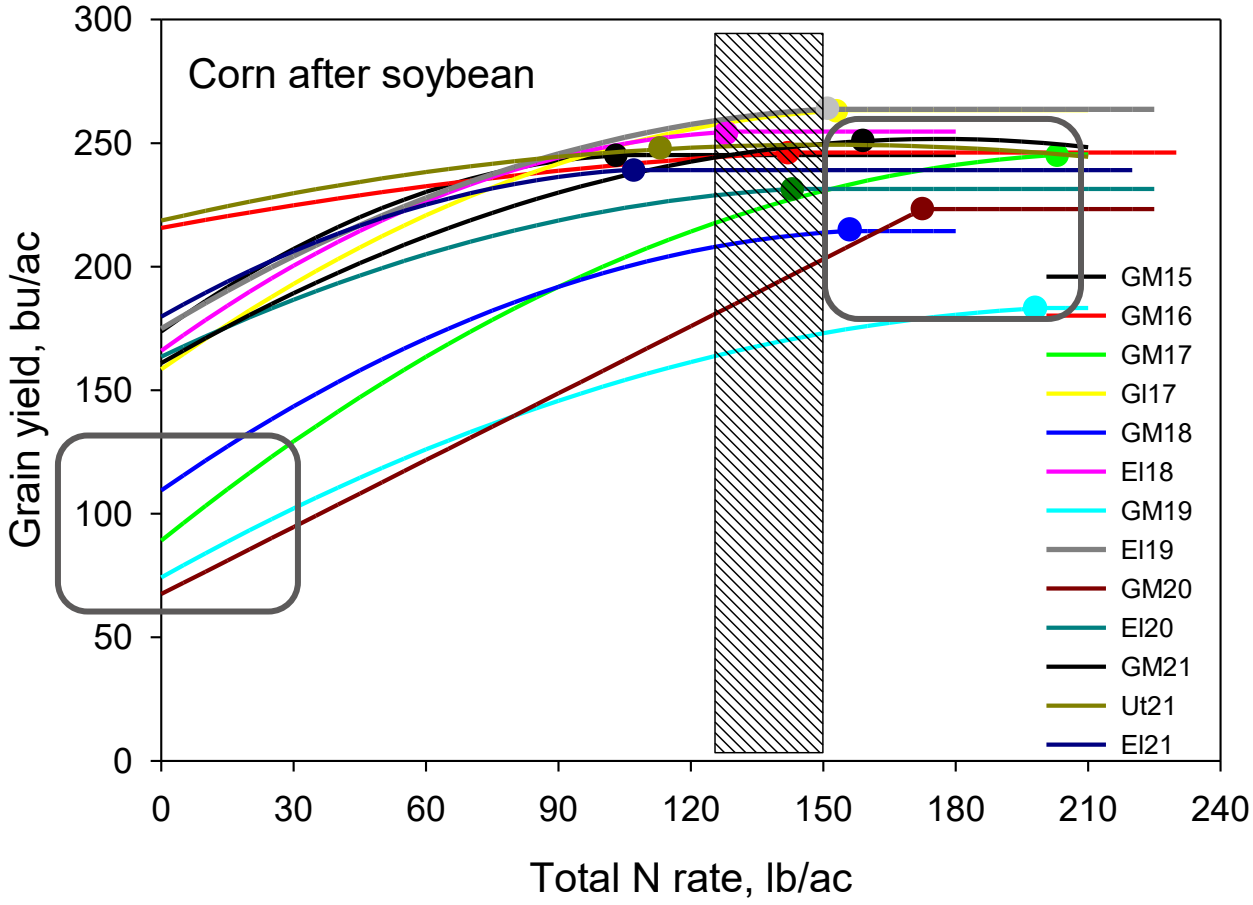
SHOULDN'T IT GO UP WITH INCREASING YIELDS?

- Yes
- Sort of
- Newest recs at 0.1 price ratio
  - Corn on corn – 185
  - Corn following soybeans – 150
- 2020 – 175 & 140, 2016 – 155 & 120, 2005 – 140 & 110

WHAT ABOUT CROP MODELS?

- Tries to get ahead of the factors that increase or decrease N demand for the crop
- Field trials in Southern MN showed lots of promise
- Mostly off the market
- Iowa is abandoning the MRTN in favor of a crop model

WHERE IS MINNESOTA HEADED?



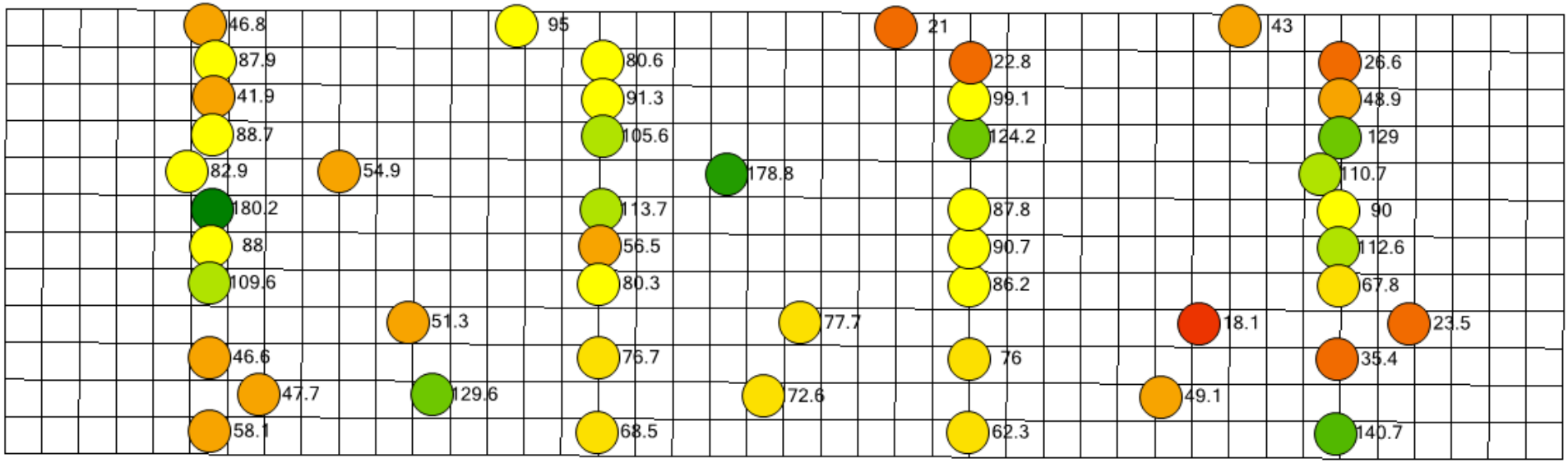
Source: Jeff Vetsch, unpublished

MINNESOTA HISTORY WITH PSNT

- Iowa has had recs since the 1990s
- MN was unable to correlate and calibrate then
- Process did result in PPNT recommendations
- Further research conducted about ten years ago

ONE SITE

- V2 vs. V6 – 8 days apart
- Percentage of V2 vs. V6



- The points with the 120 rec had soil test values of 29, 37, 49, and 37 ppm at V2

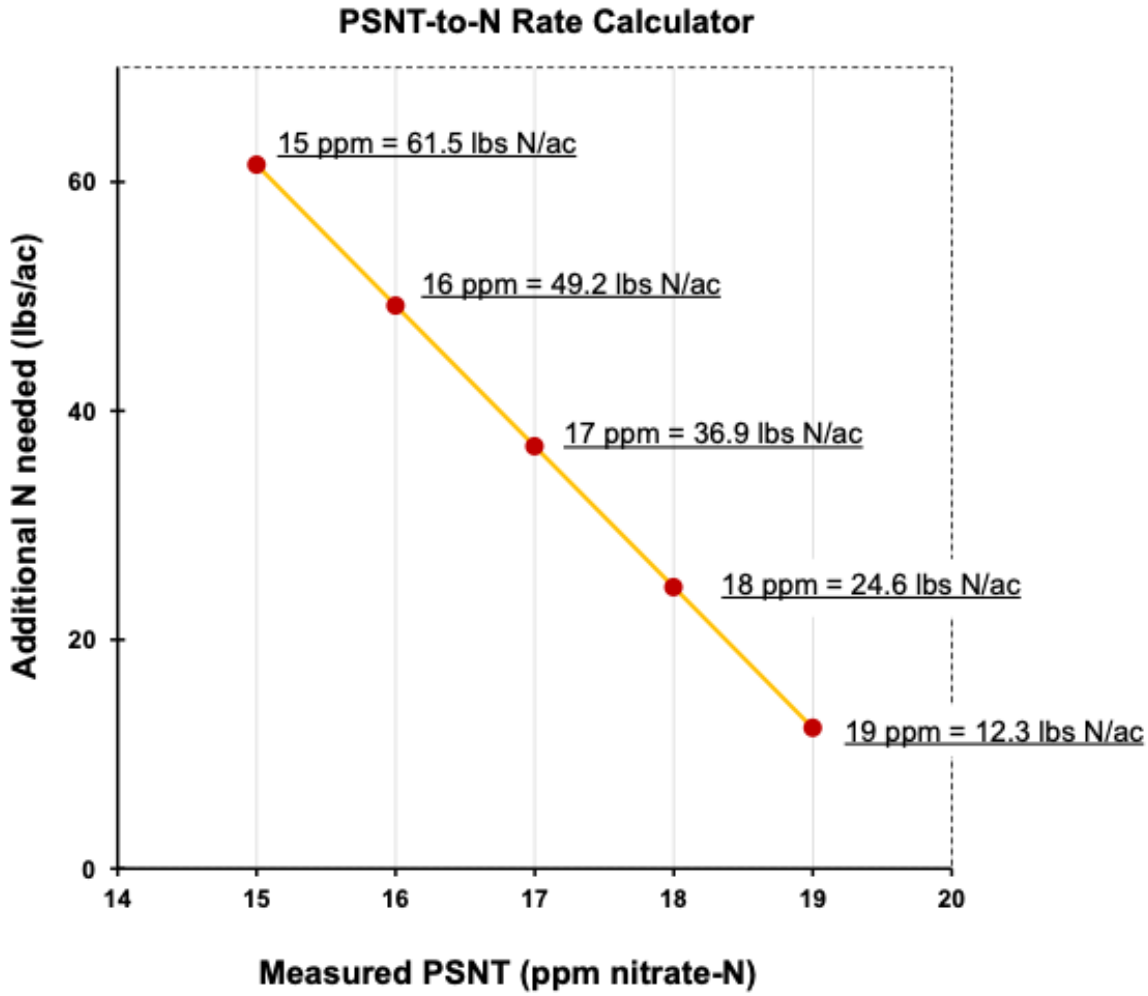
IT WORKS SOMETIMES

- The big problem is with false negatives
- Not a big economic risk
- Questions the value of the test
- MN has previously wanted to go to two feet

LATEST RESEARCH

- One foot sample
- Uses ppm, not lb./A
- Establishes a critical value of 20 ppm*

THE RECOMMENDATION CHART

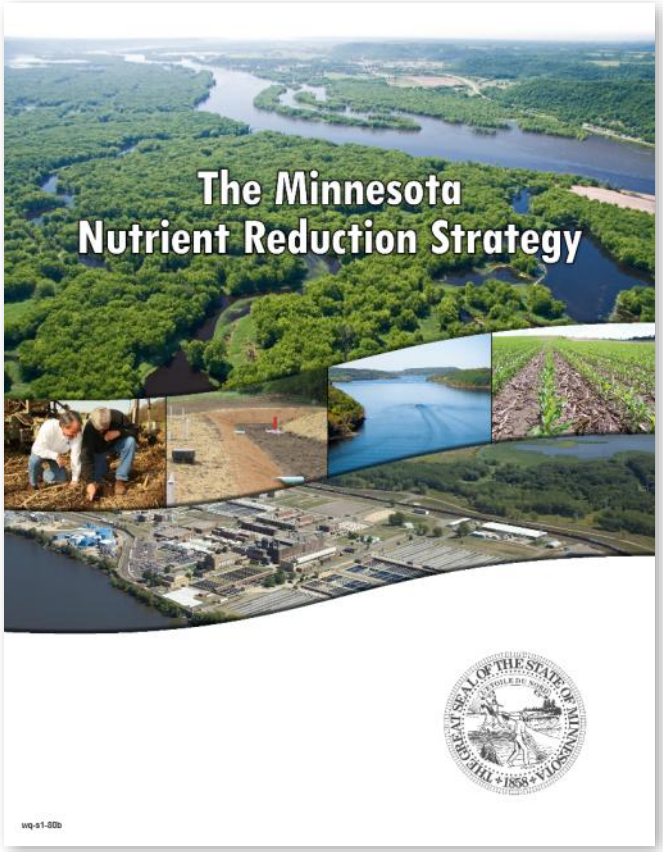


IF YOU USE IT

- Realize the potential for false negative
- Understand the potential for applied fertilizer to mess with the number
- Interpretation is in ppm
- If you receive results in lb./A probably only credit 60%
- Realize some N may be below 1’

EVERYONE'S FAVORITE TOPIC

- Minnesota Nutrient Reduction Strategy
- What is going on in SE MN?
- Surface water Nitrate standards
- BMP revision

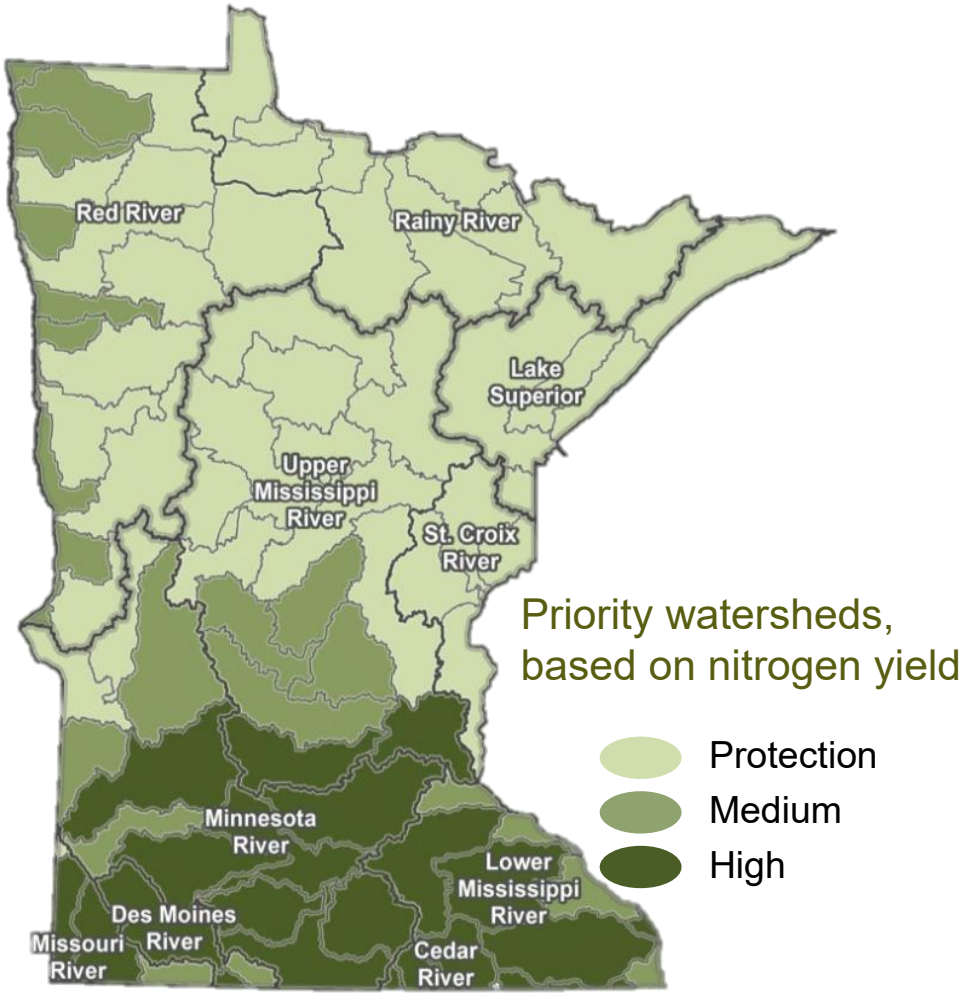


NUTRIENT REDUCTION STRATEGY

- USEPA directive
- Published in 2014
- MN version set goals for Mississippi, Red, and Lake Superior
- Update draft published in 2025
- Final publication set for January 2026

ORIGINAL GOALS

- Mississippi
  - N – 45% reduction
  - P – 45% reduction
- Red
  - N – 13%
  - P – 10%



CURRENT GOALS

- Mississippi
  - N – 45% reduction
  - P – 45% reduction
- Red
  - N – 53% reduction
  - P – 50% reduction

HOW ARE WE DOING?

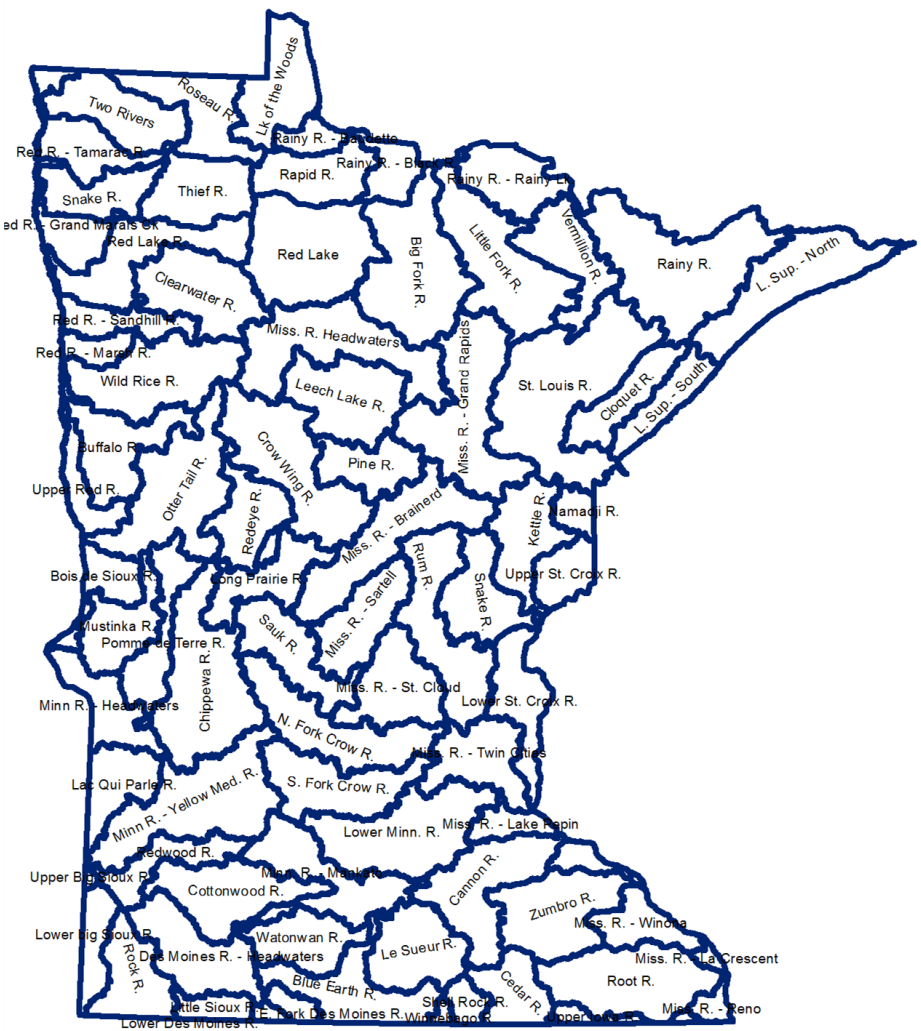
- Mississippi
  - N – 6%
  - P – 32%
- Red
  - N – Not sure
  - P – Increased 7%

THE TOOLKIT

- Urban sources – Wastewater Treatment Facilities, Stormwater
- Rural sources – Nutrient Management, Edge of Field Practices, Living Cover

IN MINNESOTA

- HUC 8 watershed plans
- Significant funding for practice implementation

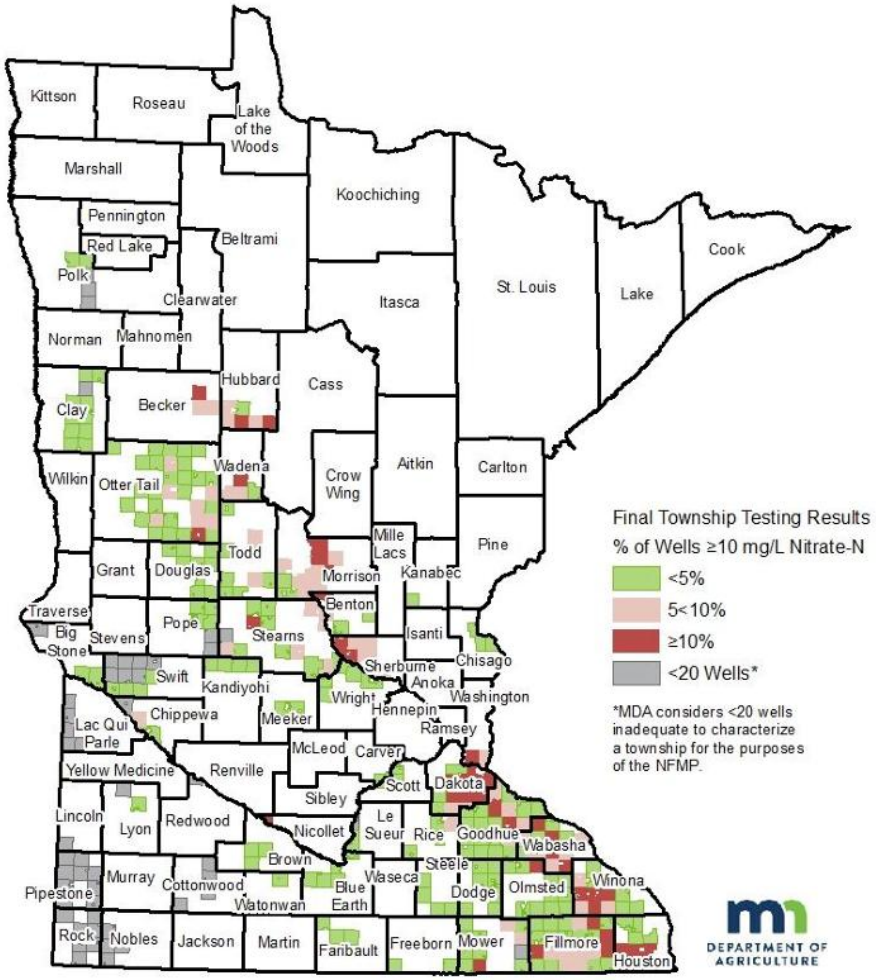


MORE ON THE RED

- N loads are estimated 40% Minnesota
- P loads are estimated 34% Minnesota
- Currently unclear what or if ND and SD intend to address

SOUTHEAST MINNESOTA

- MN Township testing program
- Petition filed with USEPA
- Age of groundwater study



SO WHAT?

- Possible expansion to coarse textured soils
- SW MN also has issues
- Newest petition seeks to define drainage systems as point sources

SURFACE WATER STANDARDS FOR NITRATE

- Legislative directive in MN
- Interim target of 10 ppm in cold water streams
- Proposed new standards 60 ppm acute anywhere, 5 ppm in cold water, 8 ppm elsewhere

MN BMP REVISION

- BMPs have legal status in MN
- Want all of them to be ready at same time
- Hopefully this year

WHAT IS LIKELY TO CHANGE?

- Regional definitions (probably no more SW MN
- Changes to crops included, manure added, financial risk modified
- Fall urea out for most of the state
- Less changes to the NW than anywhere else

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MinnesotaCorn