Can planter sensors be used to improve NUE?

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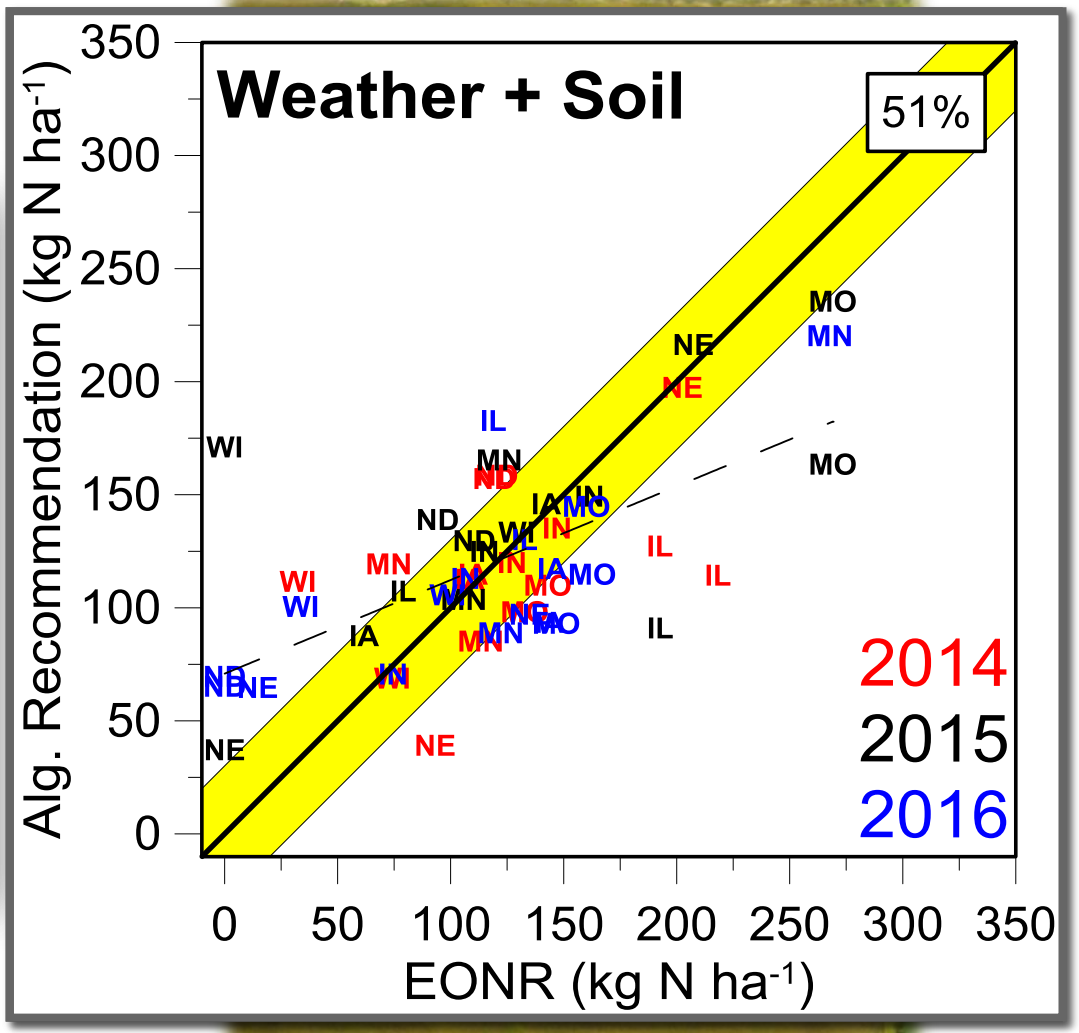
Canopy Sensors and Regional Algorithms



Agronomic Metrics

- Hybrid
- Population
- Singulation
- Spacing
- Applied Downforce
- Downforce Margin
- CEC
- Clean Furrow
- Furrow Moisture
- Organic Matter
- Soil Temperature
- Uniform Furrow

Precision Planting: SmartFirmer

- Moisture
- Temperature
- Organic Matter
- CEC
- Clean Furrow
- Furrow Uniformity

Research Questions

- Real-time Control

Sense

SmartFirmer

- Organic Matter

Interpret

20|20 display

Control

Conceal

Research Questions

- How accurate are the estimated furrow properties?

Sense

SmartFirmer

- Organic Matter

Interpret

20|20 display

Control

Conceal

Research Questions

- Can we be confident in making real-time adjustments?

Sense

SmartFirmer

- Organic Matter

Interpret

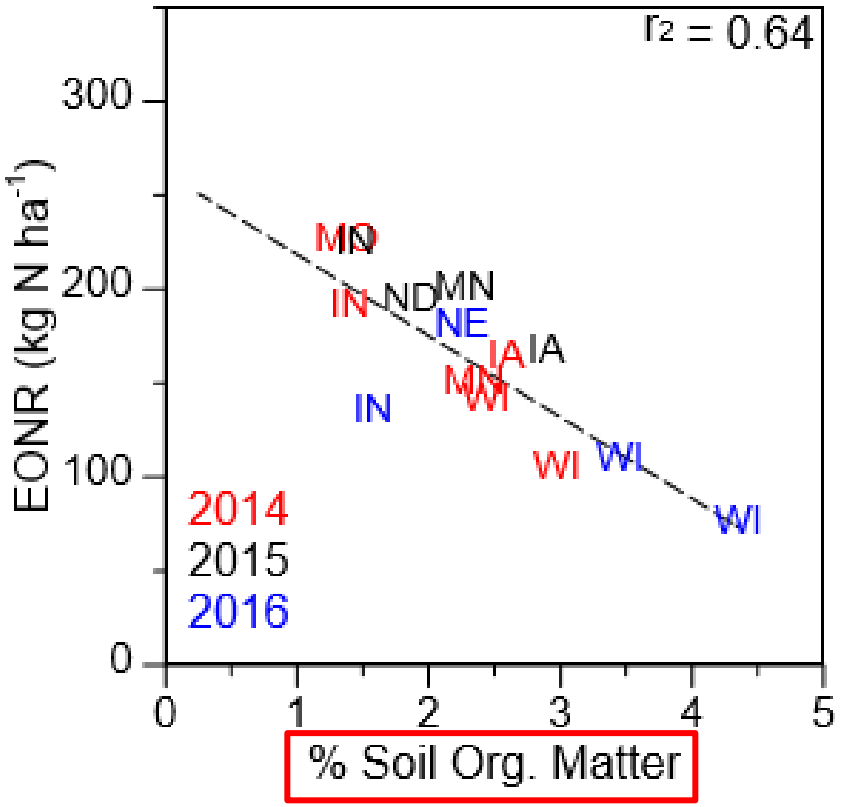
20|20 display

Control

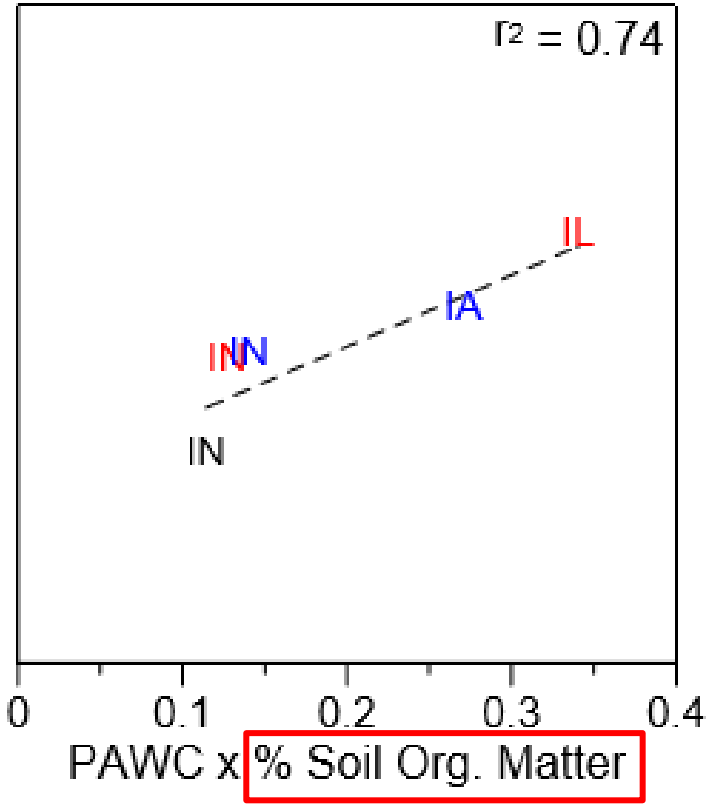
Conceal

Soil properties driving EONR

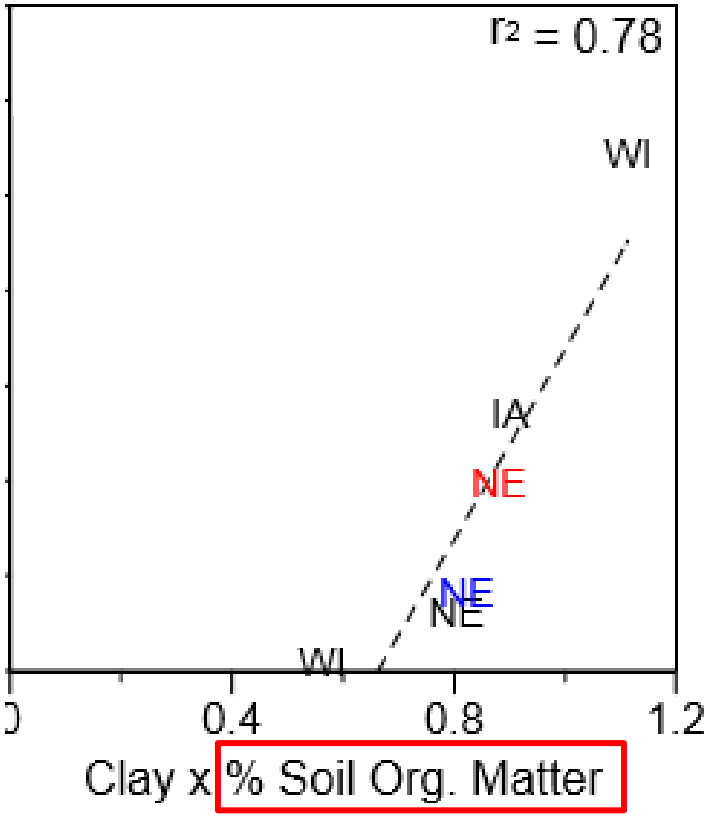
Loam
Well drained



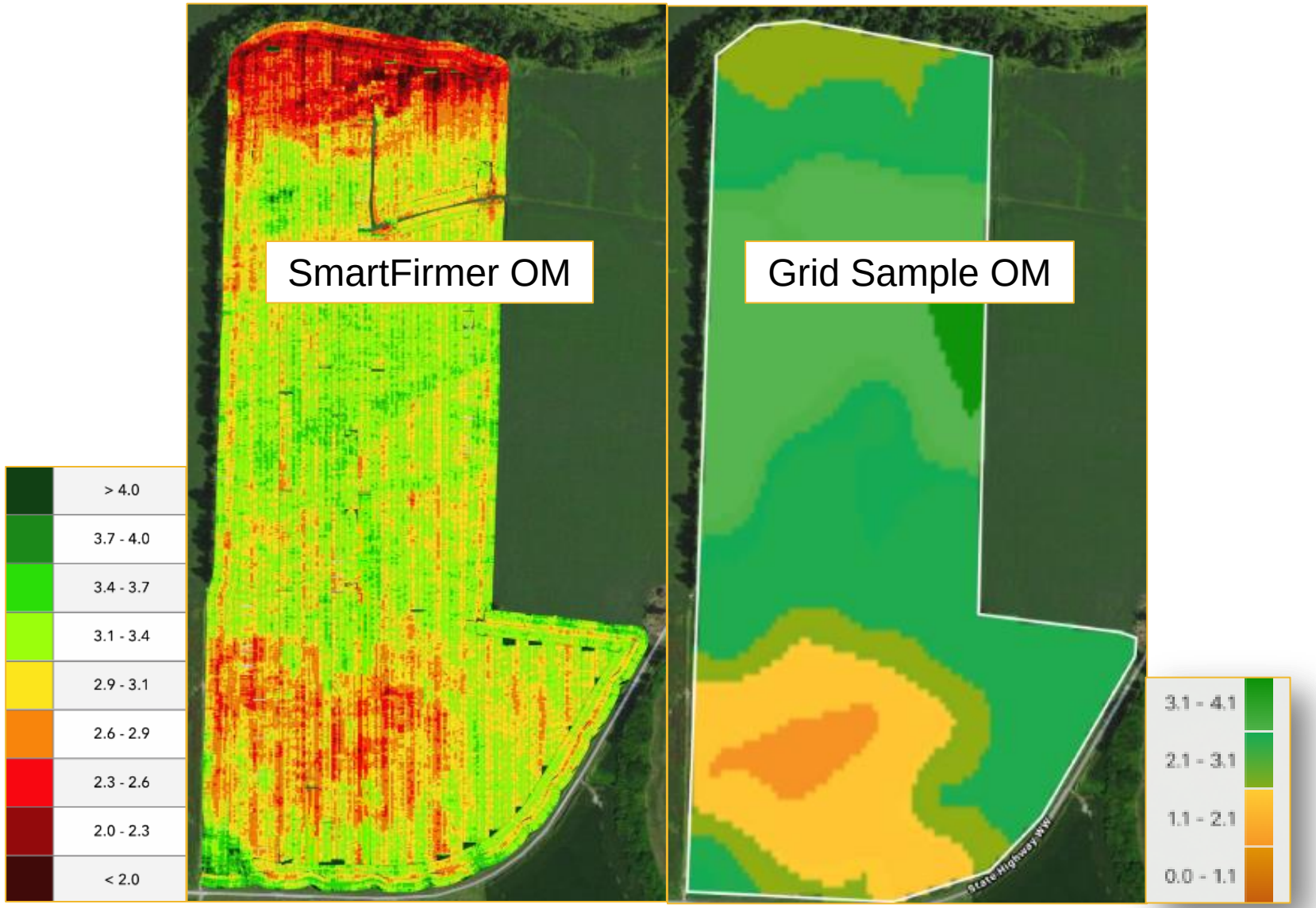
Loam
Poorly drained



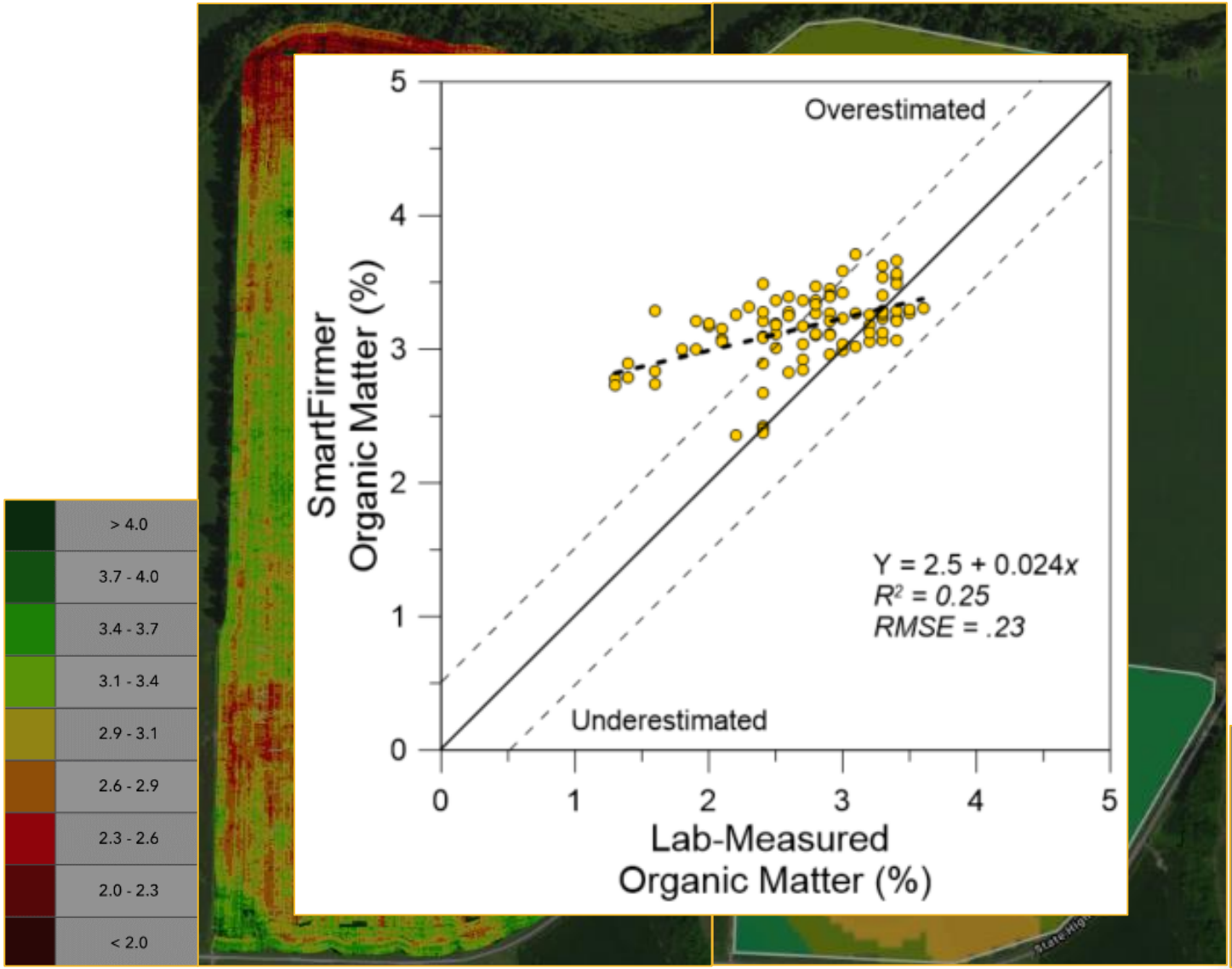
Clay loam
Well drained



How well can we predict organic matter?



How well can we predict organic matter?

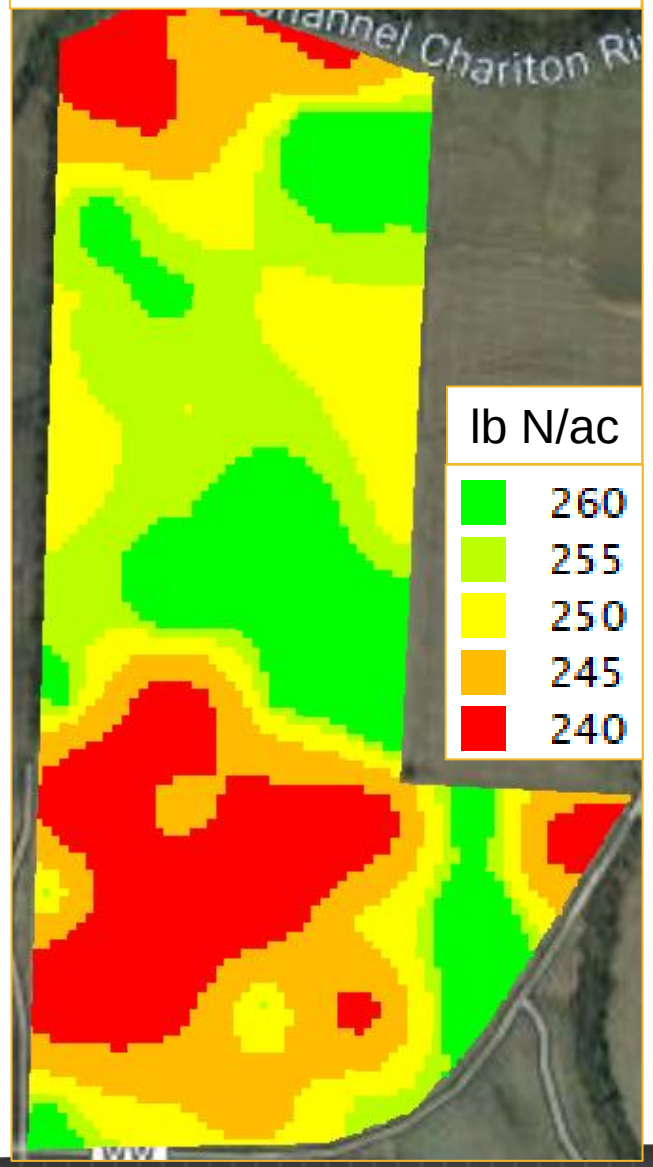


Grid Sample vs. Sensor-Based N Rates

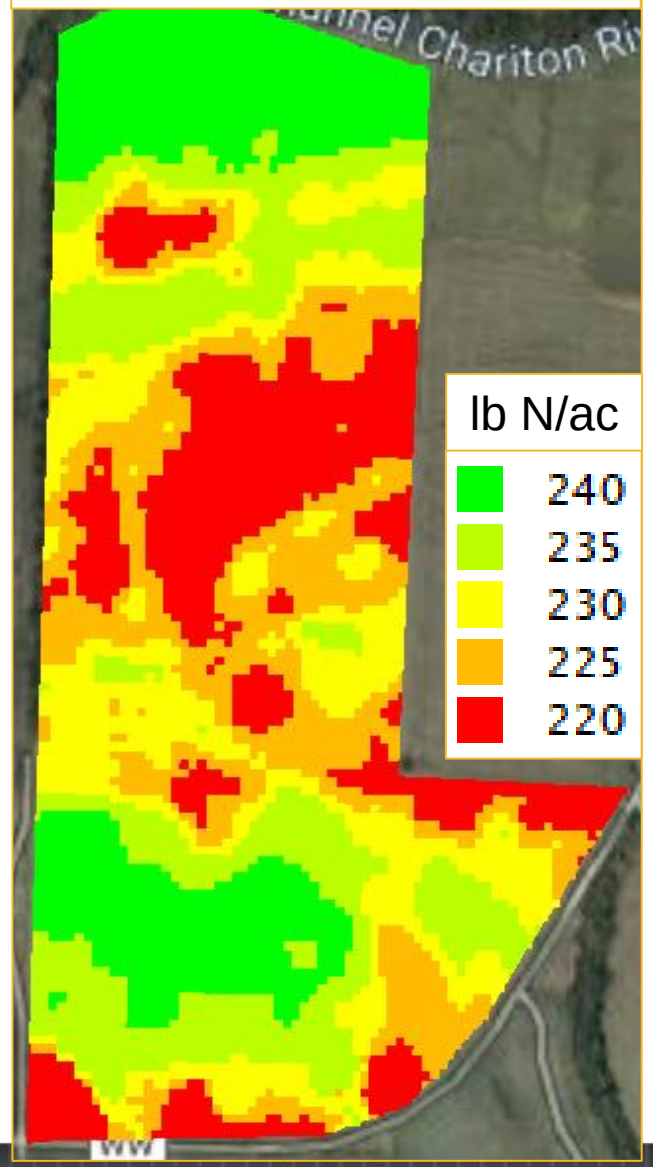
MU Recommendation adjusted for OM and CEC

- Moisture
- Temperature
- **Organic Matter**
- **CEC**
- Clean Furrow
- Furrow Uniformity

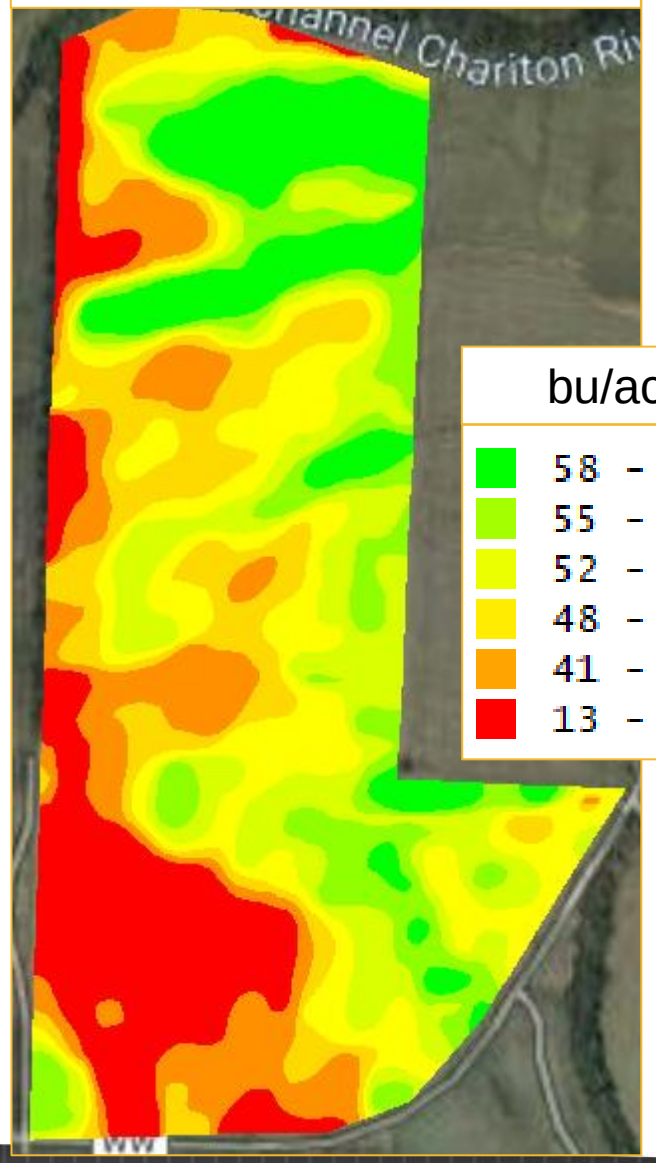
Grid sampled based
N rate



SmartFirmer based
N rate



Soybean Yield (2018)

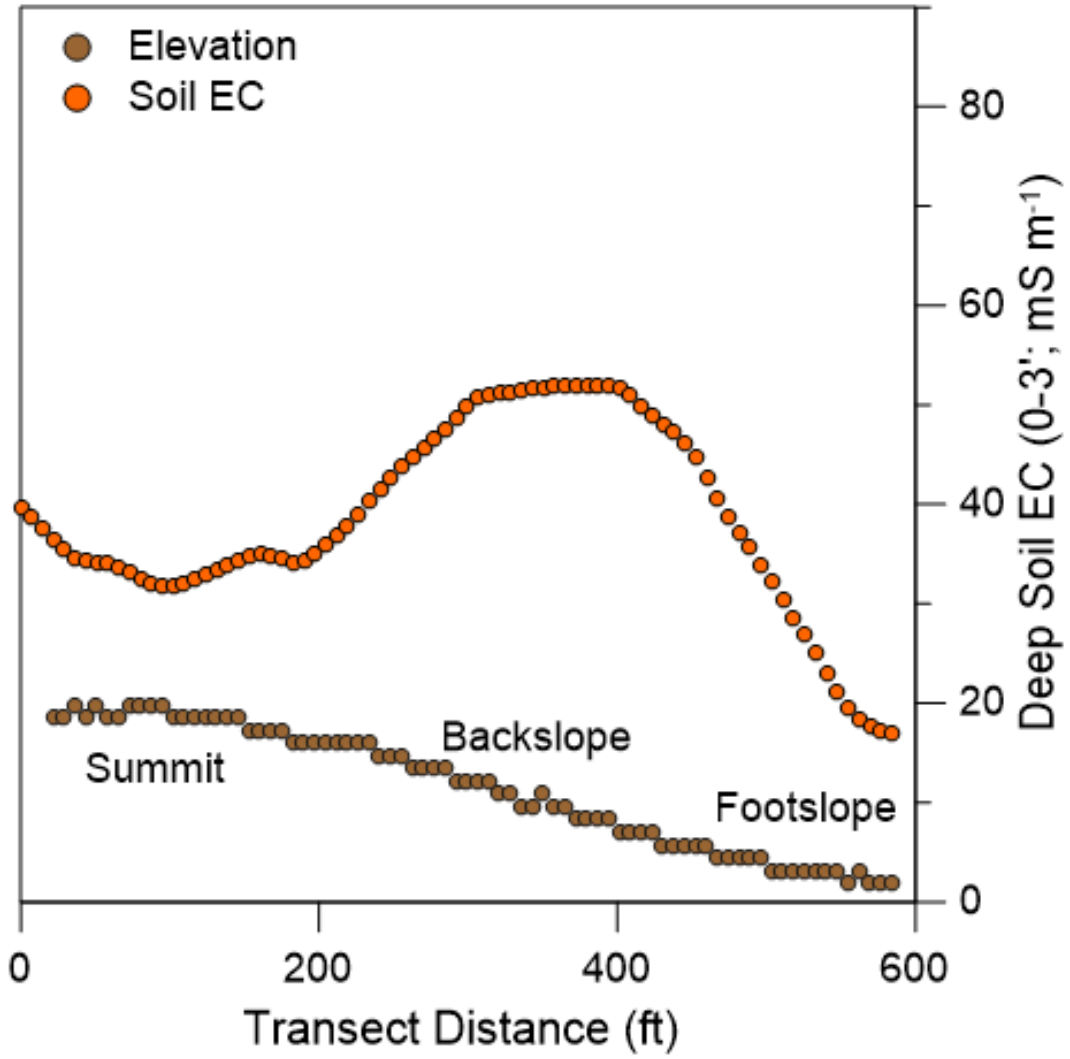


Can we capture soil spatial variability?

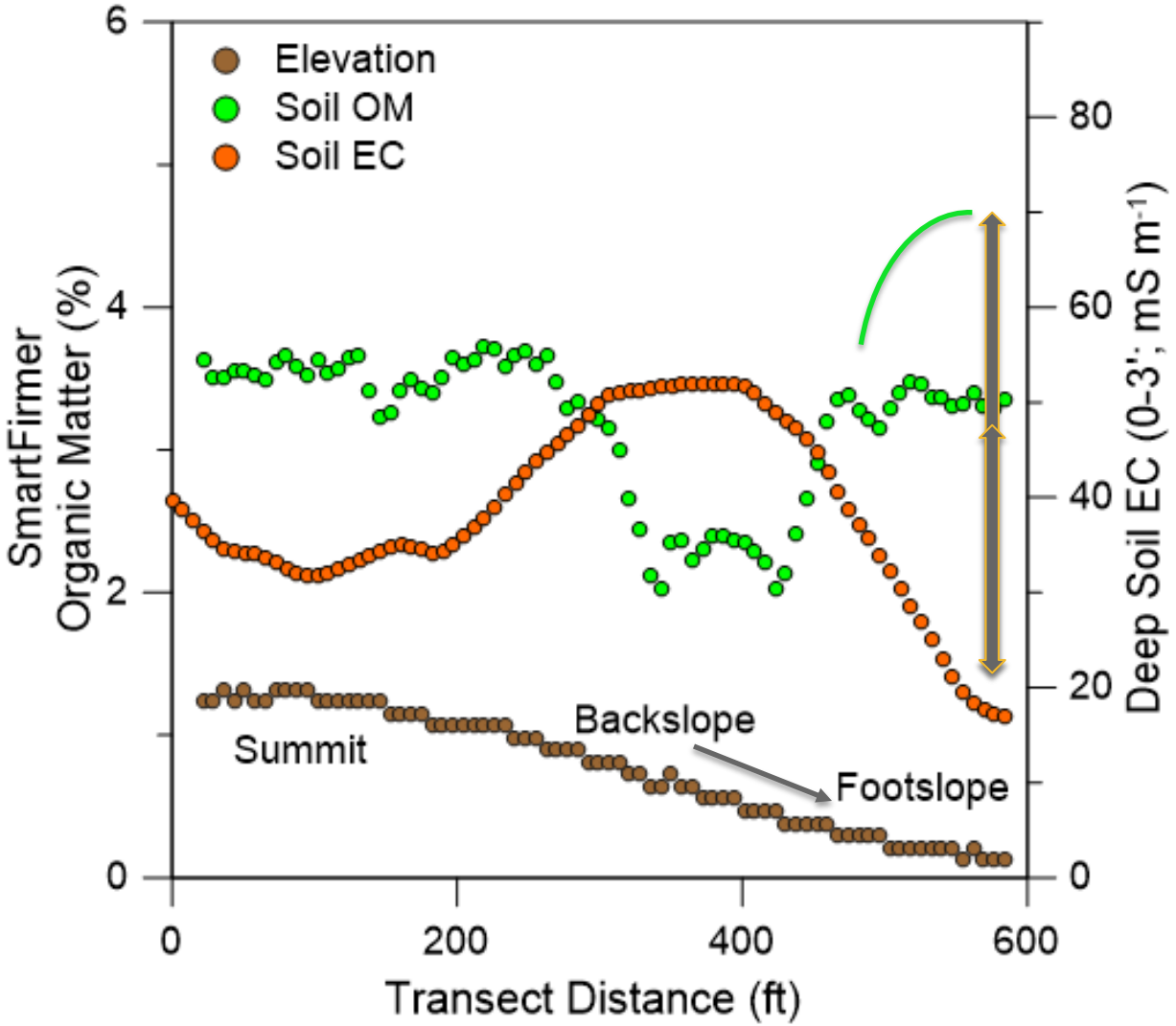
- Soil EC: “Gold Standard” for understanding soil variability

Soil Variability

Soil Variability

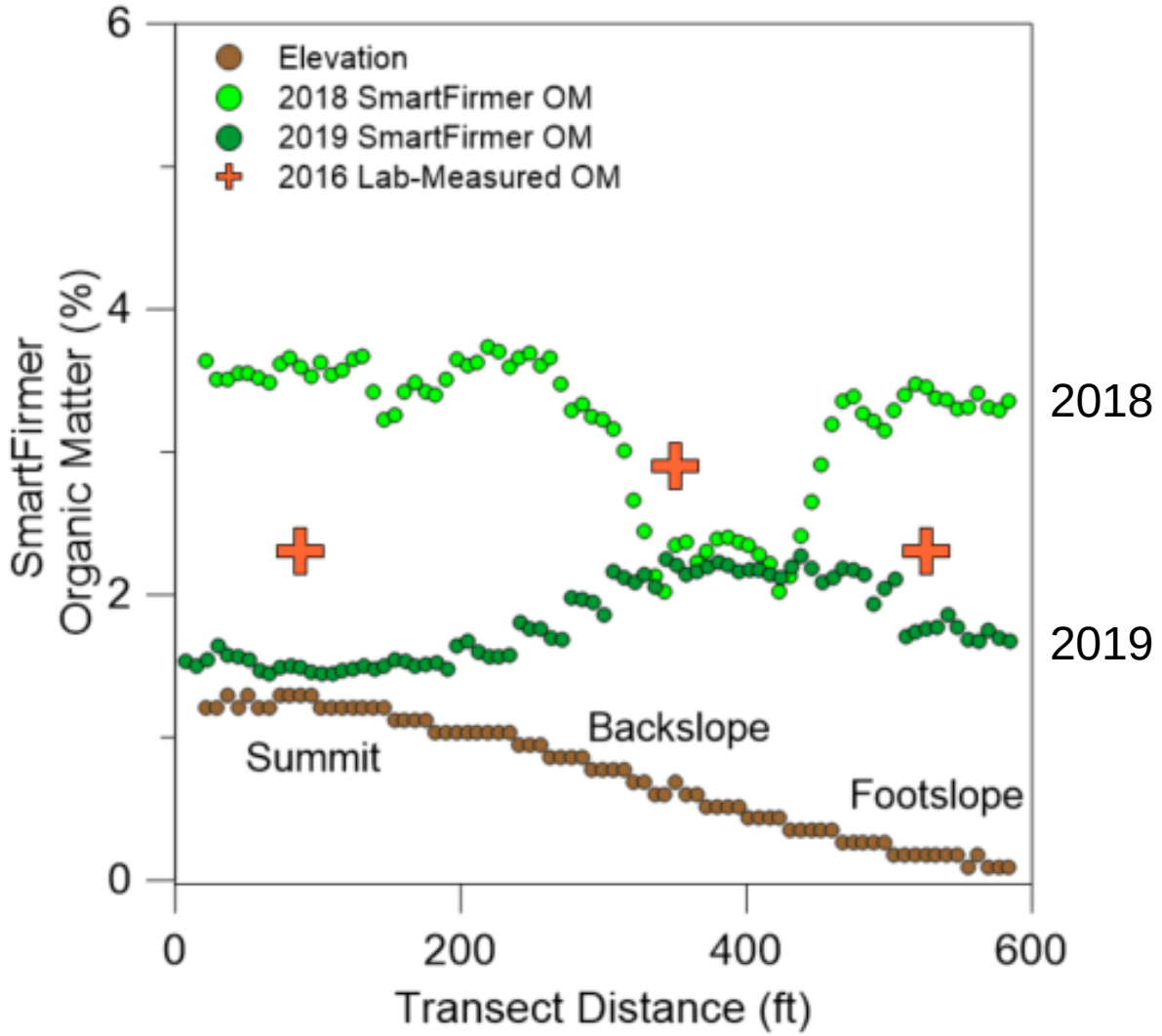


Soil Variability



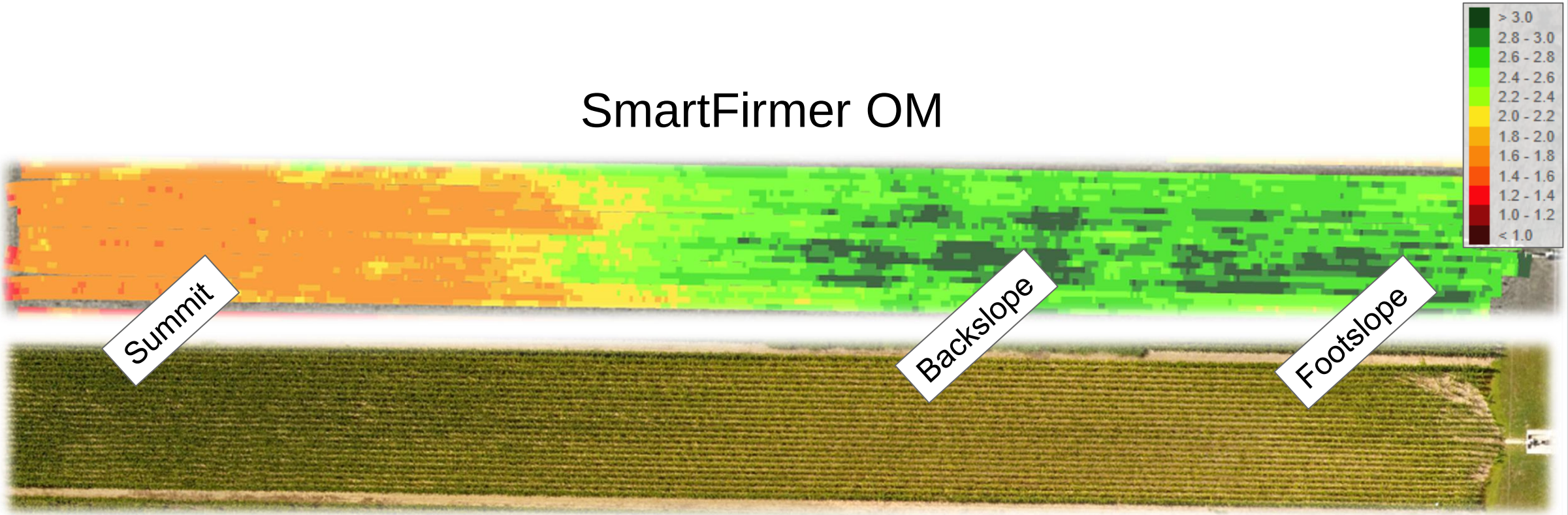
"Productivity Index"

Soil Variability



Current Status (July 25, 2019)

SmartFirmer OM



Drone Image (400ft)

Can Planter Sensors Improve NUE?

- Ability to detect soil spatial variability
  - Interpretation must be soil and year-specific
- Opportunity for fine-scale management if properly equipped