FeEDDHA – Working in the Real World of Soybean Production

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FeEDDHA as a Fertilizer

Recommended use for managing iron chlorosis in soybean:

- **Mix dry power in a ratio no less than 1 lb FeEDDHA to 2 gallons water**
- **Apply in-furrow at planting time**
- **Apply 2-3 lb per acre of 4.8% ortho,ortho FeEDDHA**

Has been used successfully as a management tool for iron deficiency chlorosis (IDC) in soybean in the RRV

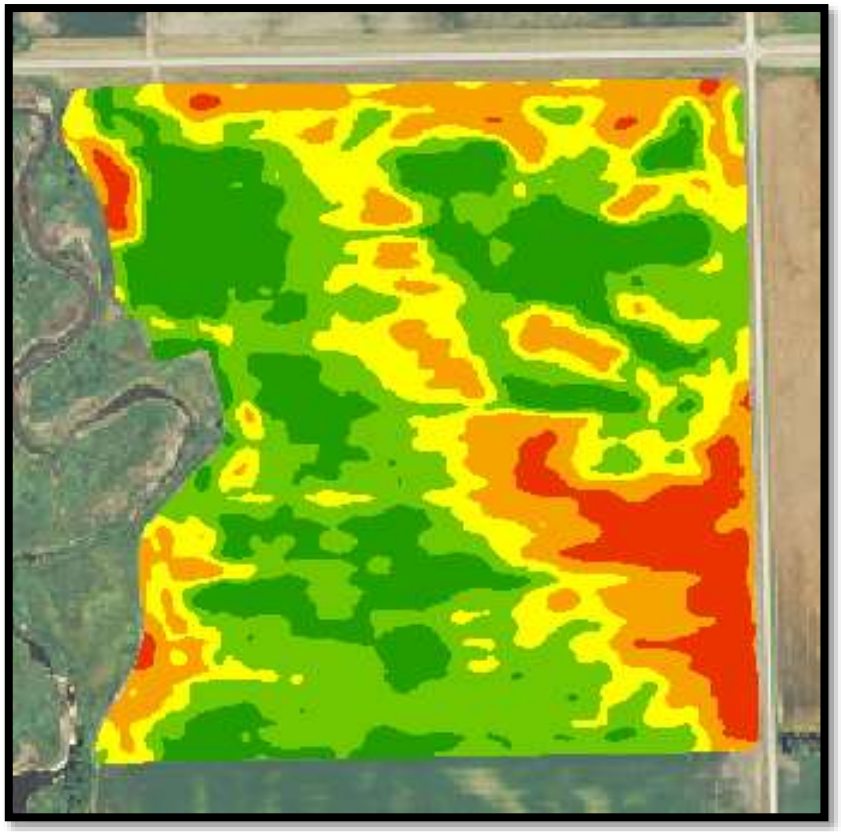
About the Field

In 2010, soybean IDC (iron deficiency chlorosis) plot was planted

Fall of 2010 zones were created from 2009 corn yield data and satellite imagery

These sample zones were used primarily to manage phosphorus and potassium

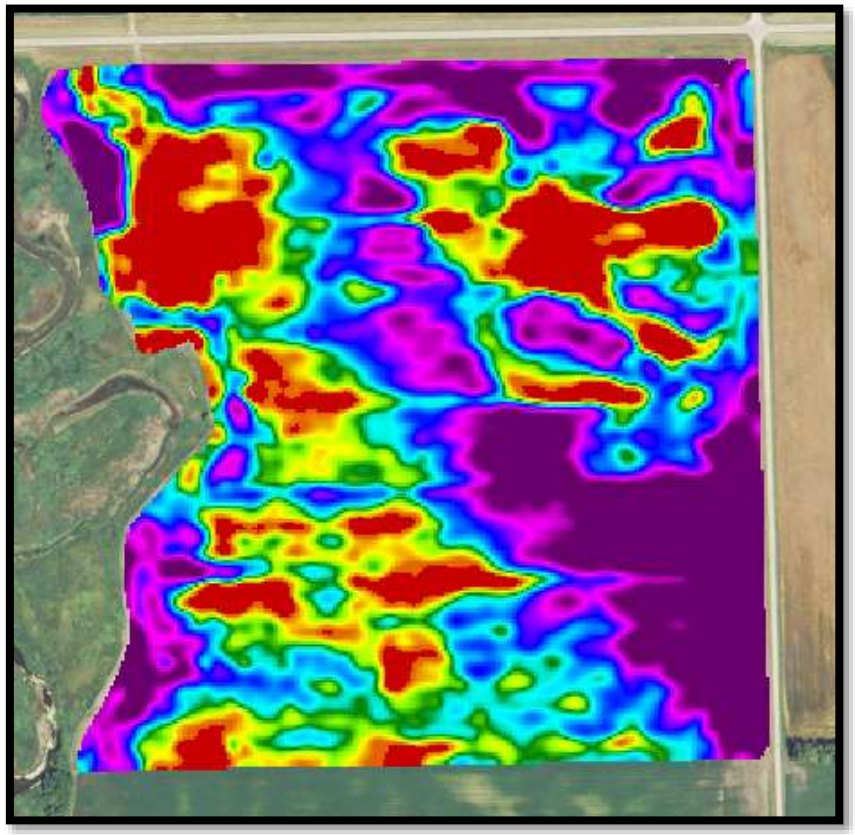
2014 used these zones to create variable rate FeEDDHA prescription



Application of FeEDDHA in 2012

- Used 2 lb/acre flat rate across the field
- Left a check strip in the field
- Visual difference in chlorosis severity

FeEDDHA Prescription in 2014



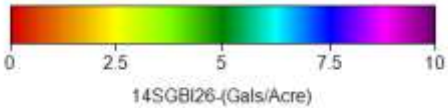
Prescription based on previously created zones

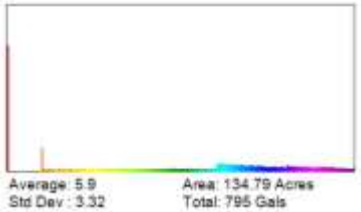
4.8% ortho, ortho FeEDDHA product

Rates varied from 0-10 gallons per acre.
2 gallons = 1 lb FeEDDHA

Total FeEDDHA used: 397.5 lb per field

- **2 lb rate would use 269.58 lb per field**
- **3 lb rate would use 404.37 lb per field**

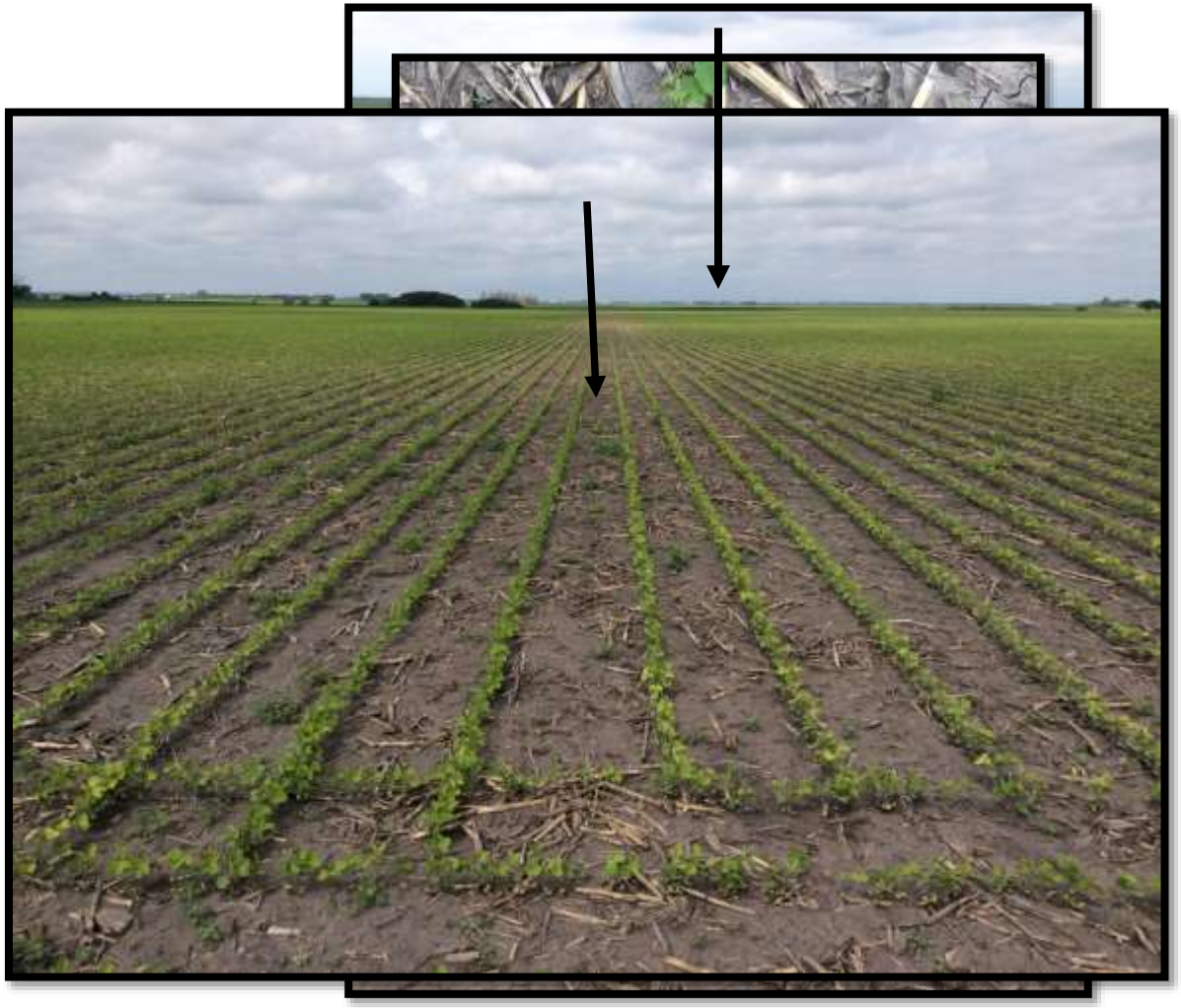




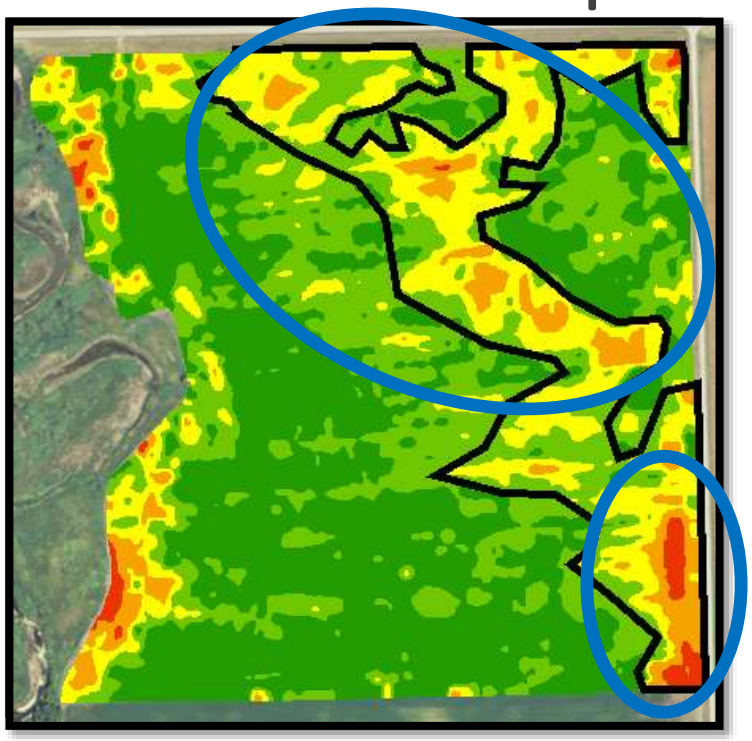
FeEDDHA in 2014

Unifoliate Stage

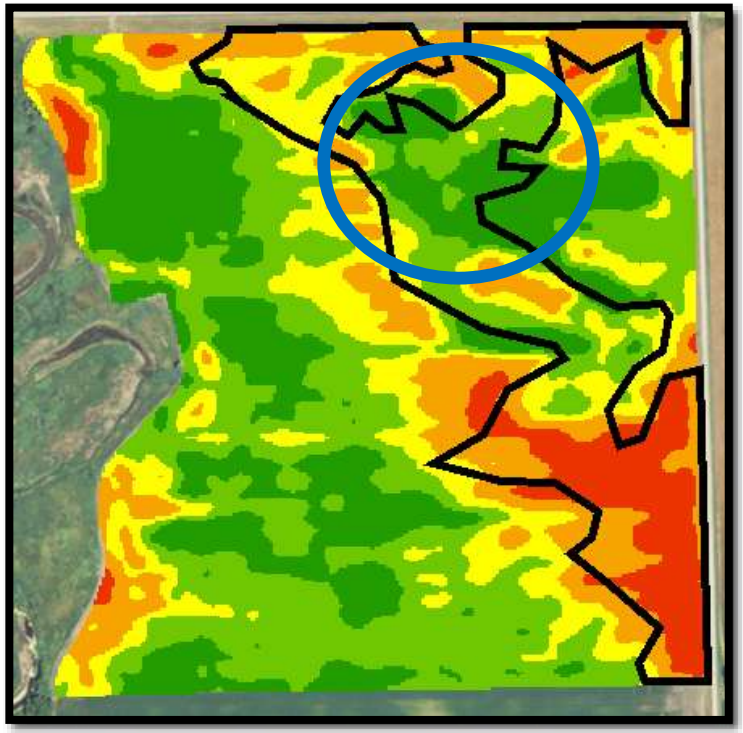
1-2 Trifoliate Stage



2014 Yield Map



Zone Map



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Questions to Answer

Is it possible to variable rate FeEDDHA to manage IDC?

What are the correct parameters to use to create a prescription map for variable rate applications of FeEDDHA?

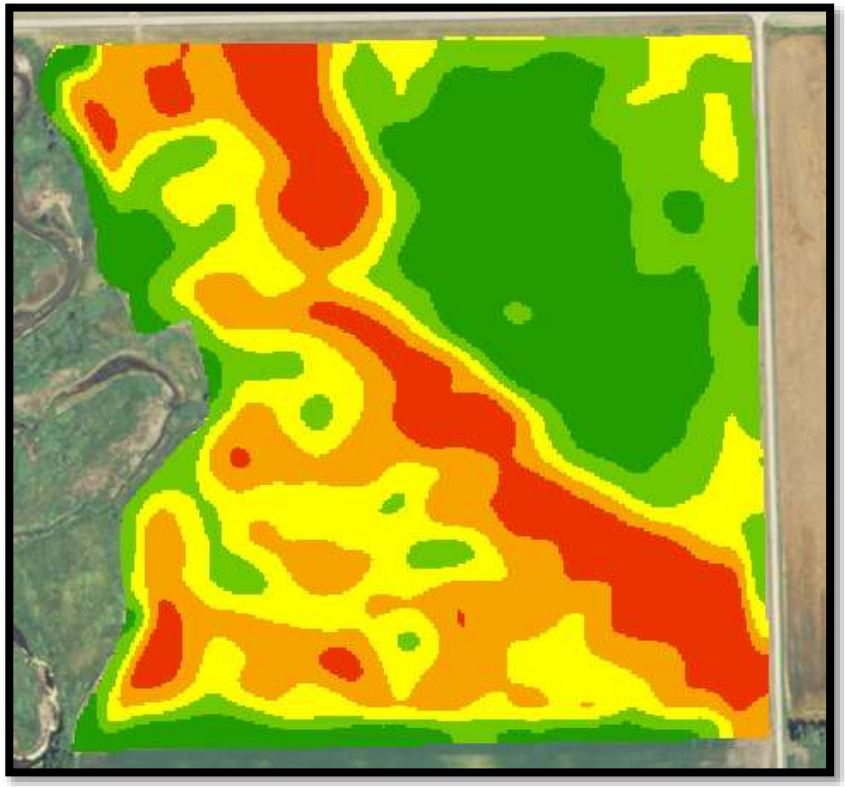
- Yield Map?
- Previous Nutrient Management Zones?
- Soil Testing Parameters?

Other Ideas for Creating FeEDDHA Zones

Imagery- satellite imagery or other imagery from previous soybean crops

Yield Data – prescription map derived from soybean yield data

- Soil testing parameters might be better for selecting FeEDDHA rate
- IDC is unpredictable year to year. Accuracy for FeEDDHA prescription dependent upon the occurrence and severity of IDC the year the image or yield data is taken
- Yield data is fairly accurate geographically, but certain images may not be precise for this prescription



2008 Satellite Image

Grid Sampling For FeEDDHA Prescription

Risk of iron chlorosis in soybeans based on salinity and $CaCO_3$ content of soil

$CaCO_3$, %	Salinity, mmho/cm			
	< 0.25	0.26-0.5	0.51 - 1.0	> 1.0
0 - 2.5	Low	Low	**	High
2.6 - 5.0	Moderate	Moderate	High	V. High
> 5.1	Moderate	High	V. High	Extreme

** Low if $CaCO_3$ is less than 1%, moderate if $CaCO_3$ is 1-2.5%

Agvise Laboratories- Slightly modified by Dr. R Jay Goos

Grid Sampling

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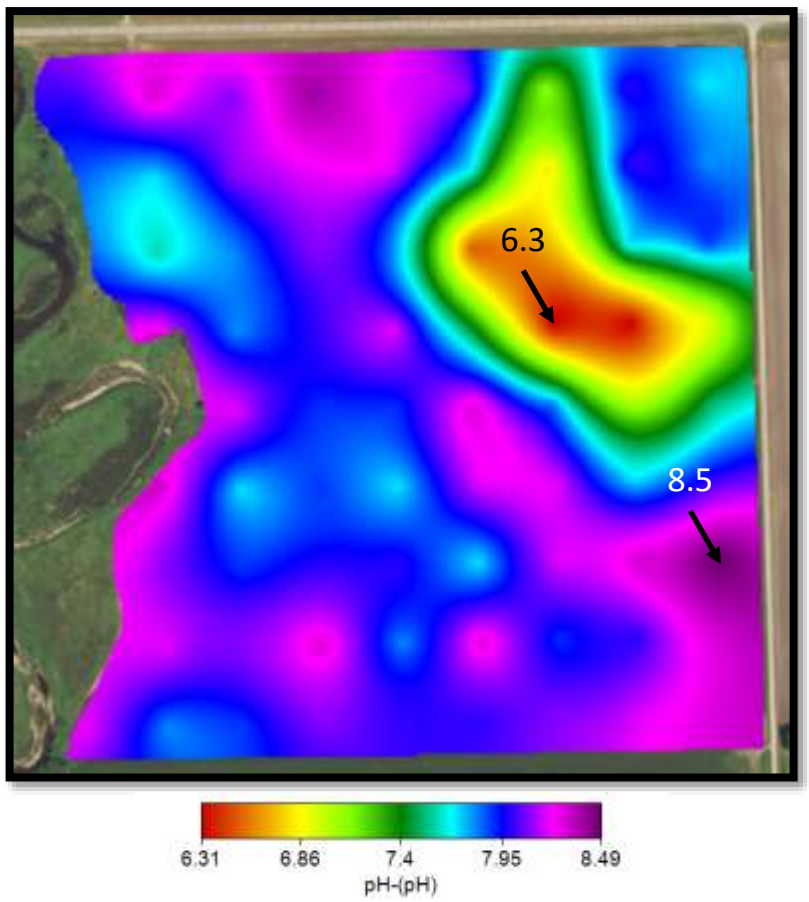
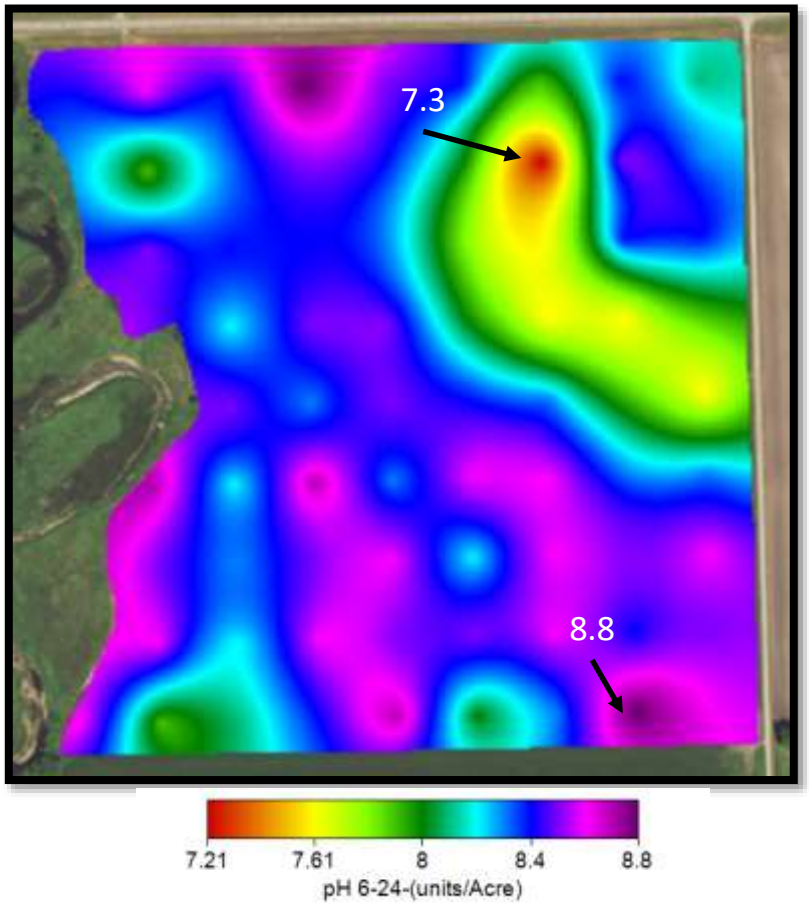
2015 Grid Sampling Revealed….

The Soil pH is Variable

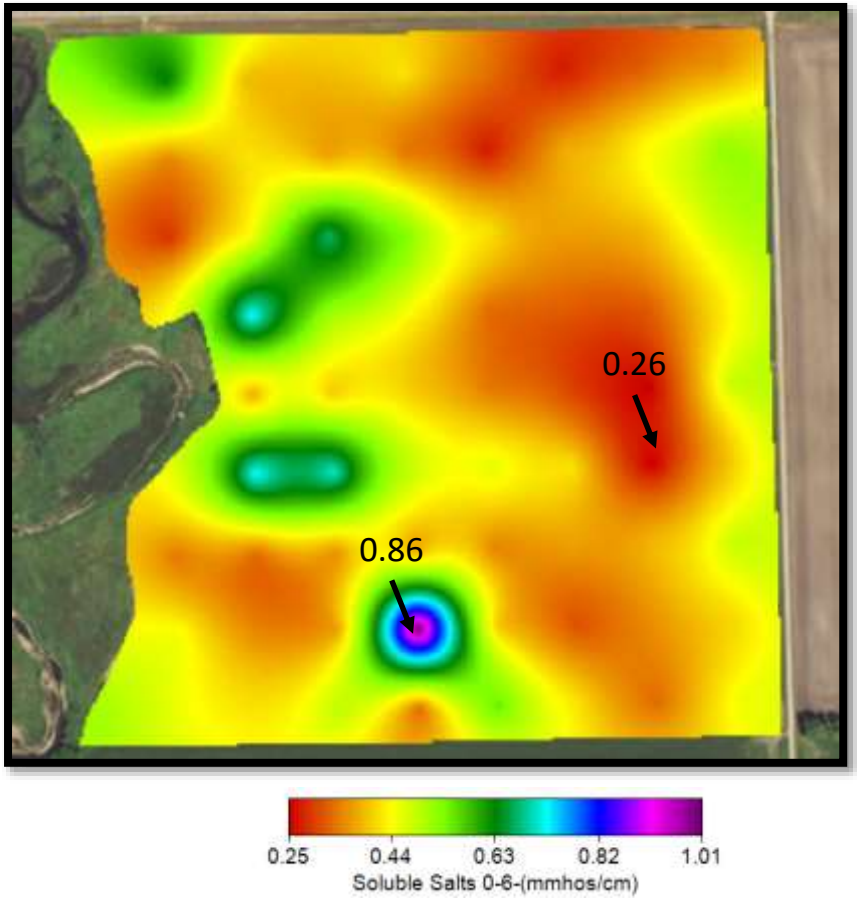


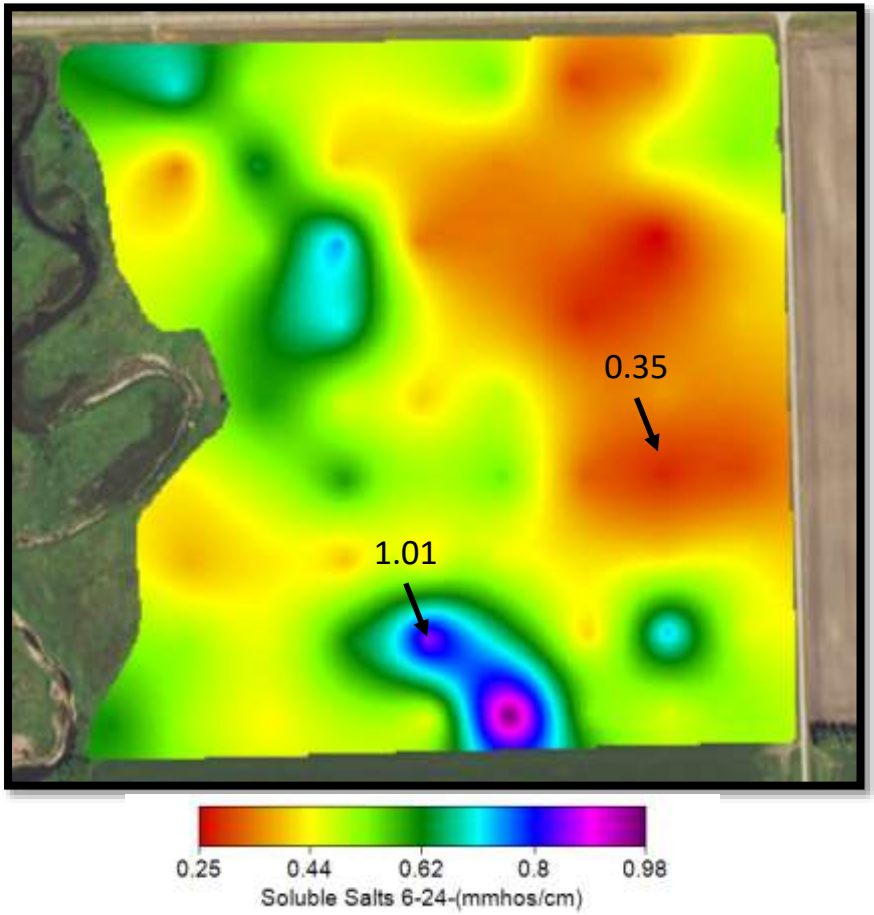


Zone Sampling Results in 2010 Showed Soil pH Variability between 8.1 and 8.5
Zone Sampling Results in 2014 Showed Soil pH Variability between 8.0 and 8.6

2015 Grid Sampling Revealed….

The Soluble Salts are low

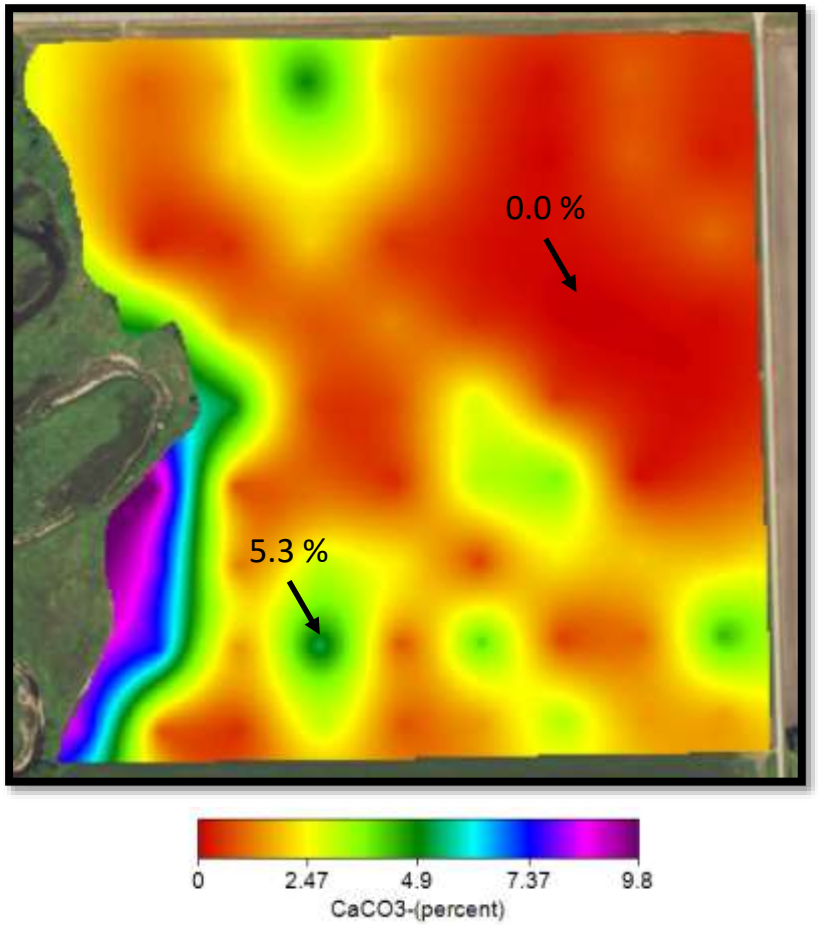


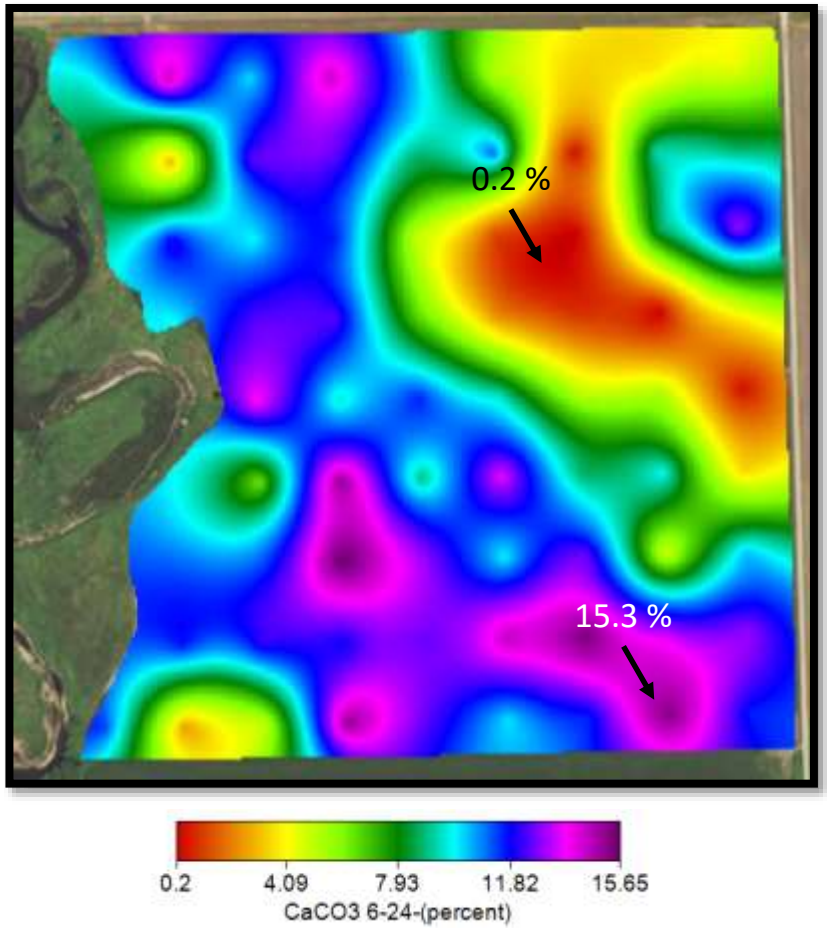


Zone Sampling Results in 2010 and 2014 Showed Similar Low Soluble Salt Values

2015 Grid Sampling Show Us….

The 0-6” Calcium Carbonates are slightly variable but relatively low
The 6-24” Calcium Carbonates are variable

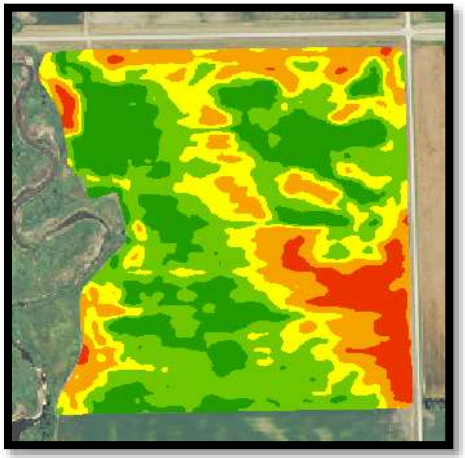




2010 versus 2014 Zone Sampling Results

2010

- **Dark Green**
  - **CaCO3 – 1.3% Soil pH – 8.1**
  - **Sol. Salts 0-6” – 0.25 mmho/cm**
- **Light Green**
  - **CaCO3 – 4.0% Soil pH – 8.3**
  - **Sol. Salts 0-6”– 0.30 mmho/cm**
- **Yellow**
  - **CaCO3 – 2.0% Soil pH – 8.3**
  - **Sol. Salts 0-6” – 0.33 mmho/cm**
- **Orange**
  - **CaCO3 – 4.3% Soil pH – 8.4**
  - **Sol. Salts 0-6” – 0.35 mmho/cm**
- **Red:**
  - **CaCO3 – 2.9% Soil pH – 8.5**
  - **Sol. Salts 0-6” – 0.31 mmho/cm**



2014

- **Dark Green**
  - **CaCO3 – 1.6% Soil pH – 8.0**
  - **Sol. Salts 0-6” – 0.27 mmho/cm**
- **Light Green**
  - **CaCO3 – 3.2% Soil pH – 8.2**
  - **Sol. Salts 0-6” – 0.26 mmho/cm**
- **Yellow**
  - **CaCO3 – 3.4% Soil pH – 8.5**
  - **Sol. Salts 0-6”– 0.24 mmho/cm**
- **Orange**
  - **CaCO3 – 4.1% Soil pH – 8.6**
  - **Sol. Salts 0-6” – 0.25 mmho/cm**
- **Red:**
  - **CaCO3 – 2.3% Soil pH – 8.6**
  - **Sol. Salts 0-6” – 0.17 mmho/cm**

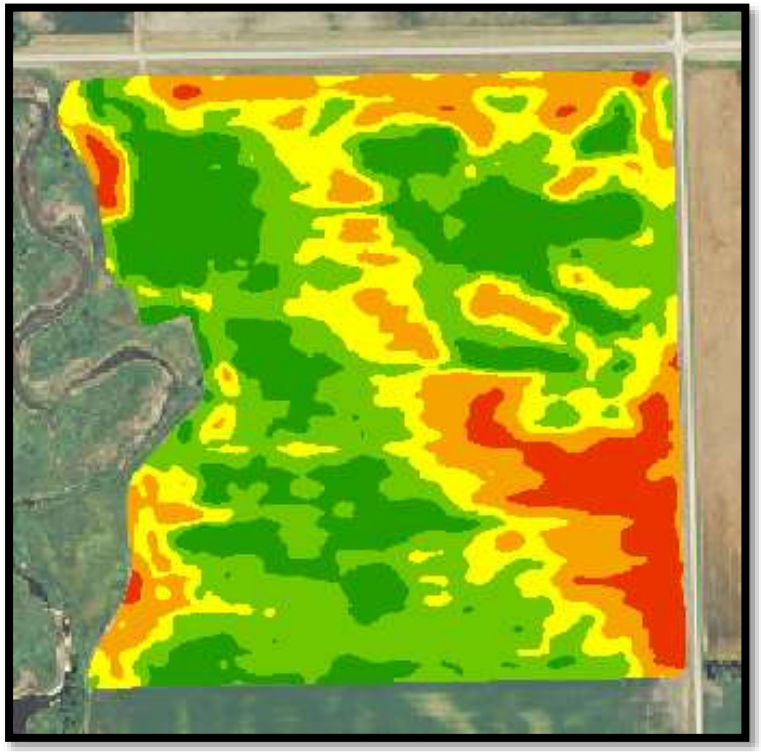
2010 versus 2014 Zone Sampling Results

2014

- **Dark Green**
  - **Olsen P – 11 ppm**
  - **Potassium – 193 ppm**
- **Light Green**
  - **Olsen P – 8 ppm**
  - **Potassium – 126 ppm**
- **Yellow**
  - **Olsen P – 8 ppm**
  - **Potassium – 111 ppm**
- **Orange**
  - **Olsen P – 7 ppm**
  - **Potassium – 101 ppm**
- **Red:**
  - **Olsen P – 6 ppm**
  - **Potassium – 89 ppm**

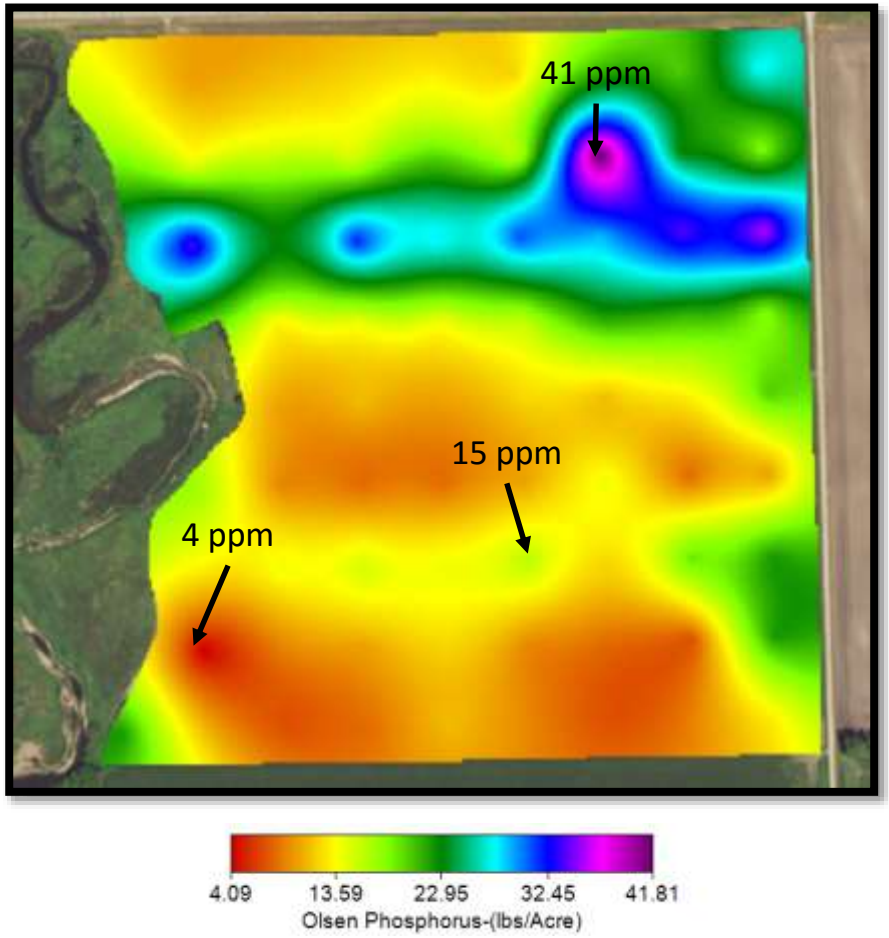
2010

- **Dark Green**
  - **Olsen P – 8 ppm**
  - **Potassium – 148 ppm**
- **Light Green**
  - **Olsen P – 3 ppm**
  - **Potassium – 102 ppm**
- **Yellow**
  - **Olsen P – 2 ppm**
  - **Potassium – 86 ppm**
- **Orange**
  - **Olsen P – 2 ppm**
  - **Potassium – 87 ppm**
- **Red:**
  - **Olsen P – 6 ppm**
  - **Potassium – 74 ppm**

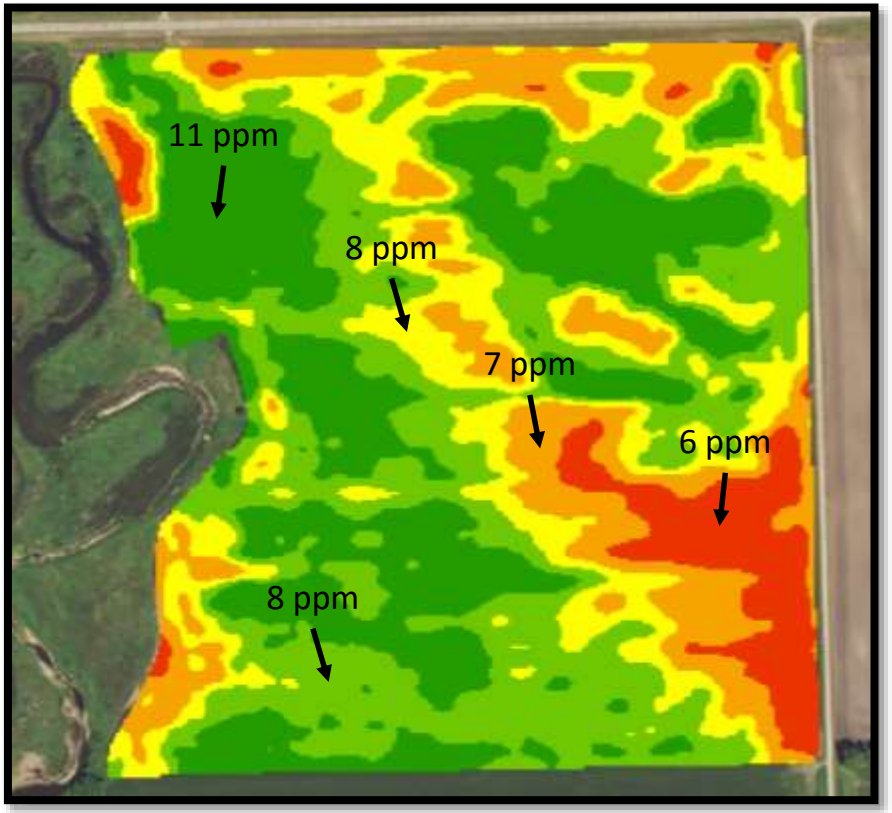


Phosphorus Levels

2015 Grid Sample Results

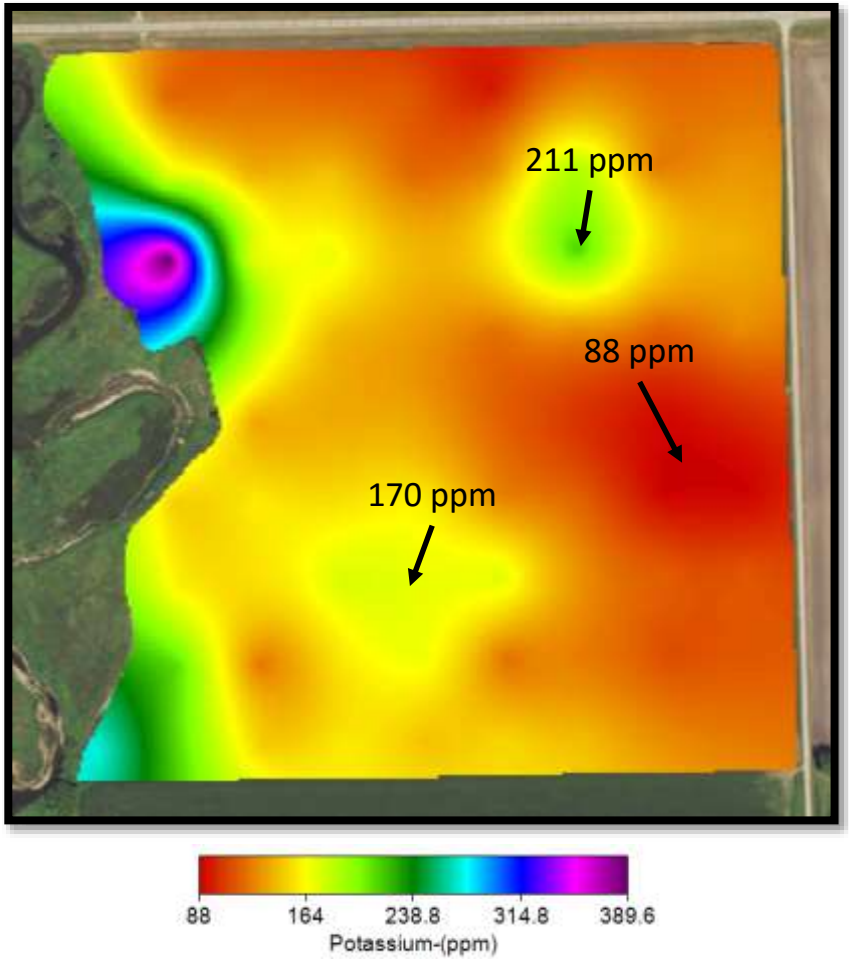


2014 Zone Sample Results

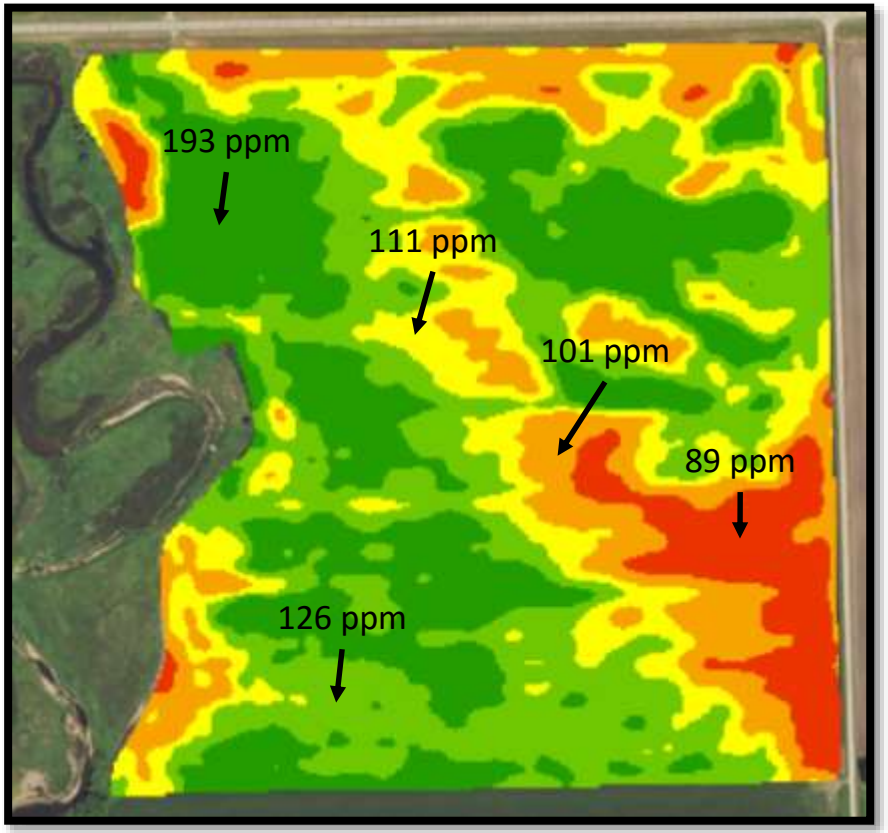


Potassium Levels

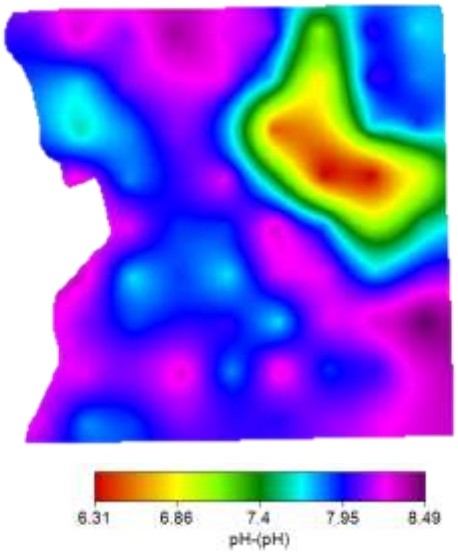
2015 Grid Sample Results

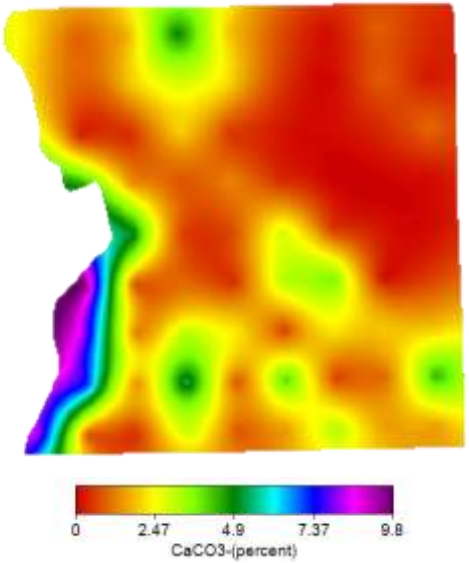


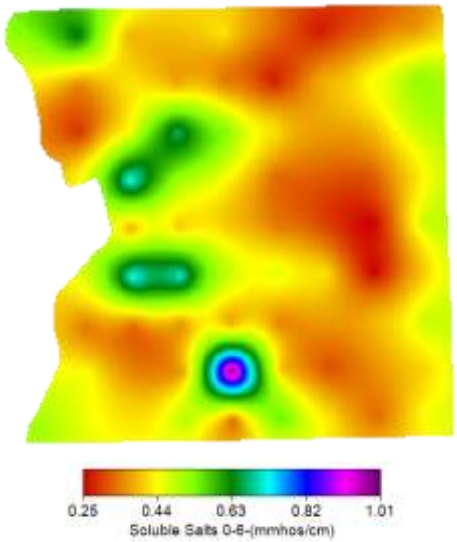
2014 Zone Sample Results

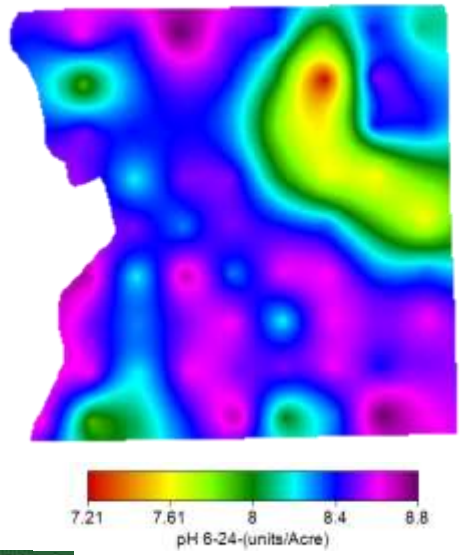


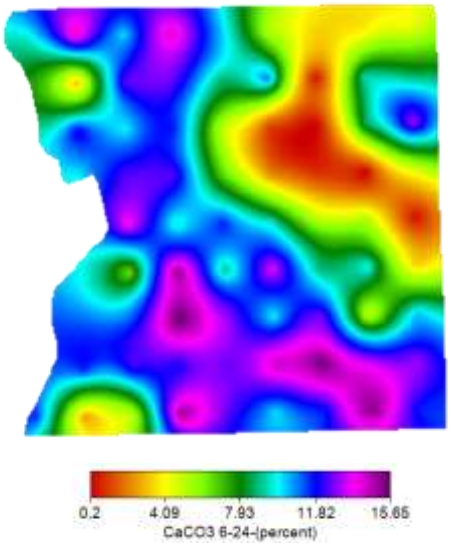
Grid Sampling for IDC Management

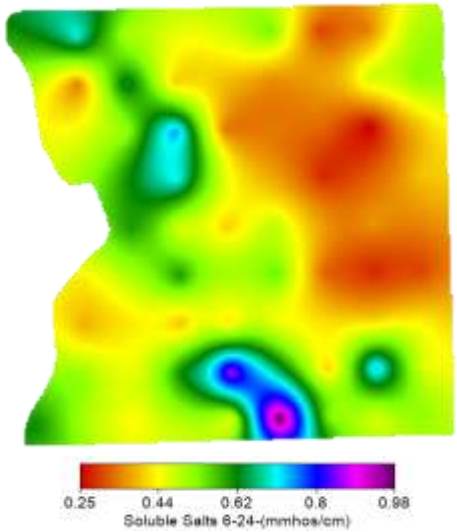












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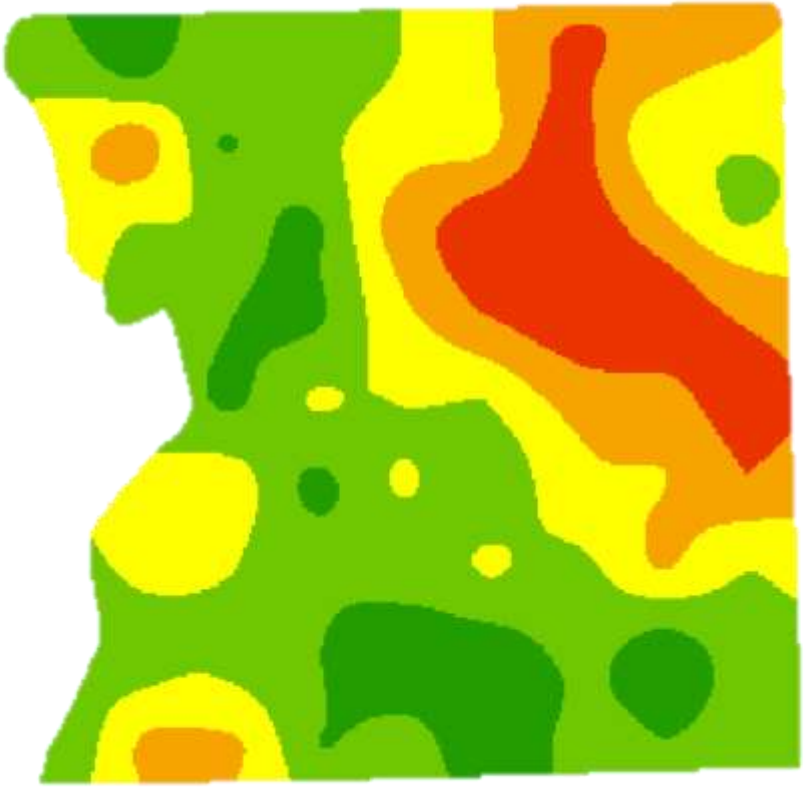
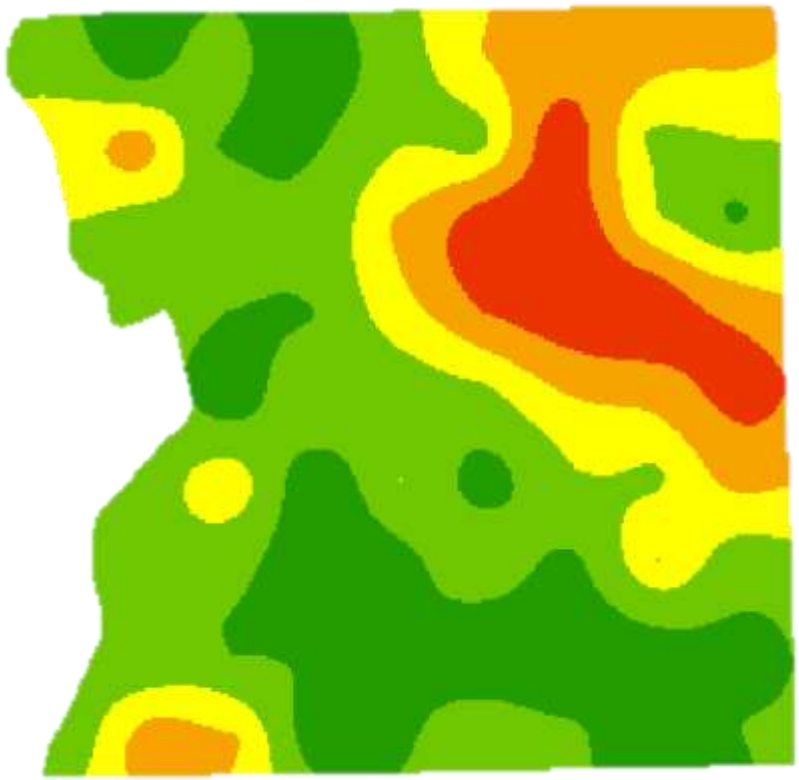
Grid Sampling for IDC Management

Maps Created by putting together:



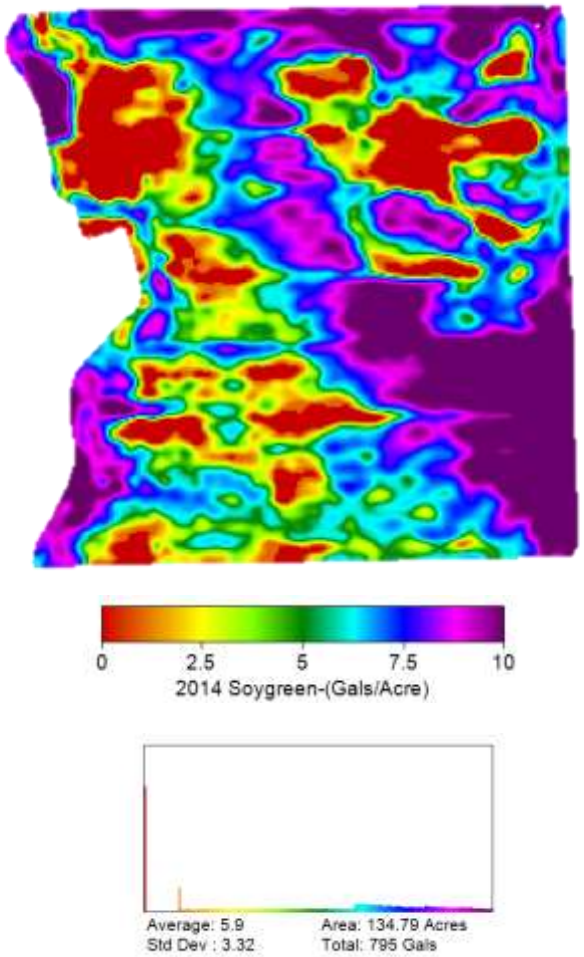
- 0-6” soil pH
- 6-24” Soluble Salts
- 6-24” $CaCO_3$.



- 0-6” soil pH
- 6-24” $CaCO_3$

Spring 2016 FeEDDHA Prescription

2014 FeEDDHA Prescription



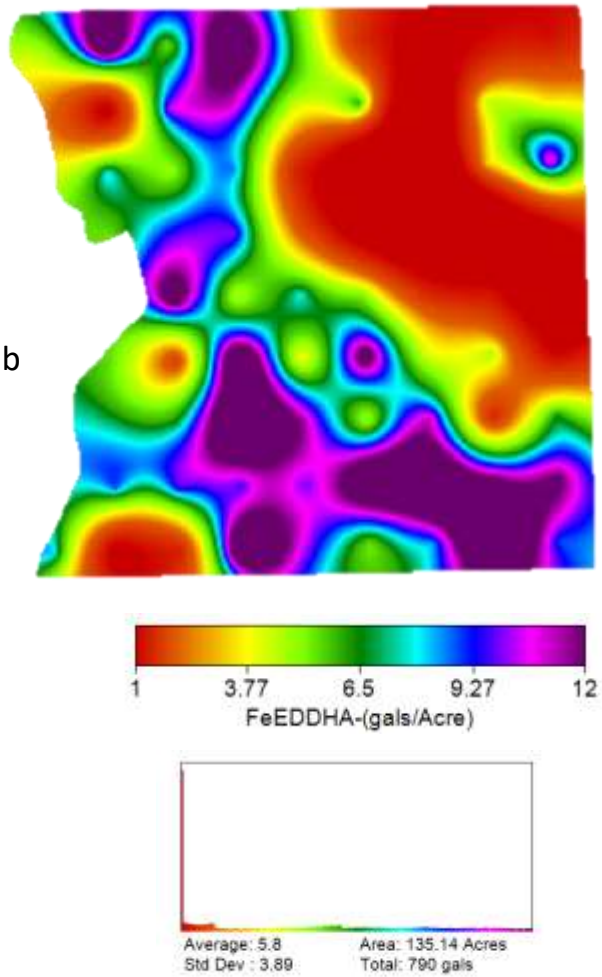
- 2016 Prescription based on 6-26" $CaCO_3$ and 0-6" Soil pH
- 2014 Prescription based on management zones

- FeEDDHA mixed in ratio of 1 lb to 2 gallons water

- 2016 prescription would require 395 lb of FeEDDHA
- 2014 prescription required 397.5 lb FeEDDHA total

- A 3 lb flat rate over this field would require 405 lb of FeEDDHA

2016 FeEDDHA Prescription



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Summary

Variable Rate FeEDDHA applications could be useful for economically placing the proper FeEDDHA rates in the places where it is most needed.

Grid Sampling was helpful to help us learn about other things going on in this field in addition to IDC.

Grid Sampling for $CaCO_3$, Salinity, and Soil pH could be useful in predicting the distribution of potential IDC spots in fields. However, more research is needed to help with this concept.

Are There Any Questions?