Sure it's Precision Ag, but is it Accurate?

Agvise Annual Soil Fertility Update
January 2011

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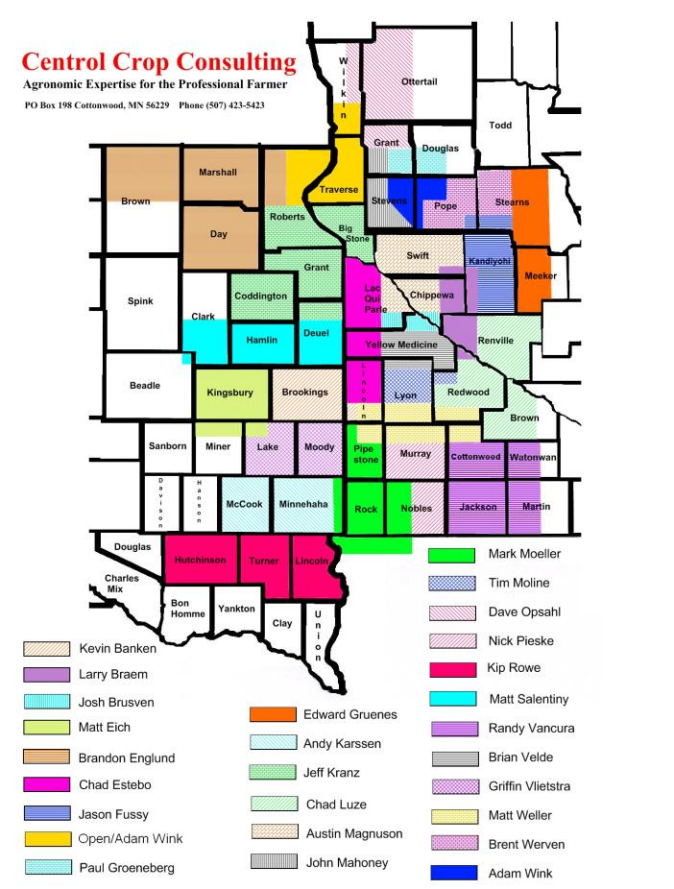
Centrol of Cottonwood MN

- 6th Year with Centrol
- Involved in Precision Ag since 2003
- Staff
  - 28 Consultants
  - 2 Office Staff



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Services Provided

- Contracted Customer
- Custom
  - Farmers
  - Retailers
  - Other Consultants
- Zone Creation
  - Imagery
  - Yield Data
  - Veris Data
- Custom Sampling
- Yield Data Processing

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Why Precision Ag?

- Reduced Fertilizer Consumption
  - Lower production and transportation
  - Decreased pollution potential
- Increased Yield (Potential)
- Acres of Production not Increasing
  - Better management of what's there
  - Maximize Profits

Precision Ag Process

- Data Acquisition
  - Collection
  - Interpretation
- Database Integration
  - Normalization of Data
- Precise Application
  - Is the Rx Map written correctly?
  - Is the machine set right?

Data Acquisition

- Cornerstone of the Precision Ag Program's Success
  - What type of data do we use?
    - Imagery
    - Yield
    - Soil EC
    - Topography
    - Grids
  - Is the data accurate?
    - Relevant
    - Repeatable
    - Current vs. Historical

Database Integration

- Normalization of Like Data
  - Averaging out multiple data sets
- Combination of Unlike Data
  - Takes great understanding
  - Are the data sets corrupting each other?
    - Differing measures
- How Much "Smoothing" is too Much?
  - Makes the picture look nice
  - Some is OK, don't get carried away
- Consistency is Key

Precise Application

- Rx Map
  - Correct file format for the controller
  - Correlate to Applicator swath width
- Controller Interpretation
  - Limit data to maximize performance
- Equipment Function
  - Maintenance
  - Calibration/Offsets/Delays

My Toolbox – Yesterday & Today

Tools
- Snap-on
- Craftsman
- Mac Tools

Hardware
- Ag Leader
- Trimble
- John Deere

Software
- GK Technology
- Farm Works
- SMS

HGIS®

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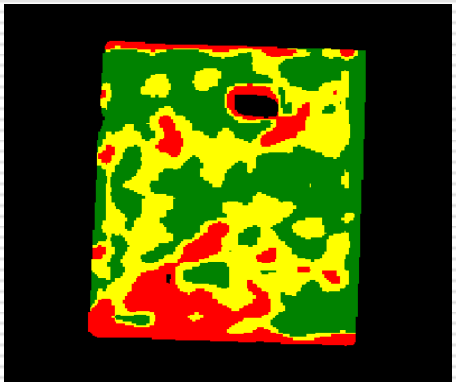
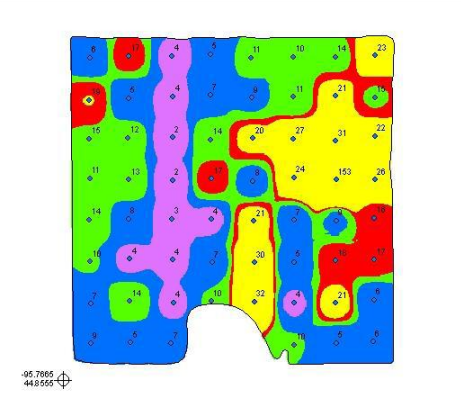
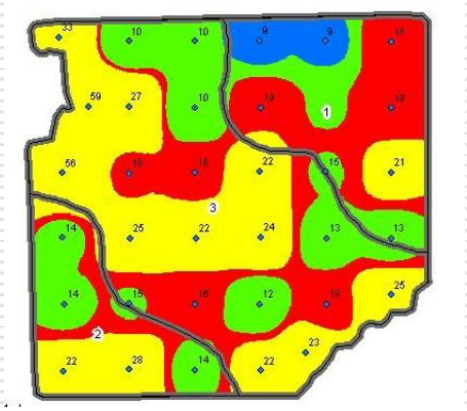
What Tools are Needed in my Toolbox?

- Site Specific Programs
  - Grids
    - Fertilize based on nutrients in the soil.
  - Zone Management
    - Fertilize and seed based on productivity.
  - Combination



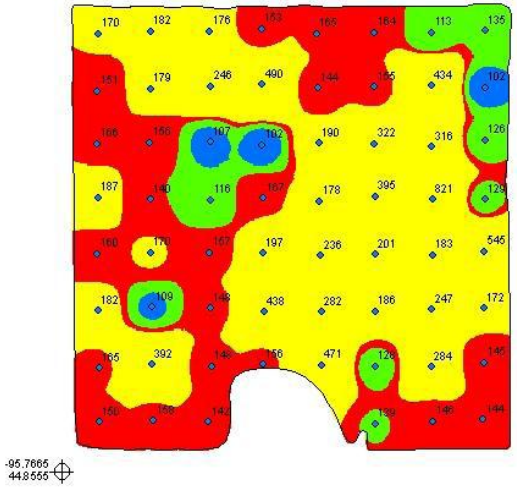




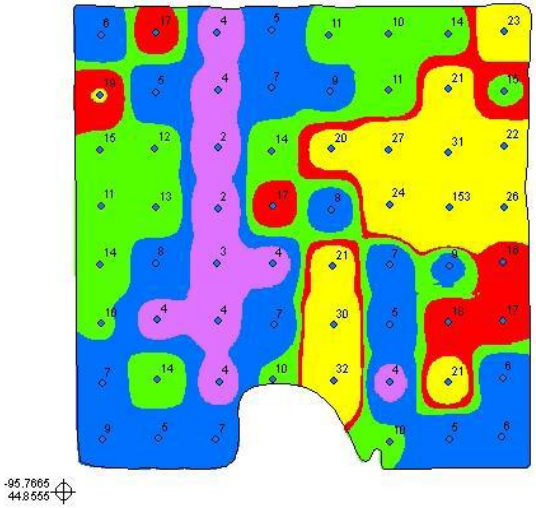
Goal: An Informed Approach to Crop Management

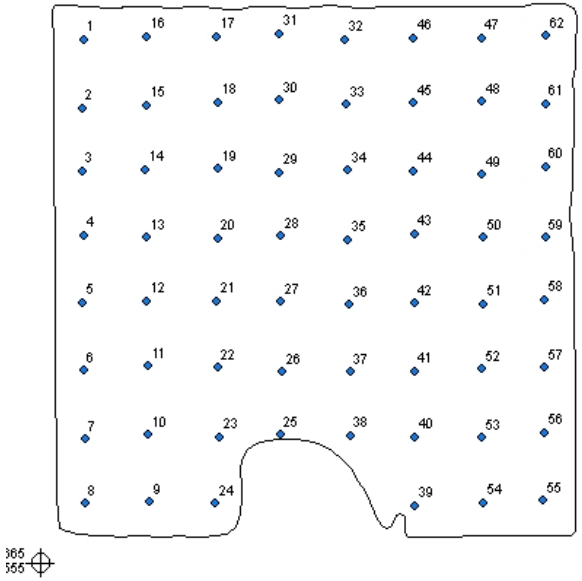
Grid Sampling

Potassium

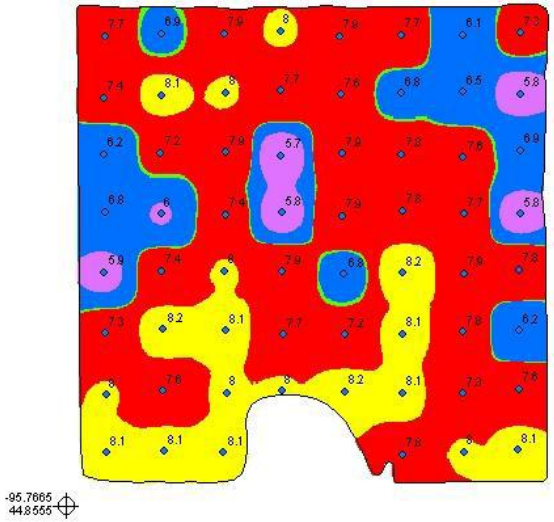


Phosphorus

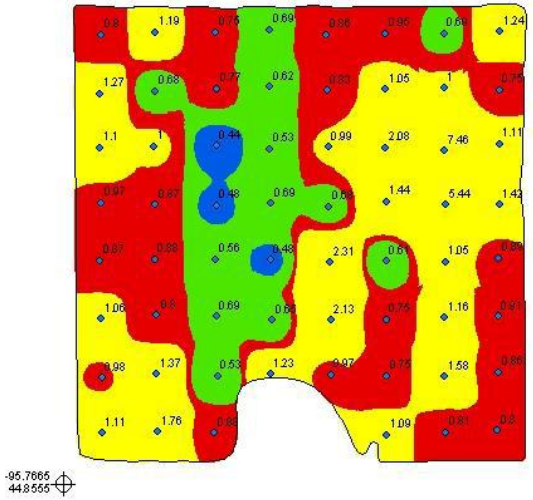




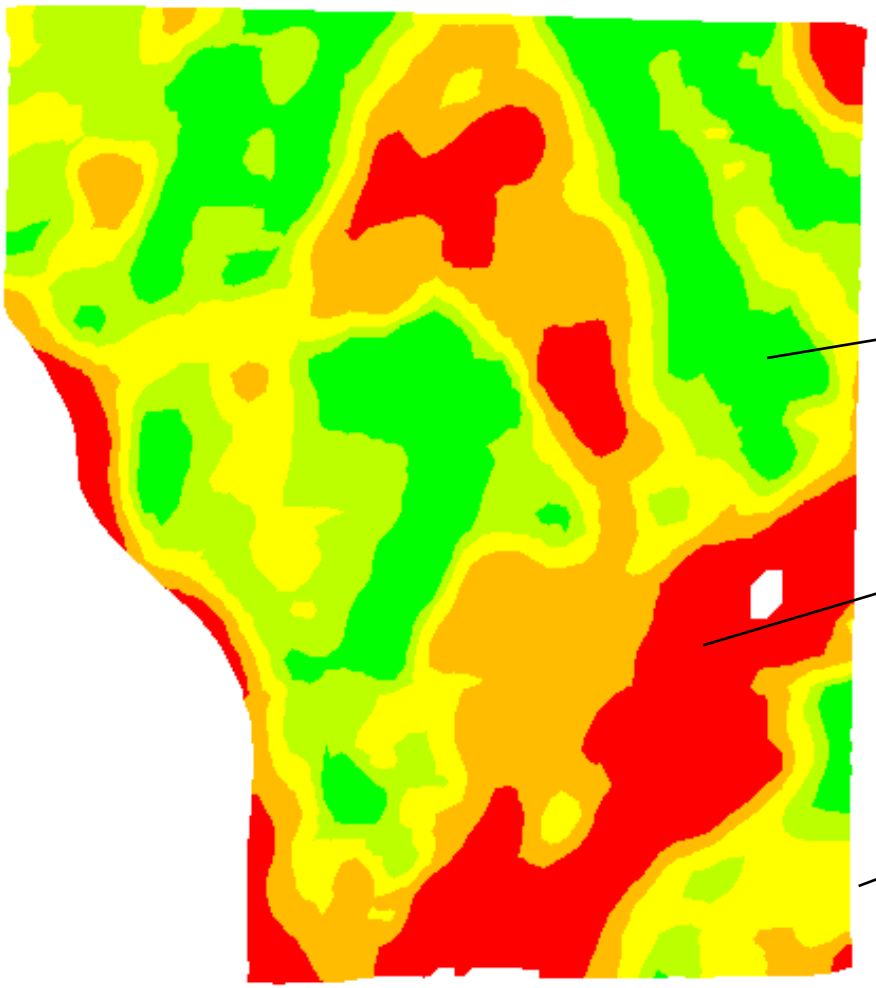
pH



Zinc



Zone Management



140-100-60
36,000 $270

120-50-20
24,000 $175

130-70-40
32,000 $225

0 360ft

N

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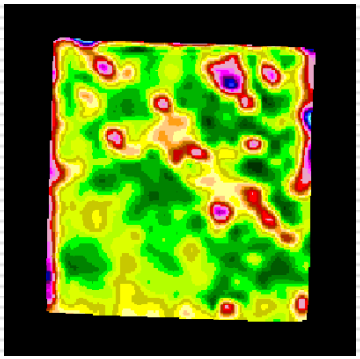
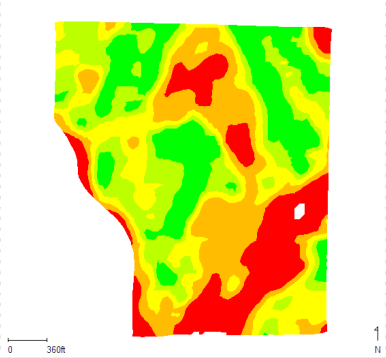
How do I Start Managing by Zone?

- Start collecting data from the field
  - Soil EC (Veris)
  - Imagery
  - Yield Maps
  - Producer Input
- PLANNING AHEAD





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Tools: Soil EC (VERIS)

- EC Measures Conductivity:
  - Soil Properties
    - Soil texture
    - Organic Matter
    - CEC
    - Drainage
  - Geo Ref Soils Map

www.veristech.com

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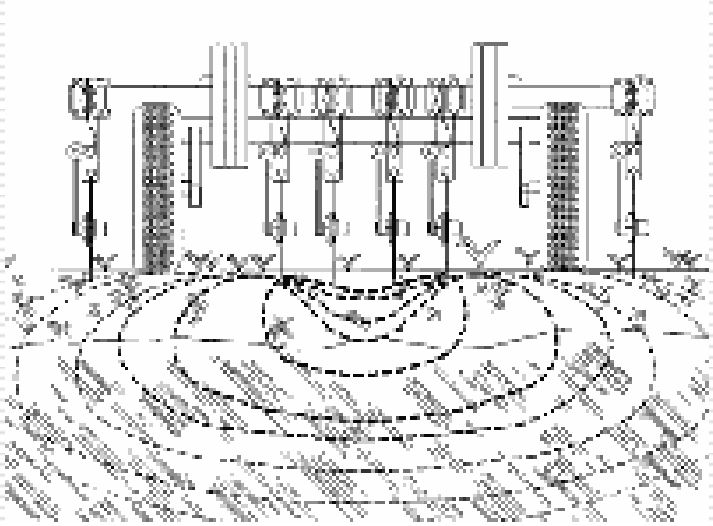
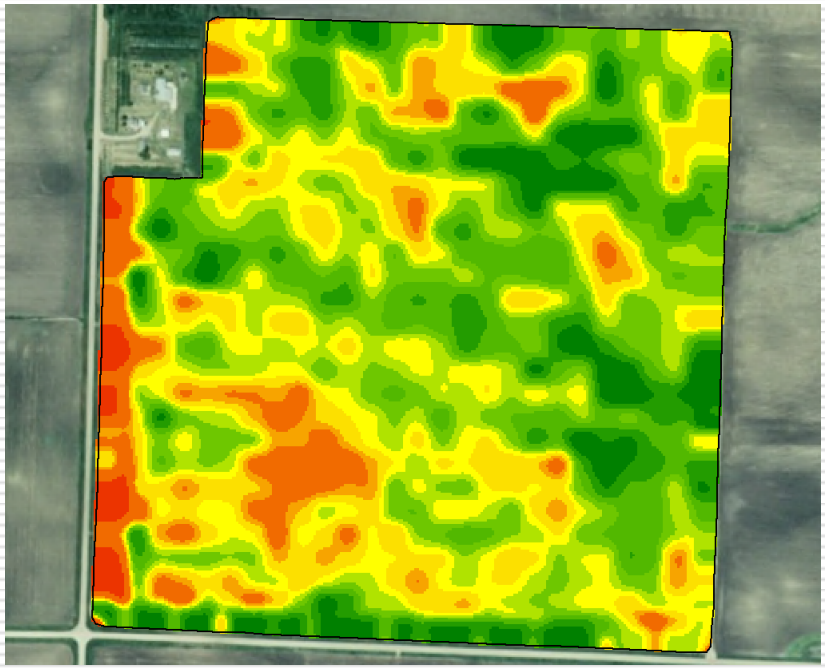
Tools: Soil EC (Veris)

- How does it work?
  - Swath Every 40-50 feet
  - 10-15 MPH
  - 1 Data Point/Second
  - Measures Conductivity
    - 0-1ft and 0-3ft



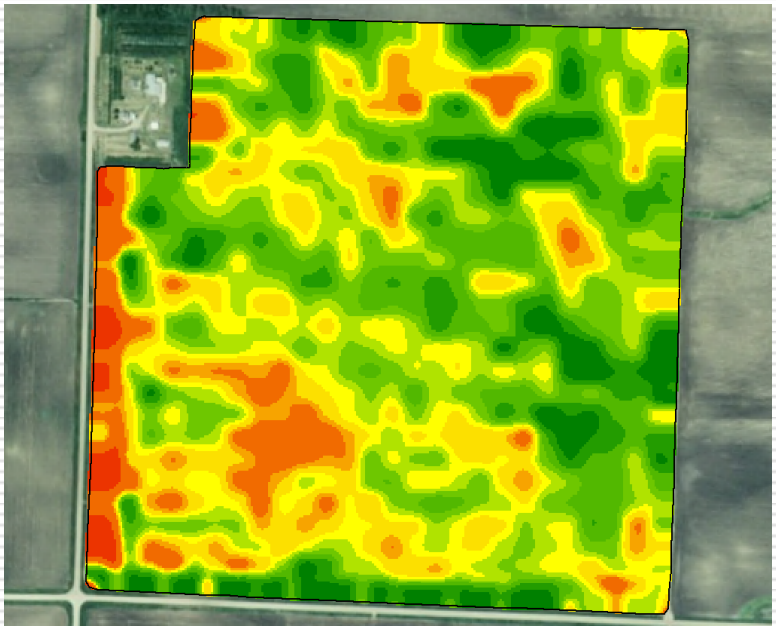
Tools: Satellite Imagery

- Picture of Productivity
  - Defines productive & non-productive areas
  - History of Productivity
    - Multiple years of imagery
  - Shows variations from nature & man
- Zones Created Quickly
- Use with Caution
  - Know what you are looking at



Tool: Satellite Imagery

- Ground Truth:
  - Imagery shows areas of different productivity, but will not tell you why
  - Shows you where to investigate
  - Field Knowledge is absolutely necessary

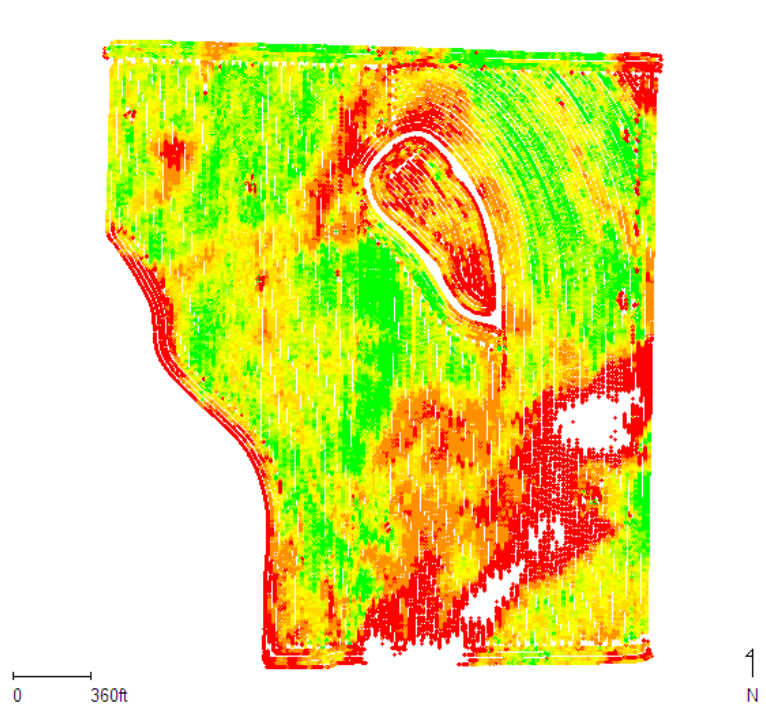


Tools: Satellite Imagery

- Sources of Imagery (NDVI)
  - http://earthexplorer.usgs.gov
    - USGS/EROS data, free to public
  - www.umac.org
    - USGS/EROS data "partially" processed
  - www.satshot.com
    - Online analysis system
  - www.rapideye.de
    - First Private Industry Provider

Tools: Yield Data

- Picture of Productivity
  - Record of productive & non-productive areas
  - History of Productivity
    - Normalized multiple years to create the most accurate zones possible
  - Shows variations from nature & man
- Zones Created Quickly
  - Is the Data Good?
    - Calibrated System
    - Clean Data
    - Multiple Combines?



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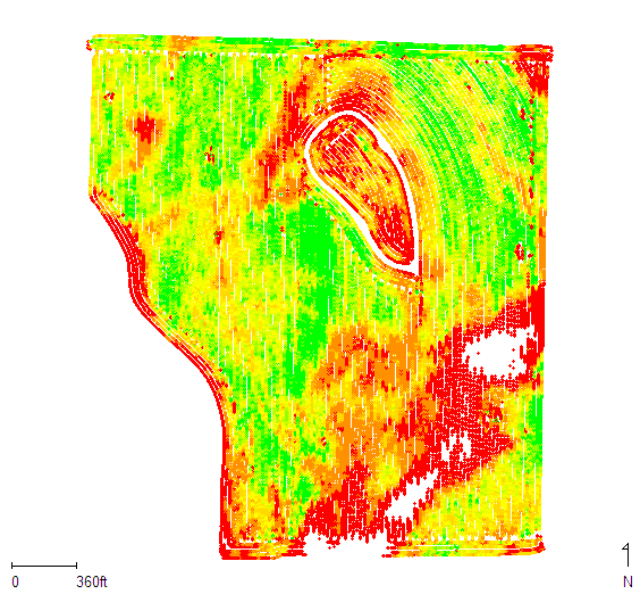
Tools: Yield Data

- Software Programs
  - Multiple on the Market
    - No one solution

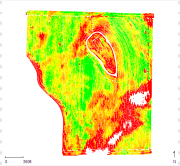
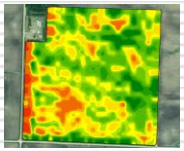
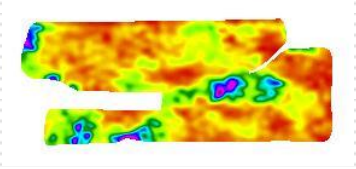


- Industry Needs:
  - Data Management
  - Analysts / Processors
  - Equipment Support

Tools: Grower Input

- Most Important Tool for Success
- Verification of Tools/Processes Used
  - Quality Control
- Modifications due to history & field knowledge

Tools: Pros & Cons

	Pros	Cons
YIELD 	Quick Creation Actual Report Card Normalize Multiple Years	Recording Errors Poor Calibration Data Integrity
IMAGERY 	Quick Creation Multiple Years Data Accessible 24/7	Cloud Cover Rotation/Varity Changes Yields Unknown
EC (VERIS) 	Accurate Soils Map Done Once Easy Operation	Seasonal Mapping Yields Unknown Maintenance Needed

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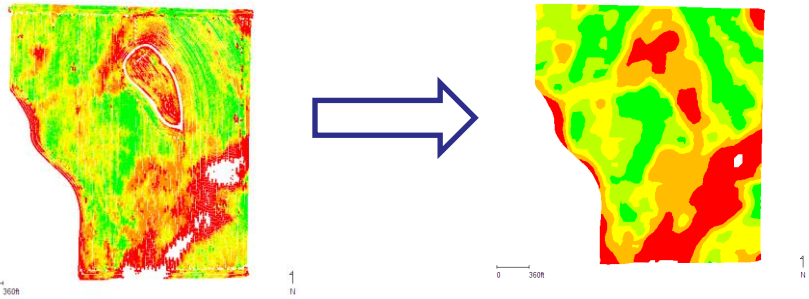
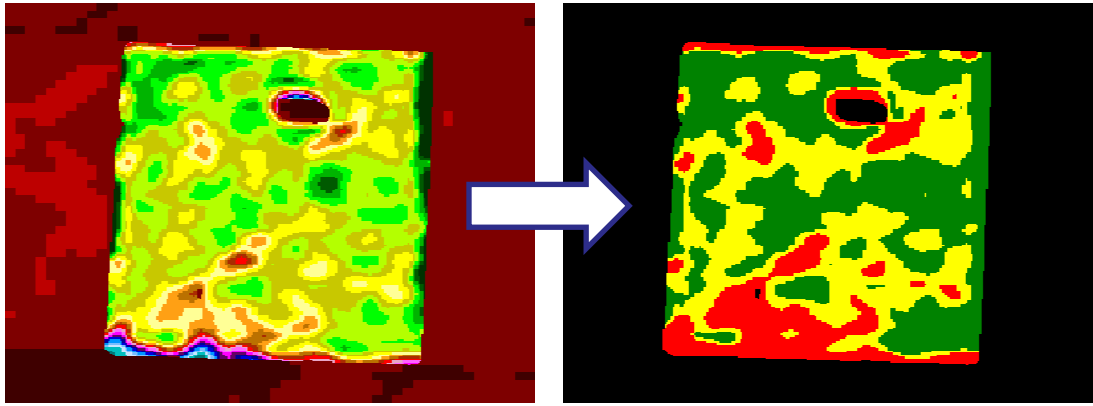
USING THE TOOLS

What does it mean to the Grower

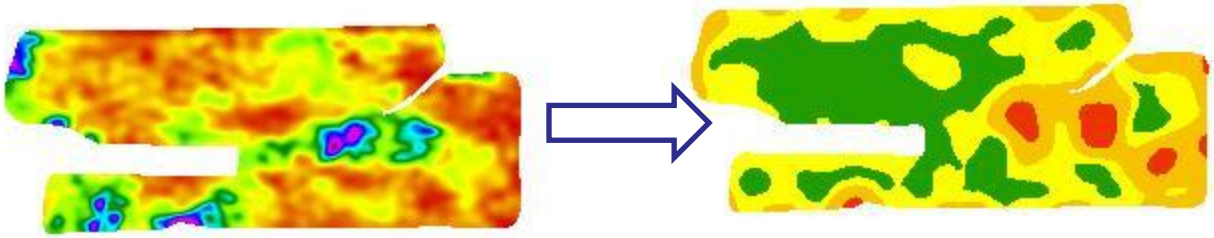
- Yield Data



- Satellite Imagery



- Veris



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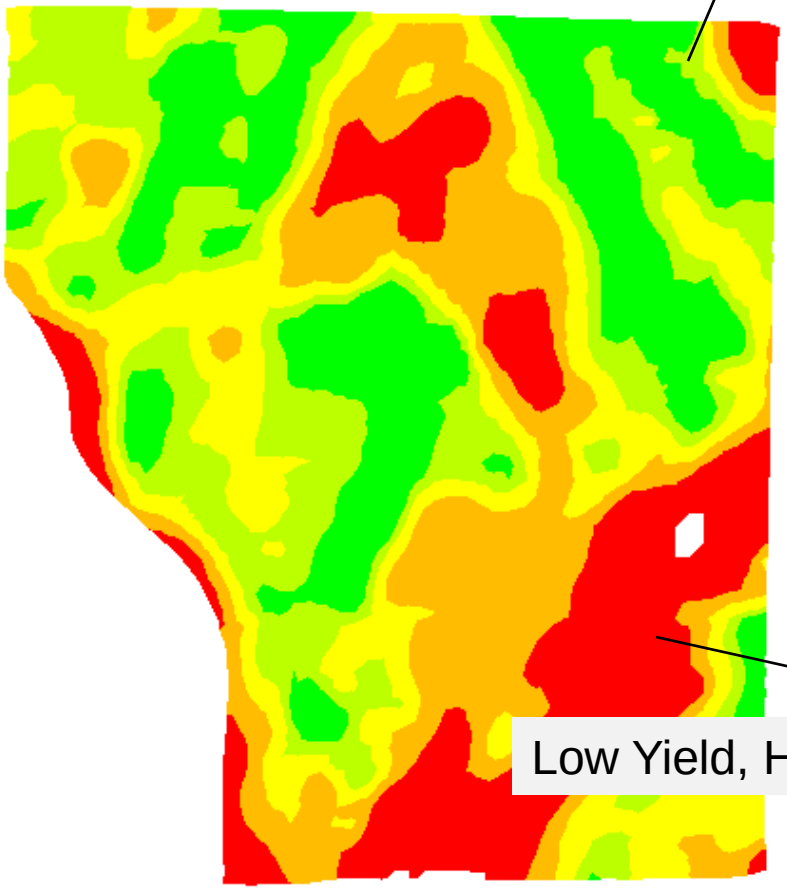
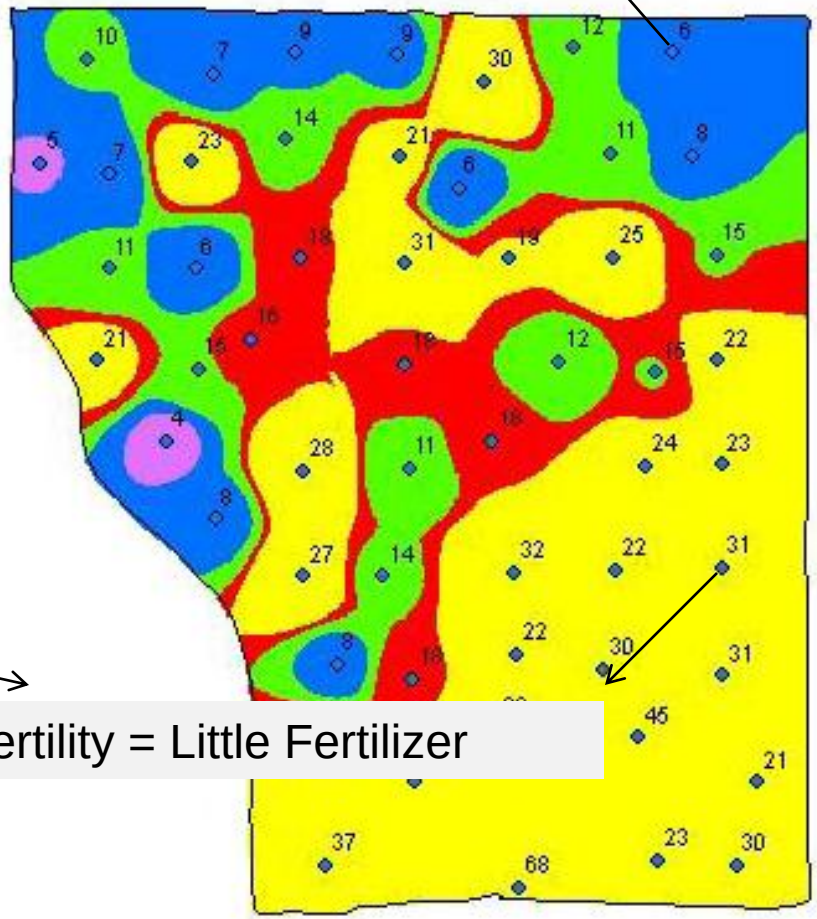
Zones over Grids

‘Smart Grids’

High Yield, Low Fertility = A lot of Fertilizer





Low Yield, High Fertility = Little Fertilizer

0 360ft

Fertilizer – Cost Savings
Zone over Grid

Field	Acres	Conventional Rec	$/Acre	Grid over Zone	$/A	Difference	
L-5	10	150-30-30	110.16	141-48-67	137.47	$(27.31)	-273.1
S-2	9	150-100-85	188.97	155-87-53	165.88	$23.09	207.81
D-2	13	150-70-50	149.48	138-64-69	148.73	$0.75	9.75
G-3	76	150-110-50	178.8	148-84-77	172.27	$6.53	496.28
A-2	113	150-110-40	173.8	144-81-74	166.62	$7.18	811.34
S-1	65	150-100-85	188.97	137-75-66	154.81	$34.16	2220.4
L-3	140	150-120-70	196.13	140-60-78	151.27	$44.86	6280.4
	426					**$ 22.89**	**$ 9,752.88**

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Fertilizer – Cost Savings
Zone over Grid

	Acres	Conventional Rec.	Cost	Zone over Grid	Cost	Difference		
Sandberg 16	16	155-90-60	$ 200.74	142-100-85	216.61	$ (15.87)	$ (253.92)	
Jim N	71	155-110-70	$ 223.89	142-68-73-2.64	185.32	**$ 38.57**	$ 2,738.47	
Home 46	46	155-120-100	$ 250.04	143-91-88-2.31	217.89	**$ 32.15**	$ 1,478.90	
Suella N	44	155-80-40	$ 180.43	147-70-86-2.66	201.85	$ (21.42)	$ (942.48)	
Less Bottom	42	155-90-20	$ 177.42	139-61-33-1.65	155.66	**$ 21.76**	$ 913.92	
Rogers River	56	155-100-100	$ 232.74	137-69-72-5.28	194.8	**$ 37.94**	$ 2,124.64	
	275						$ **6,059.53**	$ **22.03**

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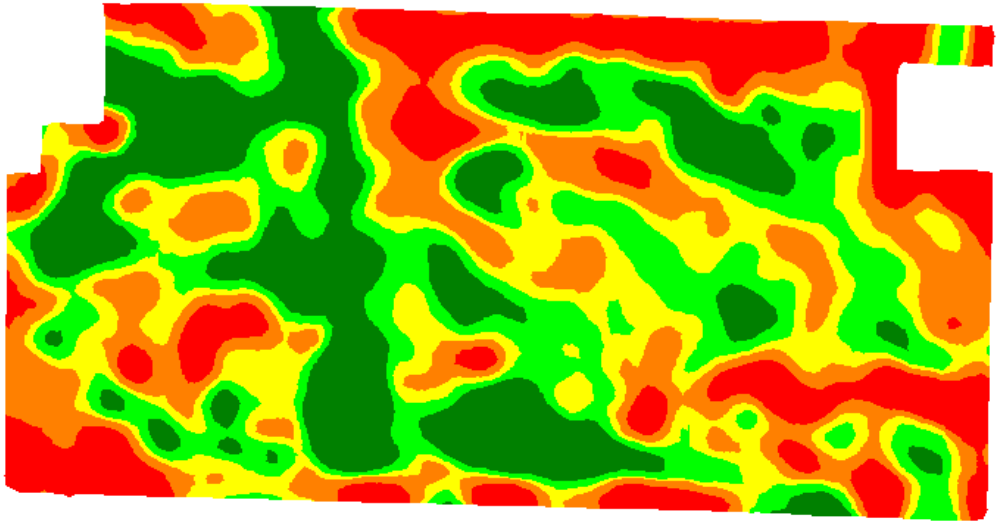
Fertilizer – Cost Savings
Zone Sampling: Corn on Corn

	Acres	Conv. Rec.	$/Acre	Zone Rec.	$/Acre	Difference	Total Diff.
Average	2,447	170-70-50	$ 196	157-54-30-1.7	$ 159	**$ 37**	**$ 87,132**



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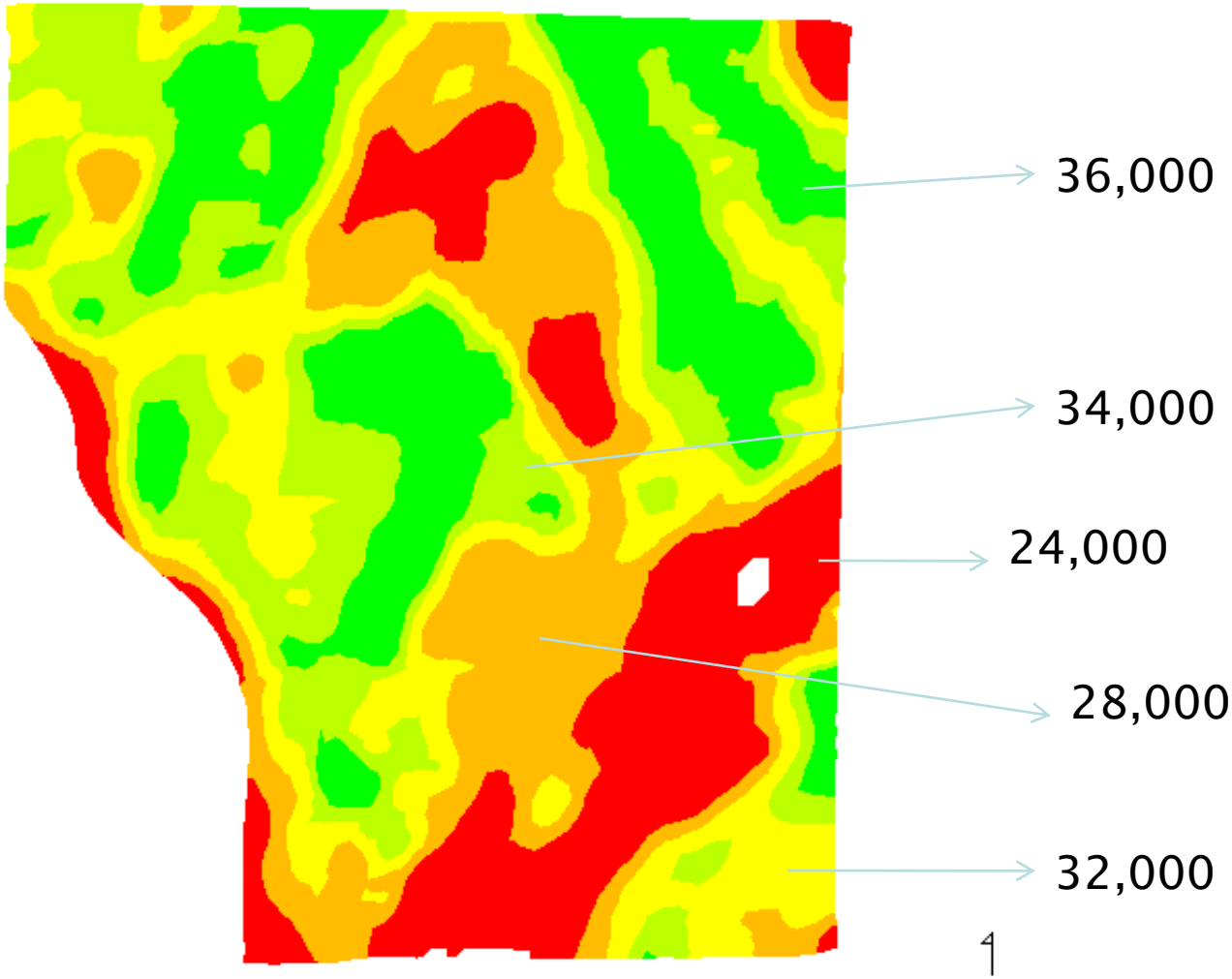
Variable Rate Seeding



Previous Years Pop.
33,400

VRT Pop.
30,970

ROI $7.59/Acre
$250/80,000 bag

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What's needed in my toolbox

- Questions to ask:
  - Do I align with a company?
    - Free up time
    - Extended Knowledge Base
  - Do I work solo?
    - More Time
    - Retain more revenue
    - Flexibility
    - Steep Learning Curve
- Work Load
  - What can I handle?
  - Office Work
  - Field Work
- Pricing
  - Don't give it away
    - Consulting Time
    - Service has value

What's needed in my toolbox

- Questions to Ask:
  - Work Through Retailers
  - Direct to Farmer Clients
  - Equipment/Software Used
  - Controllers that are Capable
  - Products Applied-Individual or Blended
  - Support Packages
    - Technical Service
    - Sales Support
    - Cost
    - Availability

Key Points

- Every Program goes from A to B
  - Different path to the end
- Time vs. Revenue
  - Give up revenue to free up time
- Support, need it or not?
  - Invaluable when needed

QUESTIONS?

Thank You!

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