Management Zones: Base Map Construction
(What Tools Are Needed In My Toolbox)

NAICC
2011 Annual Meeting

Tim Moline
Centrol Crop Consulting
Marshall, MN
tmoline@centrol.com
www.centrol.com
Centrol of Marshall MN

- 11th Year with Centrol
- Precision Ag Manager & Consultant
- Involved in Precision from beginning
- Staff
  - 28 Consultants
  - 2 Office Staff
Services Provided to:

- Contracted Customer
- Custom
  - Farmer / Retailers
  - Coop
  - Farm Managers
  - Other Consultants
Precision Toolbox-Timeline

2000

2011

CENTROL
A CROP CONSULTING COOPERATIVE
My Toolbox – Yesterday & Today

- SGIS
- UMAC
- Upper Midwest Aerospace Consortium
- SMS
- DONE
- MVTL
- John Deere
- USGS
- Earth Resources Observation and Science Center (EROS)
- AGVISE Laboratories
- MZB
- REDHEN SYSTEMS, INC.
- GK Technology for Agriculture
- AgriImaGIS Technologies
- FarmWorks
- HGIS®
- Veris Technologies
- CENTROL
  A CROP CONSULTING COOPERATIVE
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 Intelligent Approach to Crop Management
Grid Sampling

Potassium

Phosphorus

pH

Zinc
Does your yield vary?

- 200–220 bushels
- 0–110 bushels
- 140–175 bushels
Zone Management

120-50-20
24,000  $143

140-100-60
36,000  $230

120-50-20
24,000  $143

130-70-40
32,000  $189
How do I Start Managing by Zone?

- Start collecting data from the field.
  - Soil EC (Veris)
  - Imagery
  - Yield Mapping
  - Soil Surveys
  - Producer Input

- PLANNING AHEAD
Tools: Soil EC (VERIS)

- EC Measures Conductivity:
  - Soil Properties
    - Soil texture
    - Organic Matter
    - CEC
    - Drainage
  - Real Time Soils Map.

www.veristech.com
Tools: Soil EC (Veris)

- How does it work?
  - Every 30-40 feet
  - 10-15 MPH
  - Measures Conductivity
    - 0-1ft and 0-3ft
Veris Results

Fosso Farms (Zone Management) Veris Data - Prahl

Zone Management - Prahl - (4 Zone)

Grower: Fosso Farms
Farm: Fosso Farms
Field: Prahl
Year: NO Year
Operation: Zone Management
Crop/Product: 4 Zone
Op. Instance: Instance - 1
Area: 70.66 ac

Zone ID
- 1.000 (17.52 ac)
- 2.000 (19.37 ac)
- 3.000 (18.00 ac)
- 4.000 (16.04 ac)
Tools: Satellite Imagery

- Picture of Productivity
  - Defines productive & non-productive areas
- History of Productivity
  - Multiple years of imagery
  - Shows variations from nature & man made
- Zones Created Quickly
- Use with Caution
Tool: Satellite Imagery

Ground Truth:

- Imagery shows areas of different productivity, but will not tell you why or how much productivity

- Shows you where to investigate
Satellite Imagery
Tools: Satellite Imagery

- Sources of Imagery (NDVI)
  - www.umac.org
  - Need additional software to analyze/process images
  - www.satshot.com
  - Online analysis
  - http://datagateway.nrcs.usda.gov/
  - The USGS—EarthExplorer
  - GK Technology: www.geektechforag.com
  - Others...
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 made
- Zones Created Quickly
  - With Good Data
Tools: Yield Data

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

- Industry Needs:
  - Data Management
  - Analysts / Processors
  - Equipment Support
Tools: Soil Survey

Soils over Yield

How accurate are the soil surveys to actual yield?

Depends upon area:
Some Good
Some Bad
Tools: Soil Survey

Soils over Yield

How accurate are the soil surveys to actual yield?

Depends upon area:
Some Good – Bad

Better than nothing, but are other tools better?
Tools: Comparisons

Soil Type & Yield / Soil Type & Veris / Soil Type & Multi-year Yield
Tools: Grower Input

- Most Important Tool for success
- Verification of Tools Used
  - Quality Control
- Modifications due to history & field knowledge
# Tools: Pros & Cons

<table>
<thead>
<tr>
<th></th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YIELD</strong></td>
<td>Quick Creation</td>
<td>Recording Errors</td>
</tr>
<tr>
<td></td>
<td>Actual Report Card</td>
<td>Poor Calibration</td>
</tr>
<tr>
<td></td>
<td>Normalize Multiple Years</td>
<td>Data Integrity</td>
</tr>
<tr>
<td></td>
<td><a href="#">Image</a></td>
<td></td>
</tr>
<tr>
<td><strong>IMAGERY</strong></td>
<td>Quick Creation</td>
<td>Cloud Cover</td>
</tr>
<tr>
<td></td>
<td>Multiple Years Data</td>
<td>Rotation/Varity Changes</td>
</tr>
<tr>
<td></td>
<td>Accessible 24/7</td>
<td>Yields Unknown</td>
</tr>
<tr>
<td></td>
<td><a href="#">Image</a></td>
<td></td>
</tr>
<tr>
<td><strong>EC (VERIS)</strong></td>
<td>Accurate Soils Map</td>
<td>Seasonal Mapping</td>
</tr>
<tr>
<td></td>
<td>Done Once</td>
<td>Yields Unknown</td>
</tr>
<tr>
<td></td>
<td>Easy Operation</td>
<td>Maintenance Needed</td>
</tr>
<tr>
<td></td>
<td><a href="#">Image</a></td>
<td></td>
</tr>
</tbody>
</table>
I have a Zone now what?

- 140-100-60
  - 36,000
  - $332

- 120-50-20
  - 24,000
  - $208

- 130-70-40
  - 32,000
  - $274/acre
Zones over Grids

The more information we have the better decision’s we can make!

Yield Goals

High Yield, Low Fertility = A lot of Fertilizer

Fertility

Low Yield, High Fertility = Little Fertilizer
Zone Grids / Smart Grids
Managing the Data

- I’ve created all this information now what?
- Organizational Nightmare
  - Sharing Files
  - Version updates
  - Permissions
Managing the Data

Where do I put it?
- Zone Base Data
- Zone Updates
- Soil Samples
- Recommendations
- Rx Files
Managing the Data

- Internal Server
Managing the Data

- External Share File Site
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?
- Pricing
  - Don’t give it away
  - Consulting Time
What’s needed in my toolbox

Questions to Ask:
- Coops & Retailers
- Farmer Clients
  - Equipment Used
- Support Packages
  - Cost
  - Availability
QUESTIONS?

Thank You!

Tim Moline
Centrol Crop Consulting
Marshall, MN
tmoline@centrol.com