Benefits of variable rate mapping and how to develop a prescription map using a variety of precision ag tools

Eric Odberg and David Barton
Genesee, ID
What we do at North Star Guidance Co.

• Partner with growers, be a member of their team:
  o Work with them to identify their needs/wants
  o Help develop/design their system
  o Custom-fit solutions and alternatives for their operation
    • Not a canned product
    • Avoid over-building or under sizing
    • Flexibility and useful life

• Available to keep them going in the heat of battle
  o Focus on 1 hour radius of Genesee, ID
  o Equipment/hardware, software, consulting, field service
Utilize Automation on the Farm

- Save Money – Reduce Waste/Overage
  - minimize overlaps & skips during:
    - spraying, fertilizing, seeding, and harvest
- Crop Damage
  - What is the wheat like in doubled-up fertilizer?
  - What happens when you double-up Beyond?
- Better Management
  - Watching the equipment/field instead of marker
- Increase Efficiency
  - fertilizer, seed and pesticides
- Manage Yield/Profitability Zones
  - Site specific management
- Efficiently utilize people, inputs and equipment
  - Leverage farmer/owner knowledge across more resources
- Better crops, better soil, better environment
Auto Steer
- Pays on straights - less on rugged areas

Auto Section *(if it squirts it should have this)*
- Pays on cut-up/point-rows/partial swaths
- Drills/seeder, fertilizer rigs, sprayers
  - Aqua, Sol 32, Thio/Phos – 3-9 sections
  - NH₃ - up to 6 sections with manifolds
  - Sprayers - 80-120’ booms with 7-12 sections

Auto Boom
- Ultrasonic ht controllers for suspended booms
- 3 or 5 sensor systems
• Automated Variable Rate (VR)
  o Fertilizer
    • rates
    • blends
  o Seed
    • rates
    • variety blending on-the-go
• No manual switching “oops”
Making Field VR Application

What you need:

1) Application Map
2) VRA capable rate controller/console
3) Delivery/application equipment
4) Experimental approach/mindset
5) Support
Making Field VR Application

- Usually need a “Shape File”:
  - 3 files actually make a “shape file”
    - *.shp, *.shx, & *.dbf

- Load shape file into console (each has own tricks)

- Application map is “geo-referenced”

- Console simply looks at GPS location in field
  - Changes target rate as indicated on map
Map has to be based on something:

- **Grower experience**
  - Hand drawn zones, still have to get to shape file format

- **Yield map(s)**
  - Hopefully combine(s) have calibrated Yield Monitors
  - Best indicator of actual yield
    - Potential problems with calibration, missing data, steep slopes, multiple combines, point rows and partial header swaths

- **Satellite Imagery**
  - Rapid Eye – 5 meter resolution
  - Land Sat – 30 meter resolution

- **Soil maps**
  - How accurate for productivity?
How make application map?

- **Must have Software:**
  - Trimble – Farmworks
  - AgLeader – SMS
  - SST – Summit
  - John Deere – Apex
  - Case – AFS
  - Others

- **Satellite Imagery**
  - SatShot
Joe and Jay Anderson – 1st to use in area
   - Saw at Midwest ag show
   - Looked worth trying
   - We became Dealer
   - Having great success
SatShot 30 meter LandSat Image
VRA from SatShot Image
Geo-referenced Soil Sampling
30-meter LandSat Image
5-meter RapidEye Image
15-zone from SatShot
4-zone VR Application Map
1) Application Map
What you need

1) Application Map

2) VRA capable rate controller/console
   1) May need to purchase unlock key for some controllers
VR Capable Console/Controller
What you need

1) Application Map

2) VRA capable rate controller/console

3) Delivery/application equipment
Delivery/Application Equip. Limitations

- **Granular**
  - Probably widest application range (from motor stall \(\rightarrow\) plugged up)

- **NH\(_3\)**
  - Wide application range only if pressurized

- **Liquid (conventional)**
  - Limited to \(\sim 25\% +/-\) mid-point application rate
    - i.e. 50 gpa midpoint with range of 37-63 gpa
    - Limited by orifice size and pressure range (~15-60 psi)

- **Liquid (\textit{N-Ject LF} PWM system)** Available from NSGC
  - Very wide application range - 25:1 rate range
    - i.e. 50 gpa midpoint with range of \(\sim 5-125\) gpa
  - NO orifice changing,…
    - Yep, you heard me….. NO orifice changing!
  - Wide rate range perfect for VR fertility
What you need

1) Application Map

2) VRA capable rate controller/console

3) Delivery/application equipment

4) Experimental approach/mindset
   1) VR use affects your risk. More? Less? Baby steps……
   2) Don’t expect answers from outside, trust your instinct
   3) Powerful tool, but takes more management
   4) There’s money to be made…….
1) Application Map

2) VRA capable rate controller/console

3) Delivery/application equipment

4) Experimental approach/mindset
   1) VR use affects your risk. More? Less? Baby steps……
   2) Don’t expect answers from outside, trust your instinct
   3) Powerful tool, but takes more management
   4) There’s money to be made……

5) Support
   1) Get help with technical stuff that would otherwise bog you down……
While the technology is mostly industry driven...

The innovation is largely Grower Driven!

North Star Guidance Co helps make it happen

However, more is better up to the point you overload your a**!
North Star Guidance Co.
A farming technology company

208-669-2366
www.NorthStarGuidanceCo.com
Dave@NorthStarGuidanceCo.com