

Kentucky USDA State Technical Committee

December 6, 2017

9:30 am

771 Corporate Drive, Lexington, Kentucky

9:30 a.m.	Welcome and Introductions	Amanda Moore Acting NRCS State Conservationist
9:45 a.m.	ACEP-WRE Geographic Area Rate Cap	Doug Hines NRCS Easement Acquisition Coordinator
10:00 a.m.	Fiscal Year 2017 Program Updates & FY 2018 Changes <ul style="list-style-type: none">• ACEP – WRE and WRP• CRP• EQIP• CSP• Current RCPP Implementation• ACEP-ALE	Reed Cripps NRCS Assistant State Conservationist Jacob Bowman Farm Service Agency Deena Wheby NRCS Assistant State Conservationist
11:30 a.m.	Wildlife Priorities Discussion	Casey Shrader NRCS Acting State Resource Conservationist
11:45 a.m.	Technology on the Farm and Using it to Make Better Decisions	Tom Daniel Security Seed & Chemical Company
12:15 p.m.	Comments/Announcements from Group	Group
	Wrap Up	Amanda Moore

Acronym List:

ACEP: Agricultural Conservation Easement Program

ACEP – ALE: ACEP – Agricultural Land Easement

ACEP – WRE: ACEP – Wetland Reserve Easement

RCPP – Regional Conservation Partnership Program

EQIP: Environmental Quality Incentives Program

CSP: Conservation Stewardship Program

CRP: Conservation Reserve Program

WRP: Wetlands Reserve Program

Determining ACEP-WRE Easement Compensation

The basis for the compensation offer is the lowest of the following:

- 1) Fair market value of the land, determined by appraisal or area-wide market analysis
- 2) Geographic area rate cap (GARC)
- 3) An amount voluntarily offered by the landowner

FY-2018 ACEP-WRE GARC

As in prior years, Kentucky uses Area-Wide Market Analysis values and appraisal values to establish easement offers in the state.

Relative to many of the surrounding states, We see a wide range in values for cropland in Kentucky.

Easement compensation for FY-2018 will remain unchanged from that used in FY-2017

Comments/input for establishing Geographic Area Rate Caps for FY-2019?



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Fiscal Year 2017 Program Updates

Kentucky State Technical Committee
December 6, 2017

Deena Wheby
Assistant State Conservationist for Programs

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Disclaimer!



The numbers shown in this presentation have been rounded and are for informational purposes.

They are not meant to be used for “official” agency numbers for use outside of this presentation.

Should official numbers be needed, please contact Deena Wheby.



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Fiscal Year 2017 Financial Assistance Programs Accomplishments



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FY 2017 Environmental Quality Incentives Program (EQIP) Total

- 850 contracts were entered
- More than \$16.7 million obligated
- More than \$4.7 million paid out (as of 12/5/17) (28%)
- **Unfunded Requests**
 - Approximately 1,000 applications
 - Estimated at more than \$20 million



FY 2017

Environmental Quality Incentives Program

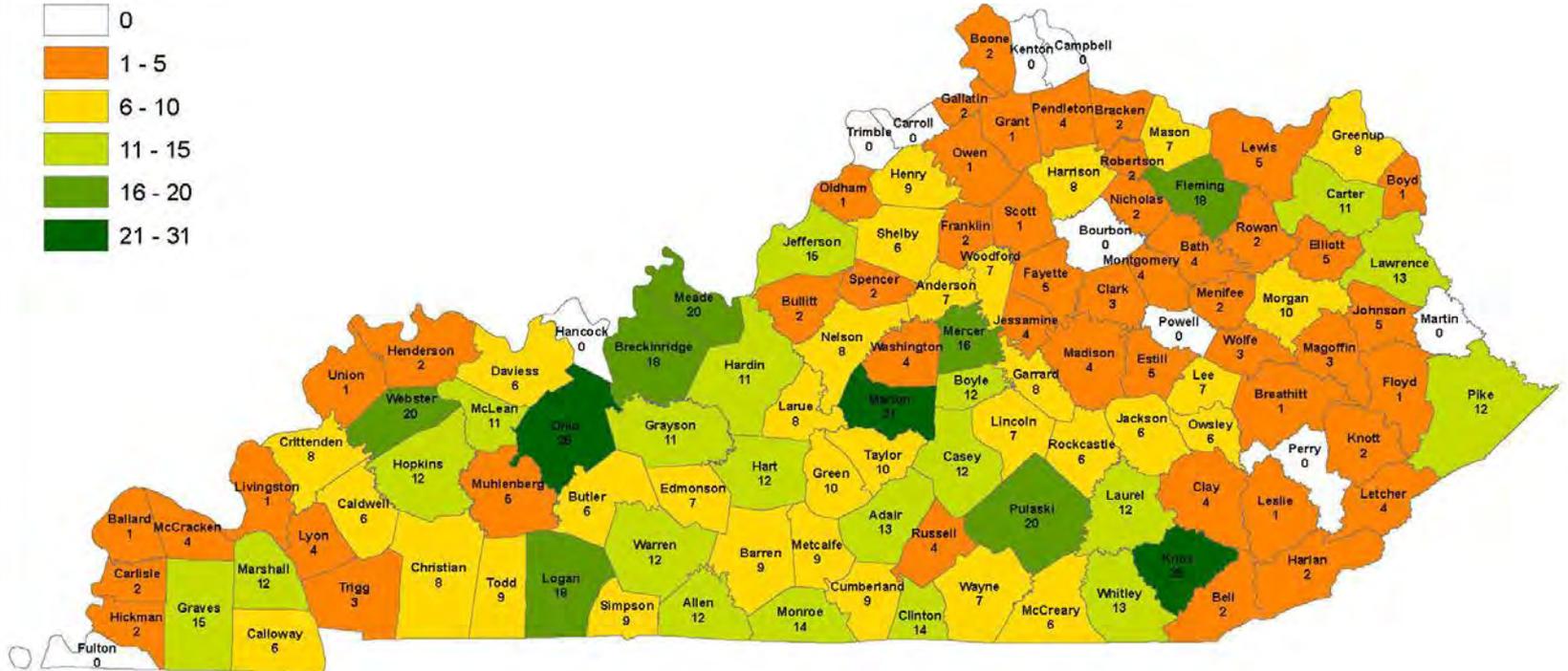
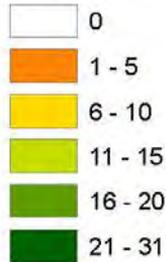
- Livestock percentage: 69.8 percent
 - Statute requires a nationwide 60 percent

- Wildlife percentage:
 - Statute requires 5 percent
 - Kentucky exceeded this
 - Wildlife + SEKESH = 6.4 percent

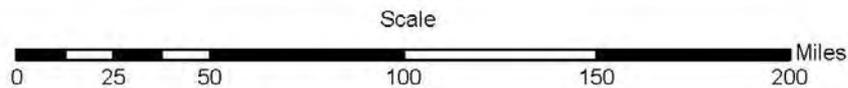


EQIP FY17 Obligated Contracts

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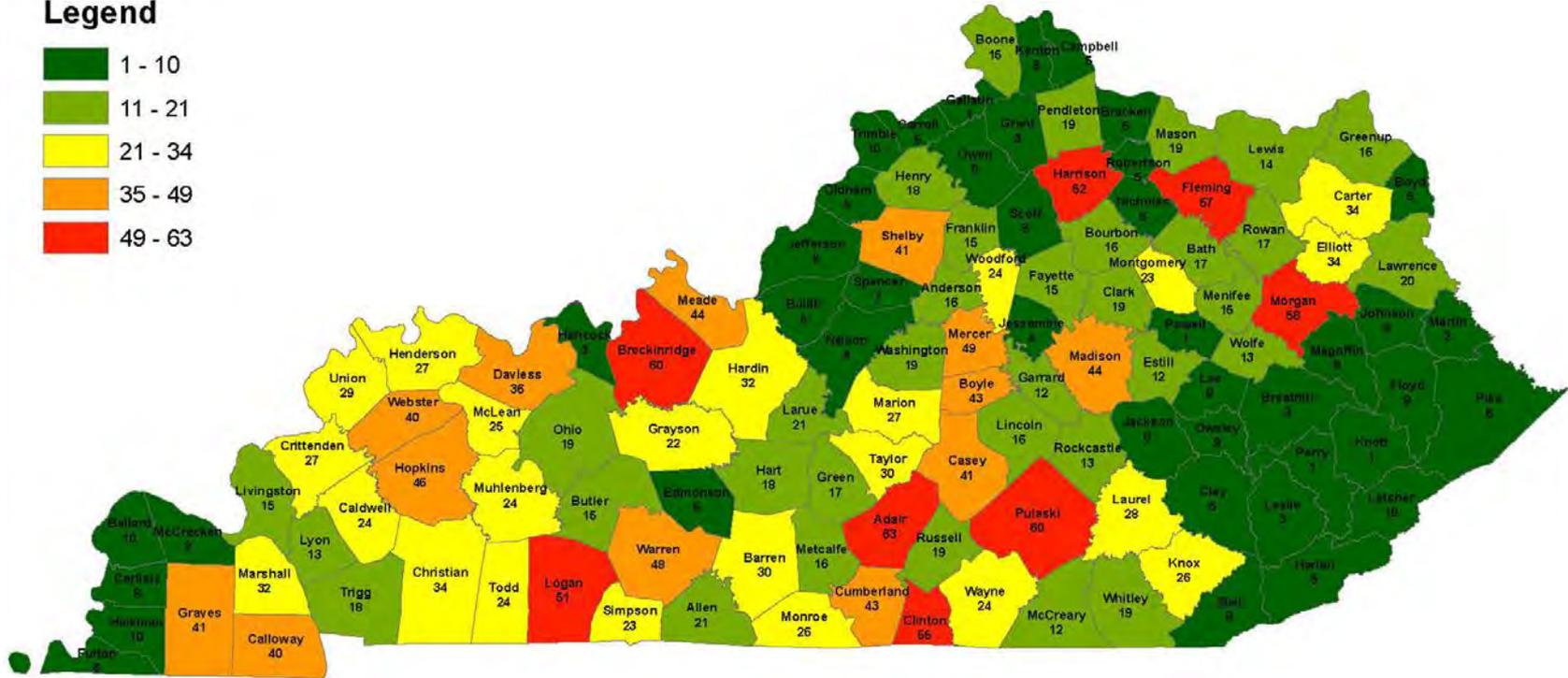
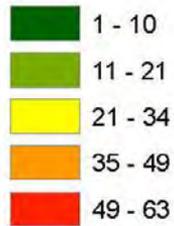


Date: November 2017



EQIP FY17 Unfunded Applications

Legend



Seasonal High Tunnels



NRCS Area	Contracts	Obligation
Area 1 (west)	59	\$564,000
Area 2 (central)	76	\$771,340
Area 3 (east)	62	\$777,600

Area Account Total:

- 197 contracts
- \$2.1 million

From ALL Accounts
(areas, organic, LRP, SD):

- 254
- \$2.325 million

Conservation Activity Plans (CAPs)

Type	Contracts	Obligation
CAP General *	59	\$115,000
CNMP	25	\$ 91,500

State CAP Total

(all accounts):

- 123 contracts
- \$ 296,500

* Includes Forestry (49), Grazing (6), Irrigation Water Management (3), Nutrient Management (1)

* Does not include Energy (28) and Organic Transitioning (11)

- Additional \$90K

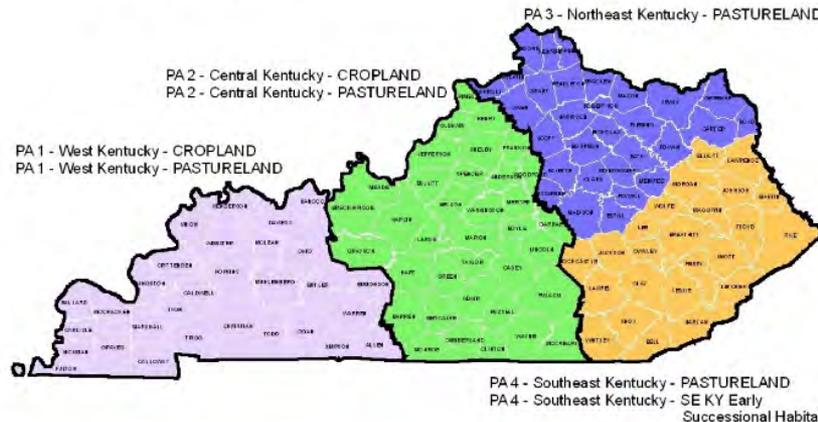


General EQIP



Pooling Area	Contracts	Obligation
PA 1 West KY - Cropland	16	\$ 544,600
PA 1 West KY - Pastureland	21	\$ 663,200
PA 2 Central KY - Cropland	23	\$ 884,500
PA 2 Central KY - Pastureland	19	\$1,216,700
PA 3 Northeast KY - Pastureland	21	\$ 633,500
PA 4 Southeast KY - Pastureland	25	\$ 200,650

Map of Pooling Areas



Historically Underserved



Subaccount	Contracts	Obligations
Beginning Farmer	38	\$ 2,090,150
Limited Resource Producer	30	\$ 962,800
Socially Disadvantaged	34	\$ 486,000

Historically Underserved from All Accounts

Customer Category	Contracts	Obligations
Beginning Farmer	293	\$ 5,613,700
Limited Resource Producer	40	\$ 1,035,000
Socially Disadvantaged	40	\$ 688,000

Because some participants meet more than one HU category, total of individuals is 350 for \$7 million





Forestland

Subaccount	Contracts	Obligations
Statewide Forestland	78	\$954,300

Wildlife

Subaccount	Contracts	Obligations
Statewide Wildlife	38	\$450,300

Southeast Kentucky Early Successional Wildlife Habitat

Subaccount	Contracts	Obligations
SEKESH	61	\$592,125





Energy

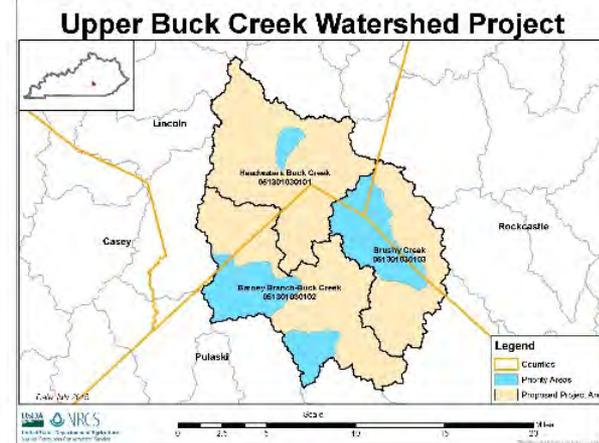
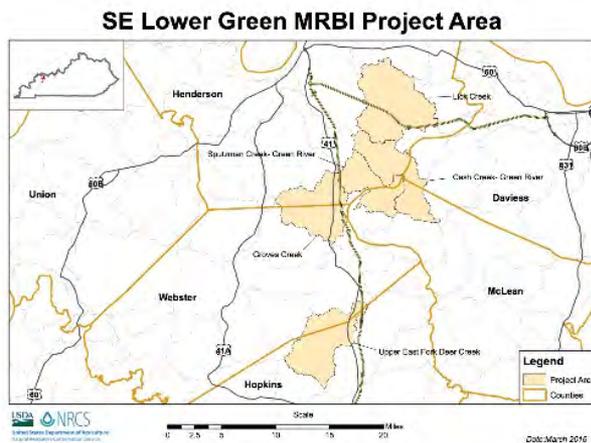
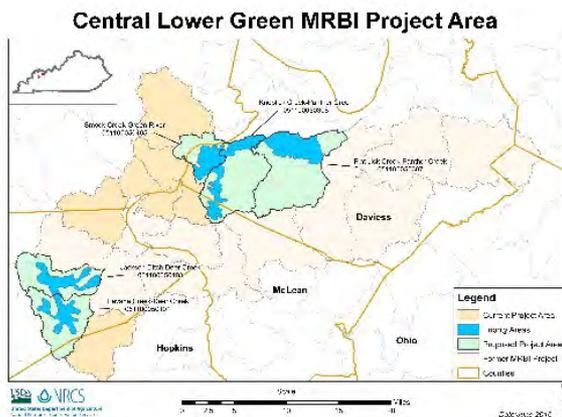
Subaccount	Contracts	Obligations
Energy (including CAPs)	39	\$ 1,401,100

Organic

Subaccount	Contracts	Obligations
Organic Certified	3	\$ 78,675
Organic Transitioning (including CAPs and SHTs)	27	\$ 258,750

Mississippi River Basin Healthy Watersheds Initiative (MRBI)

Subaccount	Contracts	Obligations
MRBI Central Lower Green	5	\$ 209,500
MRBI SE Lower Green	11	\$ 552,500
MRBI Upper Buck	9	\$ 191,000



Regional Conservation Partnership Program (RCPP) FY 2017 EQIP Contracts

- **Managing Poo**
 - 10 contracts
 - \$500,000
- **Seeding Ground Cover on Marginal Lands**
 - 4 contracts
 - \$26,000
- **Overgrazing & Soil Degradation on Horse Farms**
 - 3 contracts
 - \$ 100,000



FY 2017 Environmental Quality Incentives Program (EQIP) Total

- 850 contracts were entered
- More than \$16.7 million obligated

- Top dollar practices in FY 2017:
 - Seasonal High Tunnel Systems (\$2.3 m)
 - Fence (\$2.27 m)

 - Practices > \$1 m
 - Forestland Improvement (\$1.12 m)
 - Cover Crops (\$1.092 m)
 - Pipeline (\$1.048 m)
 - pipeline & tanks > \$2 m (1,300 on 400 contracts)
 - Forage/Biomass Planting (\$1 m)



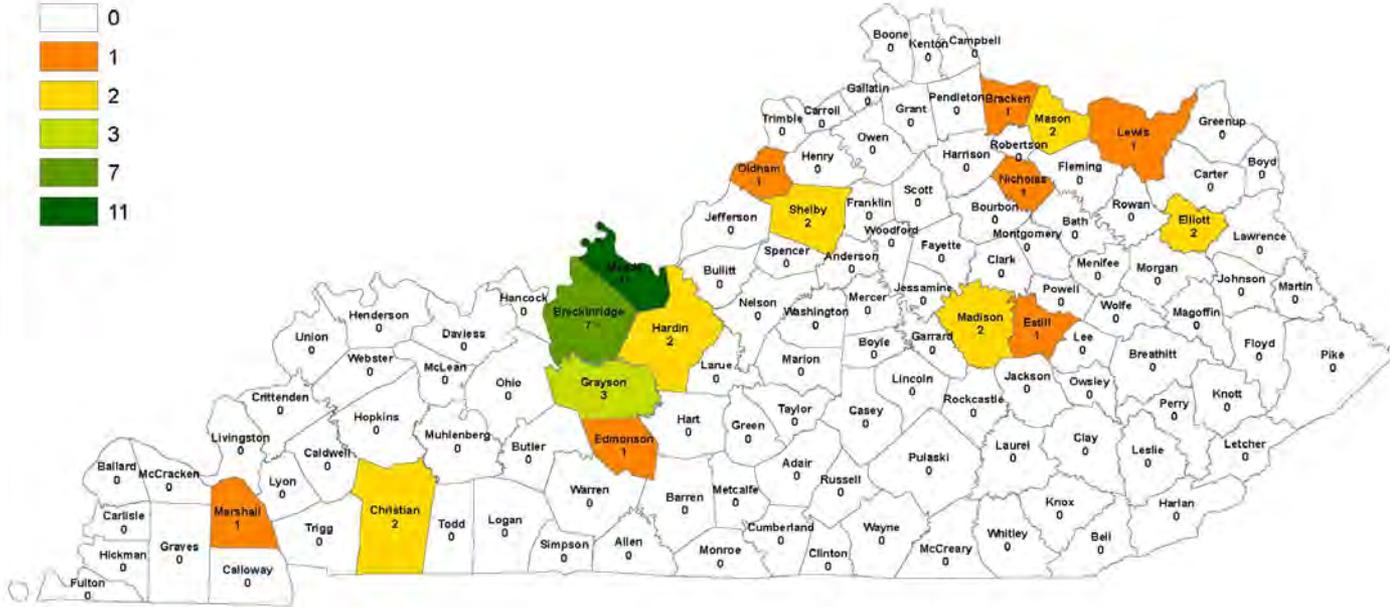


Conservation Stewardship Program (CSP)

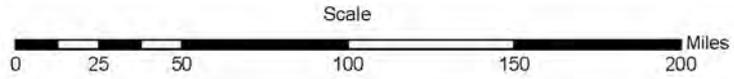


CSP FY17 Renewals

Legend



Date: November 2017



FY 2017 Renewal Contracts

- 40 contracts
- 22,400 acres
- \$500,000 annual obligation
- 5 year contracts
- Funded all eligible renewal requests.

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Total CSP FY 2017 Obligations

- **137 Contracts**
- **60,400 acres**
- **Approximately \$1.5 million annual obligation**
- **All are five year contracts**



Total Active EQIP and CSP Contracts (all years)

- **EQIP: 1,156**
- **CSP: 532**
- **319,600 acres receiving conservation treatment in these active contracts**

Total EQIP and CSP Contracts (all years since 2002)

- **15,525 contracts**
- **Obligation of almost \$203 million**
 - **Payments of more than \$176 million**
- **1.6 million acres treated**



FY 2017 Agricultural Conservation Easement Program – Agriculture Land Easement (ACEP-ALE)

Nine conservation easements closed in FY 2018 (perpetual easements)

➤ **973 acres, \$1.5 million federal share**

- Fayette County Rural Land Management Board
 - 7 easements
 - 786 acres
 - \$1,282,120 federal share
- Scott County Rural Land Management Board
 - 1 easement
 - 63 acres
 - \$110,000 federal share
- Compatible Lands Foundation
 - 1 easement
 - 124 acres
 - \$120,000 federal share



FY 2018 ACEP-ALE



- Application cut-off date expected in early 2018
- Applications accepted from eligible entities (not directly from landowners to NRCS, however land owners must meet USDA eligibility)
 - An agency of any **state or local government** or Indian Tribe, or certain **nongovernmental organizations** that preserve lands, protect habitat, etc.
 - Authority to purchase and hold agricultural conservation easements.
 - **Have an established farmland protection program** that purchases conservation easements for the purpose of protecting either of the following:
 - The agriculture use and future viability and related conservation values of eligible land by limiting nonagricultural uses of that land
 - Grazing uses and related conservation values by restoring and conserving eligible land
 - Demonstrated a commitment to the long-term conservation of agricultural lands
 - The **authority and capability to acquire, manage, and enforce agricultural land easements** or their equivalent.
 - **Staff capacity** (either directly or through formal agreement with other entities) dedicated to monitoring and easement stewardship.
 - The **availability of funds** at the time of application sufficient to meet the eligible entity's contribution requirements for each parcel proposed for funding.
 - The ability to meet the requirements of the program.





Questions??





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Fiscal Year 2018

 **EQIP**
Changes



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FY 2018 EQIP Information & Changes

FY 2018 Allocation to date: \$16.7 million

2018 Batching Periods

(“Regular EQIP” – does not include RCPP)

➤ First Application Batching Period

- November 17, 2017
- May be only batching period for regular EQIP
 - Will have additional RCPP cut-offs
 - Certain fund accounts (initiatives, others) may have additional cut-offs

➤ Interim deadlines for eligibility and for ranking

➤ Obligation Deadlines

- March 30, 2018
 - High Tunnel Accounts, CAP Accounts, On-Farm Energy Account
- June 29, 2018
 - All remaining accounts

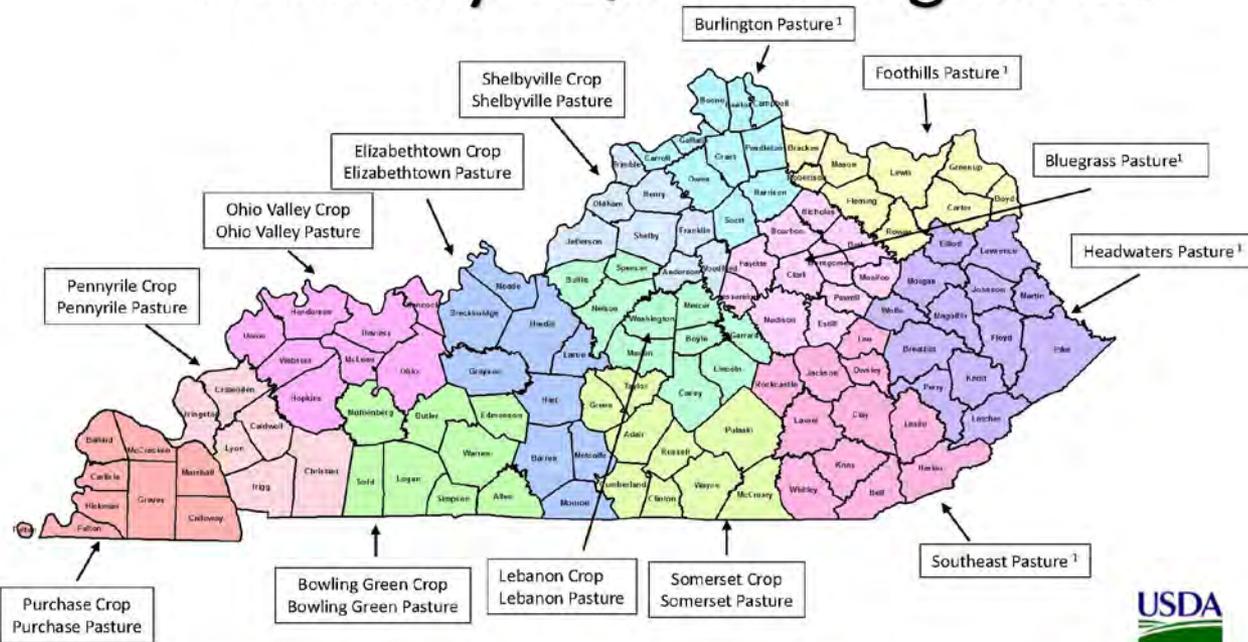


2018 EQIP Changes

Fund Account Changes

- Work Unit Pooling Areas vs. Area-wide Pooling Areas

Kentucky EQIP Pooling Areas



¹ Counties that offer either a Crop or Pasture Pooling Area, but not both, still accept applications from both land uses. All applications will be ranked together.

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Plans for FY 2019

Use Local Work Groups' input for the local questions portion of the ranking.

Ranking Points Distribution:

- National Questions: 25%
- State & Local Questions: 65% with at least 25% to Local
- Efficiency Score: 10%

Local workgroups will need to meet this summer to discuss priorities for their counties in order for us to include their priorities in FY 2019 ranking.

Conservation Districts to take the lead, but hope you or your representative will be involved at the local level!

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2018 EQIP Changes



Two New Fund Accounts

1) Irrigation Water Management

- Statewide account
- Objective is to address irrigation efficiency of EXISTING irrigation systems on cropland
- All applicants will need to meet the statutory EQIP Irrigation History Requirements
 - Two out of last five years
- Not applicable to microirrigation in High Tunnels
- Is applicable to row crop irrigation systems
- Most beneficial for operators who have an Irrigation Water Management Plan

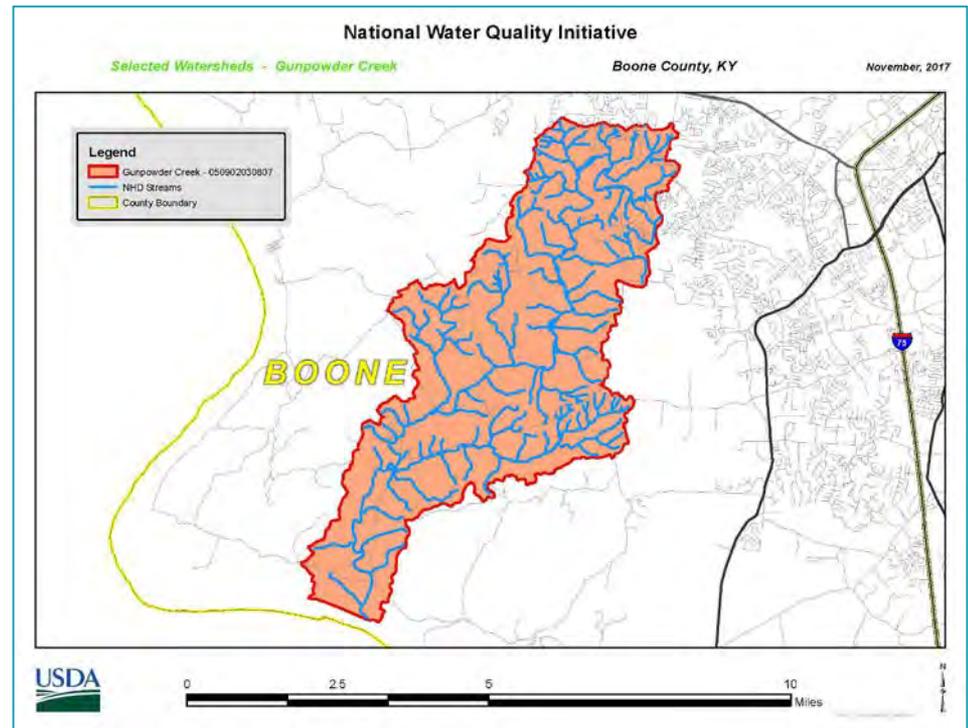


2018 EQIP Changes



2) Gunpowder Creek NWQI

- This is Kentucky's fourth NWQI watershed
- NWQI in partnership with Kentucky Division of Water
- Located in parts of Boone County
- Was part of a national planning pilot in FY 2017



2018 EQIP Changes

Screening and Ranking Applications

- Screening is used to manage workload
 - Puts applications into a High, Medium or Low category
 - We typically only rank and fund the Highs in most categories

- In FY 2017, we almost didn't have enough high/ranked applications to utilize our funding
 - Decision was made for FY 2018, for most accounts, to have only a high and a low priority.
 - Generally, a low priority will be assigned to applicants who, in the last two years, have:
 - » Had an NRCS contract terminated/cancelled due to circumstances within their control, and/or
 - » Behind schedule on an existing contract after being modified or provided additional time (and not due to NRCS error or design delay or weather, and/or
 - » Practices installed with NRCS financial assistance not being maintained for practice lifespan



2018 EQIP Changes



Practice Changes

➤ New Eligible Practices

- Irrigation Pipeline (430)
- Irrigation Reservoir (436)
- Sprinkler System (442)
- Reminders:
 - Documented Irrigation History must be provided before we can plan any irrigation practices
 - An increase in irrigation efficiency (water savings) must be documented before we can provide financial assistance for irrigation practices

➤ Practice Lifespans

- High Tunnel System increased to 5 years
- Watering Facility decreased to 10 years





Questions??





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Regional Conservation Partnership Program (RCPP)



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What is RCPP?



Established in the 2014 Farm Bill, the Regional Conservation Partnership Program (RCPP) promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements.

A Request for Proposals is published annually and project submissions come from various groups/entities.

Assistance is **delivered in accordance with the rules of EQIP, CSP, ACEP and HFRP**; and in certain areas the Watershed Operations and Flood Prevention Program.





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2018



RCPP-EQIP Active Agreements



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Quick Look by Year

FY 2015 Agreements

- Managing Poo
- Cerulean Warbler

FY 2016 Agreements

- Precision Conservation Management
- Ground Cover on Marginal Lands
- Horse Overgrazing

FY 2017

- Seasonal Extension for Eastern Kentucky (SEEK)
- Lake Cumberland RCPP (Wayne County)
- Forestry CAPs
- Agricultural Conservation Easements Program – Ag Land Easements

FY 2018

- Proposals have been evaluated and are awaiting national review and approval



Applicable to All Projects



- Dollar amounts shown on the following slides represent financial assistance dollars that will go to producers through EQIP contracts (or other programs as noted).
- In most cases (not all), there is also associated technical assistance funding that goes to the partner(s) to help implement the project.
- In all cases, the partners identified a “significant contribution” in the way of additional technical, financial, administrative, or other assistance.
- All projects have a continuous application period, but cut-off dates (“batching periods”) are identified so all eligible applications received may be evaluated.



Managing Poo – Adoption of Nutrient Management and Conservation Practices

- **Purpose:** Educational and conservation practice initiatives for landowners who may be facing regulatory action by the state due to water quality issues. The primary concern is reducing nutrient loading and sediment deposits in the waters of Kentucky due to livestock operations on private lands.
- **Partners:**
 - Kentucky Division of Conservation (lead partner)
 - Kentucky Dairy Development Council
 - Kentucky Cattleman's Association/Kentucky Beef Network
 - University of Kentucky College of Agriculture, Food, and the Environment
- **Location:** Statewide

Funding available through EQIP and State Cost Share

- \$1,268,040 EQIP financial assistance for life of project
- \$ 2.5 million State Cost Share available
- 10 contracts have been entered under EQIP for \$500K
- State cost-share has done several CNMPs

FY 2018 Batching Periods

- November 17
- January 19
- March 16
- May 18



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Cerulean Warbler Appalachian Forestland Enhancement



- **Purpose:** Enhance forest habitat for Cerulean Warblers and associated species, and demonstrate a positive response for these. Restore approximately 1,000 acres of reclaimed mine land to biodiverse forest, including American Chestnut plantings.
- **Partners**
 - Appalachian Mountain Joint Venture (American Bird Conservancy)
 - Working on their behalf in Kentucky is Kylie Schmidt (University of Kentucky)
- **Location:** Multi-state (Appalachian portions of the following states):
 - WV, PA, MD, WV
 - OH, KY
- Only available for southeast Kentucky counties on reclaimed mined land

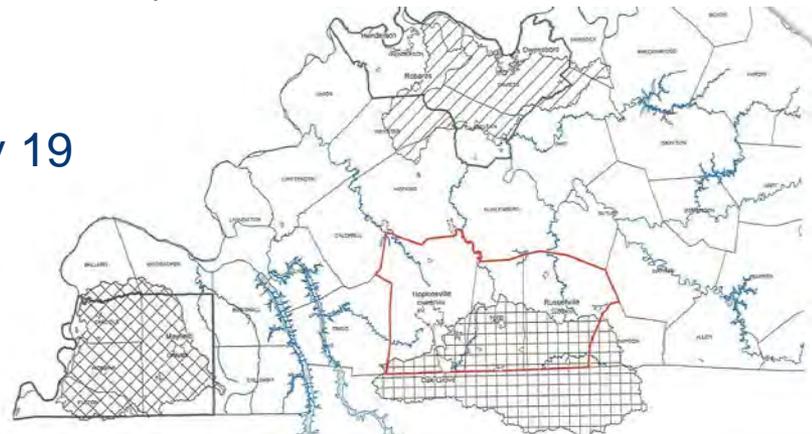


- Total project EQIP financial assistance: \$5,088,252
 - **Kentucky funding** (through 5/5/2020): Estimated \$272,000
 - Have obligated one contract for \$31,000 which leaves \$227,000 remaining
- **FY 2018 application batching periods:**
 - November 17, 2017
 - March 16, 2018



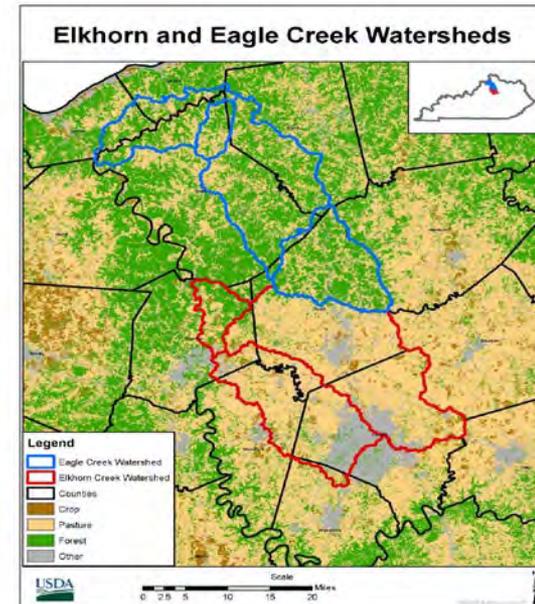
Precision Conservation Management

- **Purpose:** The project will focus on applying Precision Nutrient Management and other cropland conservation practices throughout high intensity cropland areas in Illinois and Kentucky.
- **Partner:**
 - Illinois Corn Growers Association (lead)
 - Hired Chris Stewart to assist in Kentucky (located in Lyon County CD office)
- **Location:** Includes counties in Illinois and Kentucky (MRBI focus areas)
 - Carlisle, Christian, Daviess, Fulton, Graves, Henderson, Hickman, Logan, McLean, Todd
- Will begin financial assistance (EQIP and CSP) in FY 2018
- Funds available for Kentucky (total through FY 2020):
 - EQIP: \$456,000
 - CSP: 20,000 acres
- FY 2018 application batching period: January 19



Scott County Conservation District Ground Cover on Marginal Lands

- **Purpose:** Convert highly erodible (HEL) cropland to grass
- **Partners:**
 - Scott County Conservation District (lead)
 - Other SWCDs in the project area
- **Location:** Elkhorn and Eagle Creek Watersheds
- **Funding:** \$300,000 EQIP through 9/30/2020
- 4 contracts obligated for \$26,000
 - Have already applied \$20,000 of practices
- **FY 2017 application batching periods:**
 - November 17
 - Others TBD



Overgrazing and Soil Degradation on Horse Farms

- **Goal:** Introduce small horse farms to the importance of rotational grazing and pasture management.
- **Partner:** University of Kentucky Research Foundation
 - UK will be writing Grazing Management Plans and also helping to make NRCS practice standards more equine-friendly
- **Location:** Statewide
- **Funding:** \$296,909 (through 9/30/2020) EQIP to implement recommendations in the grazing plans.
- EQIP FY 2017 – three contracts entered for \$100K
 - These are intended to be demonstration farms
- FY 2018 application batching periods:
 - October 20th
 - December 15th
 - March 16th





New RCPPs for This Year



Lake Cumberland RCPP

- **Purpose:** The project will focus on improving water quality degradation within the Lake Cumberland Watershed by promoting a diverse suite of conservation practices that address resource concerns associated with grazing and cropping operations.
- **Partner:** Wayne County Conservation District
- **Eligible Area:** Wayne County
- **EQIP funding available:** \$220,000
- **FY 2018 application batching periods**
 - December 15th
 - April 20th

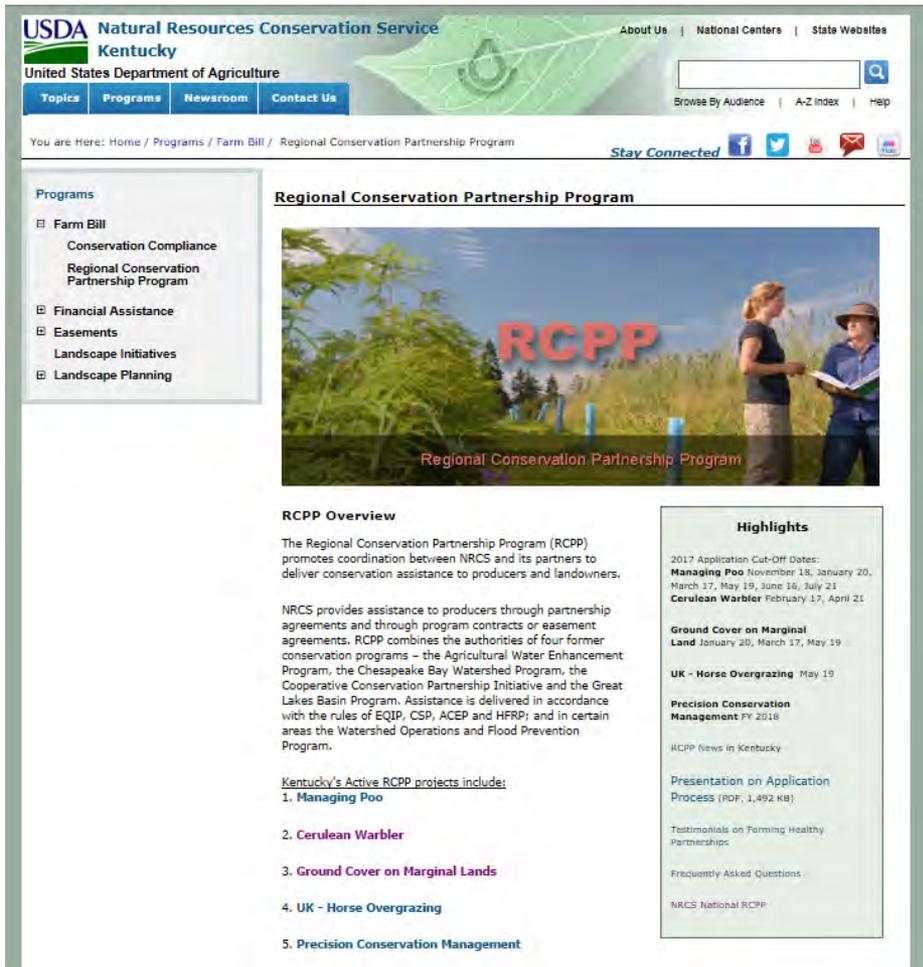
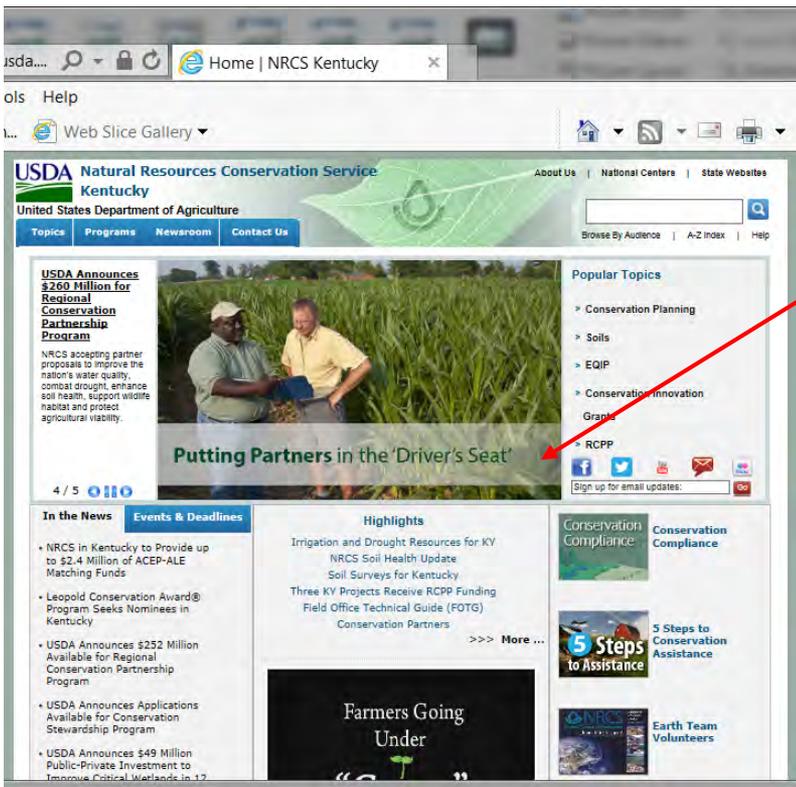


Ft. Campbell Private Lands Initiative

- **Purpose:** To prevent urban encroachment from interfering with military training activities occurring at Fort Campbell Army Base; preserve working farmland for permanent protection; and protect water quality by limiting industrial, commercial, and residential development as well as creating riparian buffers along streams on targeted lands; protect wildlife habitat.
- **Partners:** Compatible Lands Foundation, Ft. Campbell (DOD)
- **Program:** Agricultural Conservation Easements Program – Ag Land Easements (ACEP-ALE)
- **Location:** In vicinity of Fort Campbell
- **Funding:** \$ 766,379 ACEP



More information on the web



Go to Kentucky's NRCS homepage and under "Popular Topics", click on "RCPP"





Will there be an FY 2019 RCPP opportunity?

- **The 2014 Farm Bill identified availability of funds for RCPP for fiscal years 2014 through 2018.**
- **Depends on what happens with the Farm Bill.**





Questions??

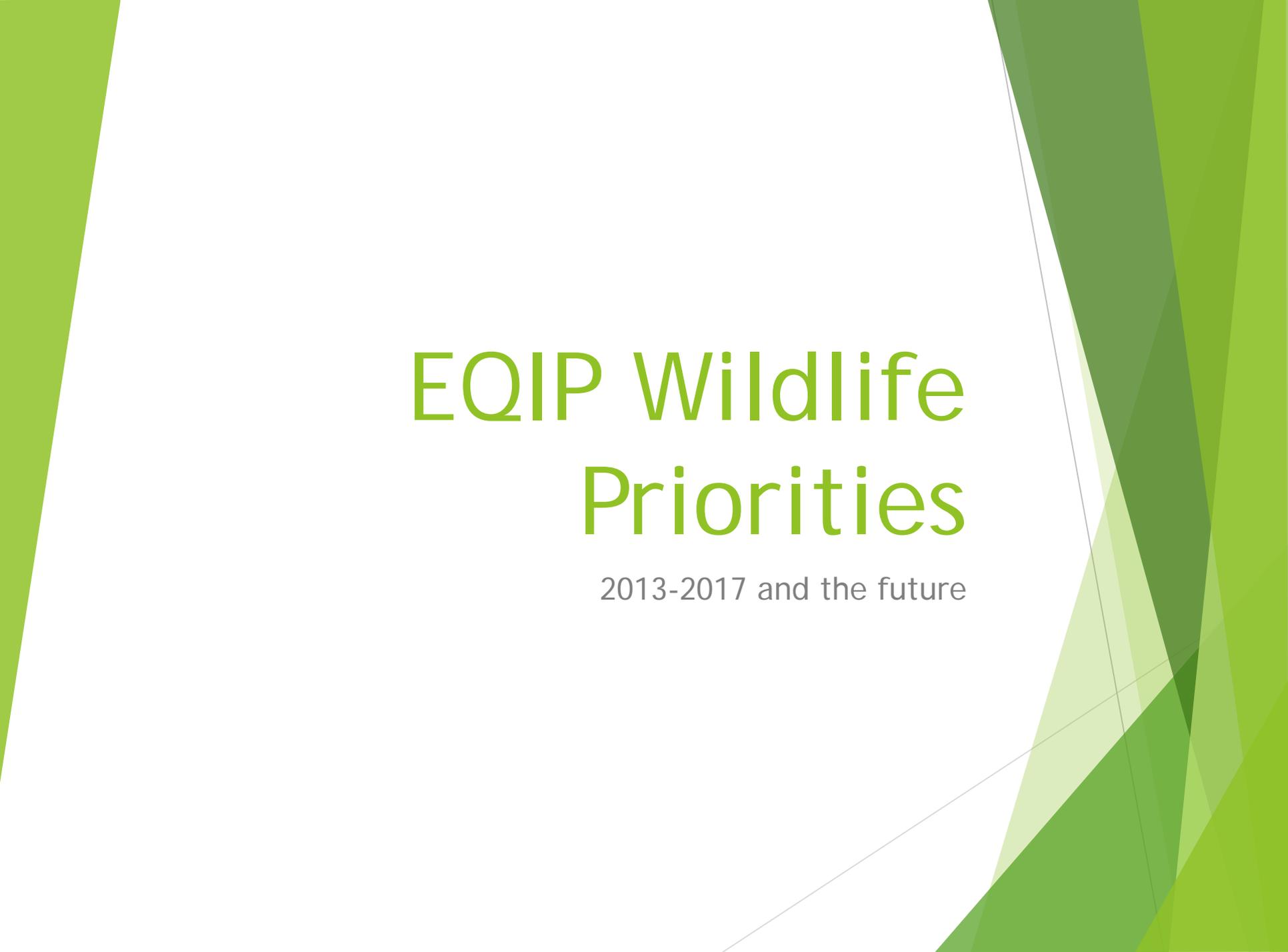




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EQIP Wildlife Priorities

2013-2017 and the future

EQIP WILDLIFE PRIORITIES

Top Funded Wildlife Oriented Conservation Practices 2013-2017	Funds Obligated	Extent
Forest Stand Improvement (666)	\$3,911,879.8	16,129 ac
Brush Management (314)	\$1,313,687.5	8,506 ac
Conservation Cover (327)	\$788,981.2	2,125 ac
Early Successional Habitat Development and Management (647)	\$453,360.1	987 ac
Tree & Shrub Site Preparation (490)	\$431,739.1	3,888 ac
Forest Management Plan (CAP 106)	\$210,295.3	1,305 no
Wetland Creation (658) - <i>Ephemeral Pools</i>	\$158,923.9	35 ac
Tree & Shrub Establishment (612)	\$111,876.6	274 ac
Herbaceous Weed Control (315)	\$79,811.7	1,031 ac
Riparian Forest Buffer (391)	\$57,955.0	77 ac

EQIP WILDLIFE PRIORITIES

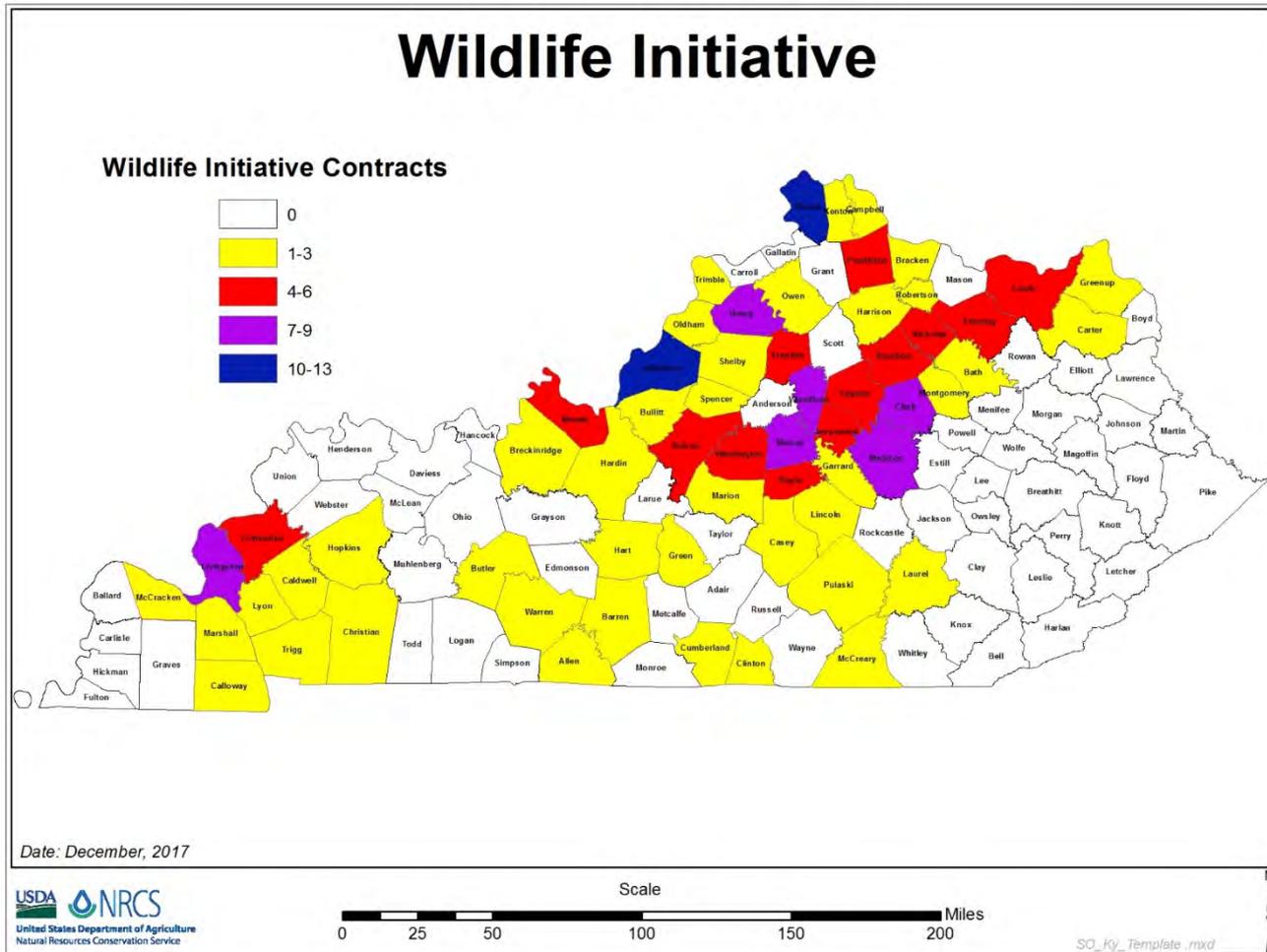
General Wildlife Fund

- ▶ Native Warm Season Species and Forb Establishment
- ▶ Pollinator Habitat
- ▶ Invasive Species Control
- ▶ Ephemeral Pools
- ▶ Restoration of Sensitive Ecological Communities *

Activity

ITEM	AVG/YR.	5 YR. TOTAL
Funds Obligated	~\$526 K	~2.6 Million
Acres	~14,200	71K
Contracts	~41	203

EQIP WILDLIFE PRIORITIES



EQIP WILDLIFE PRIORITIES

Southeast KY Early Successional Habitat Initiative (SEKESH)

- ▶ Conservation Cover
- ▶ Early Successional Habitat Management
 - ▶ Patch Clear-Cut
 - ▶ Edge feathering
- ▶ Timber Stand Improvement
- ▶ Other wildlife practices similar to general EQIP

Activity

ITEM	AVG/YR.	5 YR. TOTAL
Funds Obligated	\$~300 K	~\$1.5 million
Acres	~8,600	~43K
Contracts	~37	182

EQIP WILDLIFE PRIORITIES

Forestland Initiative

- ▶ Forestry Plans (CAP106)
- ▶ TSI
- ▶ Brush Management
- ▶ Tree Planting

Activity

ITEM	AVG/YR.	5 YR. TOTAL
Funds Obligated	~\$735 K	~\$3.7 million
Acres	~15,600	~78 K
Contracts	90	454

EQIP WILDLIFE PRIORITIES

- ▶ Items to consider going forward
 - ▶ Are these objectives meeting the needs of clients/agencies and stakeholders?
 - ▶ Are the objectives/initiatives still relevant or need to be expanded, contracted or discontinued?
 - ▶ Are there other target communities/species/ecosystems that should or need or could be addressed?
 - ▶ Are we being effective with implementation? (shotgun method?)
 - ▶ Is our marketing/outreach for wildlife sufficient; and how could it be improved?
 - ▶ Are there other partners/NGOs, JVs that can assist?

EQIP WILDLIFE PRIORITIES

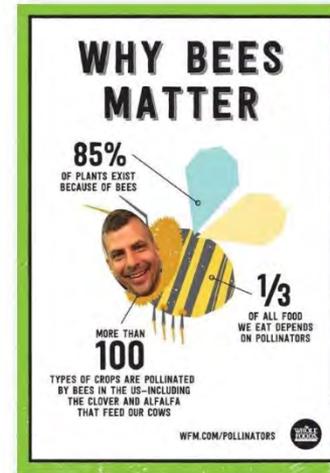
- ▶ Current subcommittee members (?) - KDFWR, TNC, USFWS, KSNPC, KDF
- ▶ Propose the reconvening of the wildlife subcommittee to review:
 - ▶ New Opportunities for Membership (JV, DOW, DOC, etc)
 - ▶ New or Revised species/habitats
 - ▶ Additional/Revised Focal Areas
 - ▶ Input to revision of ranking high priority objectives

QUESTIONS

Casey Shrader
NRCS State Biologist

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Office: 859 224-7372



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Using Technology To Make Informed Decisions

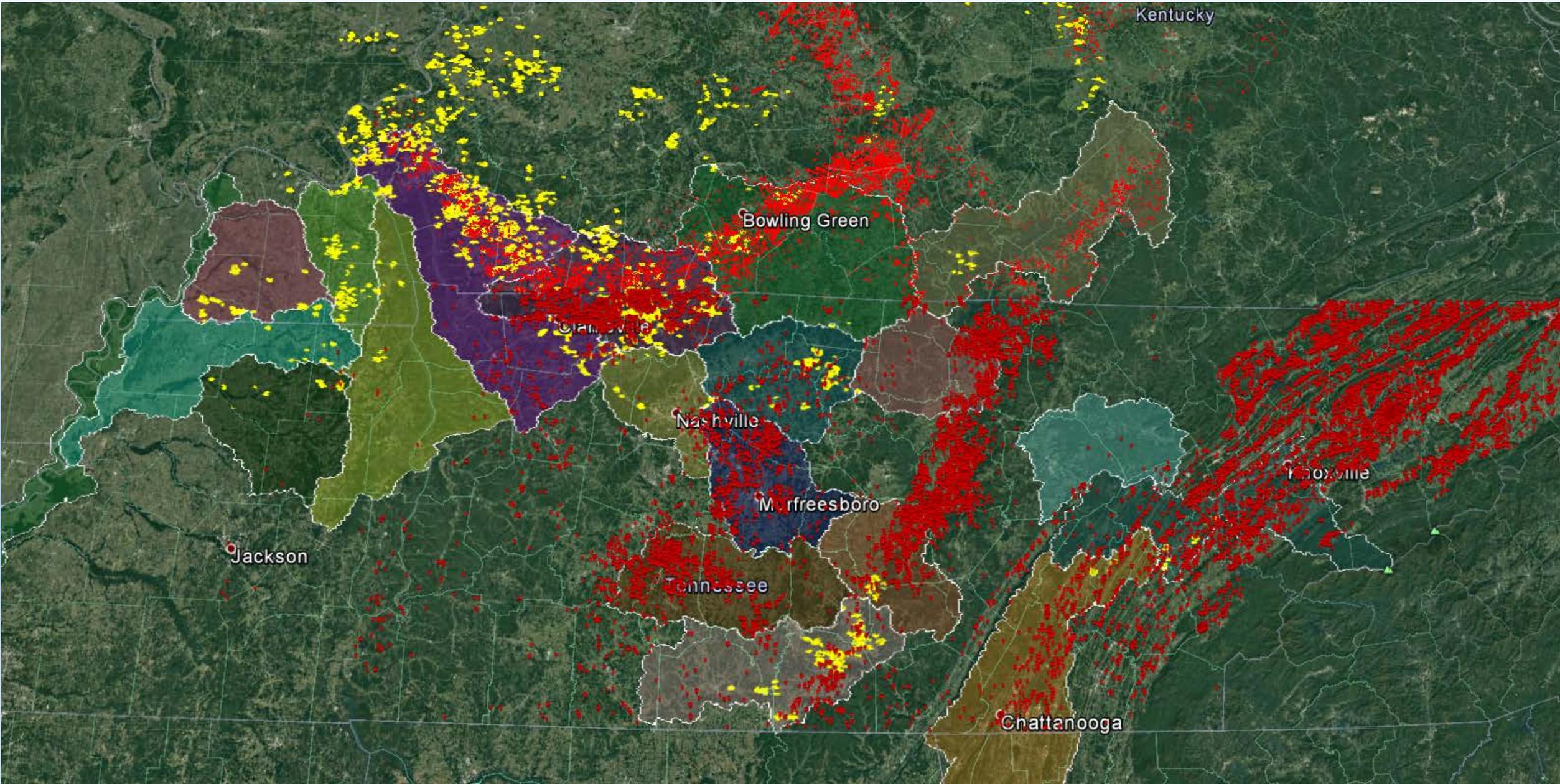
- Present New Technology and Agronomic Practices that Stewart the Land and Increase the Efficacy of Fertility. Provides Similar Yields With Less Lbs./A (Increase Profitability of The Grower)
- Win, Win, Win

Overview

- Zone Management
- Banded Fertility Technology / In-Furrow
 - Increases the efficiency of Fertilizers
- Variable Rate Technology VRT
 - Phosphorous
 - Nitrogen
- Split Application N
 - Meeting Nutrient Demand Curve
- Imagery
- Cover Crops
- NO SILVER BULLET

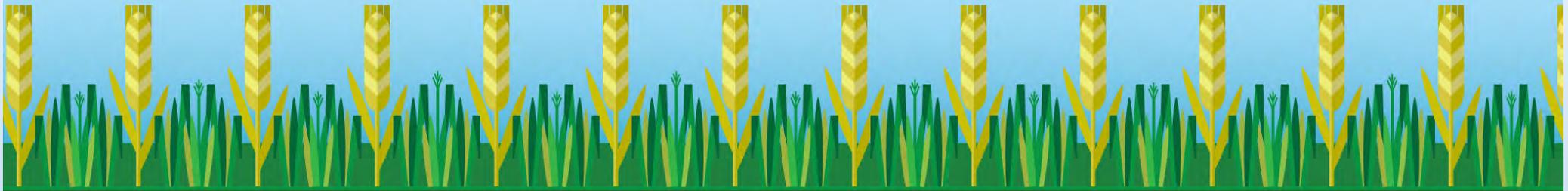
RED = Sinkholes

YELLOW = SSC Precision Ag Presence and Influence



4Rs OF NUTRIENT STEWARDSHIP

Economically, Environmentally & Socially Sustainable Crop Nutrition



The 4Rs promote best management practices (BMPs) to achieve cropping system goals while minimizing field nutrient loss and maximizing crop uptake.

4R Principles of Nutrient Stewardship



RIGHT SOURCE

Matches fertilizer type to crop needs.



RIGHT RATE

Matches amount of fertilizer to crop needs.



RIGHT TIME

Makes nutrients available when crops need them.



RIGHT PLACE

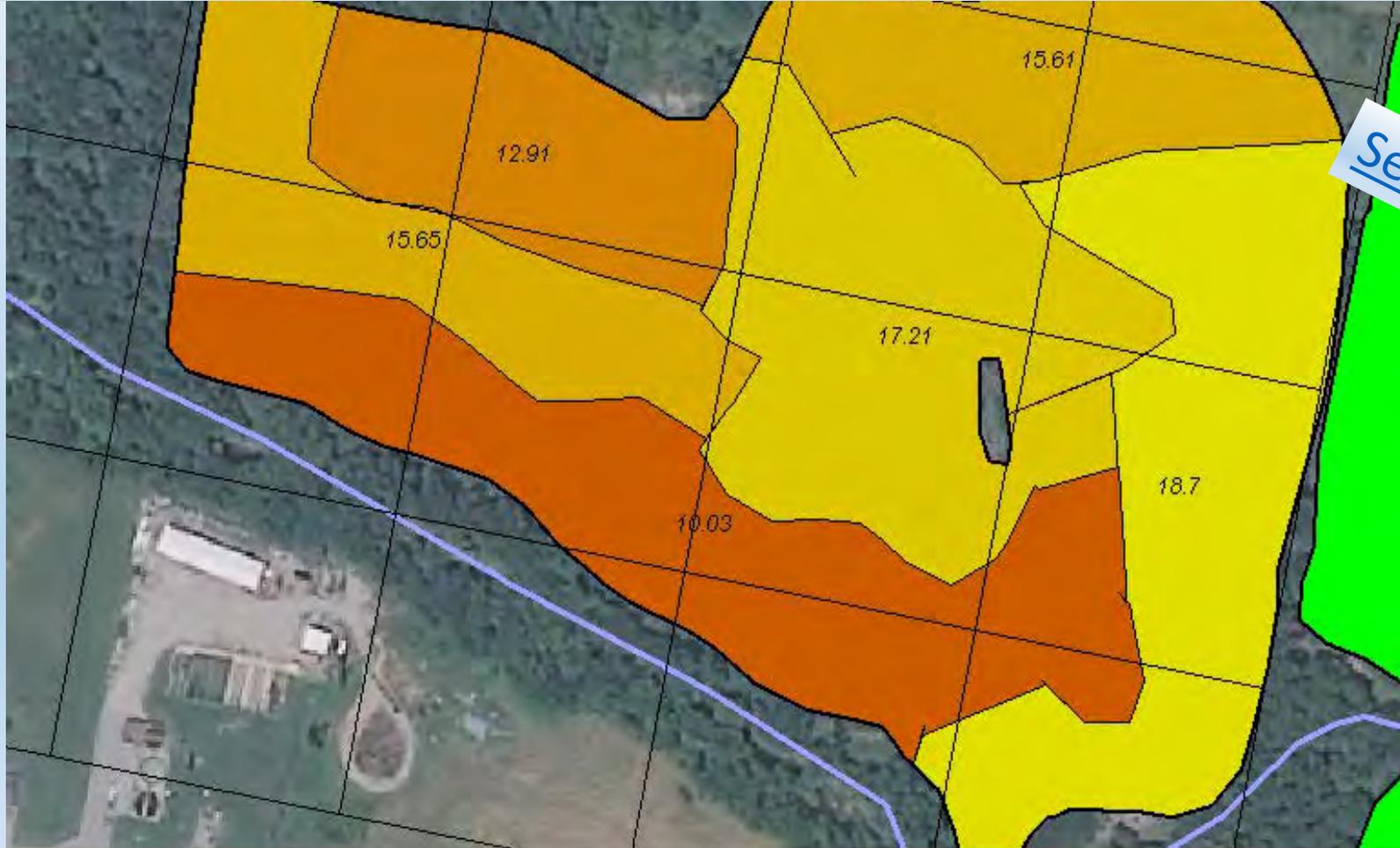
Keeps nutrients where crops can use them.

Zone Management

- Group Similar Soil Types and Yield Capacities Together
- Targeting the **Right input** , the **Right form** of Input at the **Right rate** to meet the **spatially** and **temporal** demands across the field in a environmentally sensitive manner.
 - Fertility Management Zone
 - Yield Productivity Zone

Zones vs. Grids

Grids are not reflective of true in-field variability of soil texture and/or yield changes .
Which makes matching inputs to production needs since it's meant only for soil sampling efforts and not true nutrient management.

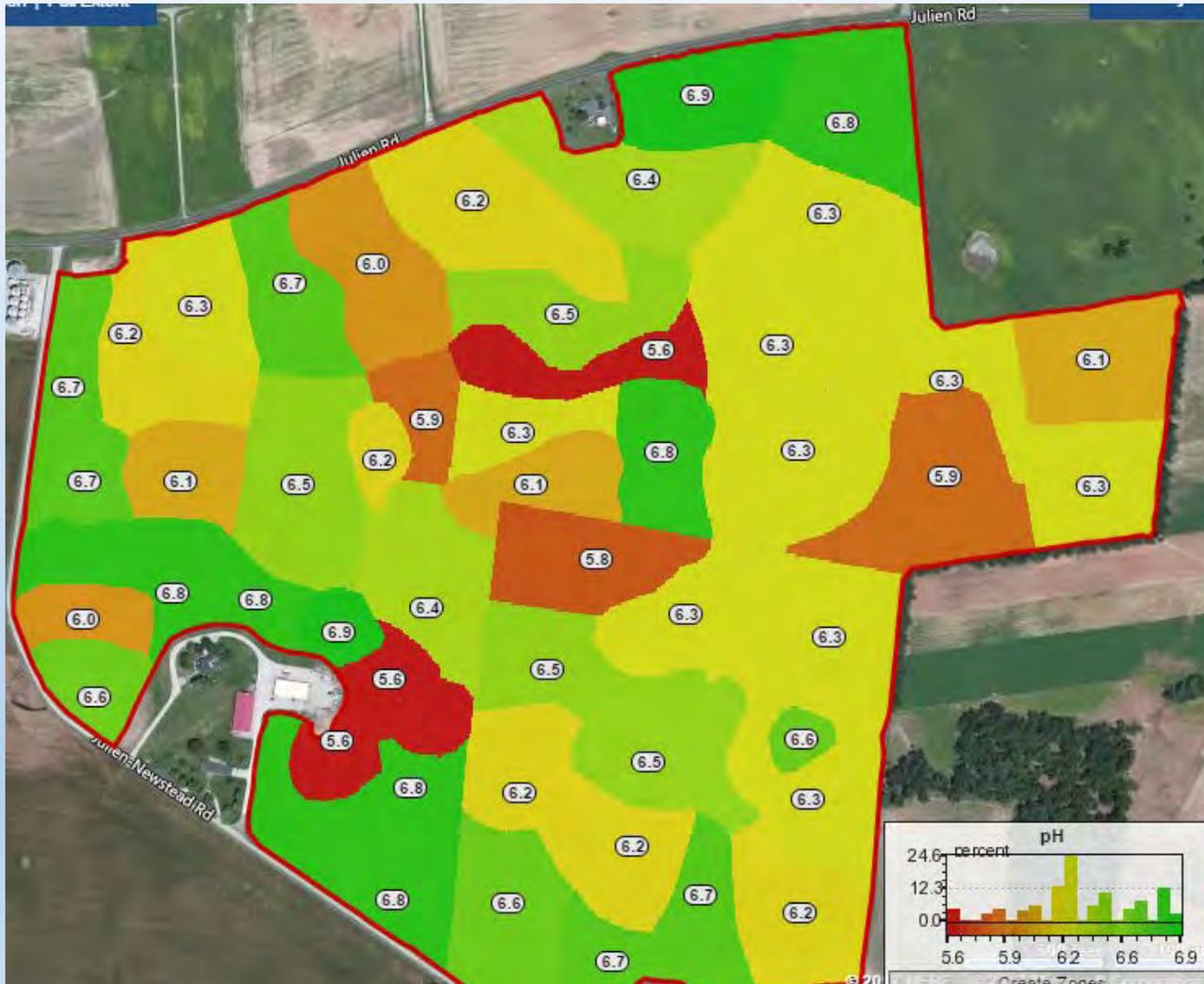


SeKure Crop Solutions 360



<https://vimeo.com/148144211>

Precision Soil Sampling



Action

Sampling Summary:
 Date: 2016-12-14
 Type: Soil
 Lab: Waters KY
[Lab Report](#)
 Layer ID: A216950923

Interpolation Method: Kriging

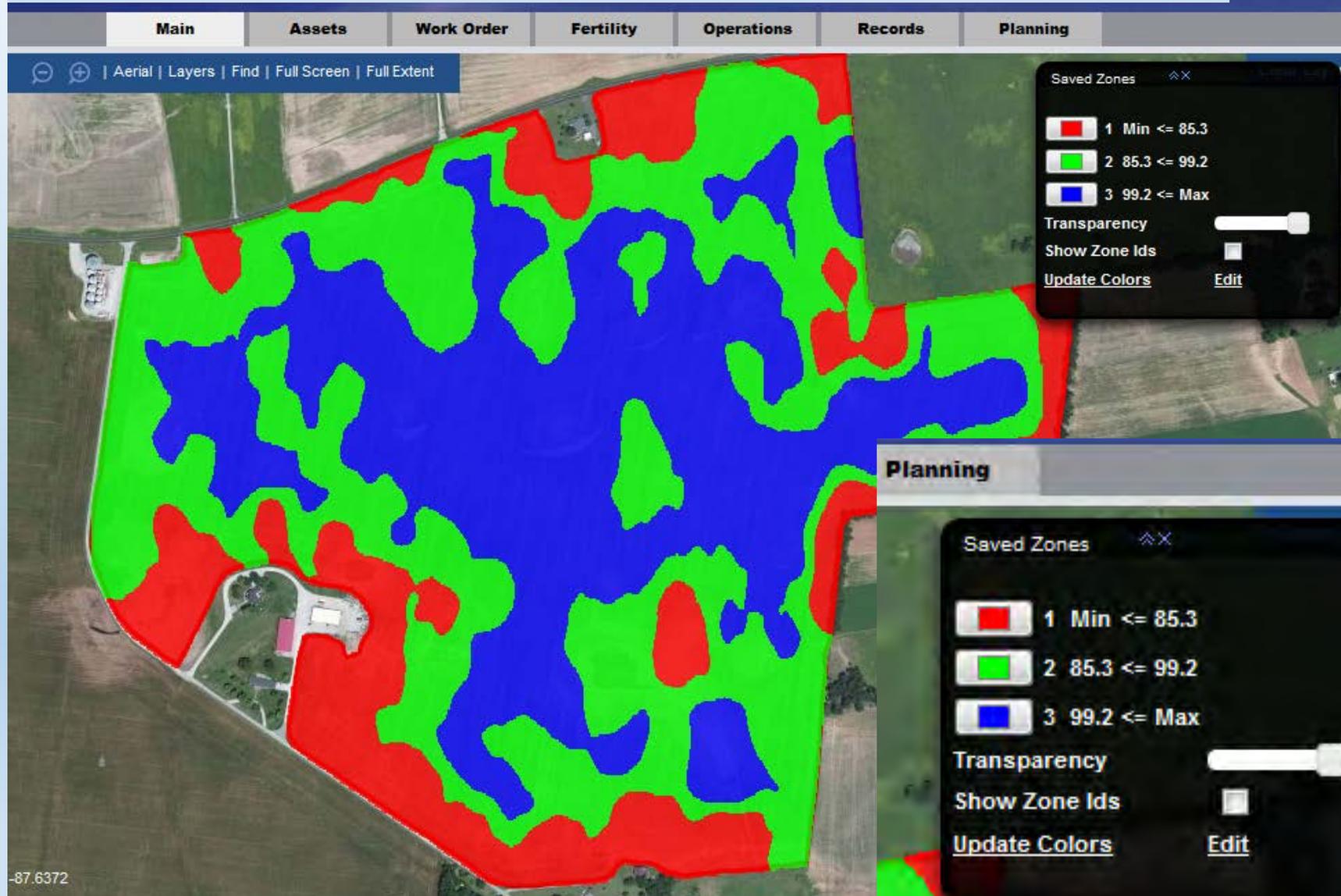
Point Map	Element	Min	Max	Avg
<input type="radio"/>	ID			
<input type="radio"/>	P	24.0	201.0	95.8
<input type="radio"/>	K	296.0	737.0	431.3
<input type="radio"/>	Mg	193.0	371.0	263.5
<input type="radio"/>	Ca	2529	5317	3624
<input type="radio"/>	S	15.0	29.0	20.6
<input type="radio"/>	B	0.5	1.2	0.7
<input type="radio"/>	Cu	2.9	11.6	5.0
<input type="radio"/>	Fe	196.0	469.0	264.6
<input type="radio"/>	Mn	208.0	555.0	409.8
<input type="radio"/>	Zn	2.7	17.9	6.7
<input checked="" type="radio"/>	pH	5.6	6.9	6.4
<input type="radio"/>	bpH	7.6	7.8	7.7
<input type="radio"/>	OM	1.5	2.1	1.9
<input type="radio"/>	CEC	10.1	17.7	12.9
<input type="radio"/>	%K	3.1	6.1	4.3
<input type="radio"/>	%Mg	6.8	10.9	8.6
<input type="radio"/>	%Ca	59.8	79.2	70.1
<input type="radio"/>	%H	8.5	25.9	17.1
Lab Rx: NO CROP				
Point Map	Element	Min	Max	Avg
<input type="radio"/>	Lime	0.0	2945	616.9
<input type="radio"/>	N	0.0	0.0	0.0



- 4-6 Acre Zones
- Sample every 2-4 years
- Zone based on
 - *Historical Yield*
 - *Veris EC*
 - *Topography*
 - *Previous Crop History*
 - *Imagery*
- *Zones created to delineate field into zones that are like kind yield and like kind soil type*

Precision Zone Soil Sampling and VRT fertilizer application matches the variable fertility demands across the field without over applying while maintaining or raising yields. Each zones fertility rate is directly calculated to the predictable yield capability of that zone.

Determining Yield Potential of Zones



Mutli-Year Yield Normalization

helps us make sense out of those confusing maps and turn them into a bases to build management zone maps.

Banded Fertility Technology

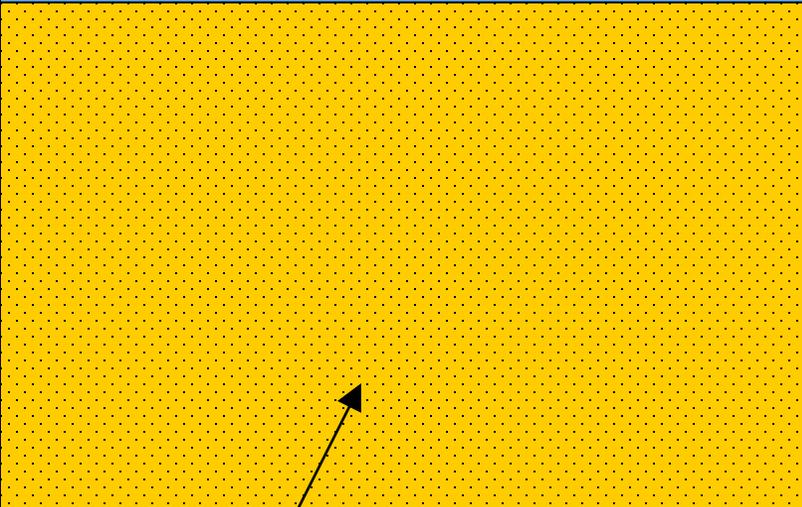
- Banded Fertility – Increases the concentration of an product in an specific area
- Efficiency is increased the closer the fertility is to the seed
 - Surface banded
 - Strip-Till
 - 2x2 Banded
 - Directed In-Row Banded
 - In-Furrow Banded (Planter Applied)
 - Most efficient because directly In the furrow
 - Has to have low salt index and safe for the seed

Effect of Fertilizer Application Method on Soil N and P

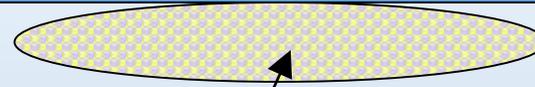
Broadcast & Disked

Surface Banding

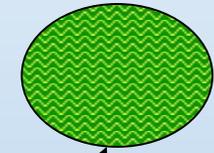
Root Zone Banding



11 ppm N
19 ppm P



750 ppm N
128 ppm P

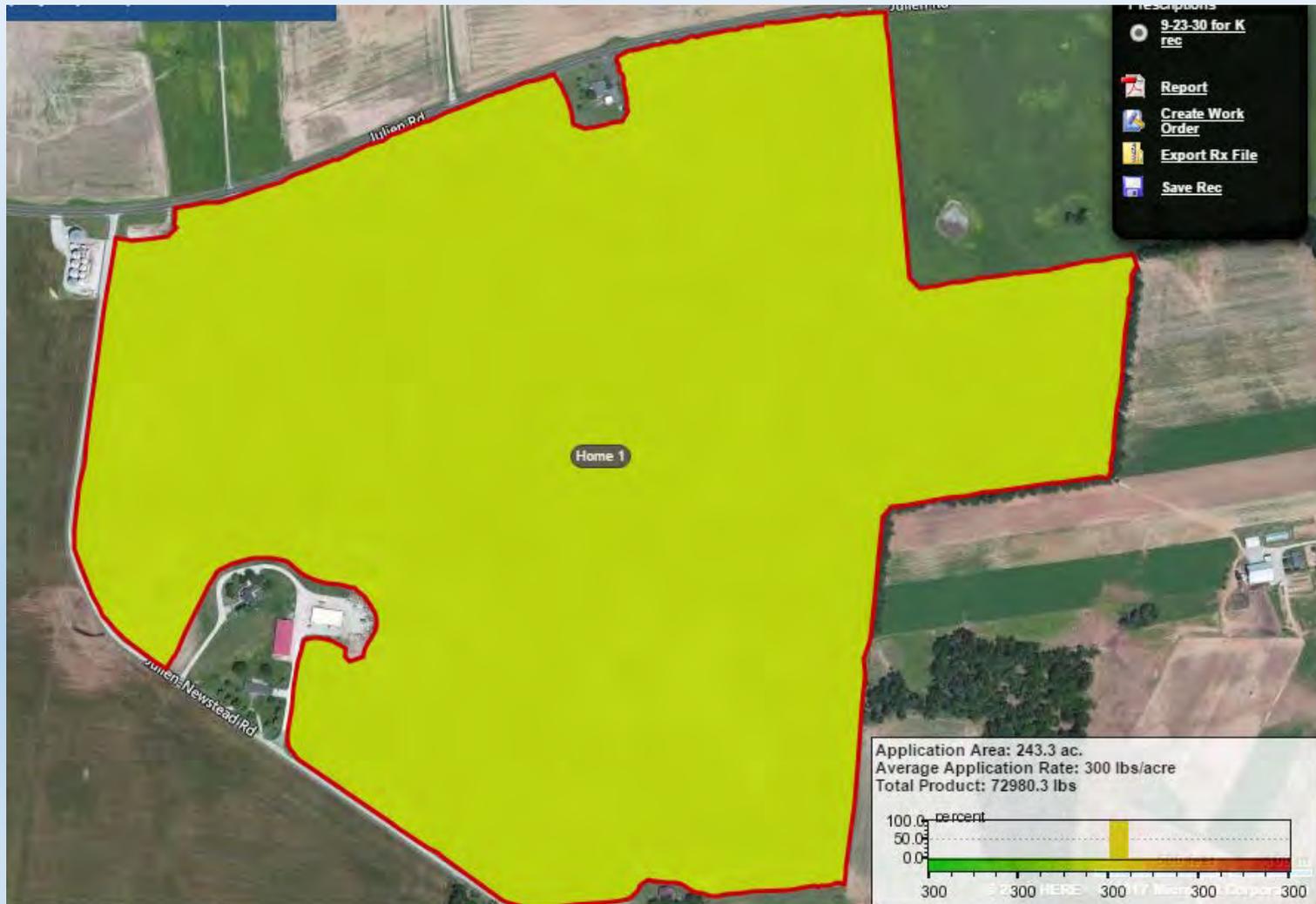


6,200 ppm N
1,200 ppm P

Application Rate: 100 lb N & 40 lb P₂O₅ per acre

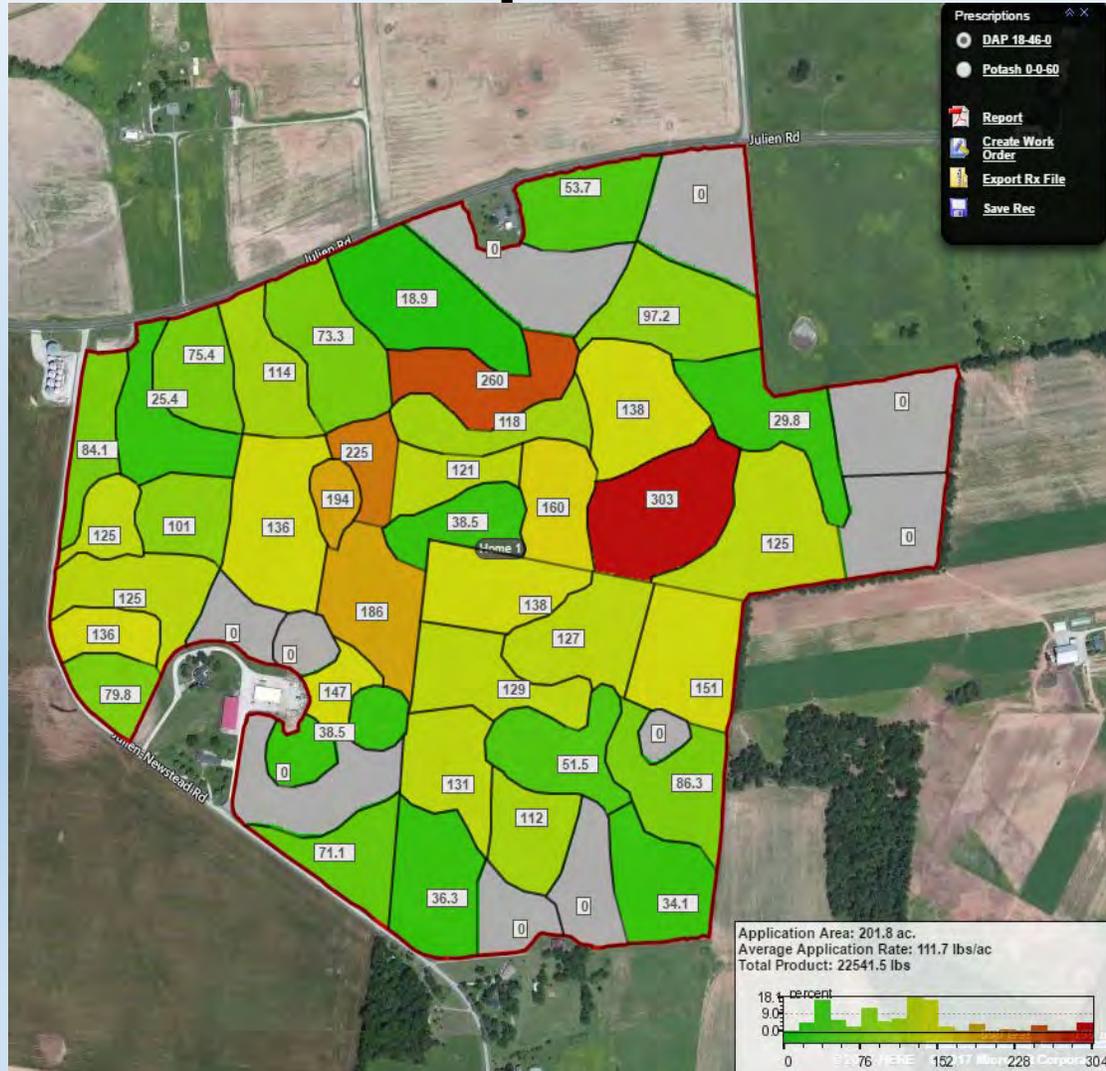
Source: Fluid Journal, Vol. 6, No. 3, 1998.

Common Fertility Program *300#/AC 9-23-30*



- Applied regardless of soil test results
- Ignores the soils ability to hold applied fertility
- 9-23-30 Blend 150lbs DAP (18-46-0) 150lbs MOP (0-0-60)
- Applying 69 actual pounds of Phosphate per acre
- Total applied Phosphate to this field id **16,767lbs**

VRT Phosphorous Variable Rate

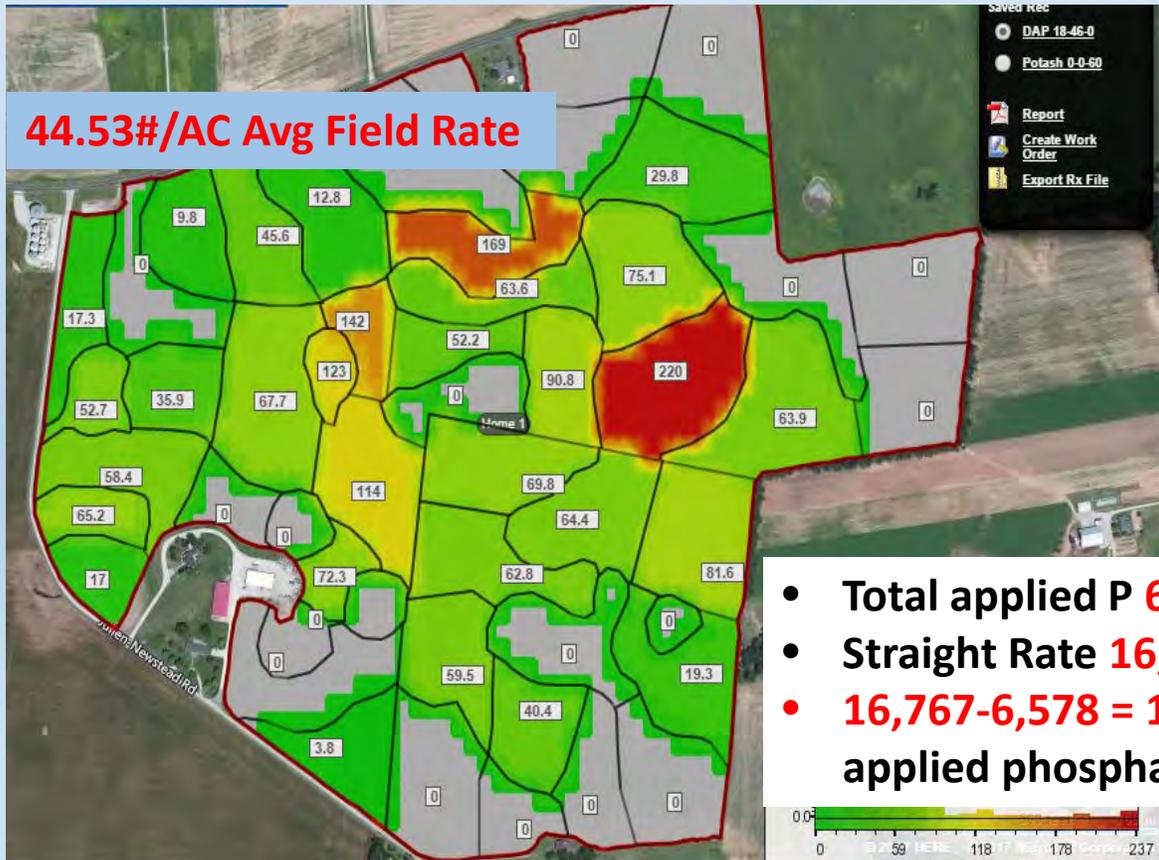


- VRT Phosphorous is more efficient and keeps from over applying in areas that can't hold or that are already high in P.
- Average rate of DAP (18-46-0) in this field is 111.7 lbs/acre
- That's 51 lbs actual P/acre
- Total applied Phosphate to this field is **12,393 lbs**
- That is **$16,767 - 12,393 = 4,374$** less pounds of phosphate applied to this field than compared to the straight rate

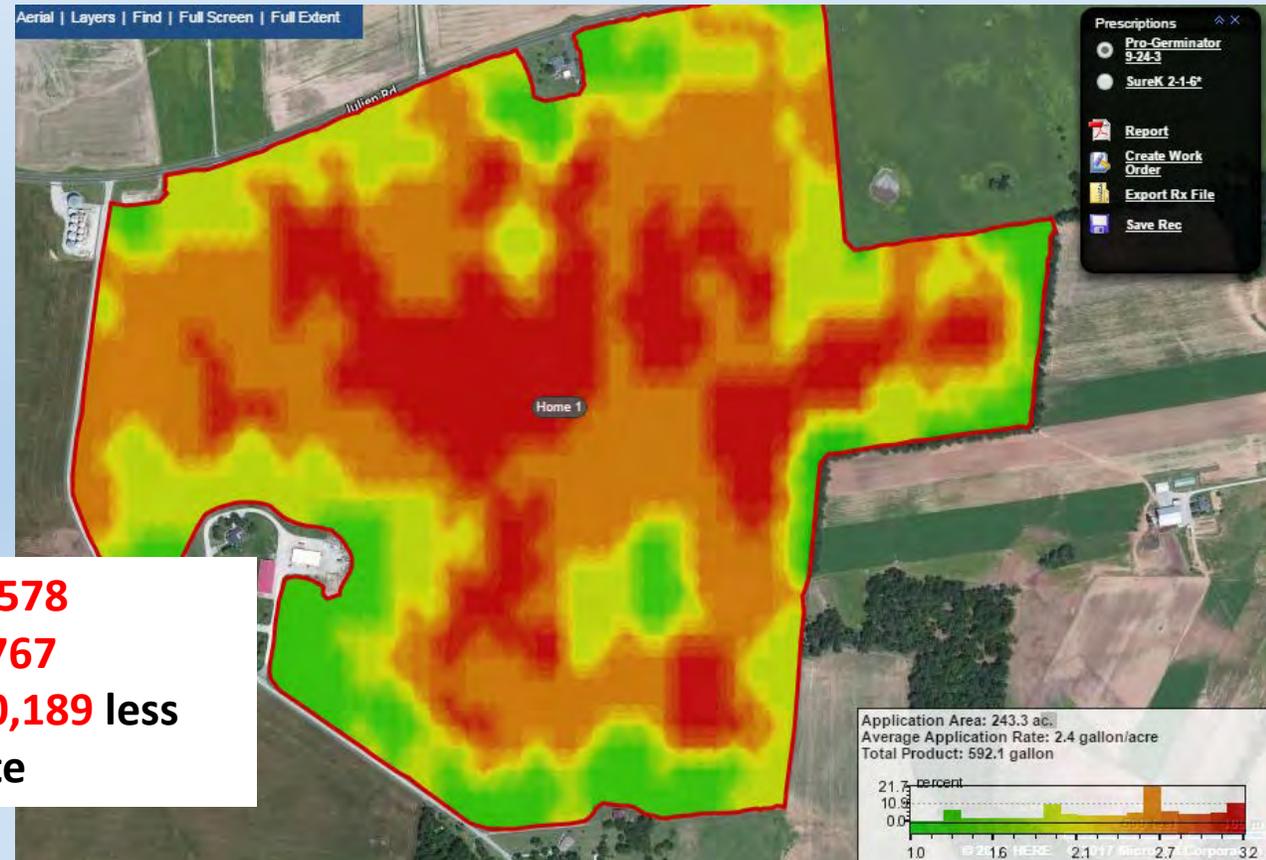
Dry/Liquid Split Application Approach

VRT Dry to 140 BPA Corn Yield plus Soil PK Maintenance

VRT DAP Soil Maintenance



In-Furrow Banded VRT Technology



Phosphorus Application Reduction Through Technology

Total Phosphate Reduced 10,189 lbs or 41.93 lbs/Acre

16,767

12,393

6,578

FLAT RATE

VRT RATE

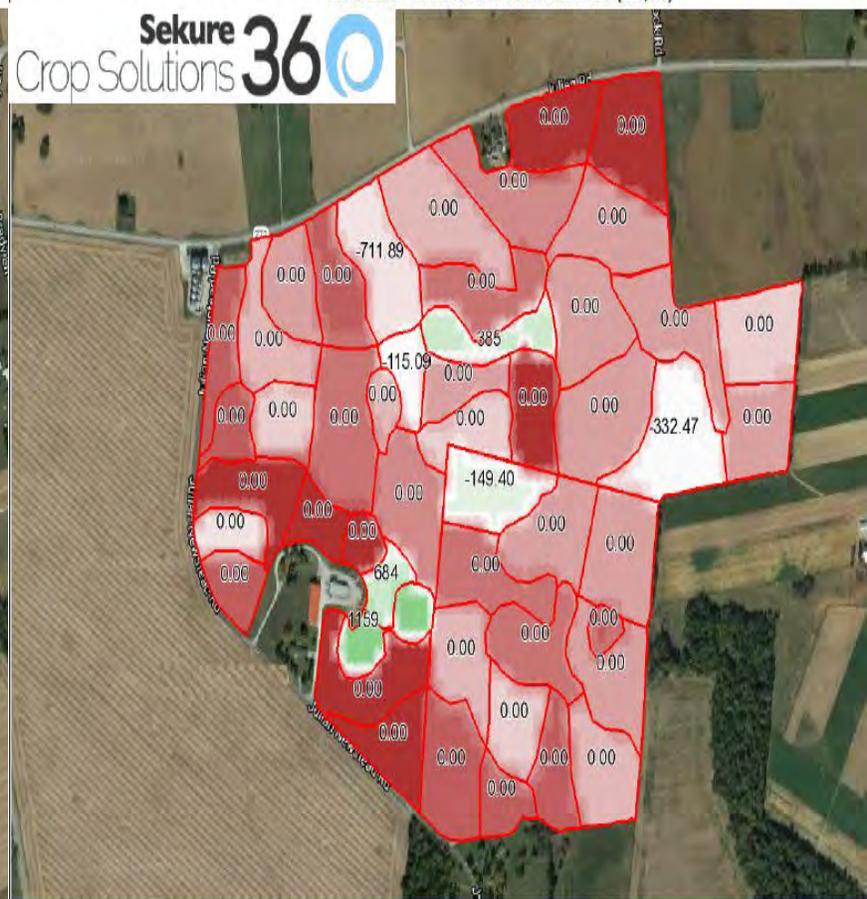
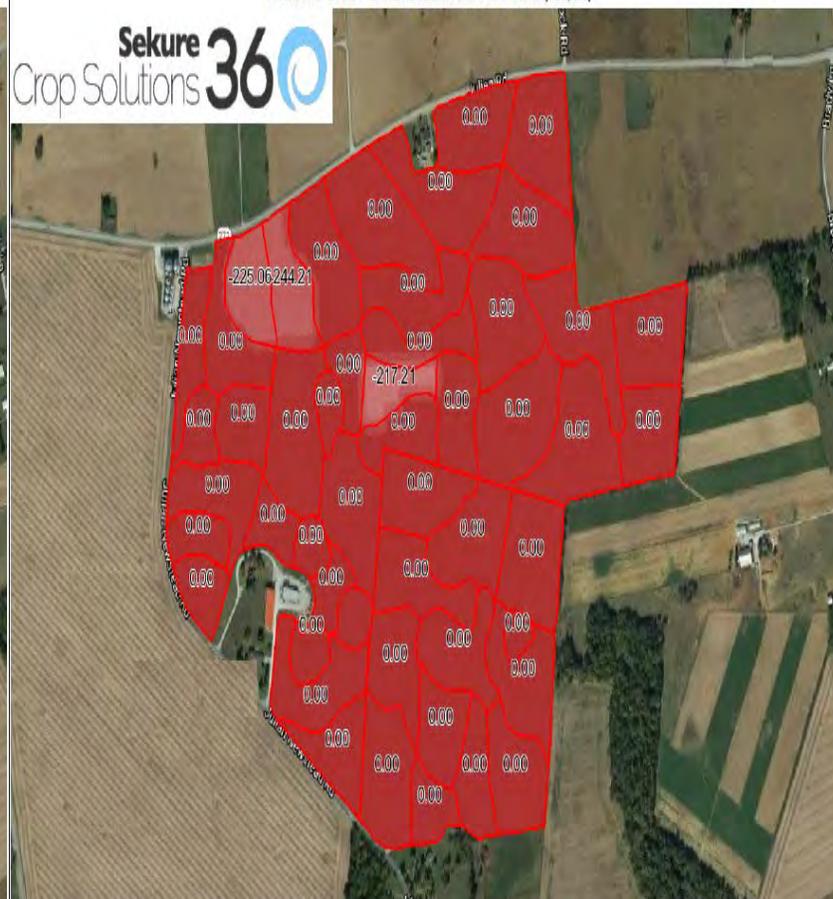
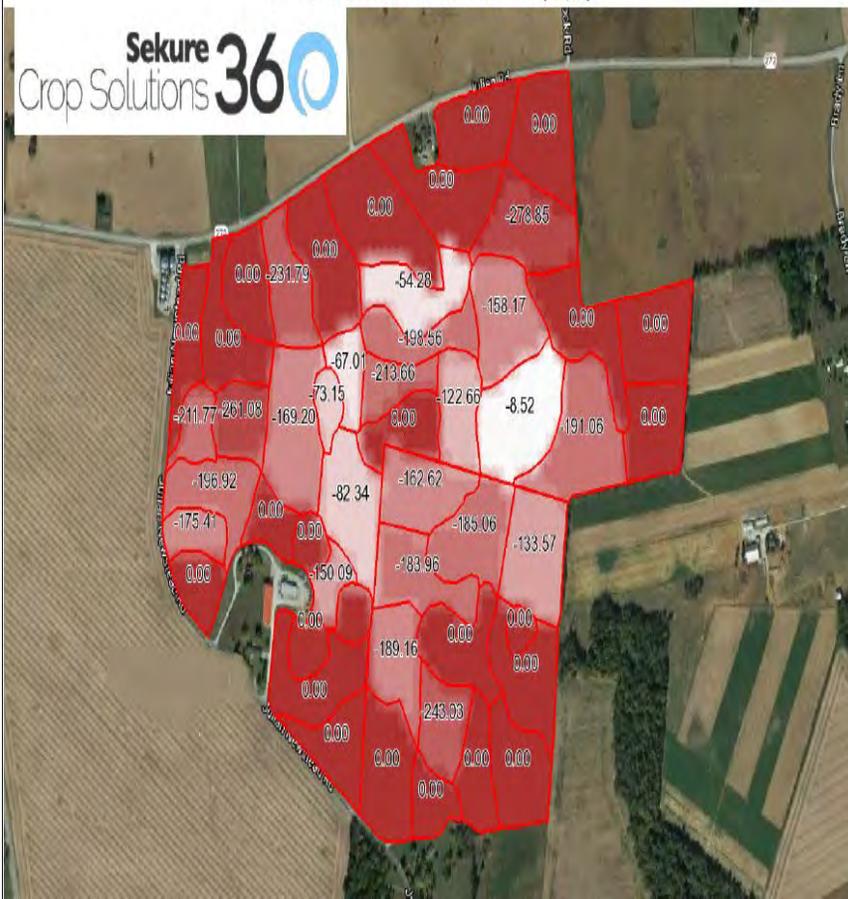
VRT/BANDED TECHNOLOGY



DAP 18-46-0 - Difference From Flat Rate (lbs/ac)

Potash 0-0-60 - Difference From Flat Rate (lbs/ac)

Lime 100 - Difference From Flat Rate (lbs/ac)



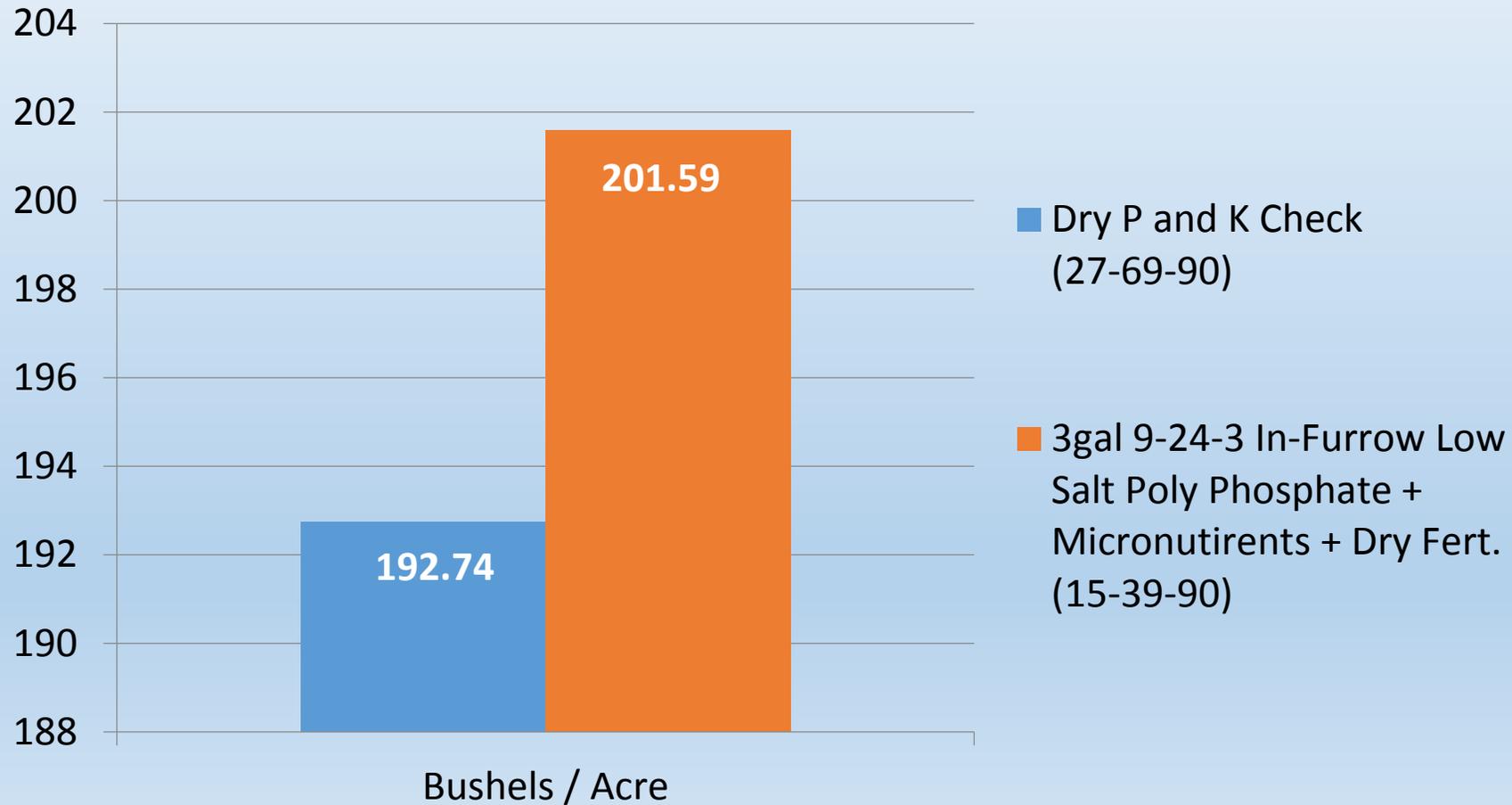
VRT DAP + 3gals 9-24-3 VS 150lbs DAP
Savings Annually = \$4.90/acre

VRT MOP + 3gals 2-1-10 VS 150lbs MOP
Savings Annually = \$7.67/acre

VRT Lime Vs Flat Rate 2tons/acre
Savings Annually = \$8.14/acre

Annual Savings of \$20.71/acre on average

2016 Average of Hopkinsville KY and Uniontown KY on Corn This Study evaluates the difference in In-Furrow banded fertilizer compared to complete broadcast system. **The In-Furrow band system in this study reduced applied phosphorous by 24 lbs /acre** (all plots had same nitrogen rate)



VRT Nitrogen Application Variable Rate

Saved Zones		Seedrate	NRate
	1 Min \leq 85.3	32000	170
	2 85.3 \leq 99.2	34000	180
	3 99.2 \leq Max	36000	195

	Seedrate	NRate
 1 Min \leq 85.3	32000	170
 2 85.3 \leq 99.2	34000	180
 3 99.2 \leq Max	36000	195

Transparency

Show Zone Ids

Update Colors



- Targeting Nitrogen applications to meet variable crop needs across the field.
- Variable Rate Nitrogen prevents over application and run-off to areas of the field where uptake is not possible.

Split Application Nitrogen

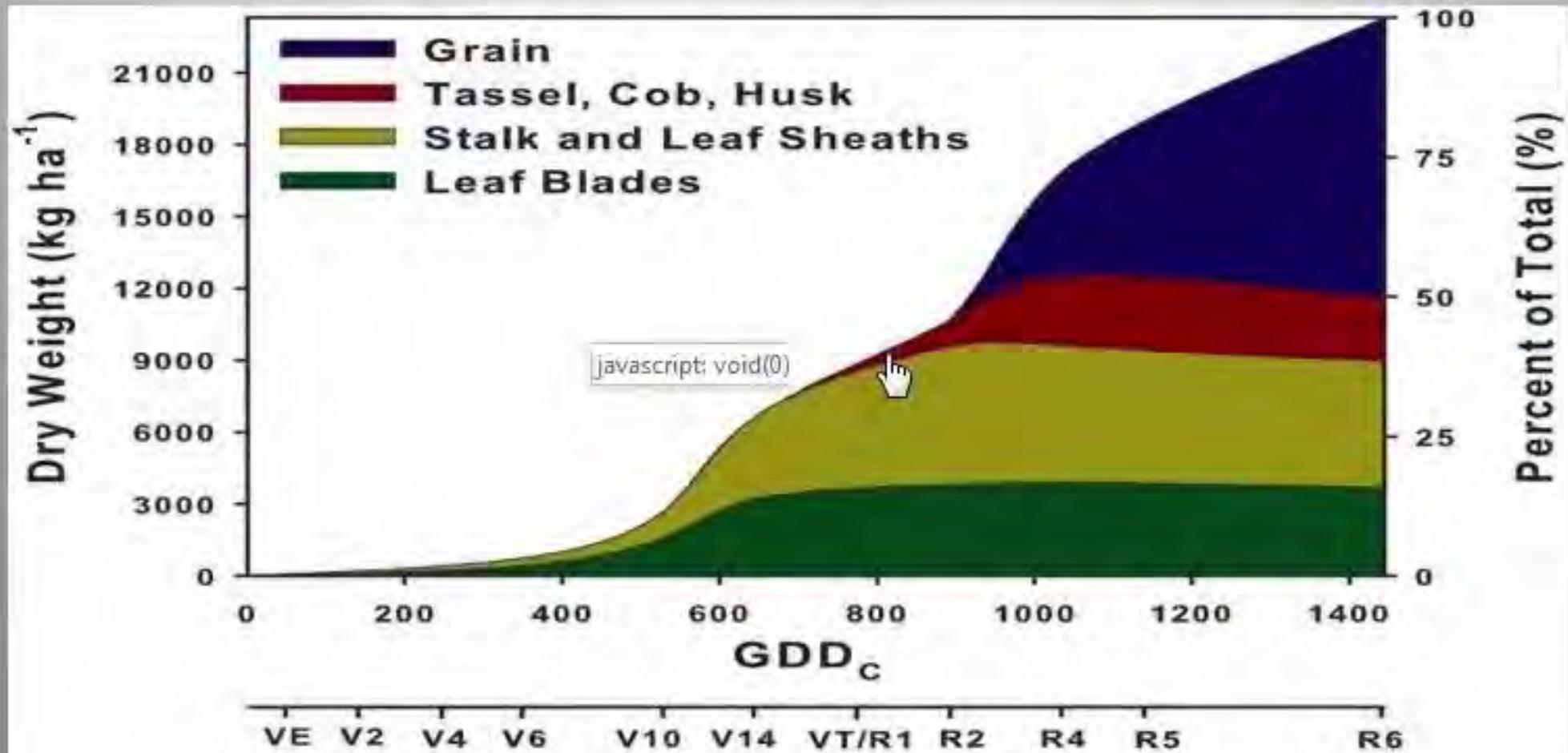
- **Timing of Application**

- Matching The Demand Curve of the Crop

- **Placement of Nitrogen**

- Put Nitrogen where it can be used by the plant and is not vulnerable to run-off and from volatility.

Timing of Nitrogen is Critical



By spreading out smaller Nitrogen applications over the season and targeting Nitrogen applications “Just in Time” when the crop needs it. We can reduce overall N applications and reduce loss of Nitrogen into the environment.

Split Application N

Placement is Key for maximum fertilizer efficiency (Directed in Row Banding)



Allows for “Just in Time Nitrogen “ which provides Nitrogen at the **Right Time, Right Place** and at the **Right Rate** that the crop needs it without exposing the environment to leeching Nitrates .

This very efficient Nitrogen management tool allows for overall reduction of Nitrogen use while maintaining or even increasing crop yield.



Precision Management of Nitrogen

Being able to put on that late shot of N was a big plus in 2015 when 10 straight days of rainfall locked him out of prime sidedressing time in June during the V-4 to V-5 growth stage. Using 360 Y-Drop nozzles and a high-clearance sprayer allow the flexibility to apply the additional N needed in tassel-tall corn.

The veteran no-till farmer said getting the exact amount of nitrogen his corn plants need is still a work in progress, but he believes he's getting closer each year. He's cut his overall usage per bushel of corn produced in half over the past 15 years -- from **1.2 pounds of N per bushel of corn reduced to 0.65 pounds of N per bushel.**

A Spoonful of N

New Tools Help Trim Fertilizer Rates *By Patrick R. Shephard DTN/Progressive Farmer Contributing Editor*

So where's the payback? A profitable PA program must be based on sound agronomic science, such as the fundamental principles that guide **4R Nutrient Stewardship**. Without an agronomic foundation for everything from **data collection, data analysis, decision-making, technology implementation, and record keeping**, PA will just be gadgets and useless data that don't result in knowledge leading to more efficient input management, higher yields, and greater profits.

IPNI Plant Nutrition Today, Fall 2014, No. 5

In-Season Soil & Water Monitoring-Management-Documentation

Soil and Water Nitrate Testing

SSC "BOOTS on the GROUND" collecting samples

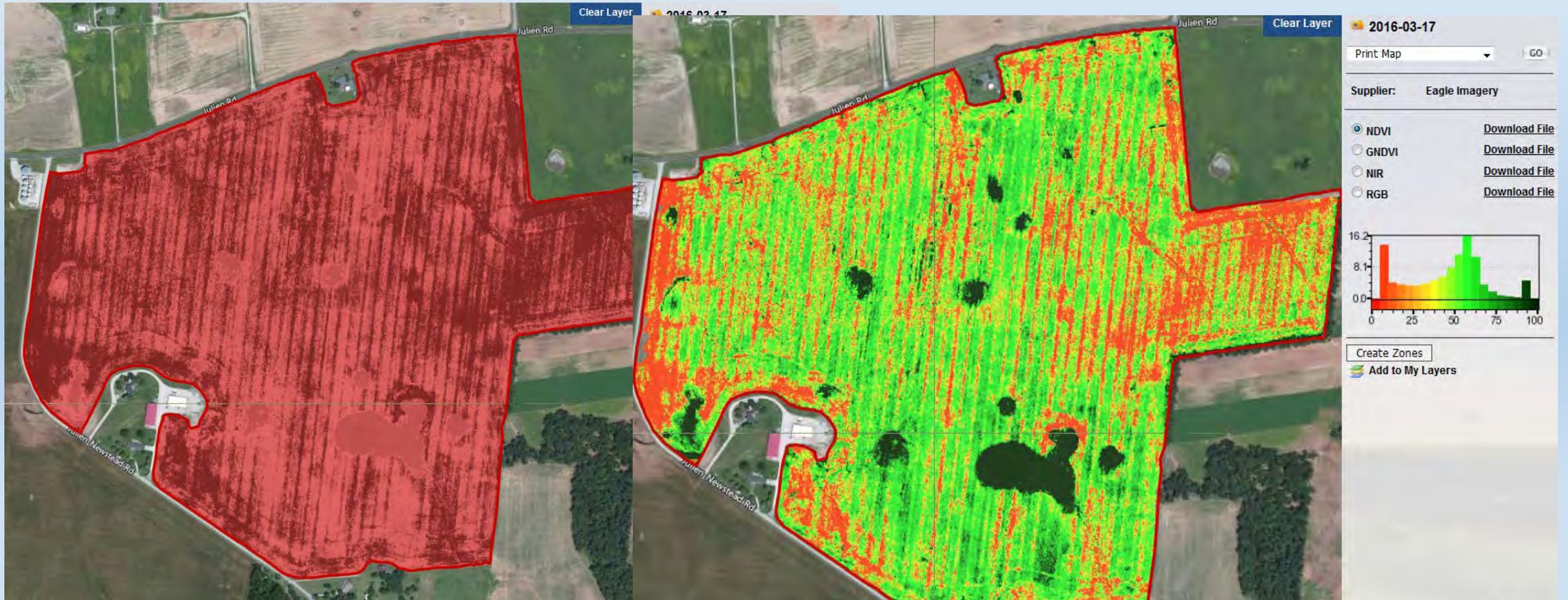
In-Field testing tools for rapid testing and GPS documentation



Documentation

Imagery

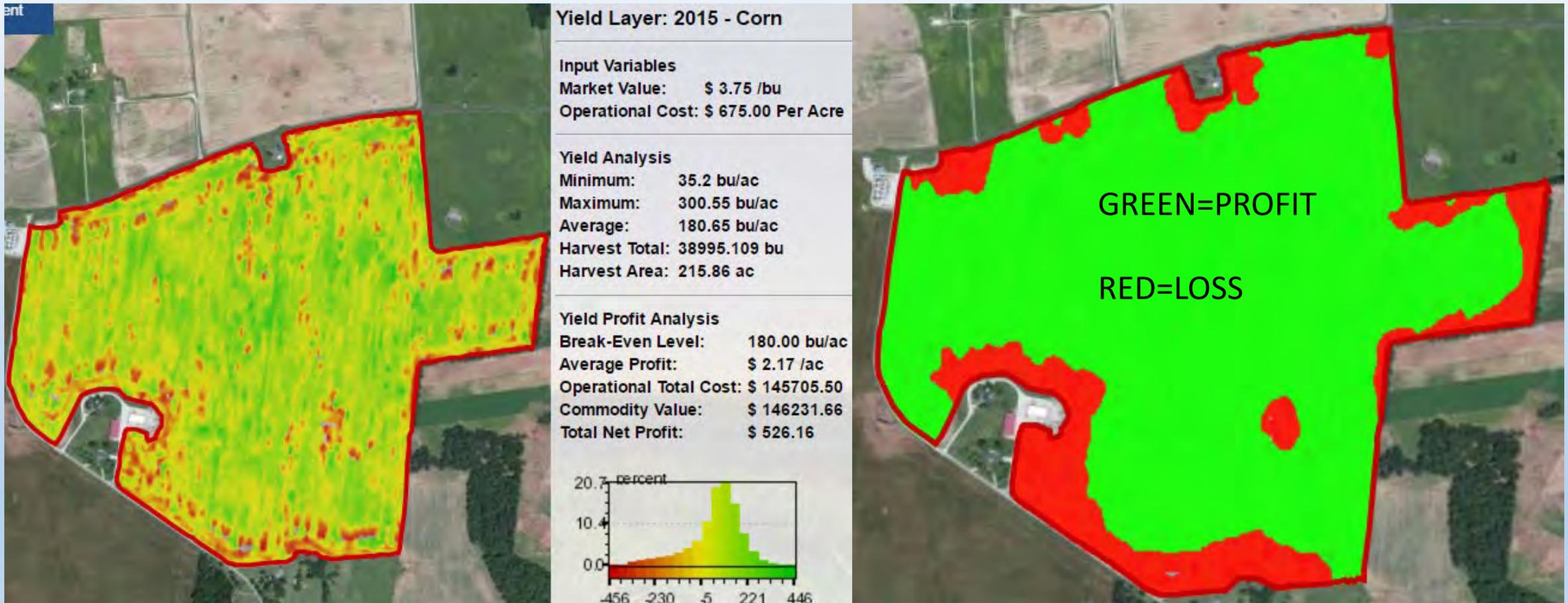
NDVI with UAVs and Satellite to Manage Inputs and Direct In-Season Sampling of Soil and Tissue Fertility Levels



NDVI GPS Directed Tissue and Soil Sampling of Crops

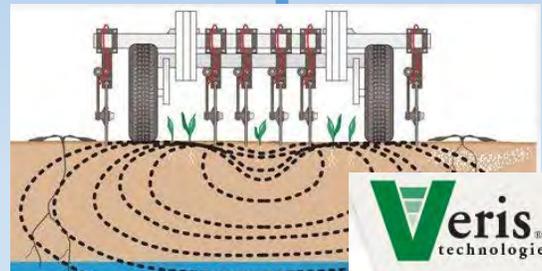


Profit Mapping to identify productive acres



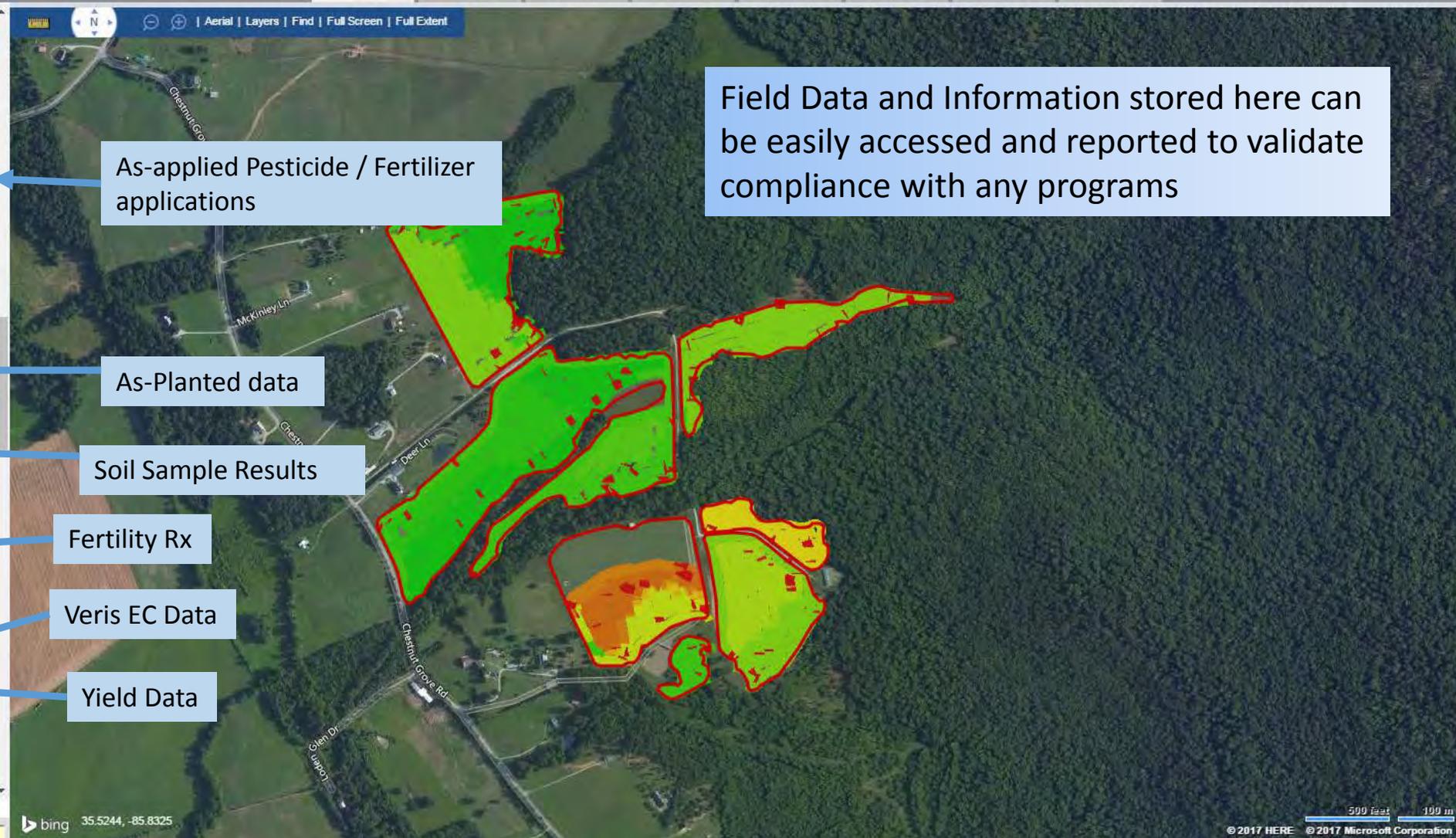
- **Profit Mapping** identifies acres that produce at a profitable level year to year.
- Allows the ability to identify under performing acres that could be taken out of production
- Requires both precision soil sampling and collection of machine documented yield data.

Information and Data Management



Full documentation storage and reporting technology

- Ken Middlebrook
- KM1
 - Field Boundary
 - As-Applied
 - 2017
 - 2016
 - 2016-06-08 access S
 - 2016-05-17 32% UAN
 - 2016-05-09 Halex GT
 - 2016-04-07 2,4-D LVE
 - 2016-03-22 Potash
 - 2015
 - 2014
 - 2013
 - As-Planted
 - 2016
 - 2016 - Corn
 - 2014
 - Field Samples
 - 2015-08-18
 - 2013-10-15
 - Mgmt Zones
 - Saved Rx
 - 2017
 - 2016
 - 2015
 - 2014
 - Veris
 - Yield
 - 2016 - Corn
 - 2015 - Soybeans
 - 2014 - Corn
 - 2013 - Soybeans
 - 2012 - Corn



As-applied Pesticide / Fertilizer applications

As-Planted data

Soil Sample Results

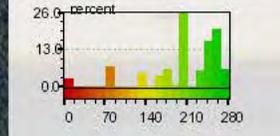
Fertility Rx

Veris EC Data

Yield Data

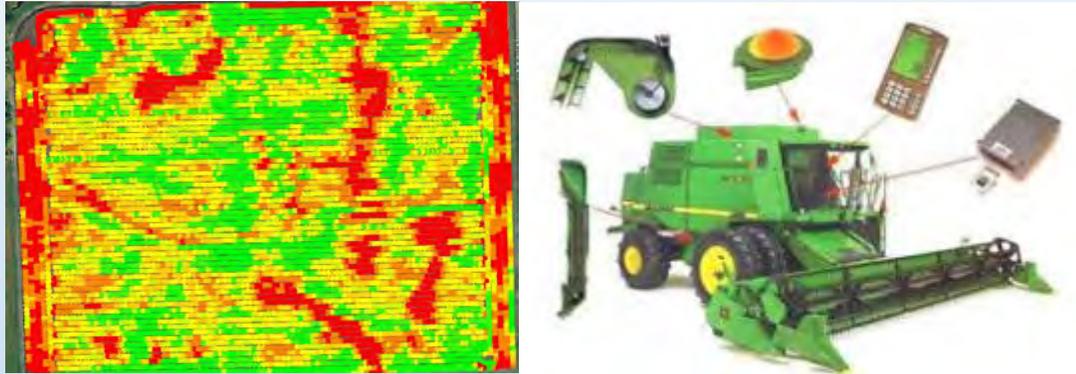
Field Data and Information stored here can be easily accessed and reported to validate compliance with any programs

Field: KM1 (81.7 ac)
As-Applied
Action [v] GO
Date: 2016-03-22
Product: Potash
Area: 95.9 acre
% Field: 100.0 %
Total (Actual): 19554.5 lbs
Total (Target): 19973.5 lbs
Avg (Actual): 203.82 lbs/acre
Avg (Target): 208.19 lbs/acre
Coverage
 Raw
Target Rate
 Normal Interpolated
Actual Rate
 Normal Interpolated
Interp Method: 1/r4
Add to My Layers

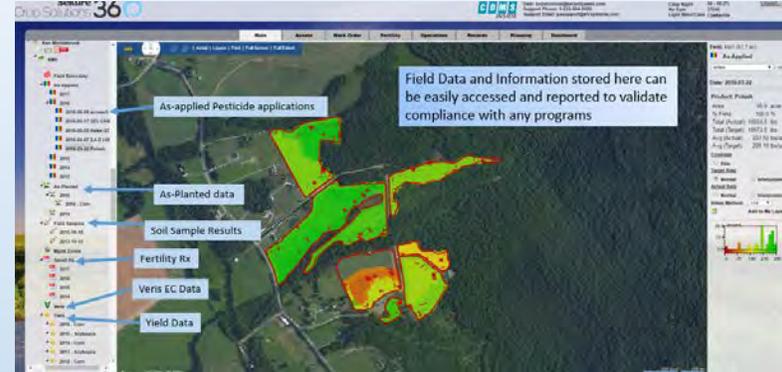


Technology Investments

GPS Yield Monitor \$2,000 to \$12,000



GIS Data Base \$3-5\$ Acre/Year



Additional \$2-\$4 Acre/Application



YDrop/In-Row Banding Equipment \$4,000-\$18,000



Precision Soil Sampling \$6 to \$12 / Acre



UAV NIR Imagery \$3.50 - \$5.00/Acre \$4



Tissue Sampling \$18/Sample

Planter In-Furrow Liquid Fertilizer System \$8000~



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