

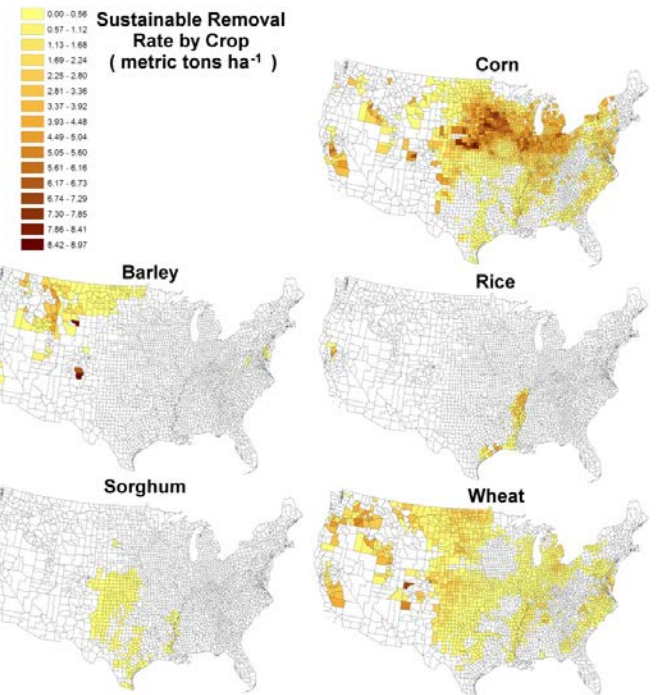
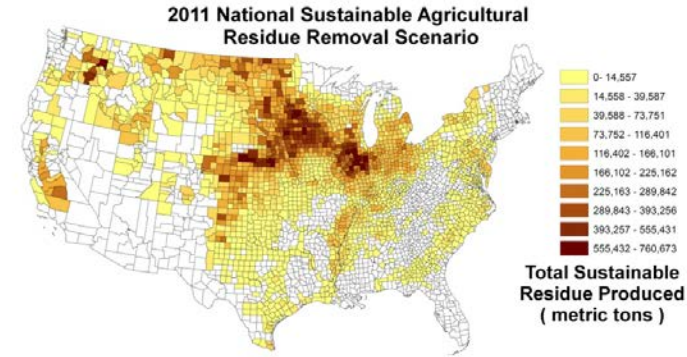
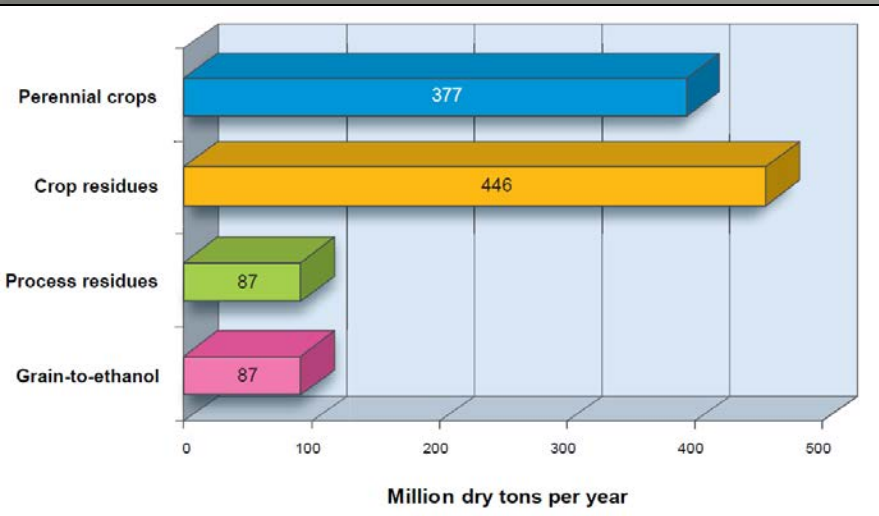
The background is a light green gradient with faint binary code (0s and 1s) scattered across it. On the left side, there is a silhouette of a single tree. On the right side, there is a silhouette of a cluster of trees. The main text is centered in the upper half of the image.

Crop Decision-making to Protect Soil and Water

AgSolver, Inc

August 7th, 2014

History



Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply

April 2005



Feedstocks

- CDP
- Emergence
- Corn Residue
- Miscanthus
- Sorghum
- Willow
- Cereal Residues
- Switchgrass
- Poplar

U.S. DEPARTMENT OF ENERGY
SunGrant INITIATIVE
 United States Department of Agriculture
 USDA Agricultural Research Service

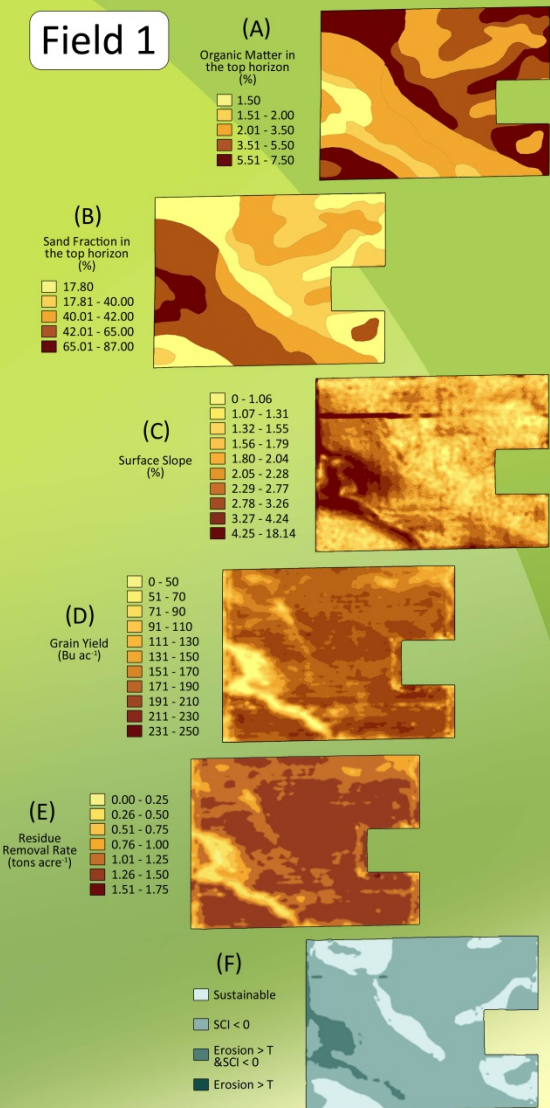
MONSANTO



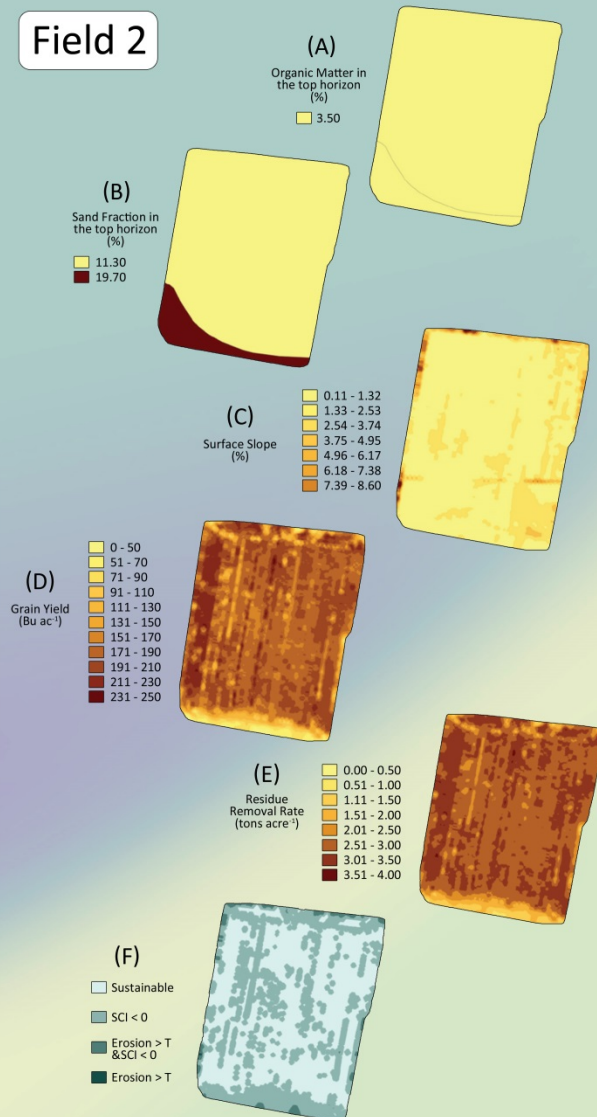
History: Sub-Field Scale Applications



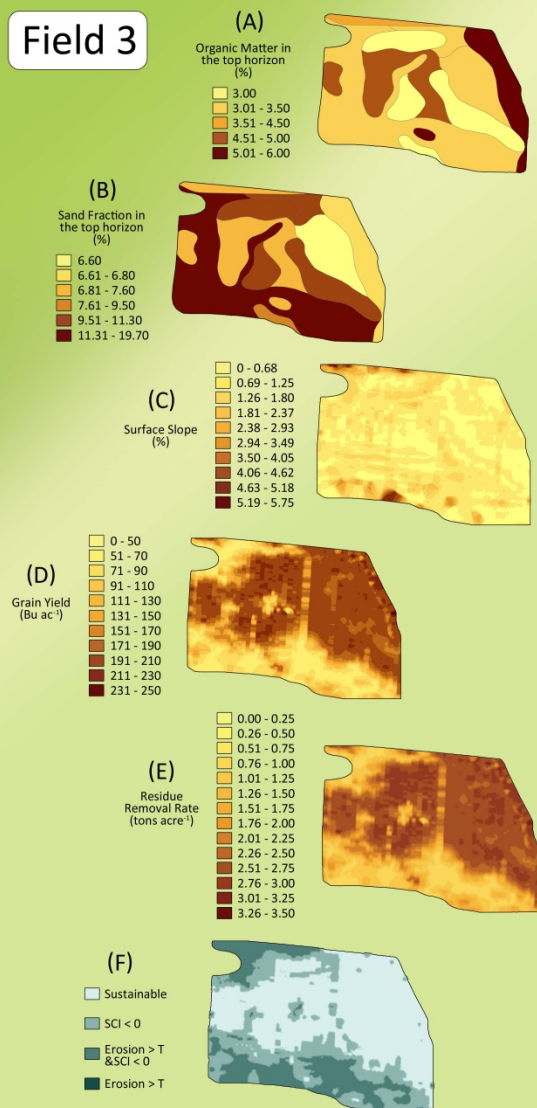
Field 1



Field 2



Field 3



Environmental Performance: Solving the Mass Balance



Cons. Outputs

SCI
SCI-OM
SCI-FO
SCI-ER
Water Ero
Wind Ero

C Balance

c_rem_grn
c_rem_biomass
c_loss_ero
ann_soil_c_delta
co2_flux
c_delta



P Balance

p_rem_grn
p_rem_biomass
p_loss_ero
p_app

N Balance

n_rem_grn
n_rem_biomass
n_loss_ero
n_app
no3_leach
n2o_flux
n2_flux
nh3_vol

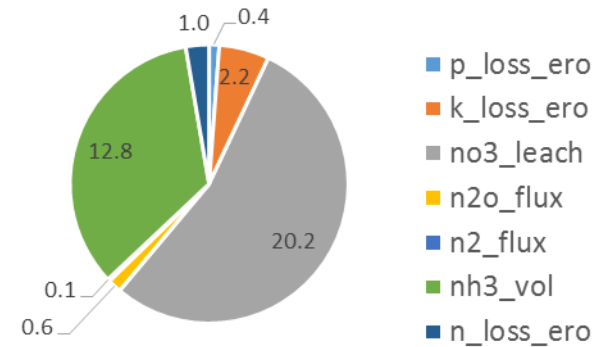
n_litter_in

n2_fix
crop_n_uptake
n_precip
n_delta

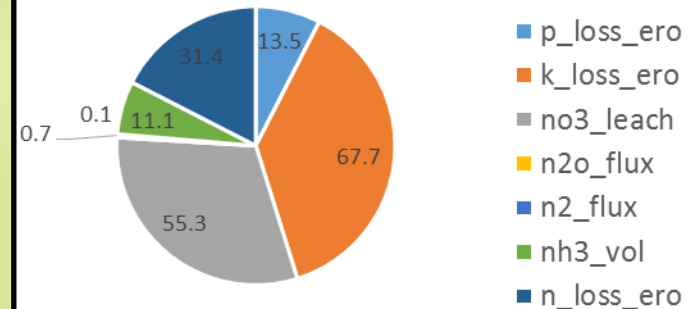
K Balance

k_rem_grn
k_rem_biomass
k_loss_ero
k_app

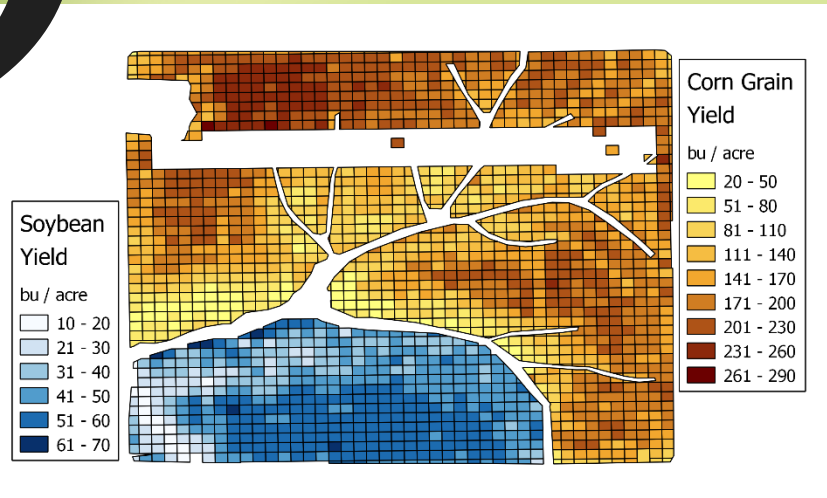
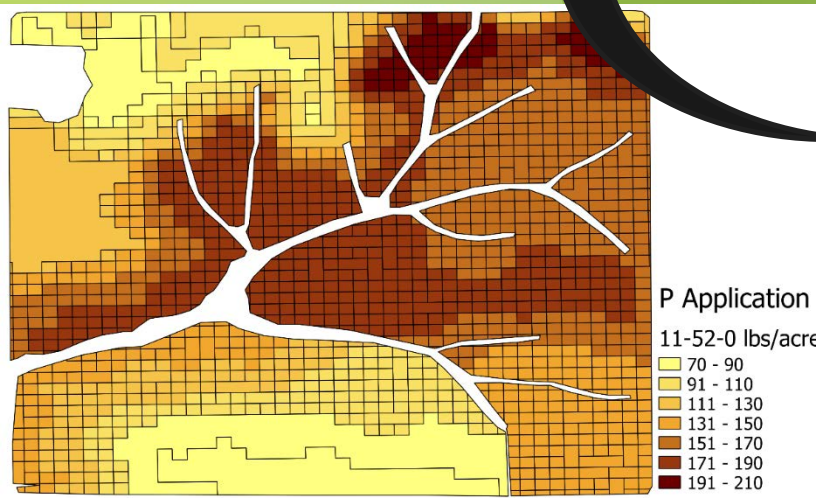
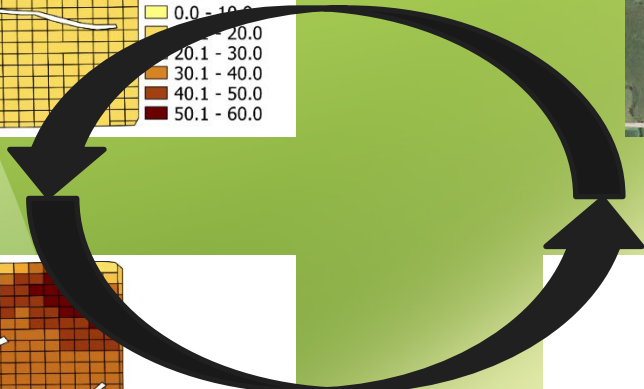
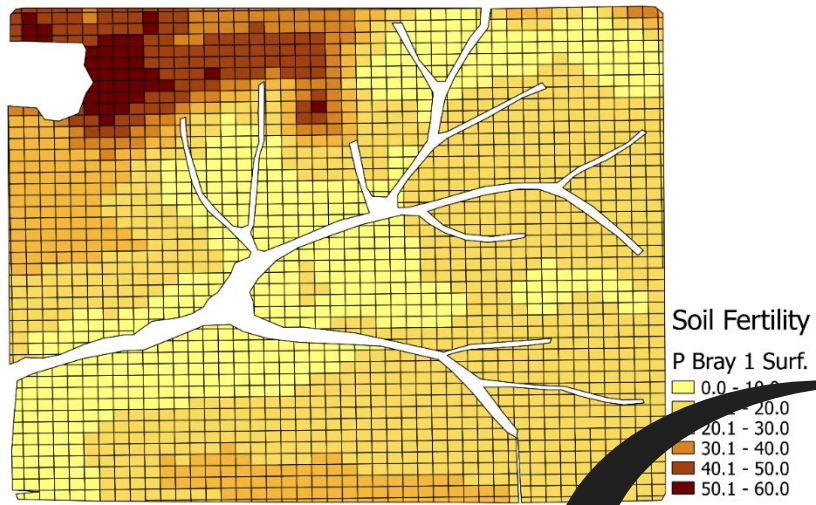
CG,CG,SB-NT-100rye-HRH



CG,CG,SB-RT-NCC-HRH



Precision Data Solutions: Nutrient Management

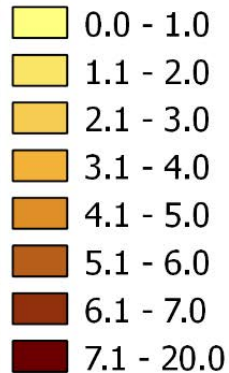


Precision Data Solutions: Nutrient Management

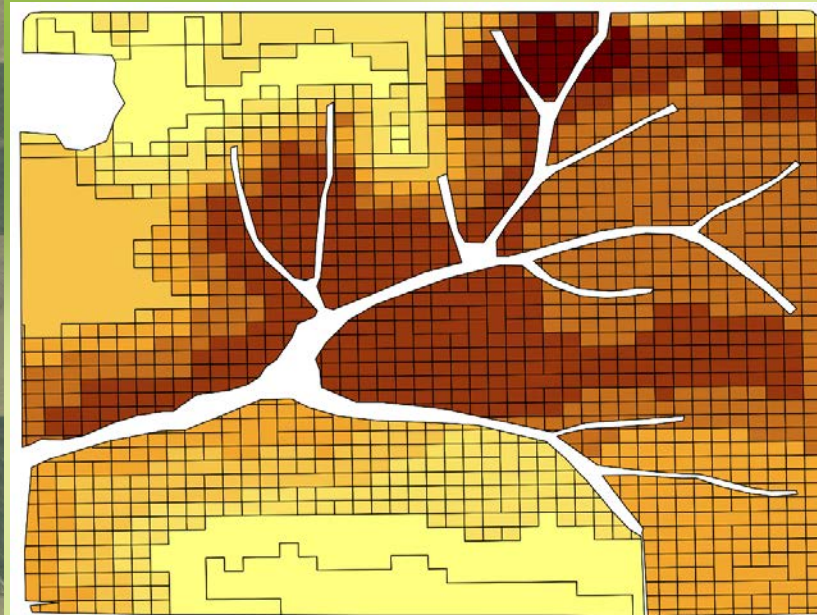


Iowa Phosphorus Index

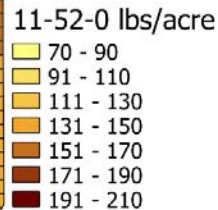
P runoff risk



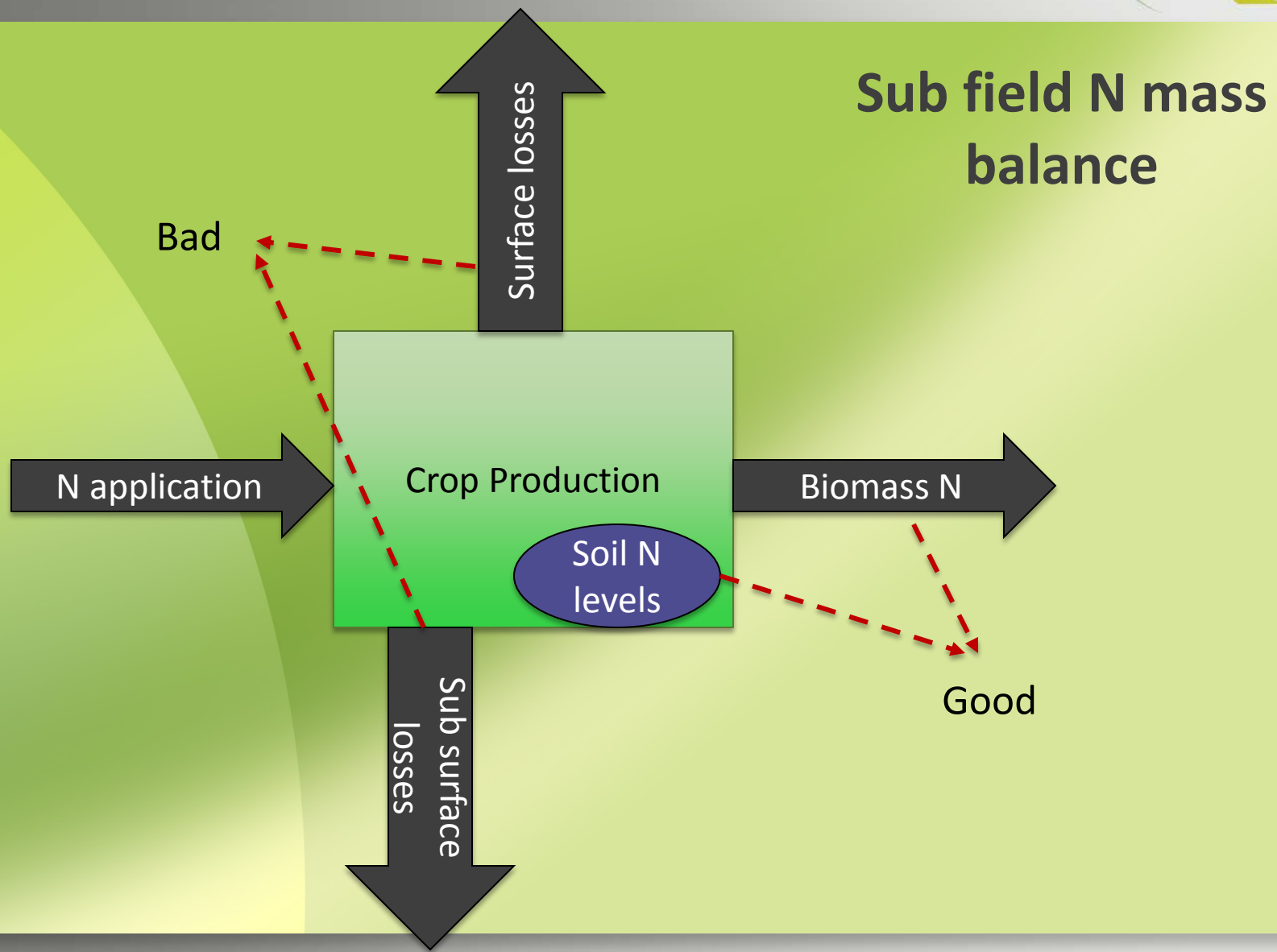
- Agronomic management to address key performance metrics
- Cover Crop
 - Select Acres
 - \$30 / acre Cost
 - On select acres >\$50 / acre N, P & K savings
 - Potential Yield Increase



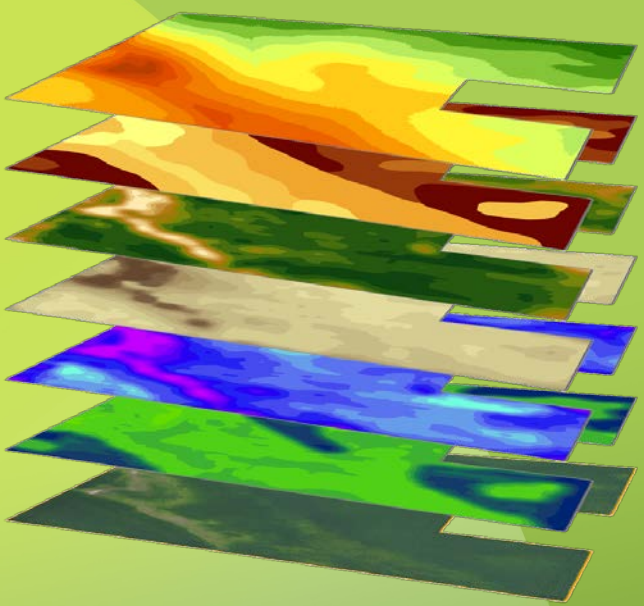
P Application



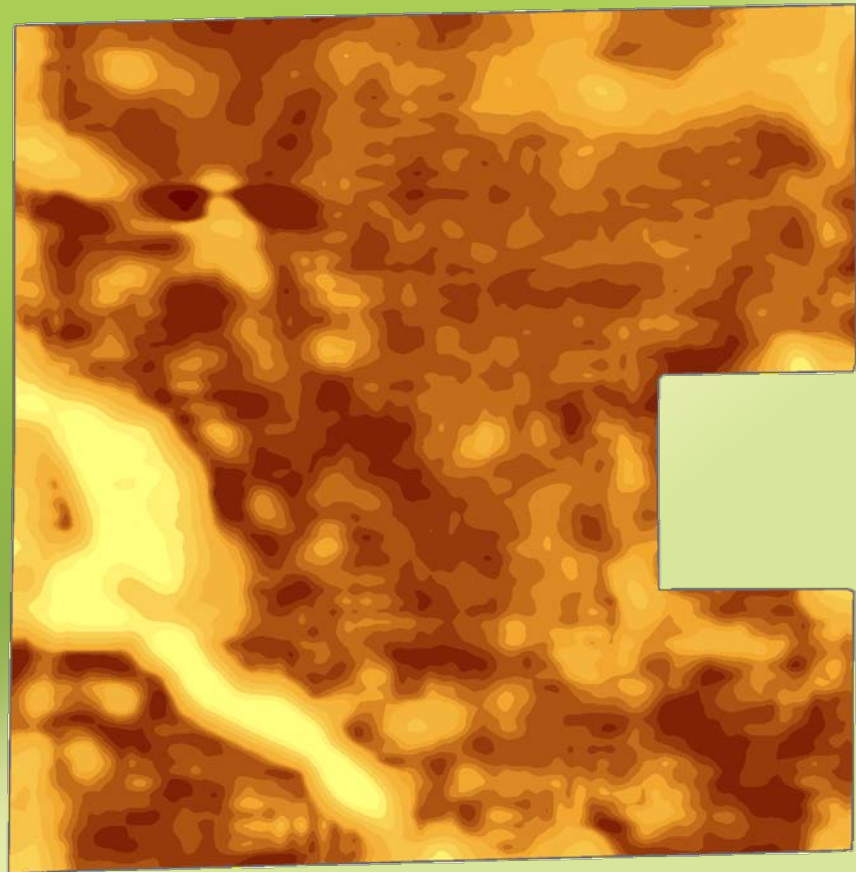
Precision Data Solutions: Nutrient Management



Precision Data Solutions: Nutrient Management



Percentage of Applied N Utilized or Available



0 - 5
5 - 10
10 - 15
15 - 20
20 - 25
25 - 30
30 - 31
31 - 32
32 - 33
33 - 34
34 - 35
35 - 40
40 - 45

Apply crop models to determine:

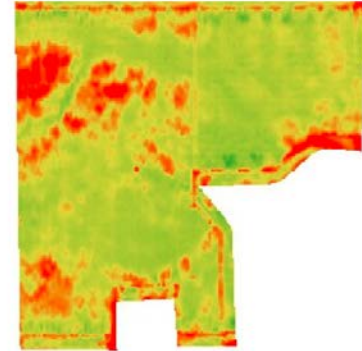
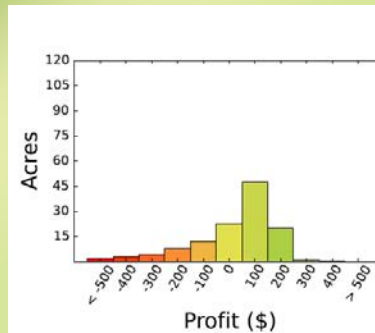
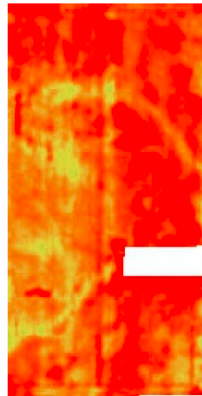
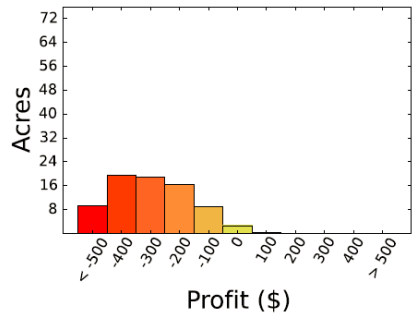
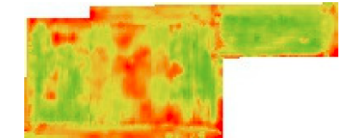
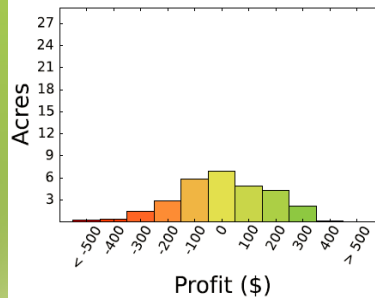
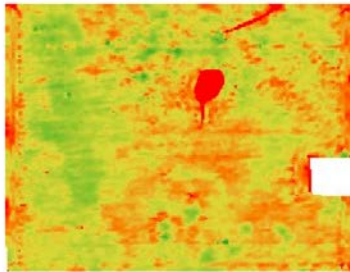
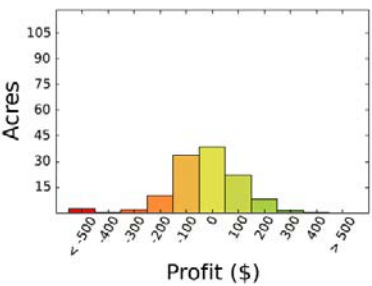
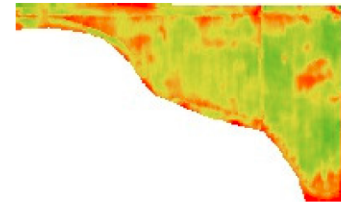
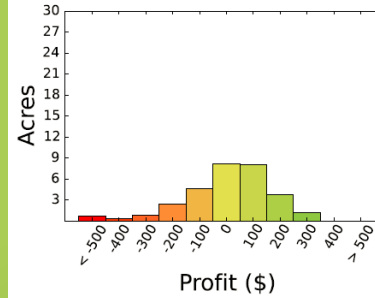
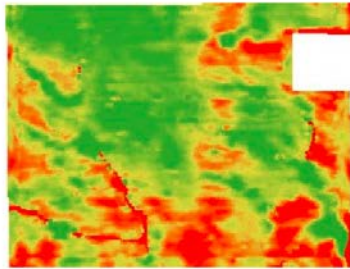
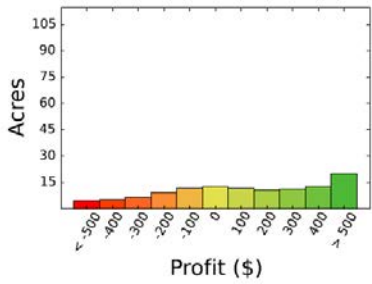
- Subfield population selection
- Subfield variety selection
- Subfield fertilization rates

This was solved with publically available data and a yield map...

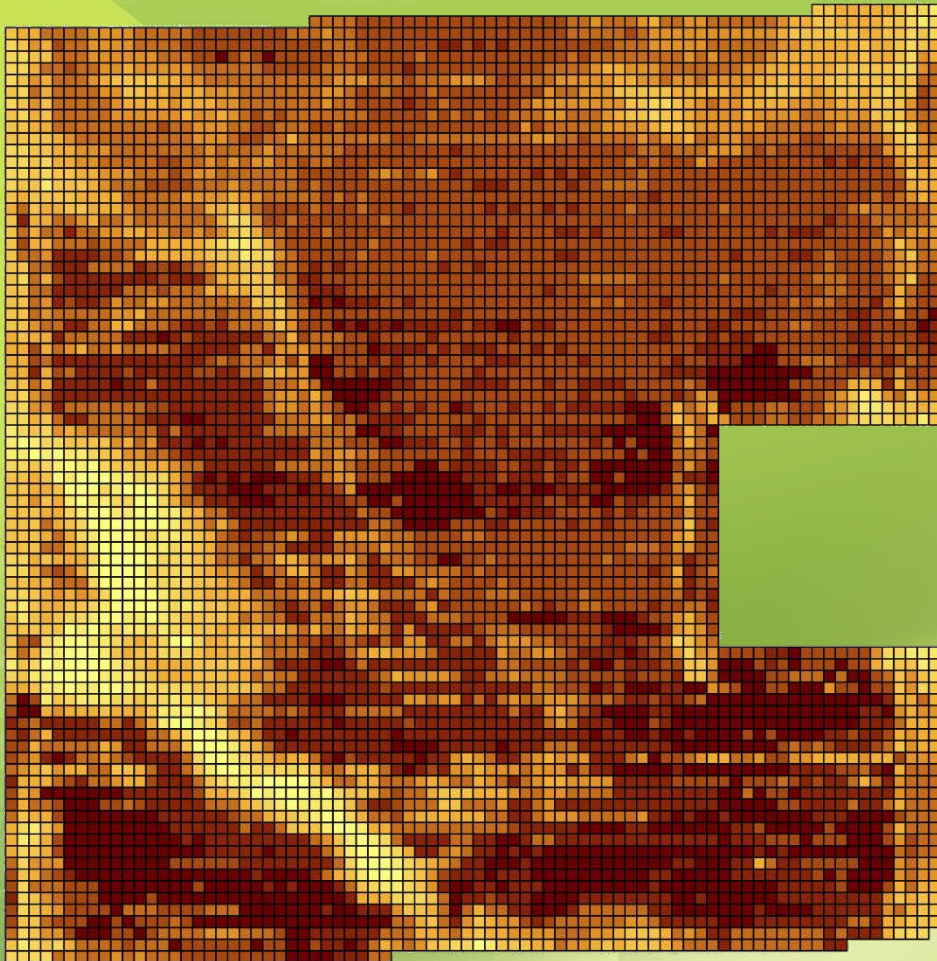
Identifying Subfield Profit and ROI: Examples pulled from current reports



Profit (\$/ac)













Correlating Profit and Sustainability



50 Year Profit Average

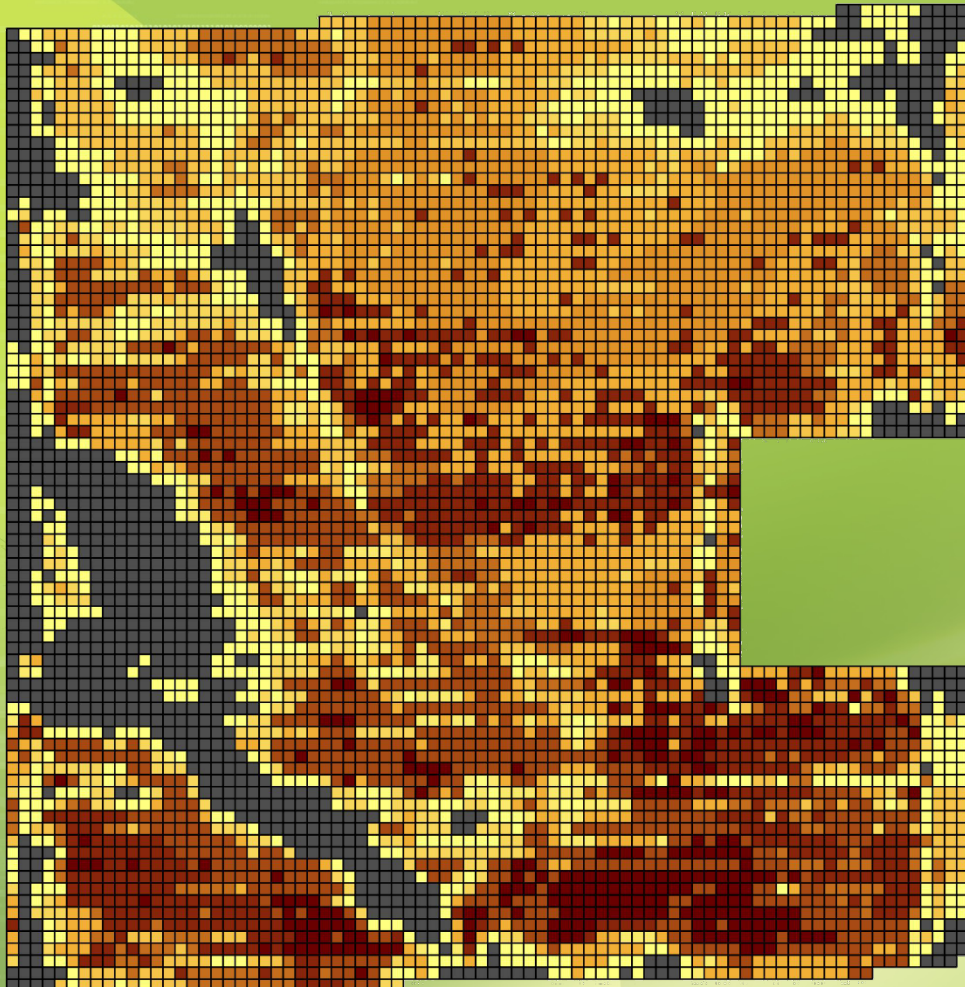
(\$/acre)

-  (933) - (784)
-  (784) - (576)
-  (576) - (404)
-  (404) - (195)
-  (195) - (76)
-  (76) - 11
-  11 - 101
-  101 - 168
-  168 - 223
-  223 - 611

Summary

50 Year Yld Ave:	170	bu/acre
50 Year Yld STD:	38	bu/acre
Profit Average:	\$47	\$/acre
Profit STD:	\$235	\$/acre
Years Profitable Ave:	31	
Years Profitable STD:	14	
Percentage of Field Profitable:	74%	

Correlating Profit and Sustainability

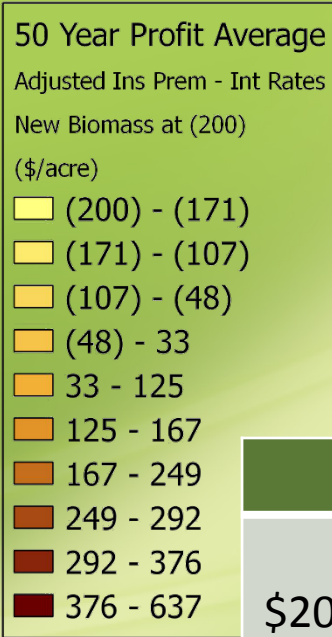


50 Year Profit Average
Adjusted Ins Prem-Int Rates
Release Acres Below (250)
(\$/acre)

- No Row Crop
- (239) - (58)
- (58) - 0
- 0 - 16
- 16 - 42
- 42 - 101
- 101 - 107
- 107 - 134
- 134 - 158
- 158 - 224
- 224 - 577

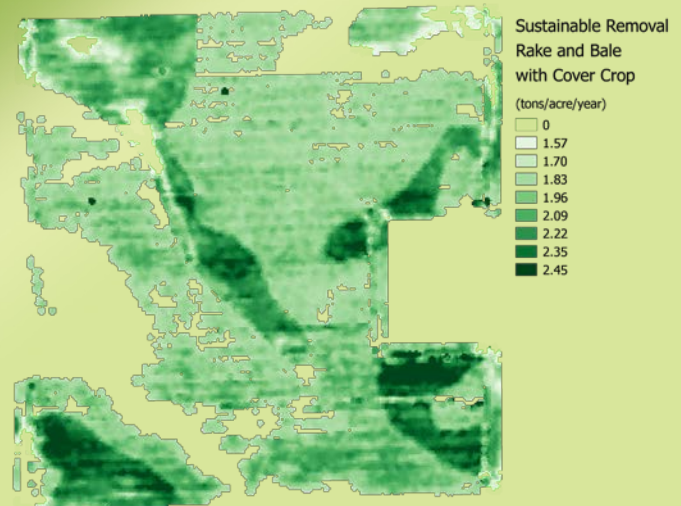
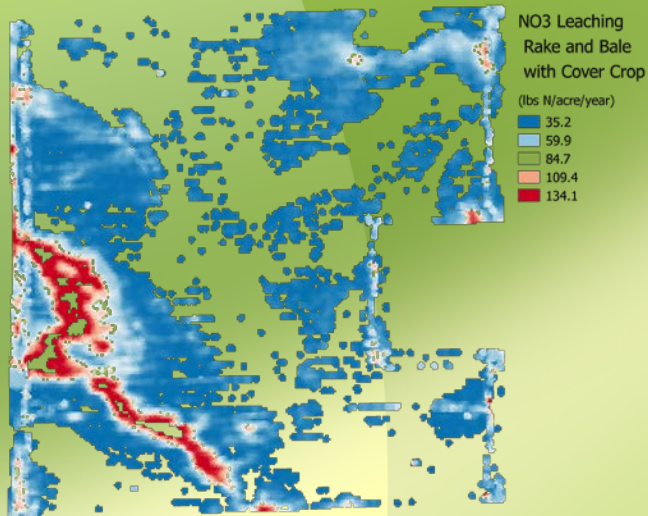
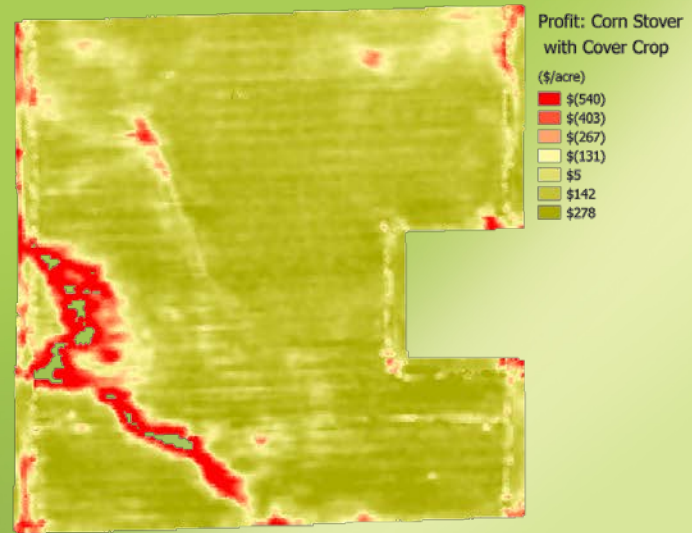
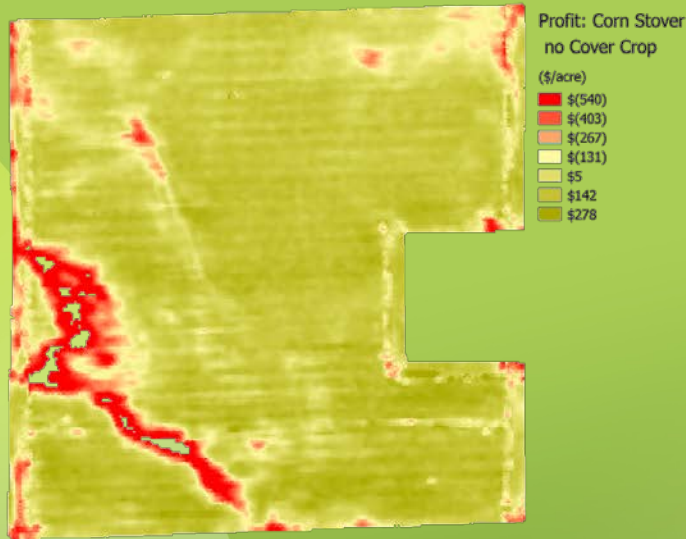
Summary		
Discontinue ops on areas with ave loss > \$250/acre with risk adjusted ins prem's and int rates		
Profit Average:	\$76	\$/acre
Profit STD:	\$124	\$/acre
Percentage of Field Profitable:	72%	
Percentage of Field Used Profitable:	81%	

Correlating Profit and Sustainability

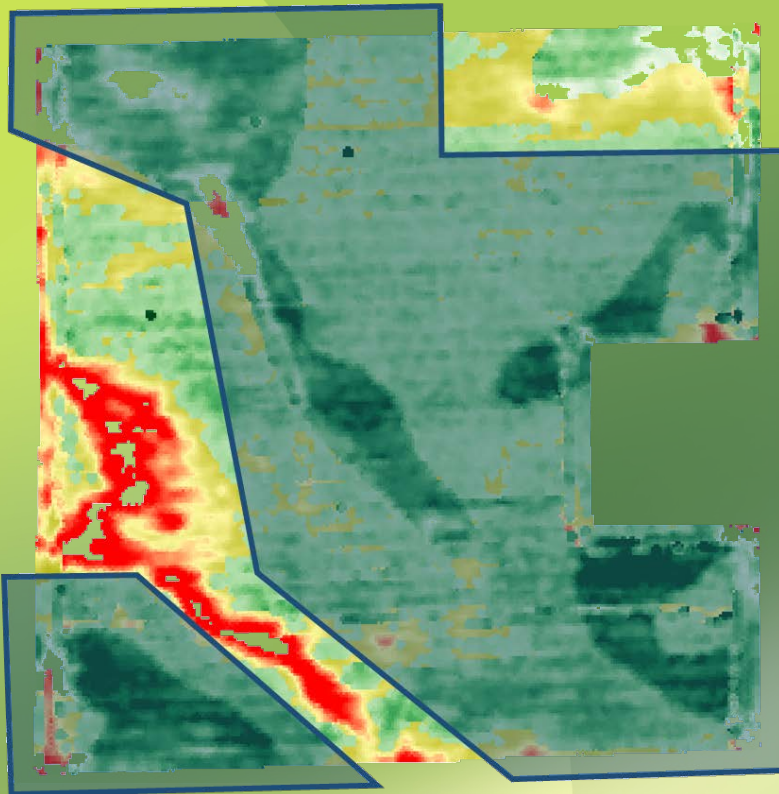


Summary		
New production at loss > \$200/acre with adjusted ins prem's and int rates		
Profit Average:	\$105	\$/acre
Profit STD:	\$149	\$/acre
Percentage of Field Profitable:	79%	

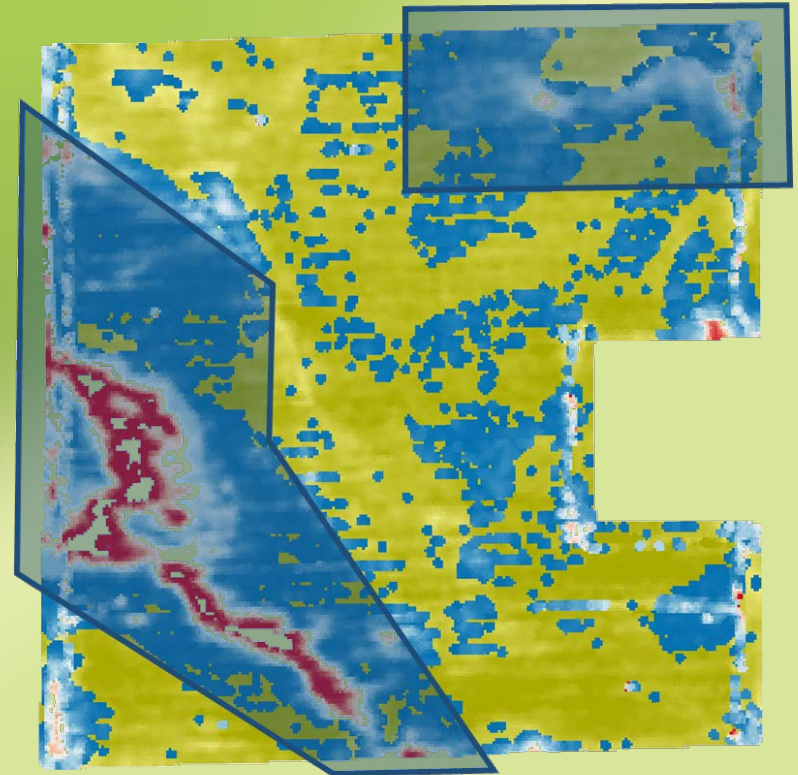
Operationalizing



Stover Removal Management Zones



NO3 Leaching Mitigation Management Zones



Driving Sustainable Agronomic Decisions through ROI



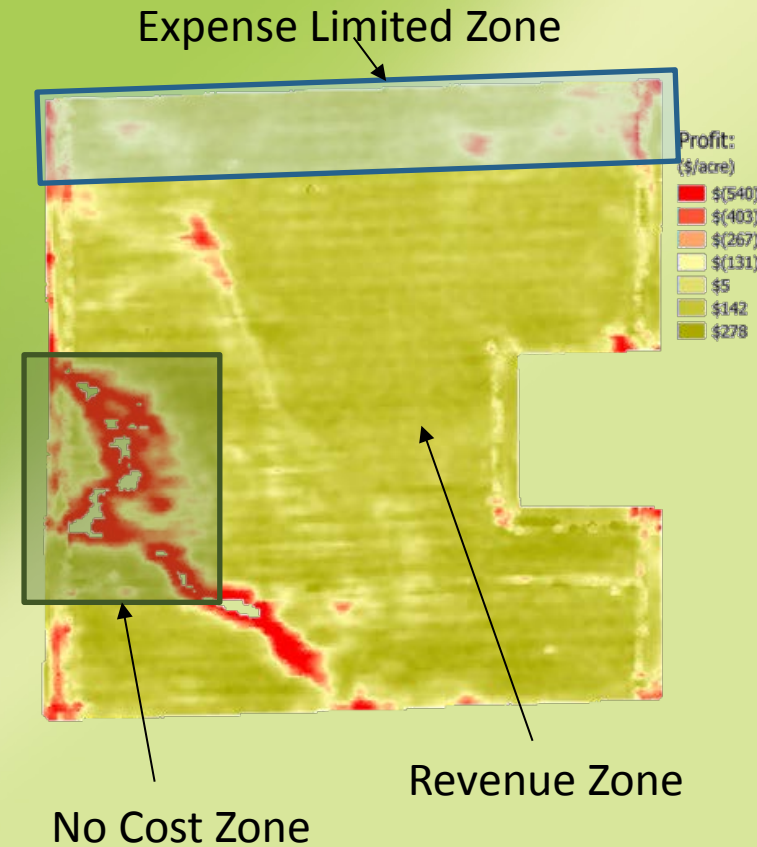
Not all acres can perform at a level justifying high input costs

Three performance zones:

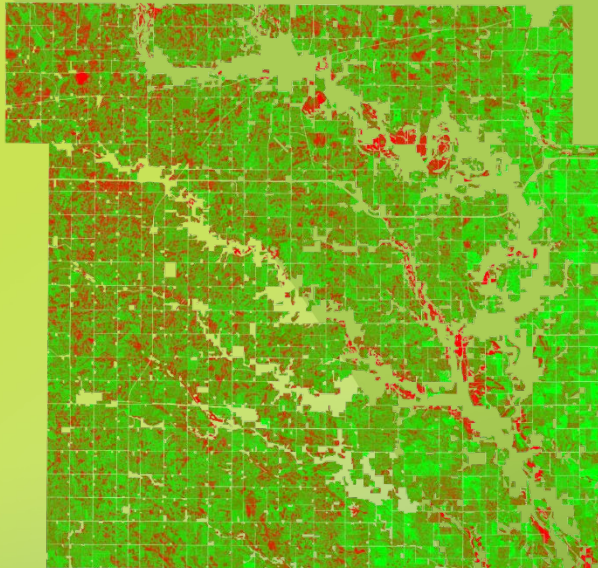
- Revenue: aggressively pursue yield
- Expense Limited: retail and agronomic choices within expense limit
- No cost: no historic ROI potential – find alternative uses, USDA programs, conservation practices

Objectives:

- Leverage grower intuition with quantified thresholds at the right scale, i.e. for Zone X, \$350/ac inputs requires 175 bu, is that reasonable...
- Couple the agronomic plan to the financial plan – crop insurance, lender, landlord

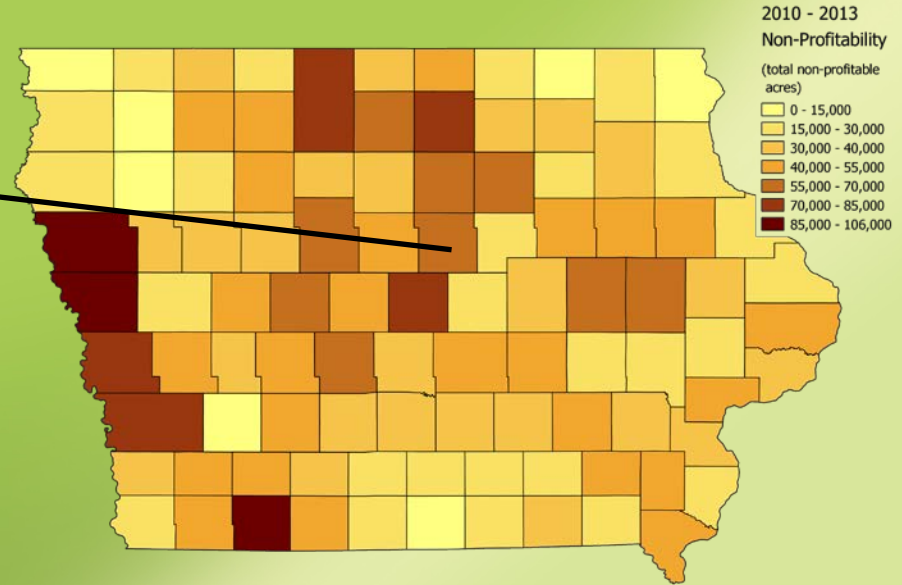


Identifying the Opportunities: Profitability



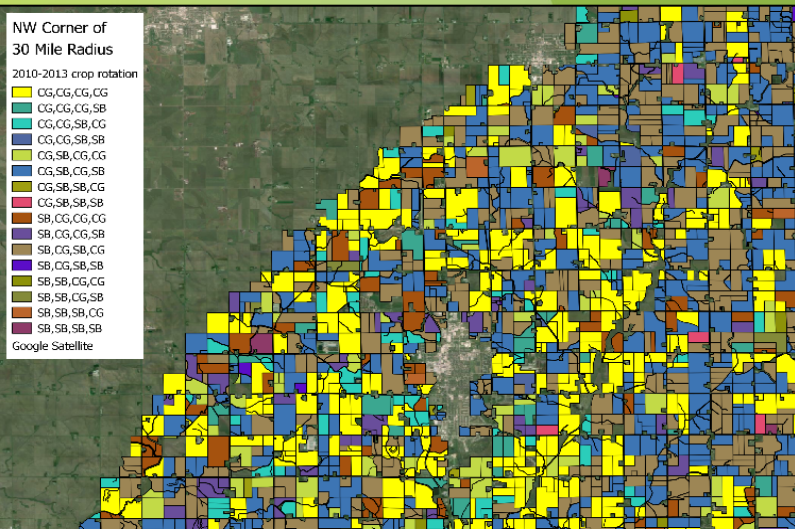
Profitability
(\$ / acre)

- 550 - -250
- 250 - -150
- 150 - -100
- 100 - -50
- 50 - 0
- 0 - 50
- 50 - 200



2010 - 2013
Non-Profitability
(total non-profitable acres)

- 0 - 15,000
- 15,000 - 30,000
- 30,000 - 40,000
- 40,000 - 55,000
- 55,000 - 70,000
- 70,000 - 85,000
- 85,000 - 106,000



NW Corner of
30 Mile Radius

2010-2013 crop rotation

- CG,CG,CG,CG
- CG,CG,CG,SB
- CG,CG,SB,CG
- CG,CG,SB,SB
- CG,SB,CG,CG
- CG,SB,CG,SB
- CG,SB,SB,CG
- CG,SB,SB,SB
- SB,CG,CG,CG
- SB,CG,CG,SB
- SB,CG,SB,CG
- SB,CG,SB,SB
- SB,SB,CG,CG
- SB,SB,CG,SB
- SB,SB,SB,CG
- SB,SB,SB,SB

Google Satellite

Year	Acres not profitable	Acres with loss >\$200/acre
2010	6,960,494	1,999,639
2011	5,785,424	1,564,059
2012	16,282,478	3,476,371
2013	10,384,392	1,821,062
All 4 Years	4,836,364	1,259,901

Questions?