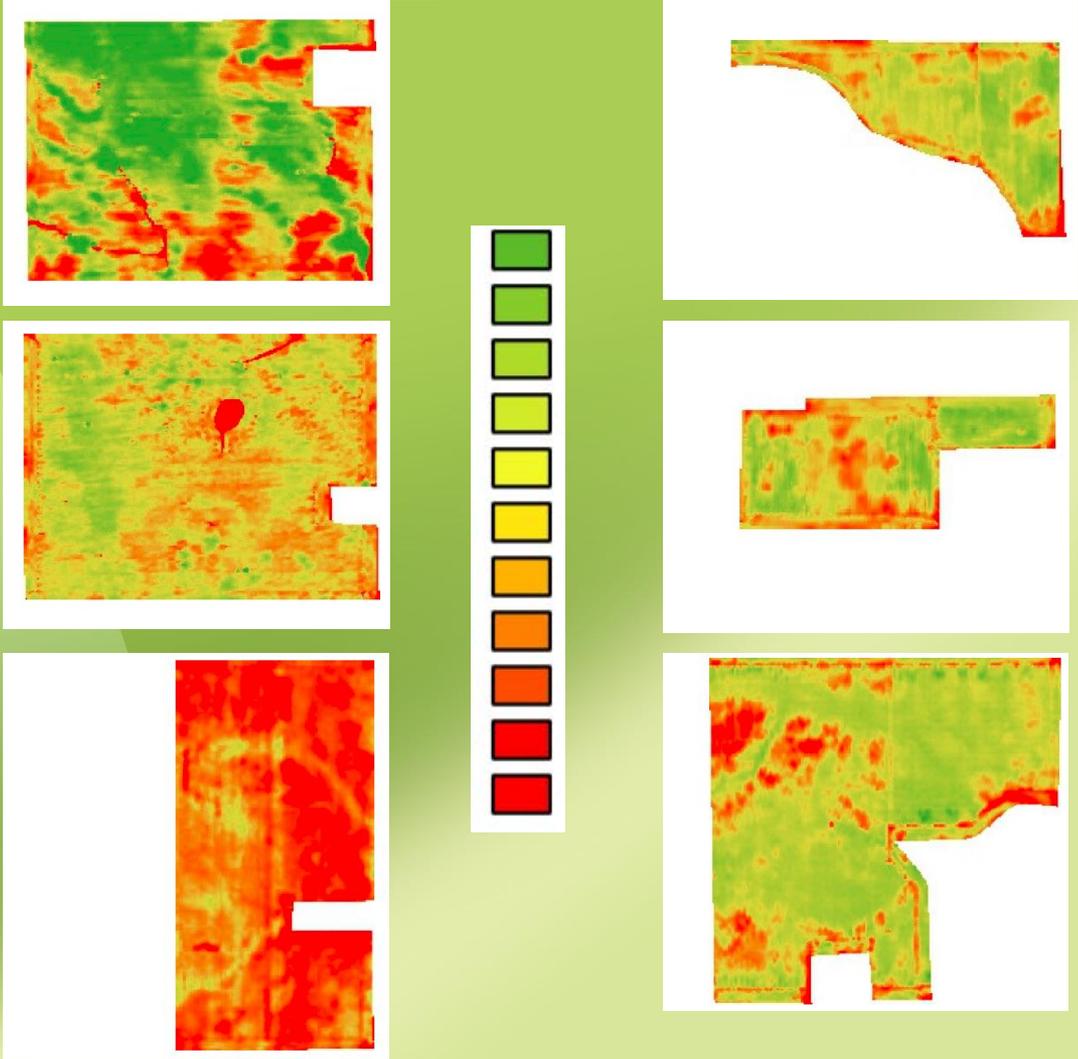


The Subfield Business Case for a Landscape Design Approach

July 11th 2017

David Muth Jr., PhD

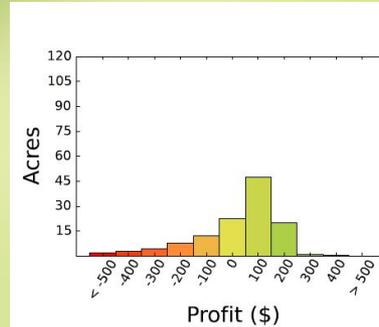
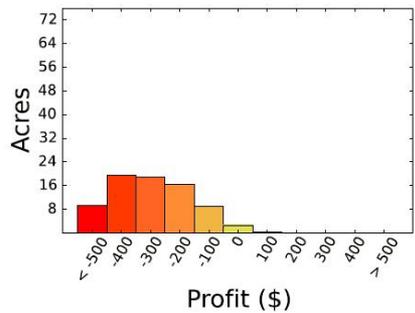
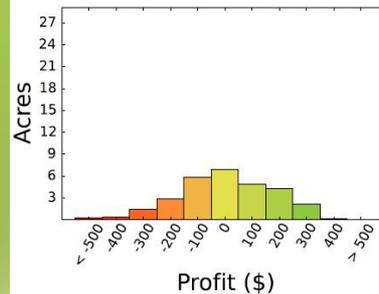
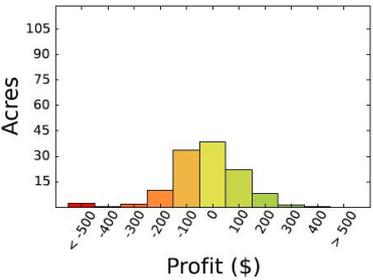
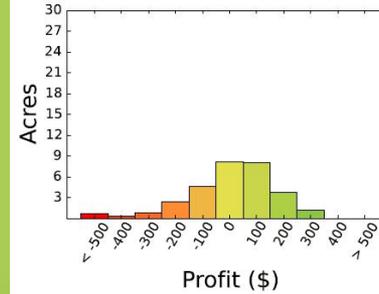
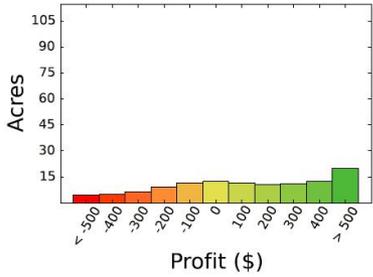
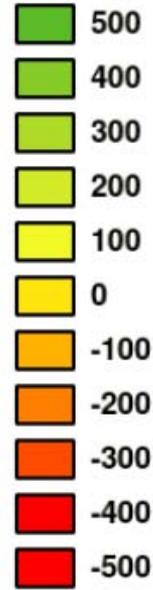
Subfield Variability



Understanding Subfield Profit and ROI



Profit (\$/ac)



Key Message

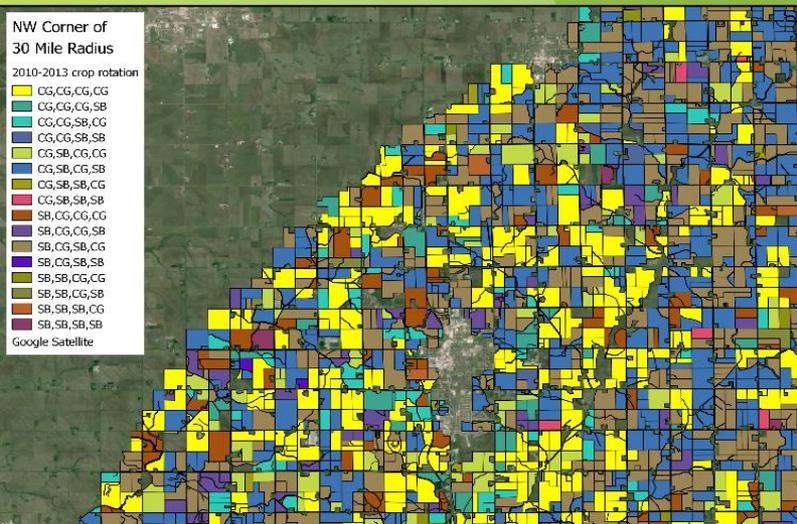
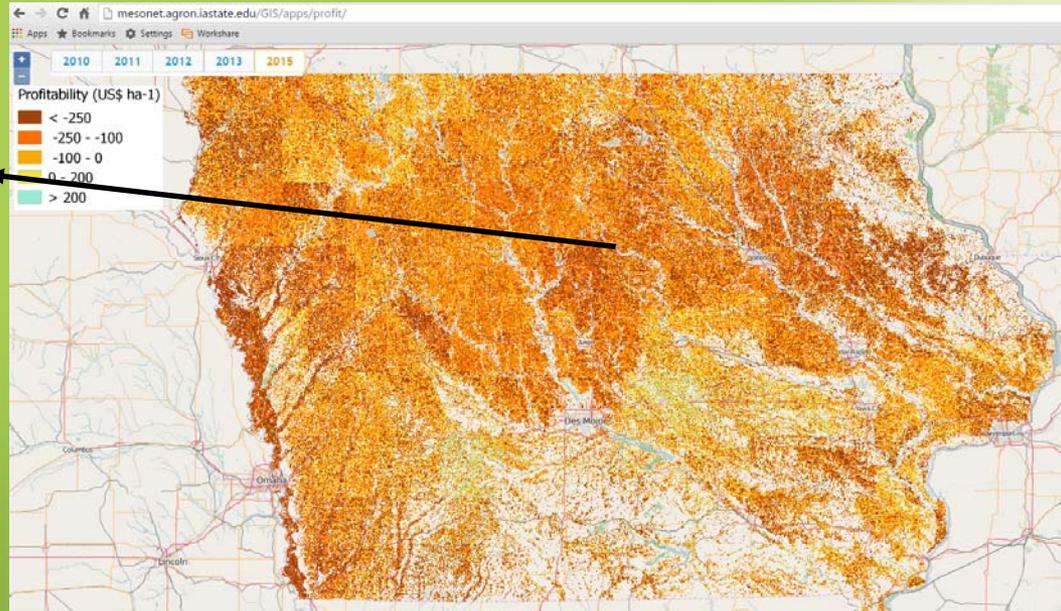
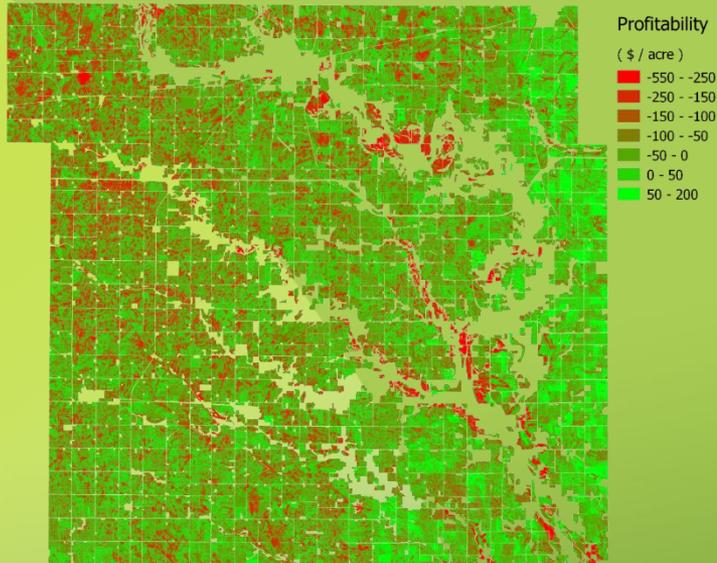


Environmental Performance and Economic Performance are driven by the same goal:

Maximize the output per unit of input



Identifying the Opportunities



- Between 2-3 million acres annually at an expected loss
- Over \$1B annually in misallocated working capital

Large Scale Project: What is the economic story?



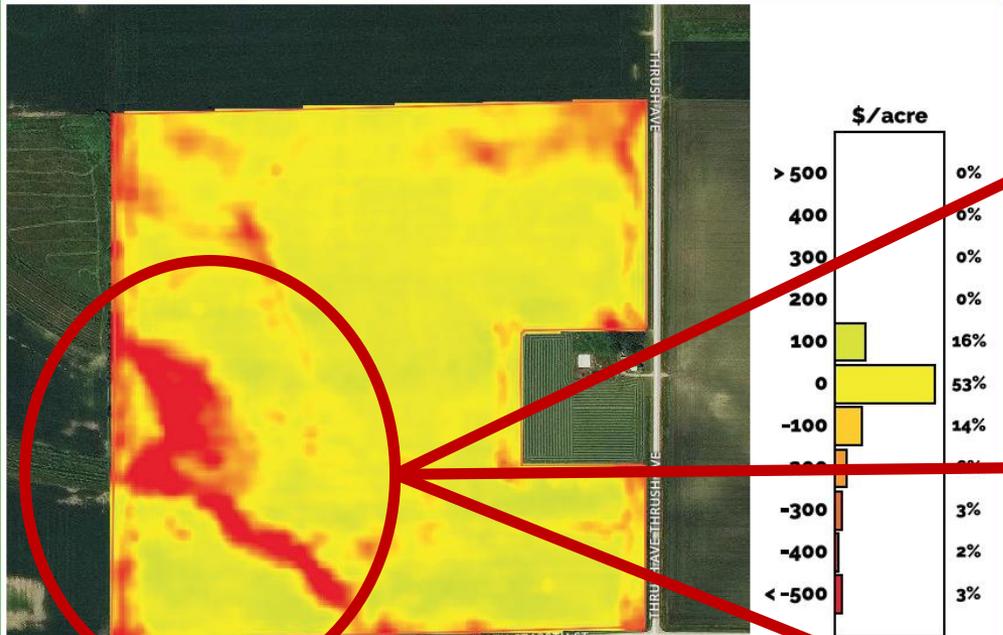
Parameter	Total
number of fields	3,796
total acres	207,937
total acre-years analyzed	641,998
average years of data per field	3.1
average acres per field	54.8
total profit	\$ 5,703,472
per field total profit (all years)	\$ 1,502
average per acre profit (all years)	\$ 27.43
average max annual per acre profit	\$ 128.23
average min annual per acre profit	\$ (147.78)
total revenue	\$ 405,192,182
total expenses	\$ 399,488,710
total annualized ROI	0.46%



National Scale Dataset – Economic and Resource Concerns



Profitability Distribution

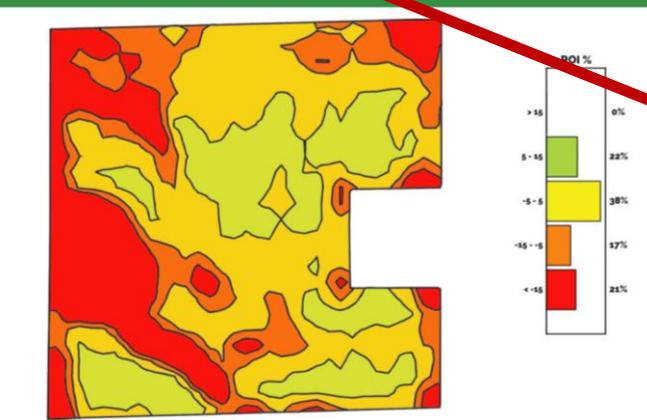


90.4% of fields in the project had multi-year zones with economic losses

51.8% of the acres analyzed are in a multi-year zone with negative ROI

53.2% of the negative return zones have potential resource concerns

ROI Zones



National Scale Dataset – Economic and Resource Concerns



ROI Zone	Total Erosion (tons/ac/yr)	SOC Change (lbs/ac/yr)	SCI	NO ₃ Leaching (lbs N/ac/yr)	GHG Flux (tons CO ₂ e/ac/yr)
< -15%	9.6	-158.8	-0.69	46.1	0.50
-5% to -15%	8.2	-115.2	-0.57	42.1	0.44
5% to -5%	5.9	-109.6	-0.41	43.3	0.42
15% to 5%	4.2	-85.0	-0.39	40.2	0.42
> 15%	5.4	-35.8	-0.33	34.9	0.34

- Average for each of the environmental metrics across each category of ROI Zone

Precision Business Planning Workflow – Alternative Systems as a Business Decision



Scenario: Actual Production

Parameter	Value
Field Acreage	143.3 ac
Average Yield	170.2 bu/ac
Profit	\$49.63/acre
ROI	6.2 %
Production Efficiency	212.4 bu/\$1000
Acreage Opportunity Ratio	23 %
Working Capital Opportunity	\$25,973.83
Total Field Expenses	\$114,800.50
Total Field Revenue	\$121,912.06
Total Field Profit	\$7,111.56



Scenario: Conservation-Final

Parameter	Value
Field Acreage	143.3 ac
Average Yield	179.2 bu/ac
Profit	\$93.85/acre
ROI	12.6 %
Production Efficiency	239.7 bu/\$1000
Acreage Opportunity Ratio	22 %
Working Capital Opportunity	\$19,494.23
Total Field Expenses	\$107,085.95
Total Field Revenue	\$120,534.99
Total Field Profit	\$13,449.04

Precision Business Planning Workflow – Alternative Systems as a Business Decision

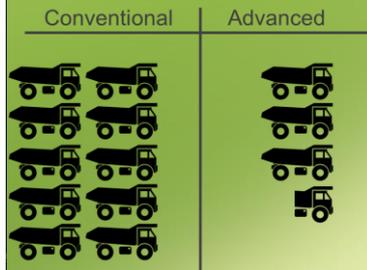


	Conventional Management	Advanced Management
Annual Soil Loss (tons of soil)	204	69
Annual Soil Carbon Change (lbs C)	8,137	44,341
Annual Nitrate Loss (lbs NO3)	7,779	3,442
Annual CO2 Loss (lbs CO2)	751,311	717,169

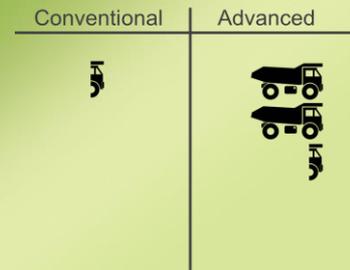
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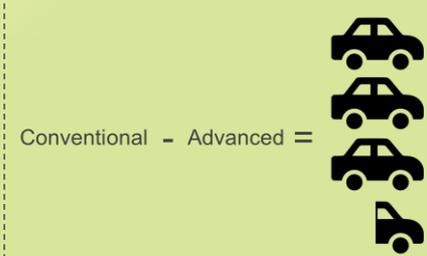
Soil Erosion



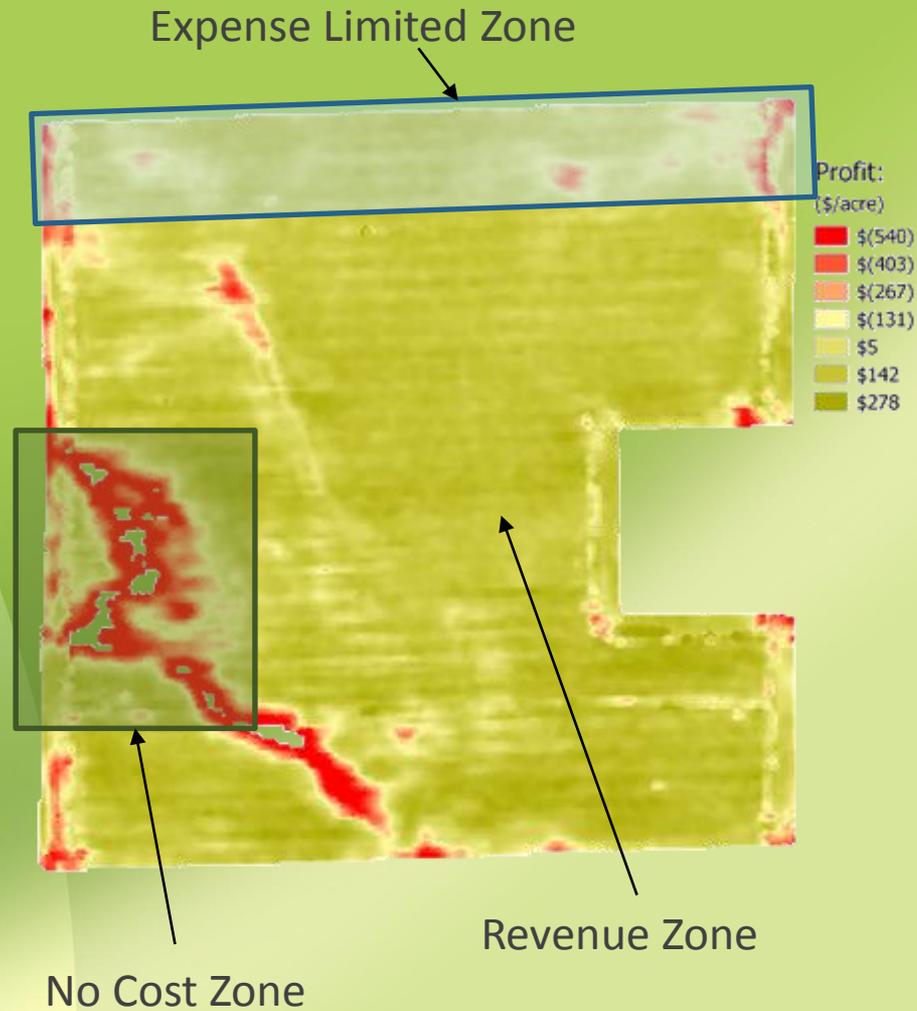
Soil Carbon



CO₂ Gas Flux



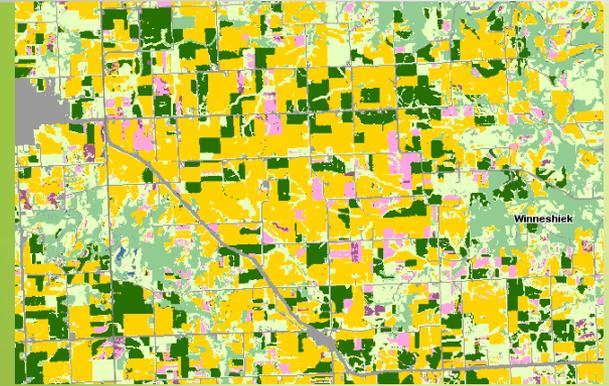
ROI Focused Management Systems



LD Energy Crop Scenarios



- Existing conservation acres
- Turning headlands and buffer zones
- Precision prairie strips
- Non-profitable zones



Questions?