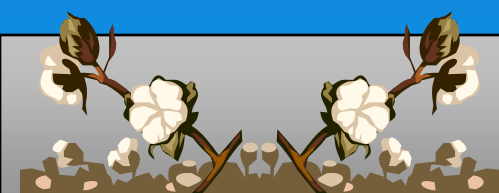
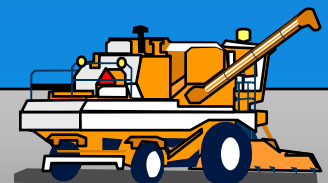


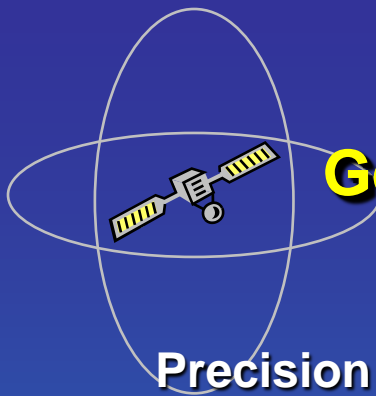
# Delineating Management Zones for Variable Rate Fertilizer

Michael J. Buschermohle  
Precision Agriculture Specialist  
University of Tennessee  
Biosystems Engineering and Soil Science



 Precision Agriculture  
University of Tennessee Extension





# Geographic Information System Software

## Precision Agriculture Software

Map Shots [www.mapshots.com](http://www.mapshots.com)

EASi Suite Farm

EASi Suite Multi-Client

EASi Suite Professional

Farm Works [www.farmworks.com](http://www.farmworks.com)

Farm Site

Site Pro

Site Mate

AgLeader [www.agleader.com](http://www.agleader.com)

SMS Basic

SMS Advanced

SMS Mobile

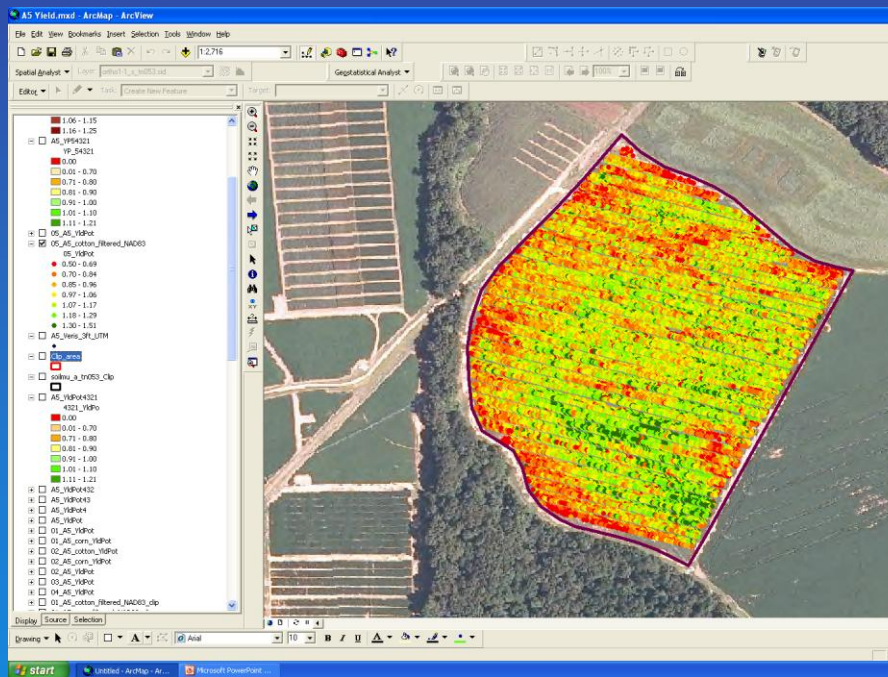
SST [www.sstsoftware.com](http://www.sstsoftware.com)

SSToolbox

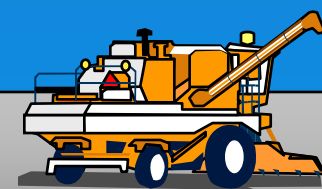
SST Stratus

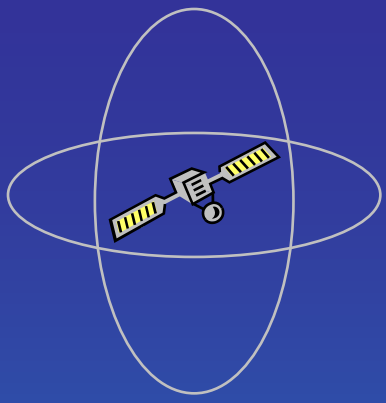
John Deere [www.deere.com](http://www.deere.com)

Apex



**UT** Precision Agriculture  
University of Tennessee Extension



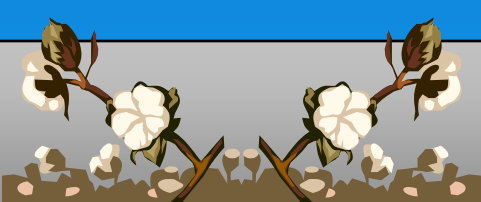


# Spatial Data From the Internet

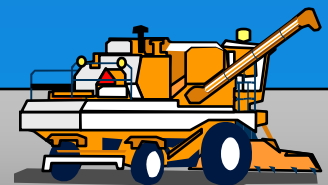
USDA NRCS

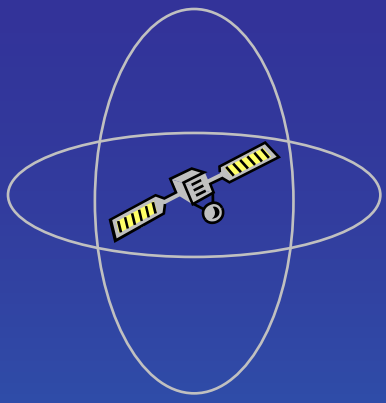
<http://datagateway.nrcs.usda.gov>

- Hydrologic Units
- Topographic Images
- Aerial Imagery
- Soils maps
- Temperature Maps
- Precipitation Maps

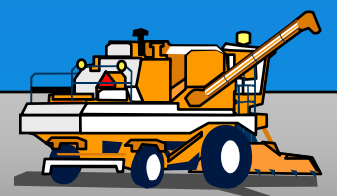
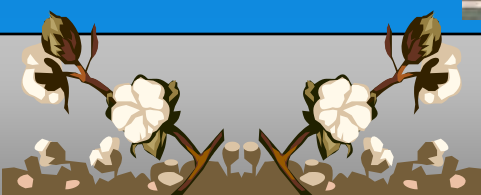


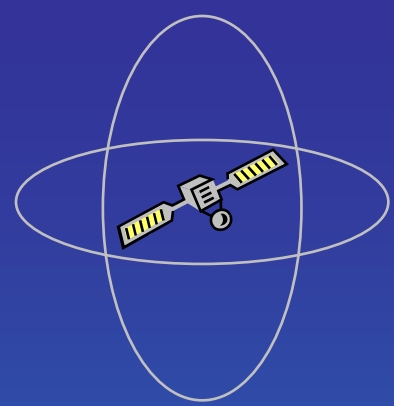
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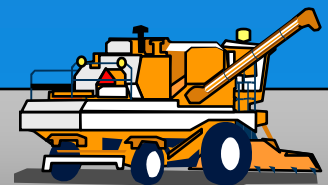
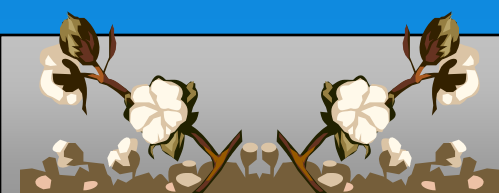
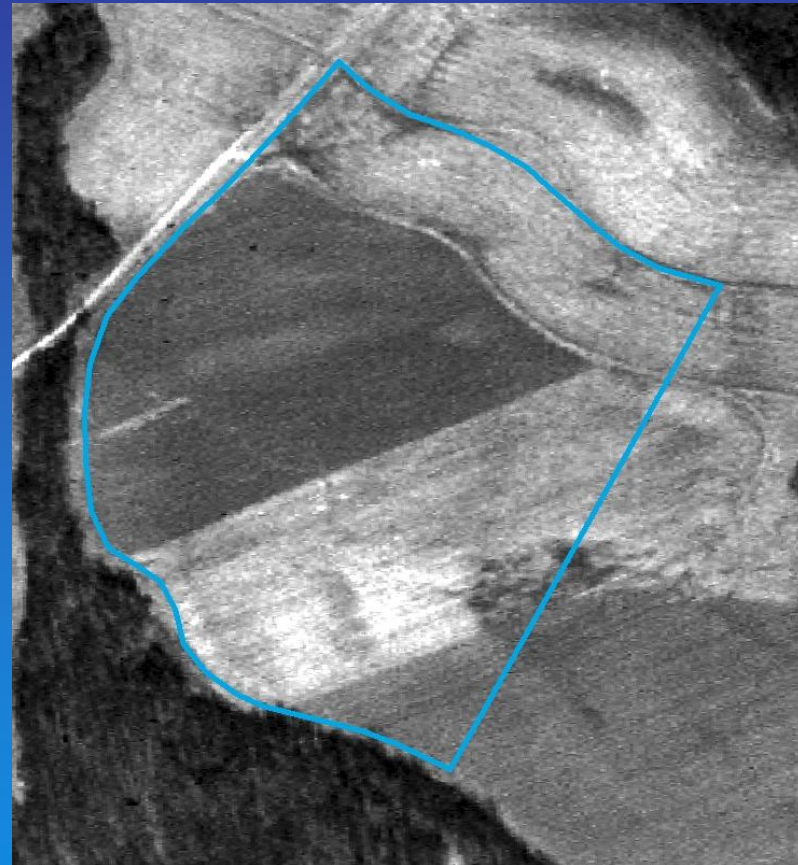
# Example Field

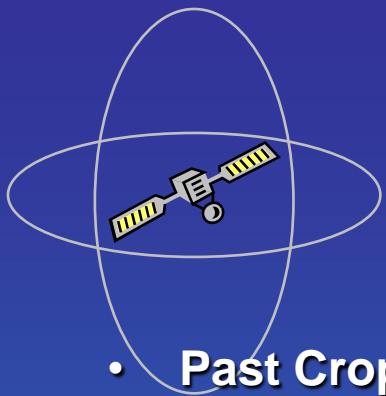




# Delineating Management Zones

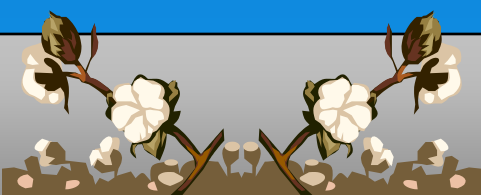
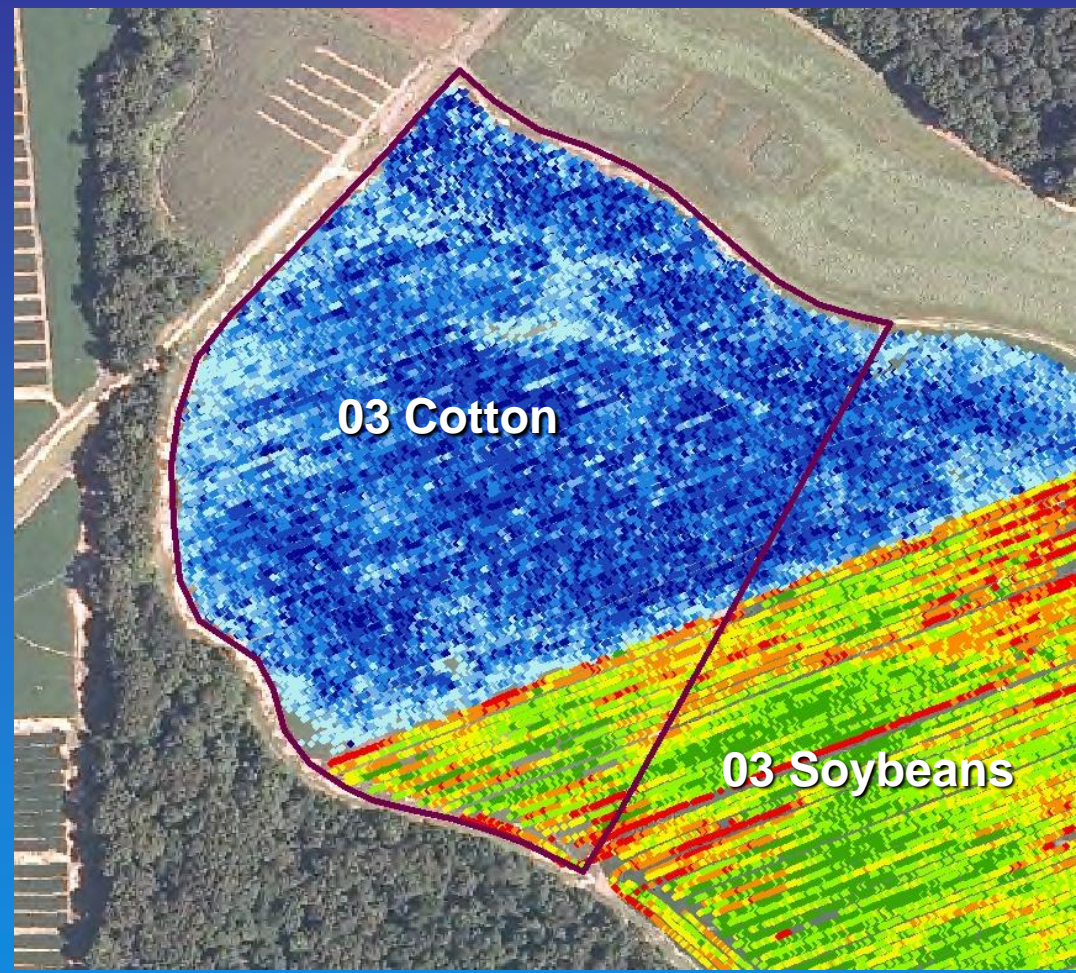
- Old Field Boundaries

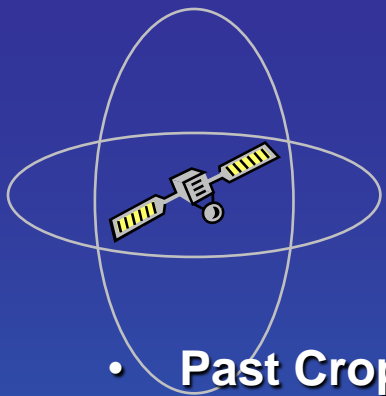




- Past Cropping History

## Historical Information

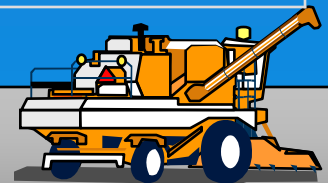
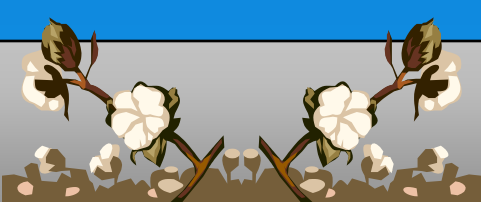


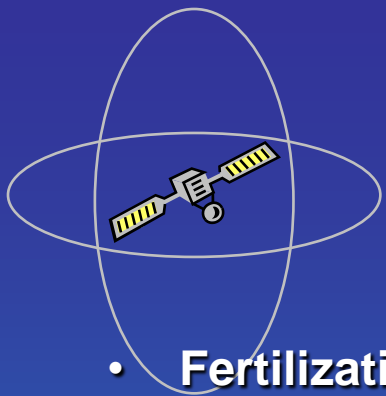


# Historical Information

- Past Cropping History

Year	Crop	Avg. Yield
01	Corn	153 bu/ac
	Cotton	2 ba/ac
02	Corn	117 bu/ac
	Cotton	2.25 ba/ac
03	Wheat	57 bu/ac
	Beans	49 bu/ac
	Cotton	2.1 ba/ac
04	Corn	178 bu/ac
05	Cotton	2.3 ba/ac





# Historical Information

- Fertilization History

Good Years:

80 lbs/ac K

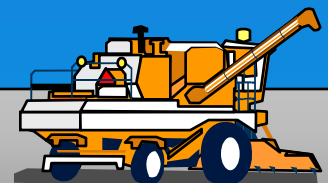
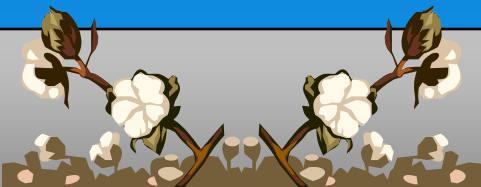
80 lbs/ac P

Lean Years:

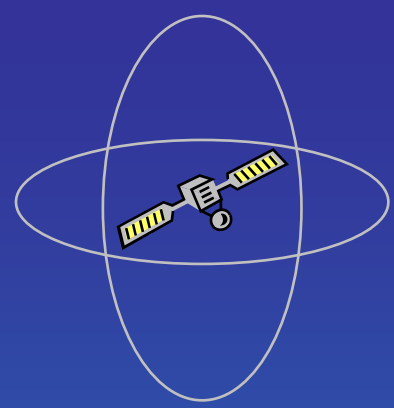
60 lbs/ac K

60 lbs/ac P

I Don't Skimp on Nitrogen





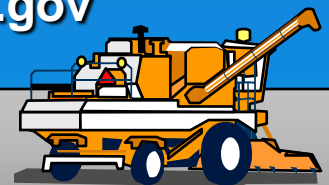
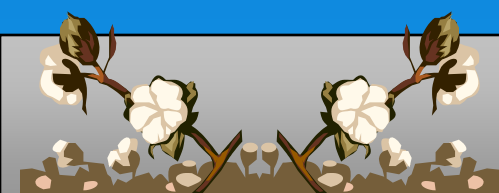


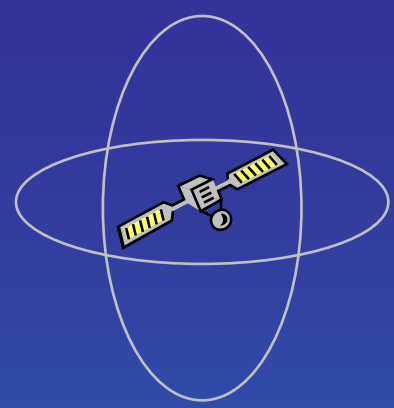
# Delineating Management Zones

- Aerial Imagery



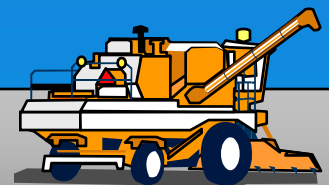
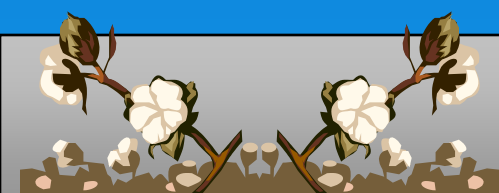
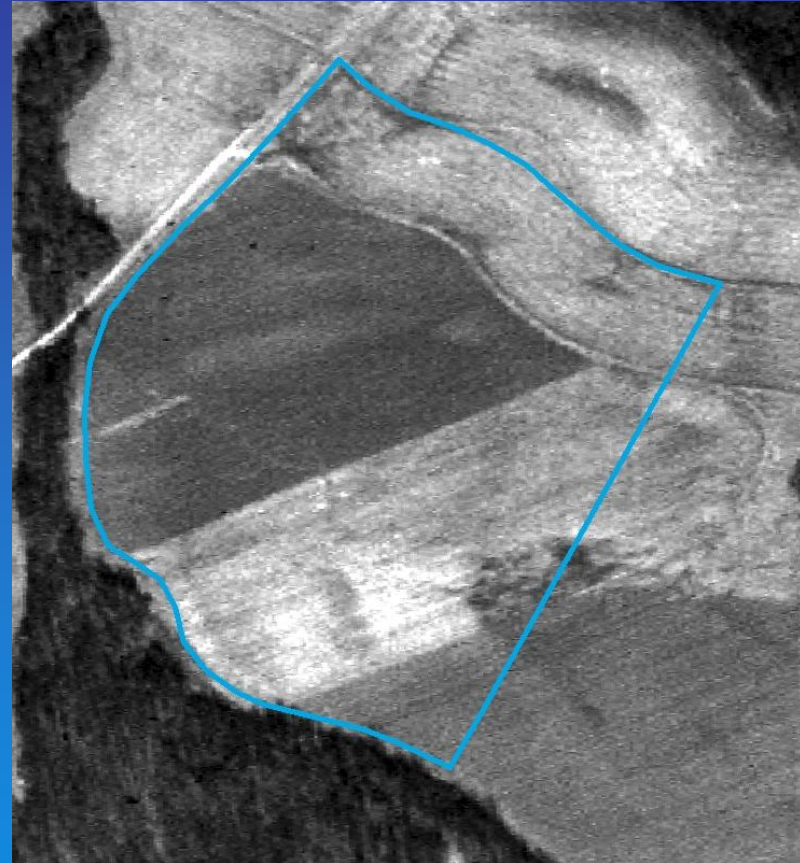
<http://datagateway.nrcs.usda.gov>

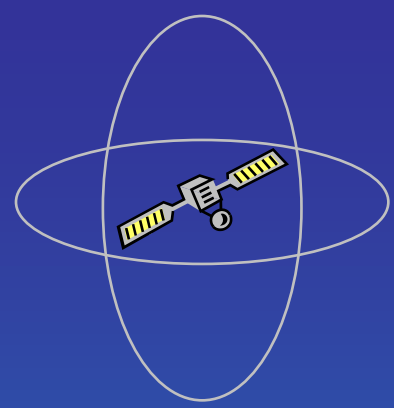




# Delineating Management Zones

- Bare Soil Aerial Photo



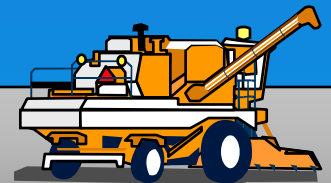
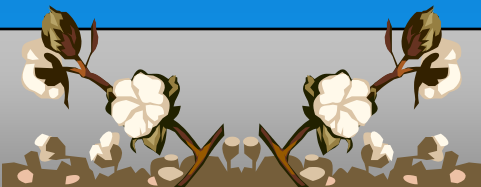


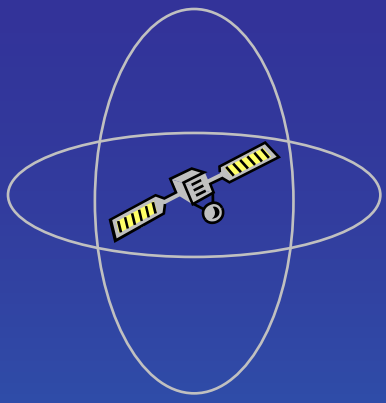
## Delineating Management Zones

- Topo Map



<http://datagateway.nrcs.usda.gov>



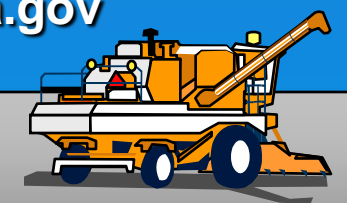
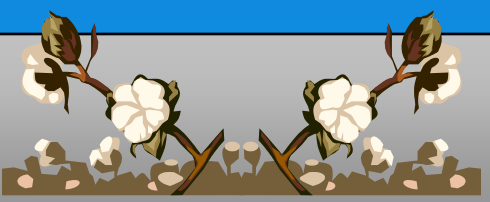


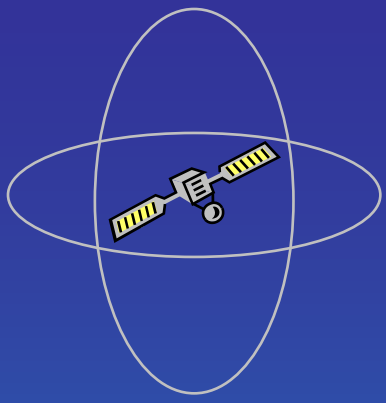
# Delineating Management Zones

- Digital Soil Map



<http://datagateway.nrcs.usda.gov>



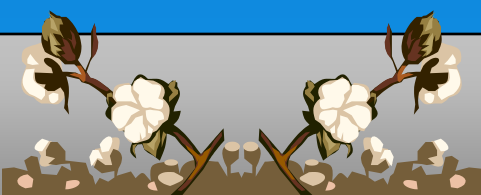


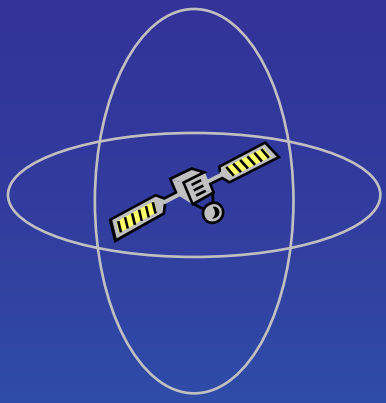
# Delineating Management Zones

- Soil Electrical Conductivity

3 ft. Depth

Range  
5.6 – 27.8 (mSiem/m)



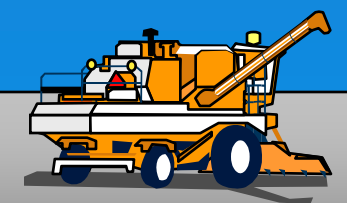
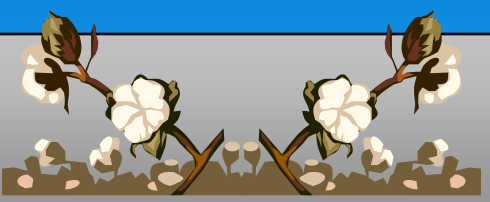


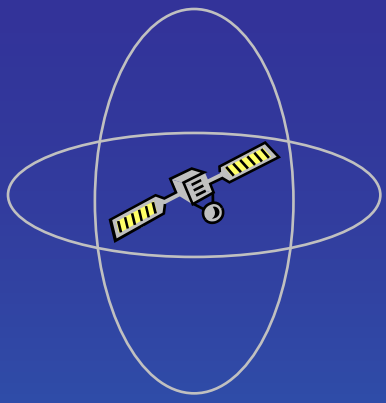
# Delineating Management Zones

- Soil Electrical Conductivity

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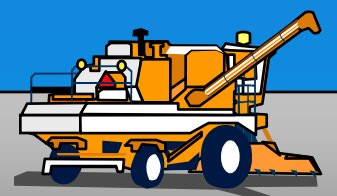
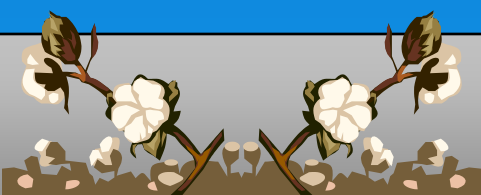
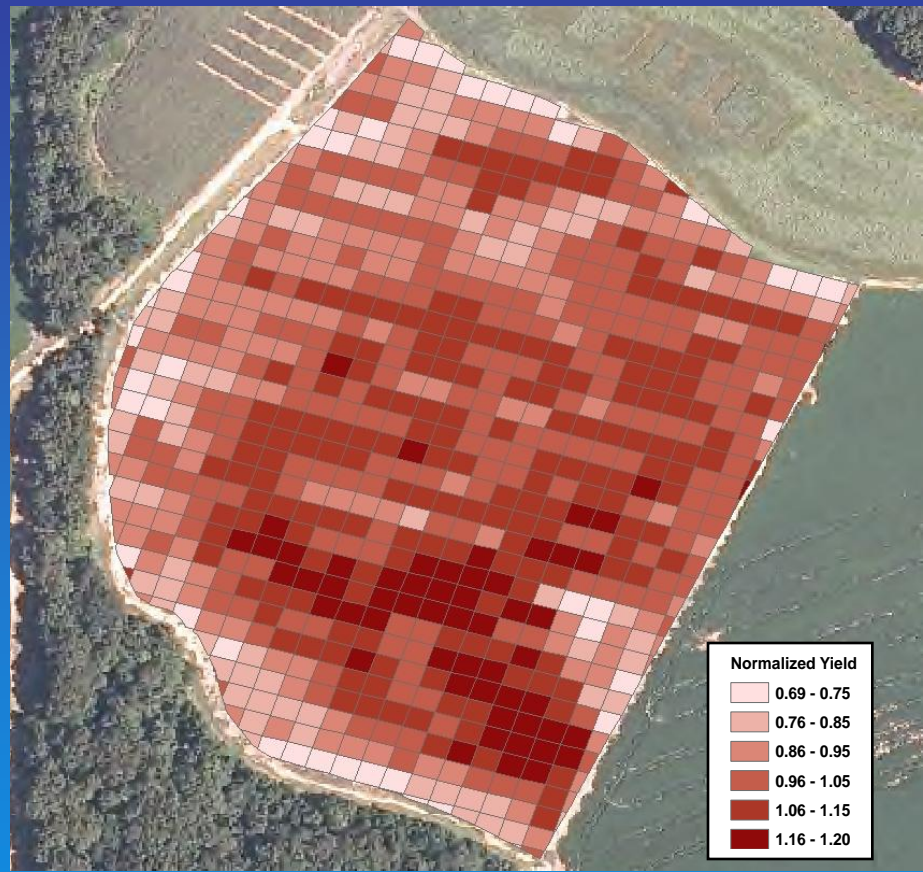




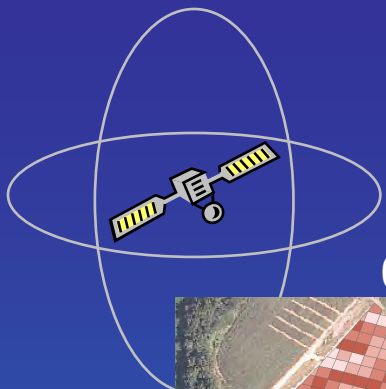
# Delineating Management Zones

- Yield Stability

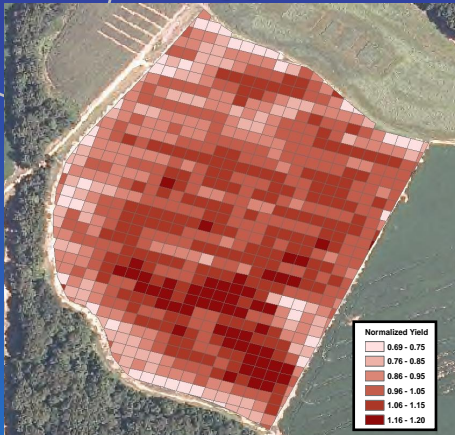
Normalized Yield



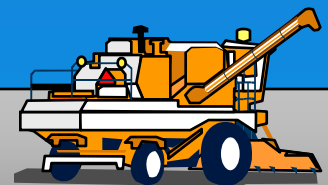
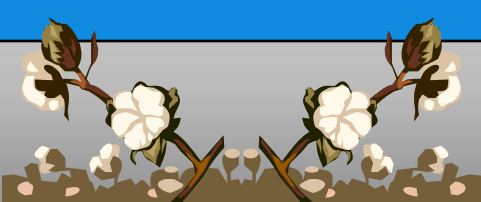
# Delineating Management Zones



05

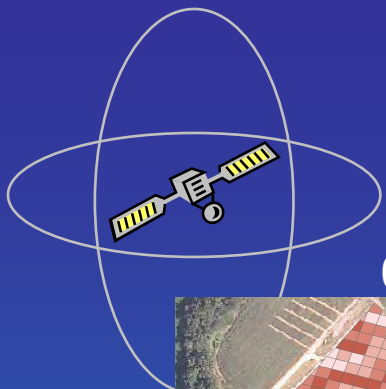


Yield Stability

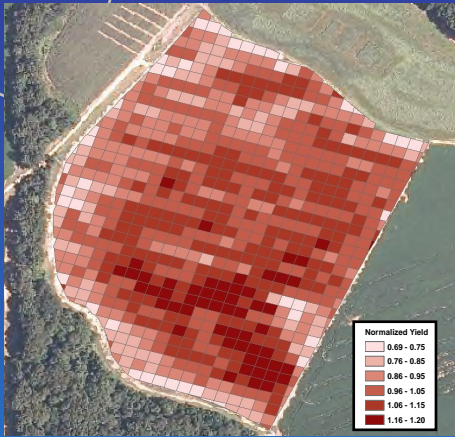




# Delineating Management Zones

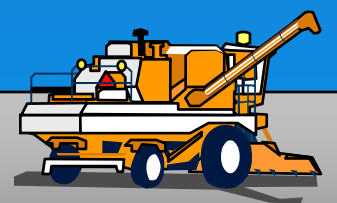
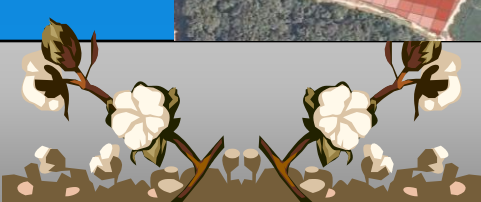


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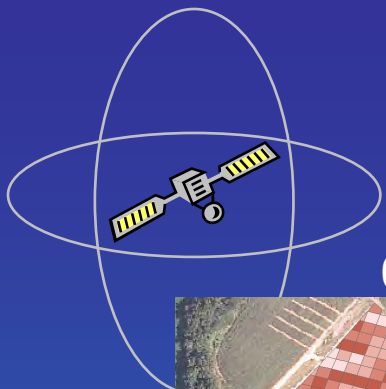


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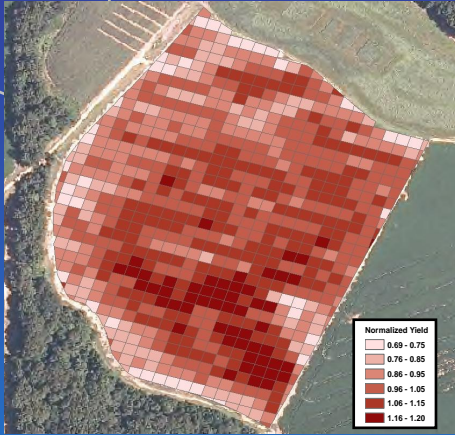
05 - 04



# Delineating Management Zones

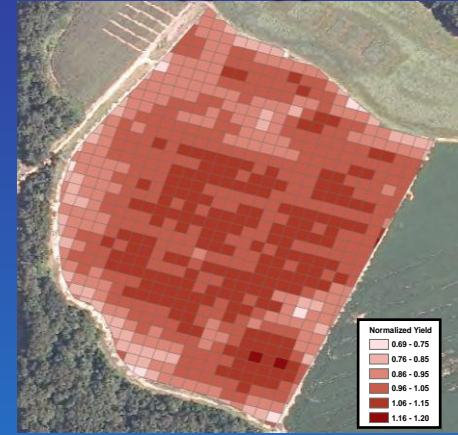


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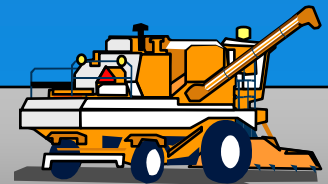
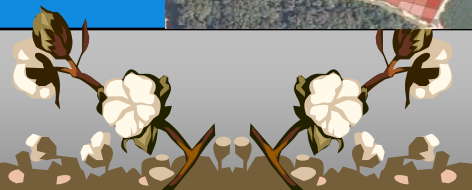


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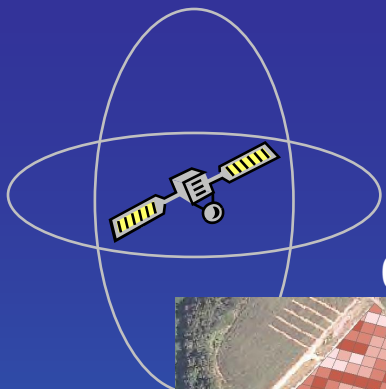
05 - 03



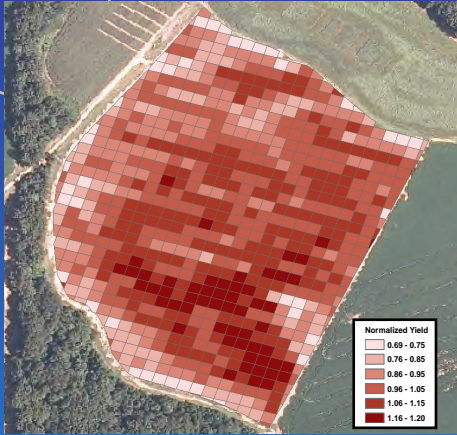
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# Delineating Management Zones

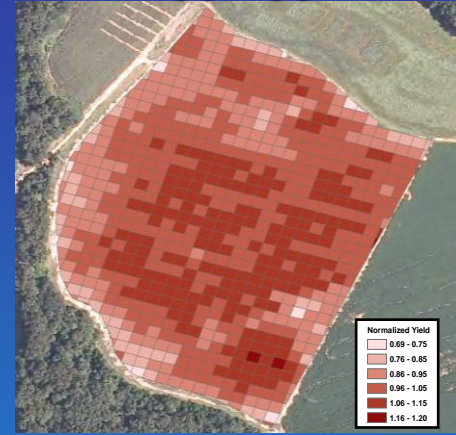


05



Yield Stability

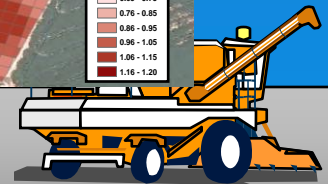
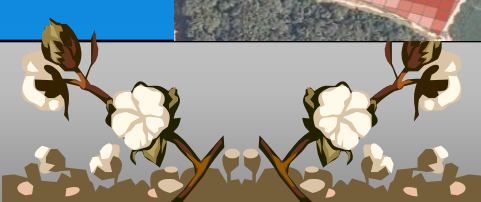
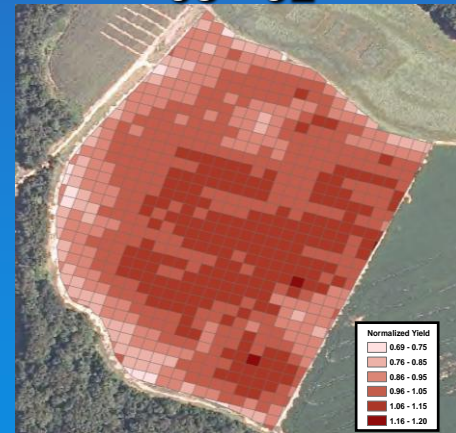
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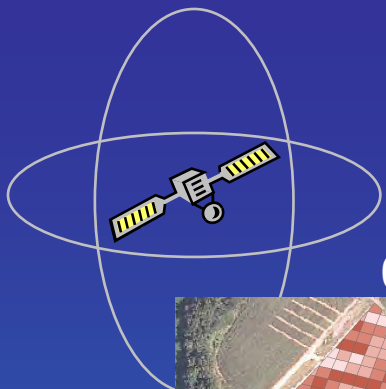
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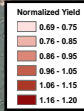
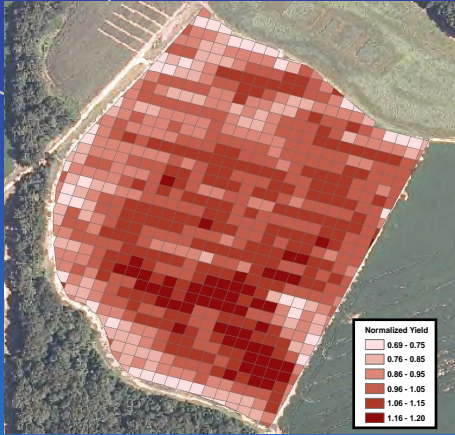
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# Delineating Management Zones

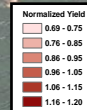
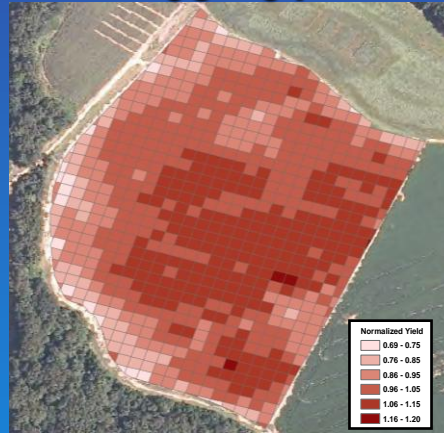


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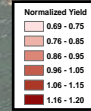
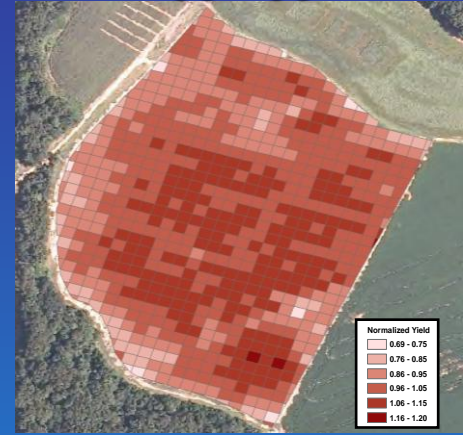


Yield Stability

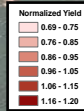
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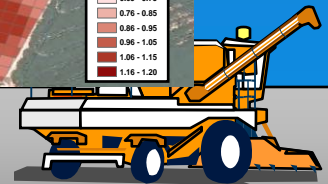
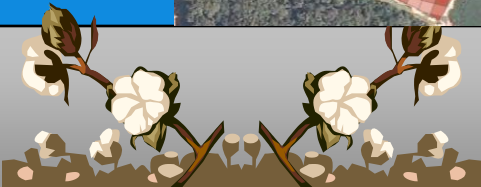
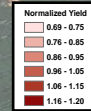
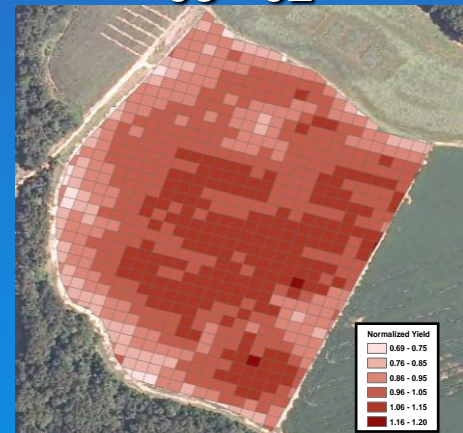
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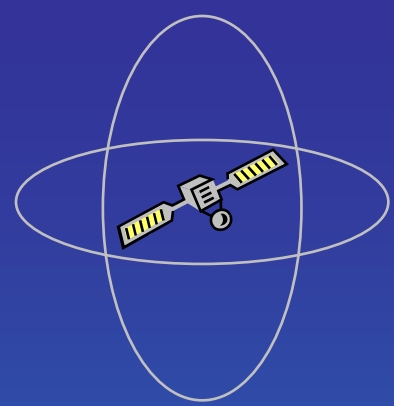


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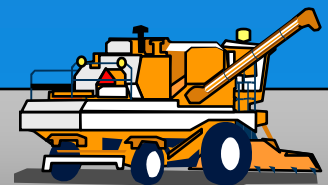
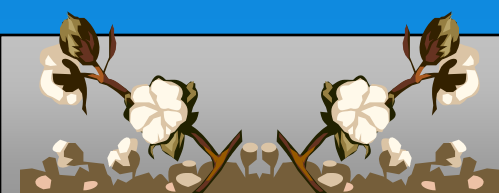
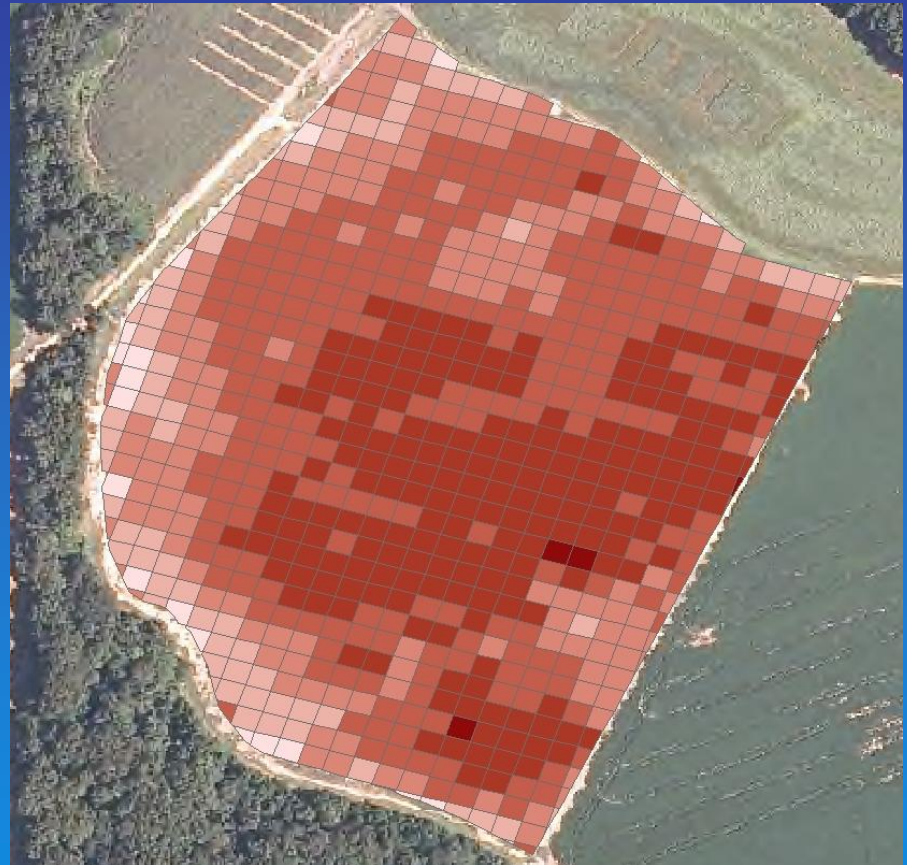
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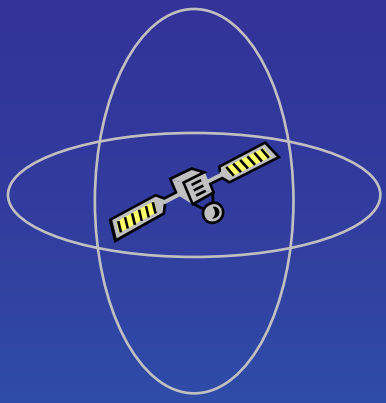




# Delineating Management Zones

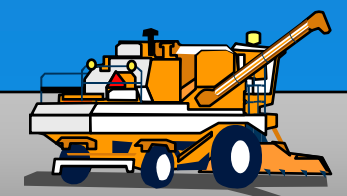
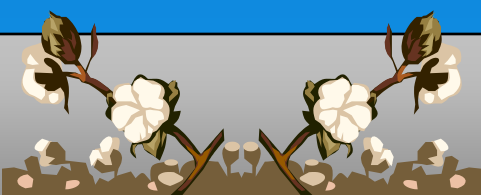
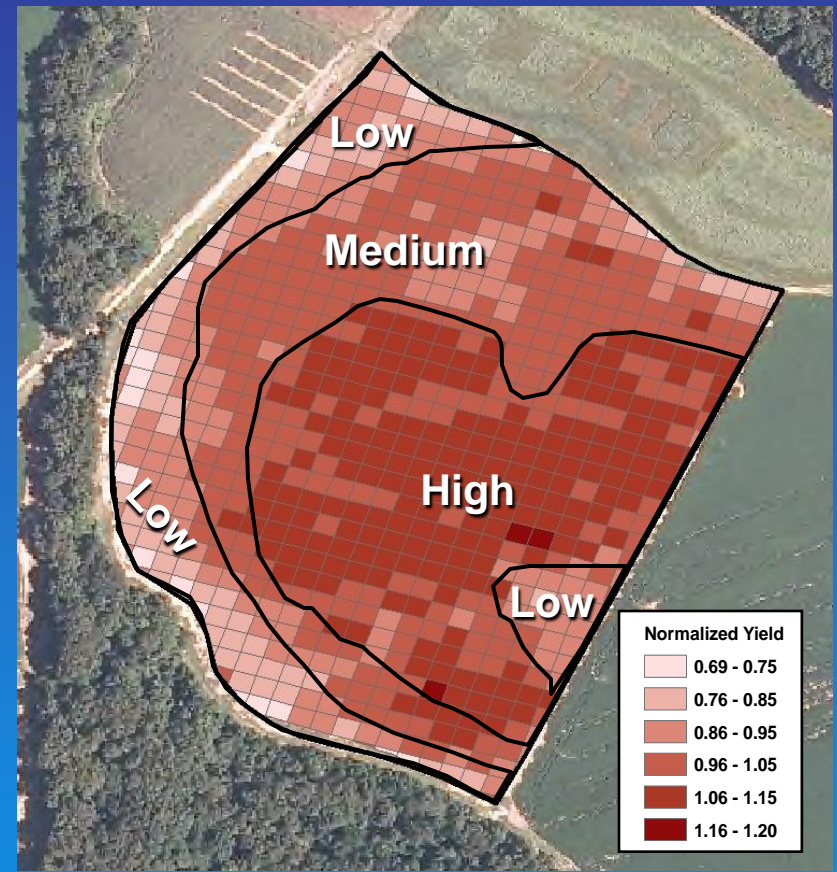
- Management Zones Based on Yield Stability

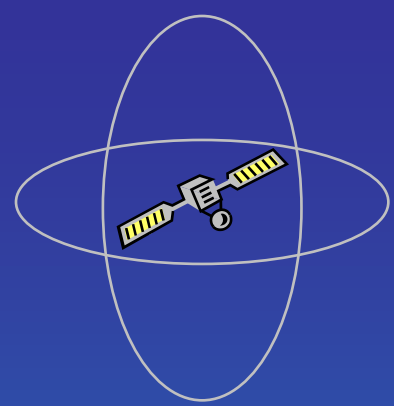




# Delineating Management Zones

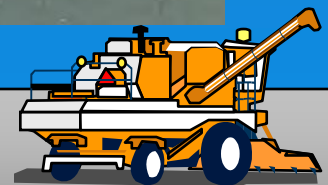
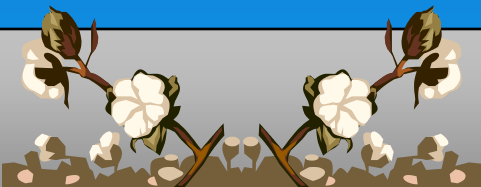
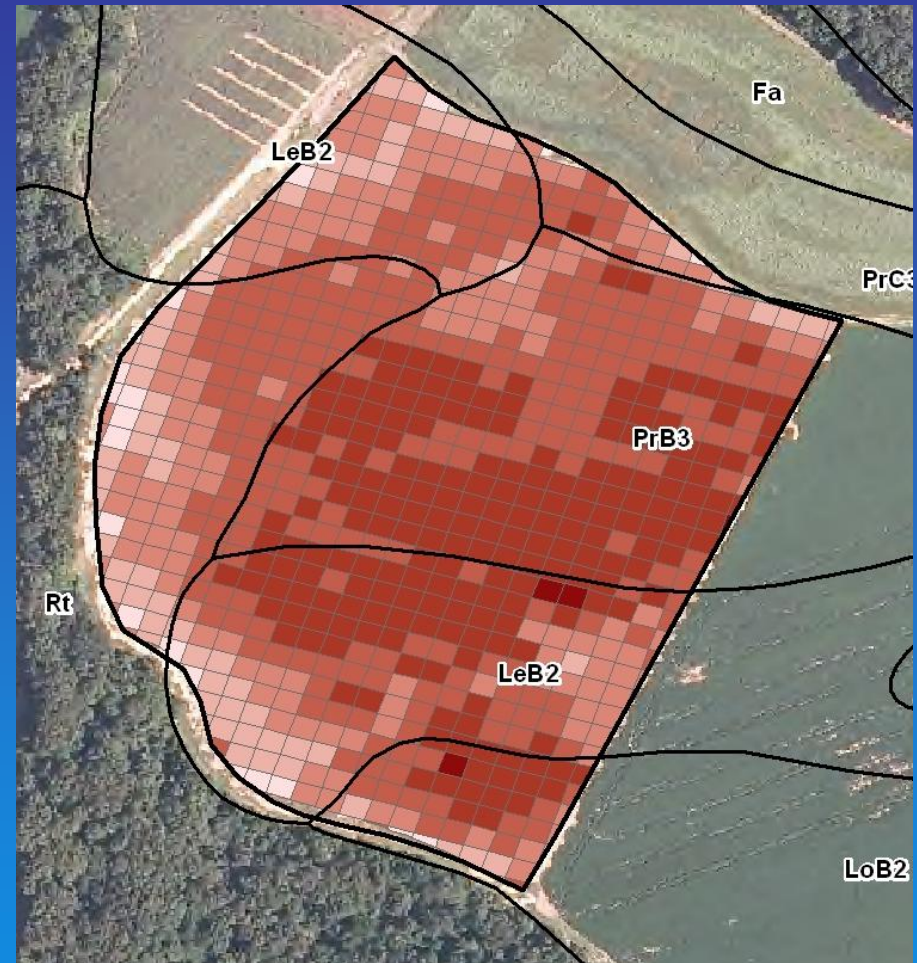
- Management Zones Based on Yield Stability

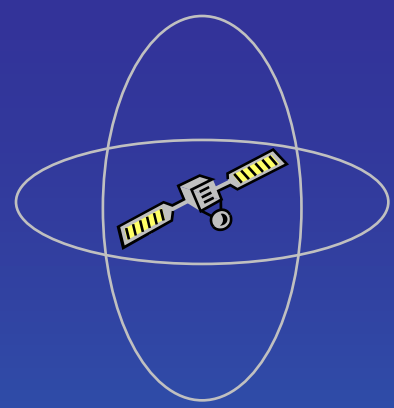




# Delineating Management Zones

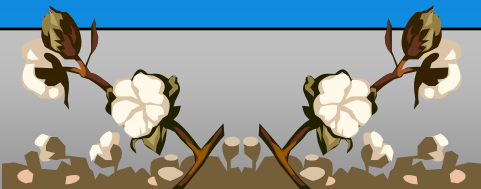
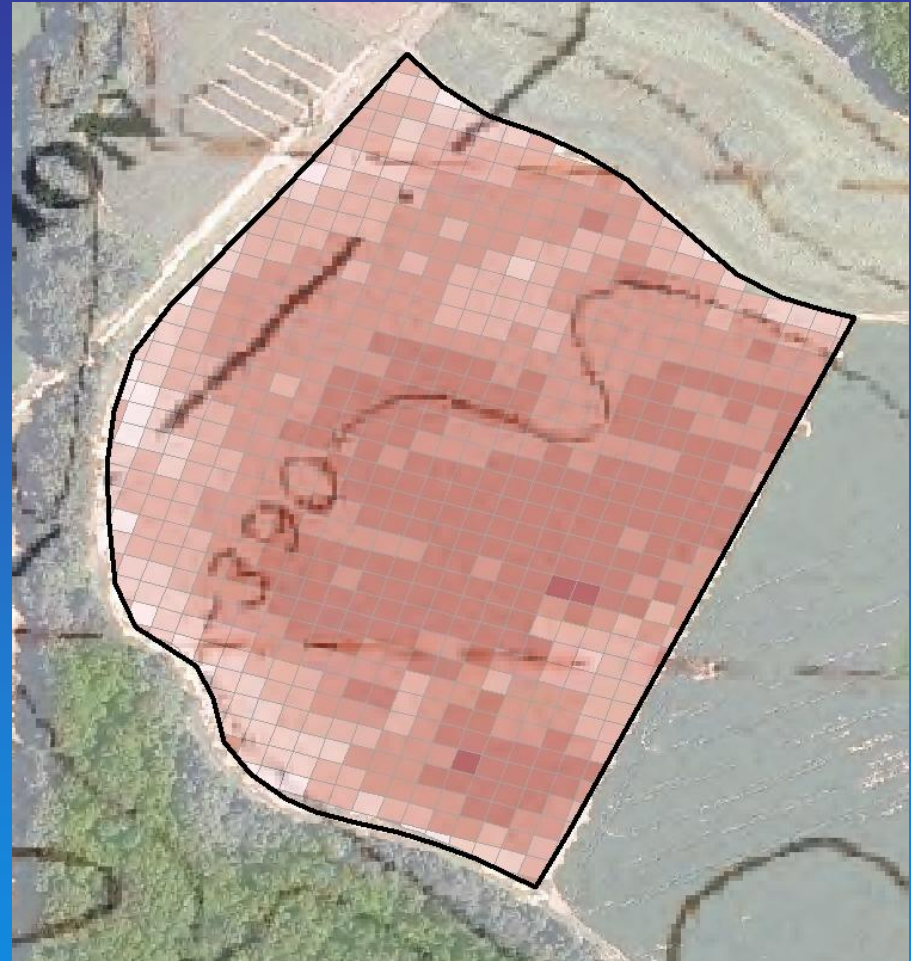
- Digital Soil Map



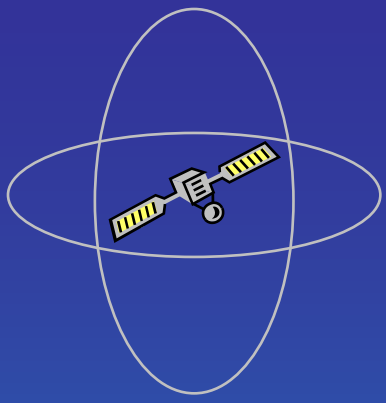


# Delineating Management Zones

- Topo Map





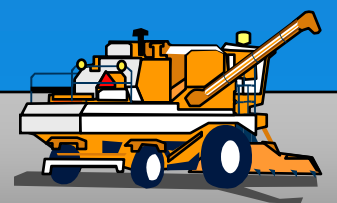
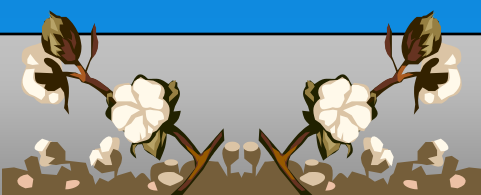
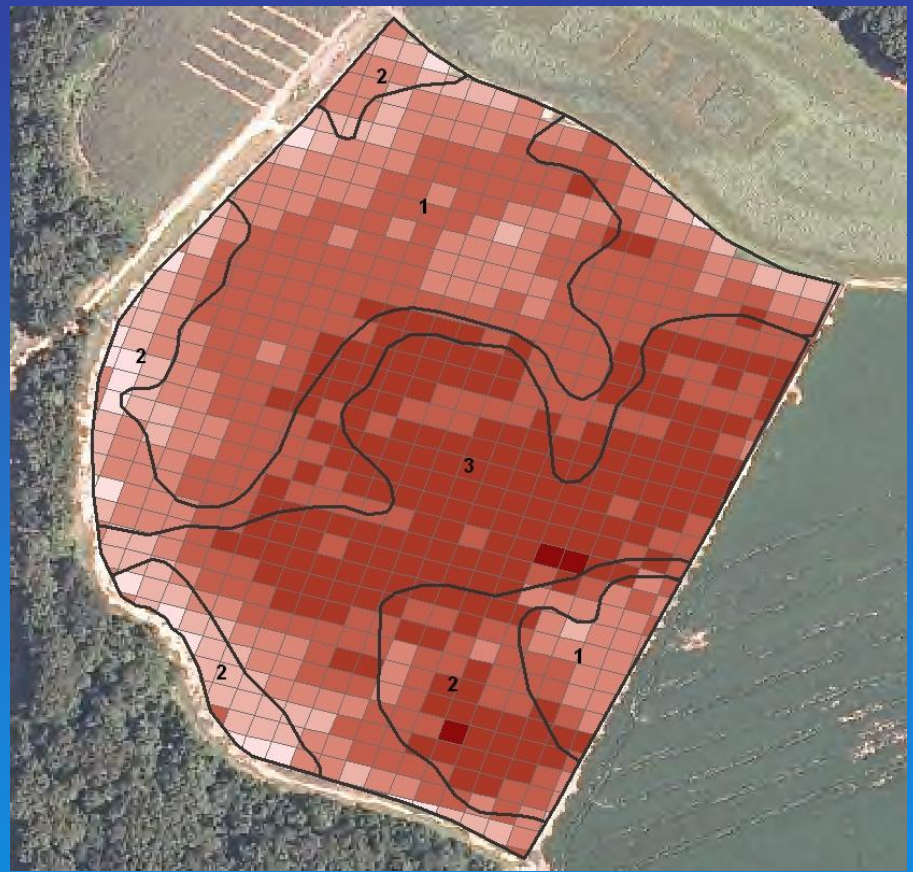


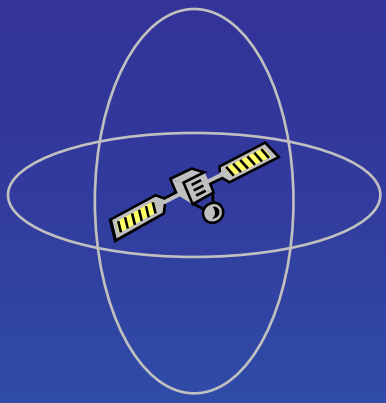
# Delineating Management Zones

- Soil Electrical Conductivity

3 ft. Depth

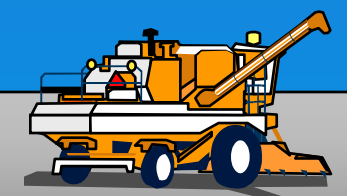
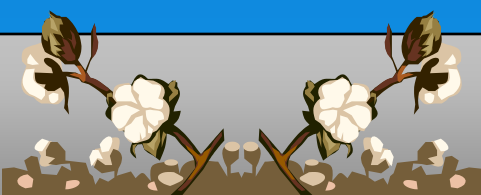
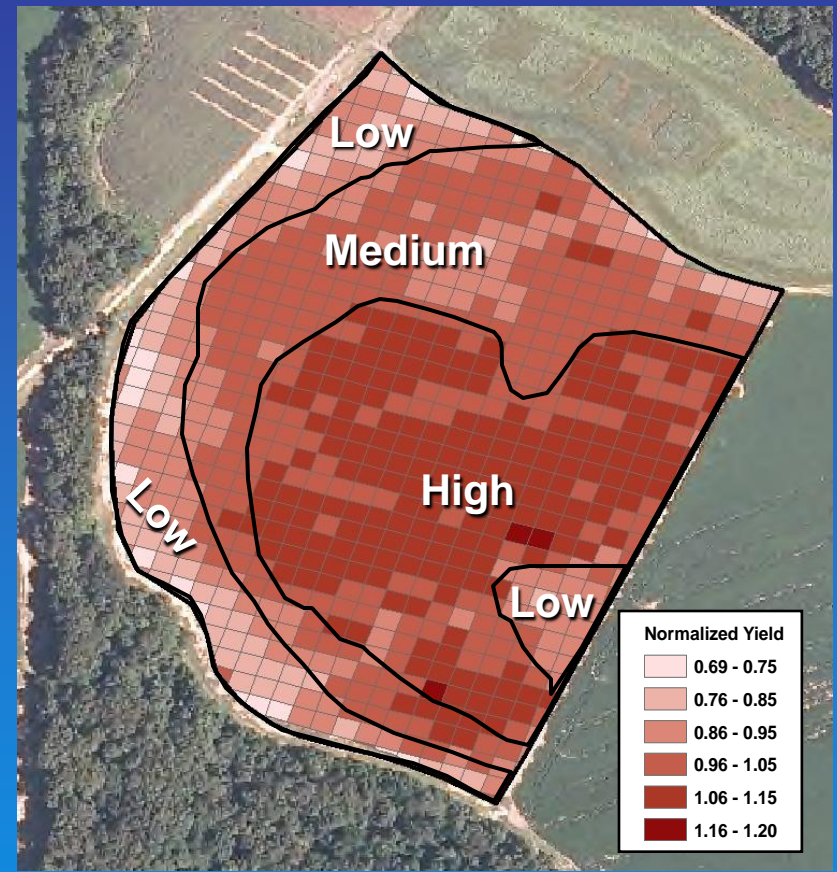
Range  
5.6 – 27.8 (mSiem/m)





# Delineating Management Zones

- What's the Next Step



# Questions

