# Precision Fertilizer Management for Pecan

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# Variable Costs Per Acre: Full Production, 2010

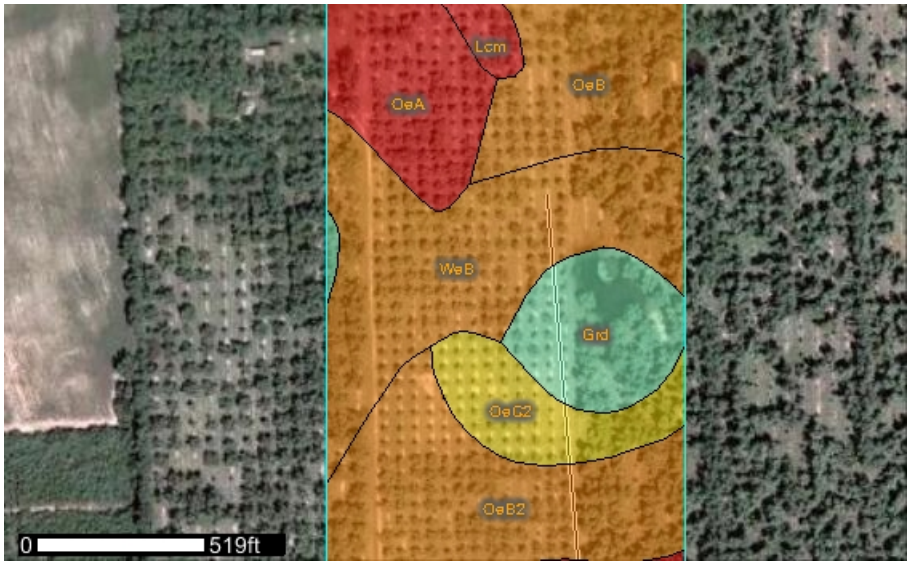
| Unit | Quant. | Price/Unit | Total/A | |
|---|---|---|---|---|
| Lime | 1 ton/A | $30 | $30 | |
| N (46% Urea) | 150 lbs | $0.48 | $72 | |
| P | 40 lbs | $0.51 | $20.57 | 18% |
| K | 60 lbs | $0.39 | $23.75 | |
| Zn Sulfate | 50 lbs | $0.50 | $25 | |
| Foliar Zn | 3 Appl. | $2.00 | $6.00 | |
| Foliar B | 3 Appl. | $1.30 | $3.90 | |
| Fungicides | 8Appl. | $11.13 | $89.06 | |
| Herbicides | 3 Appl | $33.33 | $100 | |
| Insecticides | 10 App. | $10.76 | $107.60 | |
| Fuel Gal | 33 Gal | $2.60 | $85.80 | |
| Irrigation | | | $50 | |
| Irrigation Repairs | | | $20 | |
| Equipment Repairs & Maint. | | | $30.91 | |
| Labor | 25 hrs | $8 | $200 | |
| Interest | 864.59 | 8% | $69.17 | |
| Total 2010 pre-Harvest Variable Costs | | | 933.75 | |

# Fertilizer Application in Pecan Orchards

- Typical fertilizer management involves uniform rates applied over entire orchard

- Orchards in the Southeastern U.S. are highly variable in topography, drainage, soil type, etc.

- Variable soils have:
  - varying capacity to retain nutrients
  - varying yield potentials
  - Potential for low fertilizer use efficiency



# Variable Rate Technology

- Site specific management tool that allows the producer to vary the rate of crop input across a given area
- Potentially provides economic benefit to grower while reducing the application of agrochemicals
- For pecans, the most immediate potential lies in the soil application of P, K, Zn, and lime

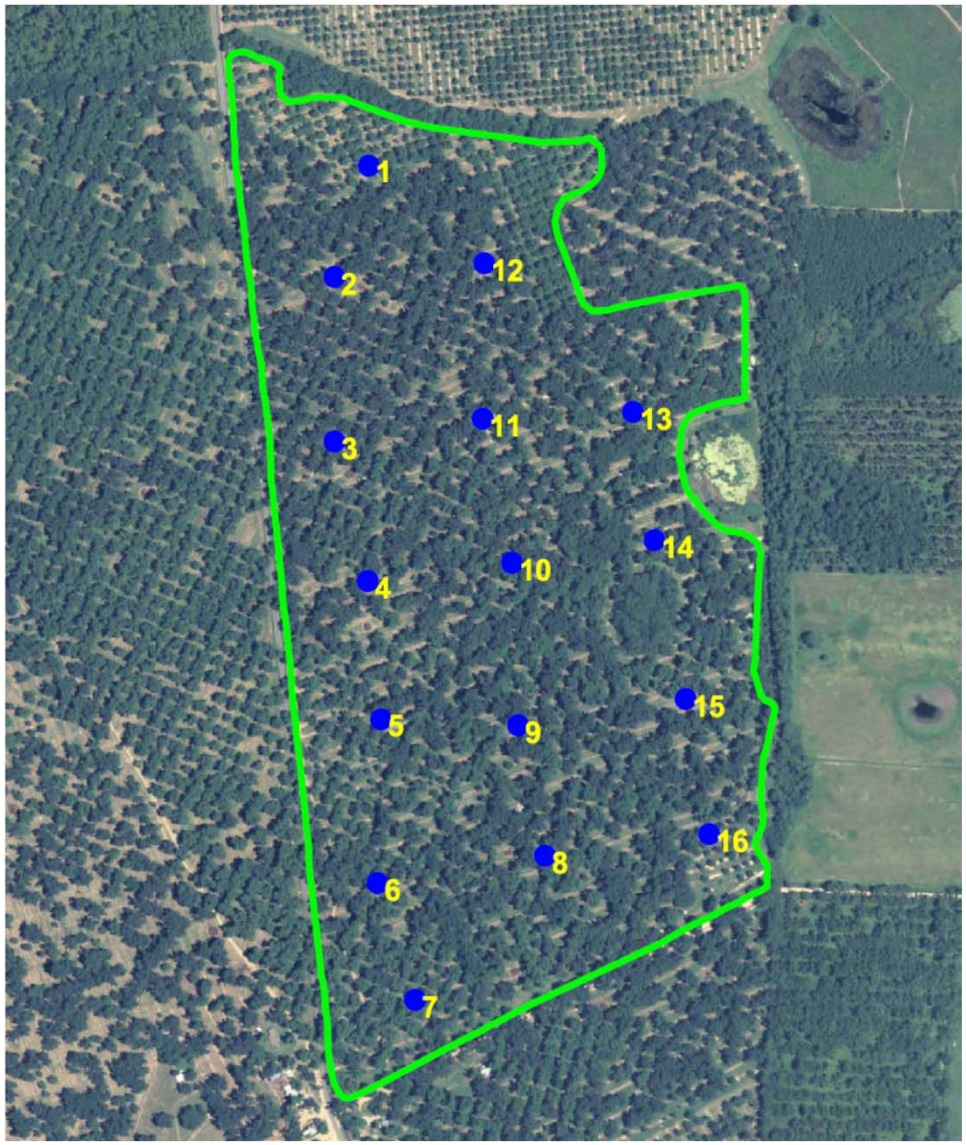
# Variable Rate Technology

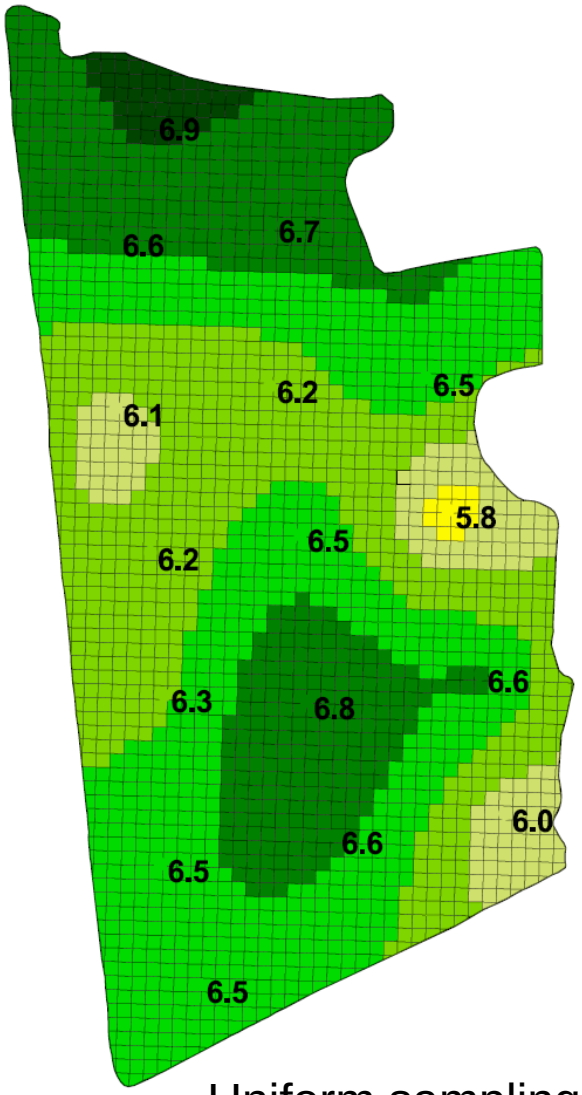
- Most variable rate fertilizer applicators are based on GIS maps
- Take grid samples based on blocks of 2.5-10 acres within an orchard
- Sample locations are mapped and rate is based on tests for each sampled block.
- Rate is adjusted by a variable rate controller which incorporates a computer that reads the GIS map and calculates the correct rate for application
- Grower pays for more soil samples, but this cost is usually overcome with the savings on fertilizer*

175 acres
80 year old orchard
10 acre blocks
Lucy/Orangeburg

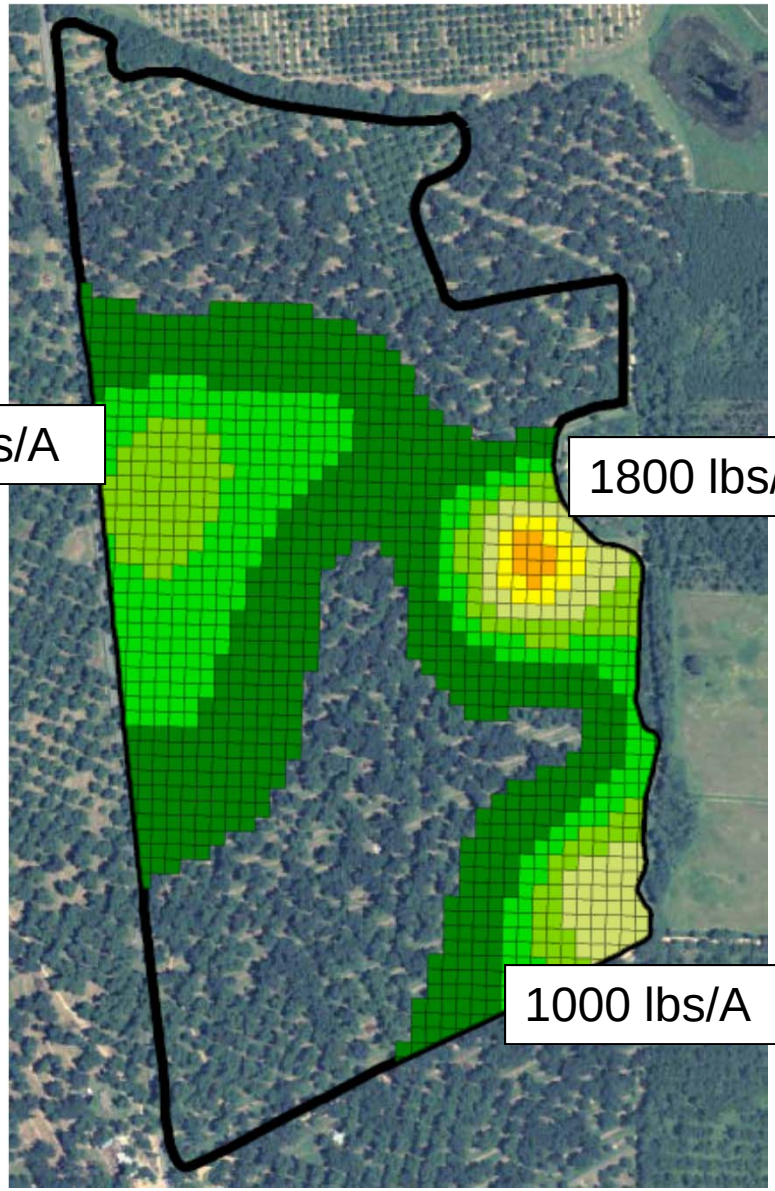
pH, P, K, Zn

22.5 acres
6 Year old orchard
2.5 acre blocks
Orangeburg



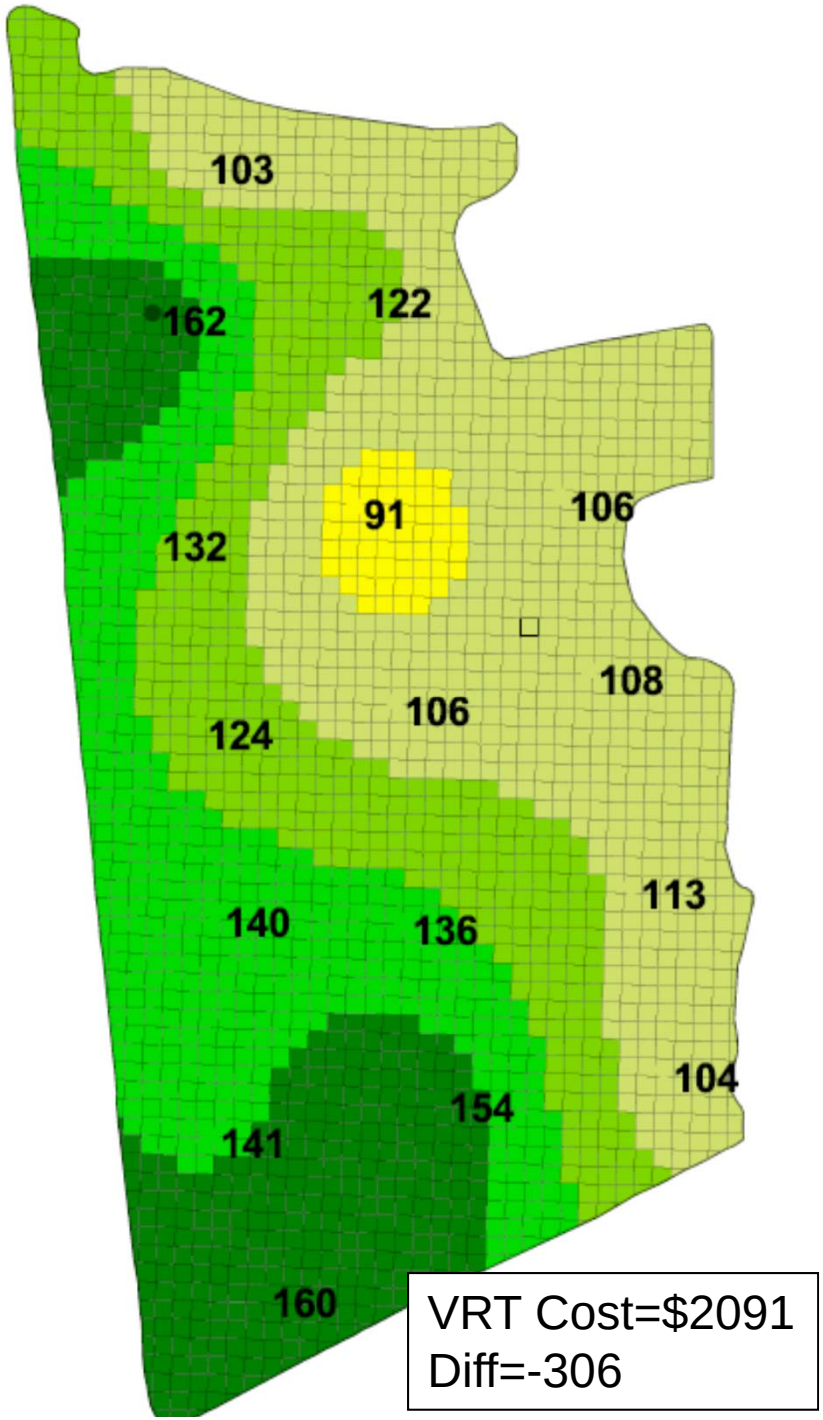

Uniform sampling pH=6.4
Lime rate suggested=0
Cost for 175 acres =$0




VRT cost: $585
Diff=-$585

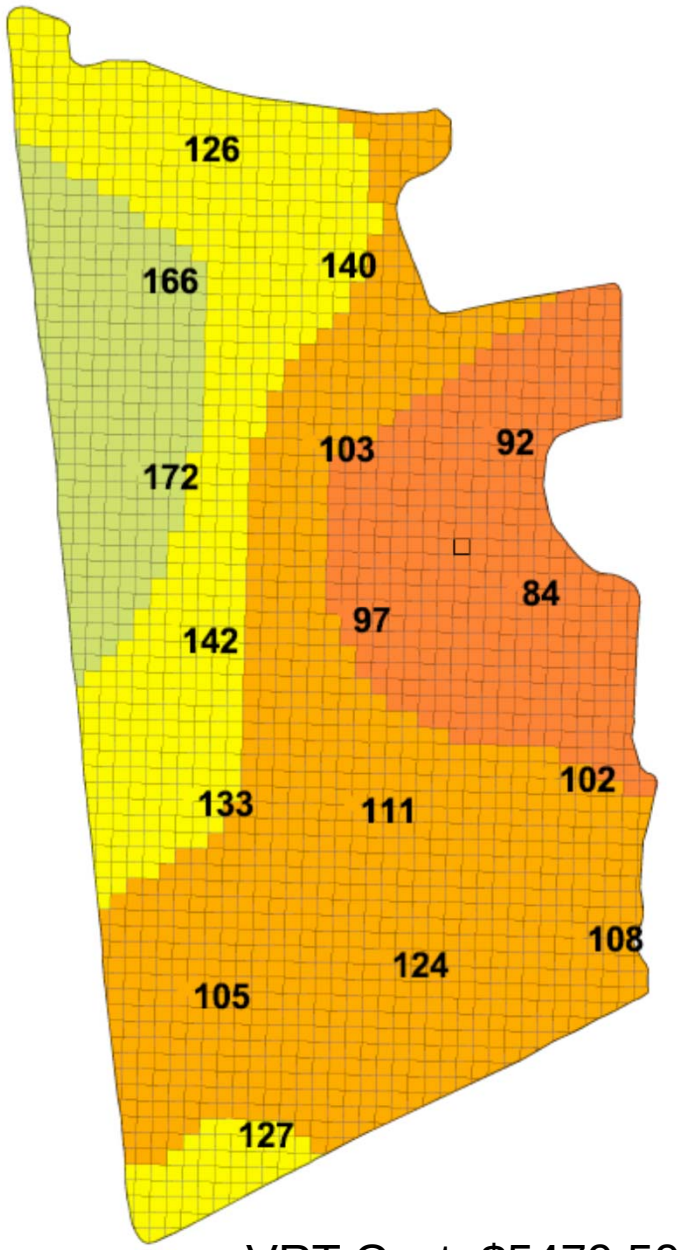
# Soil P

- Uniform sample =125 lbs P
- Uniform rate suggested = 20 lbs/acre
- Cost: $1785 for 175 acres



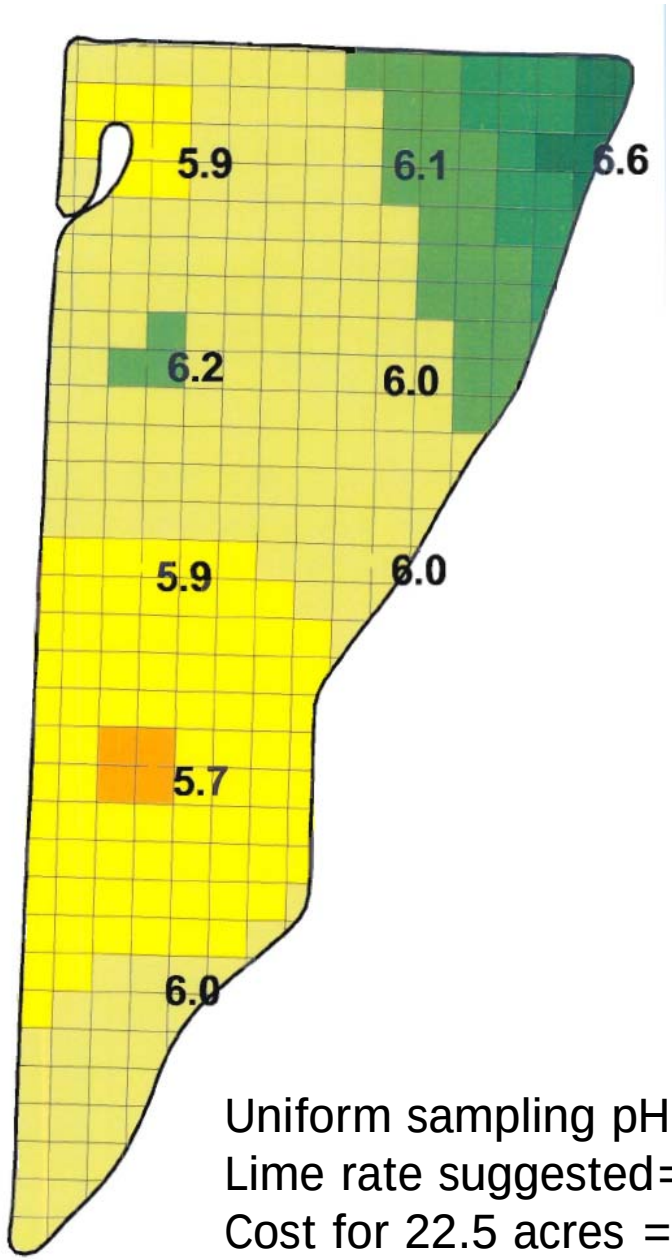
# Soil K

- Uniform sample =121 lbs K
- Uniform rate suggested = 88 lbs/acre
- Cost: $6006 for 175 acres

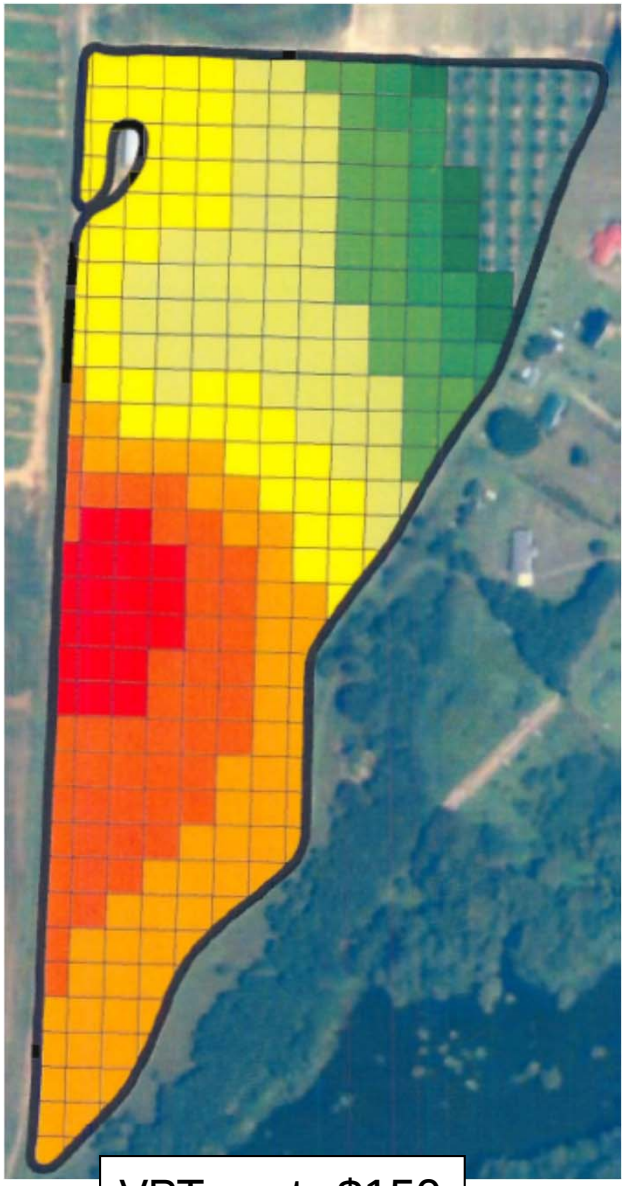



VRT Cost=$5479.50
Diff=526.50

Soil pH and lime recommendation



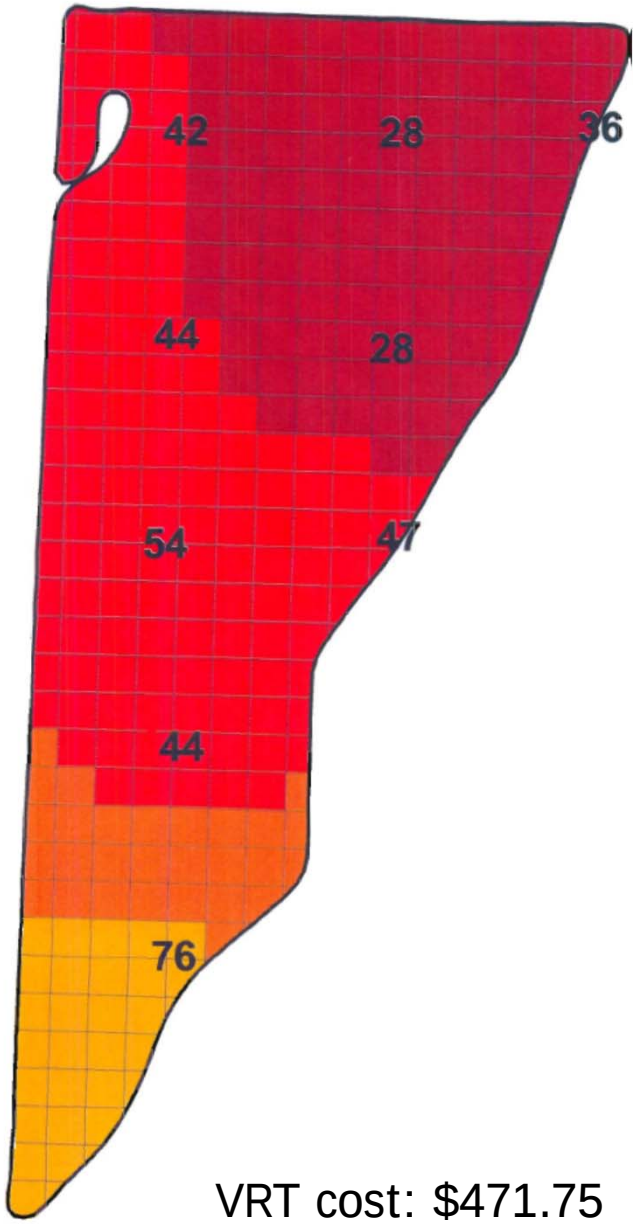

Uniform sampling pH=5.74
Lime rate suggested=3/4 ton
Cost for 22.5 acres =$506.25



VRT cost: $150
Diff=356.25

# Soil P

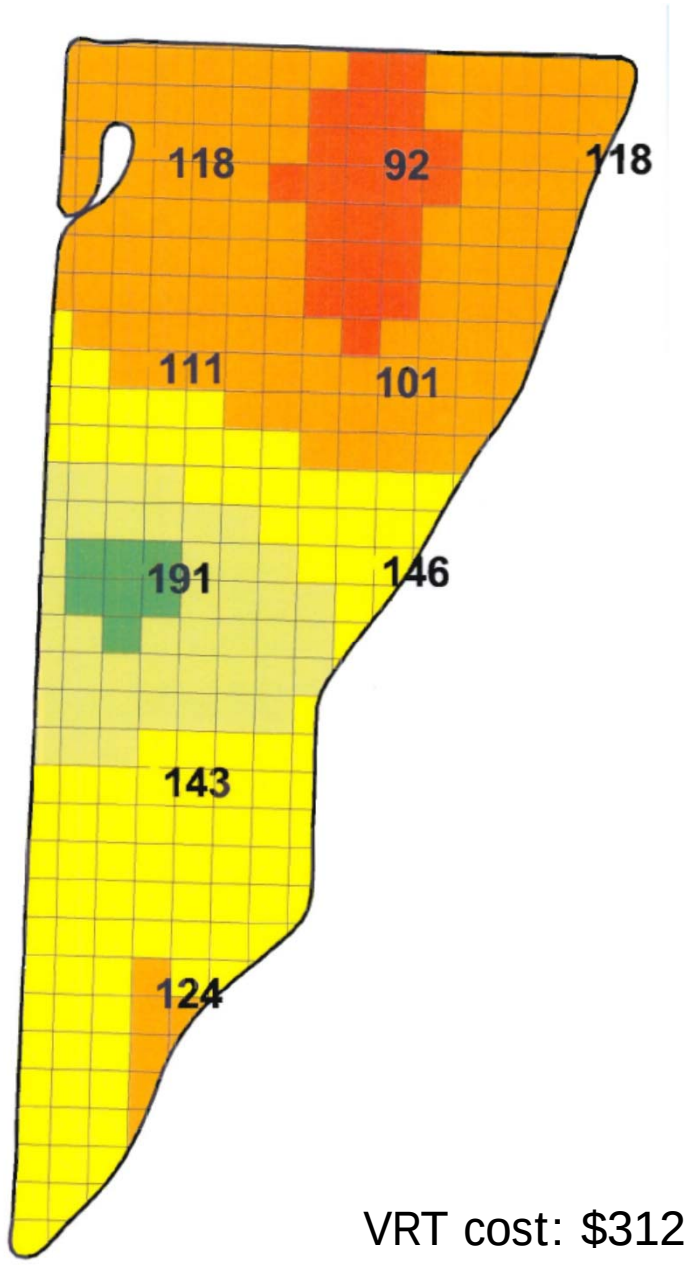
- Uniform sample =26 lbs P
- Uniform rate suggested = 50 lbs/acre
- Cost: $573.75 for 22.5 acres




VRT cost: $471.75
Diff=$102

# Soil K

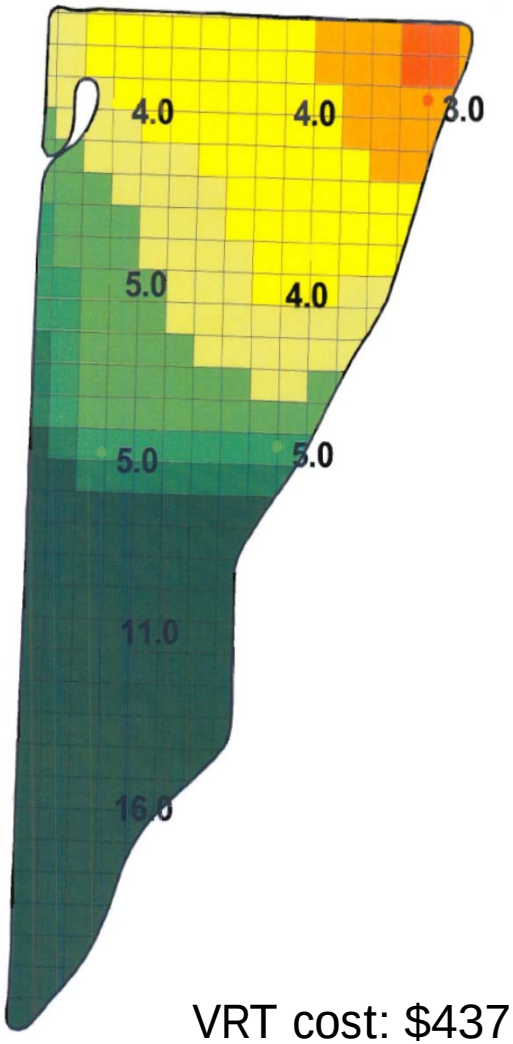
- Uniform sample =99 lbs K
- Uniform rate suggested = 40 lbs/acre
- Cost: $351 for 22.5 acres




VRT cost: $312.46
Diff=38.54

# Soil Zn

- Uniform sample =2 lbs Zn
- Uniform rate suggested = 50 lbs/acre
- Cost: $562.50 for 22.5 acres




VRT cost: $437.50
Diff=$125

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pH, P, K, Zn

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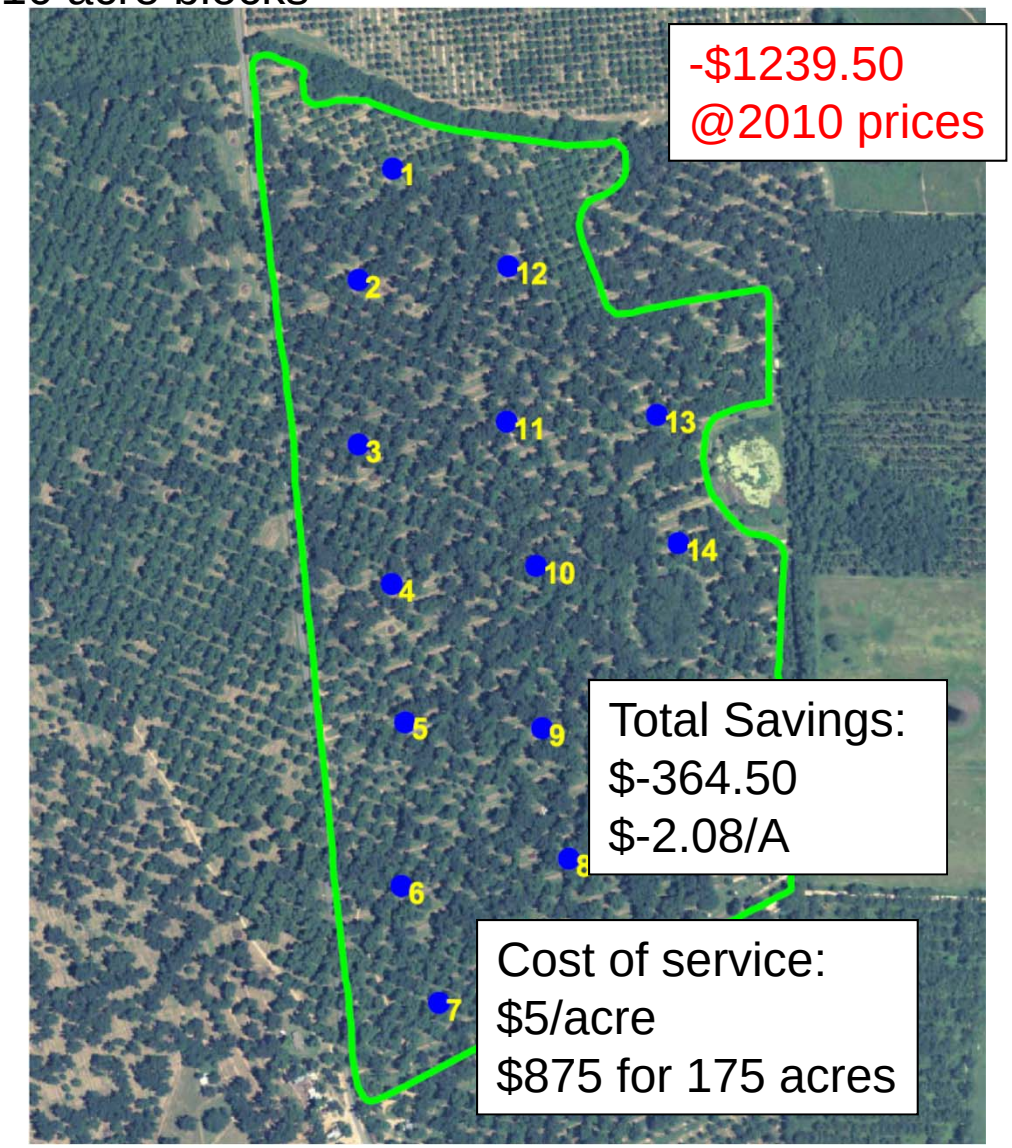
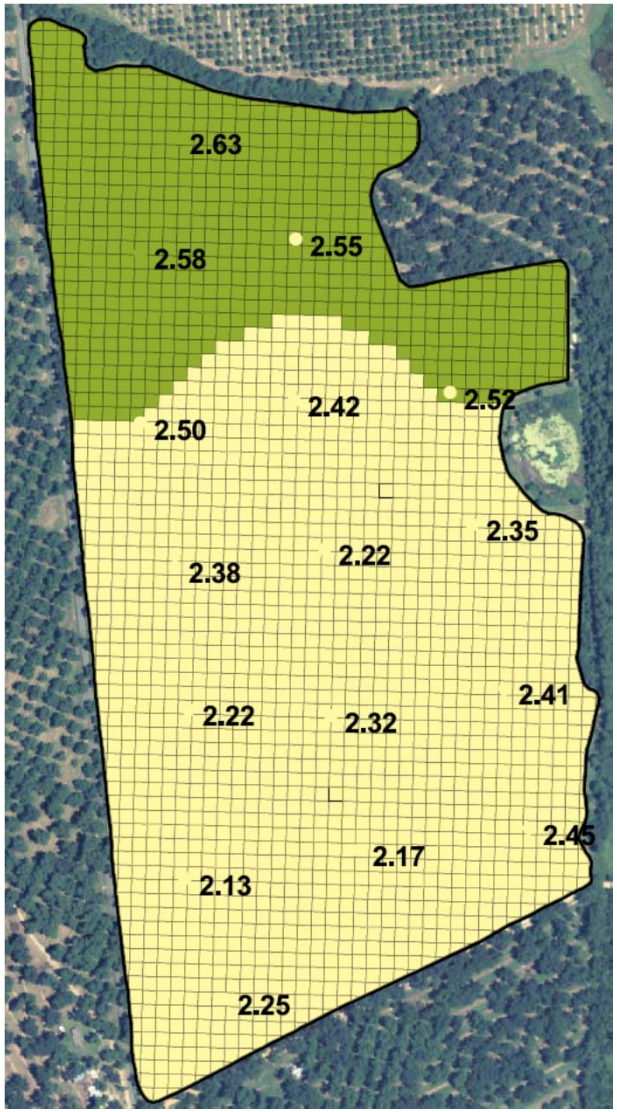
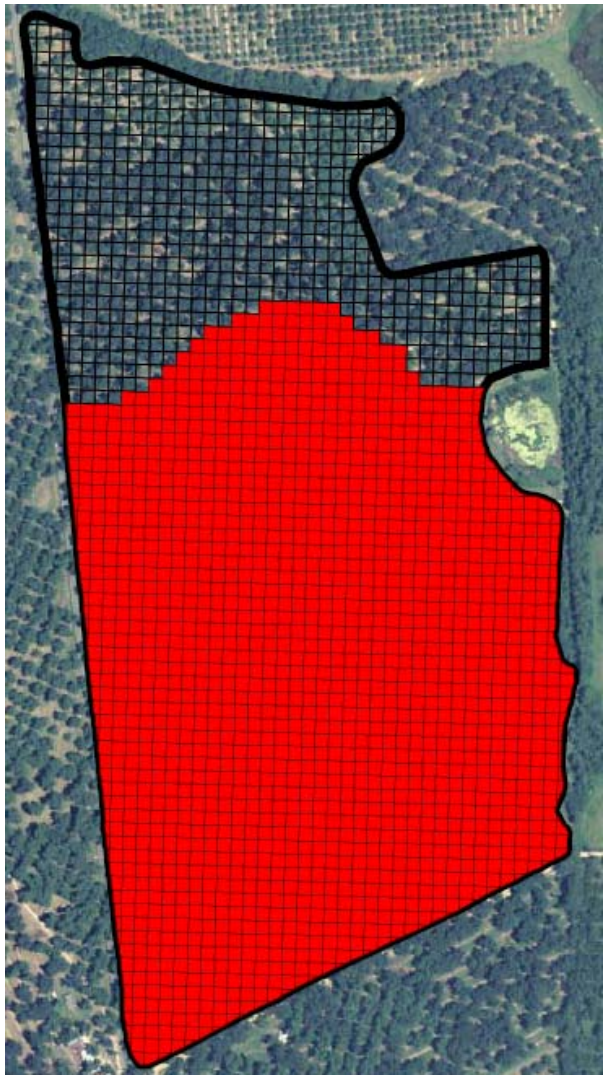



# Tissue Sampling for N application



# Summary and Limitations

- Precision fertilizer application can help to better address problem spots in the orchard and increase the efficiency of fertilizer use
- Fertilizer prices, orchard size, target rate, soil condition, sampling location, and soil variability determine the justification for use of precision fertilizer application
- The smaller the orchard, the smaller the sampling block should be
- Application and sampling must be done in winter or early spring to prevent canopy interference with GPS in a mature orchard*
- In young orchards (those without full canopy enclosure), sampling and application could be done throughout the year and leaf sampling could potentially be included