

Precision Fertilizer Management for Pecan

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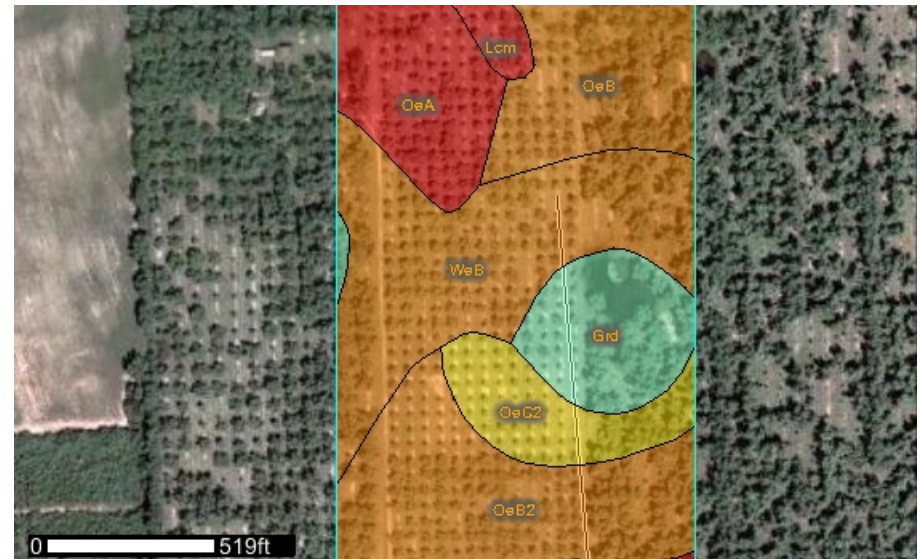
Horticulture

Variable Costs Per Acre: Full Production, 2010

Unit	Quant.	Price/Unit	Total/A	
Lime	1 ton/A	\$30	\$30	} 18%
N (46% Urea)	150 lbs	\$0.48	\$72	
P	40 lbs	\$0.51	\$20.57	
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	8 Appl.	\$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

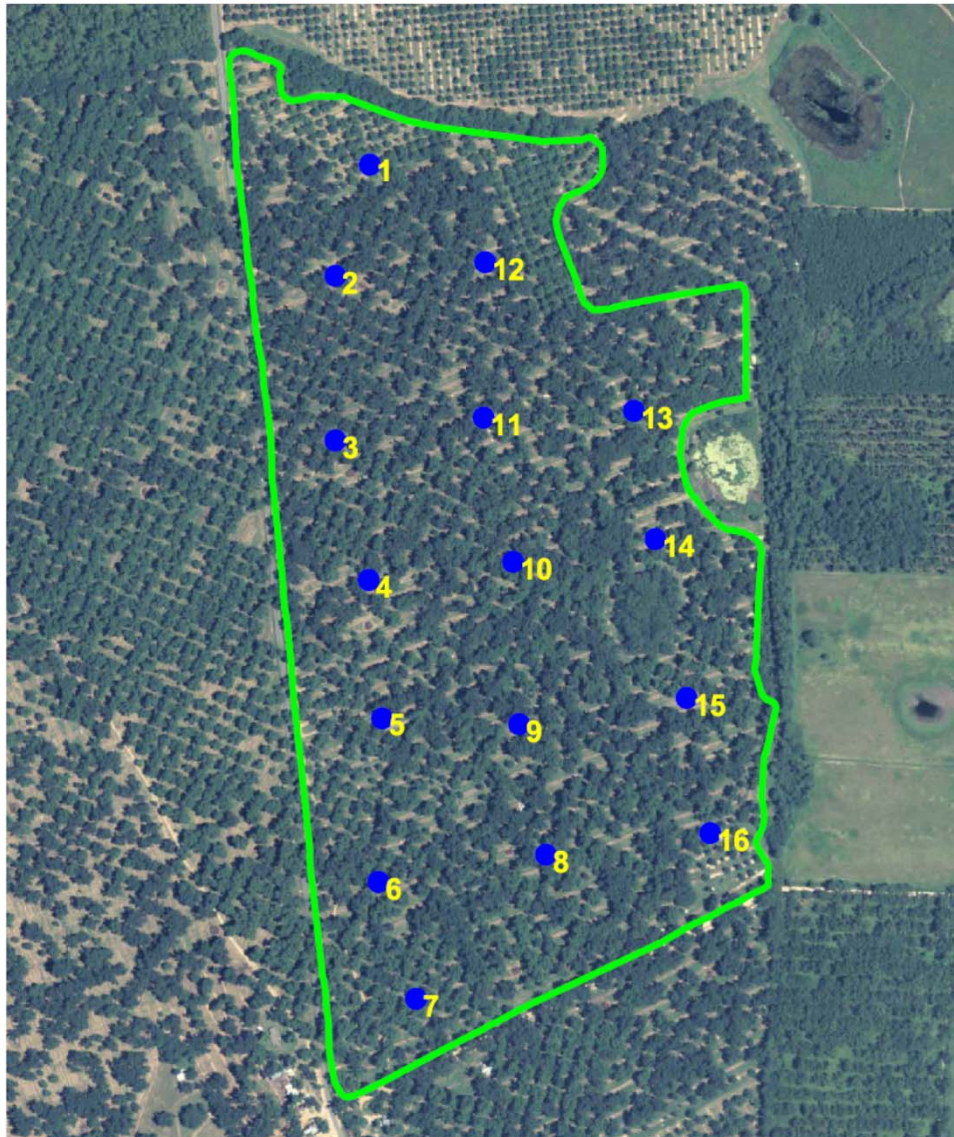
- Site specific management tool that allows the producer to vary the rate of crop input across a given area
- Potentially provides economic benefit to grower while reducing the application of agrochemicals
- For pecans, the most immediate potential lies in the soil application of P, K, Zn, and lime

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*

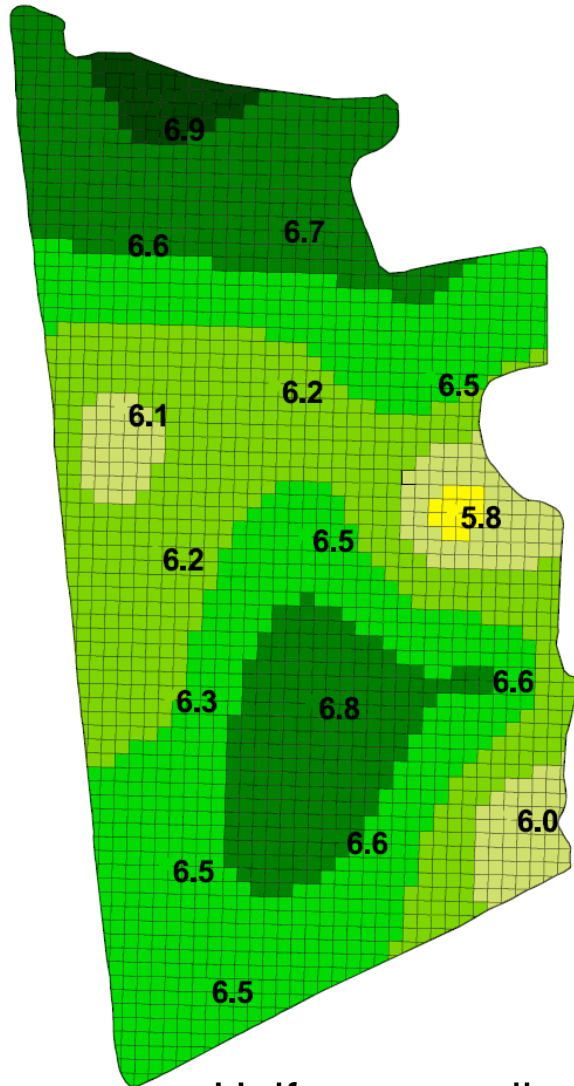
175 acres
80 year old orchard
10 acre blocks
Lucy/Orangeburg

pH, P, K, Zn

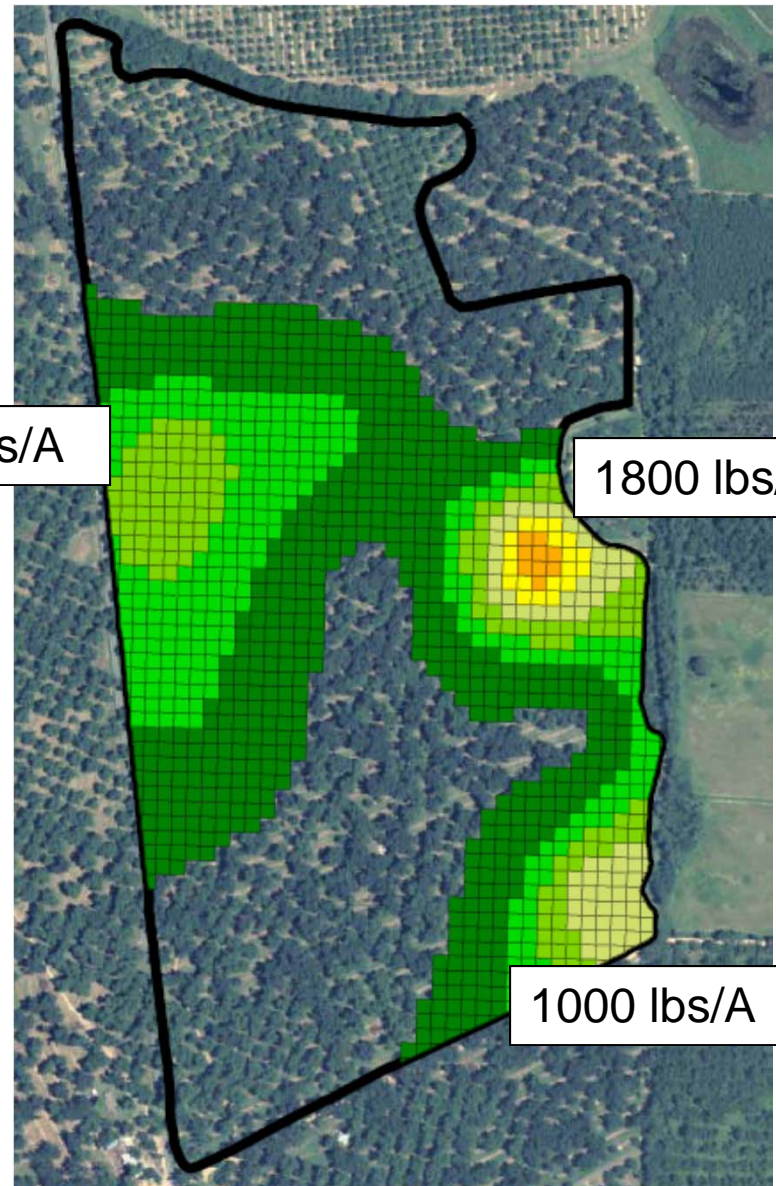


22.5 acres
6 Year old orchard
2.5 acre blocks
Orangeburg





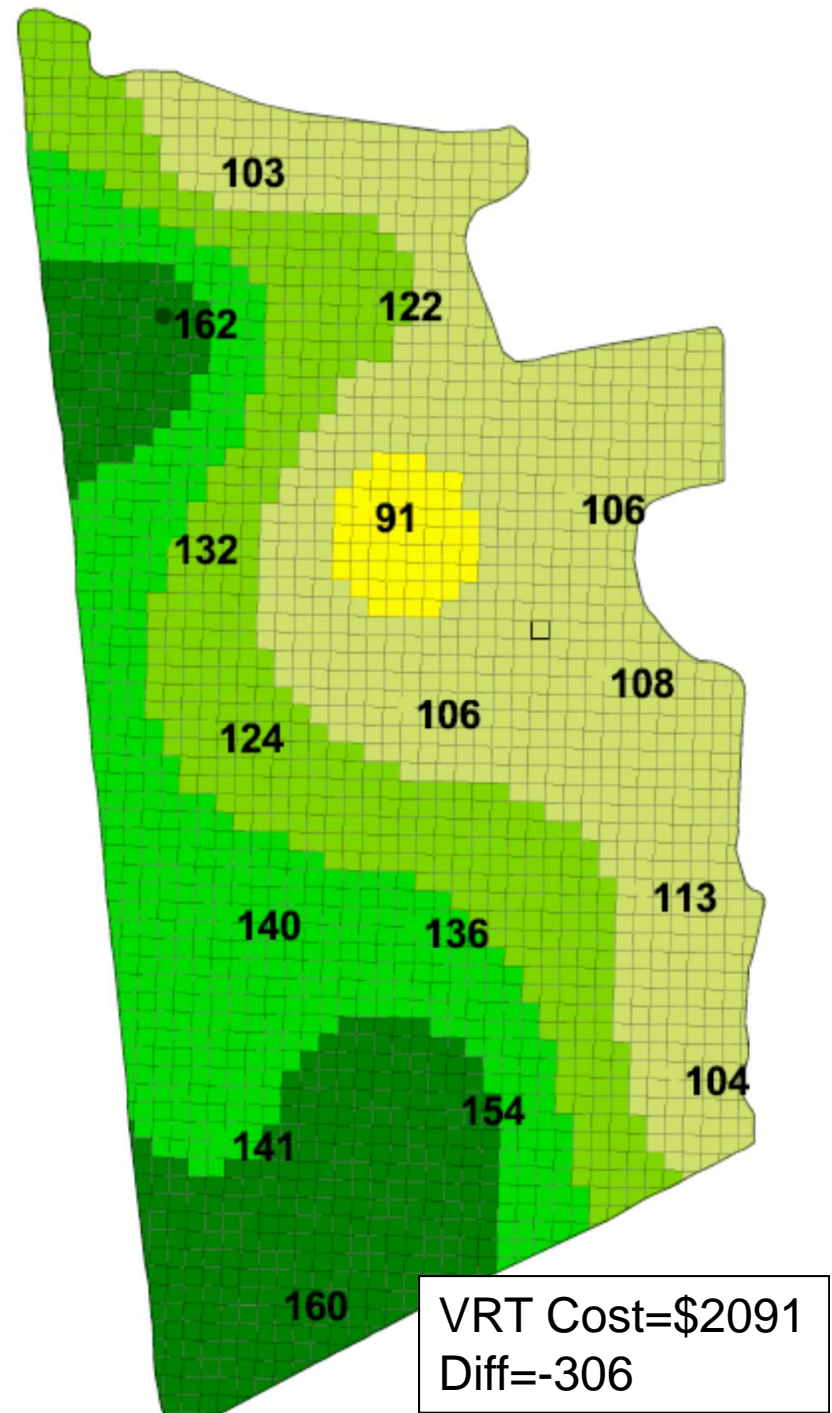
Uniform sampling pH=6.4
 Lime rate suggested=0
 Cost for 175 acres = \$0



VRT cost: \$585
 Diff=-\$585

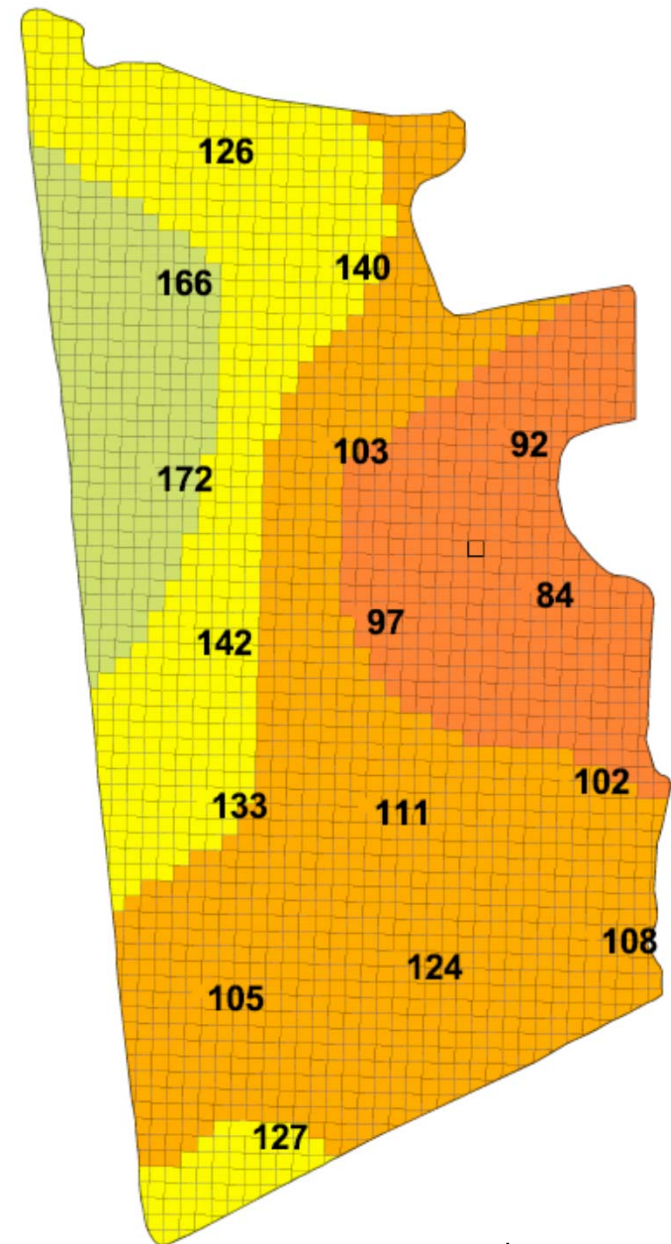
Soil P

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



Soil K

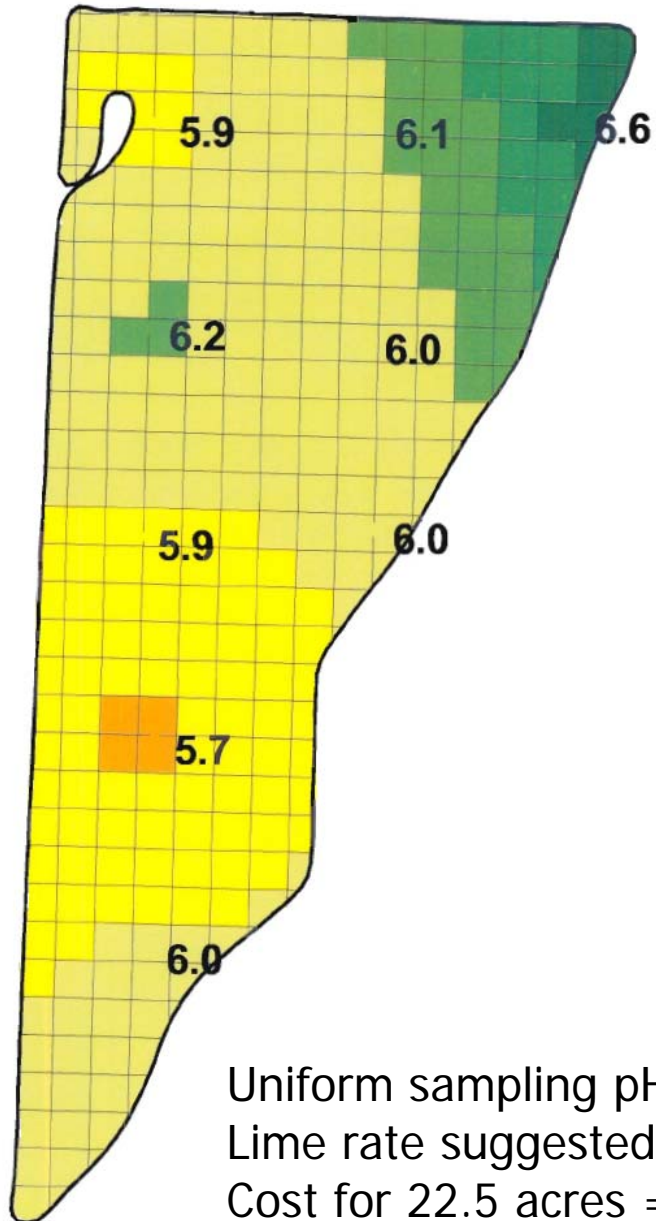
- Uniform sample = 121 lbs K
- Uniform rate suggested = 88 lbs/acre
- Cost: \$6006 for 175 acres



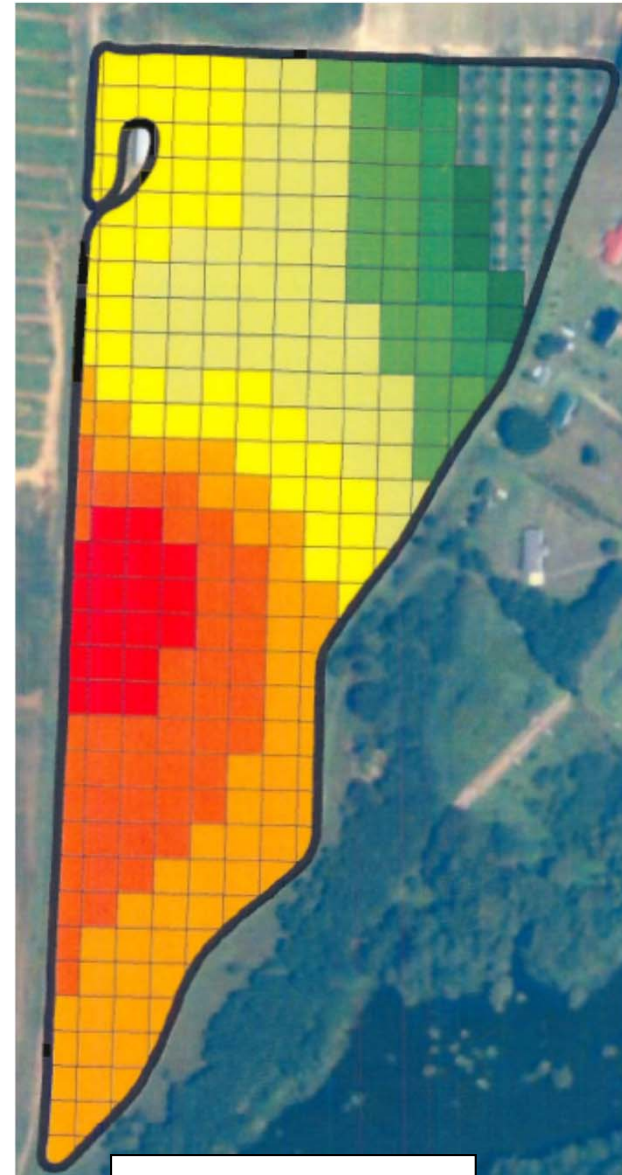
VRT Cost=\$5479.50

Diff=526.50

Soil pH and lime recommendation



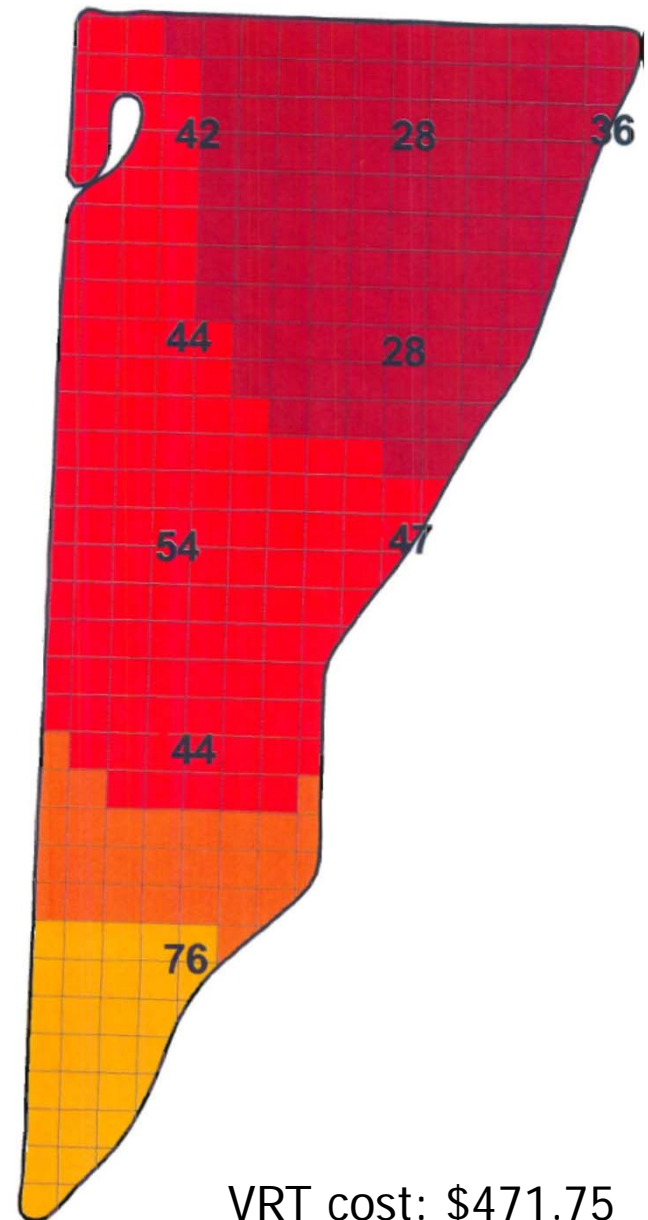
Uniform sampling pH=5.74
Lime rate suggested=3/4 ton
Cost for 22.5 acres =\$506.25



VRT cost: \$150
Diff=356.25

Soil P

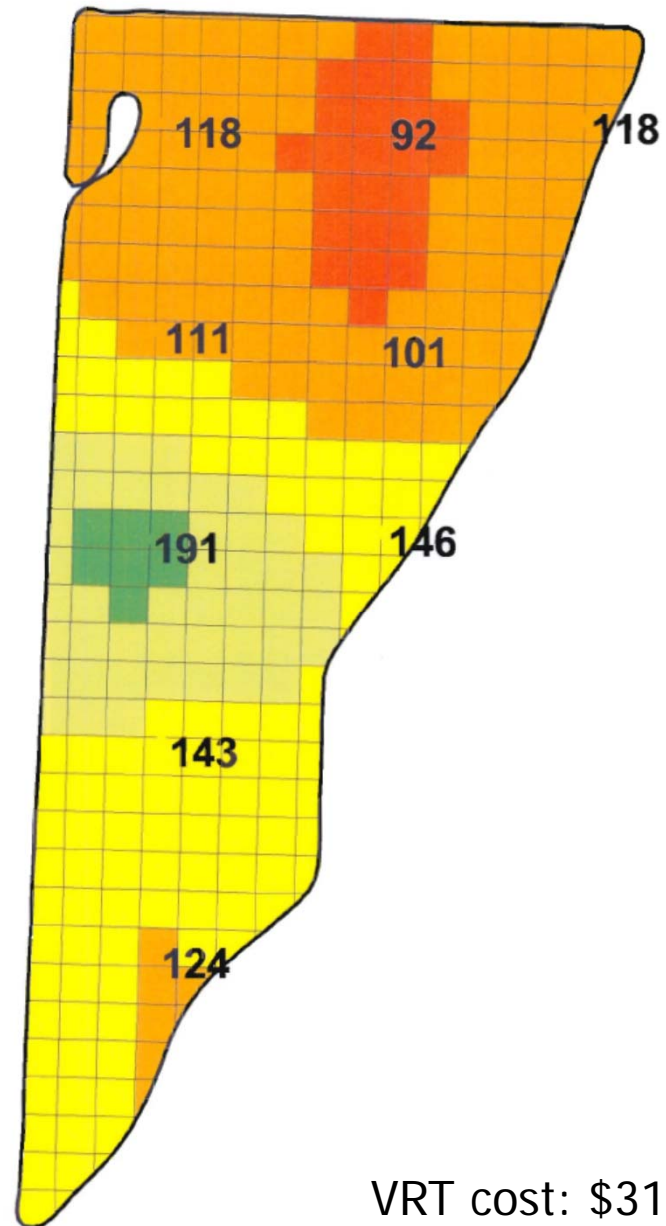
- Uniform sample = 26 lbs P
- Uniform rate suggested = 50 lbs/acre
- Cost: \$573.75 for 22.5 acres



VRT cost: \$471.75
Diff=\$102

Soil K

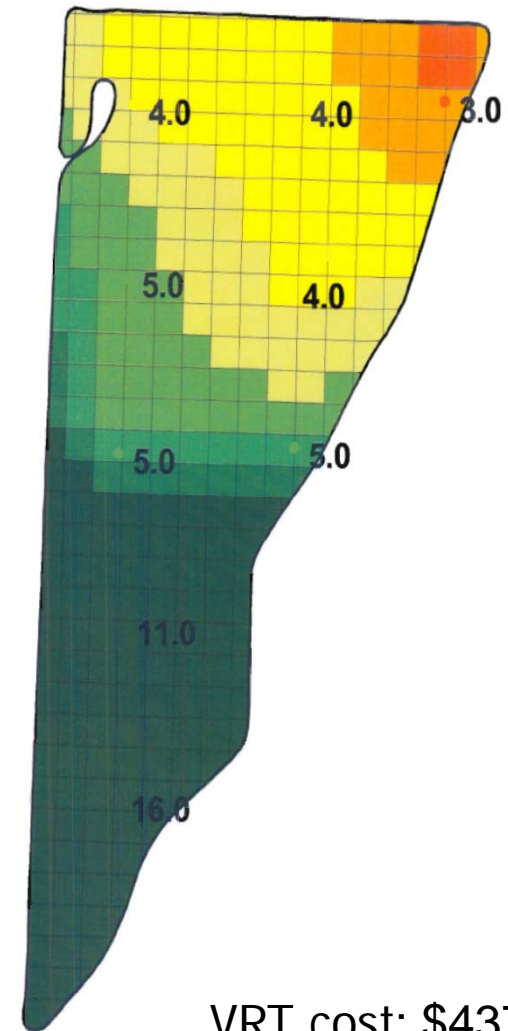
- Uniform sample = 99 lbs K
- Uniform rate suggested = 40 lbs/acre
- Cost: \$351 for 22.5 acres



VRT cost: \$312.46
Diff=38.54

Soil Zn

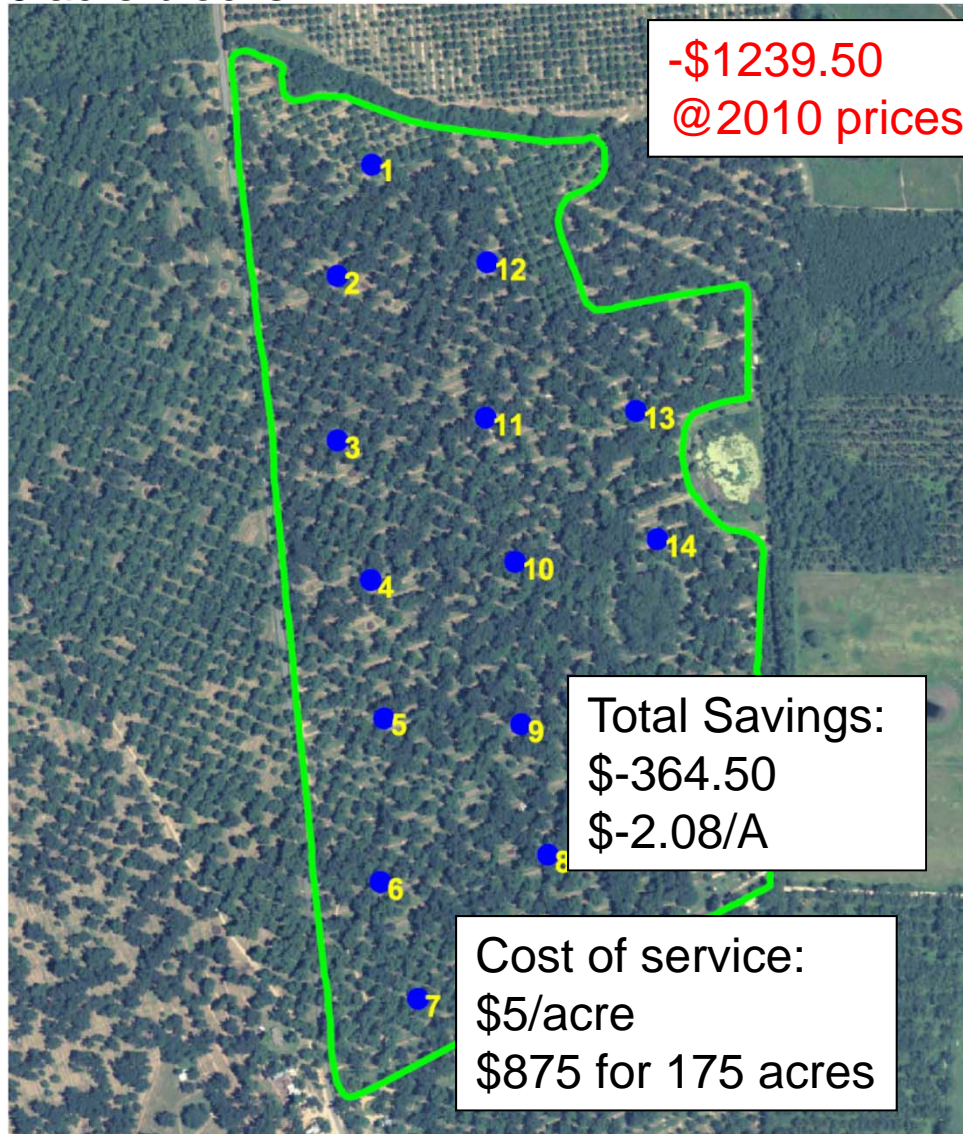
- Uniform sample = 2 lbs Zn
- Uniform rate suggested = 50 lbs/acre
- Cost: \$562.50 for 22.5 acres



VRT cost: \$437.50
Diff=\$125

175 acres
80 year old orchard
10 acre blocks

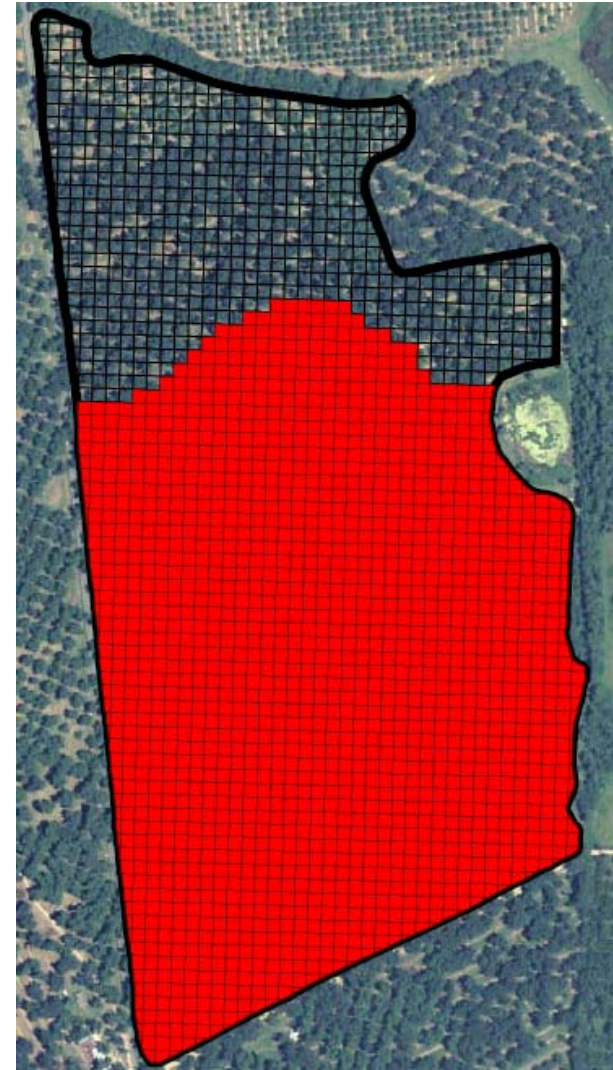
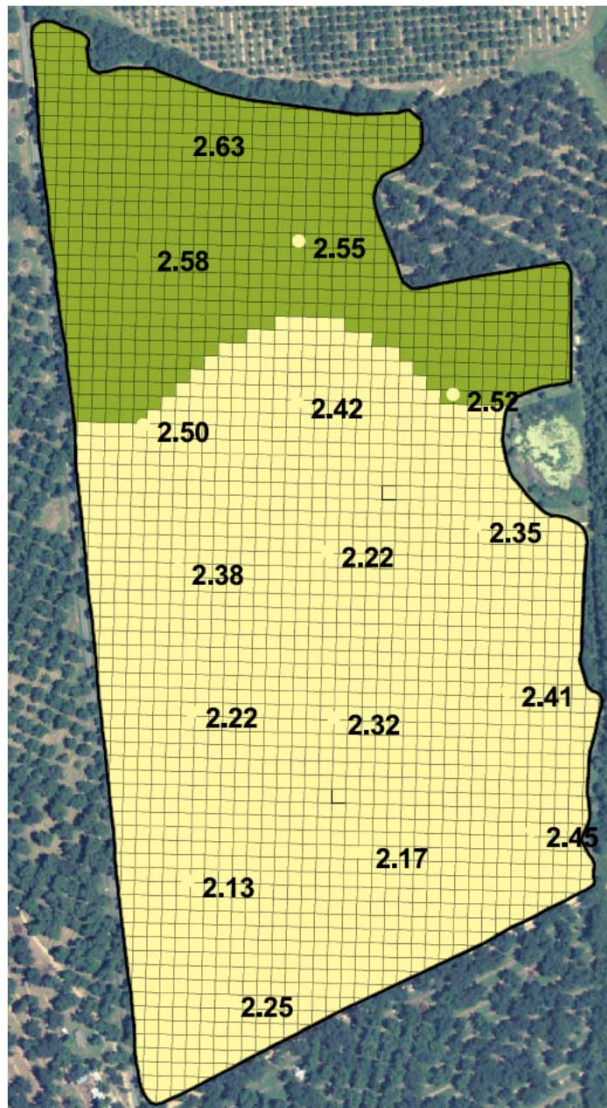
pH, P, K, Zn



22.5 acres
6 year old orchard
2.5 acre blocks



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