Soil Phosphorus History

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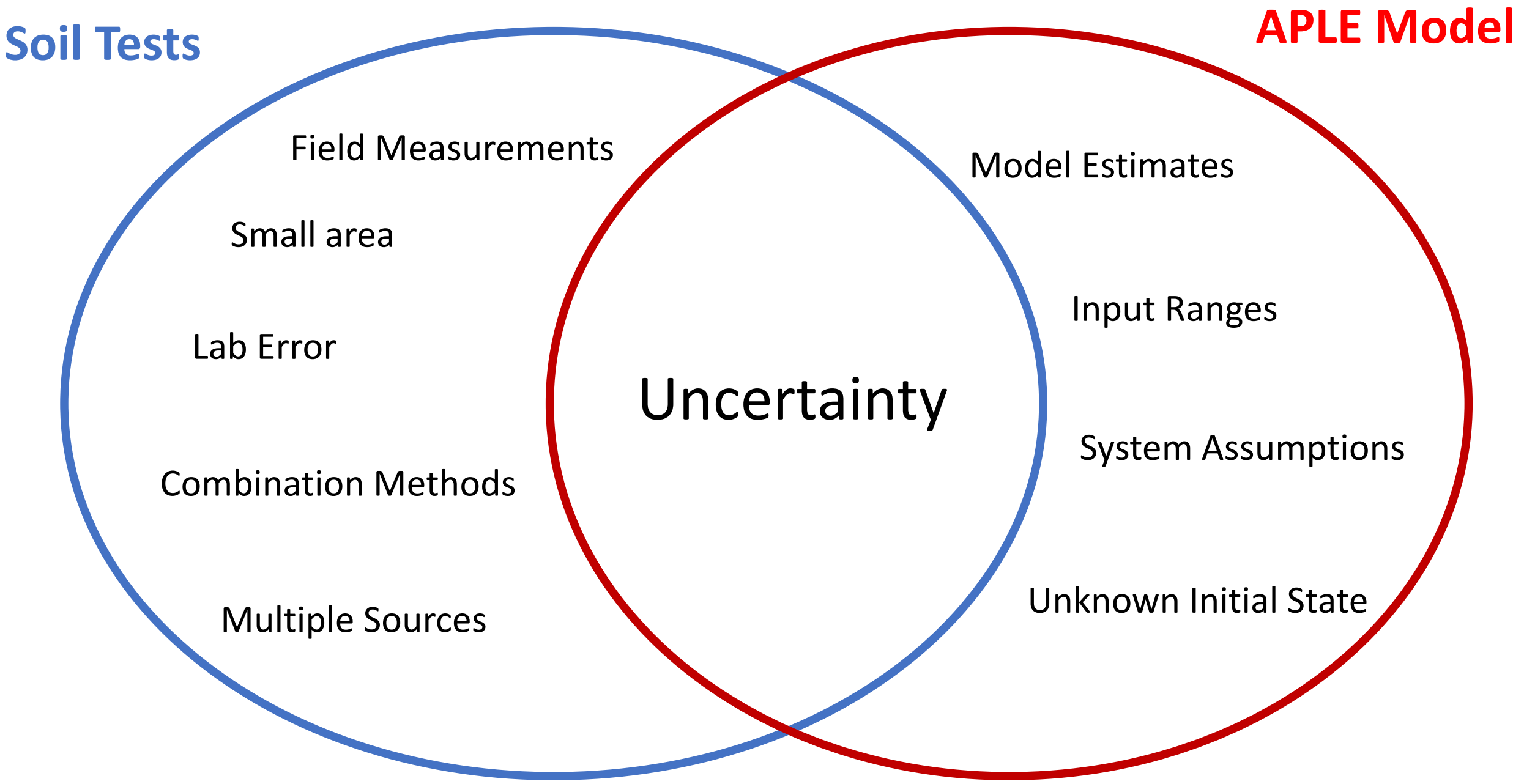
Soil P History

Soil P is an Important Sensitivity

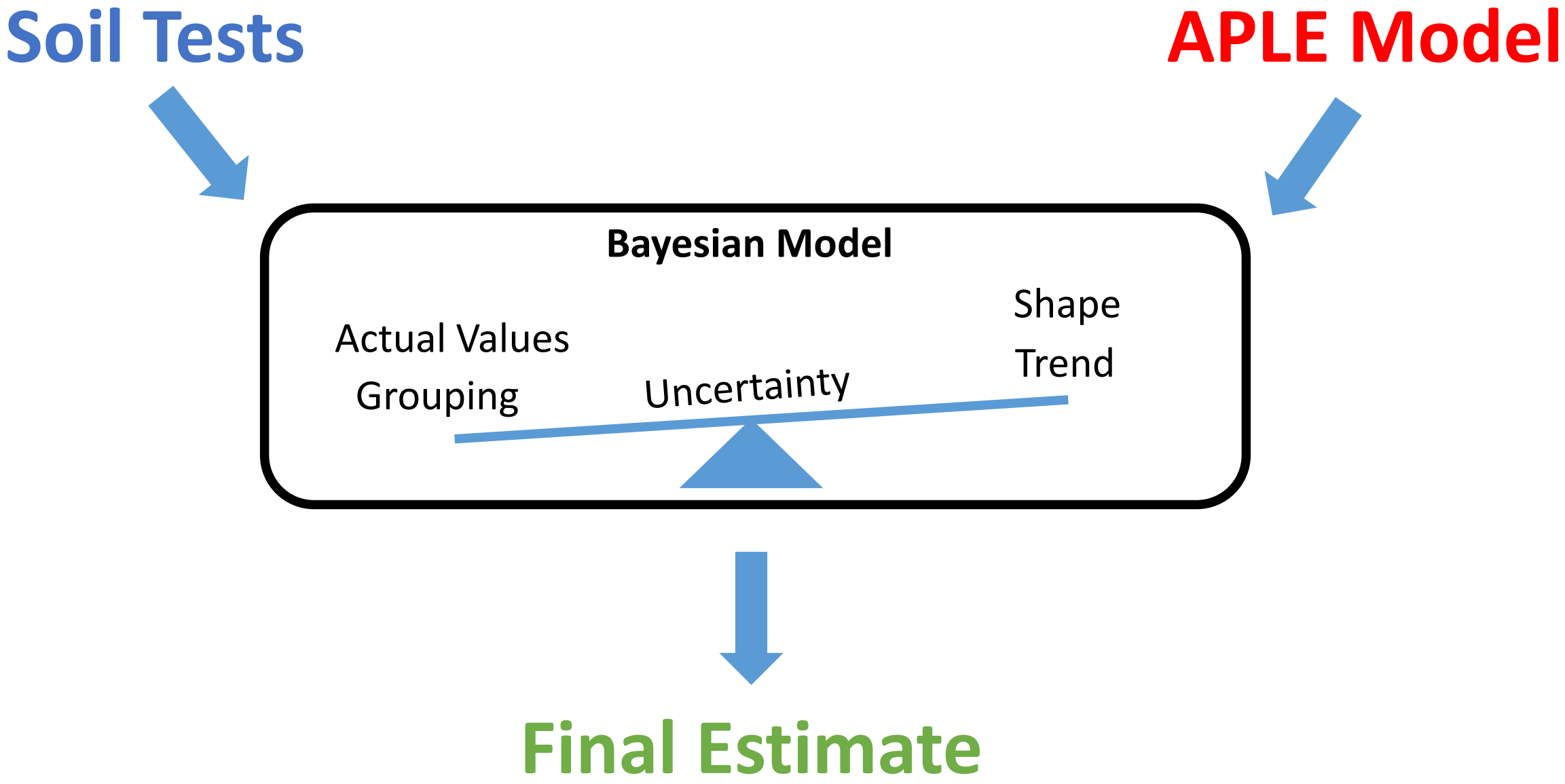
Soil Tests

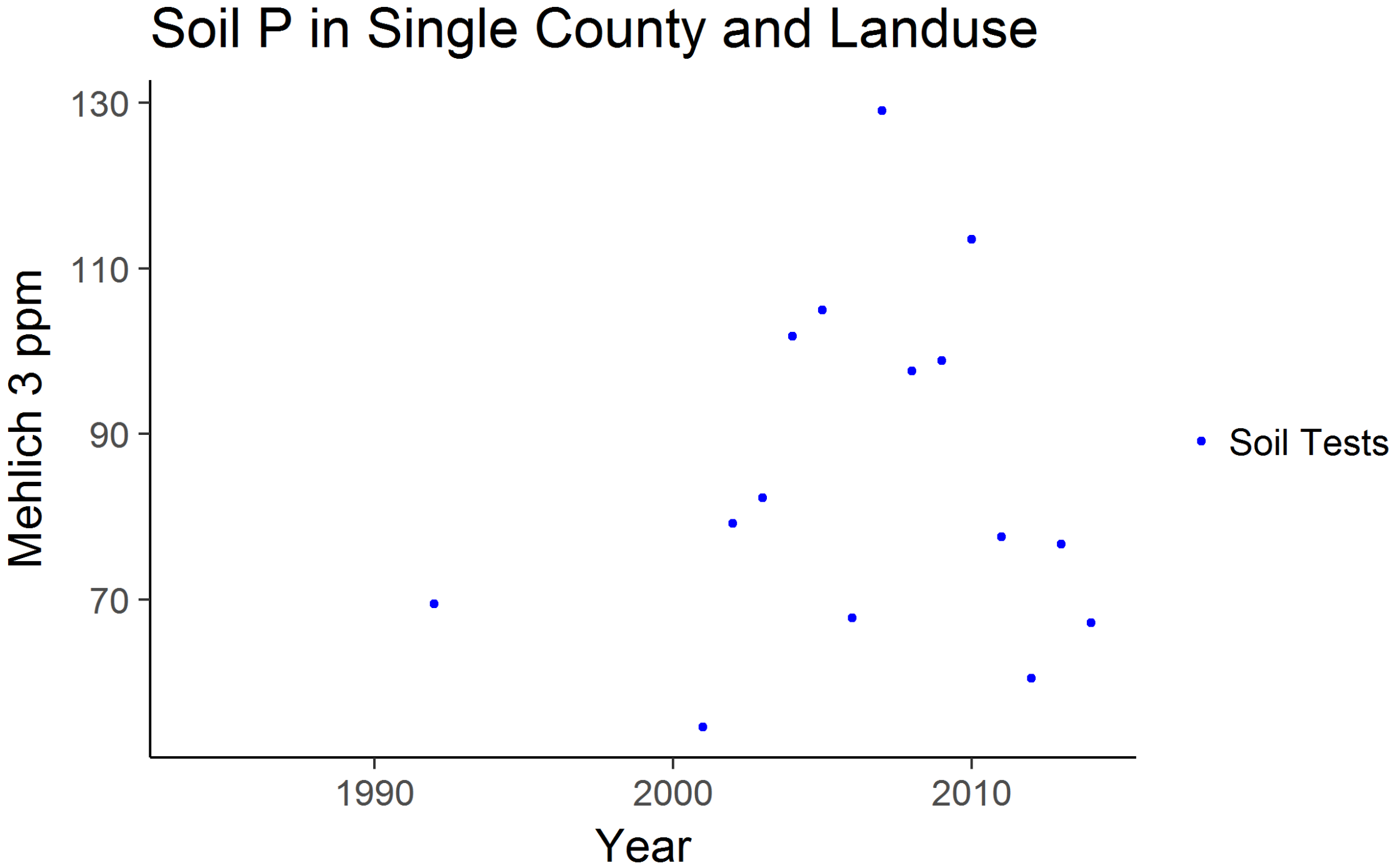
Annual Phosphorus Loss Estimator (APLE)

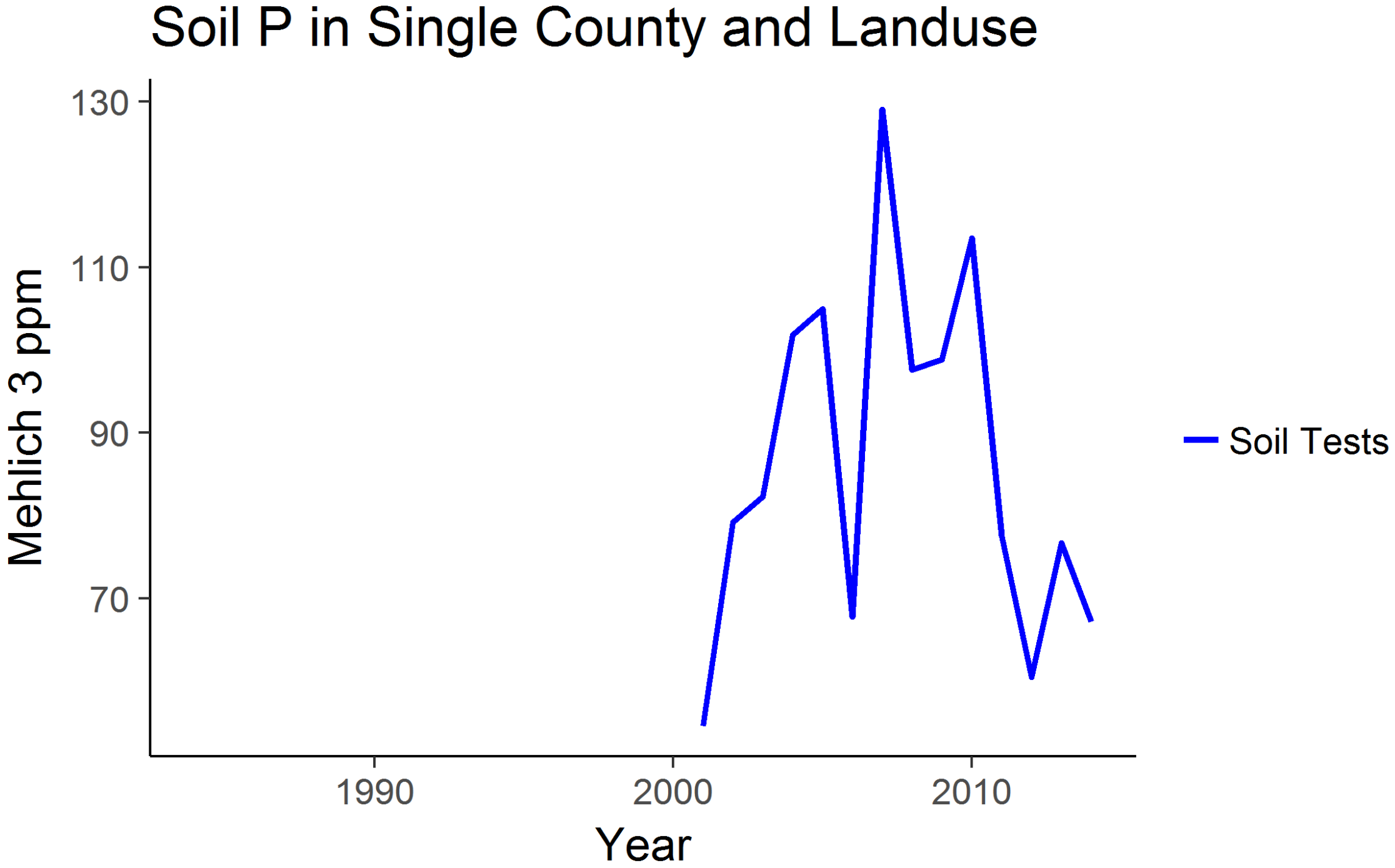
Both sets of data have problems providing satisfactory estimates


Soil Tests
APLE Model
Field Measurements
Small area
Lab Error
Combination Methods
Multiple Sources
Uncertainty
Model Estimates
Input Ranges
System Assumptions
Unknown Initial State

Balance of what the two data sets are telling us




Soil P in Single County and Landuse
130
110
90
70
Mehlich 3 ppm
1990
2000
2010
Year
Soil Tests


Soil P in Single County and Landuse
130
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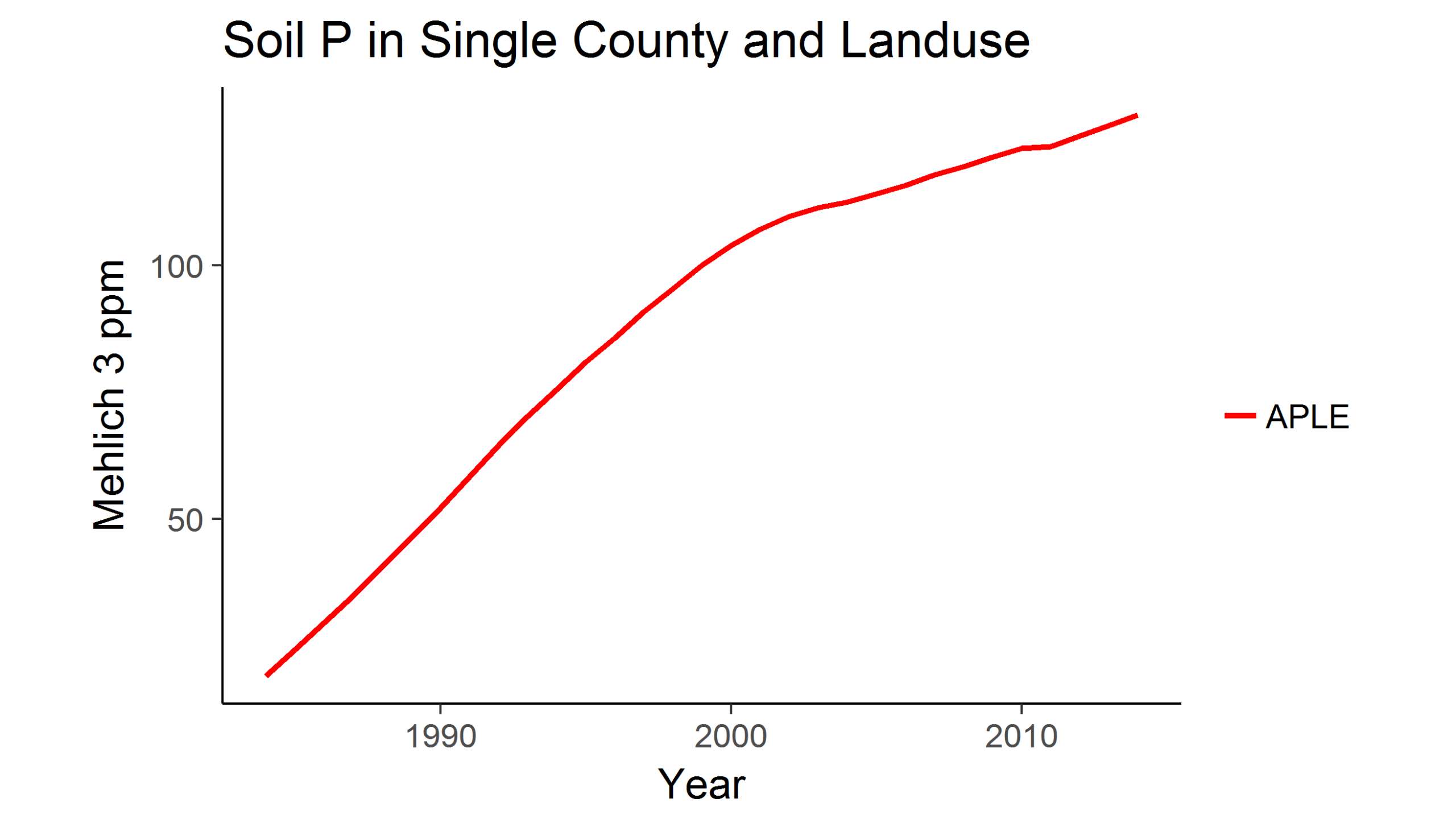
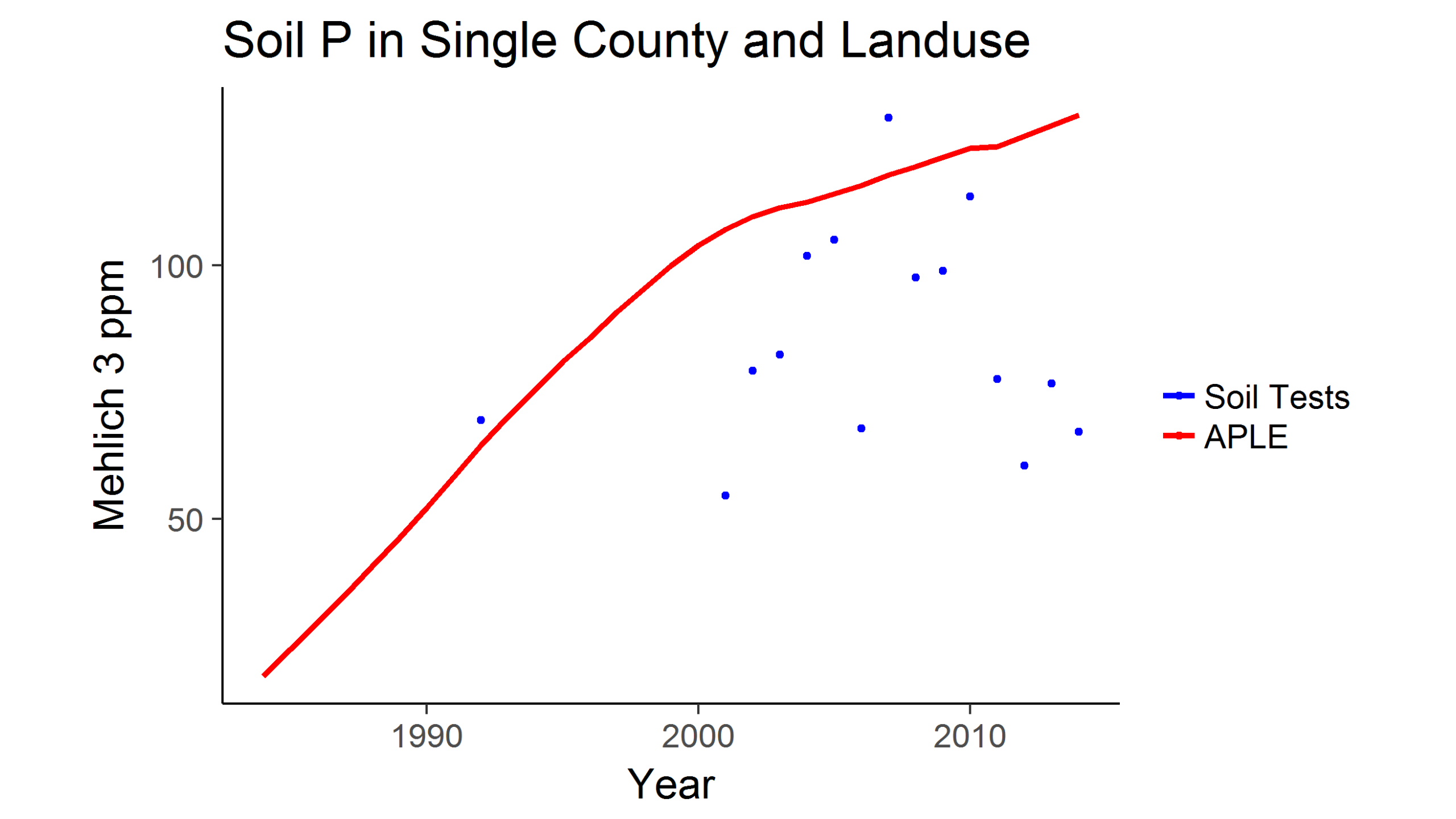
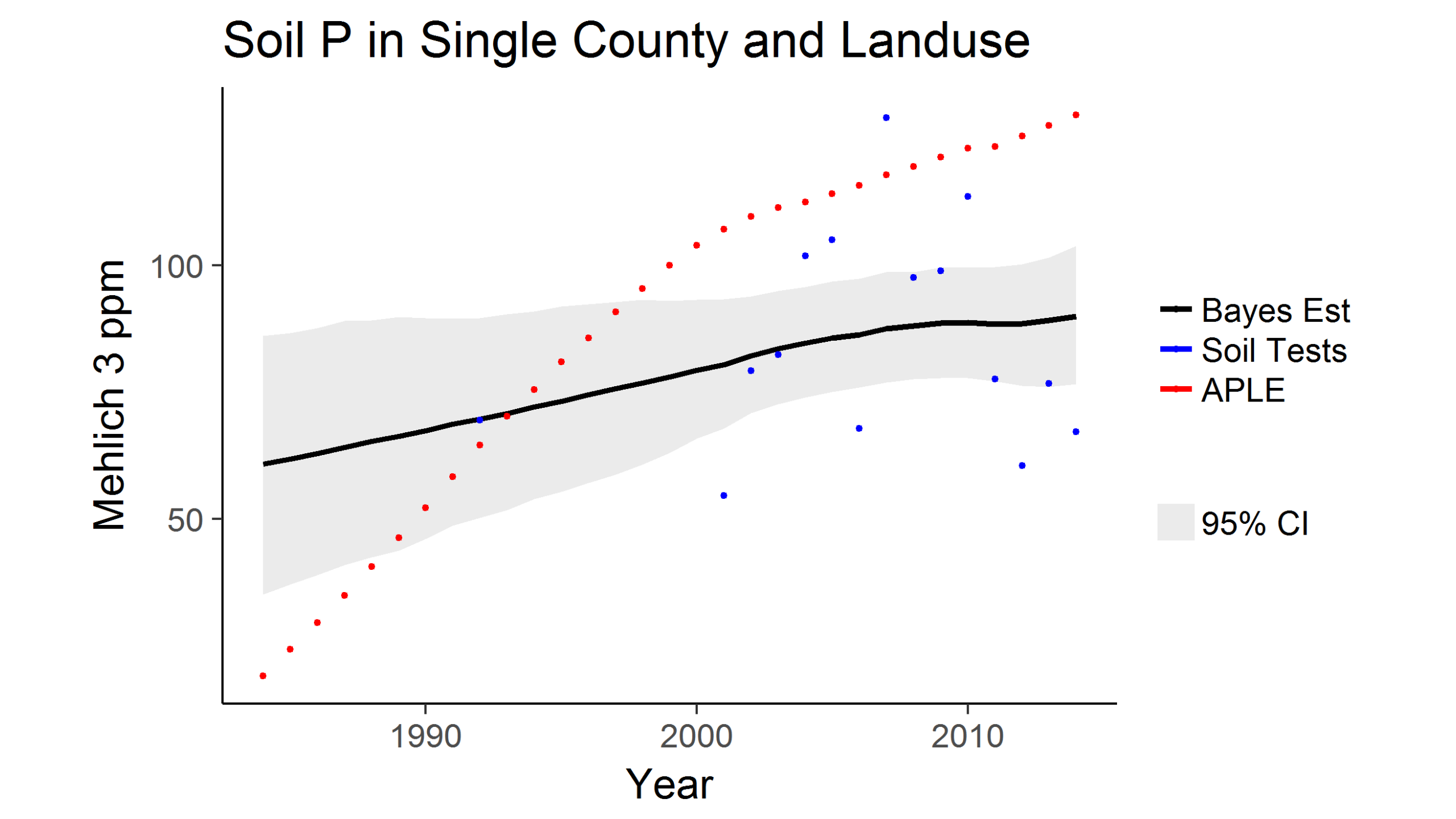
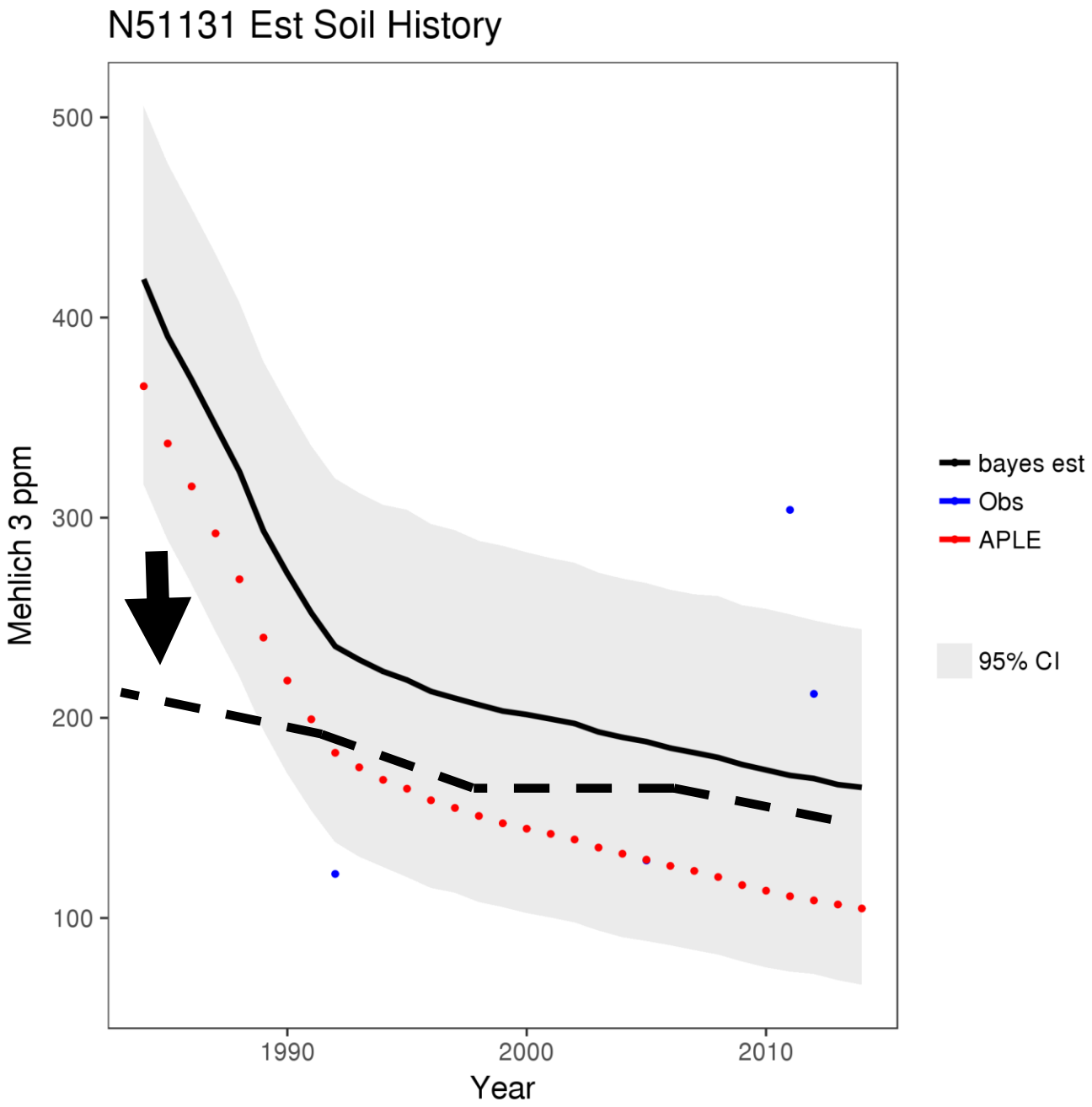
Mehlich 3 ppm
1990
2000
2010
Year
Soil Tests


Soil P in Single County and Landuse
Mehlich 3 ppm
100
50
1990
2000
2010
Year
APLE


Soil P in Single County and Landuse
Mehlich 3 ppm
100
50
1990
2000
2010
Year
Soil Tests
APLE

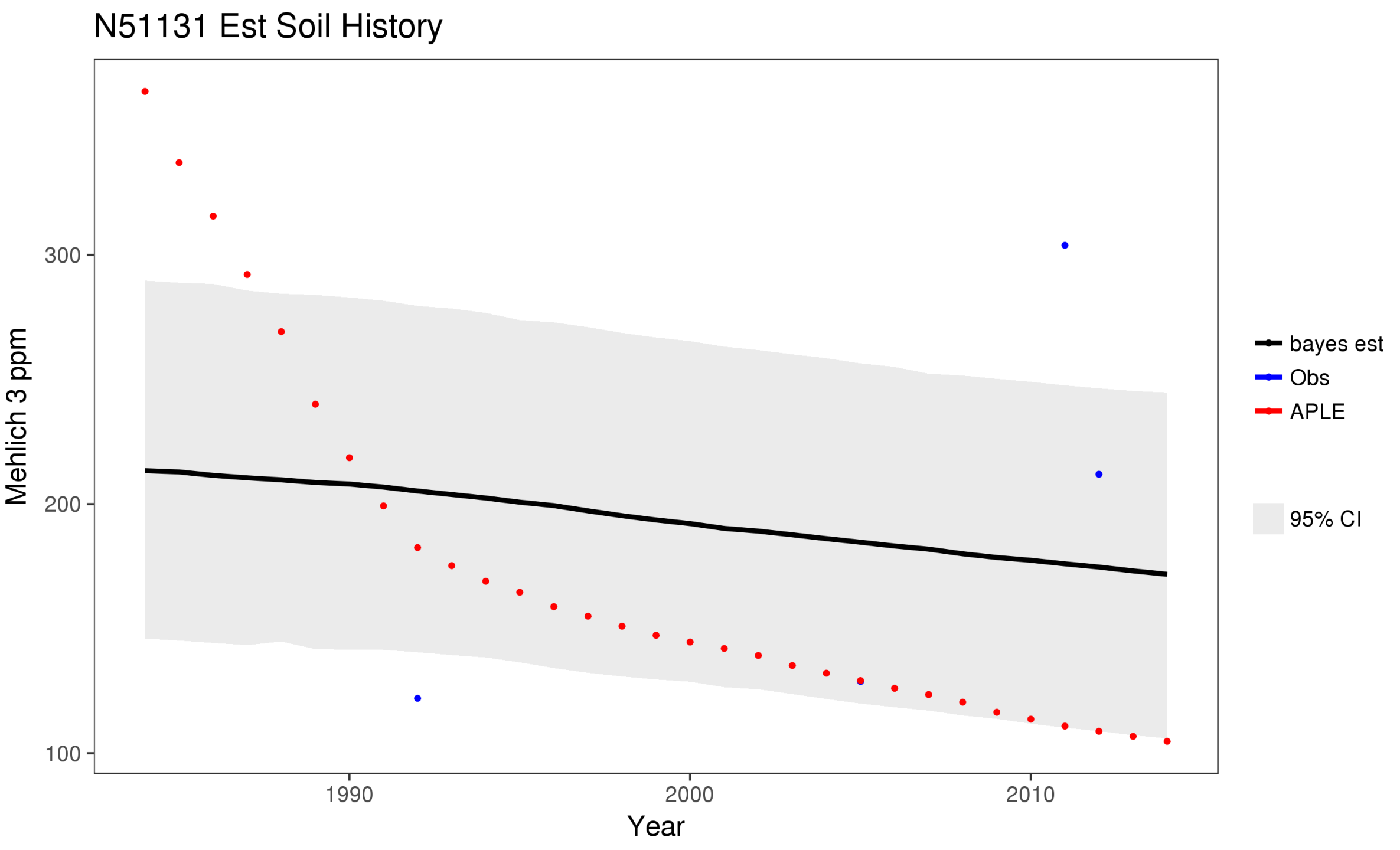

Soil P in Single County and Landuse
Mehlich 3 ppm
100
50
1990
2000
2010
Year
Bayes Est
Soil Tests
APLE
95% CI



Adjust Uncertainties

Adjust Landuse Discretization

Adjust No Data Assumptions


N51131 Est Soil History
Mehlich 3 ppm
300
200
100
1990
2000
2010
Year
bayes est
Obs
APLE
95% CI

Summary

Soil Test Data

The APLE model

Combination of the Two Incorporating Partnership Decisions on Uncertainty

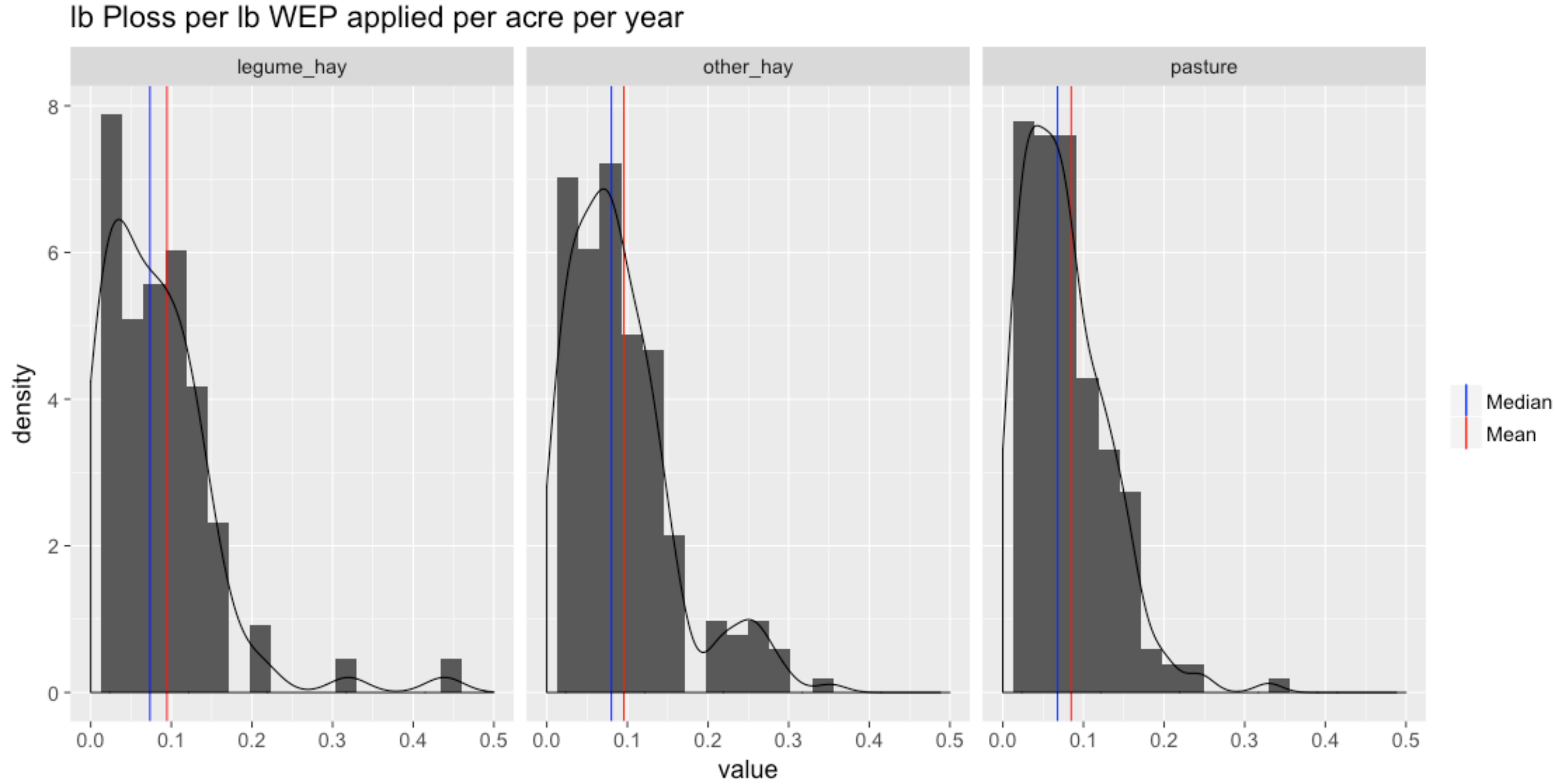
Results

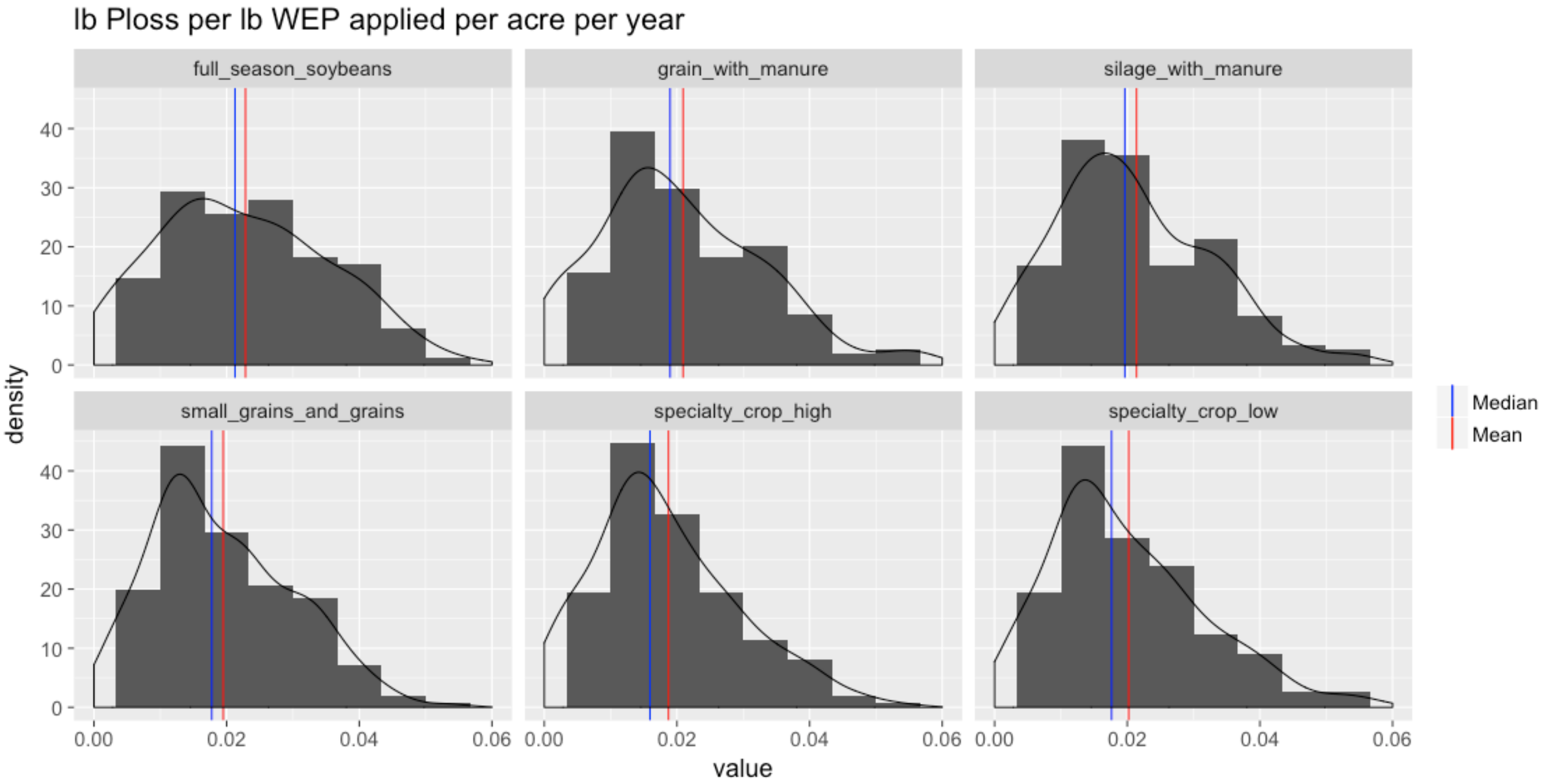
https://archive.chesapeakebay.net/Modeling/soil-p-history/figures/

WEP Sensitivity

What's Happening: WEP % of applied manure can influence P loss without big changes to sediment P storage

Solution: Make WEP sensitivities


lb Ploss per lb WEP applied per acre per year
legume_hay
other_hay
pasture
density
value
0
2
4
6
8
0.0
0.1
0.2
0.3
0.4
0.5
Median
Mean


lb Ploss per lb WEP applied per acre per year
full_season_soybeans
grain_with_manure
silage_with_manure
small_grains_and_grains
specialty_crop_high
specialty_crop_low
density
value
0
10
20
30
40
0.00
0.02
0.04
0.06
Median
Mean

Values

Crops: 0.02

Hay and Pasture: 0.09

lbs P loss per lb WEP applied