

Soil Phosphorus History

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¹UMCES

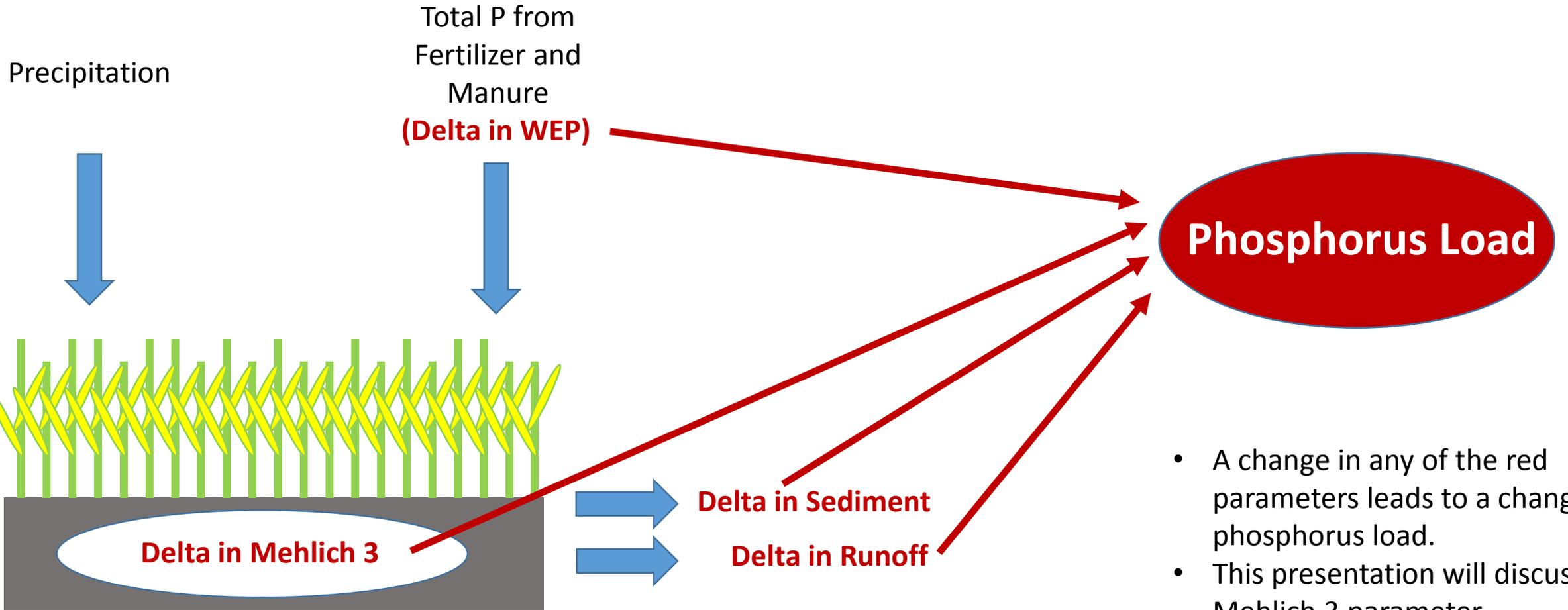
²USGS

³UMD

Question

- The Modeling Workgroup approved the use of APLE to estimate P loads and the use of a statistical model to estimate soil P history.
- Upon review, the AMS provided uncertainty estimates to improve the statistical model's estimates of soil P history.
- **Does the Ag Workgroup concur with the AMS recommendations for improving the statistical model's estimates of soil P history?**

Estimating Phosphorus Load Using APLE



- A change in any of the red parameters leads to a change in phosphorus load.
- This presentation will discuss the Mehlich 3 parameter.

Soil P History

Soil P is an Important Sensitivity

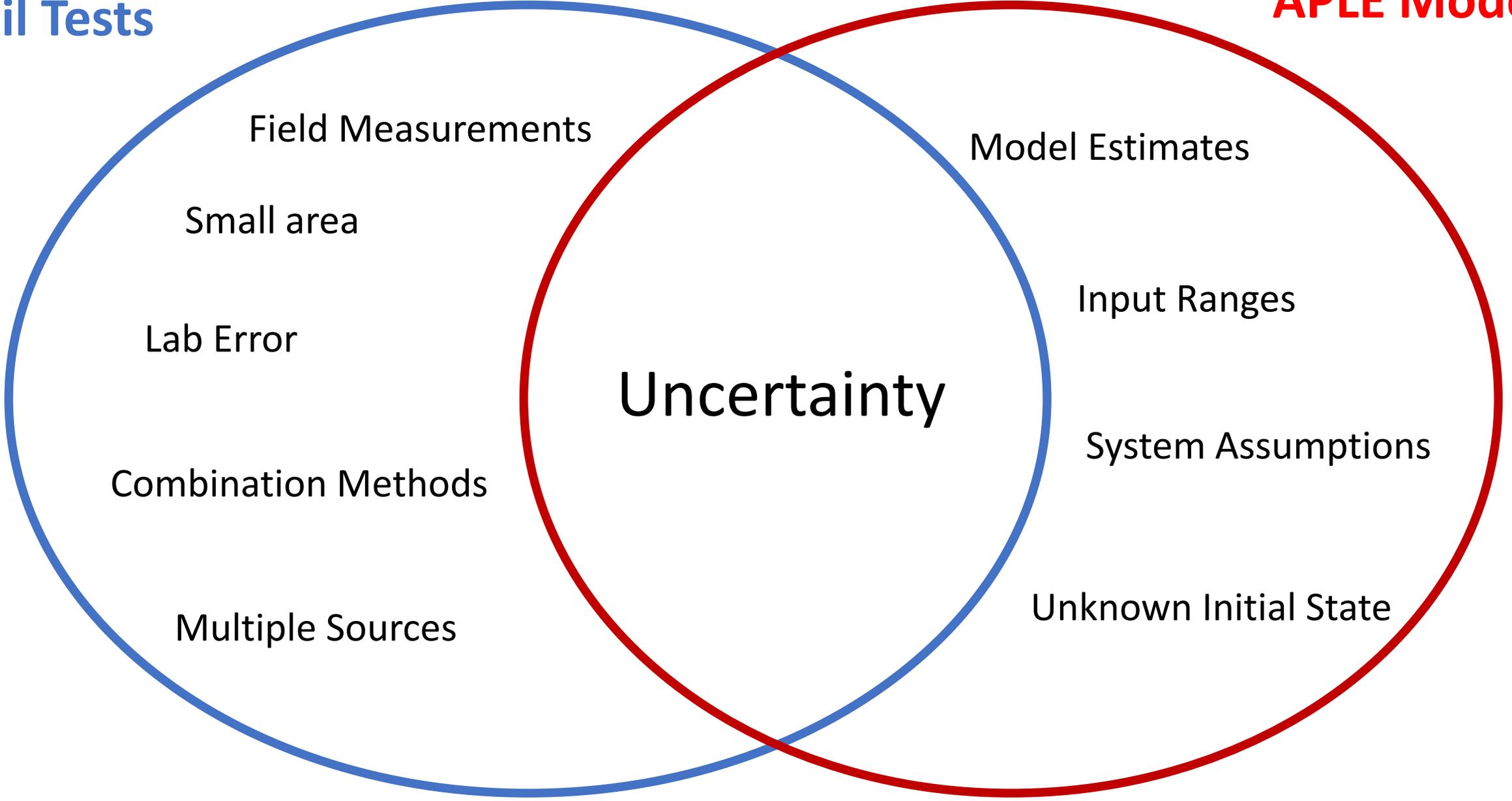
Soil Tests

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

Model Estimates

Input Ranges

System Assumptions

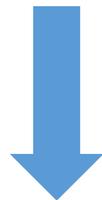
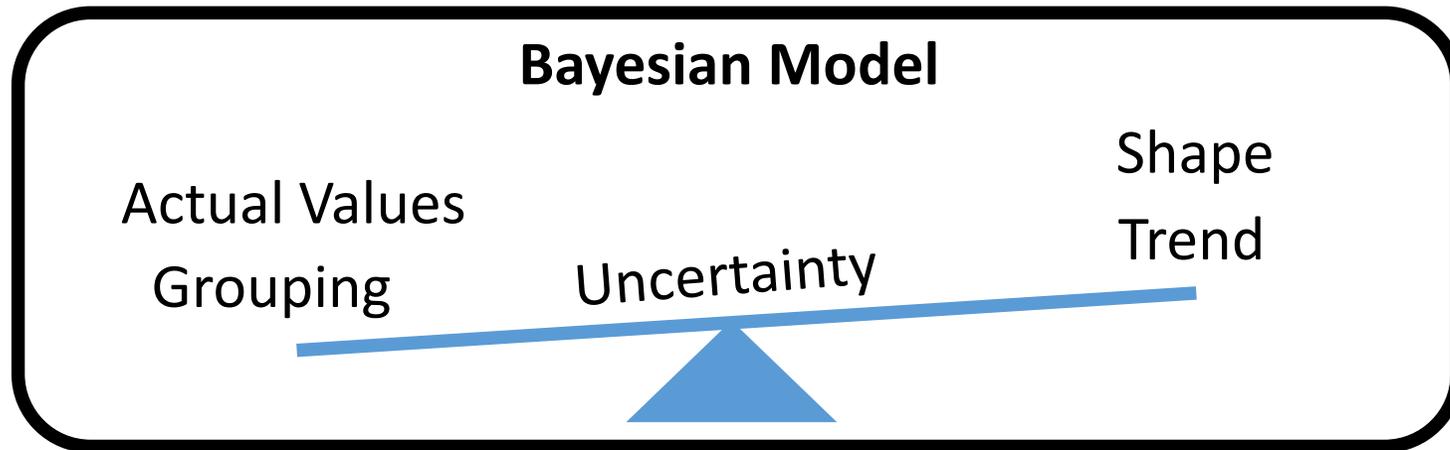
Unknown Initial State

Uncertainty

Balance of what the two data sets are telling us

Soil Tests

APLE Model



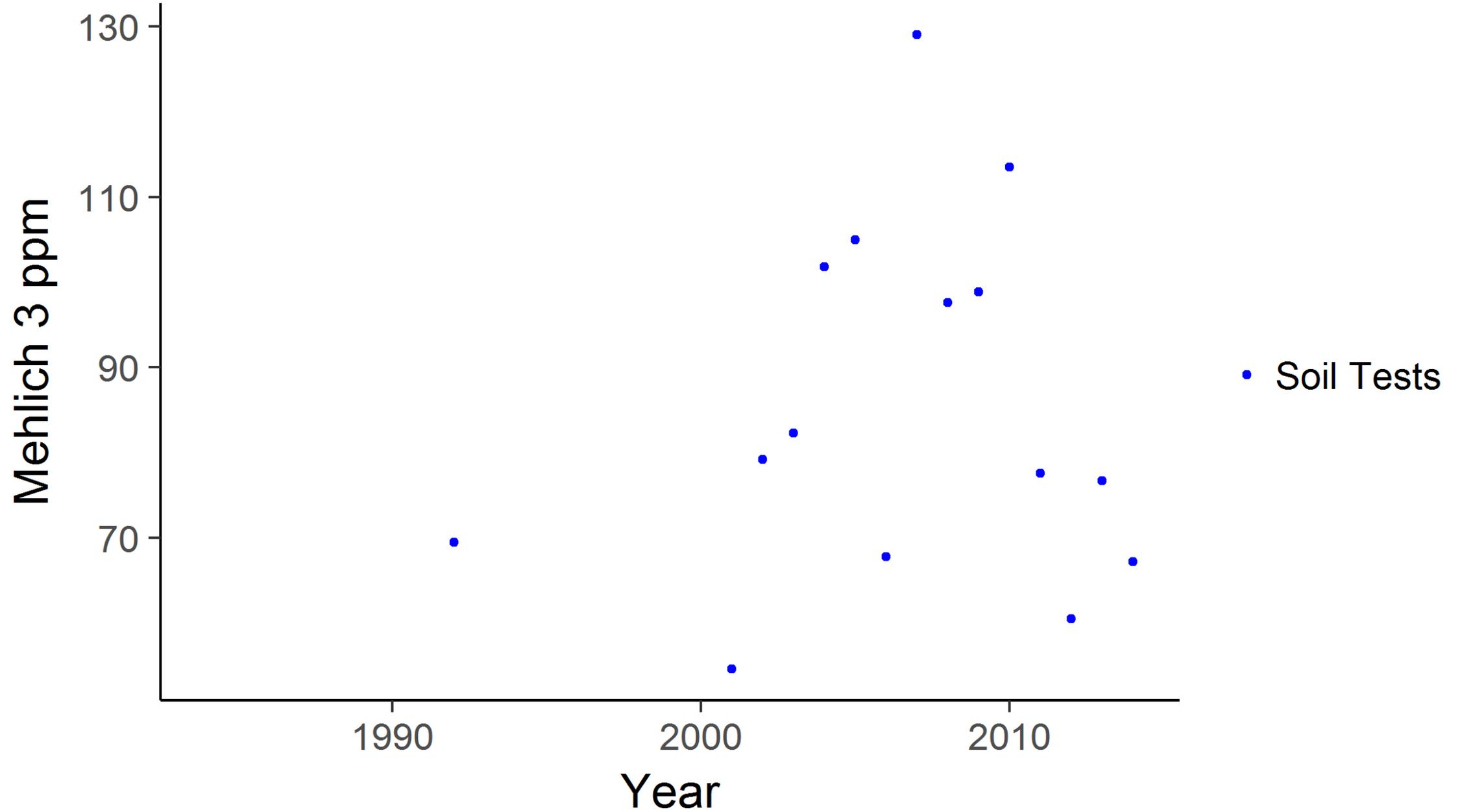
Final Estimate

Contributions of AMS

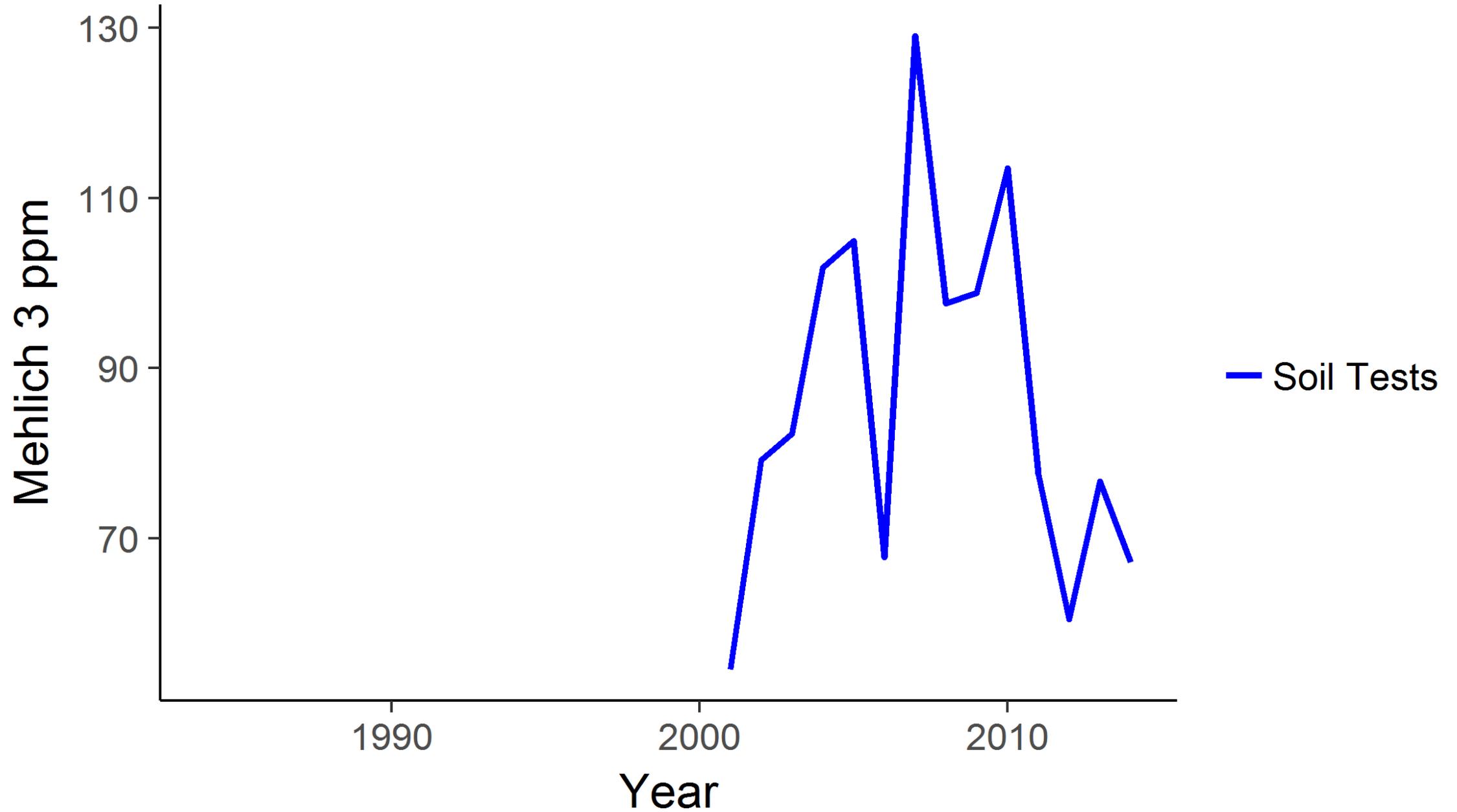
- Concurred with Modeling Workgroup's recommendation to use Bayesian statistical model.
- Provided uncertainty estimates for soil test data.
- Recommended bounding the Bayesian Model results within a range of possible soil P values (not allowing 1,000 ppm).
- Recommended simulating soil test P changes for row crop rotations (corn, soybean, small grains), rather than individual crops.

How Did We Get Here?

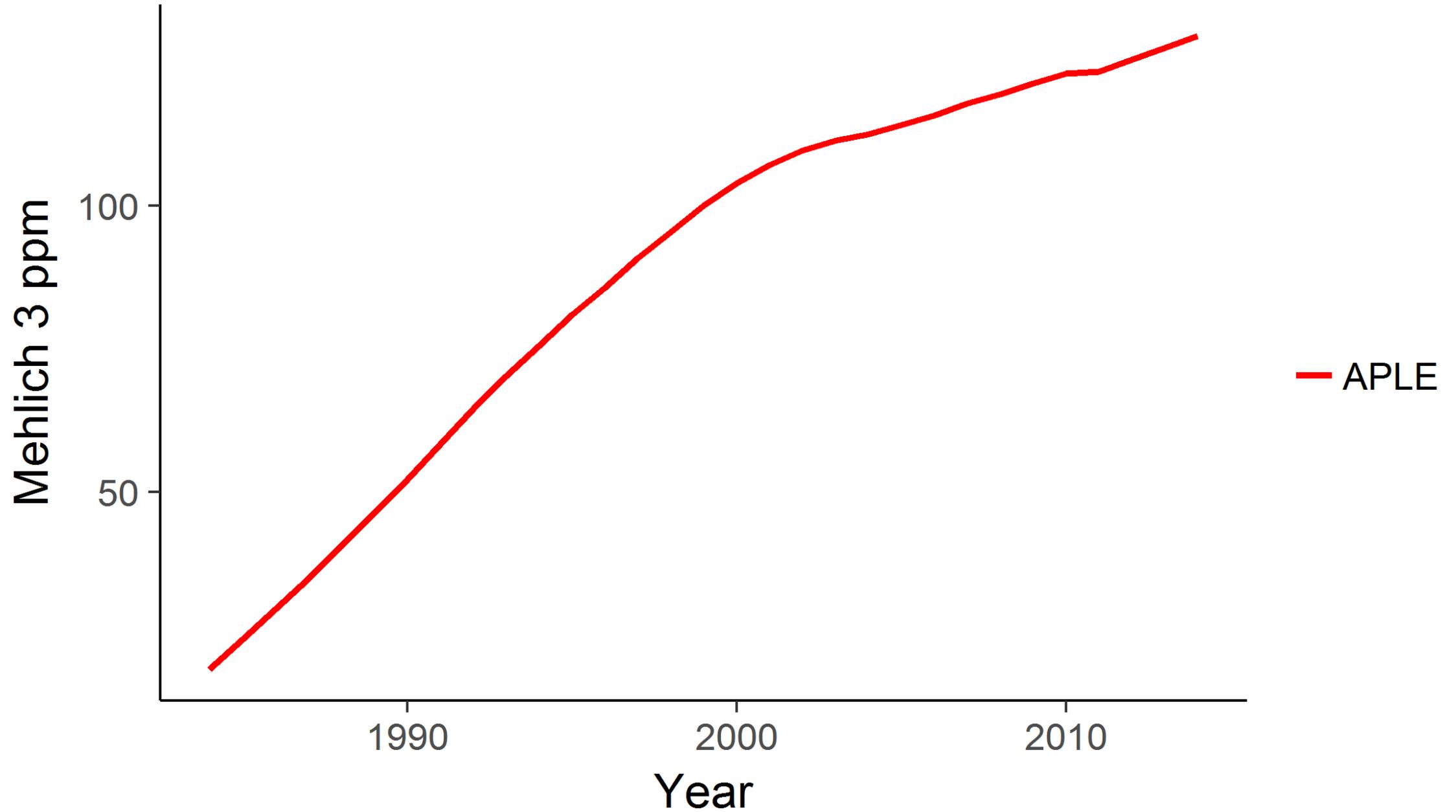
Soil P in Single County and Landuse



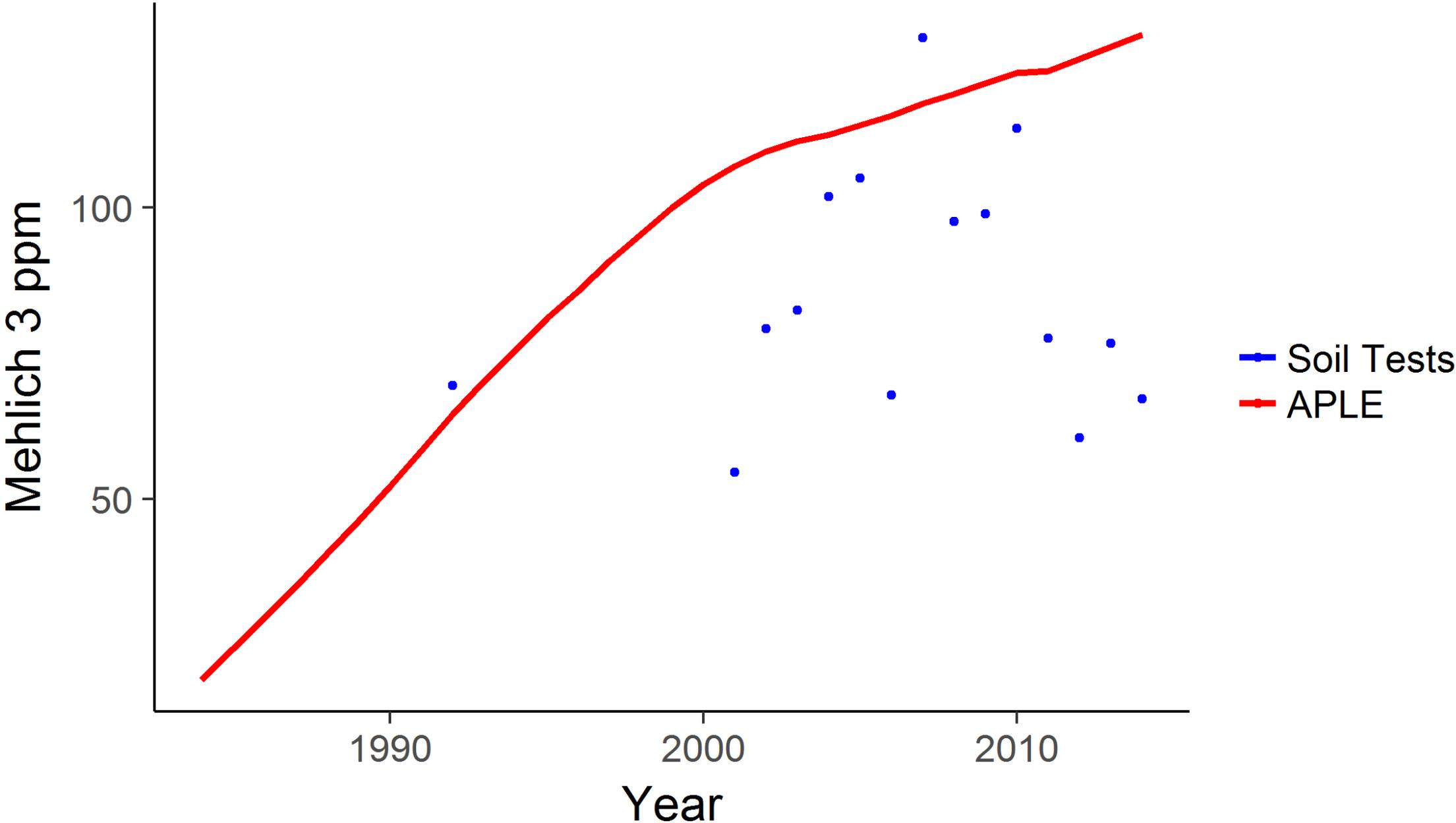
Soil P in Single County and Landuse



Soil P in Single County and Landuse

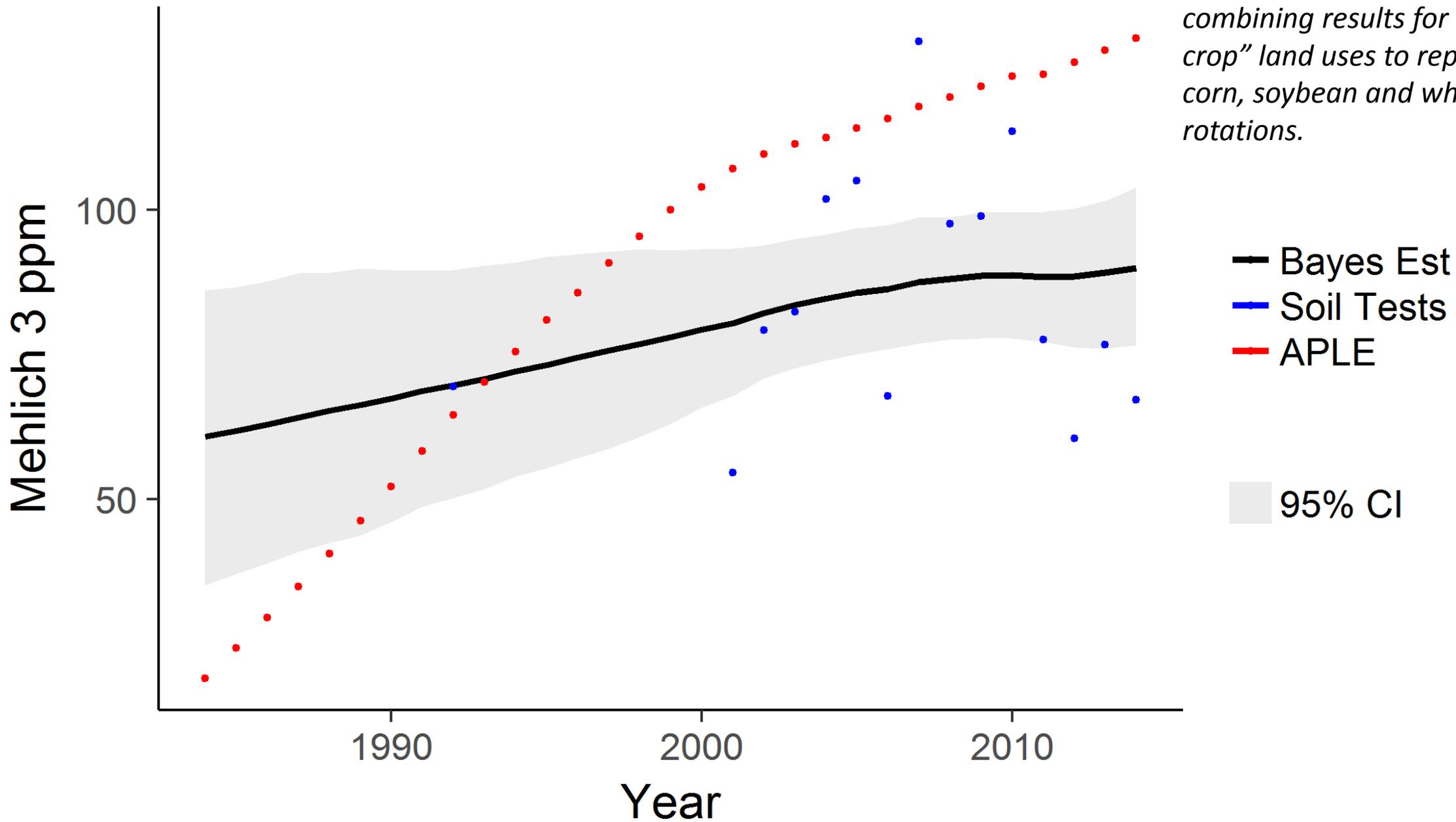


Soil P in Single County and Landuse



Soil P in Single County and Landuse

Note: AMS recommends combining results for all "row crop" land uses to represent corn, soybean and wheat rotations.



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/>

Question

- **Does the Ag Workgroup concur with the AMS recommendations for improving the statistical model's estimates of soil P history?**