

AMT Fertilizer

12/12/2025

Tom Butler, EPA

November Action items

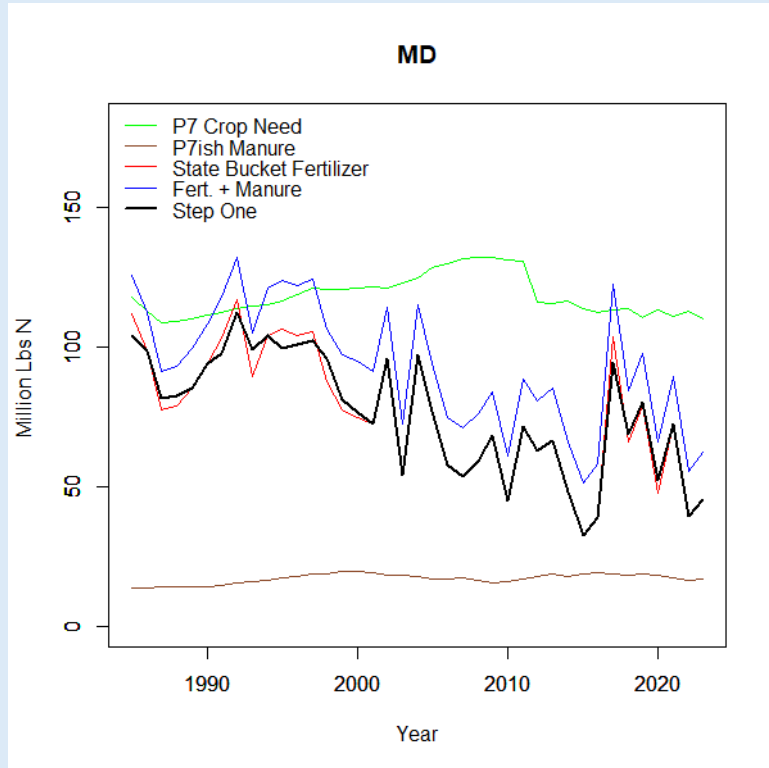
- 1) Examine potential data collection changes in states
- 2) **Add manure to smoother fertilizer and crop need figures**
 - 1) **Examine projection method for non reporting jurisdictions**
- 3) Dig deeper into Delaware fertilizer data behavior
- 4) Supply County Level crop need data
- 5) Compare national and Chesapeake watershed scale fertilizer and crop data trends
- 6) **Compare Hillandale Populations vs CAFO permit numbers**

Yellow Highlight = decisional item

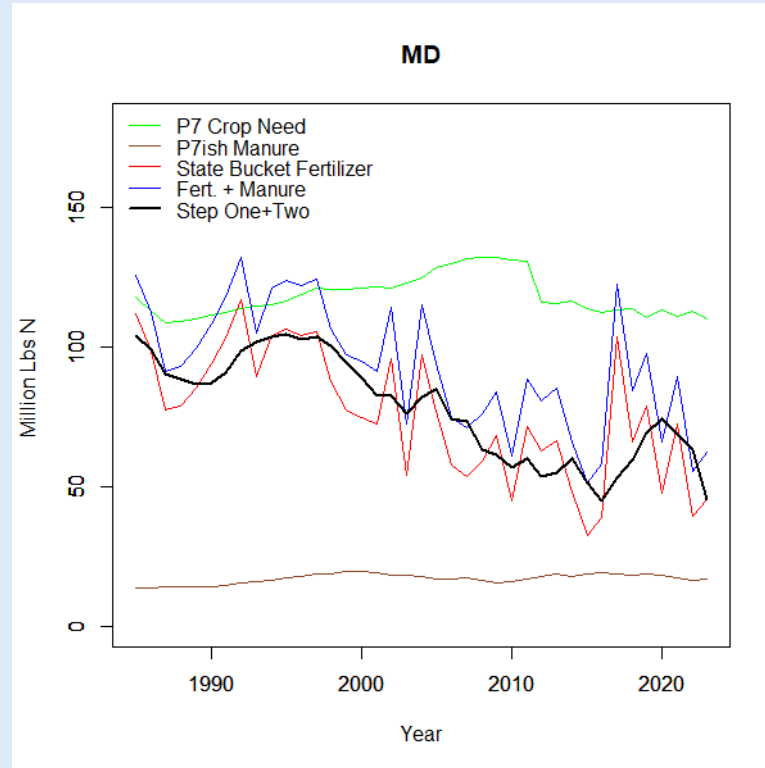
Item 1 Reach out to state chemists

- **KEY TAKEAWAY: CURRENT DATA ARE CORRECT**
- Pennsylvania Fertilizer Sales tonnage vs AAPFCO
 - Concerned that a change in data reporting caused an underreporting of NPK between 2007 - 2014.
- Discovered there are multiple reports of AAPFCO data
 - Book release (generalized)
 - Purchased reports (specific)
- Confirmed no collection concerns
 - DE, MD, VA
- No responses were taken to mean data were correct

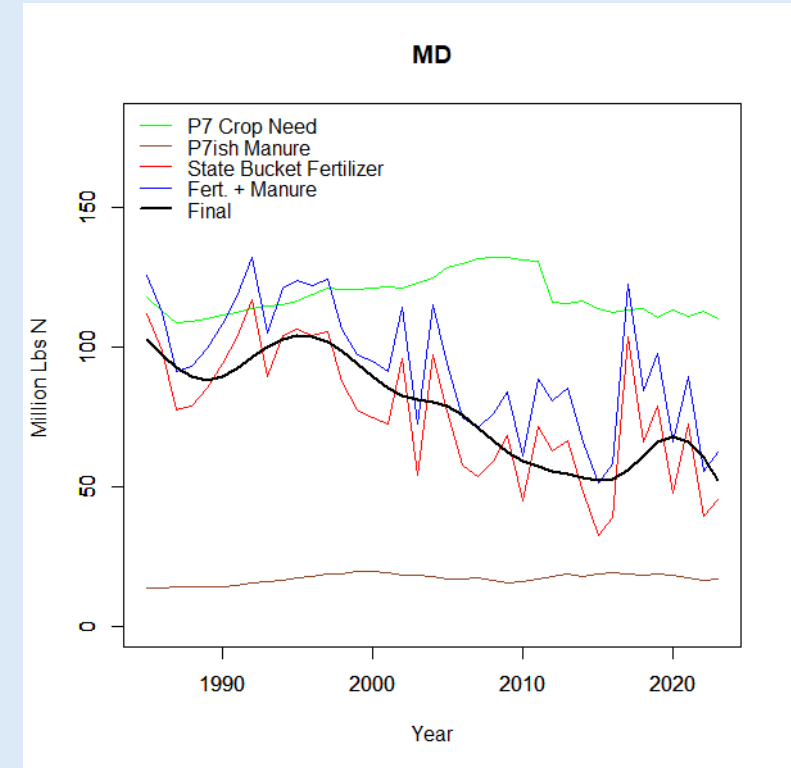
Item 2 Plot manure with crop need and smoothed fertilizer: How it works



Step one: Redistributes fertilizer from years of surplus to years of deficit within a 4-year window. Surplus now defined including estimated manure PAN.

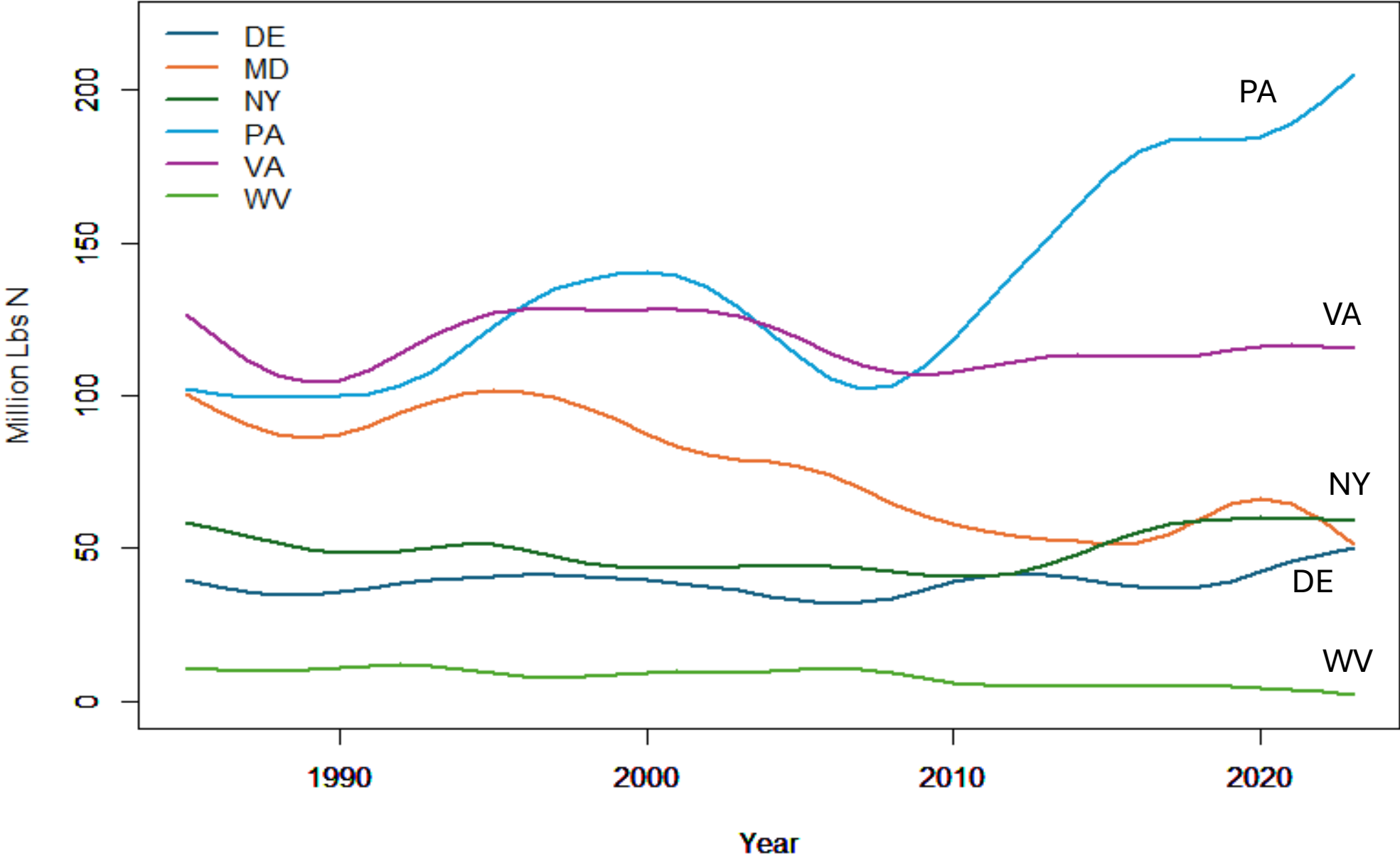


Step two: Redistributes fertilizer based on crop need within a forward looking 4-year window.

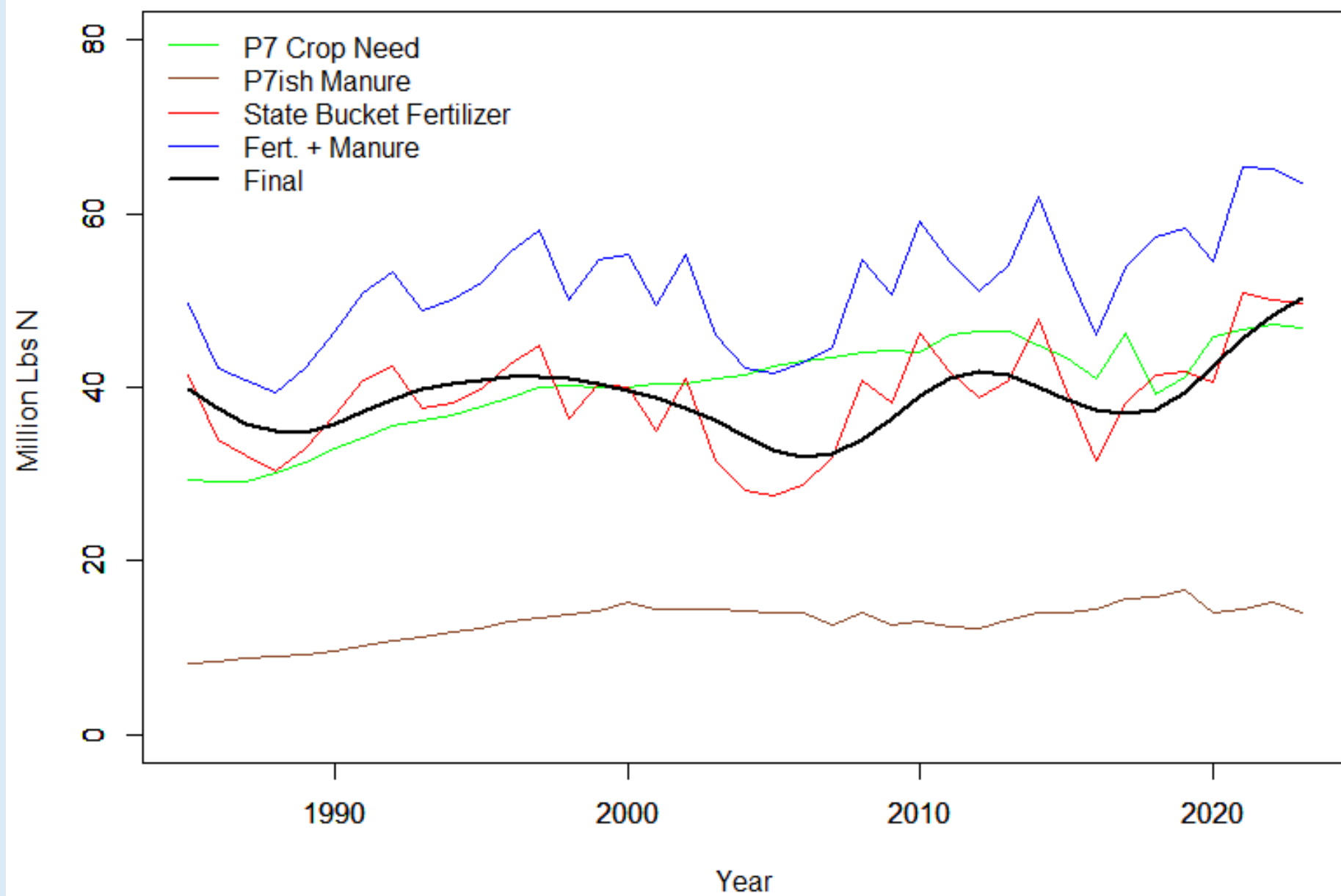


Step three: Uses a spline to provide additional arbitrary smoothing.

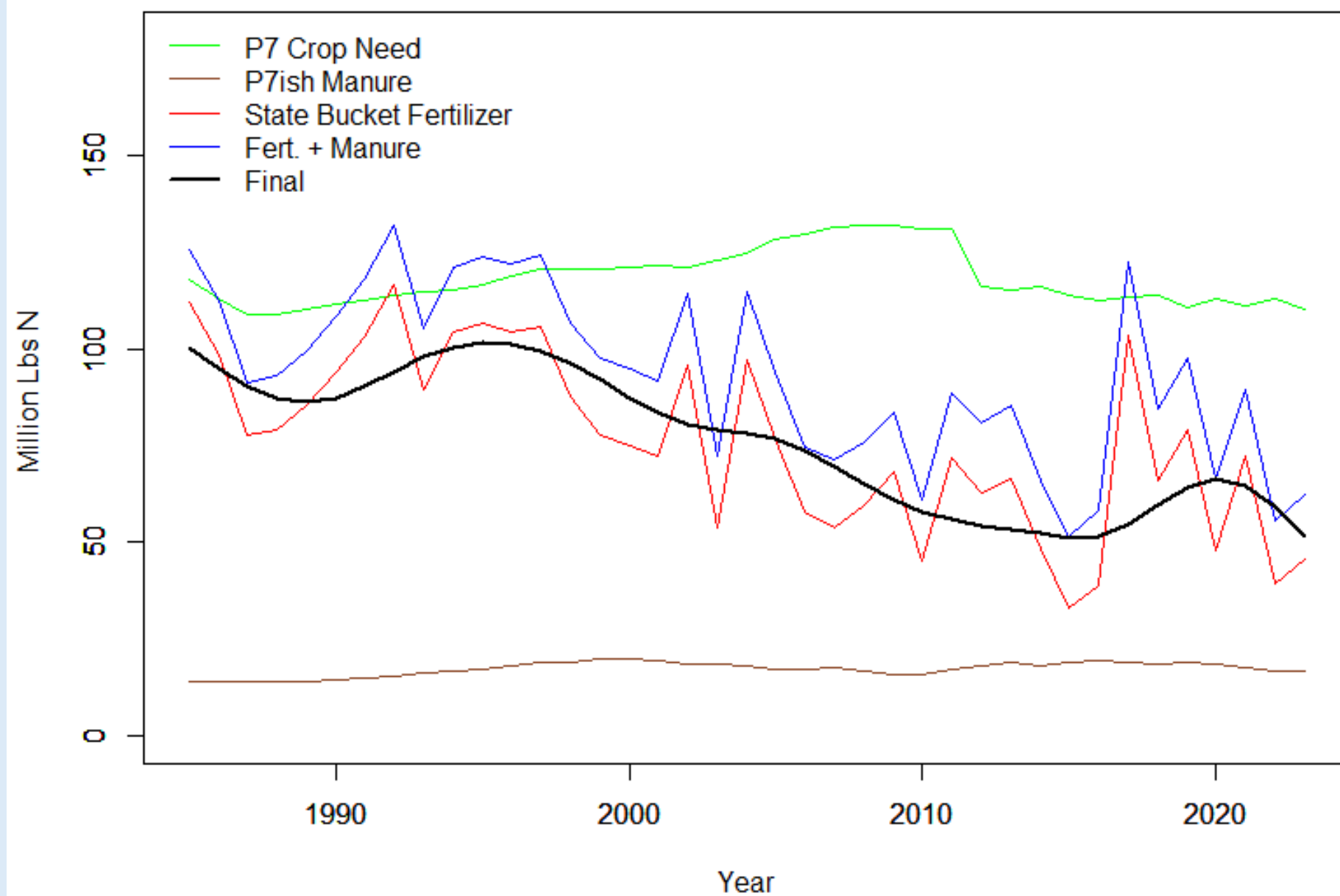
All States, N



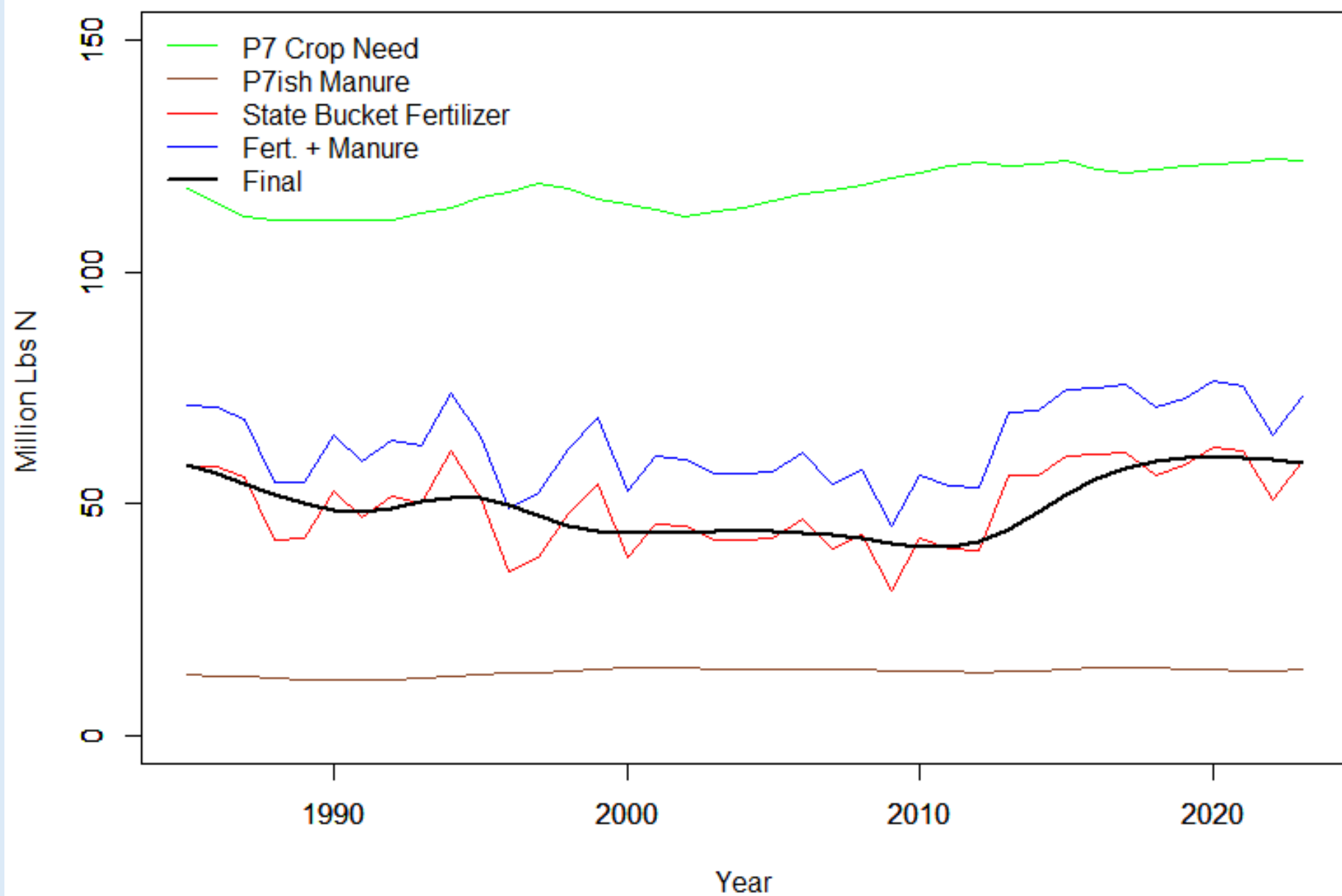
DE



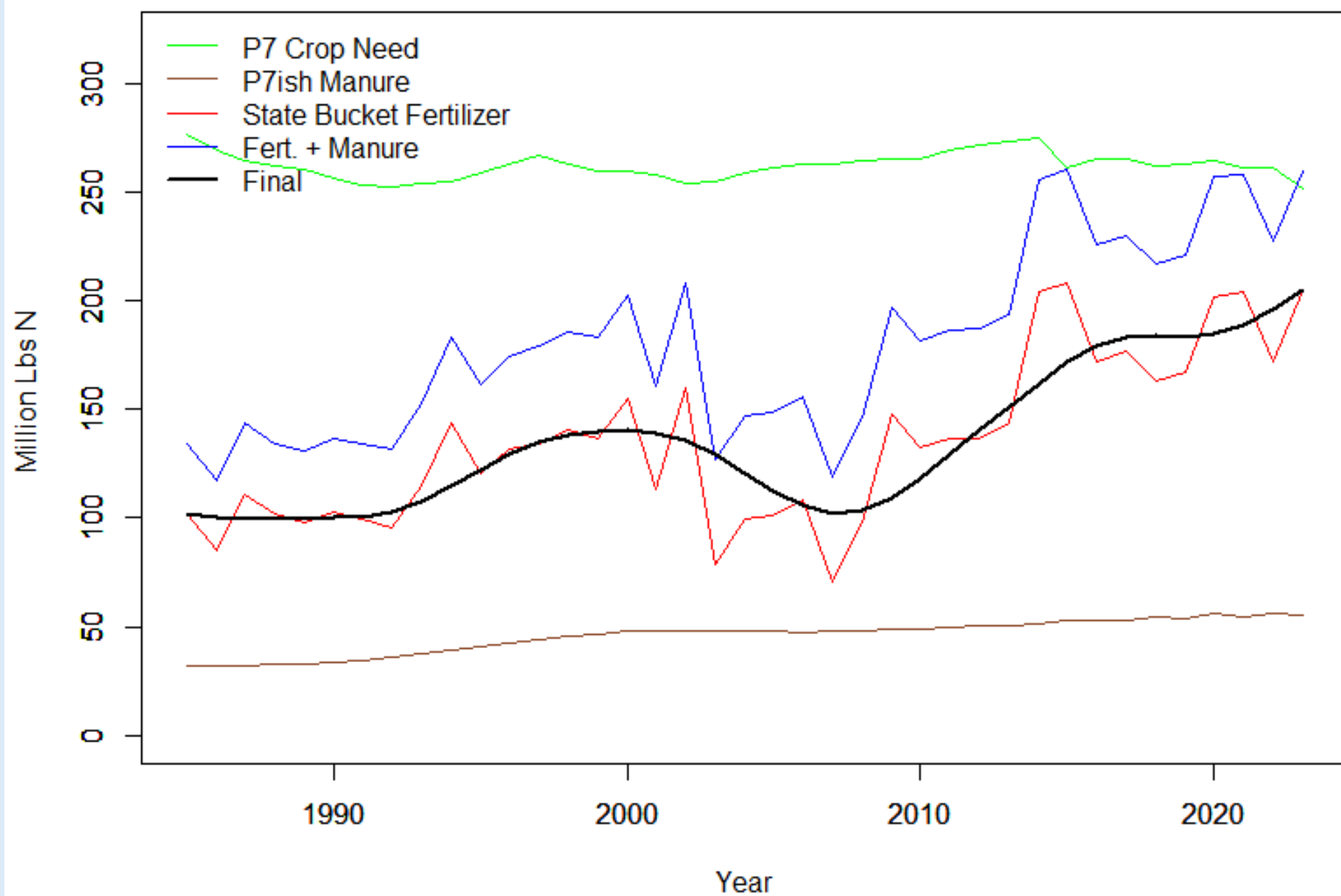
MD



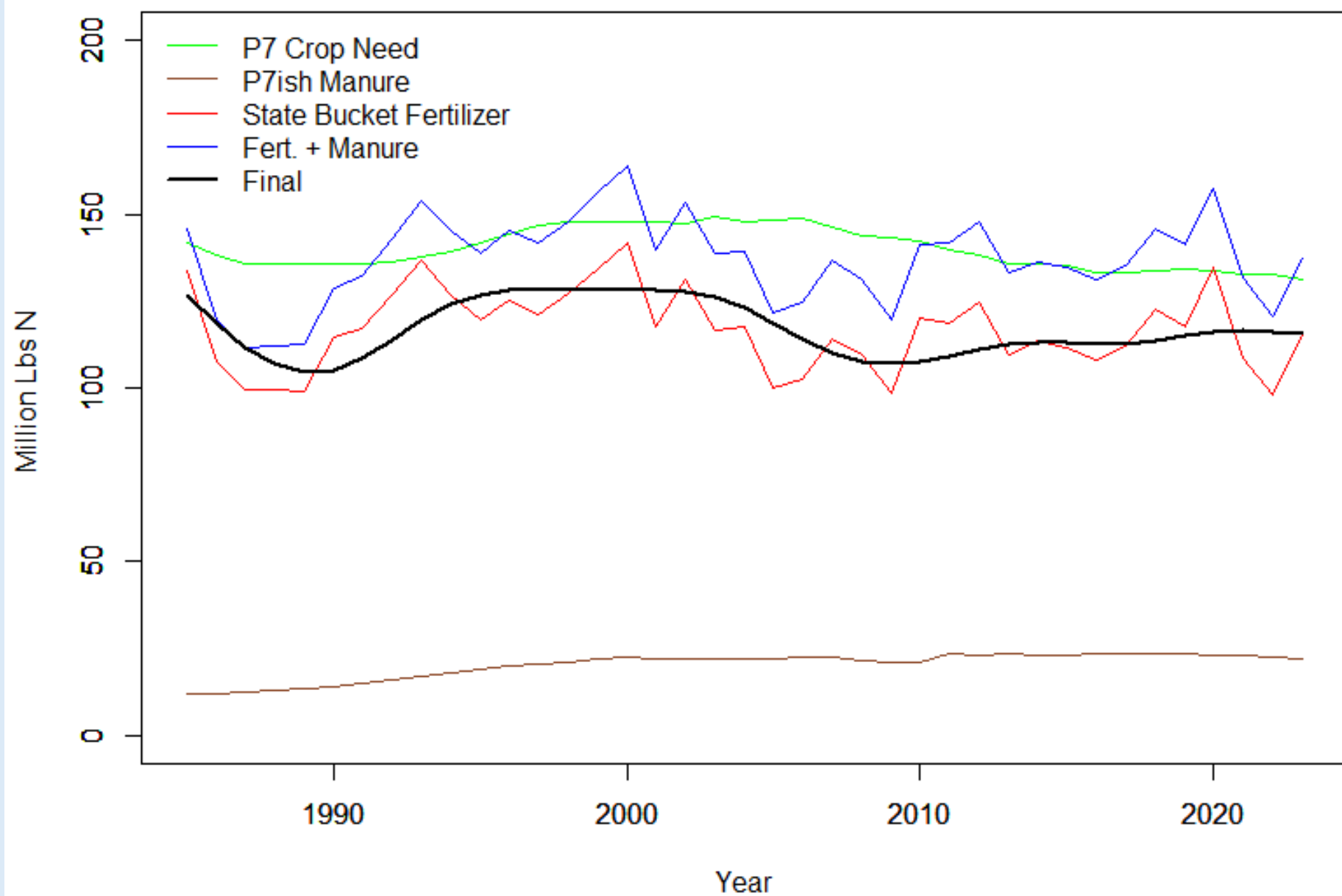
NY



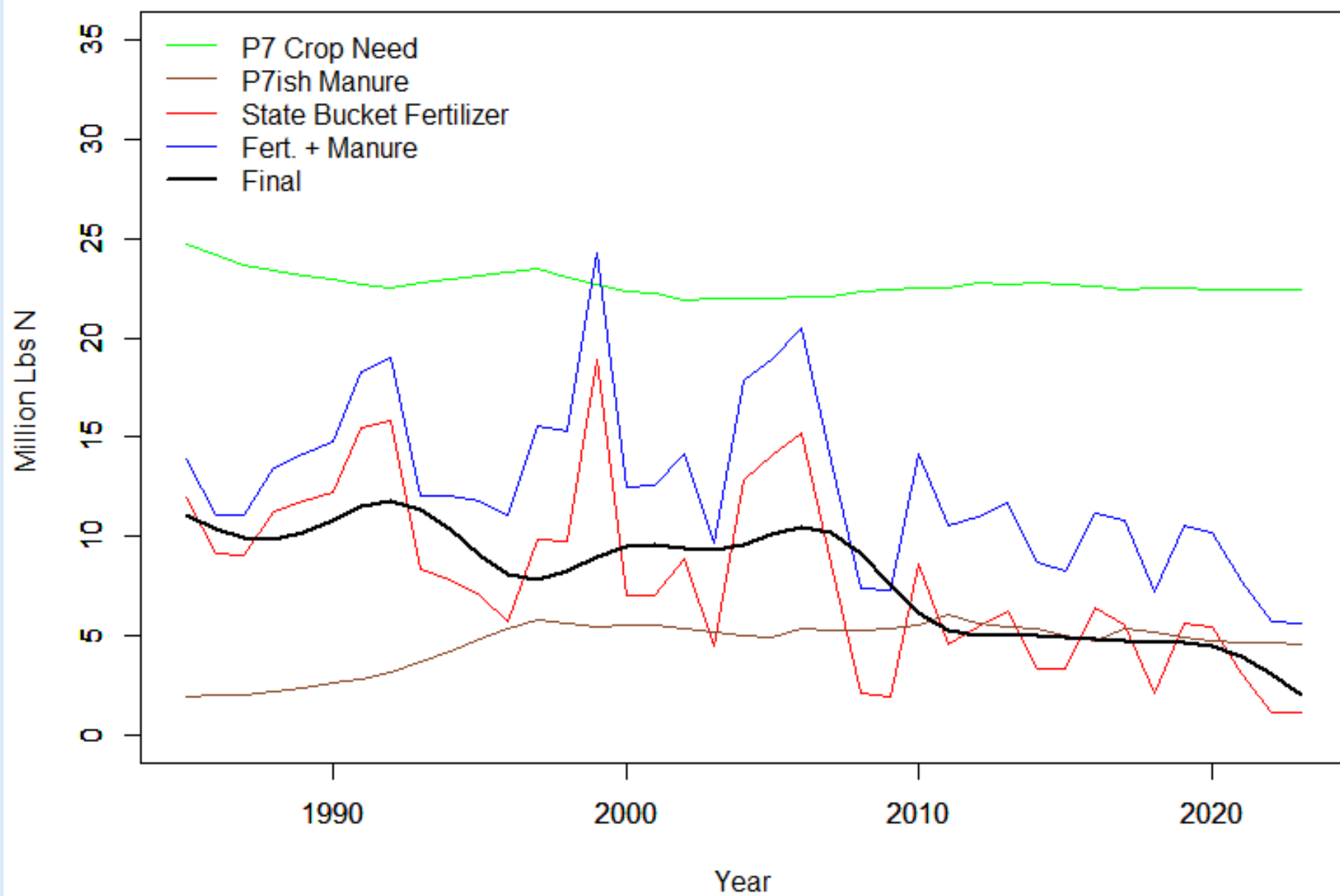
PA



VA



WV



Questions?

Decision Proposal

- We should utilize the provided fertilizer data smoothing methodology for Phase 7.
 - State specific based on crop need, a four-year stockpiling window tied to crop need with a spline added.

Consensus Continuum



Item 2.b Project fertilizer for states not reporting data

Option 1

- Tied to the **last year** of known data

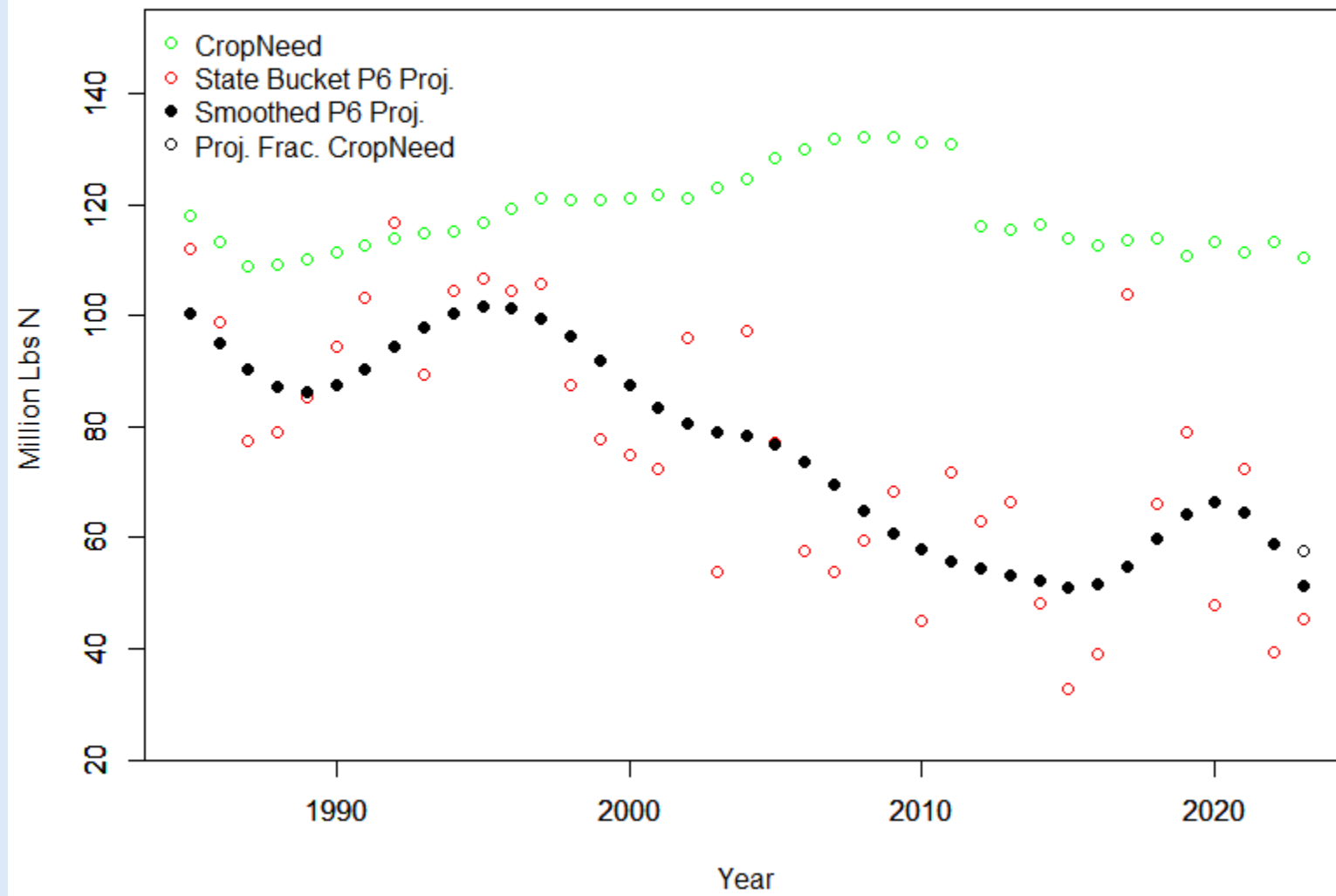
Option 2

- Tied to an **average of the last three years** of crop need

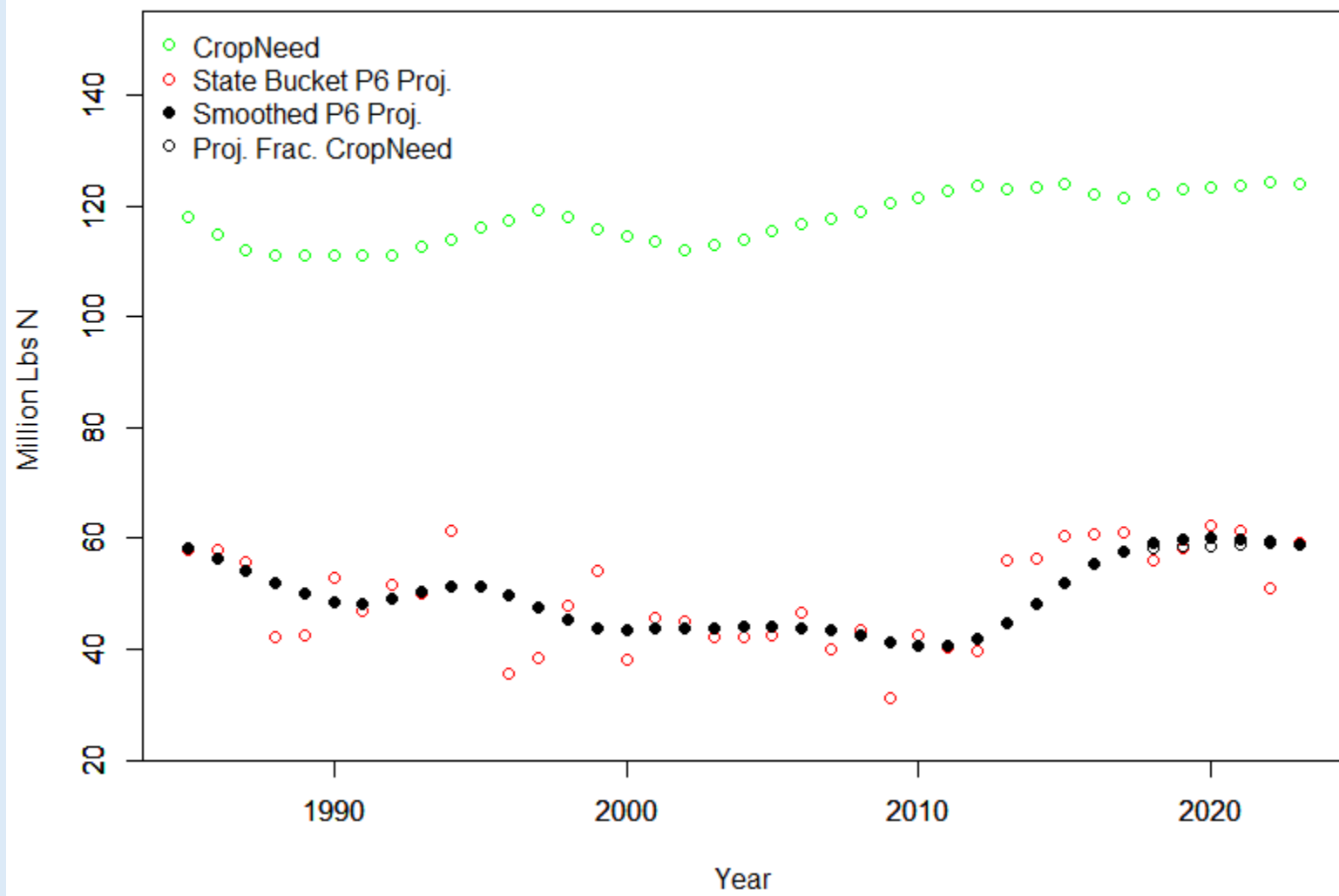
Option 1

- Ties states fertilizer usage to crop need
 - Based on the last known year with BOTH fertilizer AND yields
 - Calculate the amount of crop need (application goal) that is satisfied with known fertilizer
 - Extrapolate into years with no known fertilizer but a known yield.
- Retains the ability of the states to keep fertilizer independent and tied to their own behavior

MD



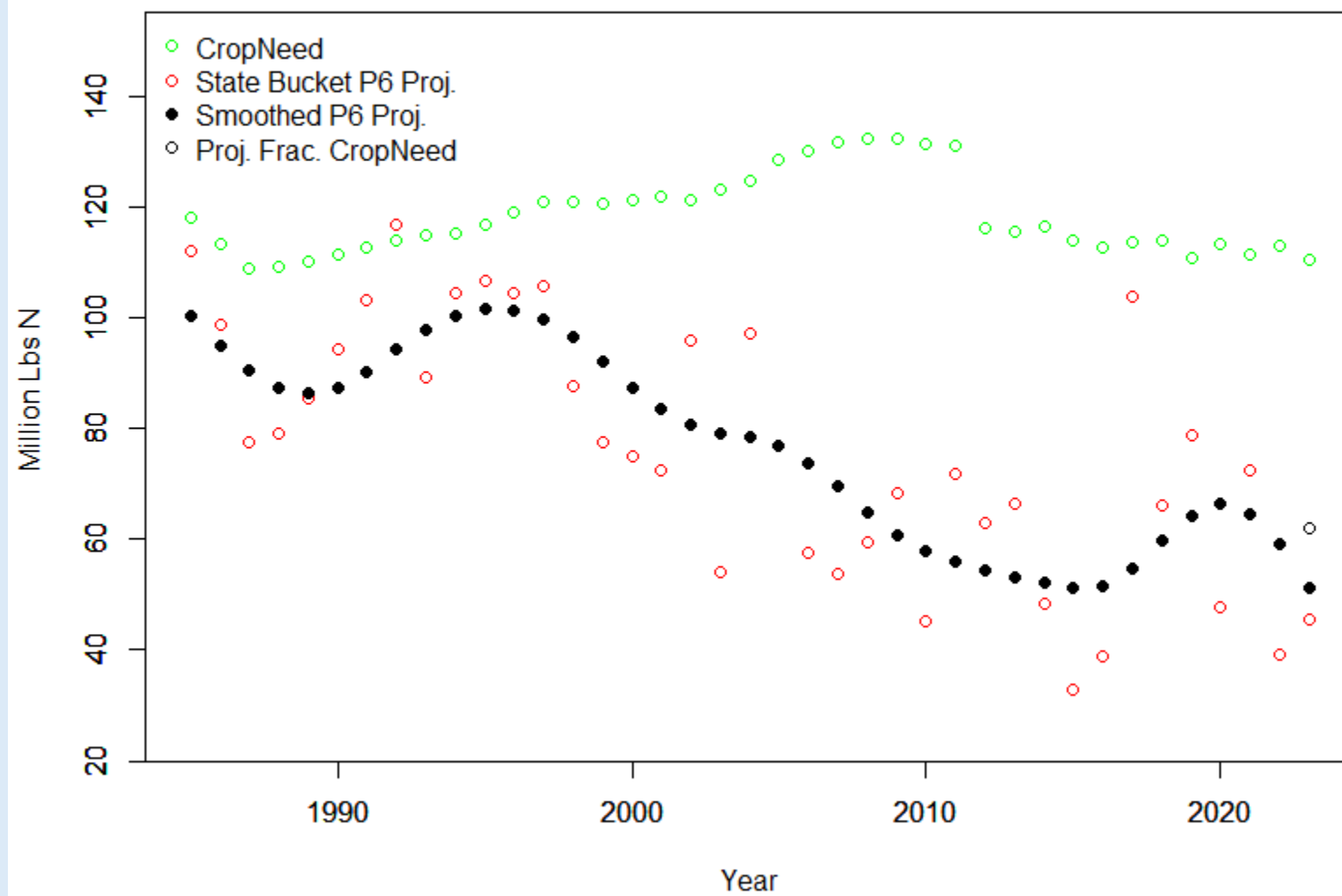
NY



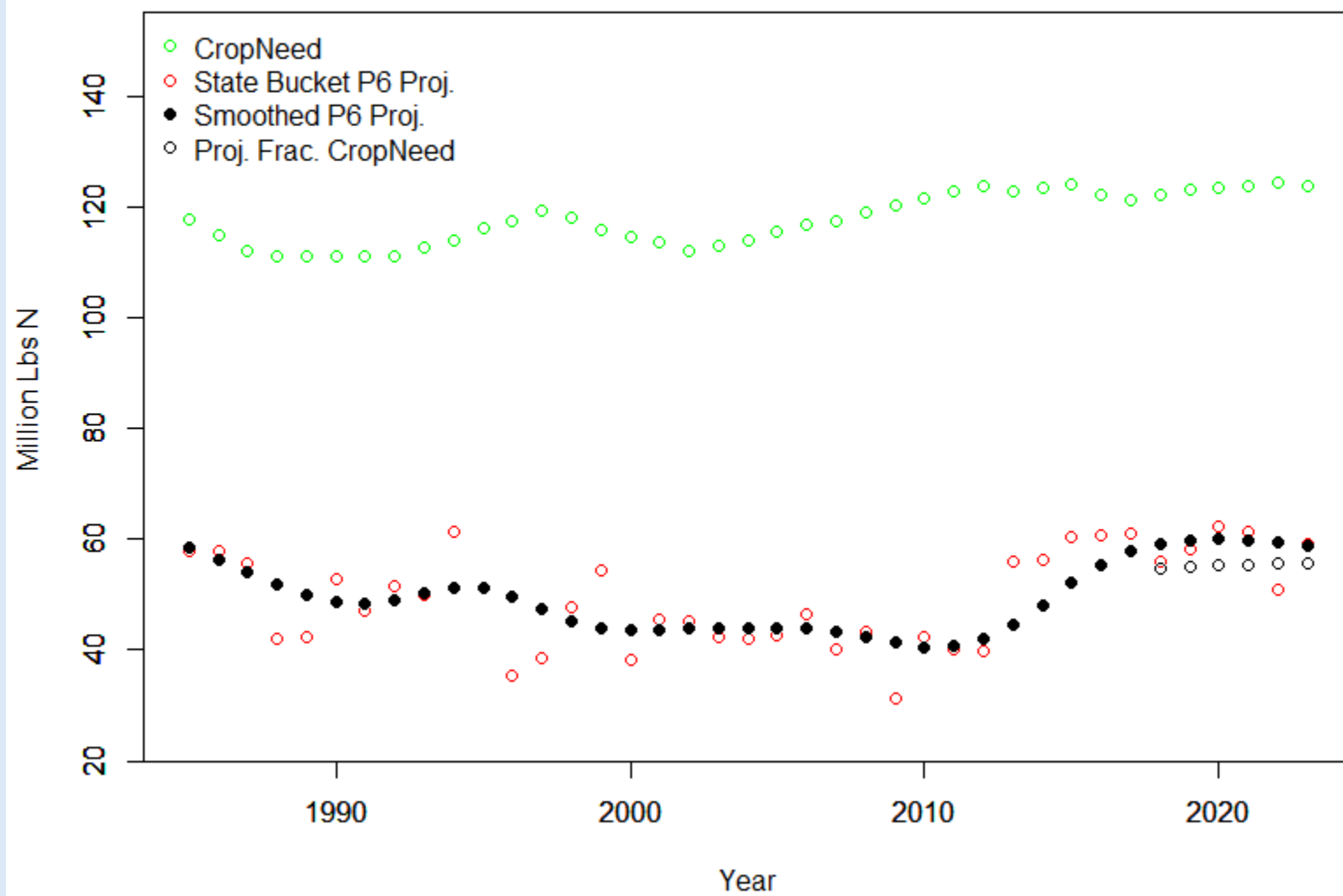
Option 2

- Average the fraction of crop need (application goal) met over the last three years
- Ties states fertilizer usage to crop need
 - Based on the last known year with BOTH fertilizer AND yields
 - Calculate the amount of crop need (application goal) that is satisfied with known fertilizer
 - Extrapolate into years with no known fertilizer but a known yield.
- Retains the ability of the states to keep fertilizer independent and tied to their own behavior

MD



NY



Questions?

Decision Proposal

- 1) We should adopt the provided method for projecting fertilizer for Phase 7.
 - 1) Projection based on state specific crop need with an average of the last three years. This is only applicable during periods where no data is reported.

Consensus Continuum

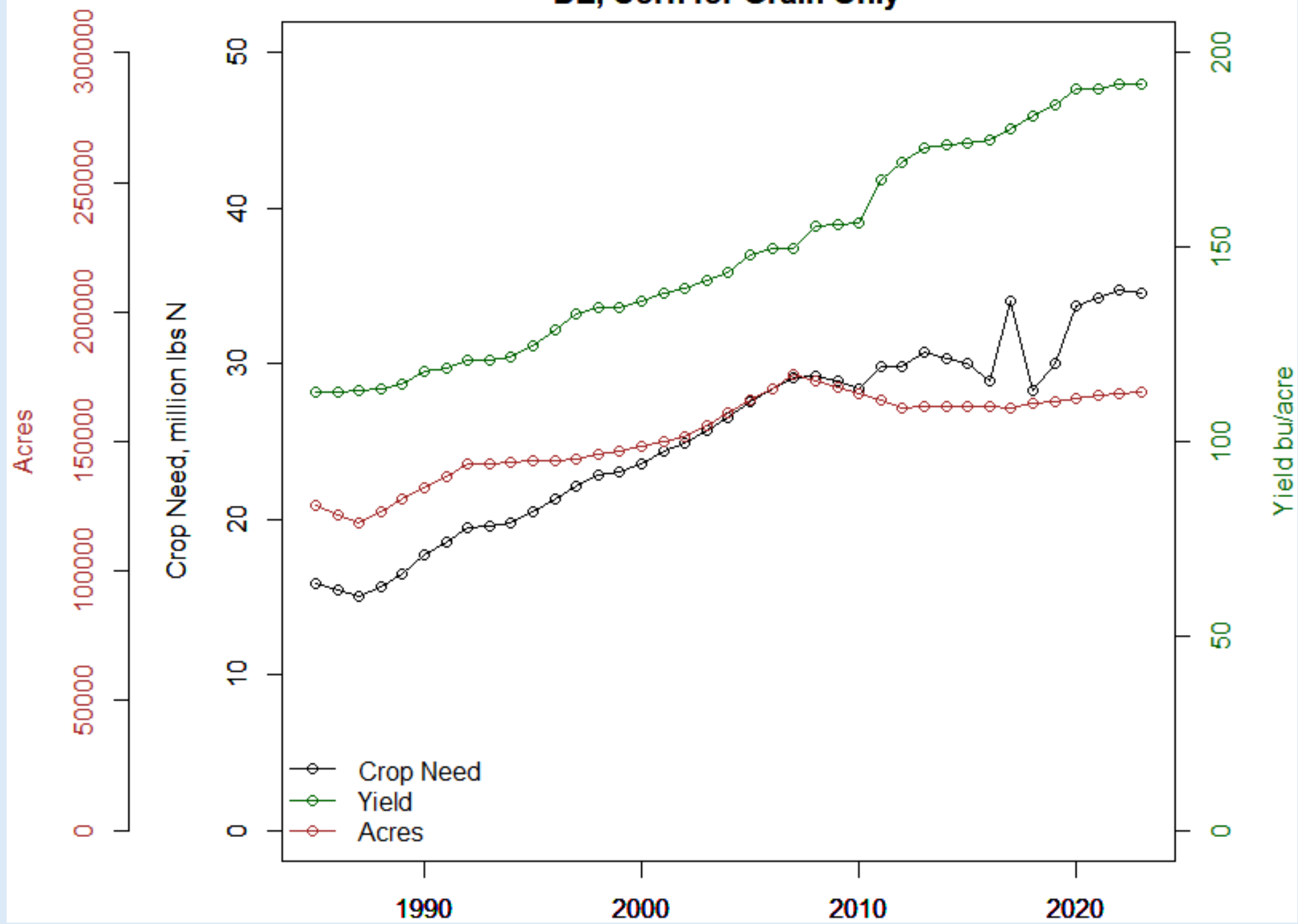


Item 3 Examine Delaware fertilizer data behavior

Possible progress with new smoothing

- State Level Fert Buckets
- State Smoothed Level Fert Buckets
- Further discussions might be warranted

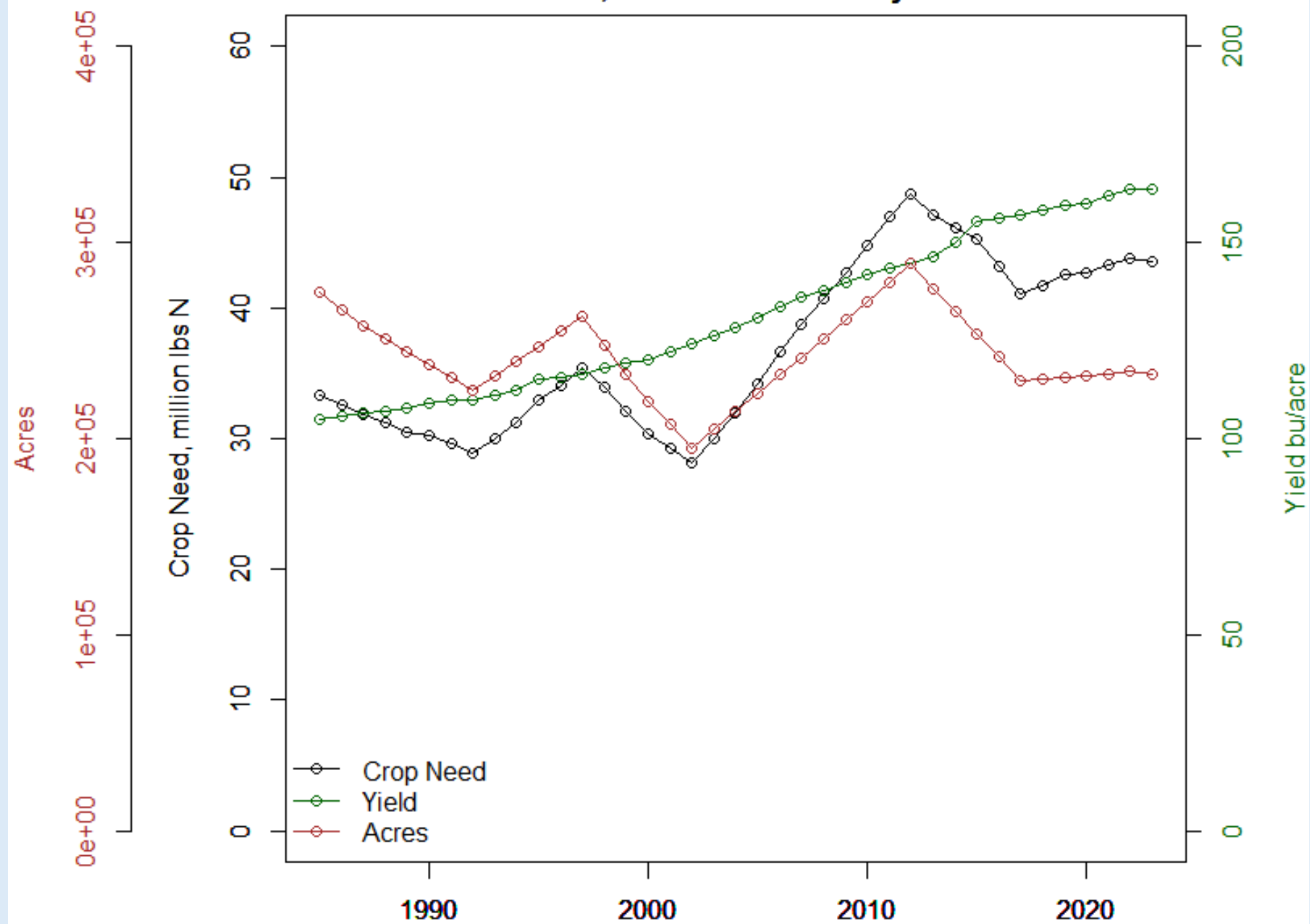
DE, Corn for Grain Only



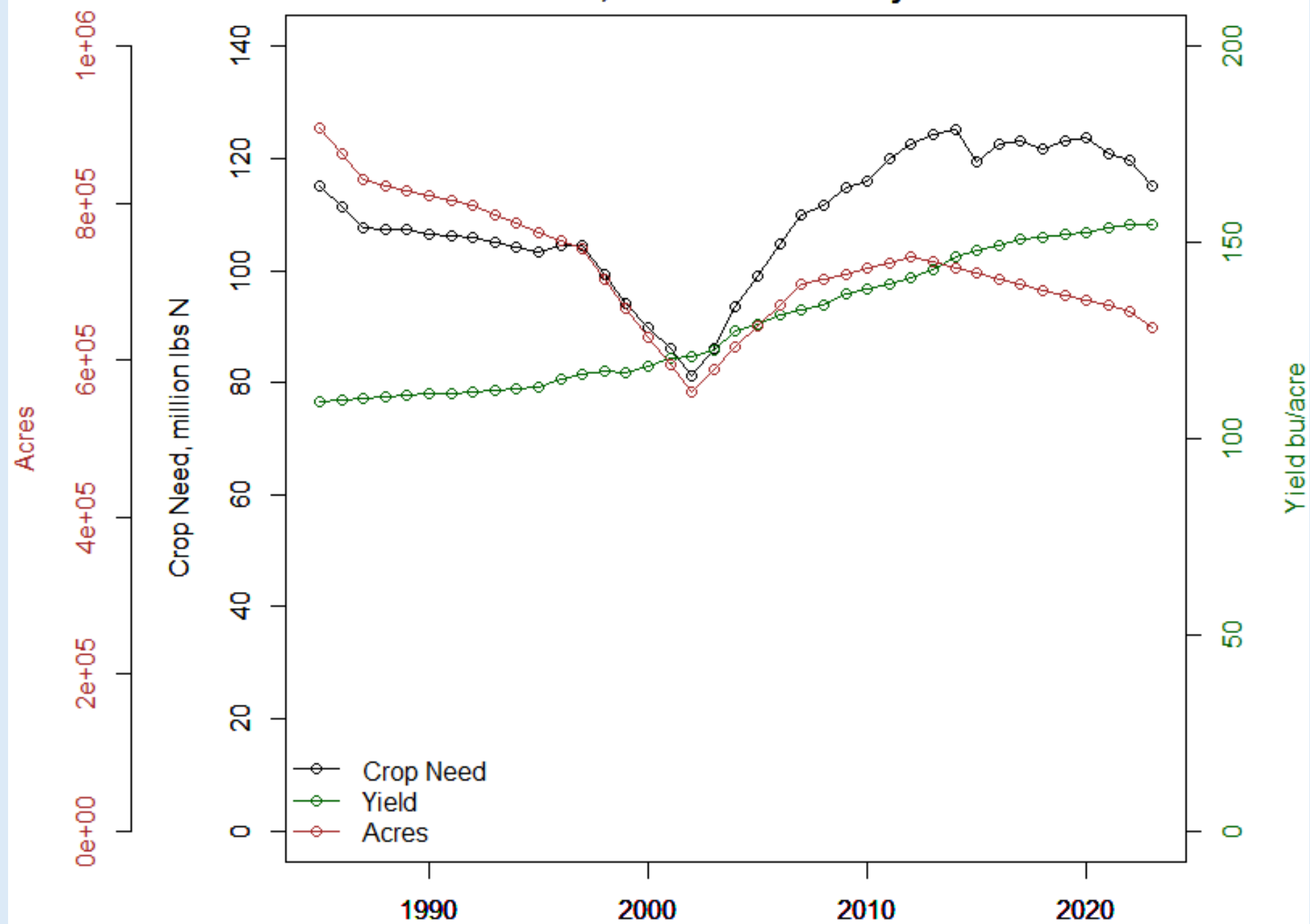
MD, Corn for Grain Only



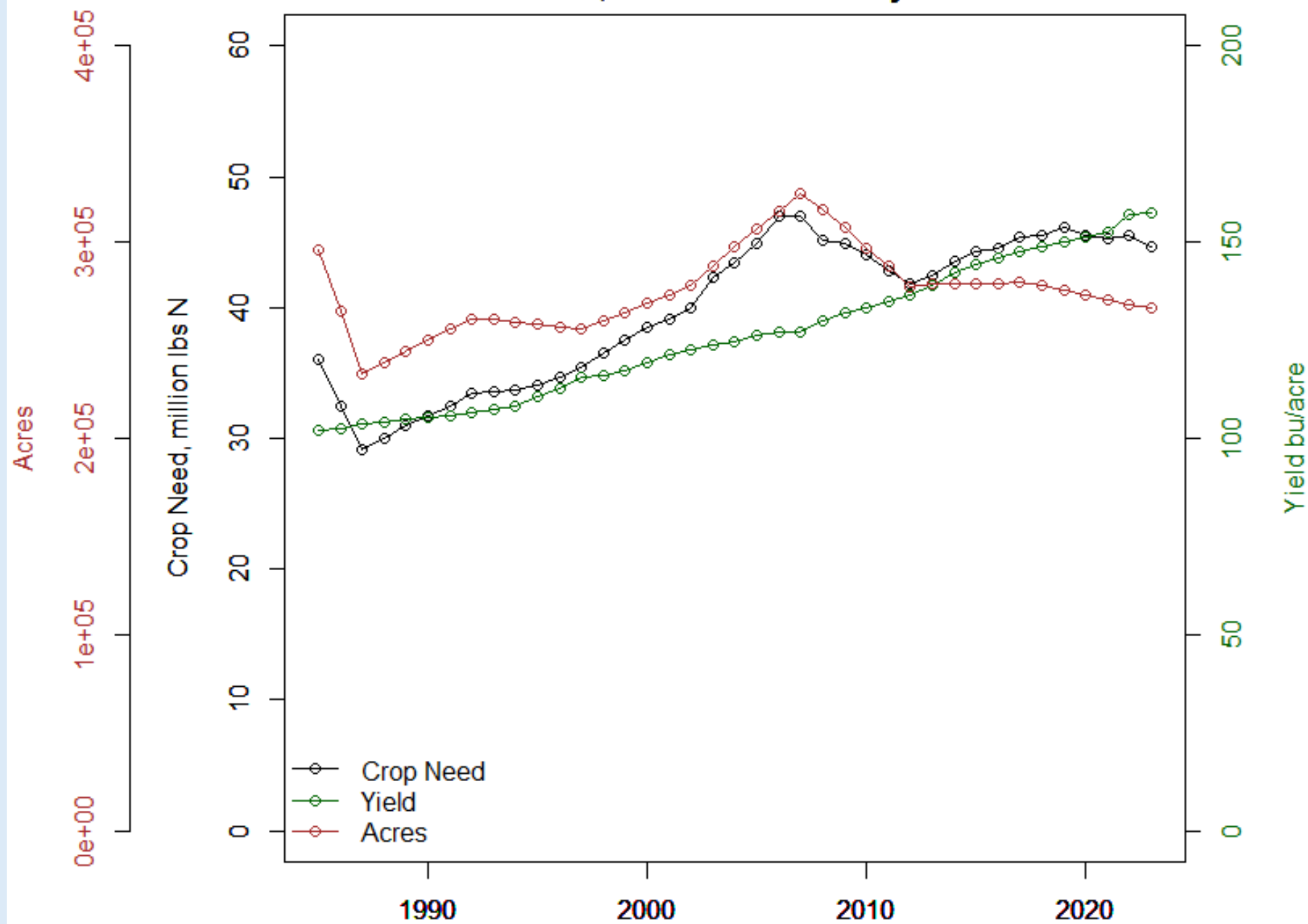
NY, Corn for Grain Only



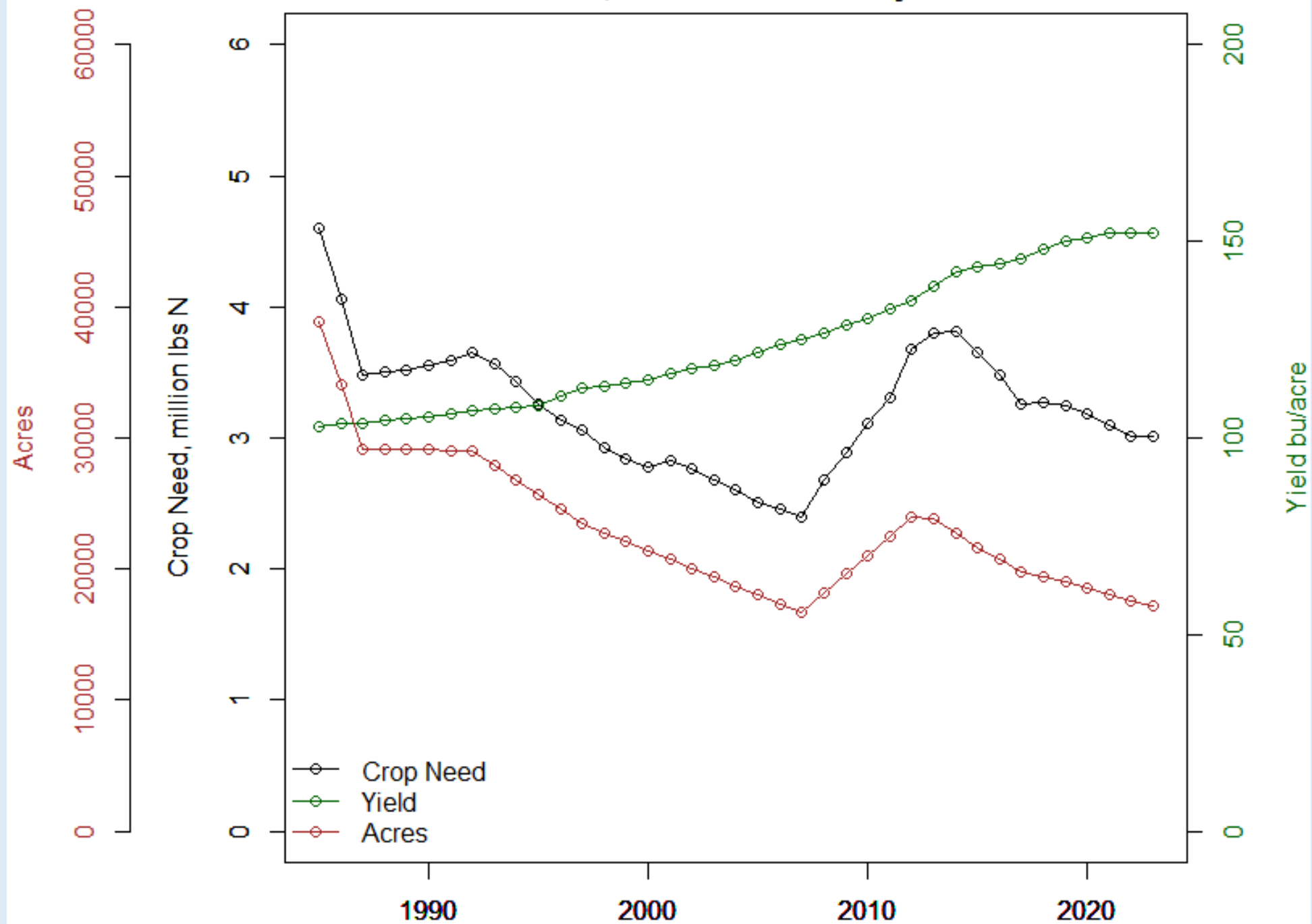
PA, Corn for Grain Only



VA, Corn for Grain Only



WV, Corn for Grain Only



Item 4 Supply County Level data for crop need

State Level Fert Buckets

- NOT SMOOTHED
- 1985-2020
- Load Source AND Crop tabs

State Smoothed Level Fert Buckets

- SMOOTHED (11/14 methods)
- 1985-2020
- Load Source AND Crop tabs

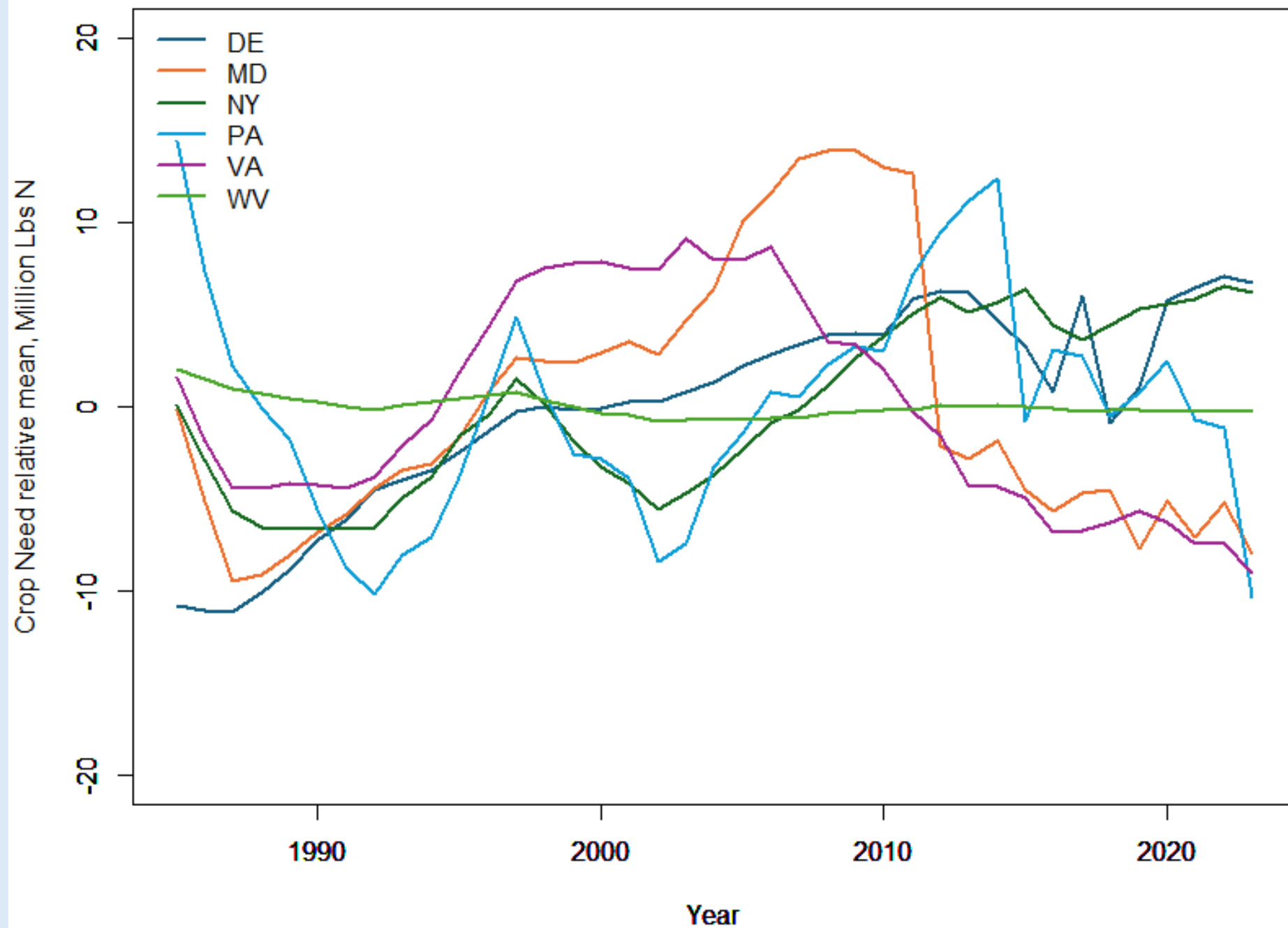
Item 5 Compare national and Chesapeake watershed scale fertilizer and crop data trends

Examine state crop need

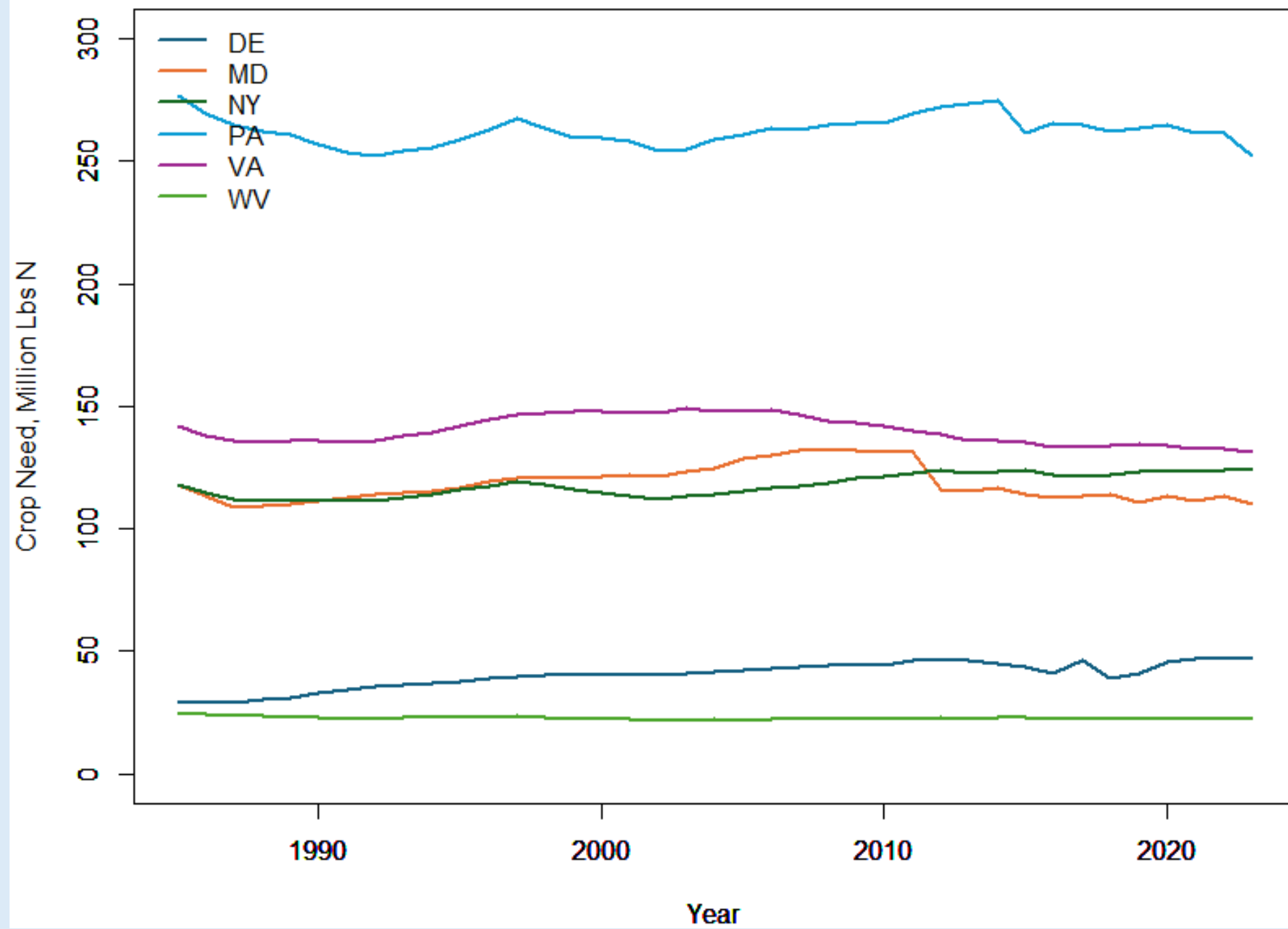
Compare several fertilizer data sets

Examine USDA reported application to corn

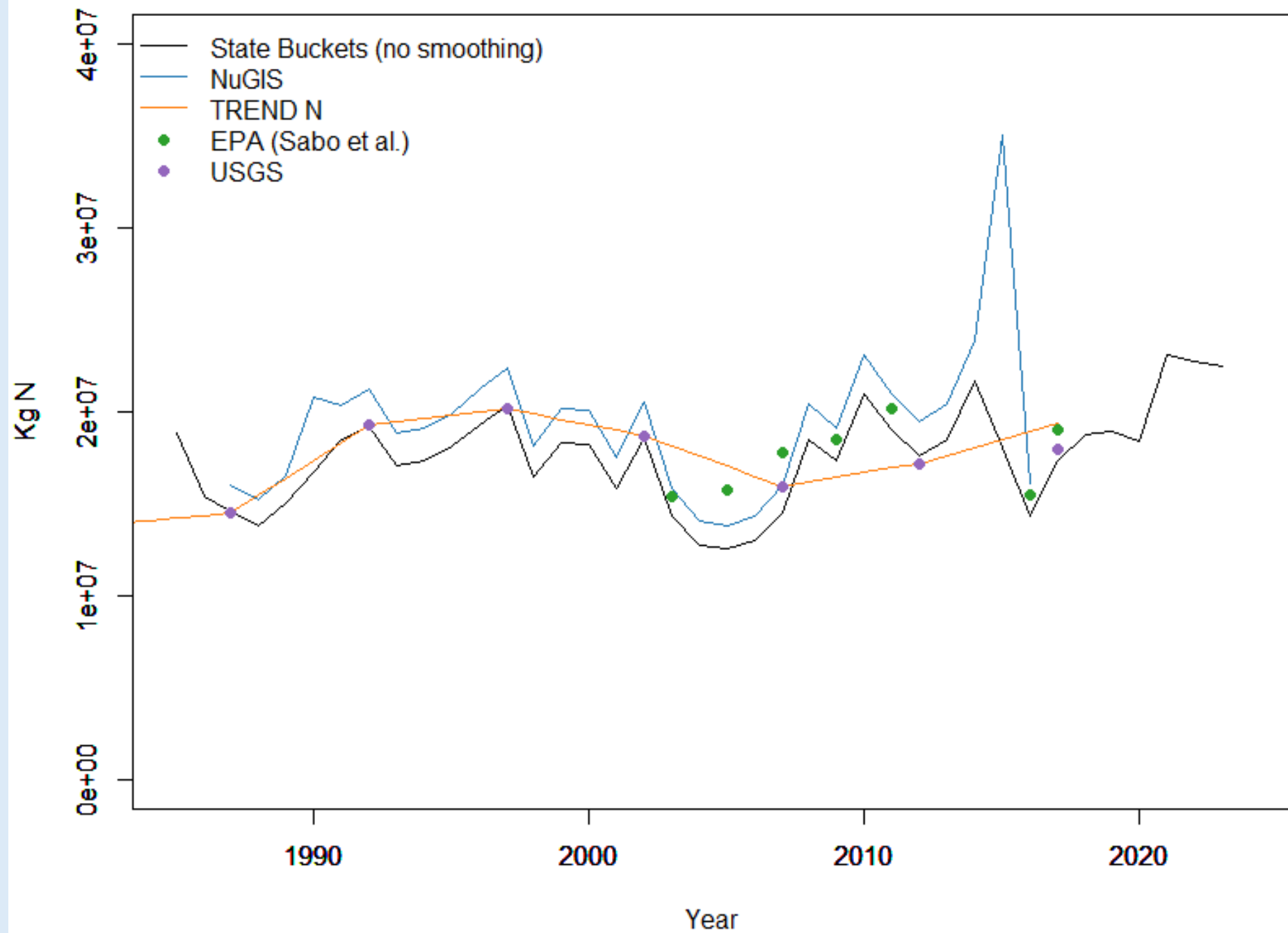
All States



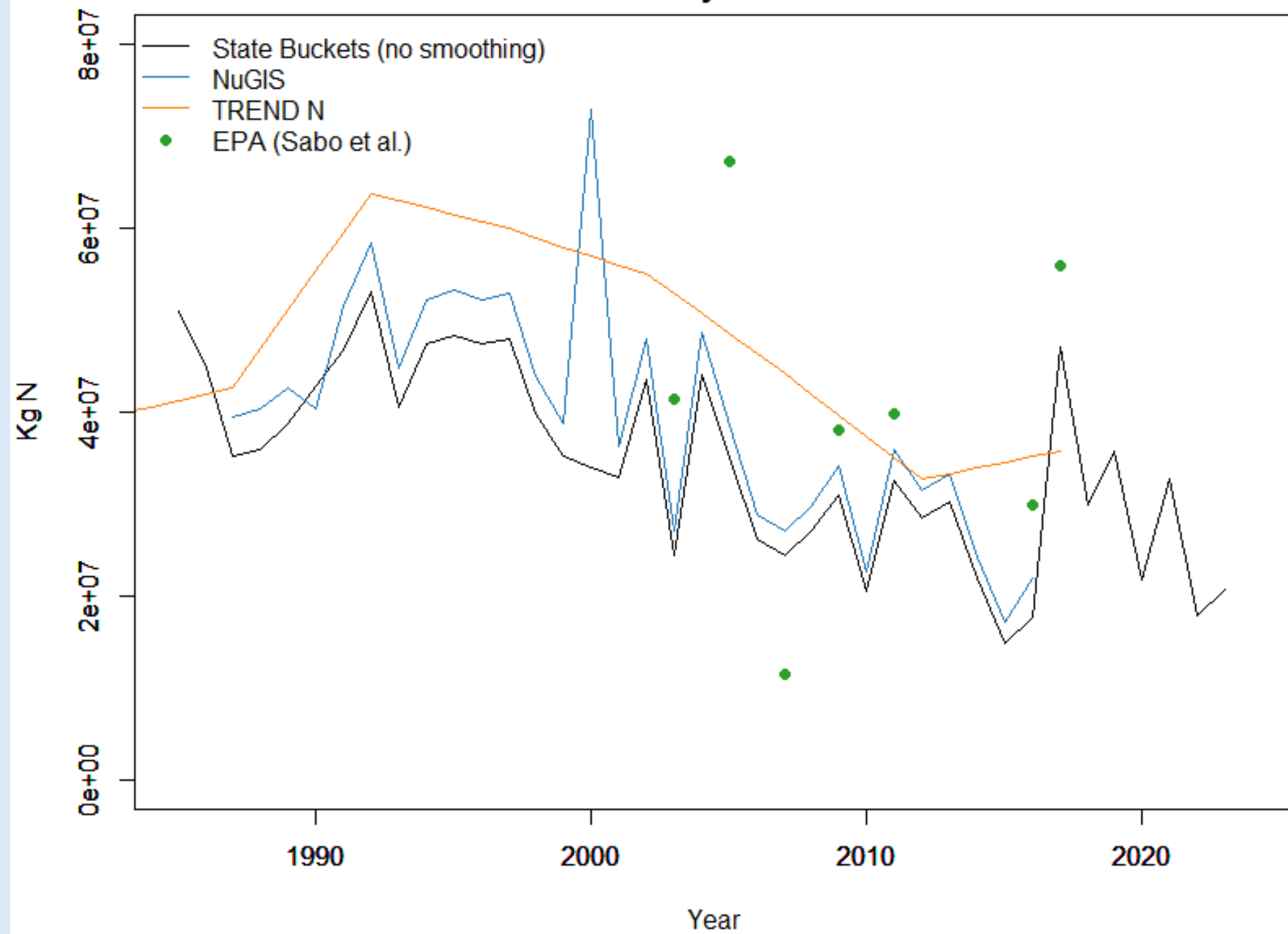
All States



Delaware



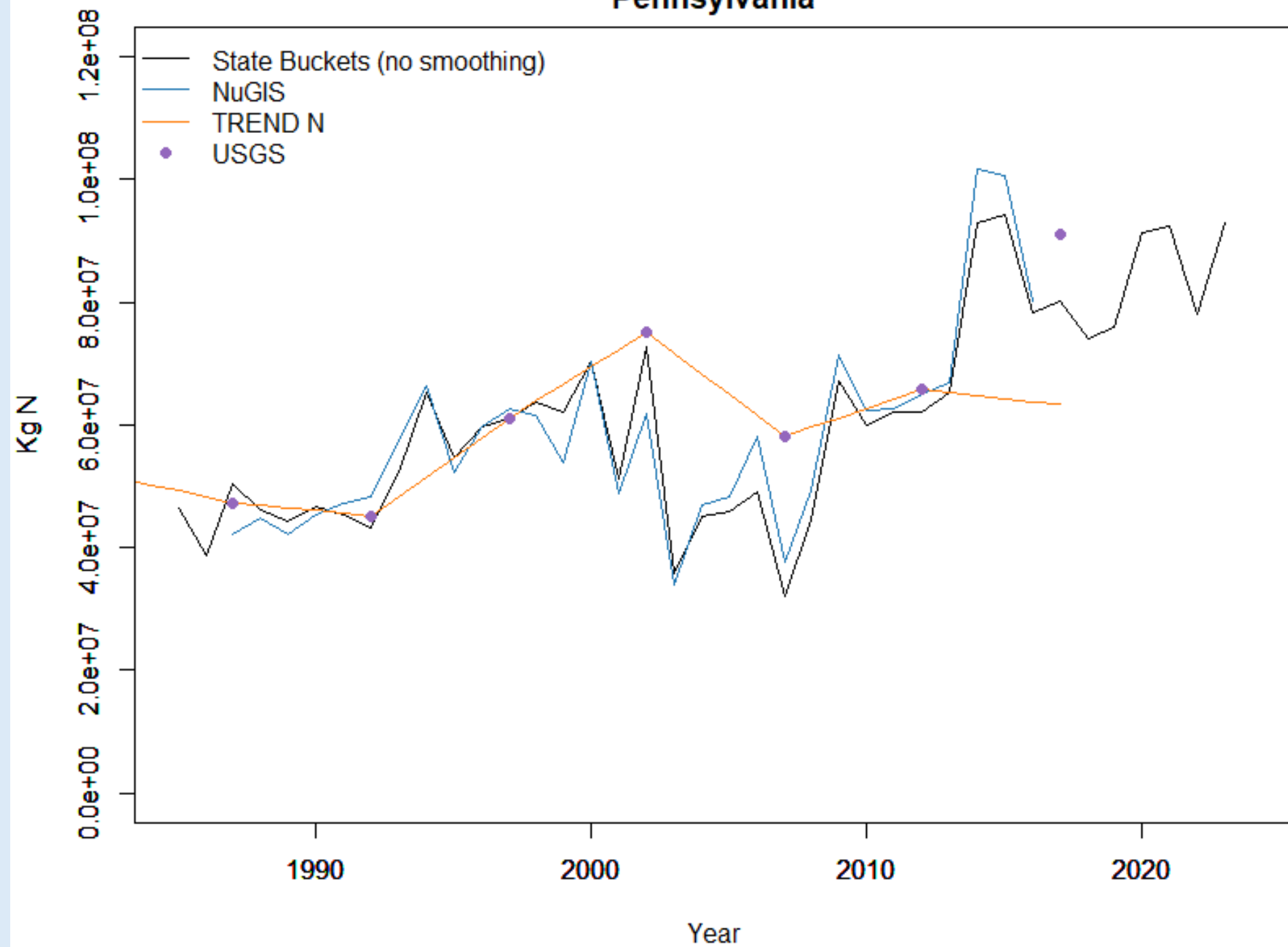
Maryland



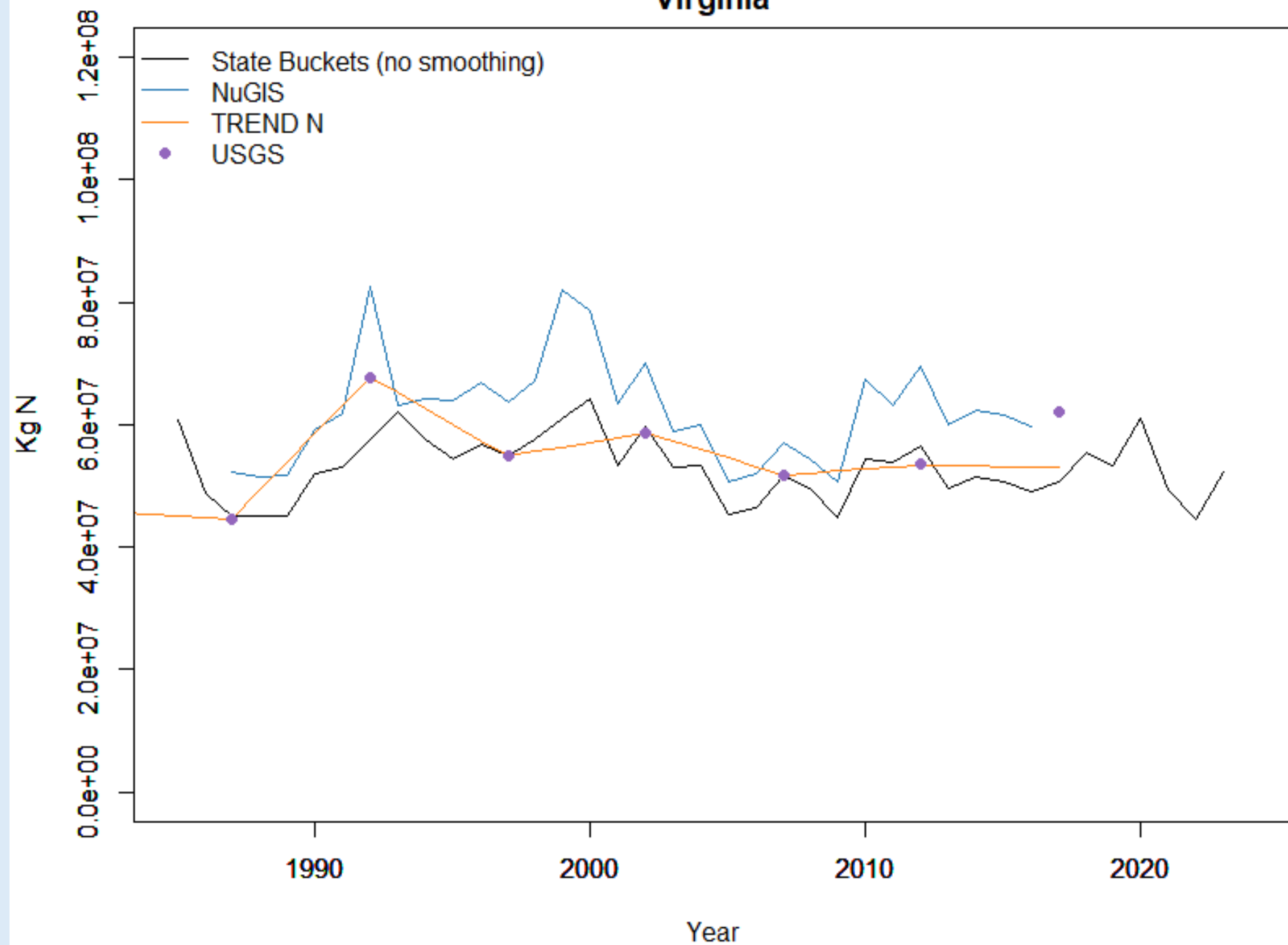
New York



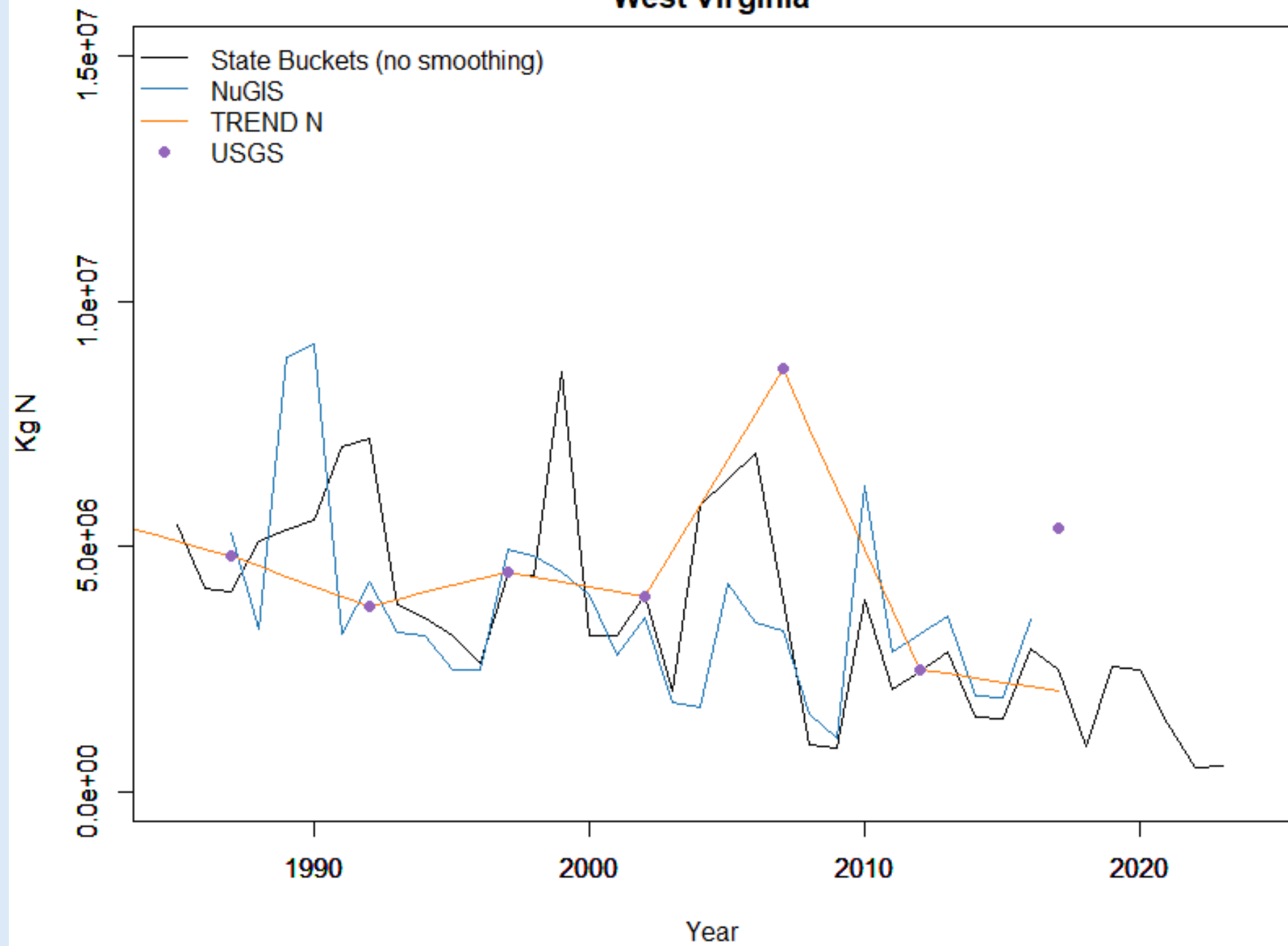
Pennsylvania



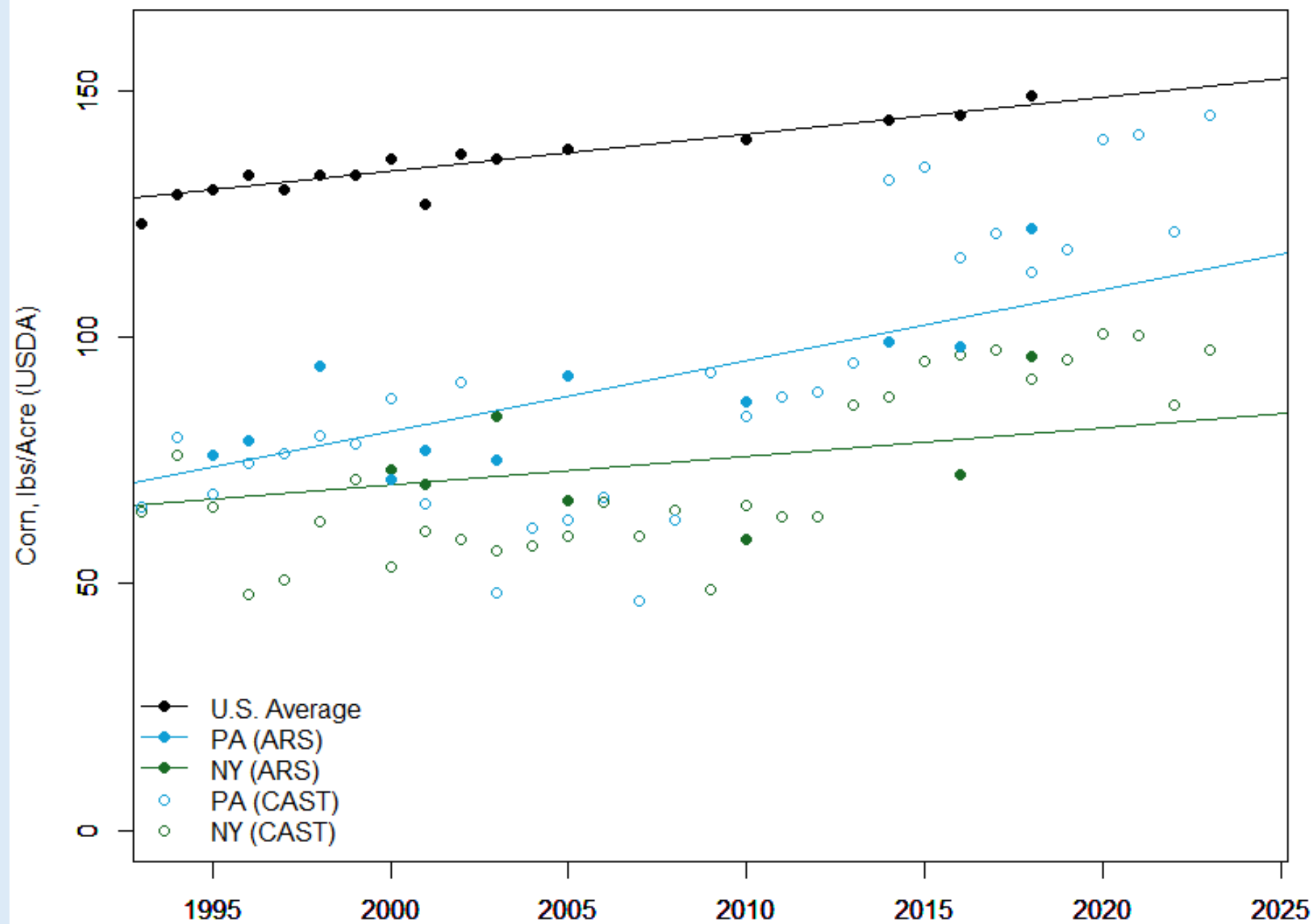
Virginia



West Virginia



USDA reported N application rate to Corn



Takeaways:

- **Data trends are consistent over time and across multiple sources**
 - Crop need is consistent over time
 - Multiple fertilizer data sets show similar trends
 - For states with application data on corn
 - Below the national average
 - Corn in CAST appears consistent with observed data

Questions?

Next steps:

- Nutrient application algorithm
 - Inorganic replacement of organic “cap” based on crop need?