AMT Office Hours

7/11/2025

Tom Butler, EPA

On the docket:

- Inorganic Fertilizer

- Land Use Loading Rate Ratios

- Animal BMP excess

Inorganic Fertilizer

Recap

- June 2025
  1. Fertilizer Data Trend walkthrough
  2. Requested update to state supplied data
  3. State Scale fertilizer stock investigation

Where do we stand on the update?

As of 7/8/25

- Data supplied by: DE, PA
- NY still is not collecting
- Data are being worked up: VA
- Waiting on: MD, WV

What about moving to the state scale?

Current = watershed stock

Requested = state stock

- Some possible solutions
  - Sum data to the state scale
  - Sum to state scale and use only farm fertilizer
  - Sum data to the watershed scale, then disaggregate to the state scale

Comparison Plots

OldFertP7

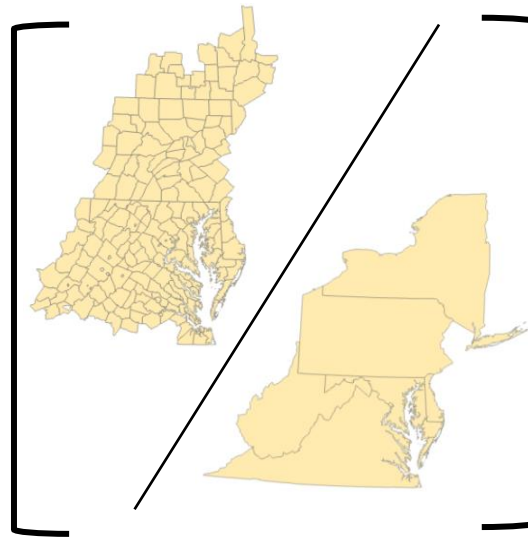- Current watershed wide fertilizer stock with current AMT decisions

3. Six State Level fertilizer

AAPFCO/State

X

6. Expenditures Fraction

Ag Census

=

7. Counties & CBW Levels

AAPFCO/State & Ag Census

Comparison Plots

New • State fertilizer buckets kept separate

2. State Level

AAPFCO/State

Note* This still uses farm AND nonfarm data which are accounted for with a fraction

Comparison Plots

NewFarmOnly
- State buckets kept separate and only using farm fertilizer

2. State Level

NY

PA

MD

DE

WV

VA

AAPFCO/State

Note* This only uses farm data

Comparison Plots

NewStateExpenditures
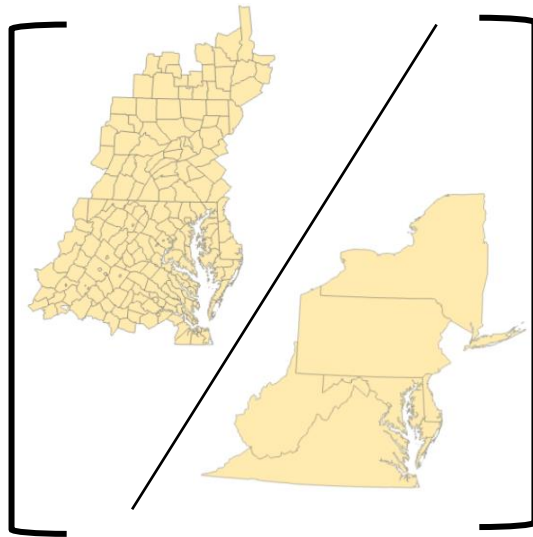- C23 method and use state expenditures to split into state buckets

3. Six State Level fertilizer

AAPFCO/State

X
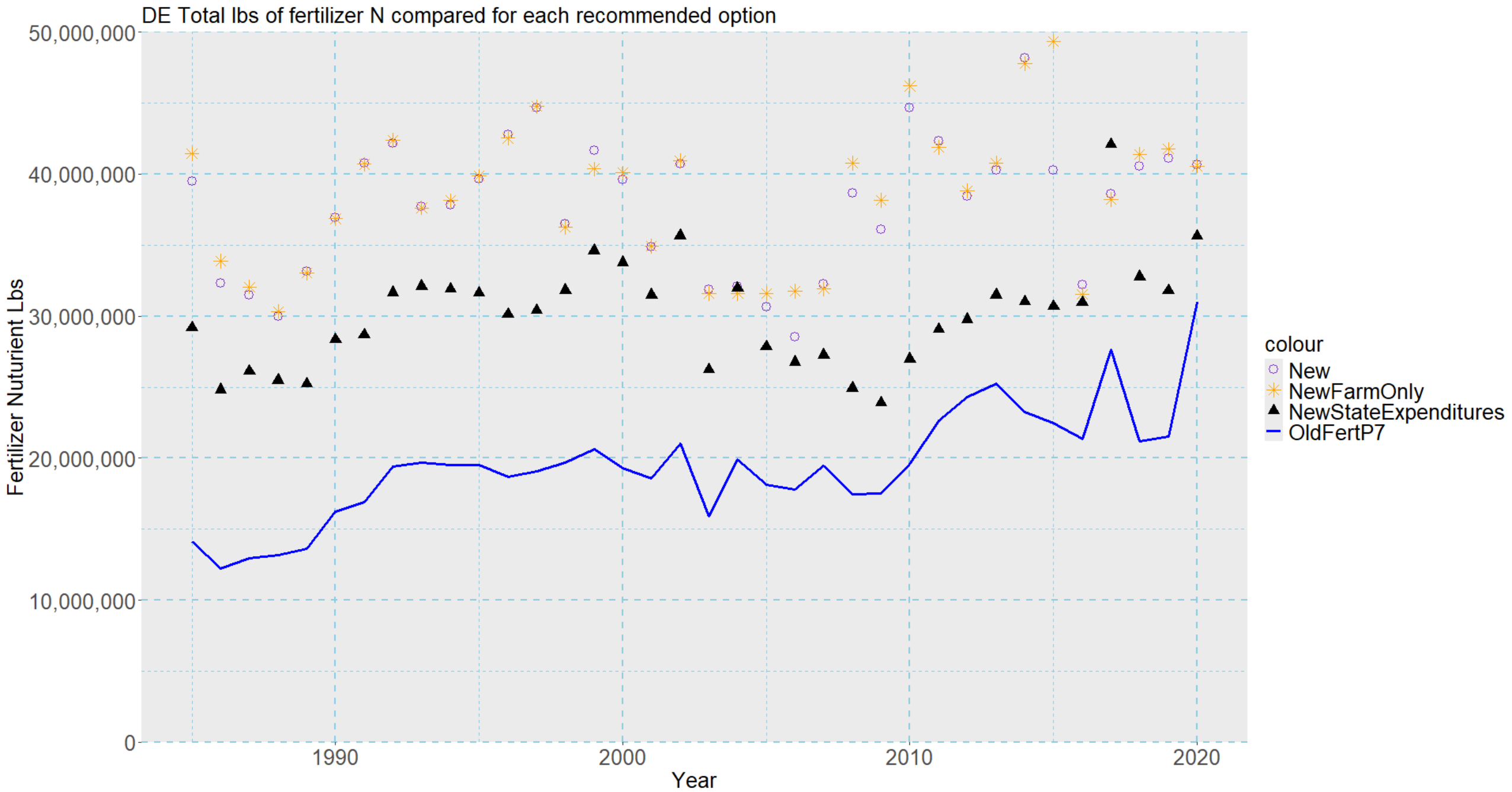
6. Expenditures Fraction

Ag Census

=

7. Counties & CBW Levels

AAPFCO/State & Ag Census

2. State Level

NY

PA

MD

DE

WV

VA
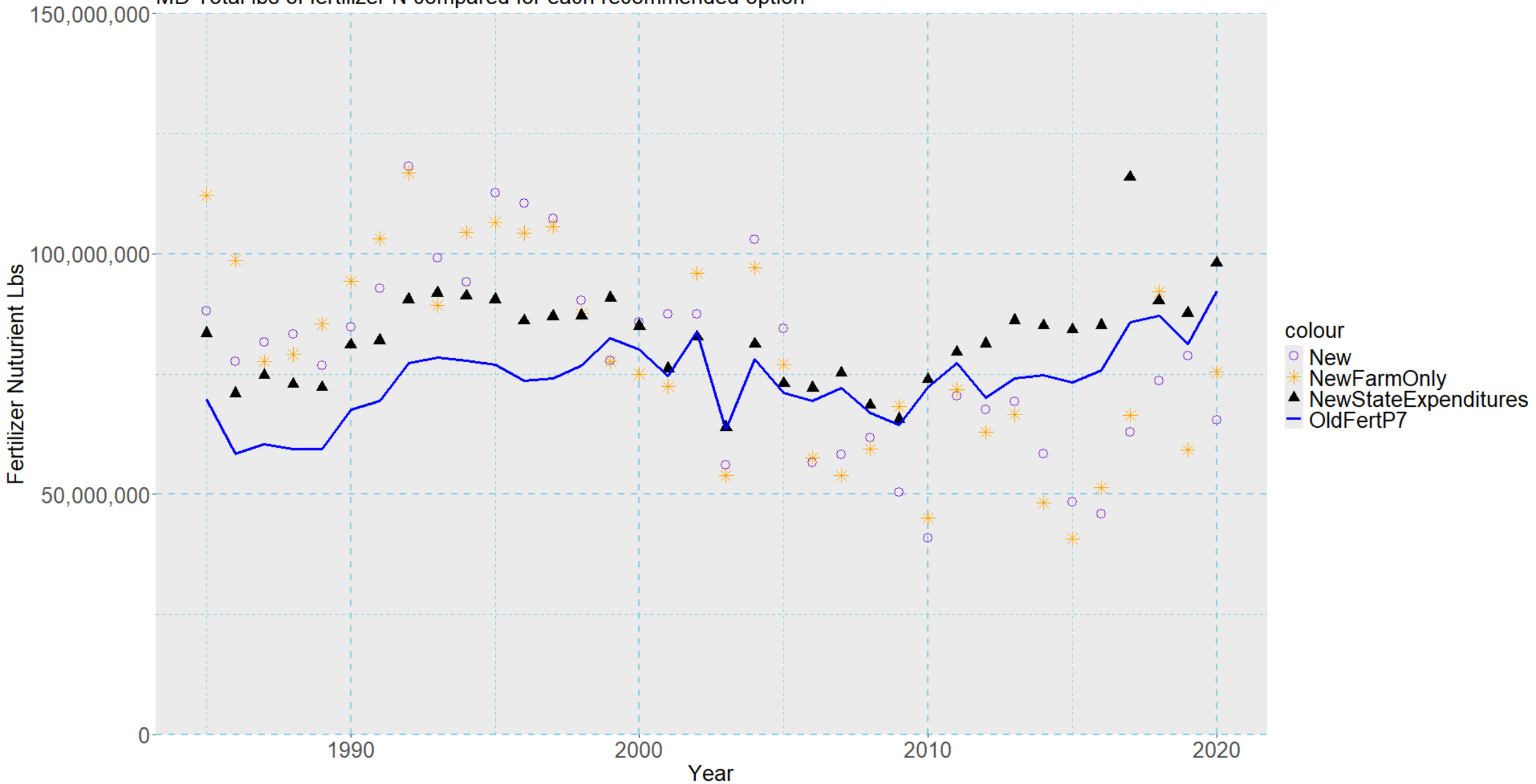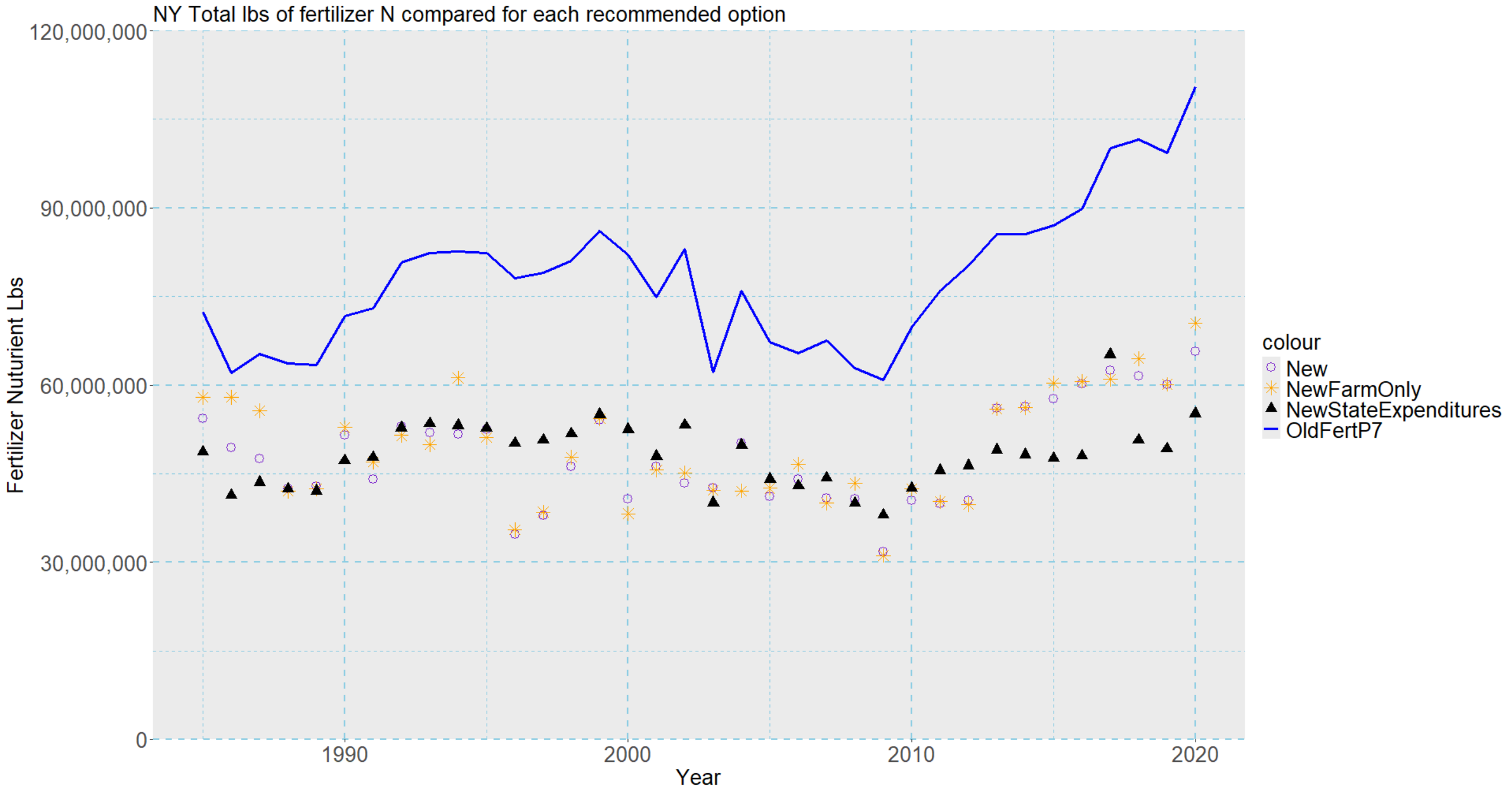
AAPFCO/State

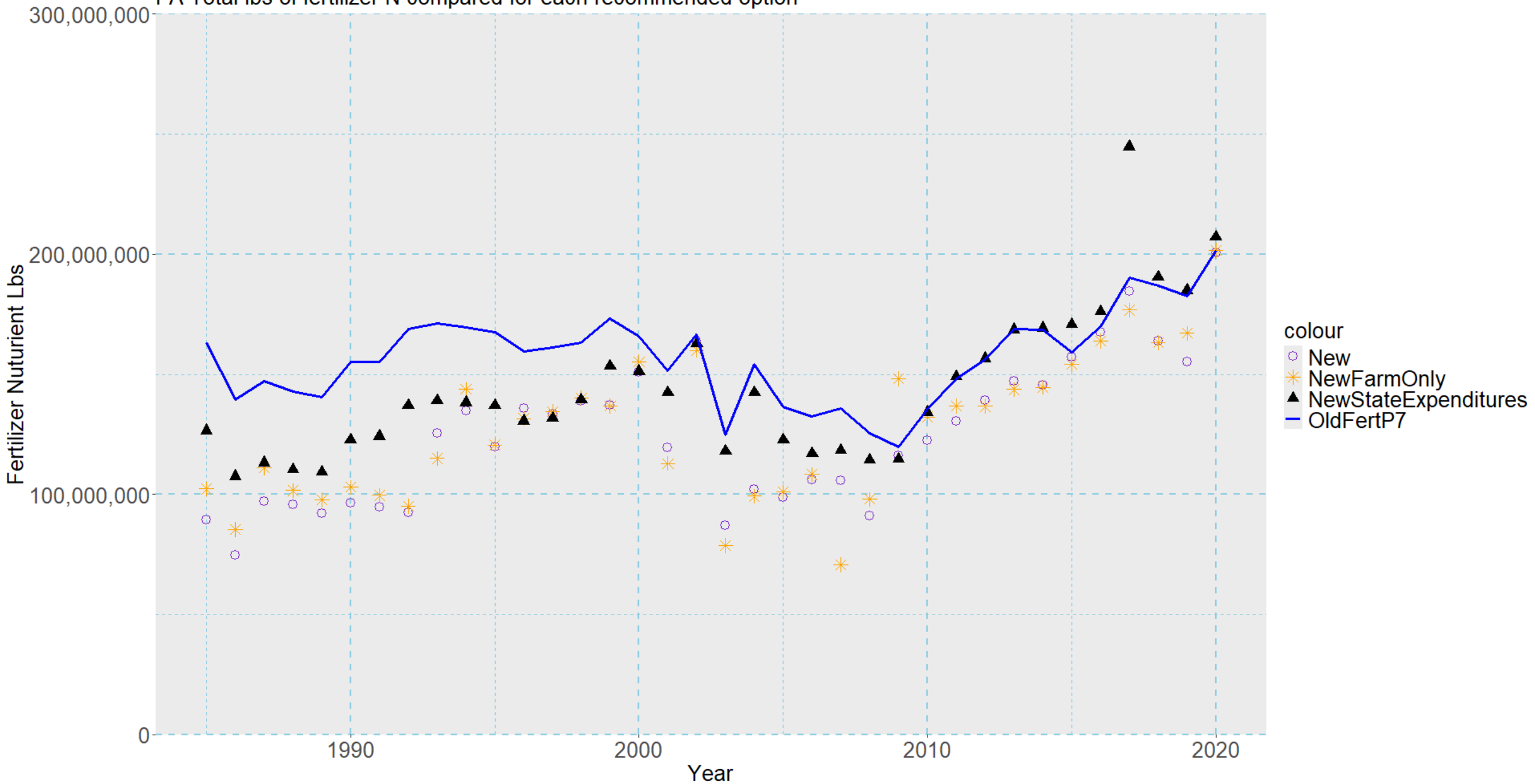DE Total lbs of fertilizer N compared for each recommended option

MD Total lbs of fertilizer N compared for each recommended option

NY Total lbs of fertilizer N compared for each recommended option

PA Total lbs of fertilizer N compared for each recommended option

colour

- ○ New
- ✳ NewFarmOnly
- ▲ NewStateExpenditures
- — OldFertP7

X-axis: Year

Y-axis: Fertilizer Nuturient Lbs

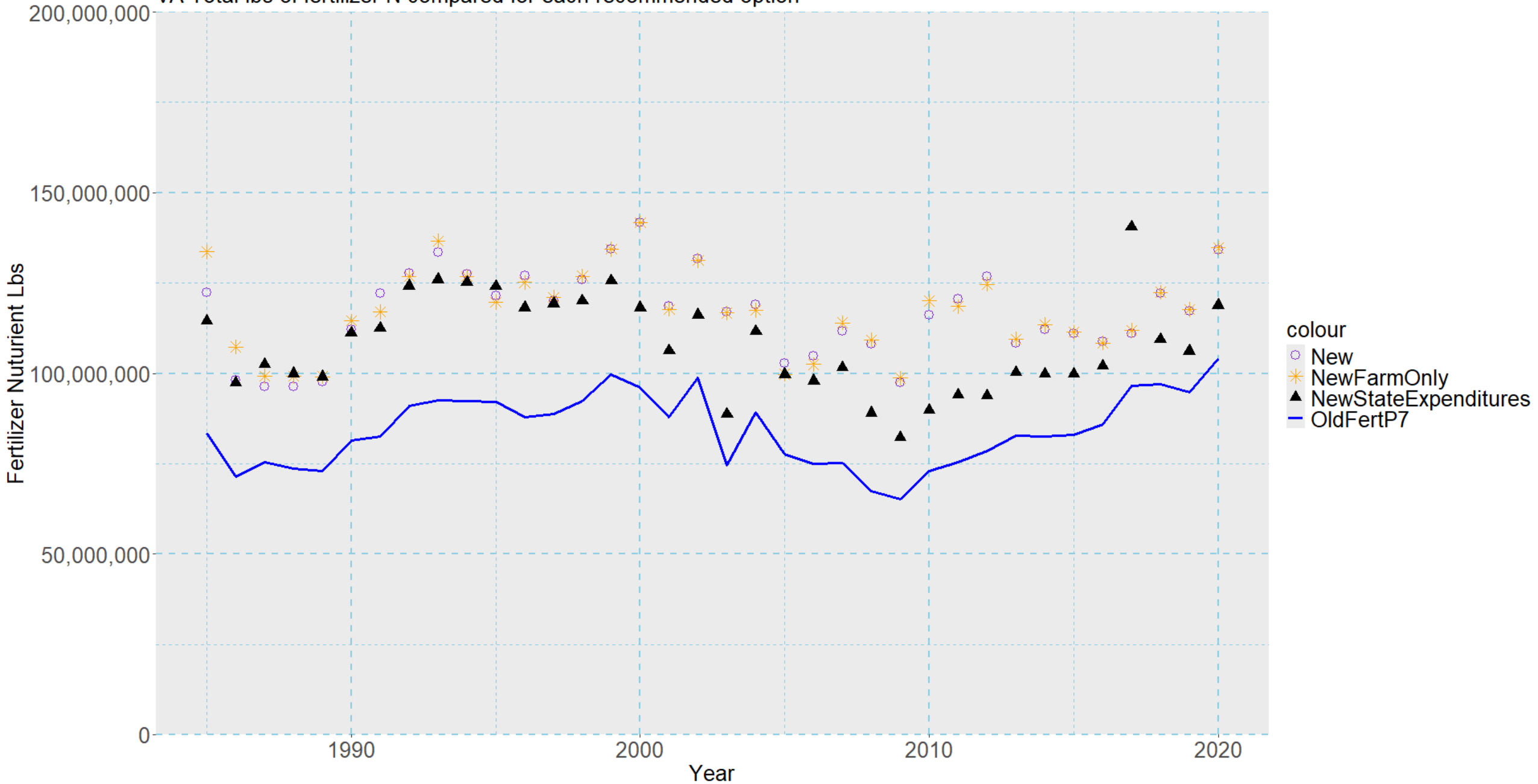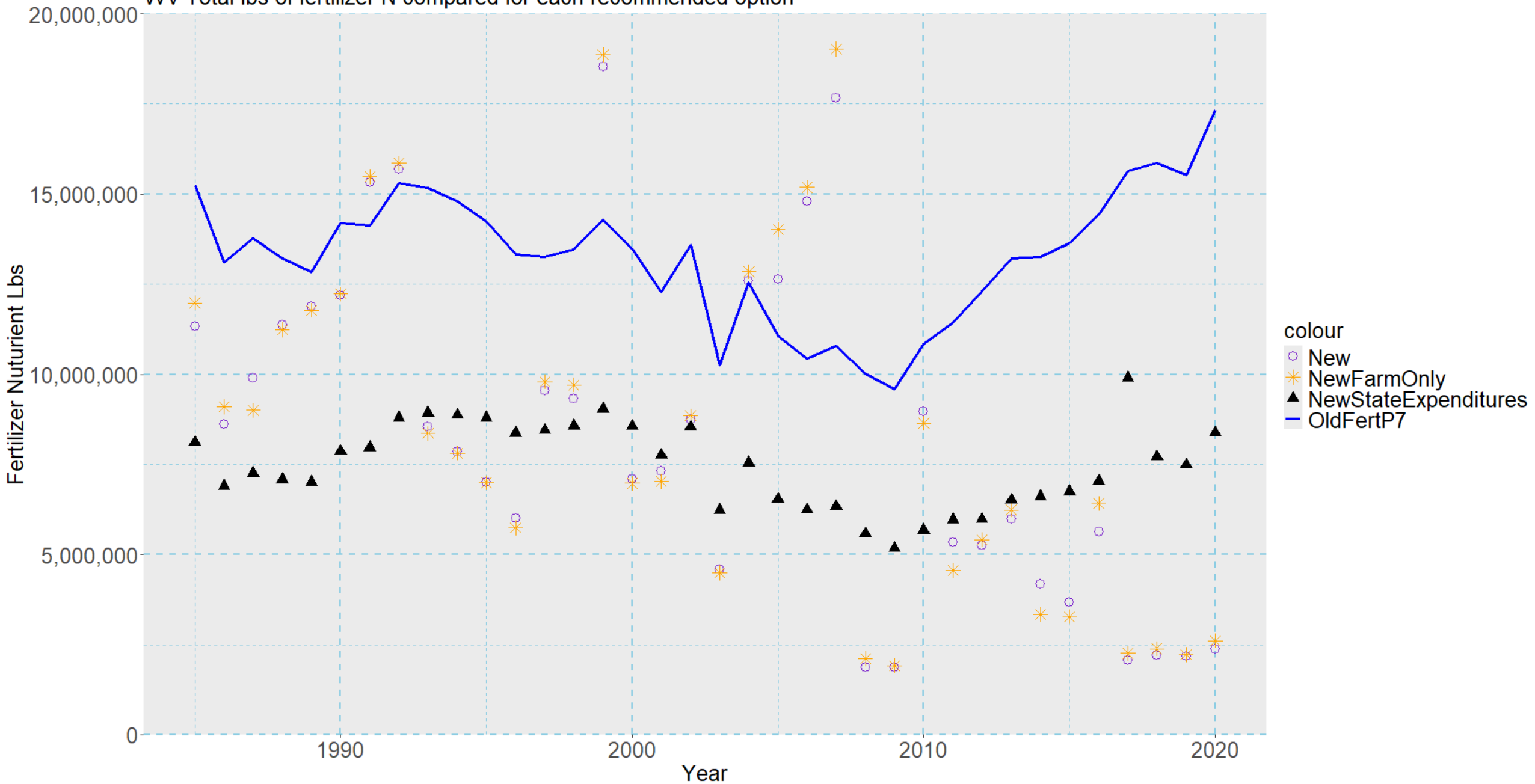VA Total lbs of fertilizer N compared for each recommended option

WV Total lbs of fertilizer N compared for each recommended option

Some things to keep in mind

High variability

Data smoothing can be done

Need to think about what is the most realistic

More in the main meeting

Questions?

Land Use Loading Rate Ratios

Some background: Loading Rate Ratios

Chesapeake Bay Average			
Land class	Land Use	Loading Rate Ratio	Loading Rate (pounds per acre per year)
Cropland	Double Cropped Land	0.79	30.9
	Full Season Soybeans	0.71	27.7
	Grain with Manure	1.4	54.7
	Grain without Manure: **Reference land use**	1	39.1
	Other Agronomic Crops	0.45	17.6
	Silage with Manure	1.62	63.3
	Silage without Manure	1.16	45.3
	Small Grains and Grains	0.84	32.8
	Specialty Crop High	1.34	52.4
	Specialty Crop Low	0.31	12.1
Pasture	Ag Open Space	0.43	5.1
	Legume Hay	0.74	8.7
	Other Hay	1.04	12.3
	Pasture: **Reference Land Use**	1	11.8

CAST Ag Land Use Loading

- Land Classes
  - Basic split of ag into Cropland and Pasture

Chesapeake Bay Average			
Land class			
Cropland			
Pasture			

CAST Ag Land Use Loading

- Divided into Land Uses
  - Groups of crops we believe behave similarly.
- Reference Land Uses are determined for each class
  - Foundation for behavior of all other land uses

Chesapeake Bay Average			
Land class	Land Use		
Cropland	Double Cropped Land		
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	Grain with Manure		
	Grain without Manure: **Reference land use**		
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	Specialty Crop High		
	Specialty Crop Low		
Pasture	Ag Open Space		
	Legume Hay		
	Other Hay		
	Pasture: **Reference Land Use**		

CAST Ag Land Use Loading

- **Divided into Land Uses**
  - Groups of crops we believe behave similarly.

- **Reference Land Uses are determined for each class**
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	Other Hay		
	Pasture: **Reference Land Use**		

CAST Ag Land Use Loading

- Loading Rate Ratio
  - Relative loading behavior of Land Uses compared to the reference.

	Chesapeake Bay Average		
Land class	Land Use	Loading Rate Ratio	
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	Full Season Soybeans	0.71	
	Grain with Manure	1.4	
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	Other Hay	1.04	
	Pasture: **Reference Land Use**	1	

CAST Ag Land Use Loading

- Loading Rate
  - Pounds/acre/year of nutrients delivered to the water from the land.
  - Modeling workgroups purview
    - Encompass physical transport

Chesapeake Bay Average			
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Phase 7 CAST Ag Land Uses

- Two new Land Uses
  - Managed Hay
  - Managed Pasture
- Need to think about differences between new Land Uses and existing ones.

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	Other Hay	1.04	12.3
	Managed Hay	?	?
	Pasture: **Reference Land Use**	1	11.8
	Managed Pasture	?	?

What did we do?

- Literature review

- Data processing

- Average ratio calculation

Literature Review:

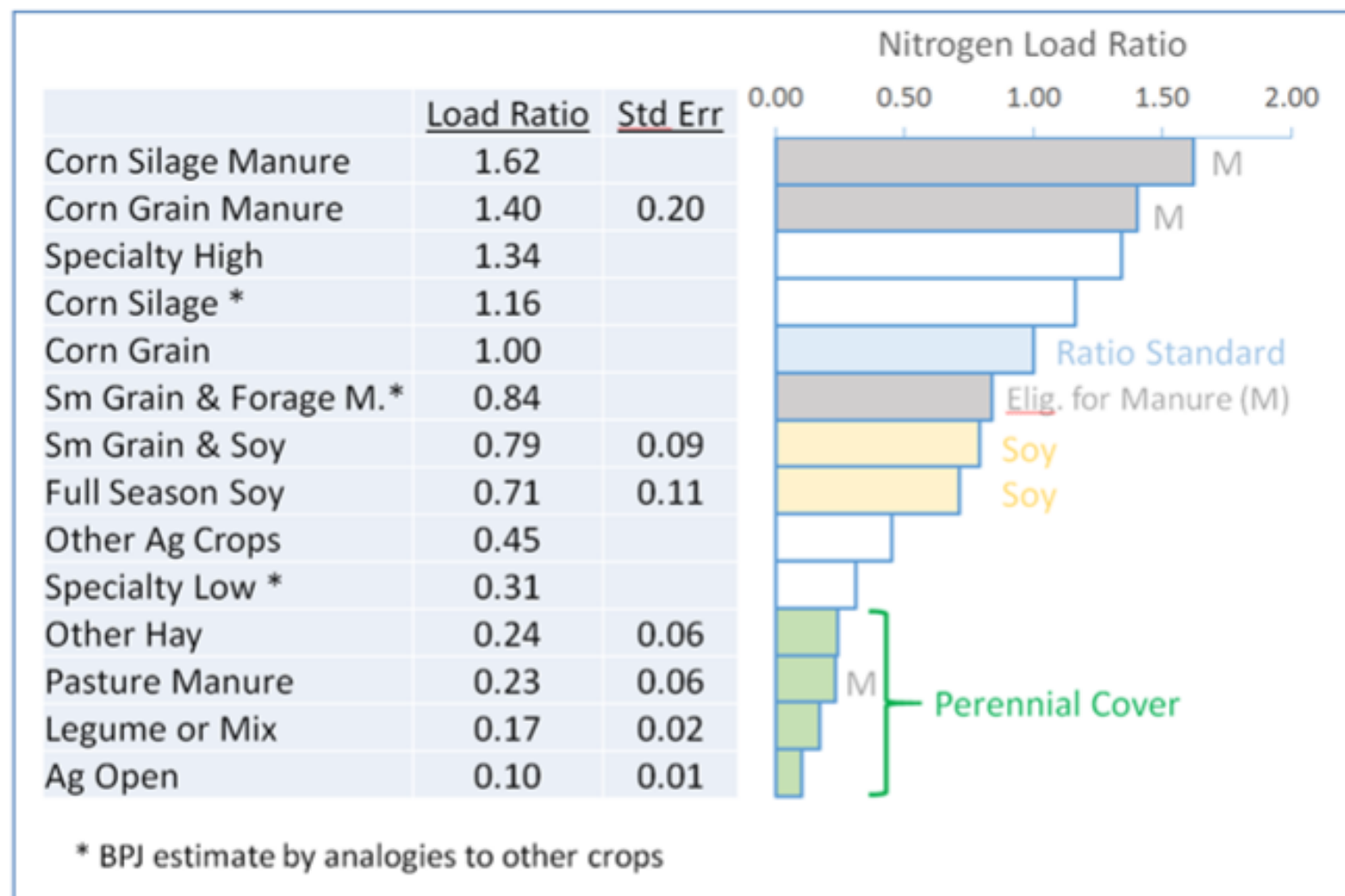| Concerns:	Solution:
• What do we mean by "managed"? • No codified definition of managed vs unmanaged hay/pasture in literature	• Managed pasture/hay = high application • Unmanaged pasture/hay = low application

Literature Review

- Long-Term Leachate Water Quality Trends from a Broiler-Litter-Amended Udult in a Karst Region R.L. McMullen, K.R. Brye,* A.L. Daigh, D.M. Miller, E.E. Gbur, A.L. Pirani, M.A. Evans-White, and R.E. Mason 2014

- "The impacts of nitrogen fertilisation and increased stocking rate on pasture yield, soil physical condition and nutrient losses in drainage from a cattle-grazed pasture, Monoghan et al 2005"

- Field-Scale Nitrogen and Phosphorus Losses from Hayfields Receiving Fresh and Composted Broiler Litter R. W. Vervoort,* D. E. Radcliffe, M. L. Cabrera, and M. Latimore, Jr. 1998

- Nutrient Losses from Fertilized Grassed Watersheds in Western North Carolina V. J. Kilmer,2 J. W. Gilliam,a J. F. Lutz,a R. T. Joyce,4 a4nd C. D. Eklund 1974"

A concern: Perennial Grass ratio (2016)

Figure 2. Nitrogen Load Ratio Relative to Corn (or Sorghum) Grain Without Manure

Additional rates from Chapter 2 table 2.7:
- **Ag**
- Full Season Soybean 27.7
- Other Agronomic 17.6
- Specialty Low 12.1
- Other Hay 12.3
- Pasture 11.8
- **Non - Ag**
- MS4 Construction   26.80
- MS4 Tree Canopy over Turfgrass 8.53
- Non-Regulated Turf Grass 11.19
- Harvested Forest   11.88
- Other Hay 12.3

New VA proposal

- Perennial grasses should not exceed traditional row crops

- More details in the main meeting

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Pasture	Ag Open Space	0.43	5.1
	Legume Hay	0.74	8.7
	Other Hay	1.04	12.3
	Managed Hay	1.56	18.4
	Pasture: **Reference Land Use**	1	11.8
	Managed Pasture	1.52	17.9

Questions?

Animal BMP excess

May 2025 - Animal BMP Excess

Request a Review of Current Process in Model versus BMP Reporting:

- Animal Waste Management Systems
- Animal Mortality Disposal
- Riparian Fence – Reduction of Direct Deposition

Discussion

- Animal Waste Management Systems:
  - Do we need to update the conversion factor for P7?
- Mortality Disposal:
  - Do we need a unique conversion factor that differs from AWMS?
- Are animal submissions based on max capacity?
- Exclusion fencing:
  - Do we need to revisit the default conversion?
  - Should the default be wider?

AnimalName	Source	AverageAnimalCountPerSystem	MortalityFraction
pullets	Sales	9,734	0.08
turkeys	Production	3,744	0.15
hogs and pigs for breeding	Inventory	428	0.08
beef	Inventory	22	0.09
broilers	Production	198,096	0.05
dairy	Inventory	84	0.1
hogs for slaughter	Sales	74	0.05
horses	Inventory	7	0.01
layers	Inventory	1,720	0.08
other cattle	Inventory	43	0.03
sheep and lambs	Inventory	33	0.03
goats	Inventory	13	0.03

Next steps: Compile feedback

Question	Change required?	Suggested change
Do we need to update the AWMS conversion factor for P7?		
Do we need a unique conversion factor for MD that differs from AWMS?		
Are animal submissions based on max capacity?		
Do we need to revisit the default exclusion fencing conversion? (1000ft of fencing = 17.6 Animal Units)		
Should the default be wider? (10-foot width for narrow buffers and 35 for full buffers)		

Questions?