2017 Census of Agriculture
Chesapeake Bay Watershed

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Water Quality GIT Meeting
September 9, 2019

2017 Census of Agriculture

Categories

- CBP Animal Types
- CBP Landuse/Crop Types and Categories

2017 Census of Agriculture

Time Period for Trends

- 1987 through 2012
  - Post-2012 with old forecast through 2025, the background conditions for the Phase III WIP scenarios.
  - Post-2012 with new 2017 Ag Census data and new forecast through 2025
- Forecasts use methods recommended by Ag Modeling for Phase 6 Watershed Model (CAST) and approved through Water Quality GIT

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When will the new data be used?

- According to decisions through the PSC, introduction of new data and methods (science) occurs at the beginning of new Milestone periods.
  - 2017 Ag Census data will be incorporated with the next version of CAST for the 2020-2021 Milestone period.
  - Current schedule calls for updated CAST to be finalized Nov. 1.

2017 Census of Agriculture

When will the new data be used?

- The new forecasts are used for background conditions for the annual model Progress assessments. Starting point is 2nd 2019 progress scenario, then 2020 and 2021 Progress scenarios.
- The new forecasts do not change the background conditions for Phase III WIPs which were finalized August, 2019.

2017 Census of Agriculture

When will the new data be used?

- There have been corrections to the forecasts since originally presented to the Agriculture Workgroup on 7/18/19

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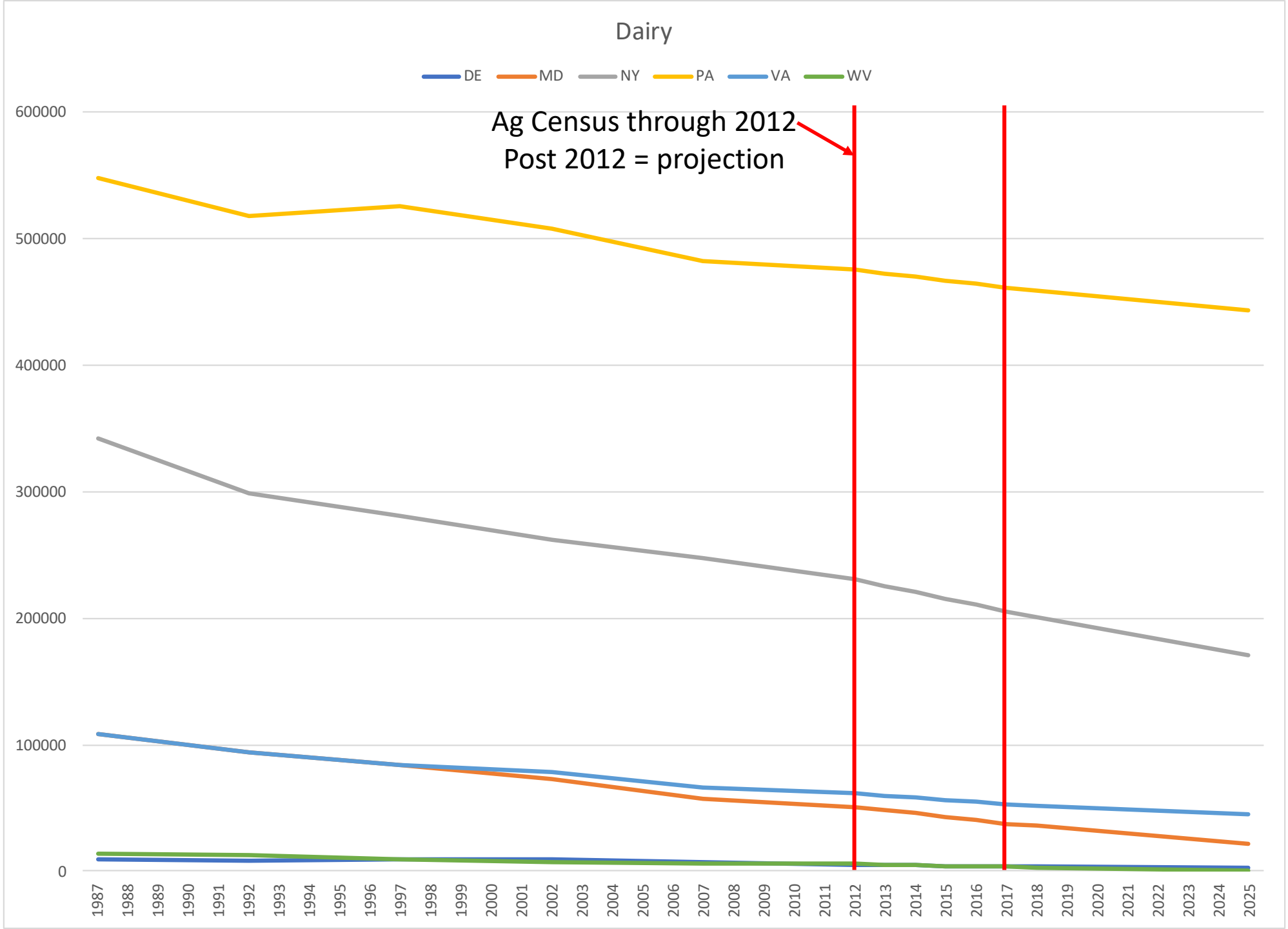
Animal Forecast Methods

- For animals, forecasts are at the state scale
- State numbers are then proportioned to individual counties according to latest Census of Agriculture
- For broilers, turkeys, pullets, and hogs, use annual Census production numbers by state
- For all other animals, use 5-year Census inventory numbers by state
- For forecasts, greater weight is given to more recent short-term trends than long-term trends

2017 Census of Agriculture

Animals and Crops

- Decreases in animal manure nutrients, generally, reduce loads.
- Increases in animal manure nutrients can be offset.
  - BMPs
  - Changes in crop types the manure is applied to
  - Less chemical fertilizer use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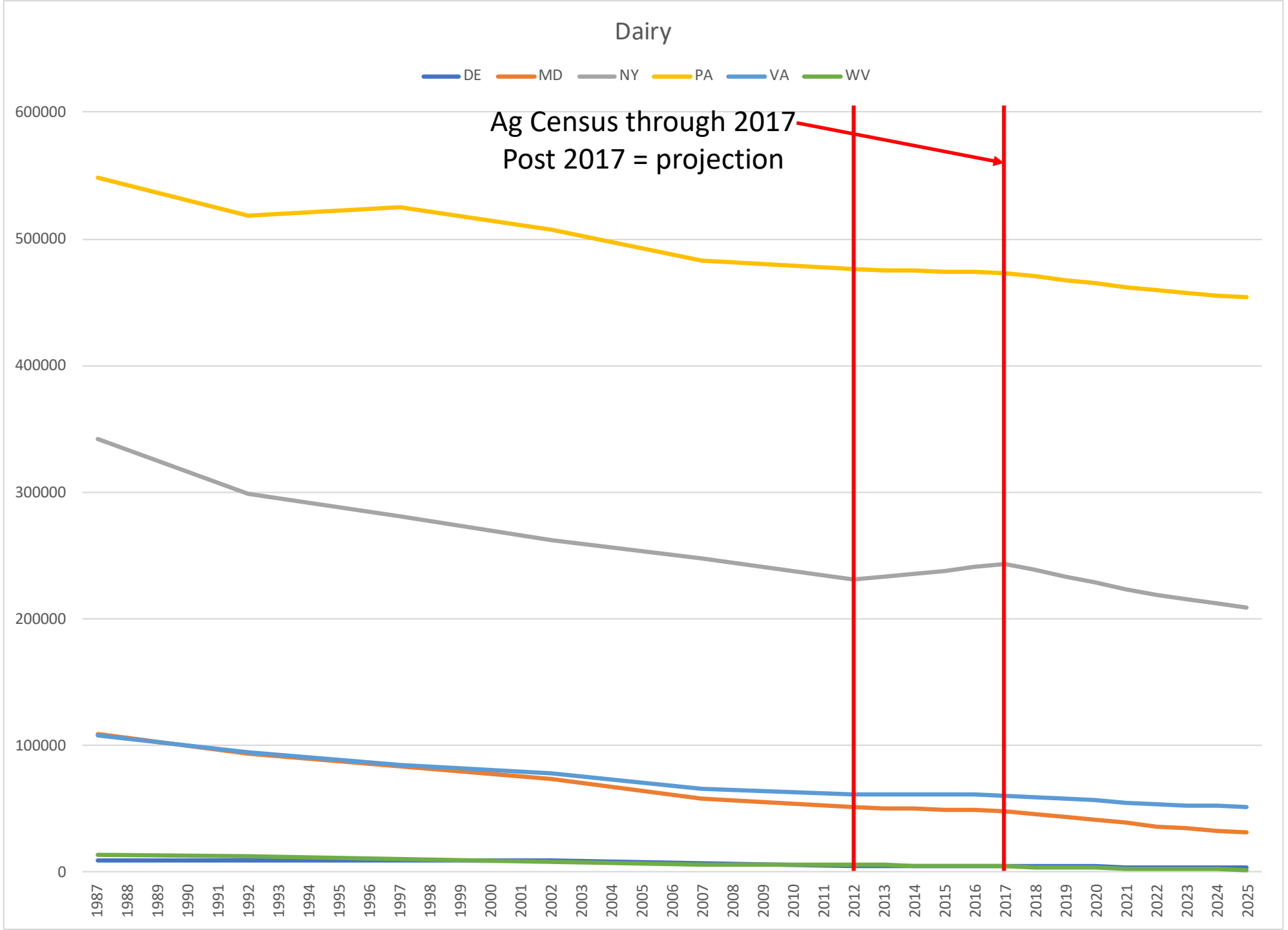
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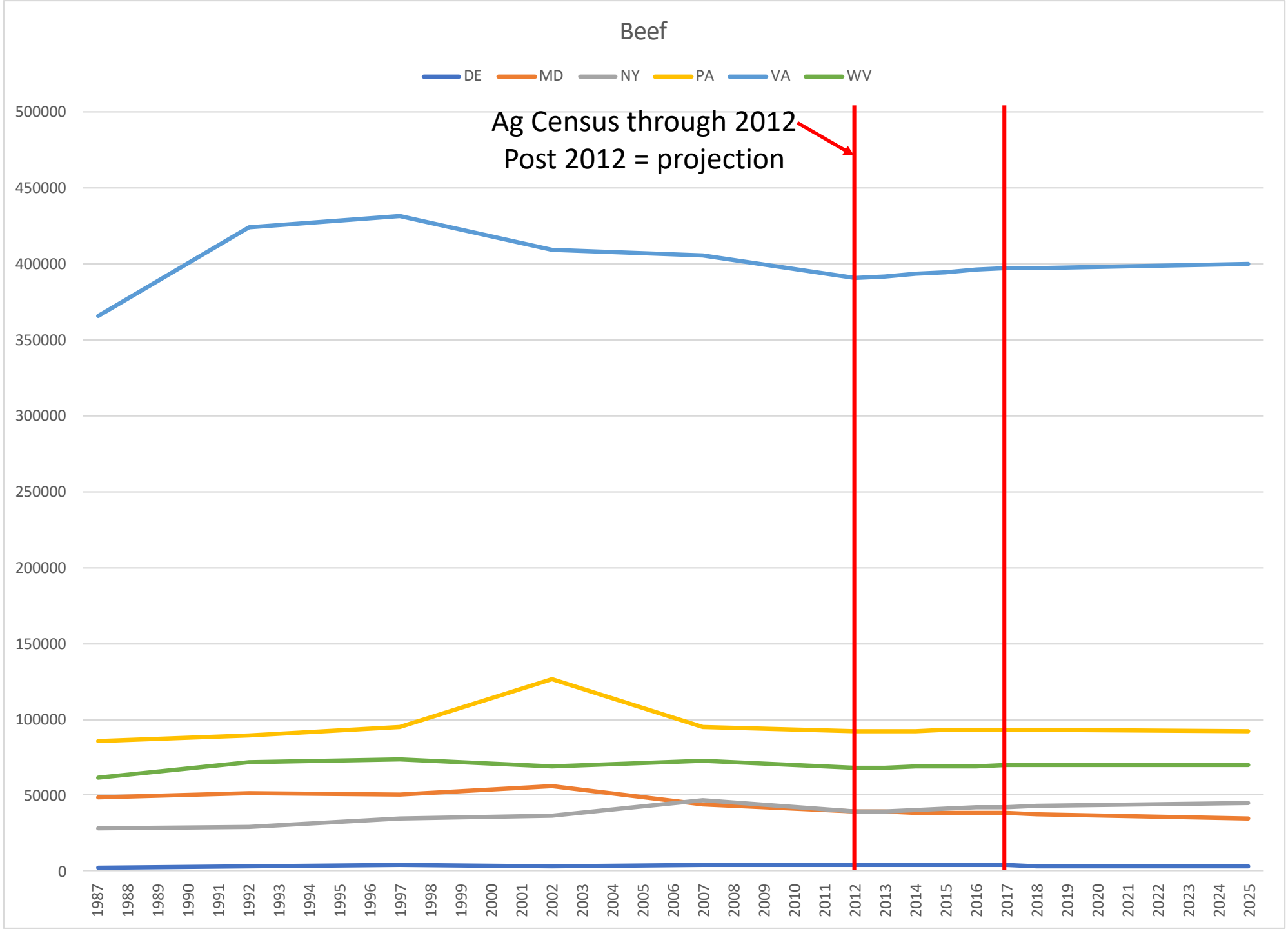
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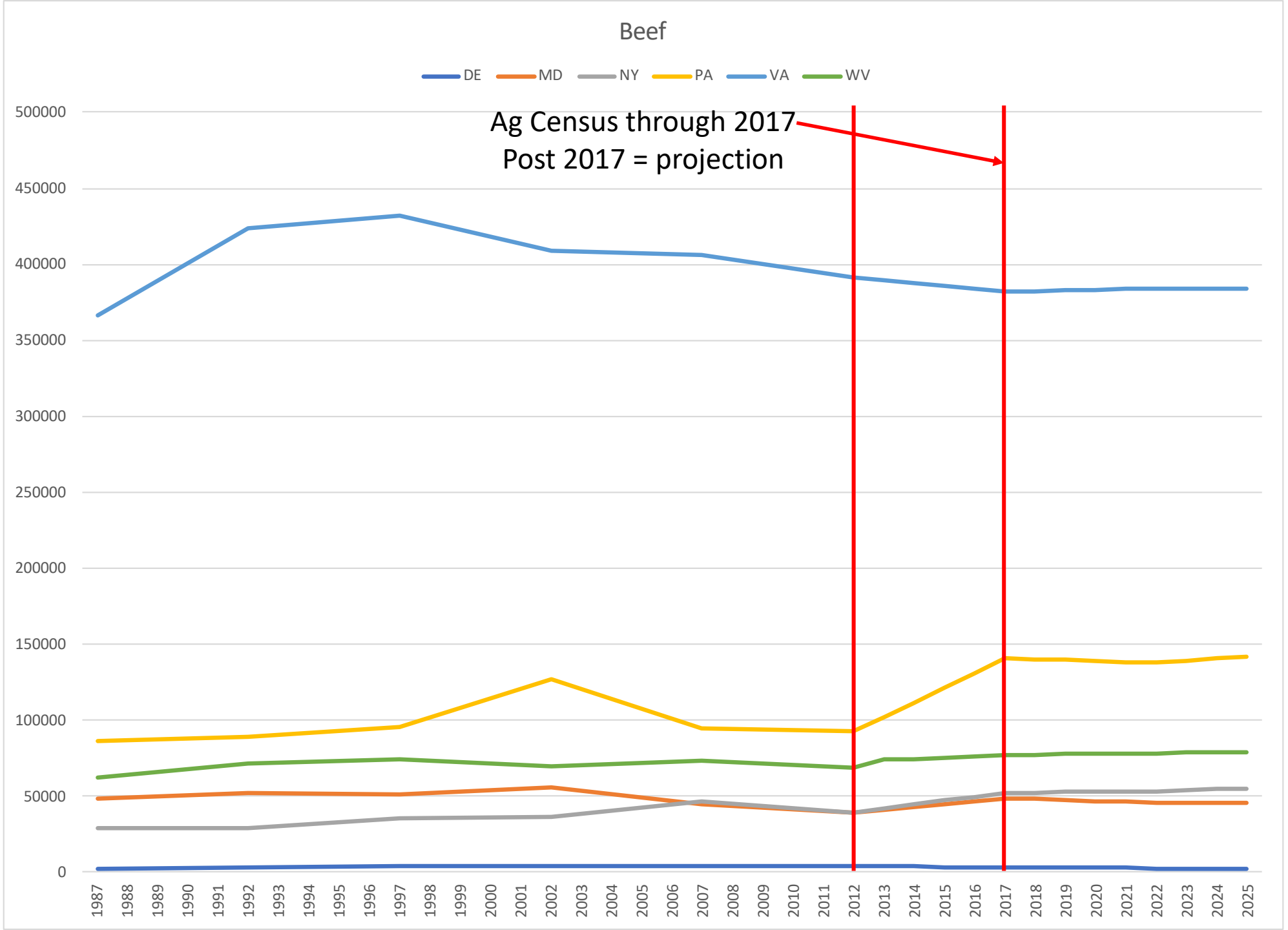
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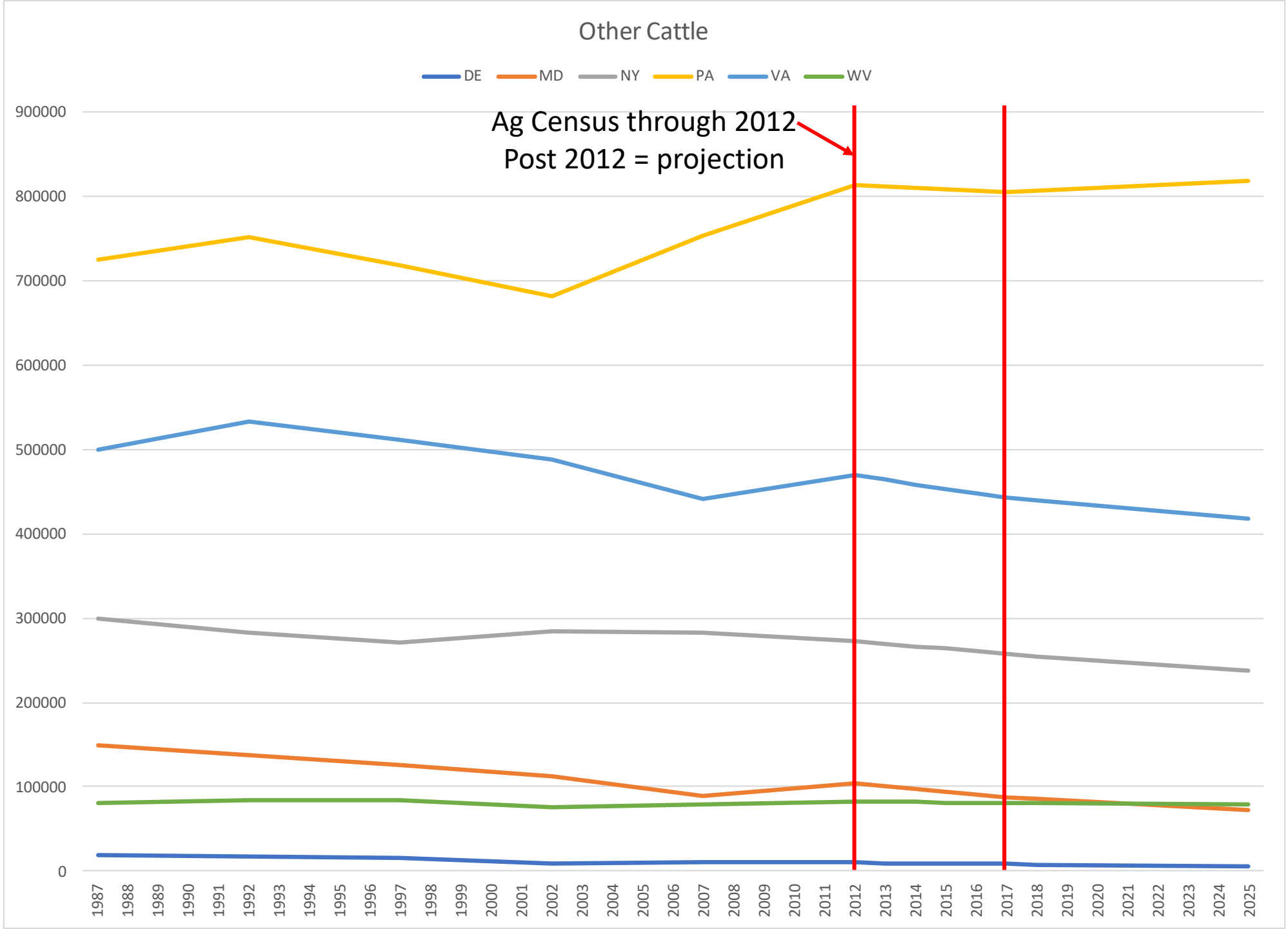
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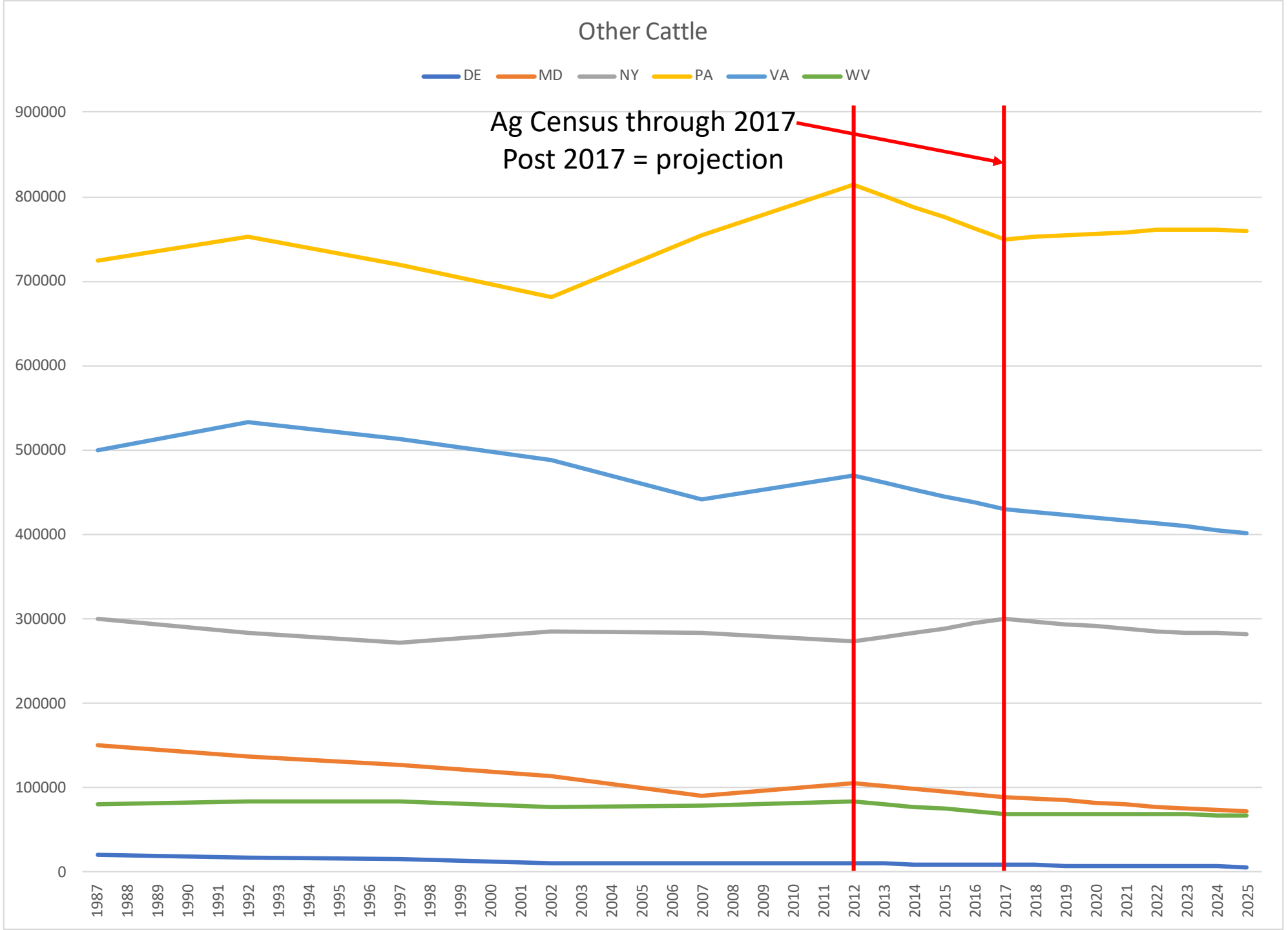
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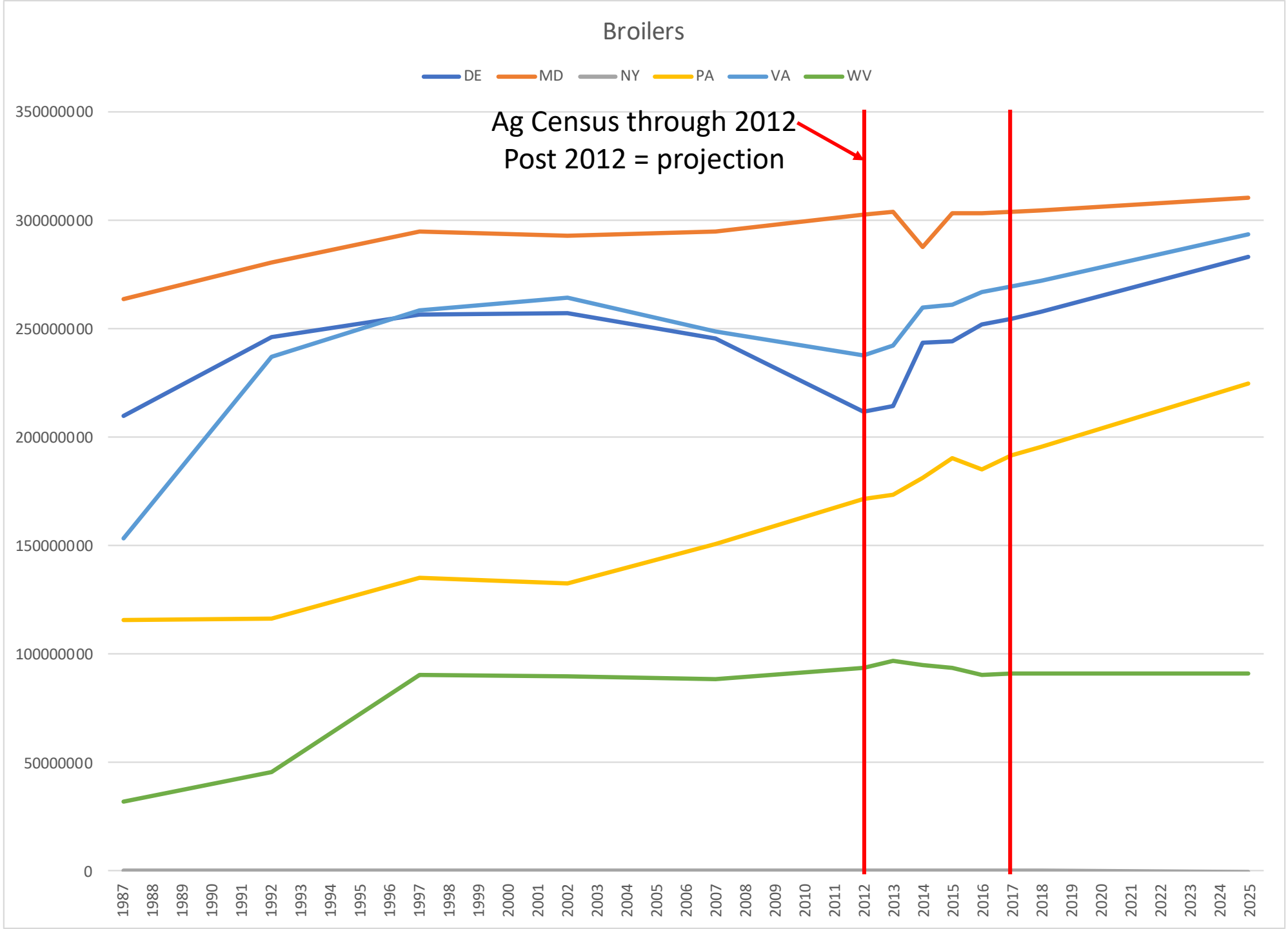
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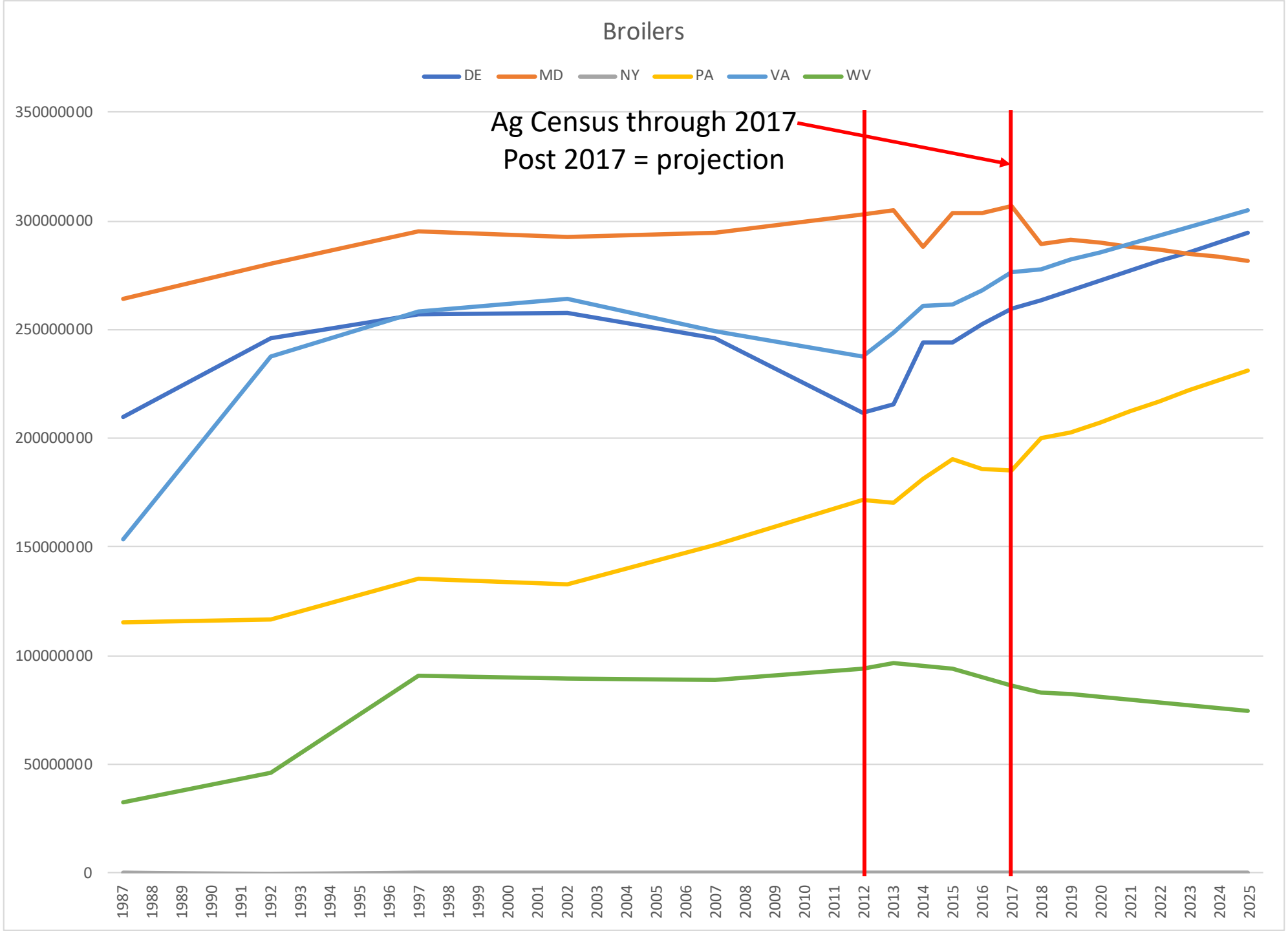
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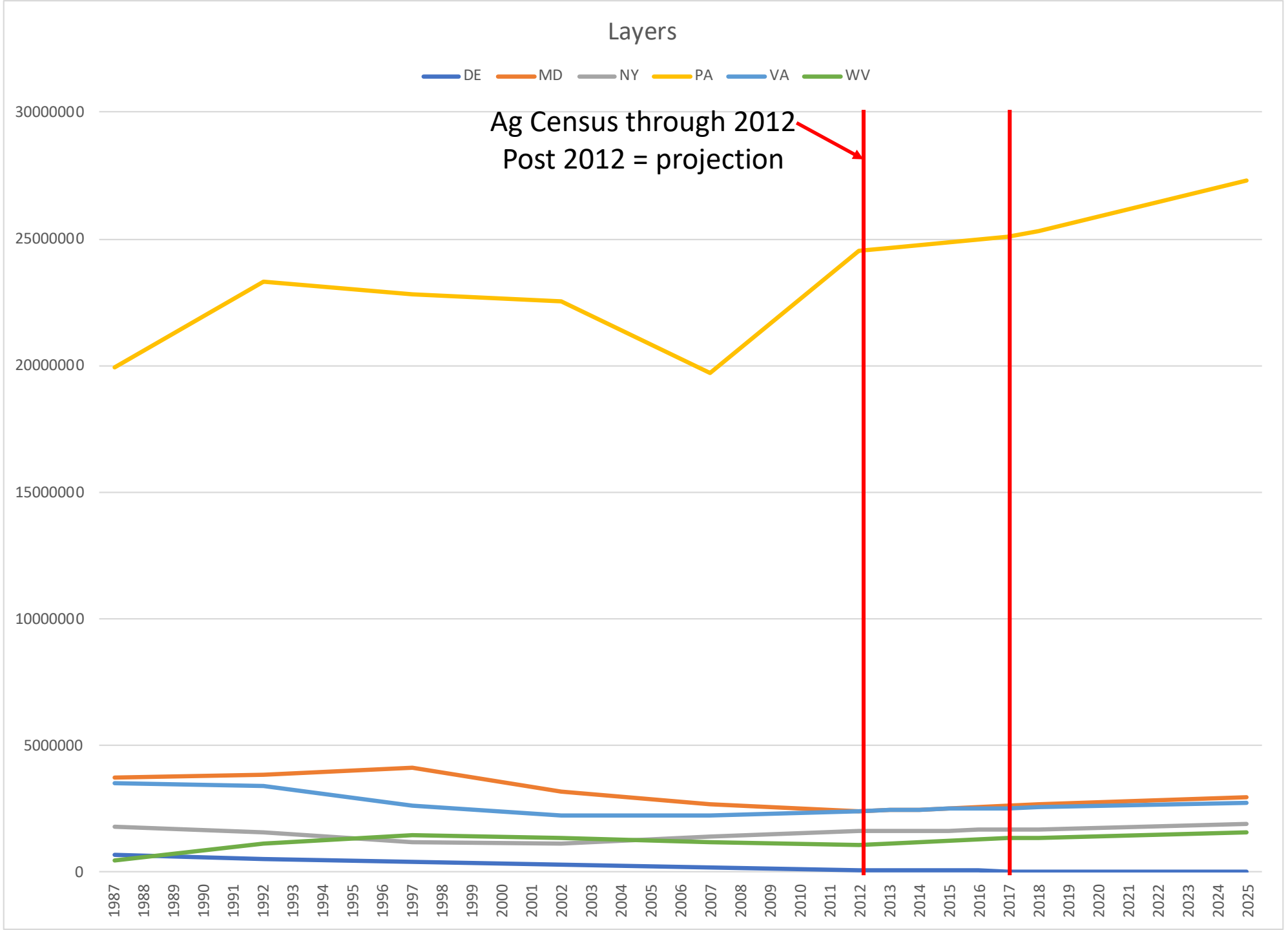
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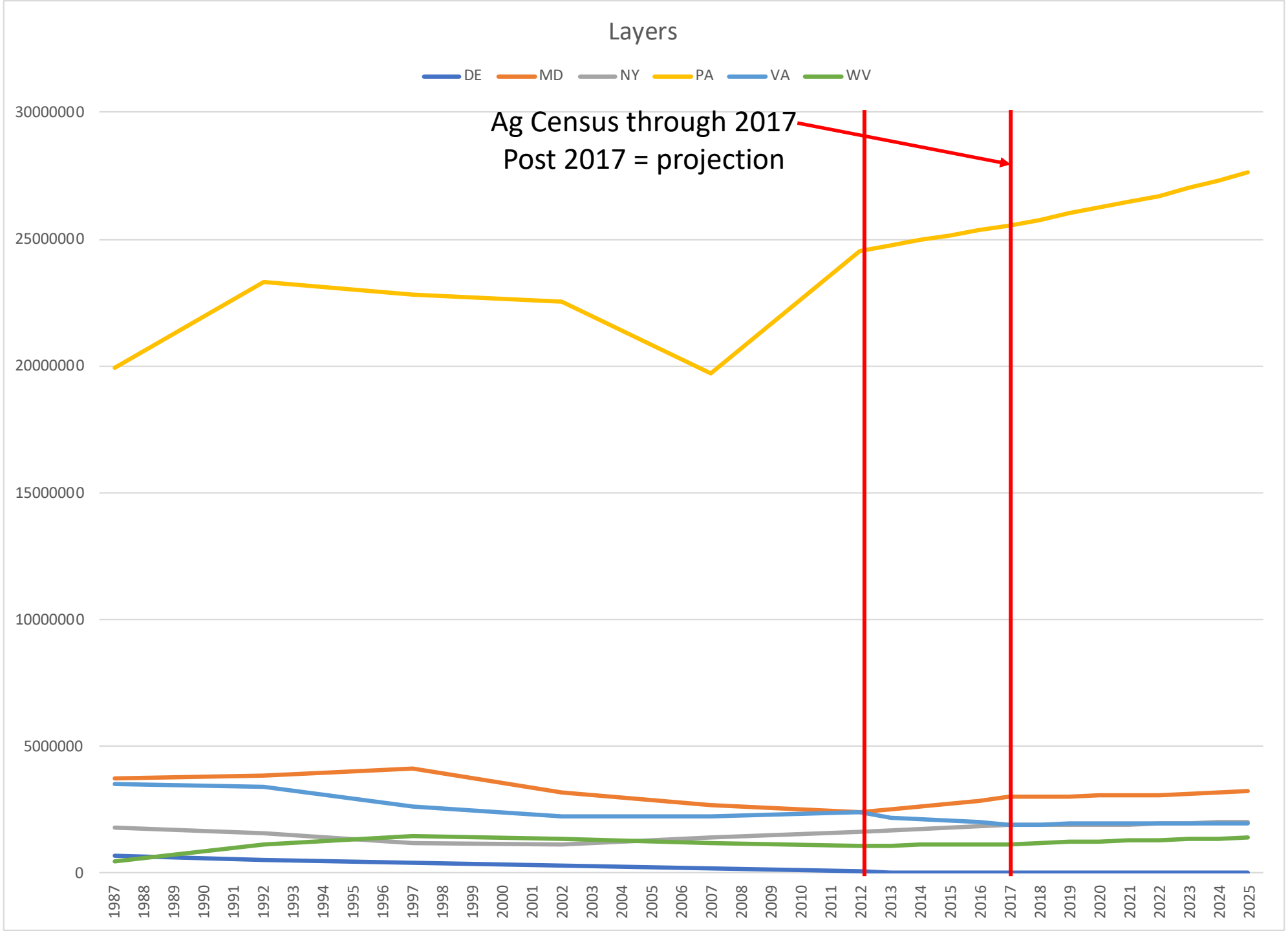
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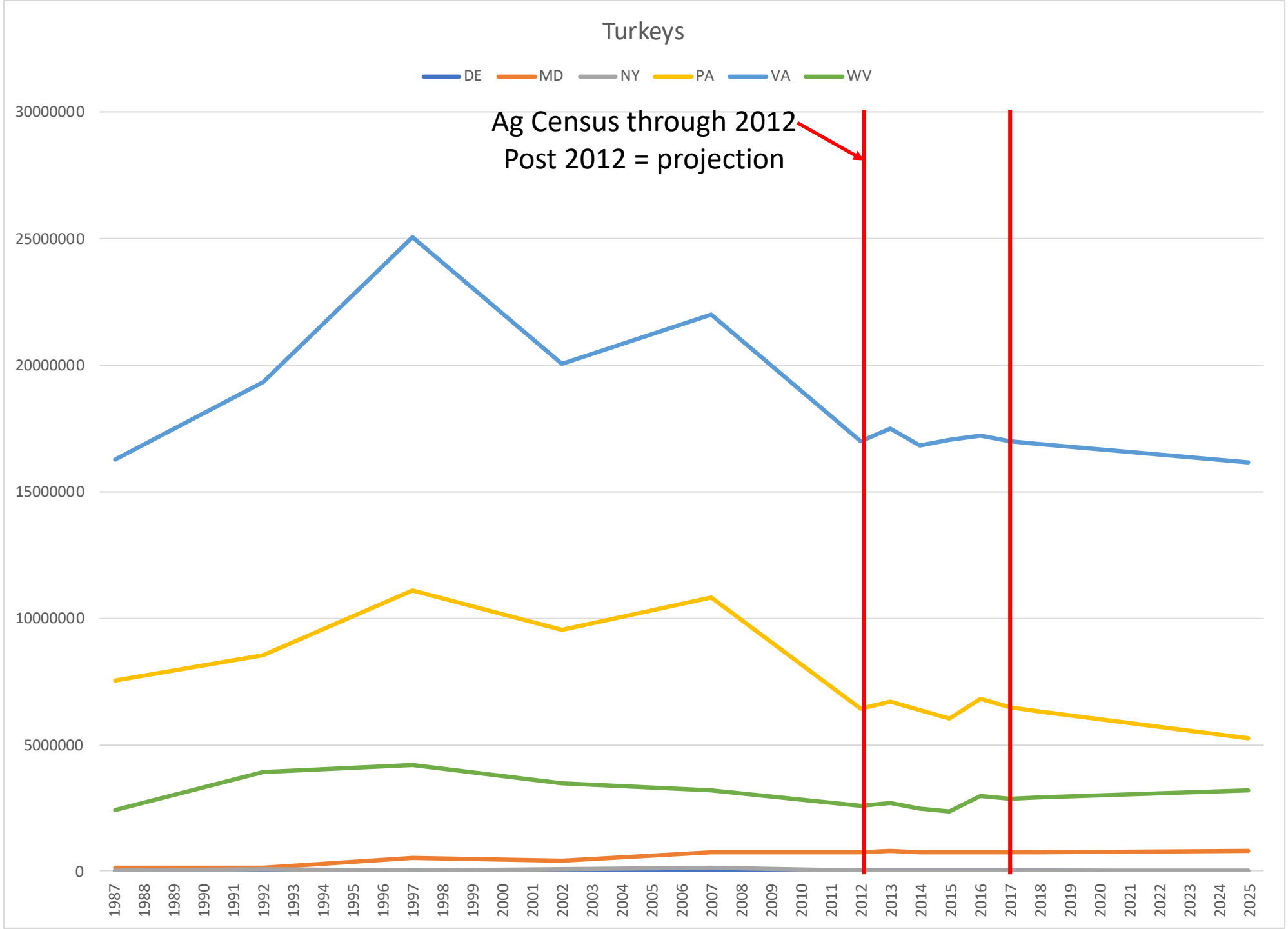
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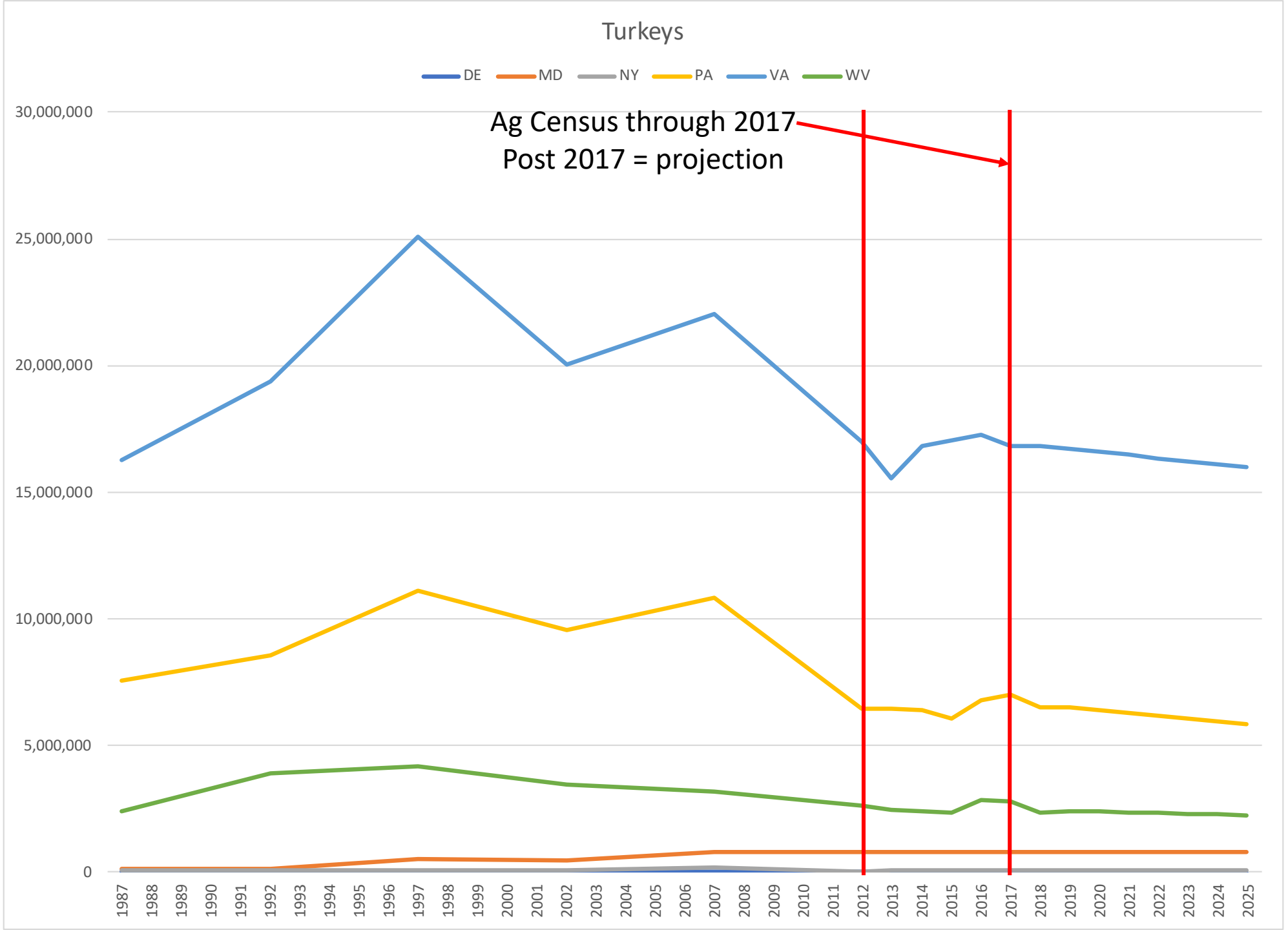
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2017 Census of Agriculture

Categories

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- CBP Landuse/Crop Types and Categories

2017 Census of Agriculture

Crop Forecast Methods

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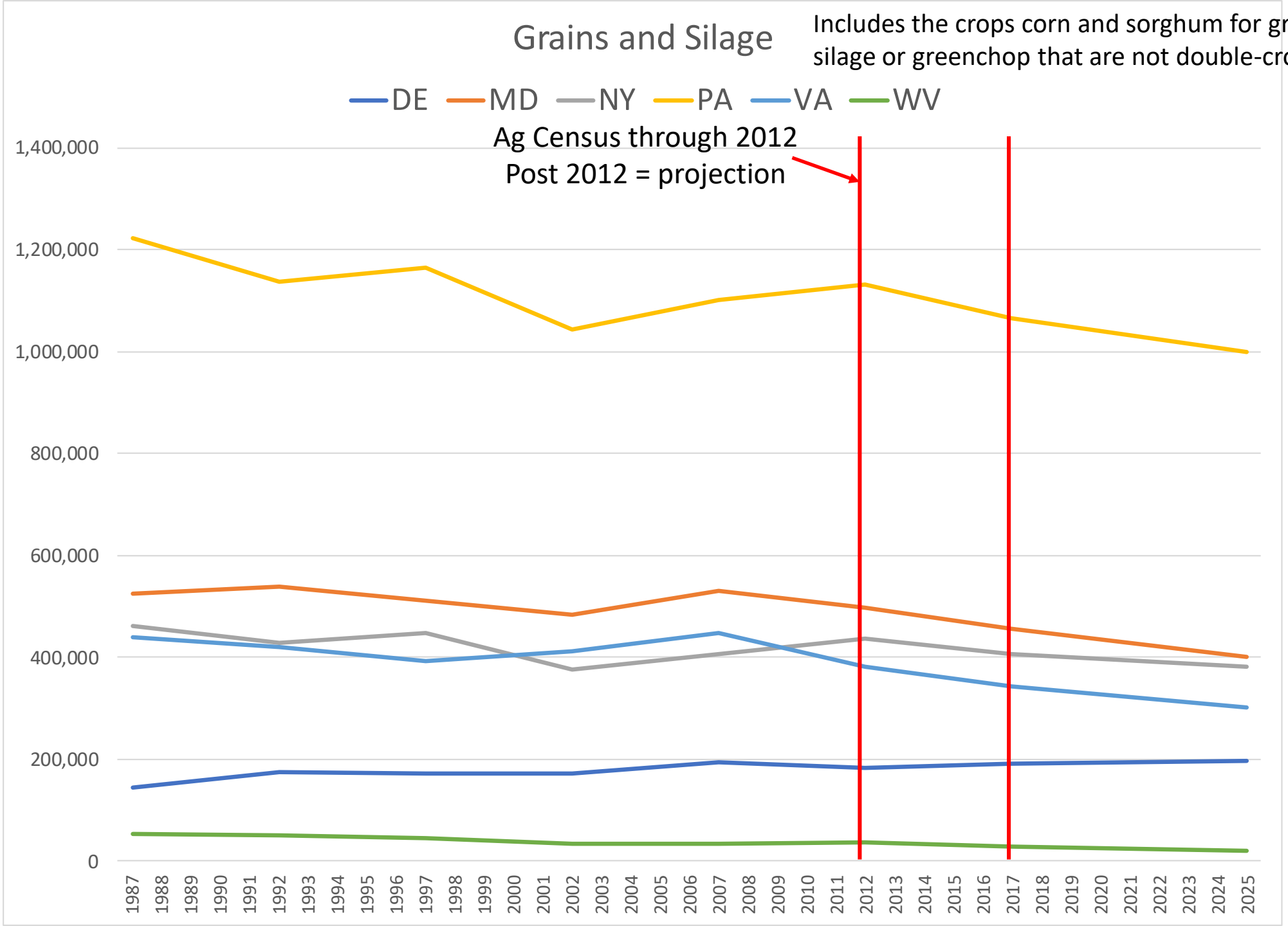
Grains and Silage

Includes the crops corn and sorghum for grain and for silage or greenchop that are not double-cropped



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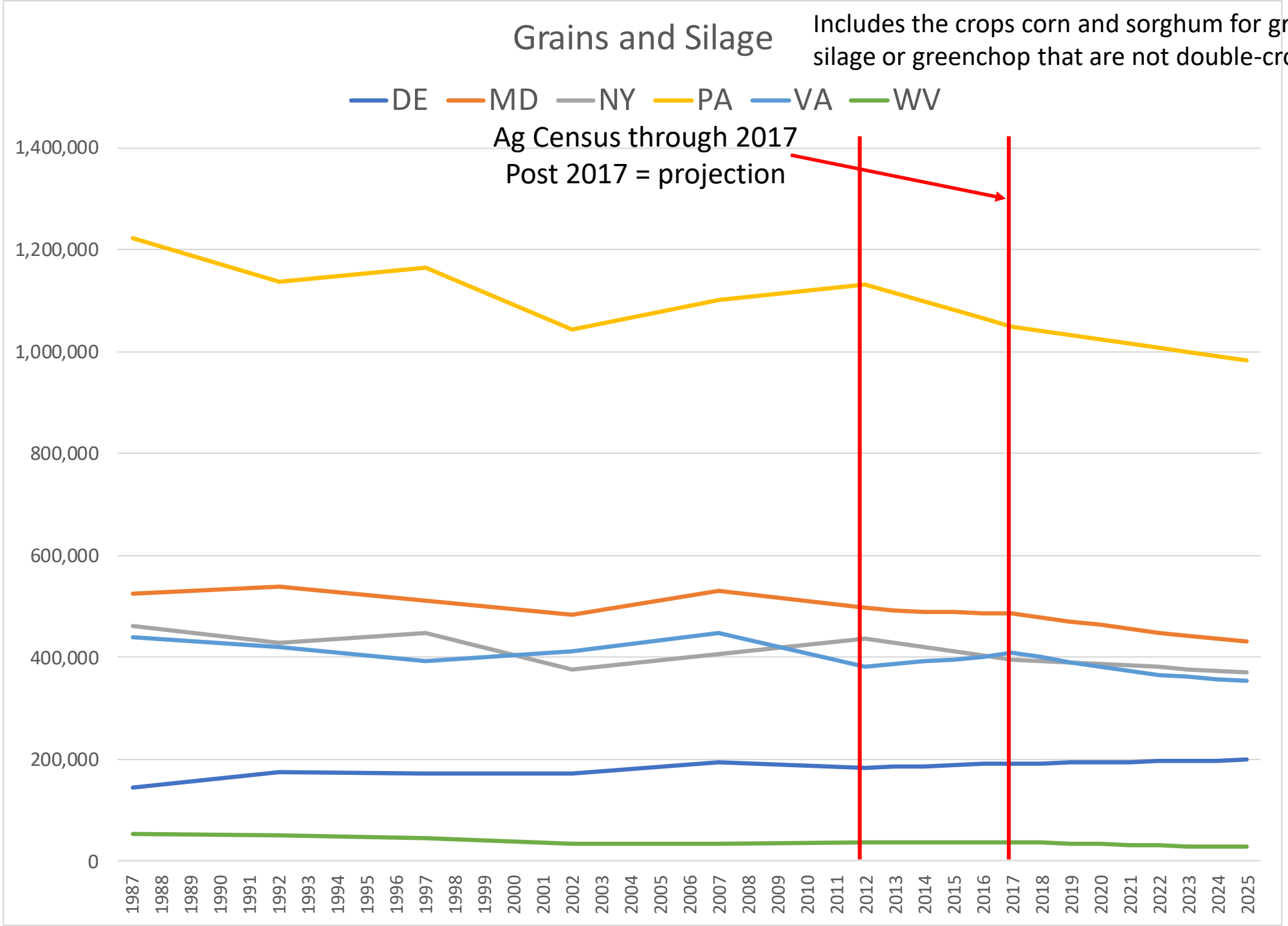
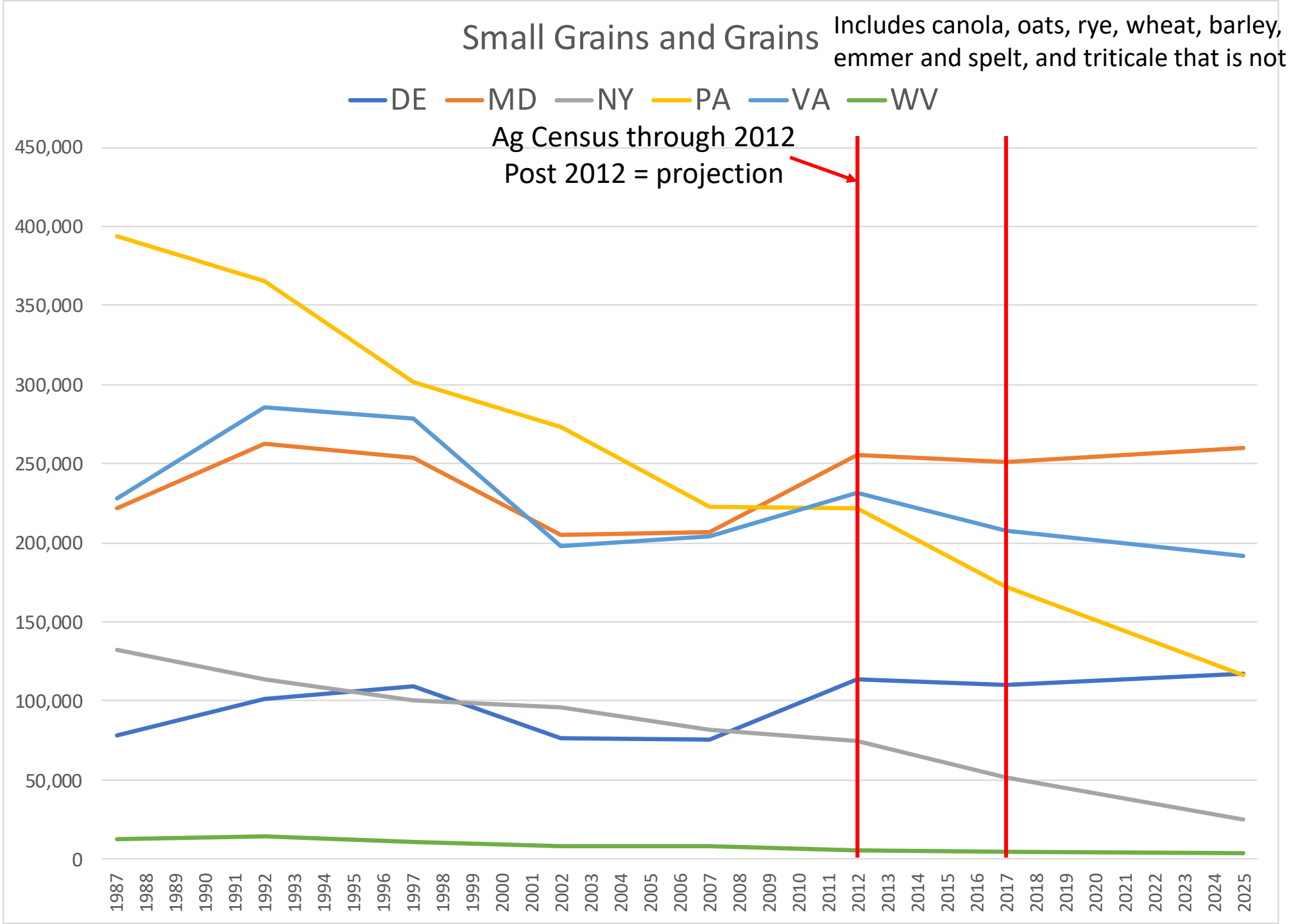


Small Grains and Grains

Includes canola, oats, rye, wheat, barley, buckwheat, emmer and spelt, and triticale that is not double-crop



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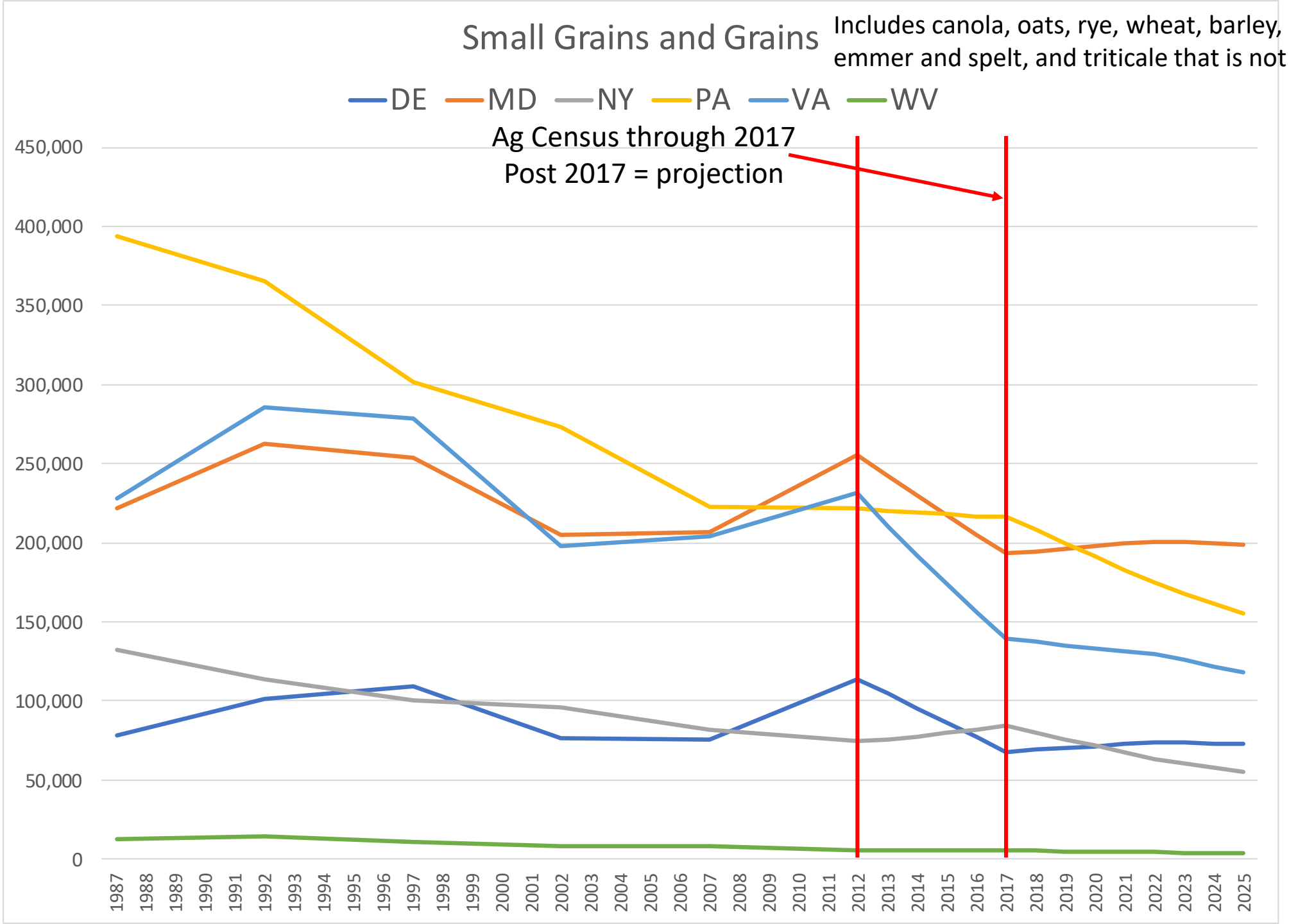

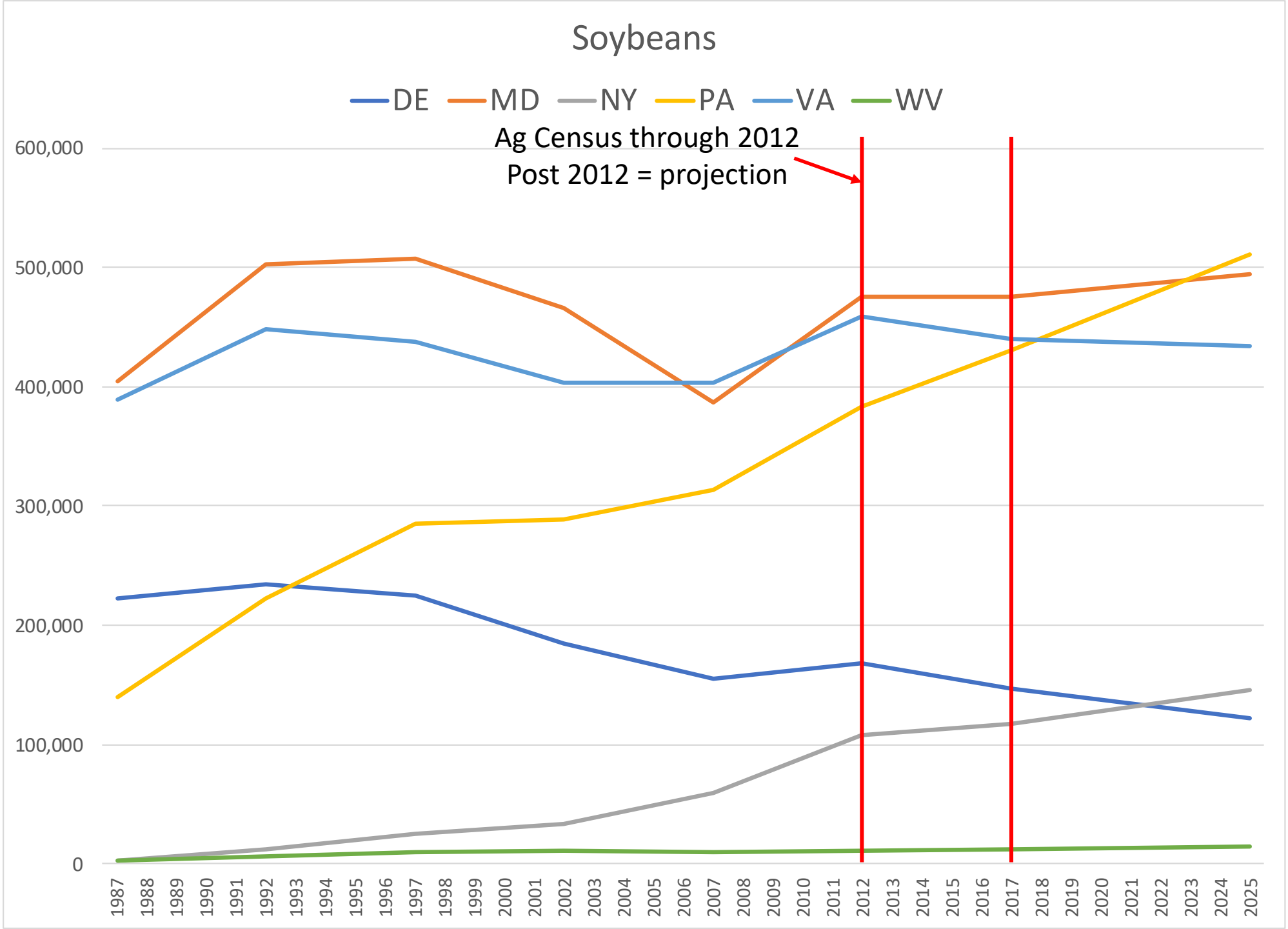
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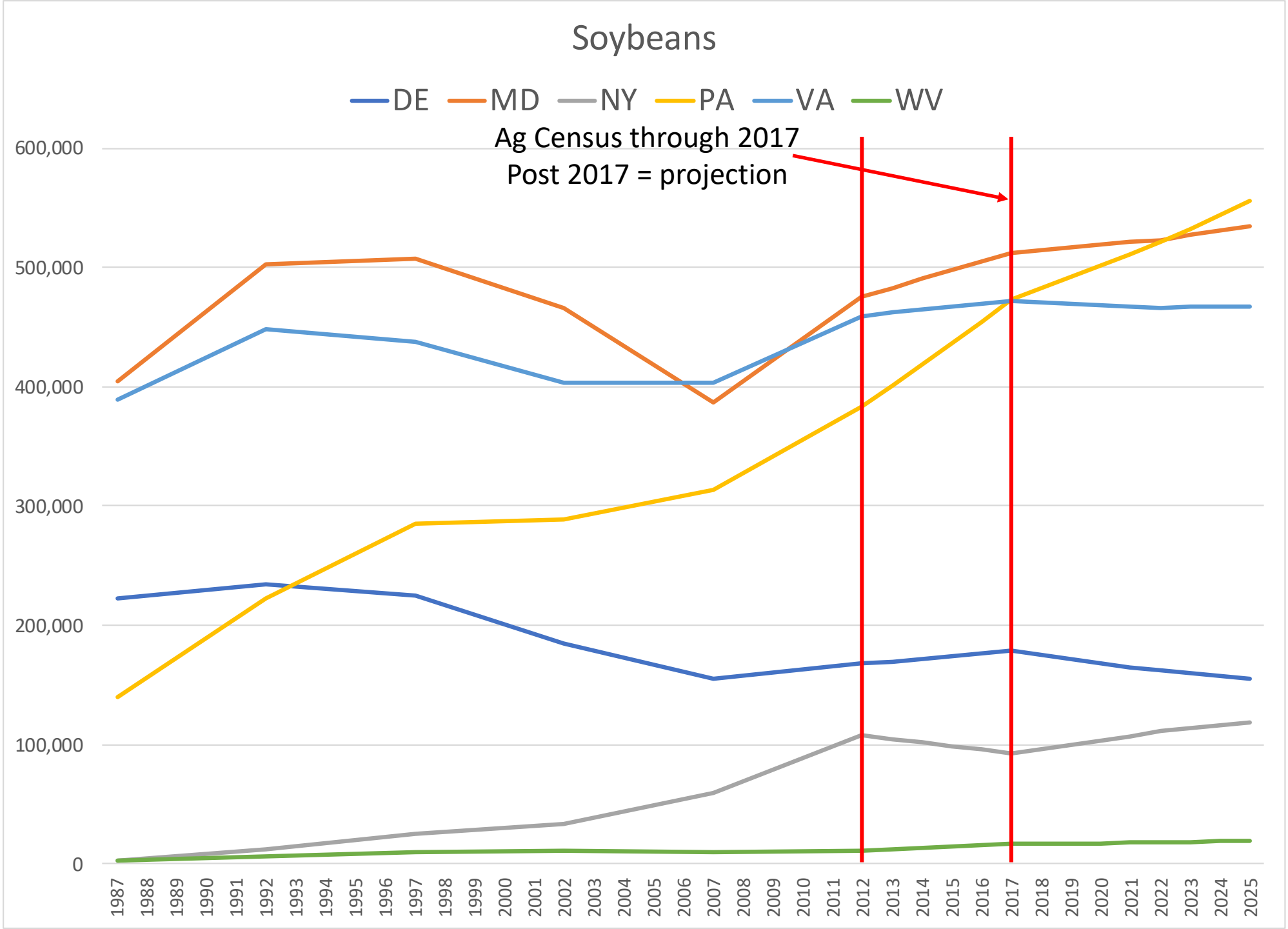
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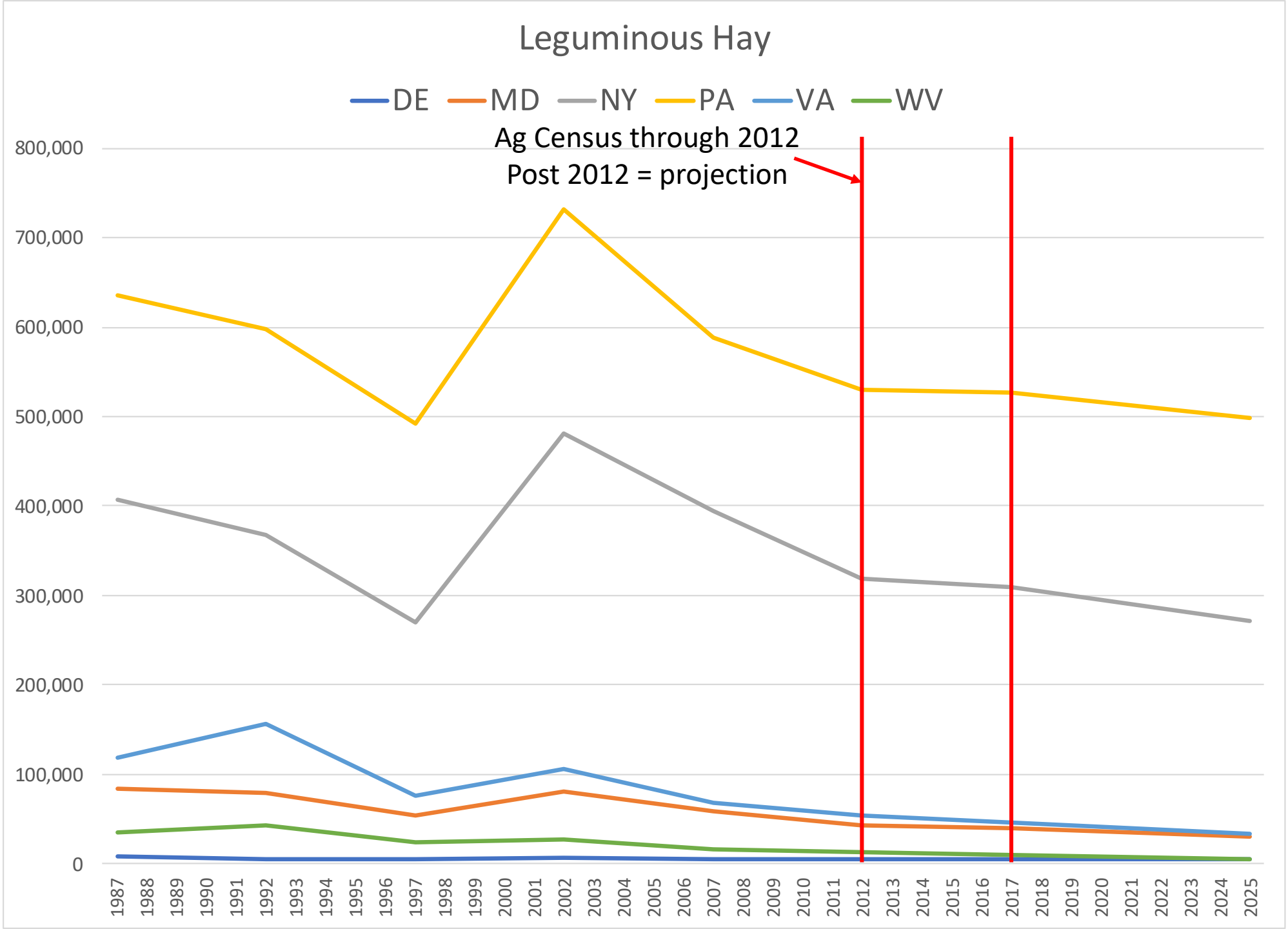
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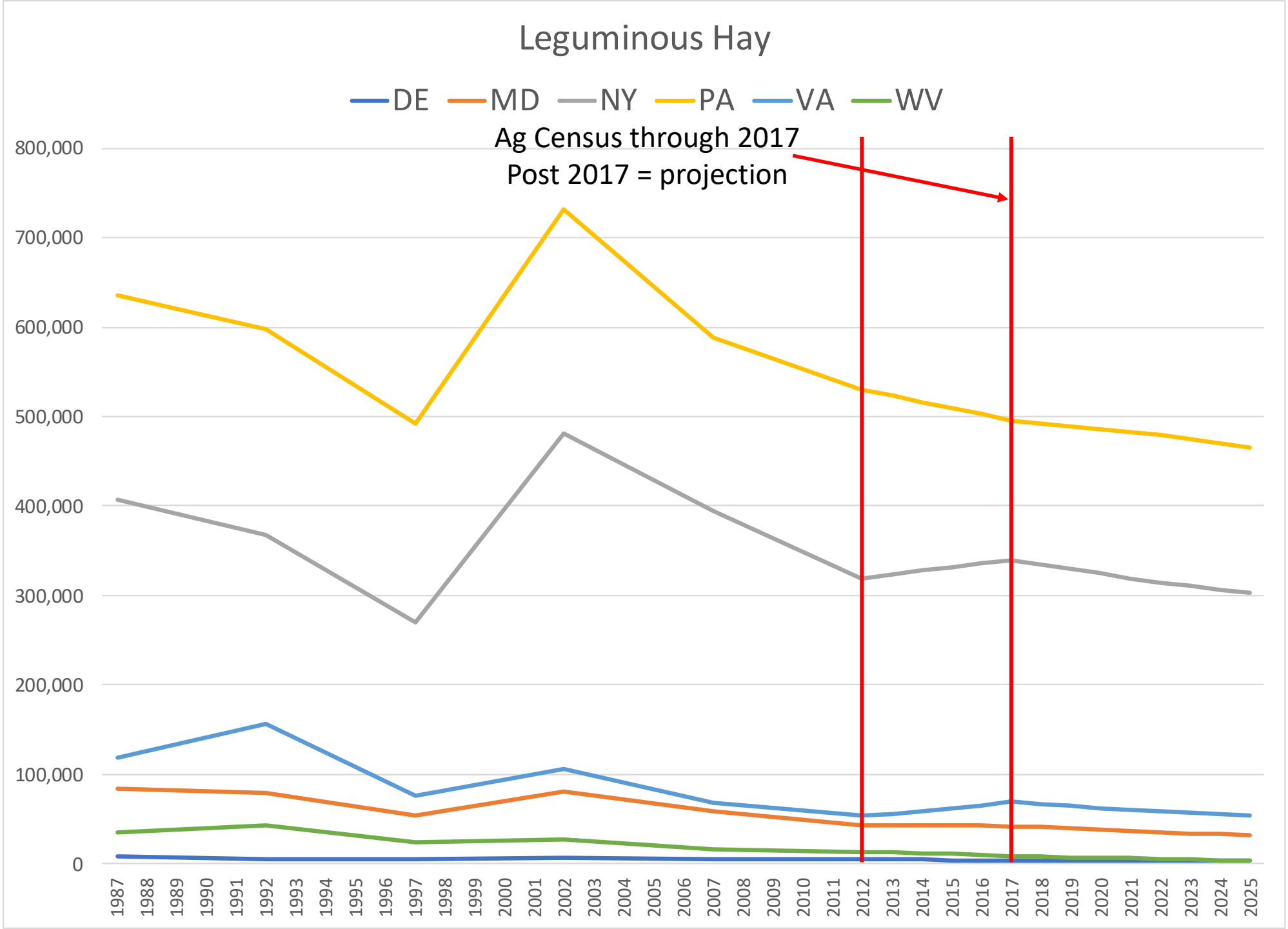
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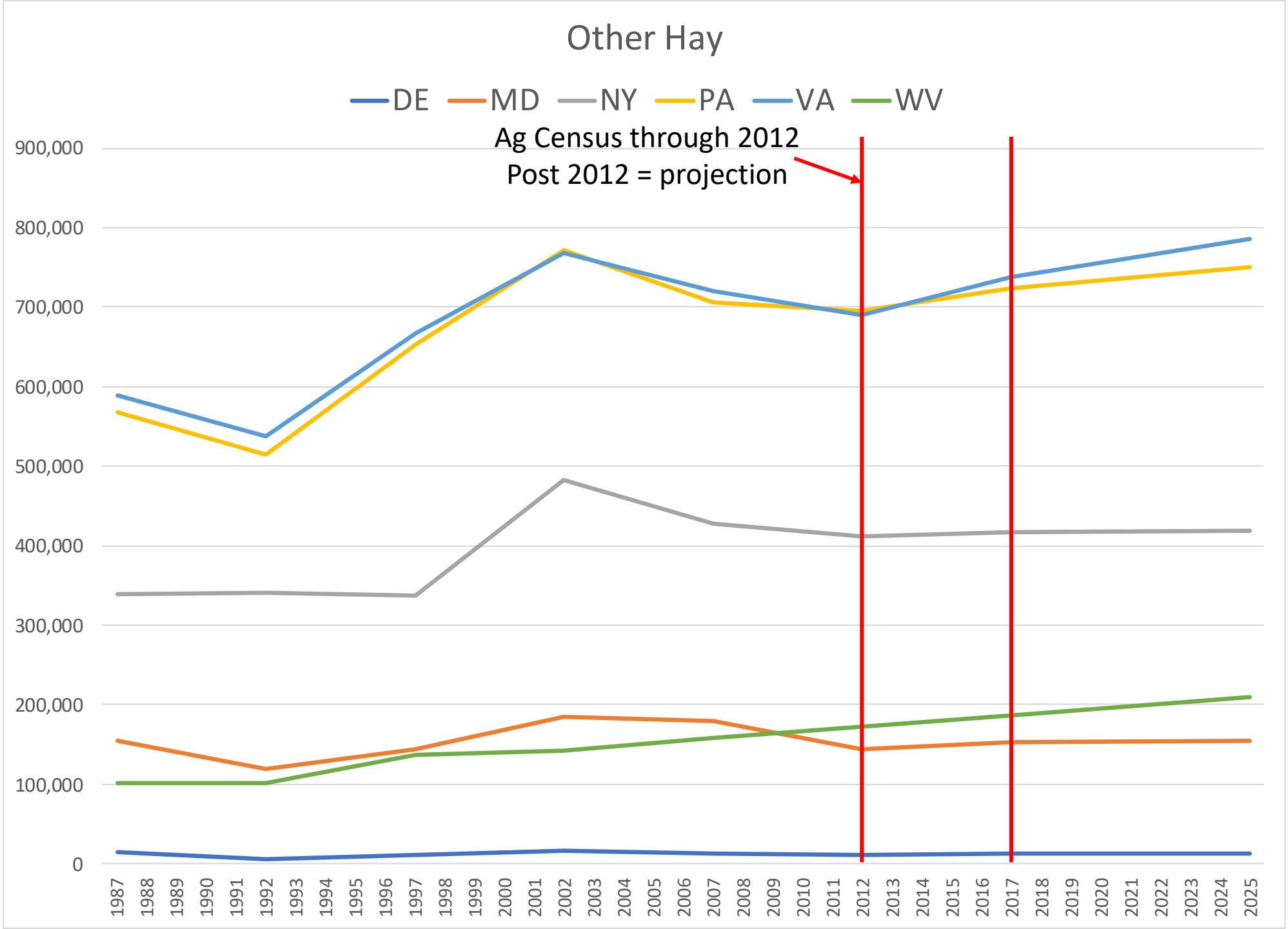
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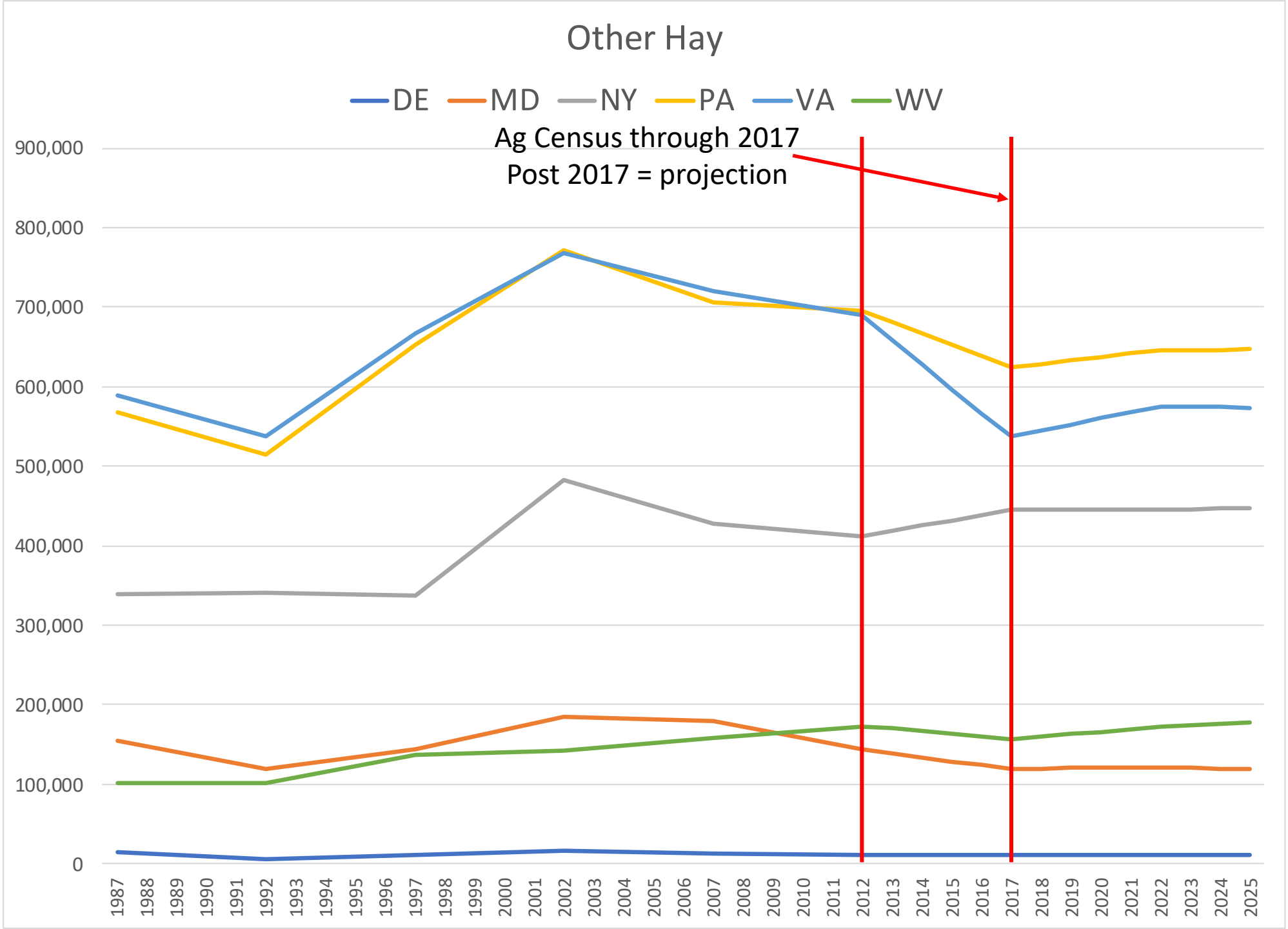
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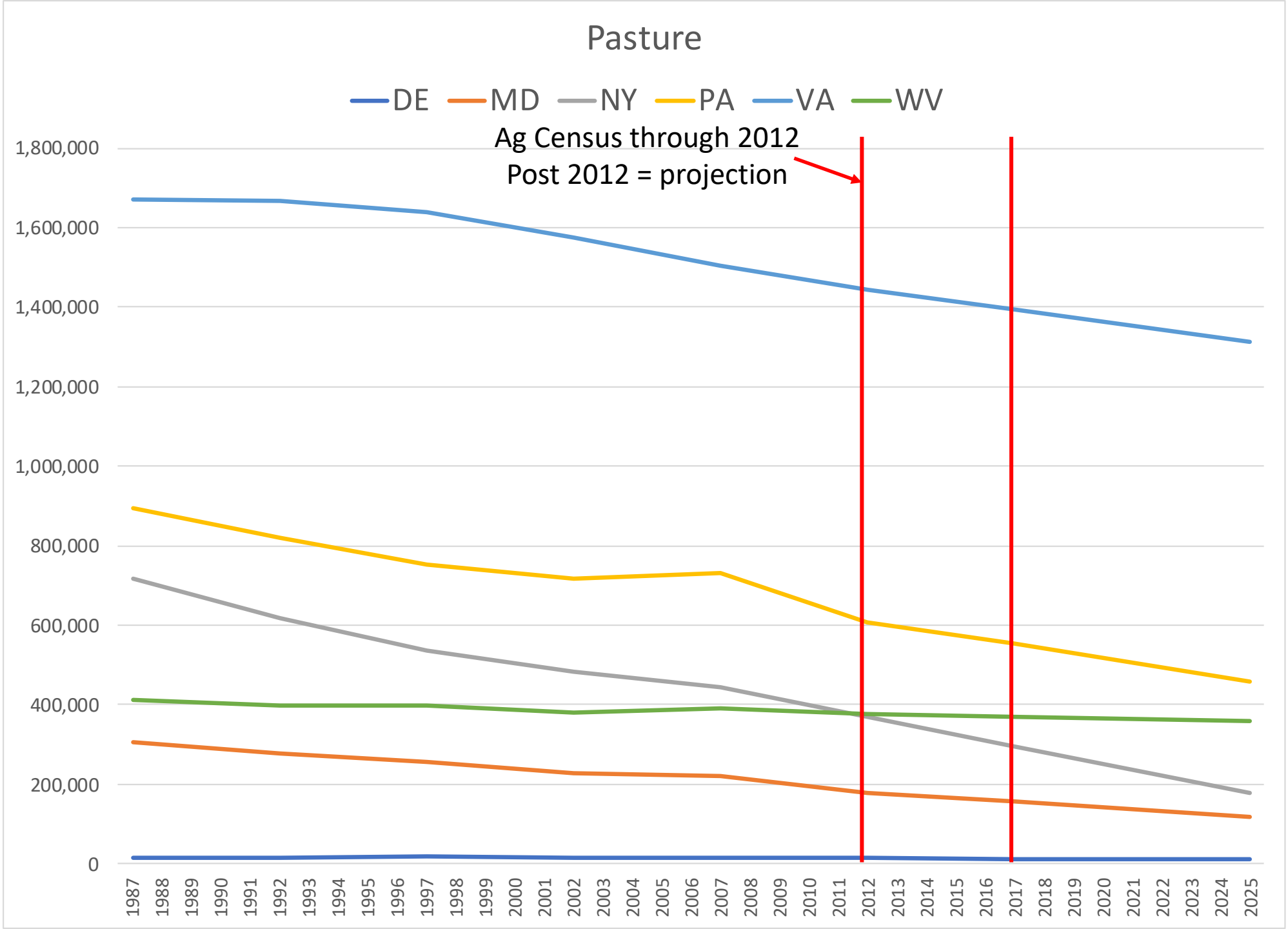
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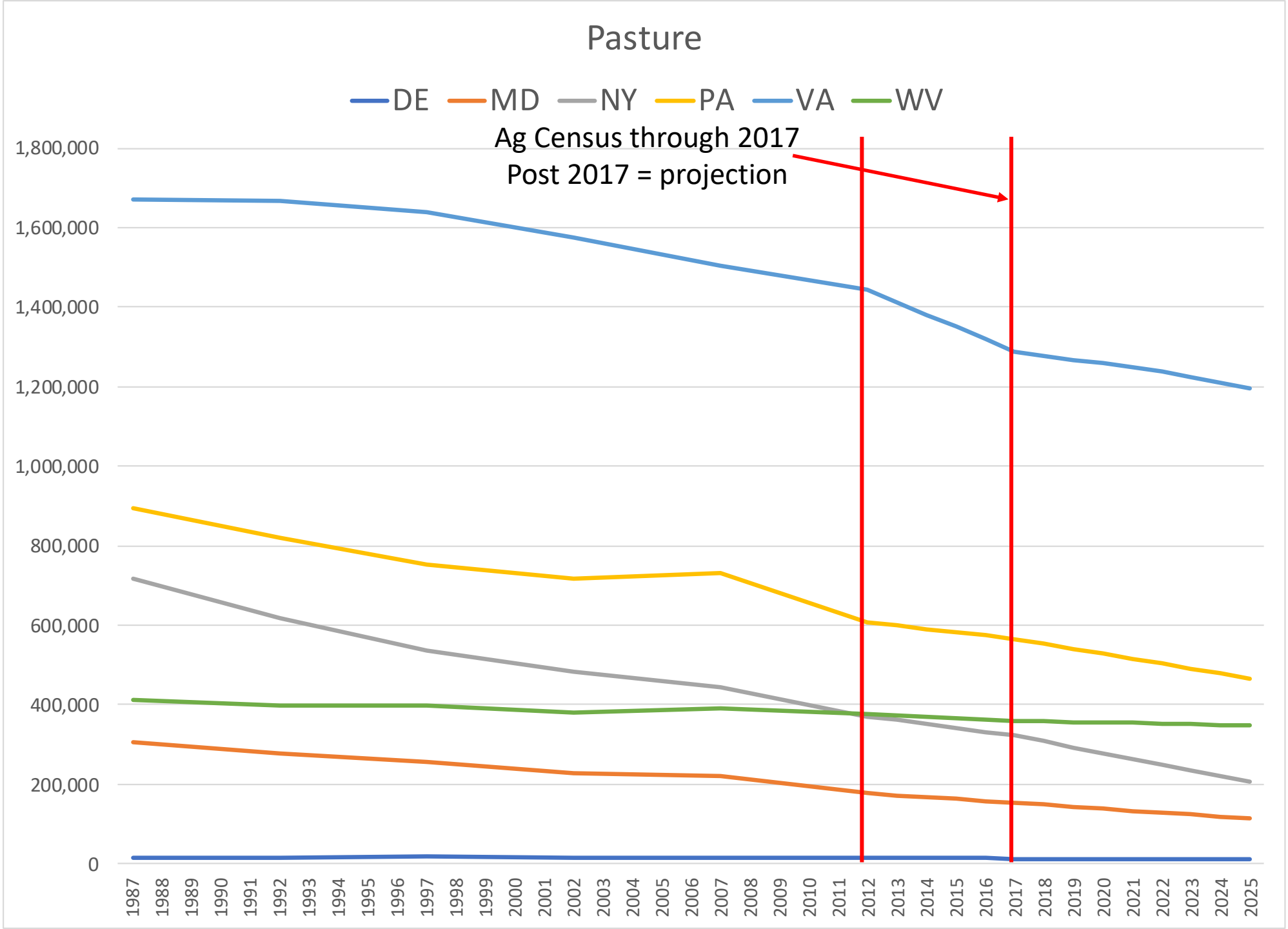
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2017 Census of Agriculture

Animals and Crops

- Changes in crop types will increase or decrease nutrient (and sediment) loads – related to the degree of the change and, primarily, the crop nutrient needs.

Turfgrass Fertilizer

New Data for CAST '19

Turfgrass Nutrient Applications

Phase 6 Model

- Methods for the developed sector prescribe a mass of fertilizer nutrients for each state distributed to one "crop" type = turfgrass
  - Methods capture variability among states for rural versus suburban.
  - Using fertilizer data that has other utilities nation-wide

Turfgrass Nutrient Applications

Phase 6 Model

- Source for fertilizer nutrient mass is AAPFCO with methods to fill in holes in the data, such as when a county didn't report, or the sales data were not split between Farm and Non-Farm
  - Same source as chemical fertilizer data for agriculture sector

Turfgrass Nutrient Applications

Phase 6 Model

- Two components to the application rates (lbs/acre)
  1) Fertilizer mass
  2) Turfgrass acres
     - For back-cast, high-resolution land cover w/ USGS's Landsat processing center's back-casting methodology for land cover change 1984-2013 annual
     - Land Use Workgroup + CBP office working on land use forecast with new data

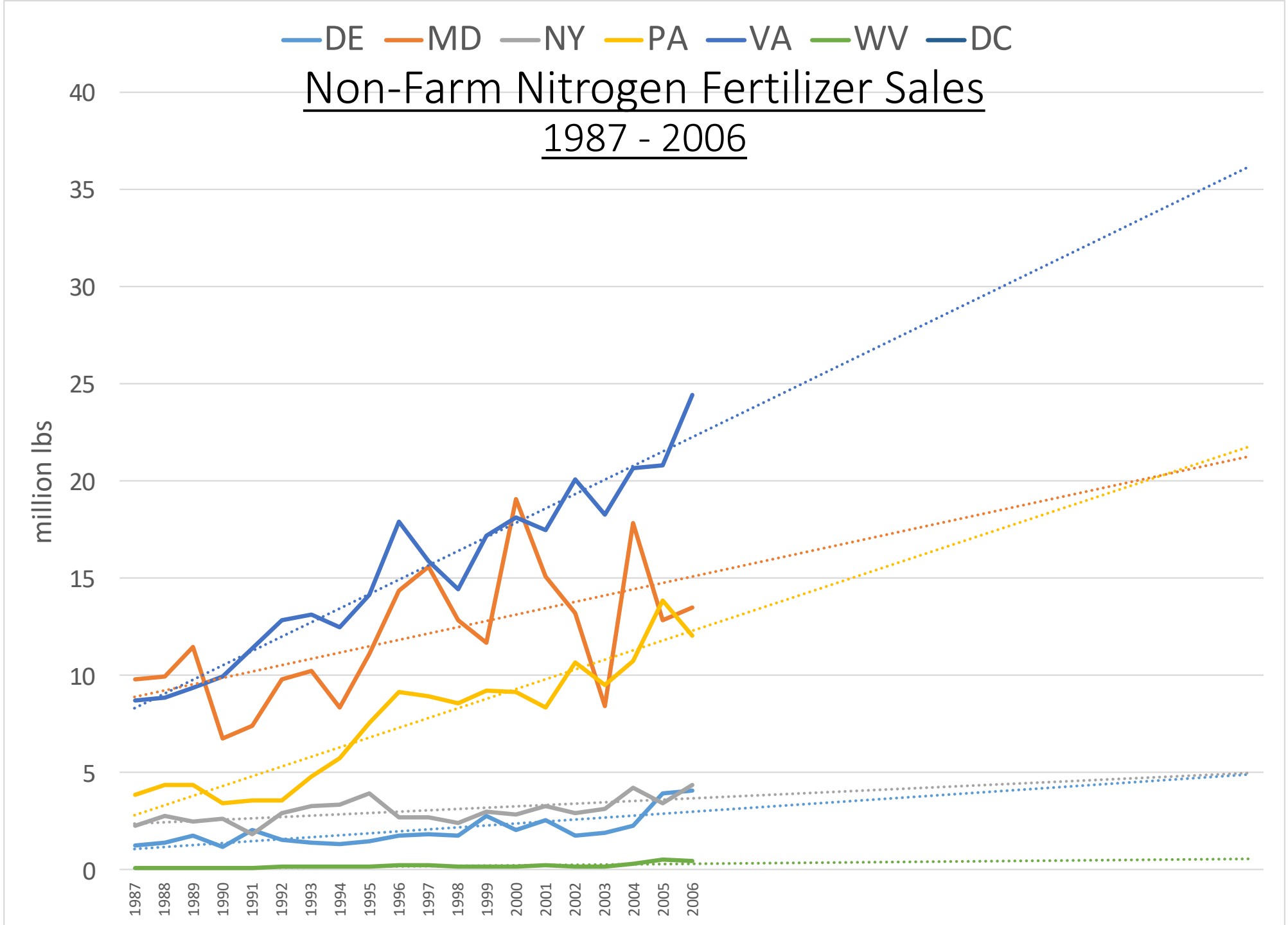
Turfgrass Nutrient Applications

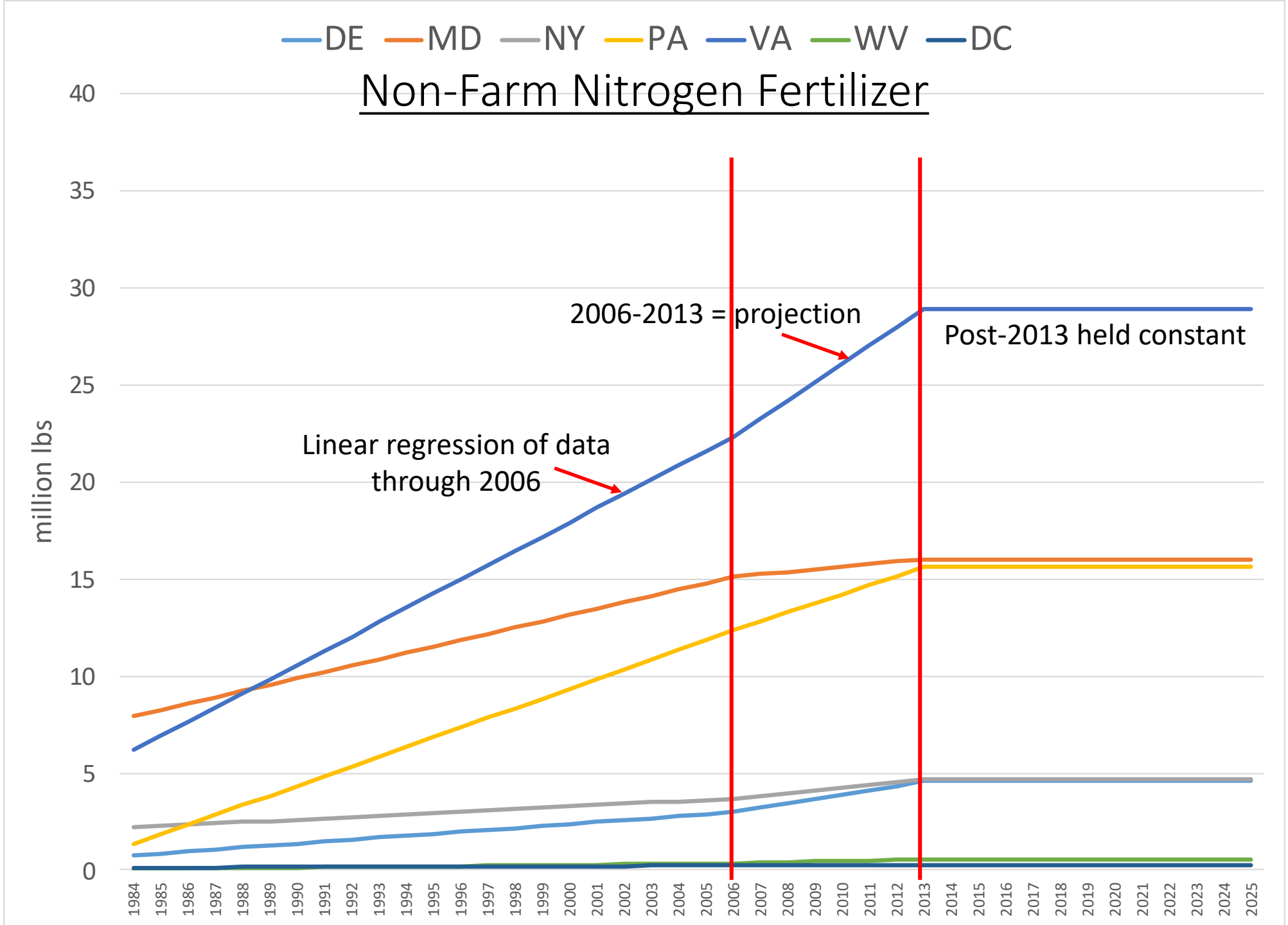
Phase 6 Model

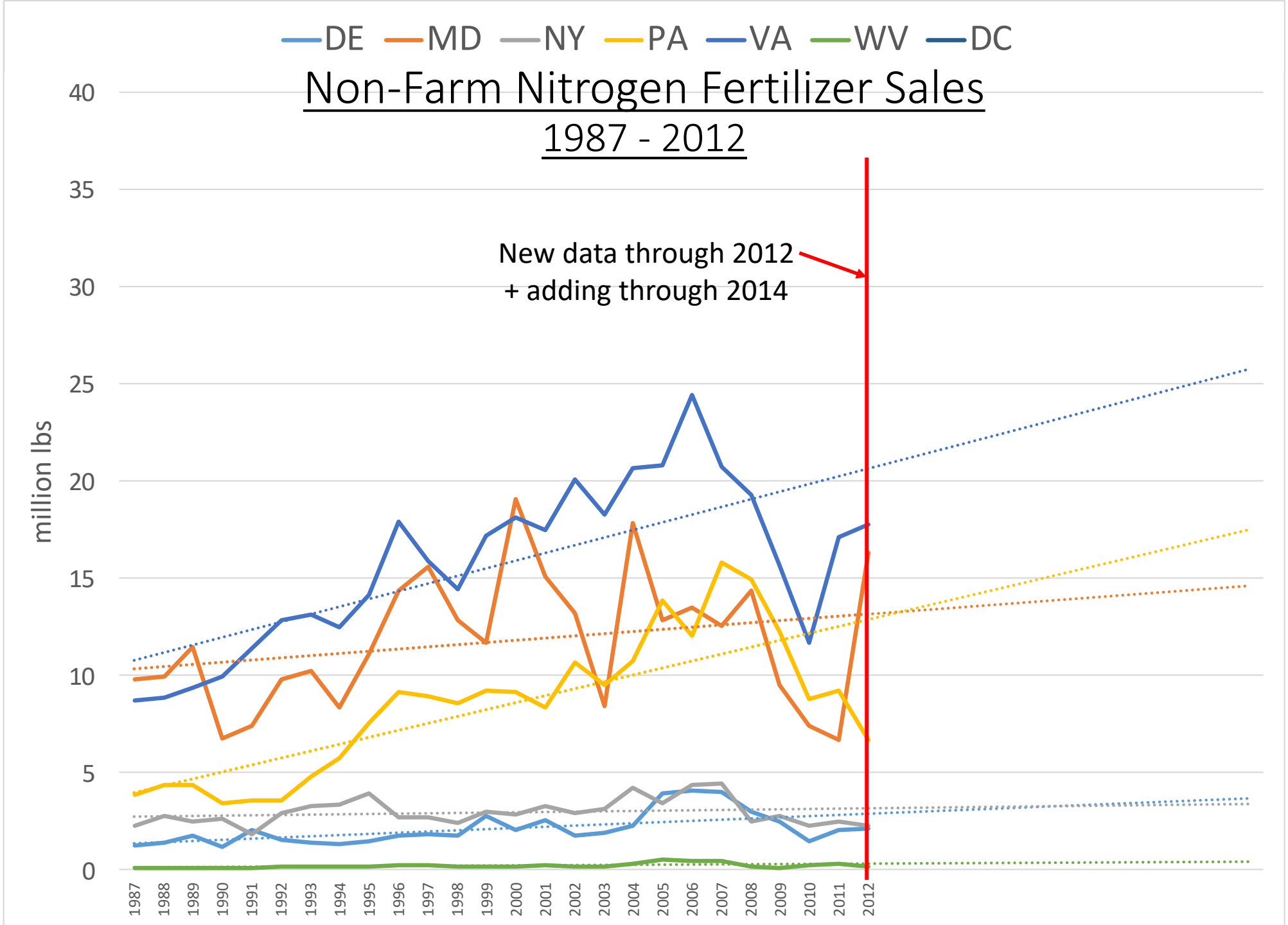
- Additional credit is given for practices that make up nutrient management – depending on high-risk, low-risk, blended
- The USWG approved the methods to vary nutrient application on developed lands for the Phase 6 model by jurisdiction and through time, 6/21/16
  - USWG will review new data at their 9/17/19 meeting

Turfgrass Fertilizer

Nitrogen

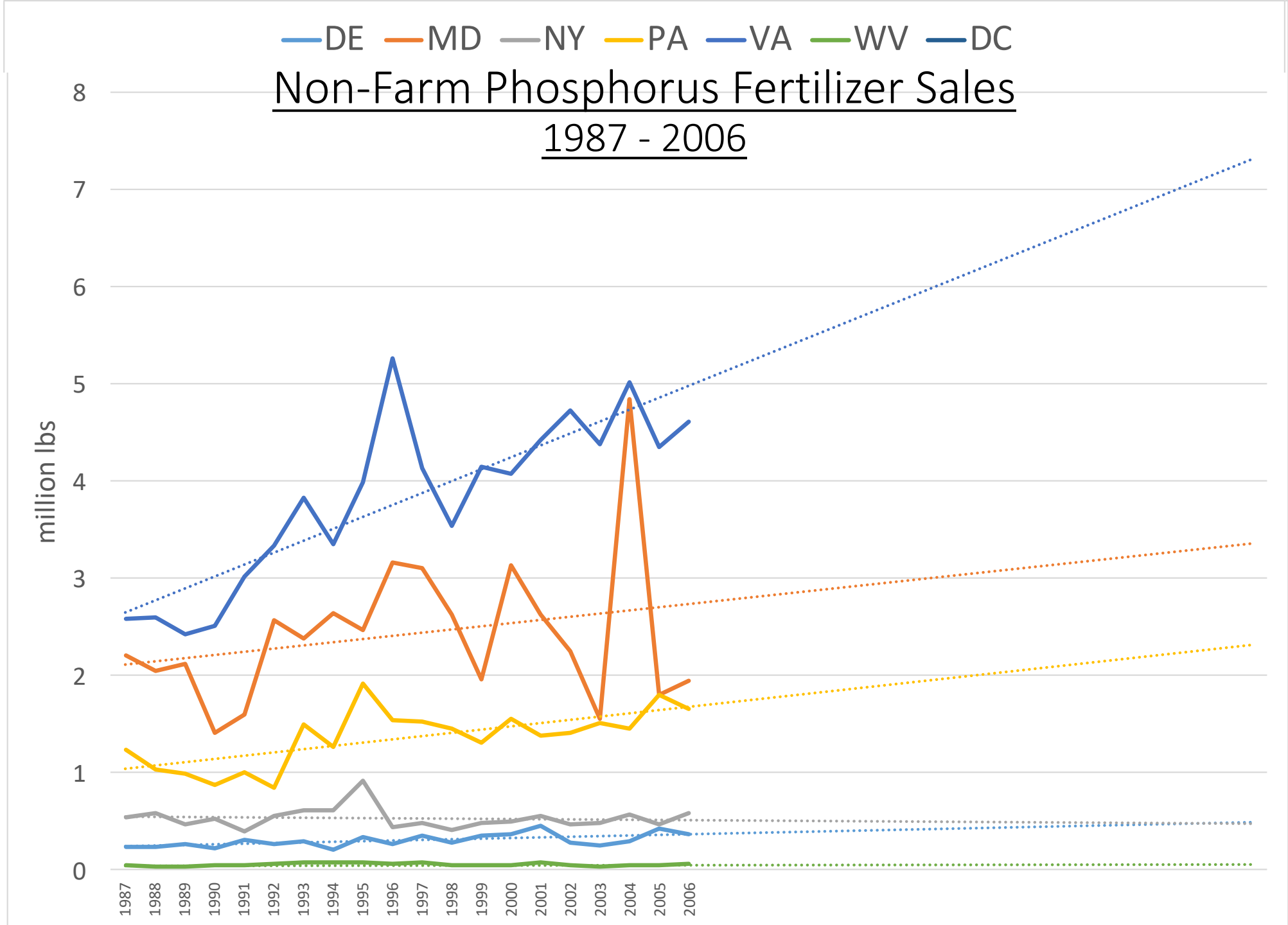

DE
MD
NY
PA
VA
WV
DC
Non-Farm Nitrogen Fertilizer Sales
1987 - 2006
million lbs
40
35
30
25
20
15
10
5
0
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006

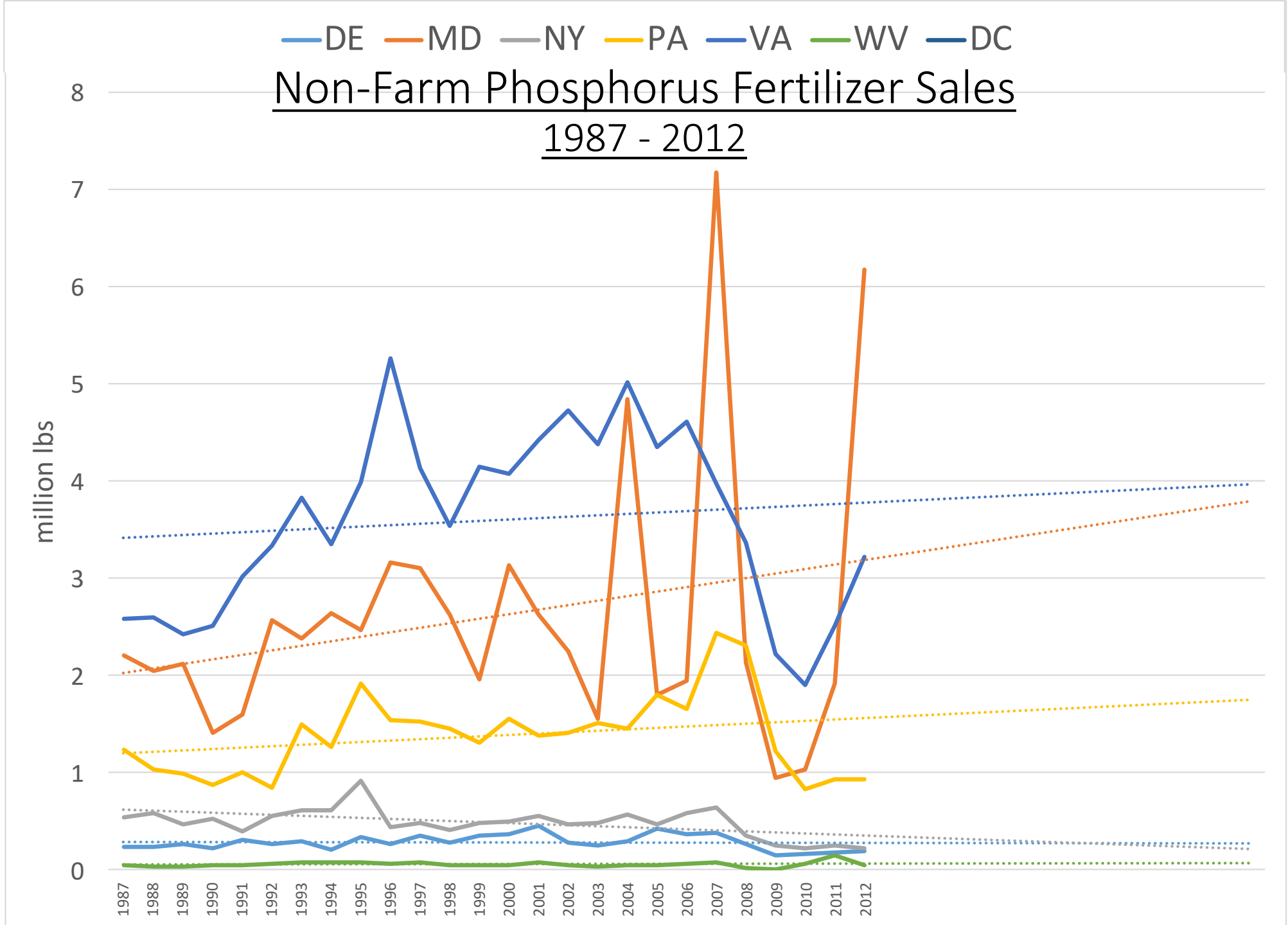

DE
MD
NY
PA
VA
WV
DC
Non-Farm Nitrogen Fertilizer
million lbs
40
35
30
25
20
15
10
5
0
2006-2013 = projection
Post-2013 held constant
Linear regression of data through 2006
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025


DE
MD
NY
PA
VA
WV
DC
Non-Farm Nitrogen Fertilizer Sales
1987 - 2012
New data through 2012
+ adding through 2014
million lbs
40
35
30
25
20
15
10
5
0
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012

Turfgrass Fertilizer

Phosphorus


DE
MD
NY
PA
VA
WV
DC
Non-Farm Phosphorus Fertilizer Sales
1987 - 2006
million lbs
0
1
2
3
4
5
6
7
8
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006


DE
MD
NY
PA
VA
WV
DC
Non-Farm Phosphorus Fertilizer Sales
1987 - 2012
million lbs
0
1
2
3
4
5
6
7
8
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012

Turfgrass Nutrient Applications

Phase 6 Model

- Urban Stormwater Workgroup will decide what trend to use that incorporates the new fertilizer data.
- Increasing nutrient mass on turfgrass does not necessarily mean increasing loads.
- Load changes primarily depend on the relationship of the rate of change of nutrient mass to the rate of change of the turfgrass acres.

Turfgrass Nutrient Applications

Phase 6 Model

Changes in application rates over time (as an impact of nutrient management) would be captured by sales data.

Summary of Urban Fertilizer Management Credits for Phosphorus and Nitrogen			
Nutrient	*Statewide with P fertilizer legislation*	*Statewide without P fertilizer legislation*	*Urban Nutrient Management UNM*[2]
Phosphorus	25%	20%	Low risk: 3% High risk: 10% Blended: 4.5%
Notes & Conditions of Credit	Effective 2013 for 3 years. In 2016 , need to show reduction in P using two years of fertilizer sales data		Need to survey high-risk every 5 years; Renew UNM every 3 years
Nitrogen	For States with N fertilizer legislation: 9% reduction for qualifying acres by commercial applicators, 4.5% reduction for do-it-yourselfer acres For all other States: 3% load reduction for every 10% decrease in N urban fertilizer input from CBWM benchmark		Low risk: 6% High risk: 20% Blended: 9%
Notes & Conditions of Credit	Effective 2014, need to show N reduction using two consecutive years sales data		Need to survey high-risk every 5 years; Renew UNM every 3 years

Must be an actual plan or homeowner pledge

Recommendations of the Expert Panel to Define Removal Rates for Urban Nutrient Management CBP Approved Final Report – by WQGIT 3/11/2013

Water Quality Standards Attainment