Chesapeake Bay Restoration

CAST-21 Urban Fertilizer Application Rates

Jeff Sweeney

EPA, Chesapeake Bay Program Office

Urban Stormwater Workgroup Meeting

November 16, 2021

Turfgrass Nutrient Application Rates

Phase 6 Model

- AAPFCO non-farm fertilizer sales data by county
- Urban method uses mass of fertilizer nutrients for each state distributed to one “crop” type = turfgrass
- Additional credit for practices that make up nutrient management – depending on high-risk, low-risk, blended

Turfgrass Nutrient Application Rates

Phase 6 Model

- Method captures variability among states for rural versus suburban
- Using data that has other utilities nation-wide
- June 21, 2016 USWG decision:
  - The USWG approved the proposed method to vary nutrient application on urban lands in the Chesapeake Bay Watershed Model by jurisdiction and through time

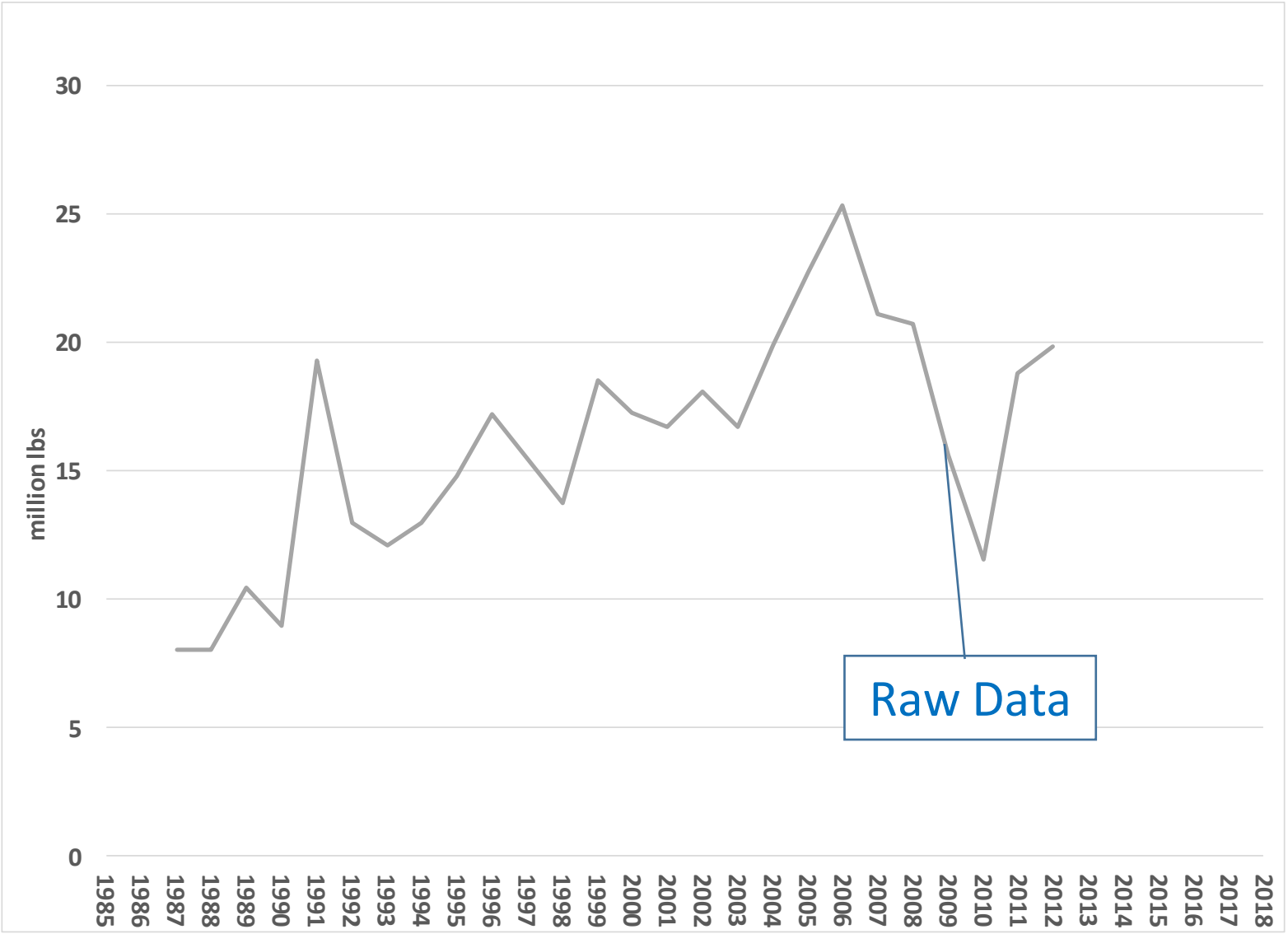
Turfgrass Application Rates

Phase 6 Model

- Two components:
  - Fertilizer mass data
  - Turfgrass acres – High-resolution land cover w/ approved change-product 2013-2017
- Non-farm fertilizer mass ÷ turfgrass acres = turfgrass application rate

VIRGINIA

VA Pounds of Nitrogen Applied (1987–2012)



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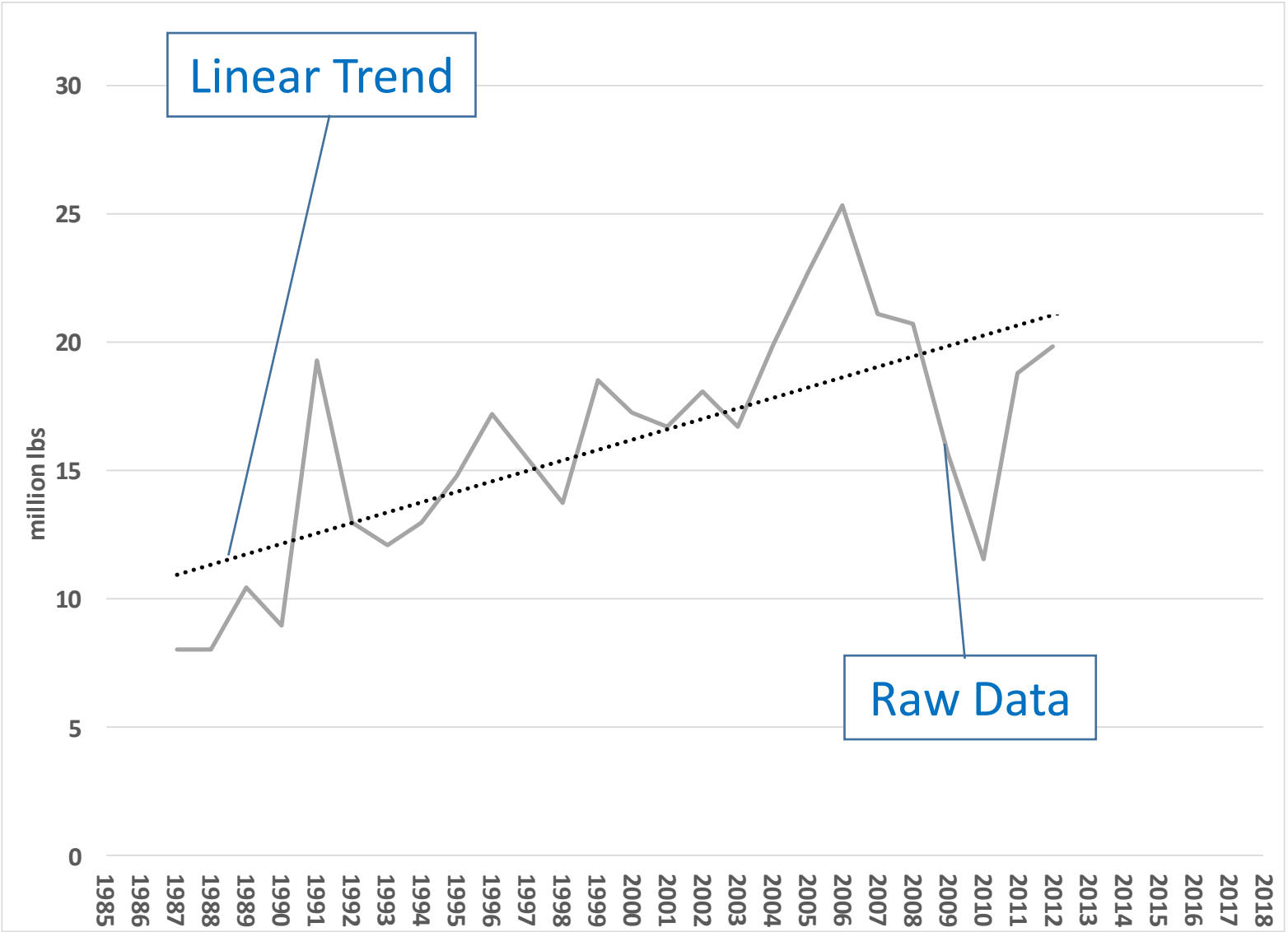

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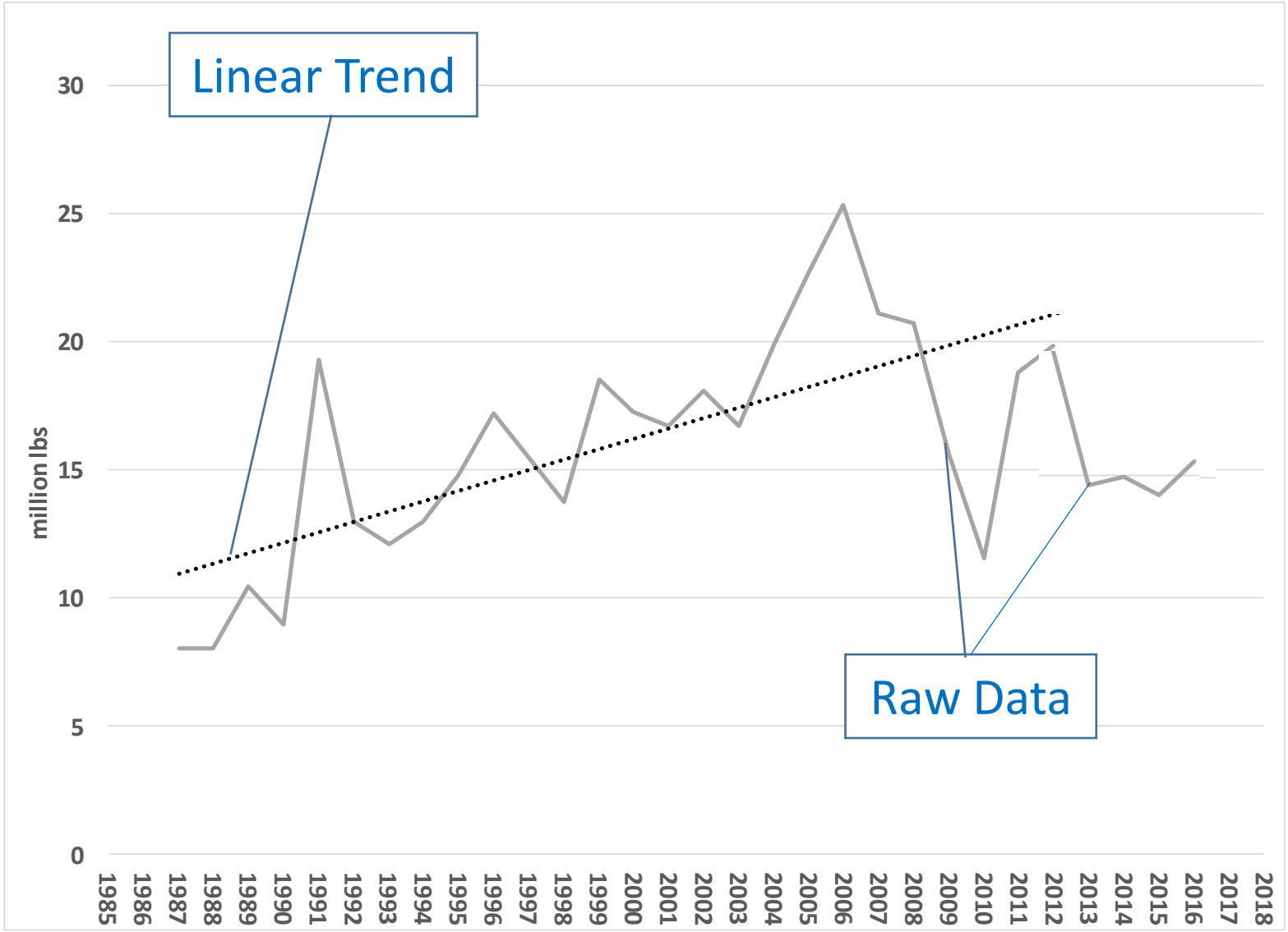

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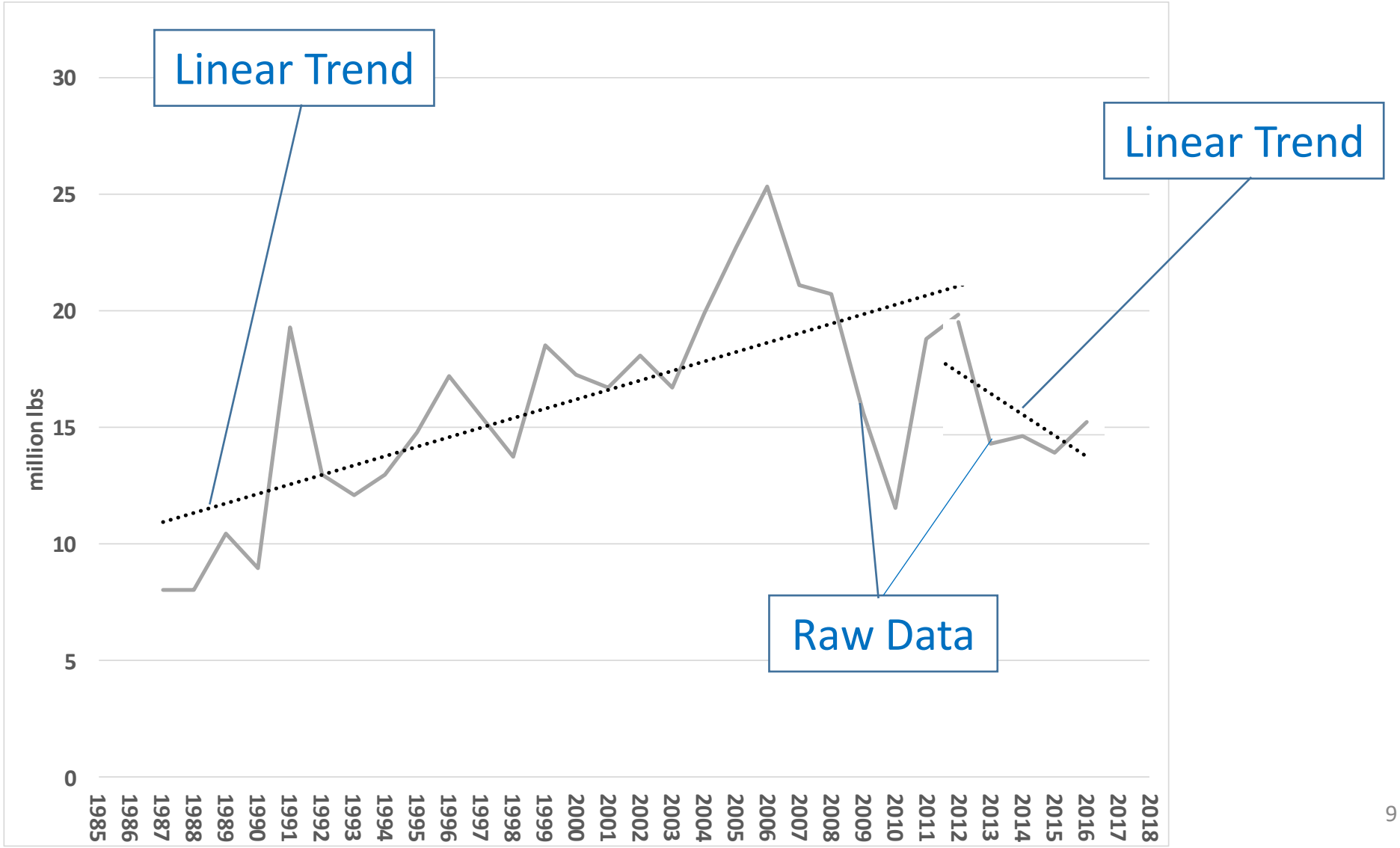

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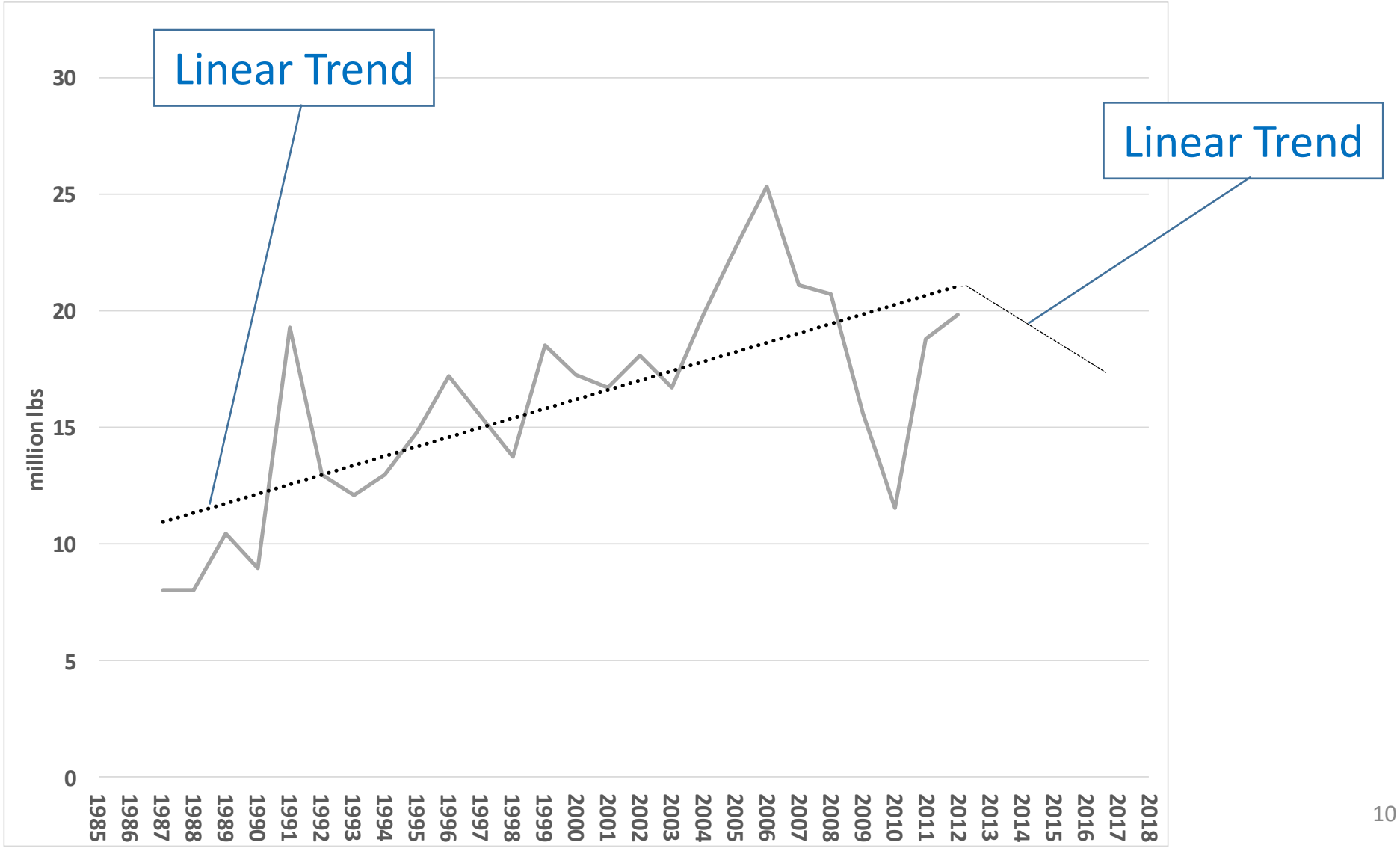

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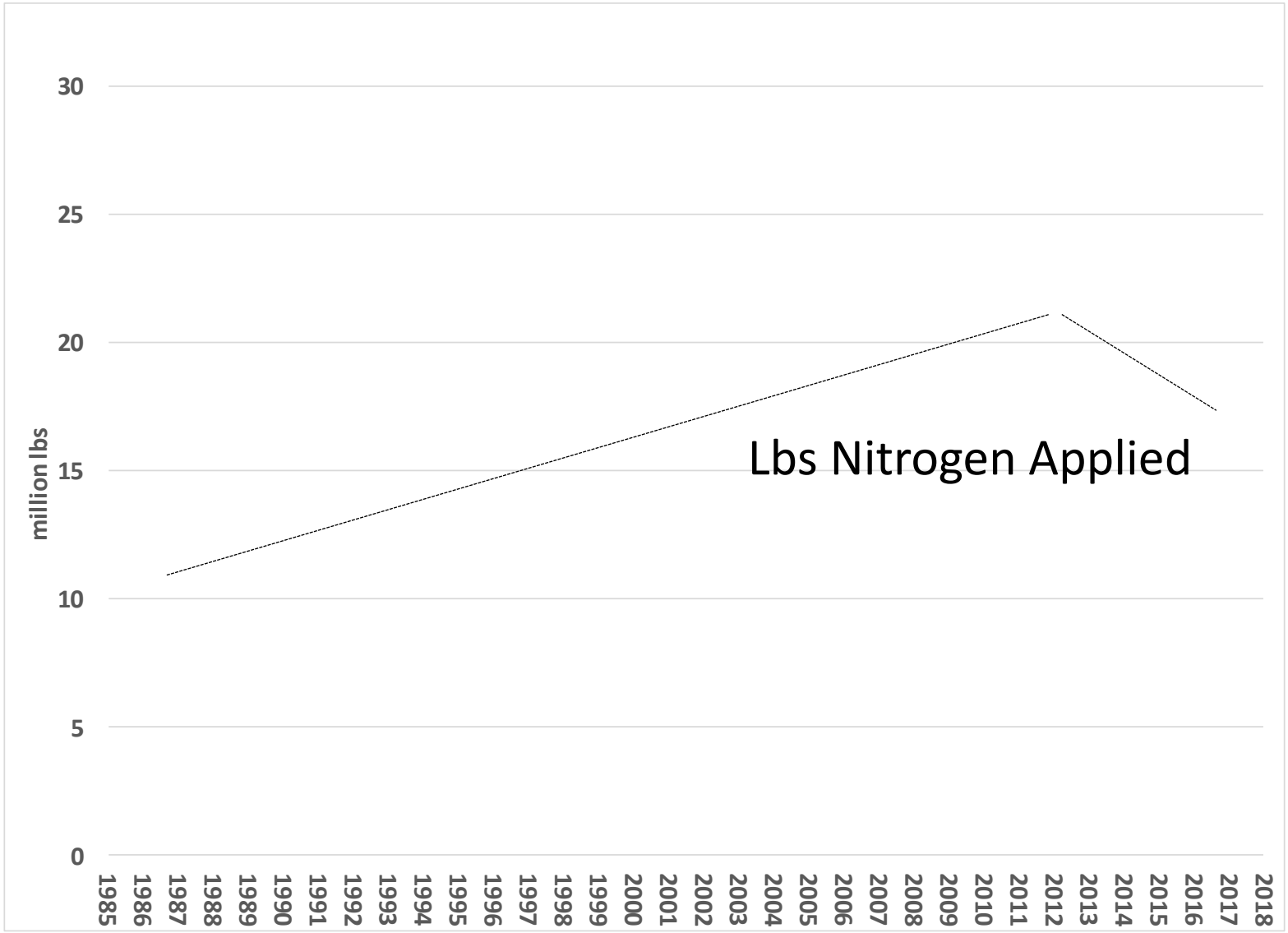
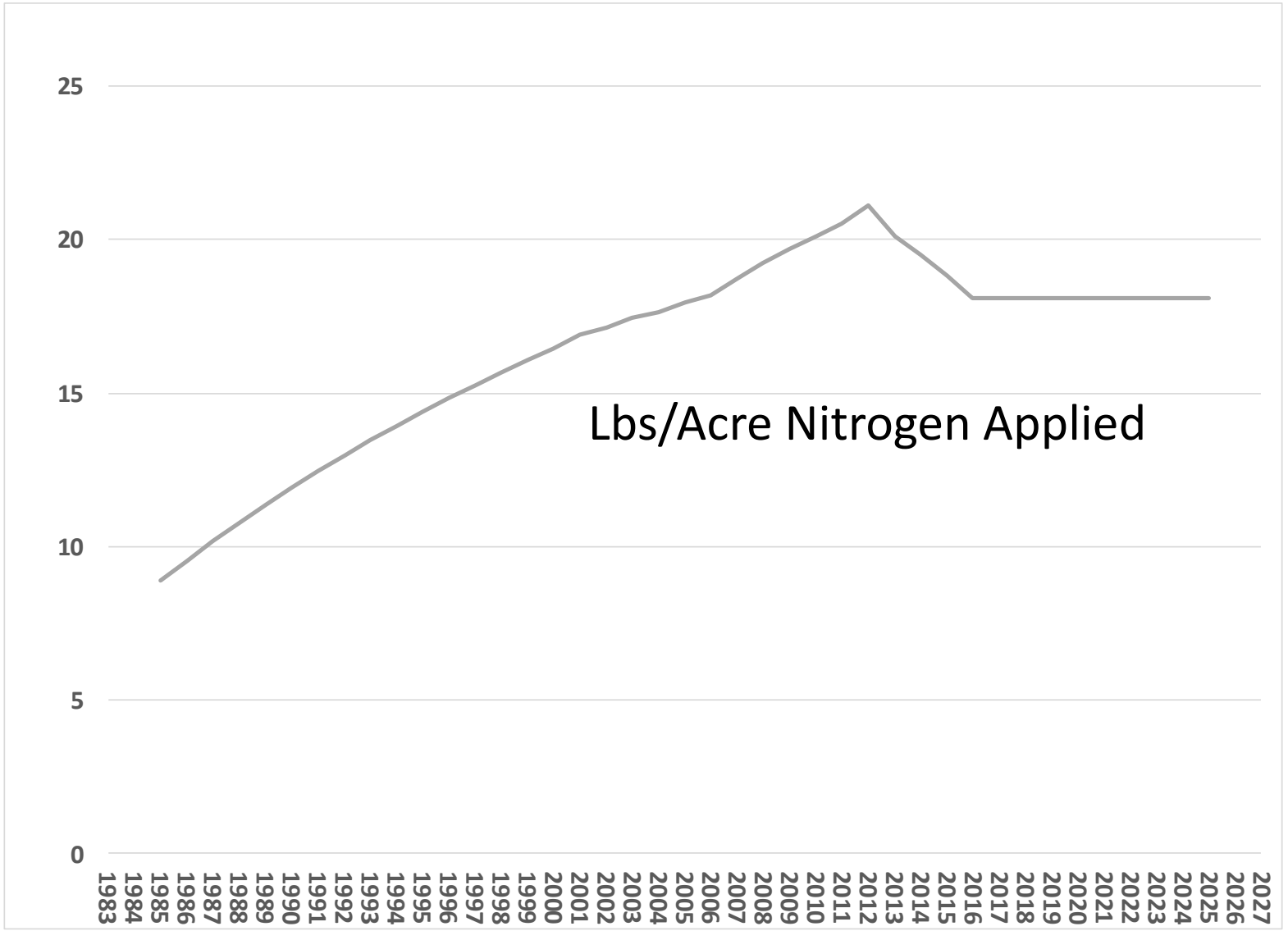


VA Turf Grass Acres (1985–2025)

VA Pounds Per Acre of Nitrogen Applied (1985–2025)



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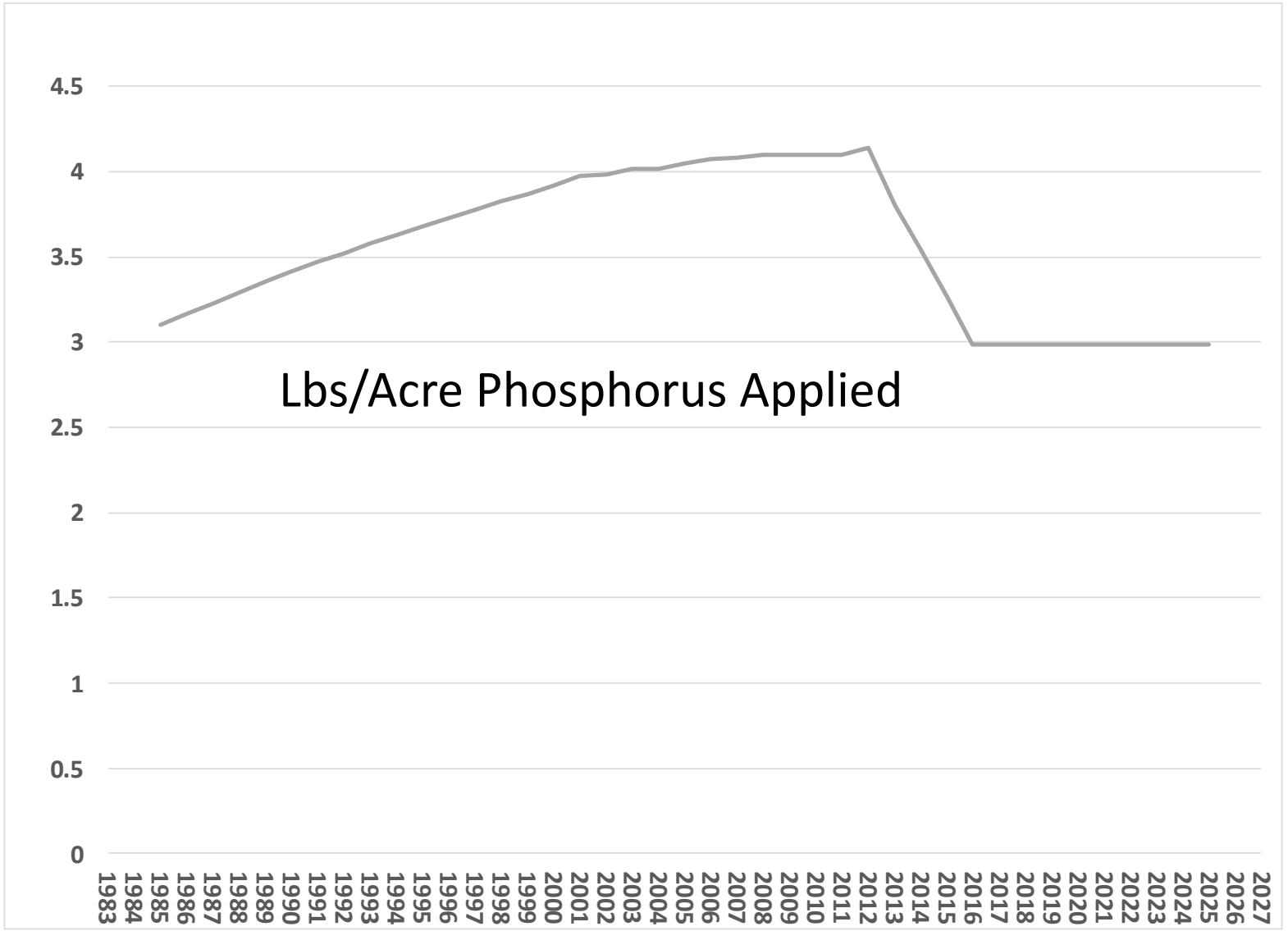

MARYLAND

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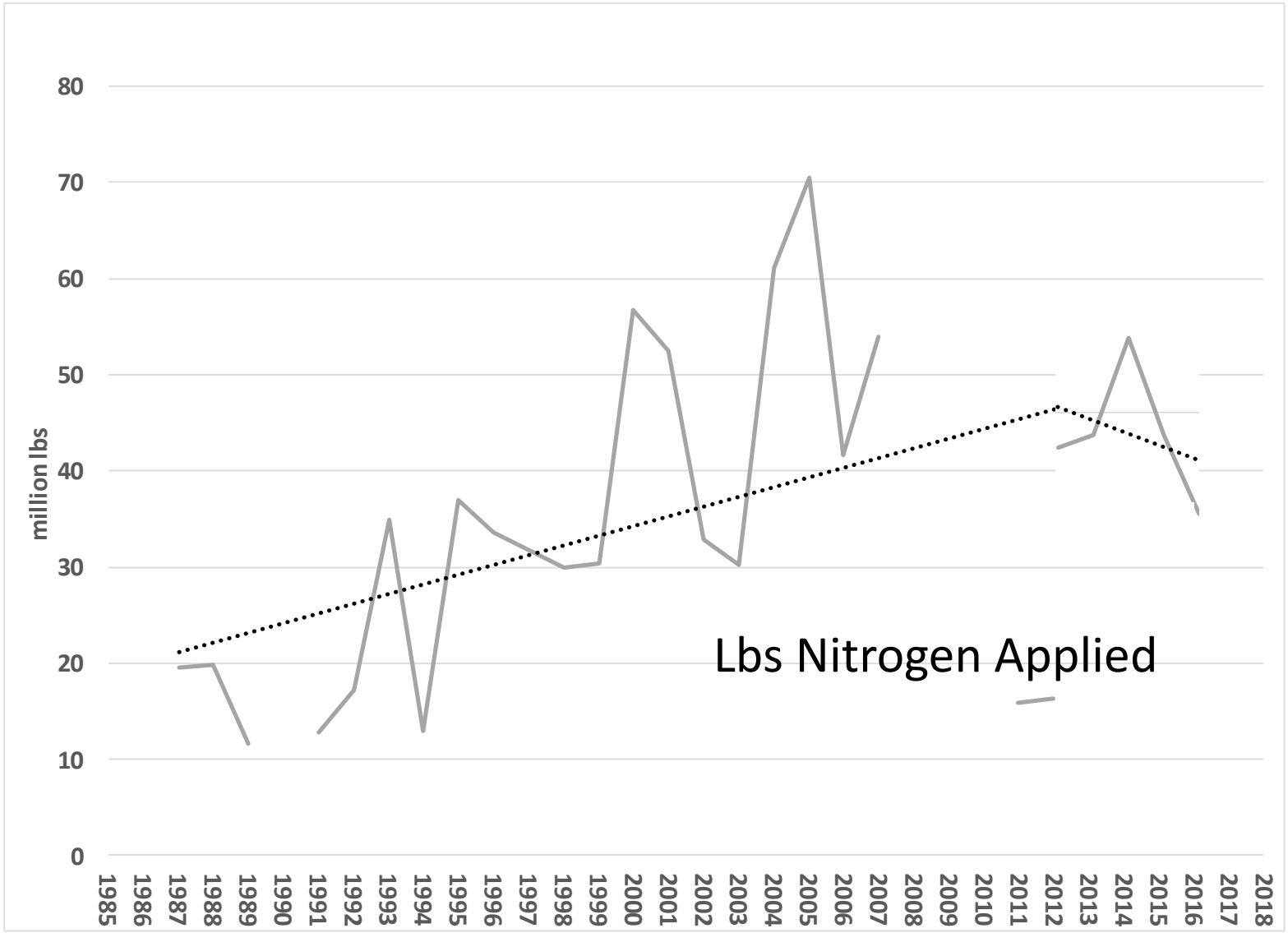

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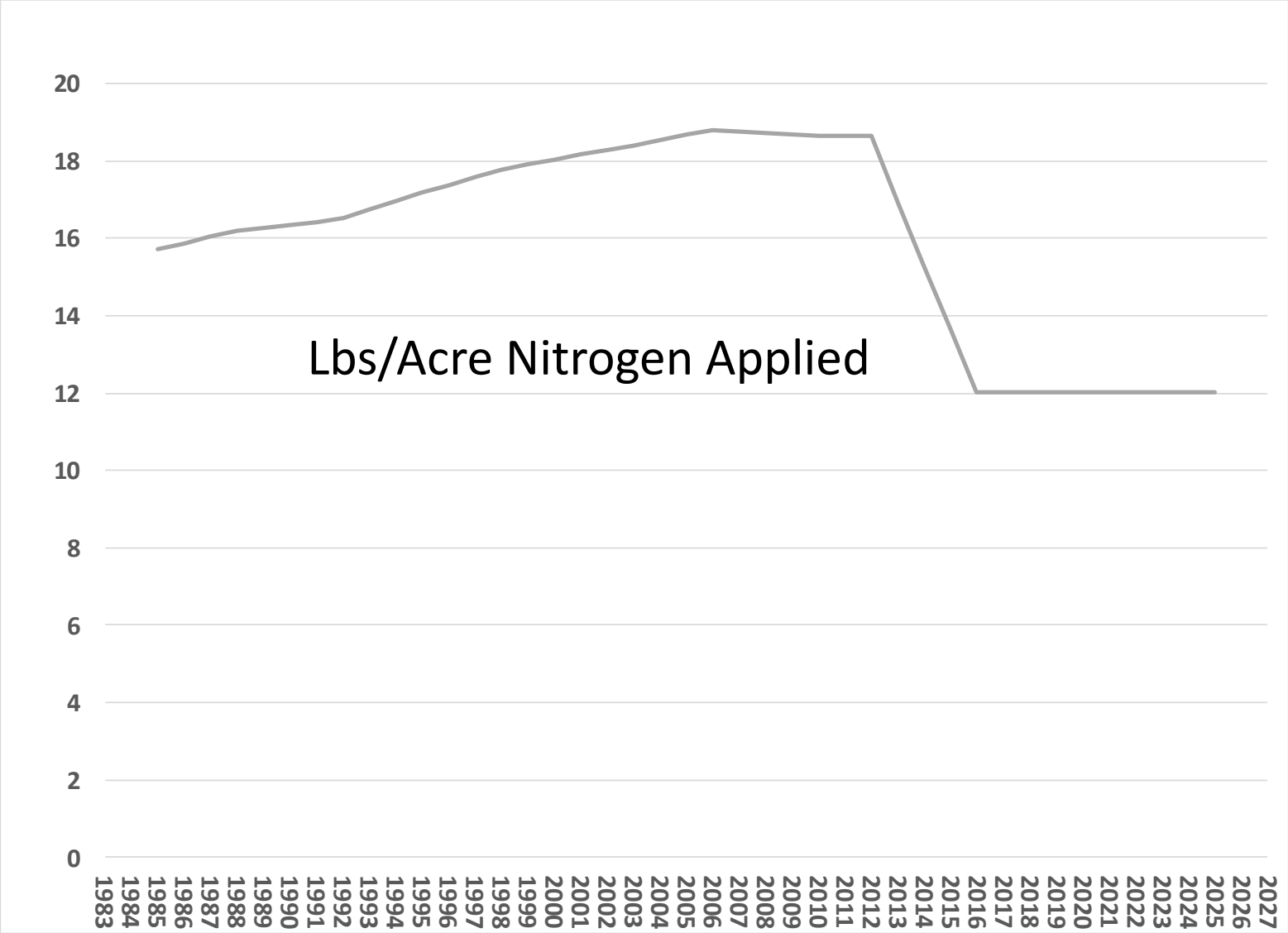

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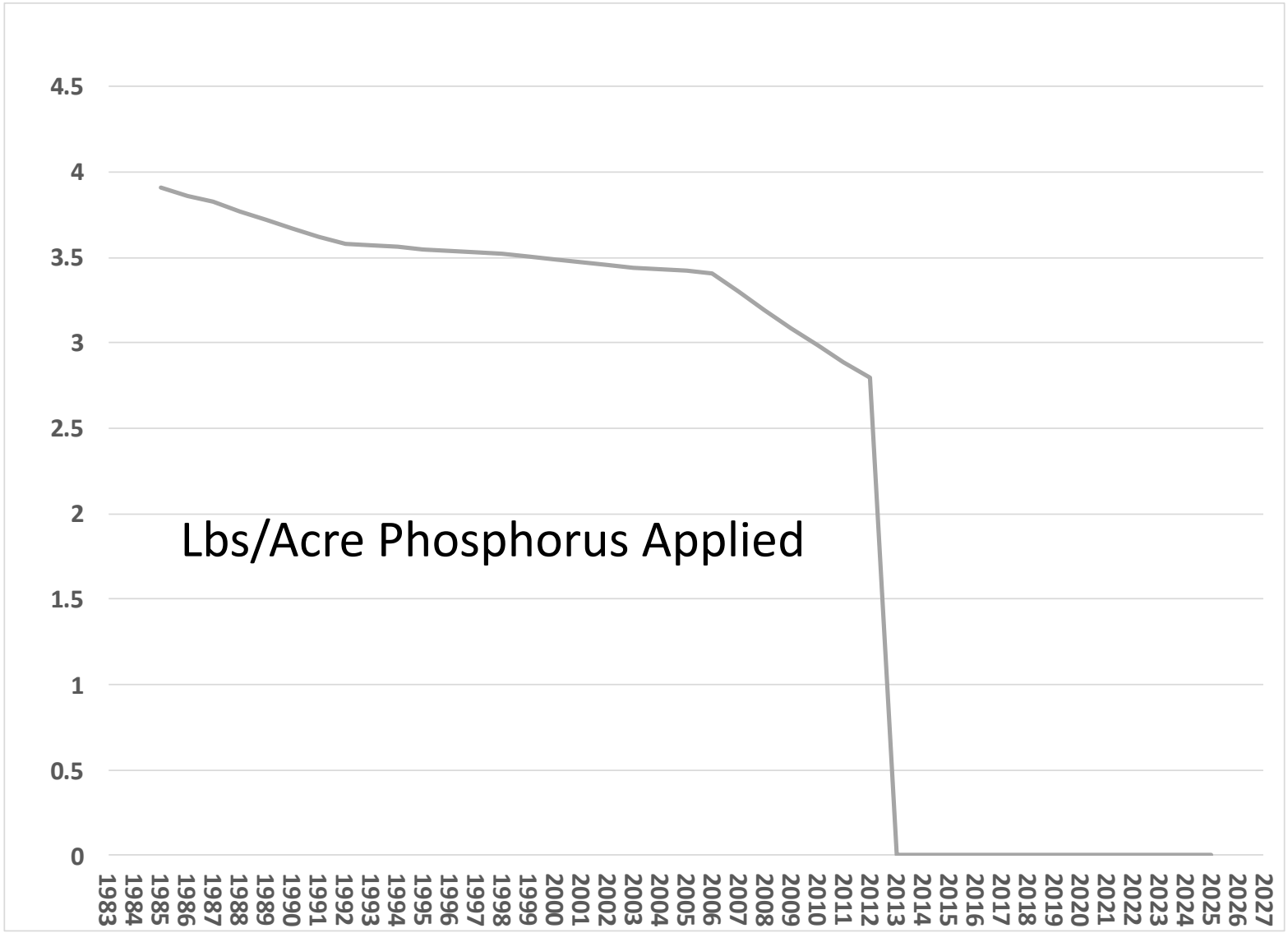
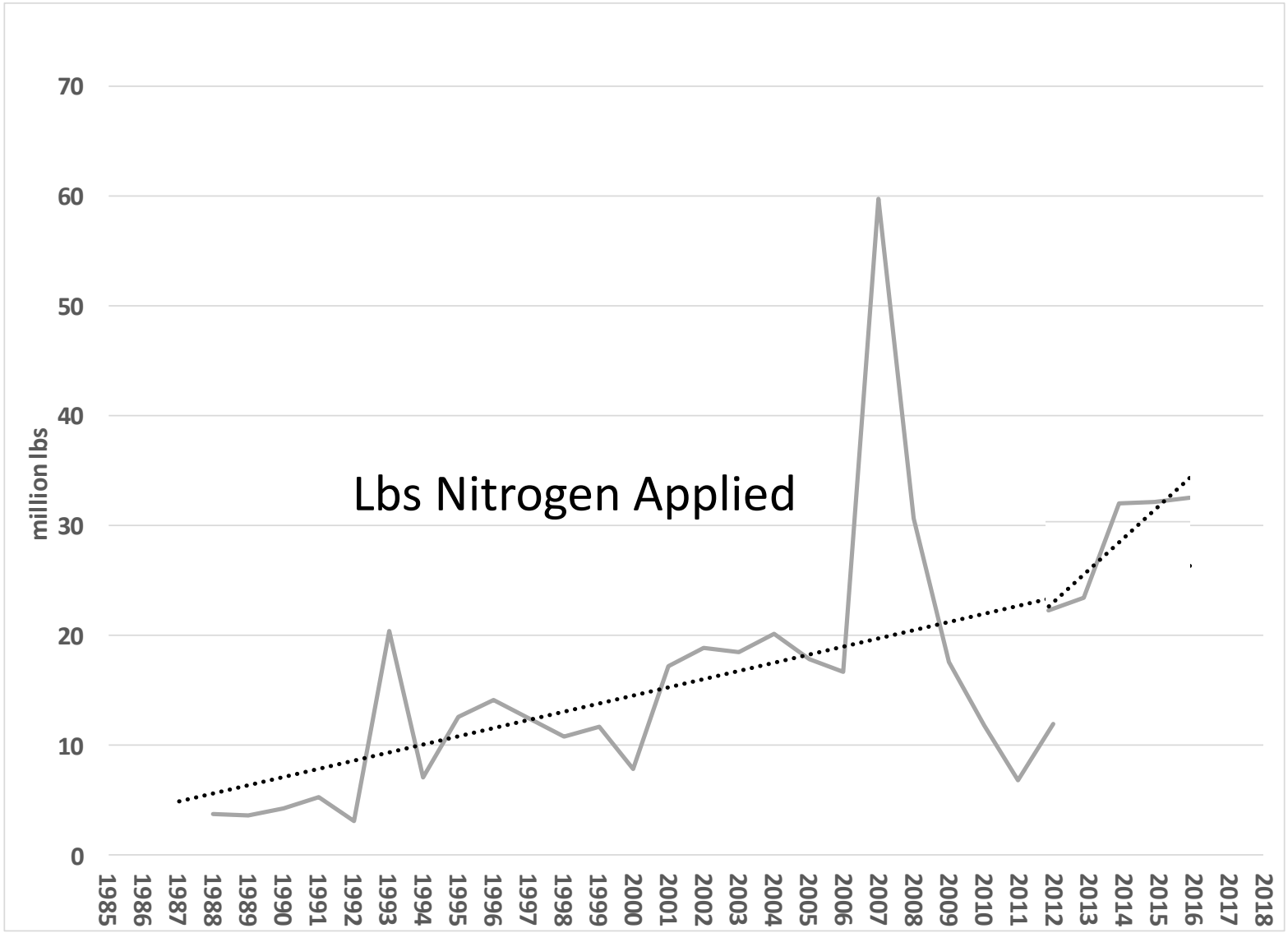


PENNSYLVANIA

PA Pounds of Nitrogen Applied (1987–2012 + 2013–2016)



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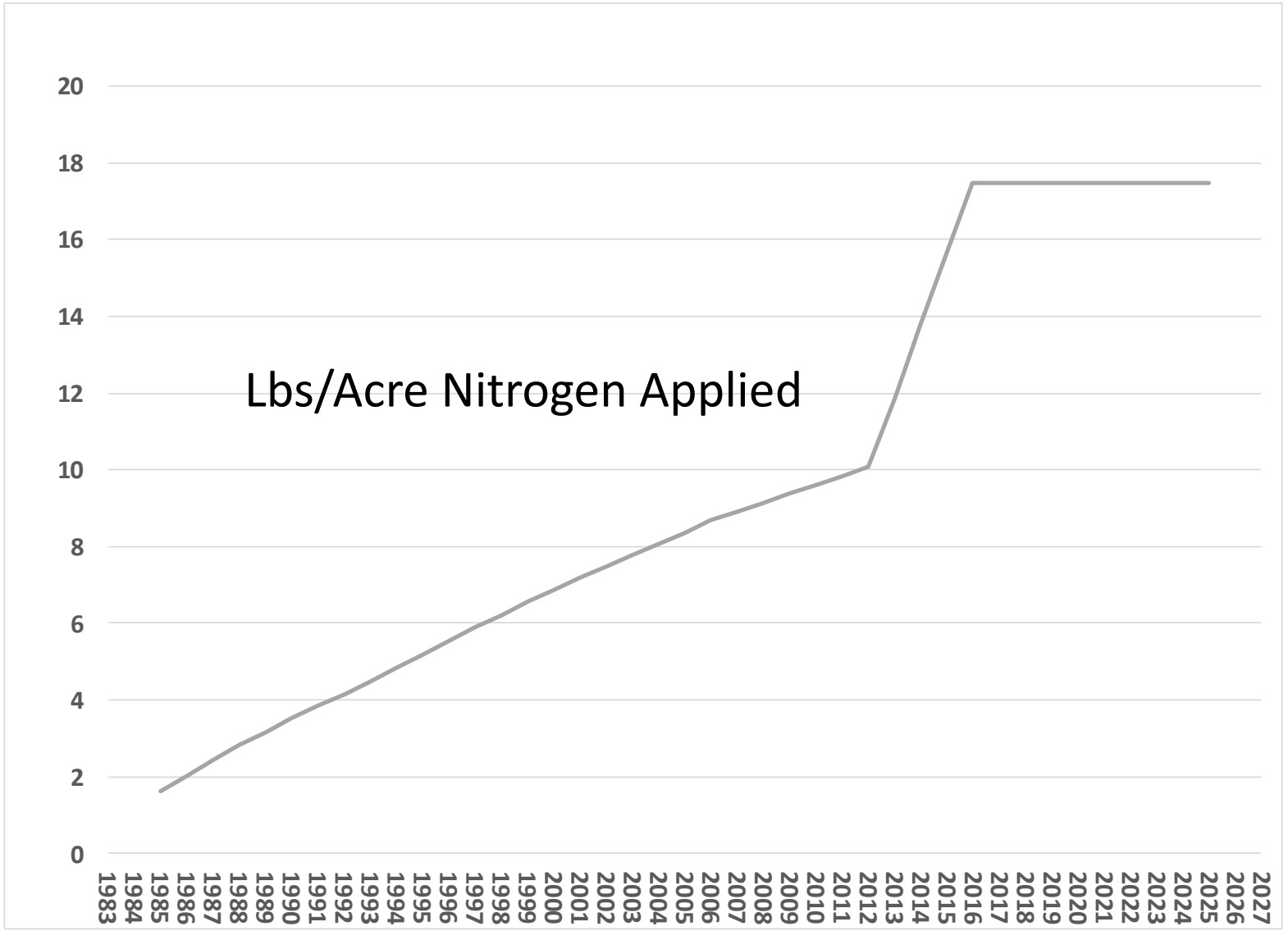

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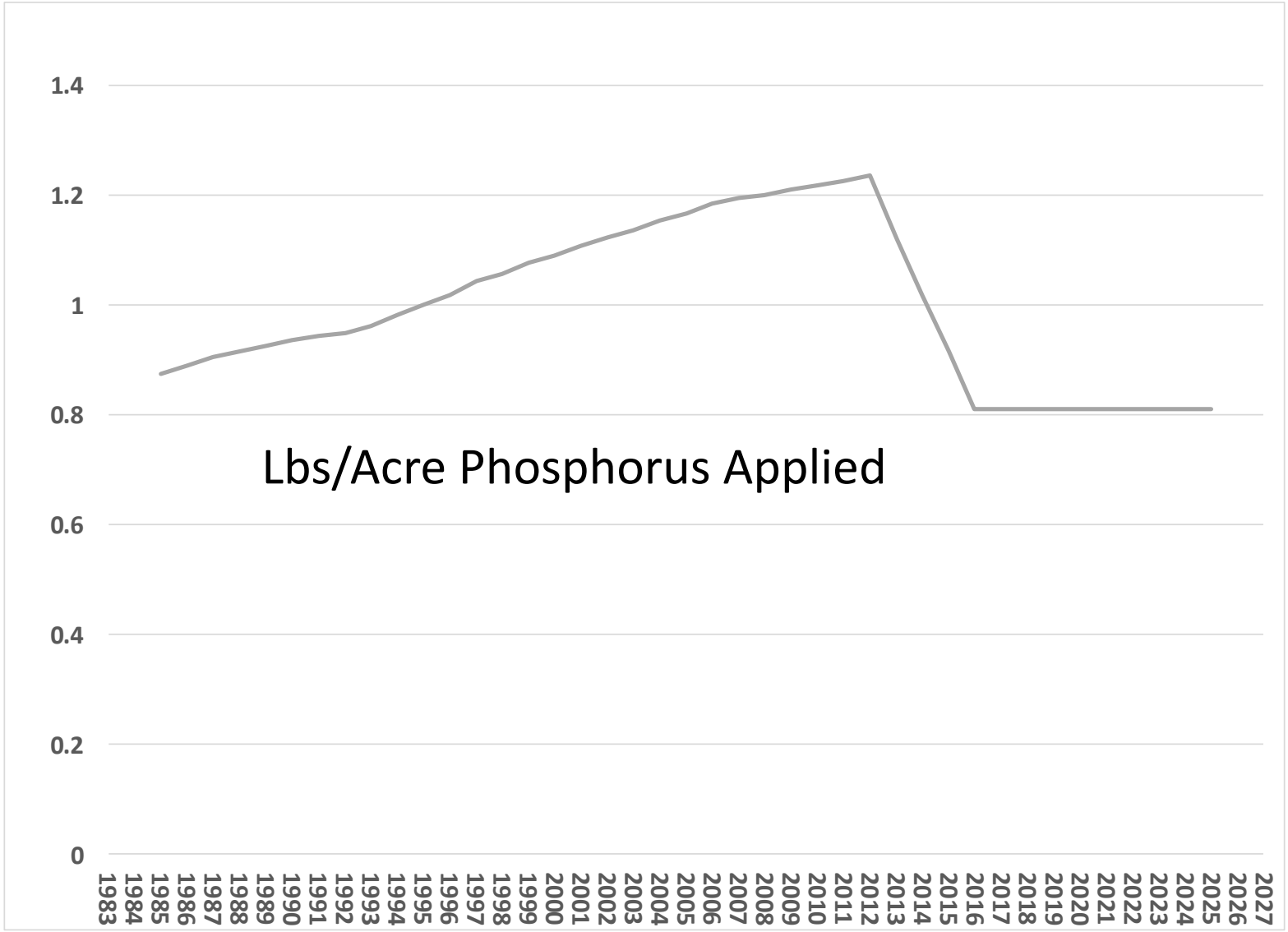
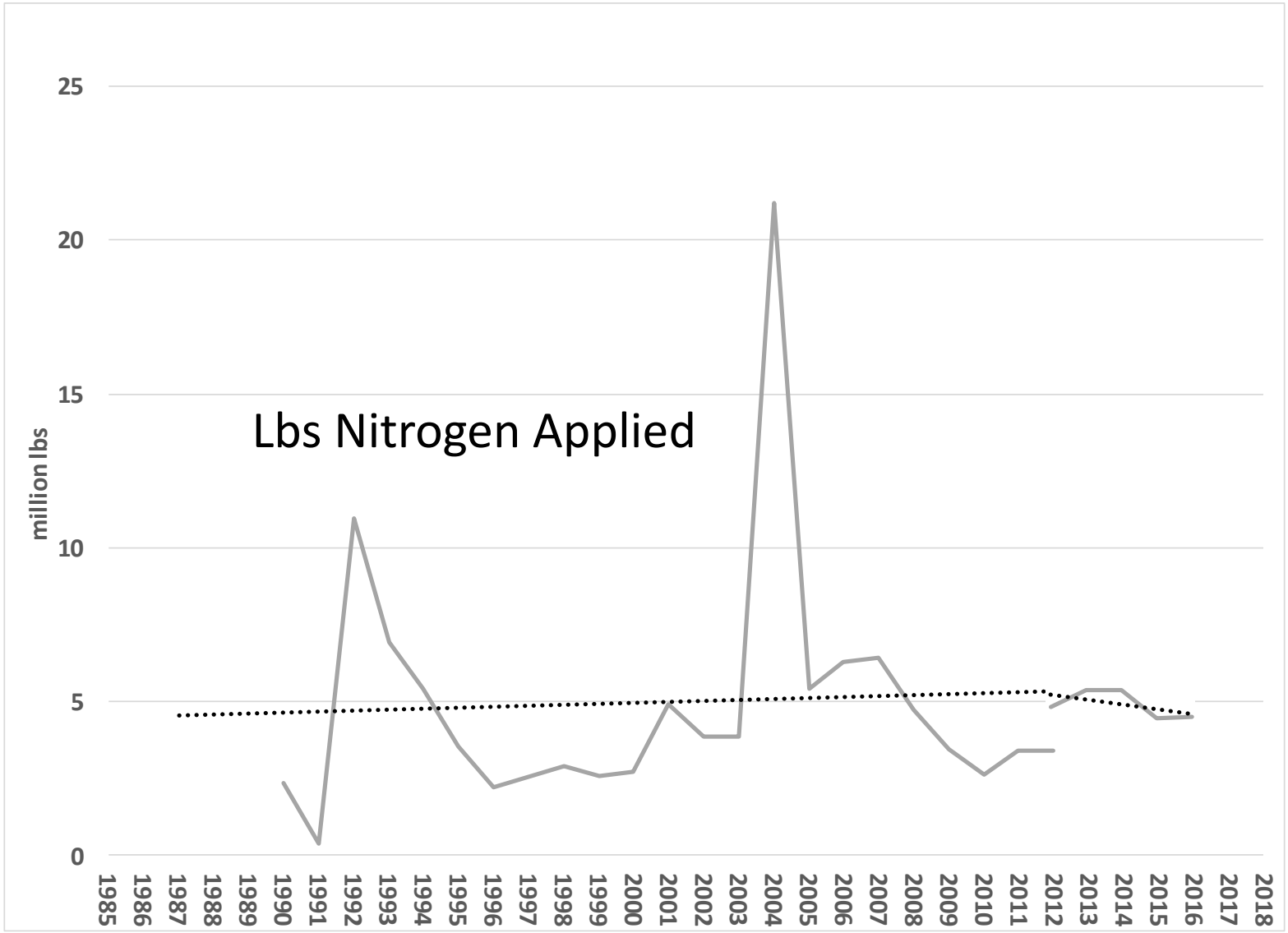


NEW YORK

NY Pounds of Nitrogen Applied (1987–2012 + 2013–2016)



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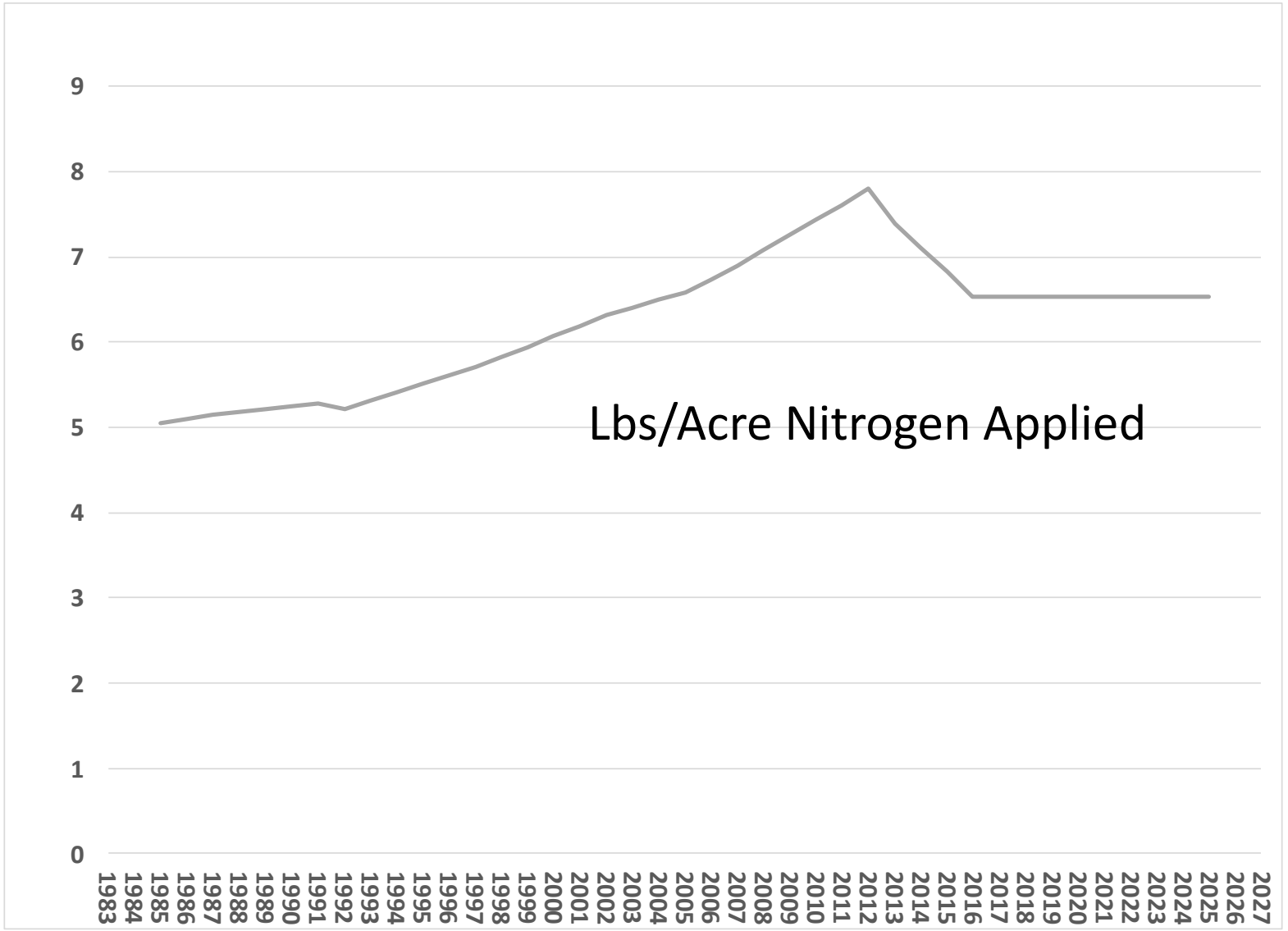

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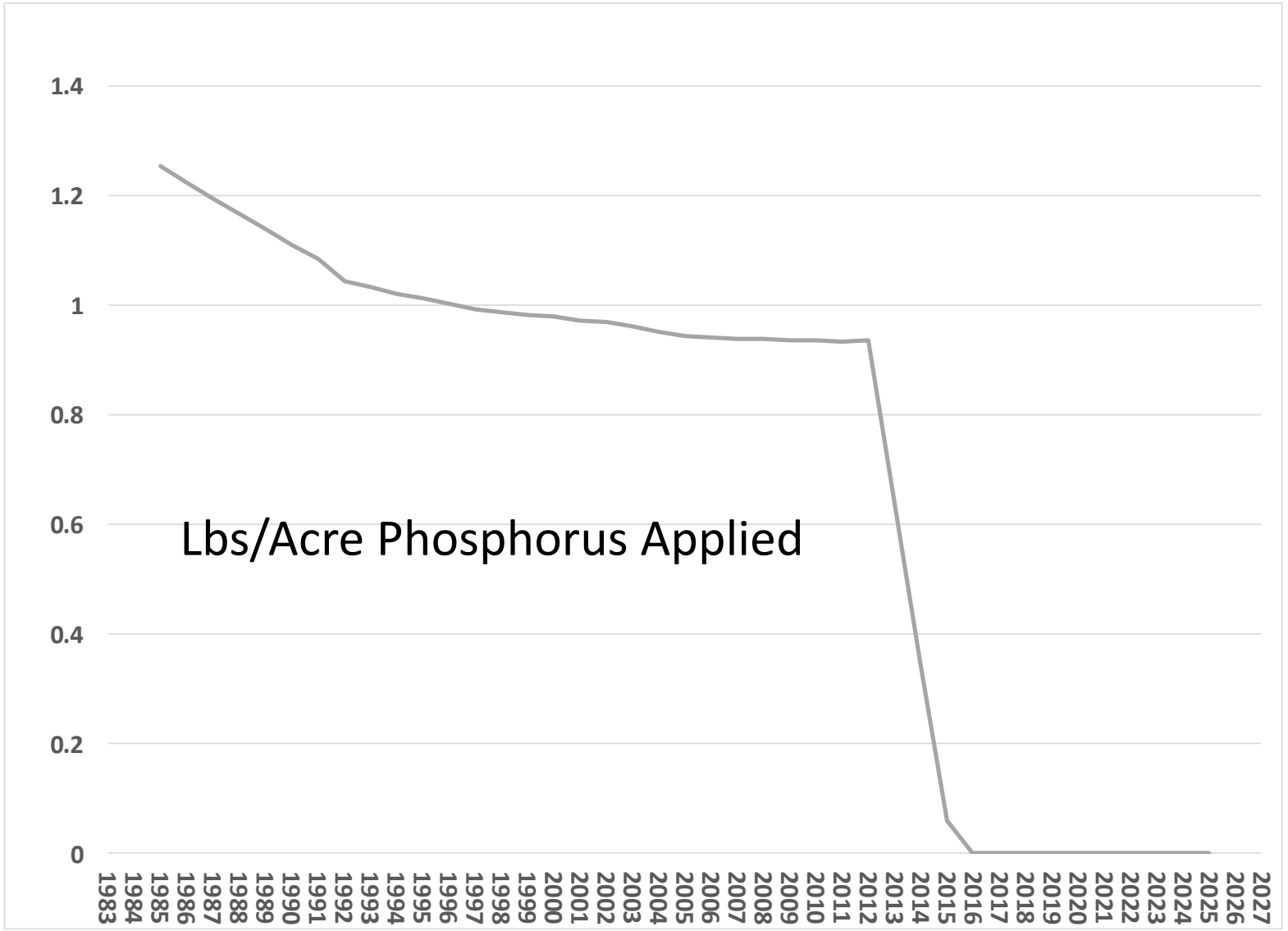

DELAWARE

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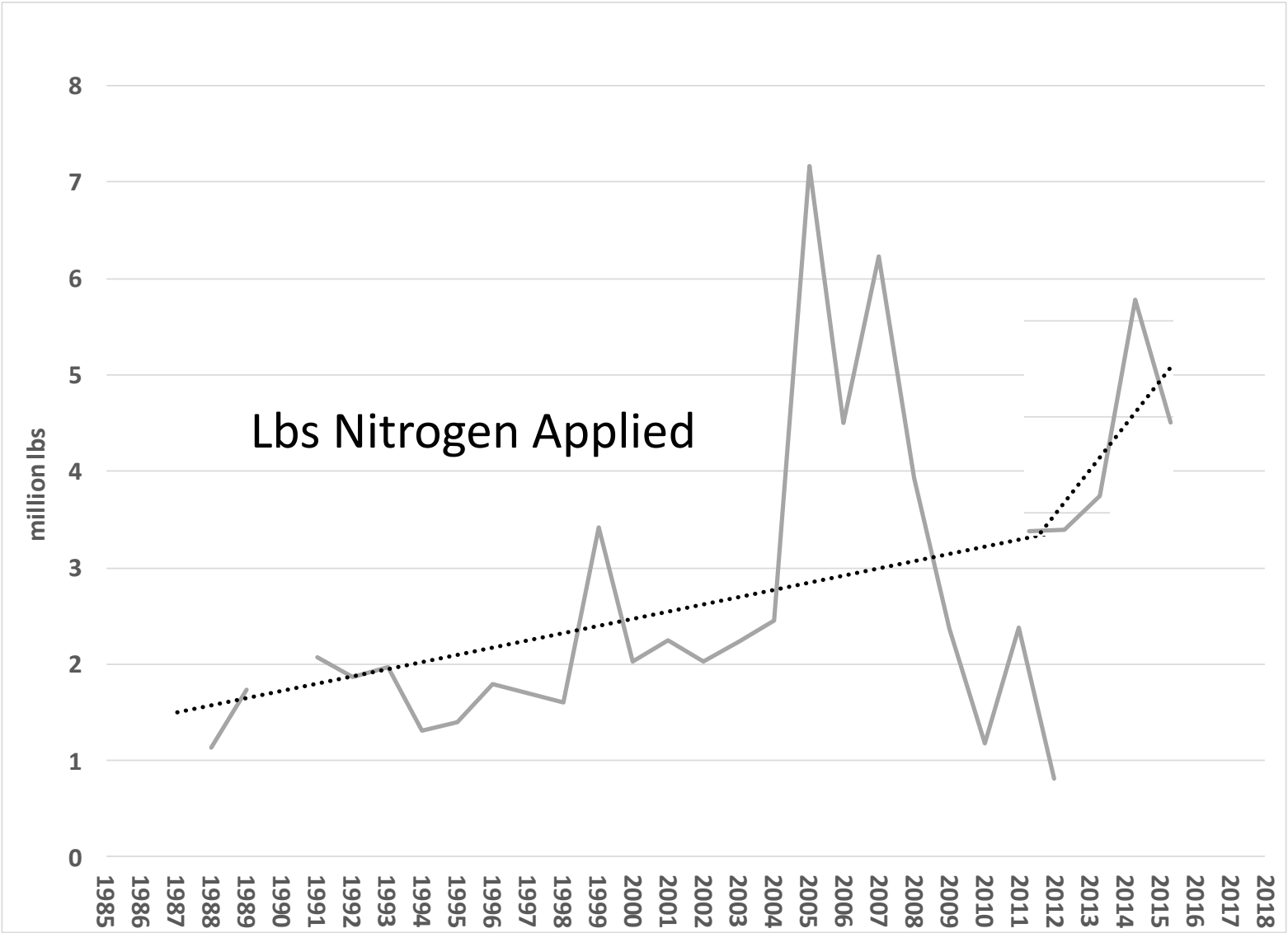

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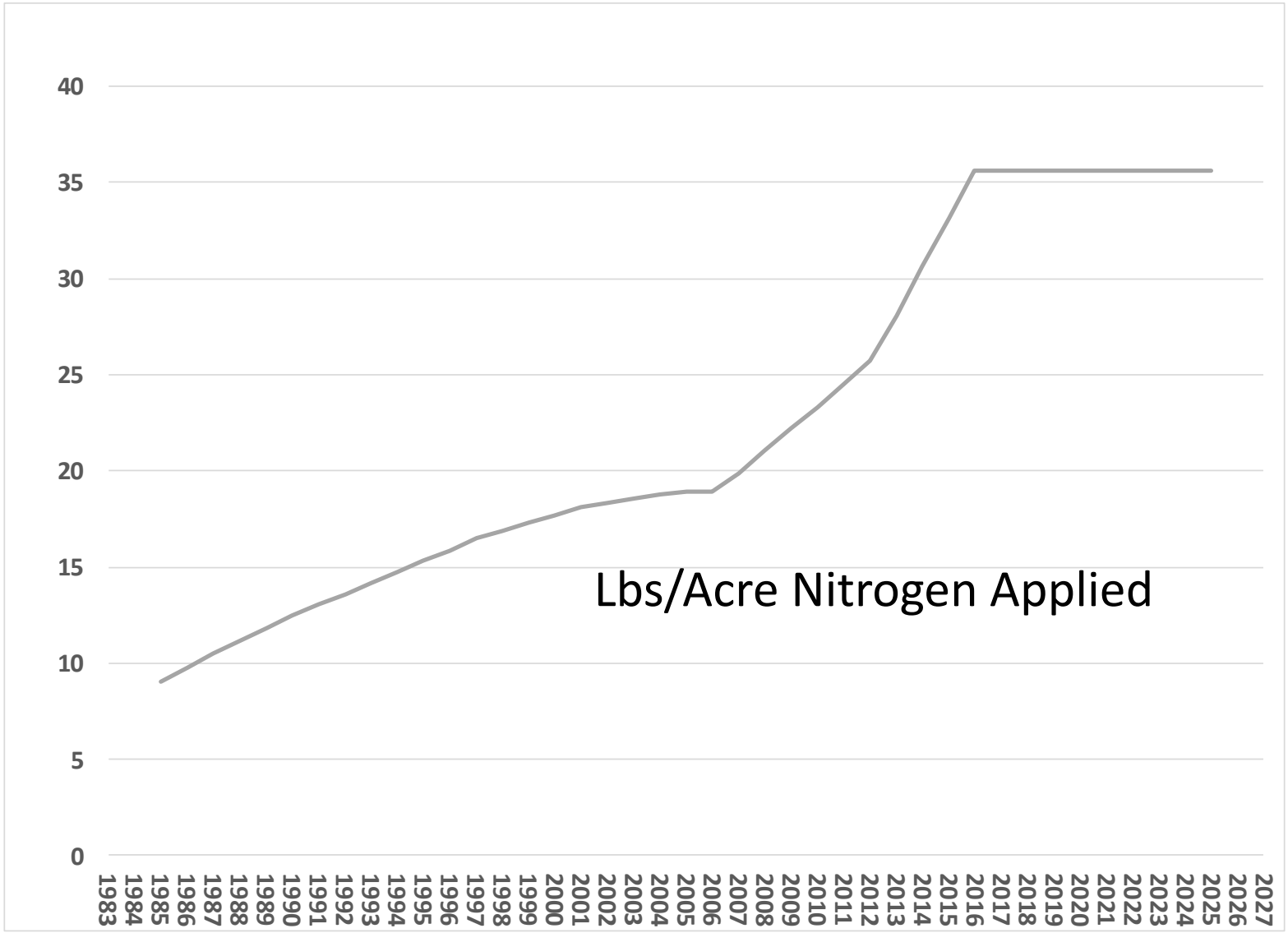

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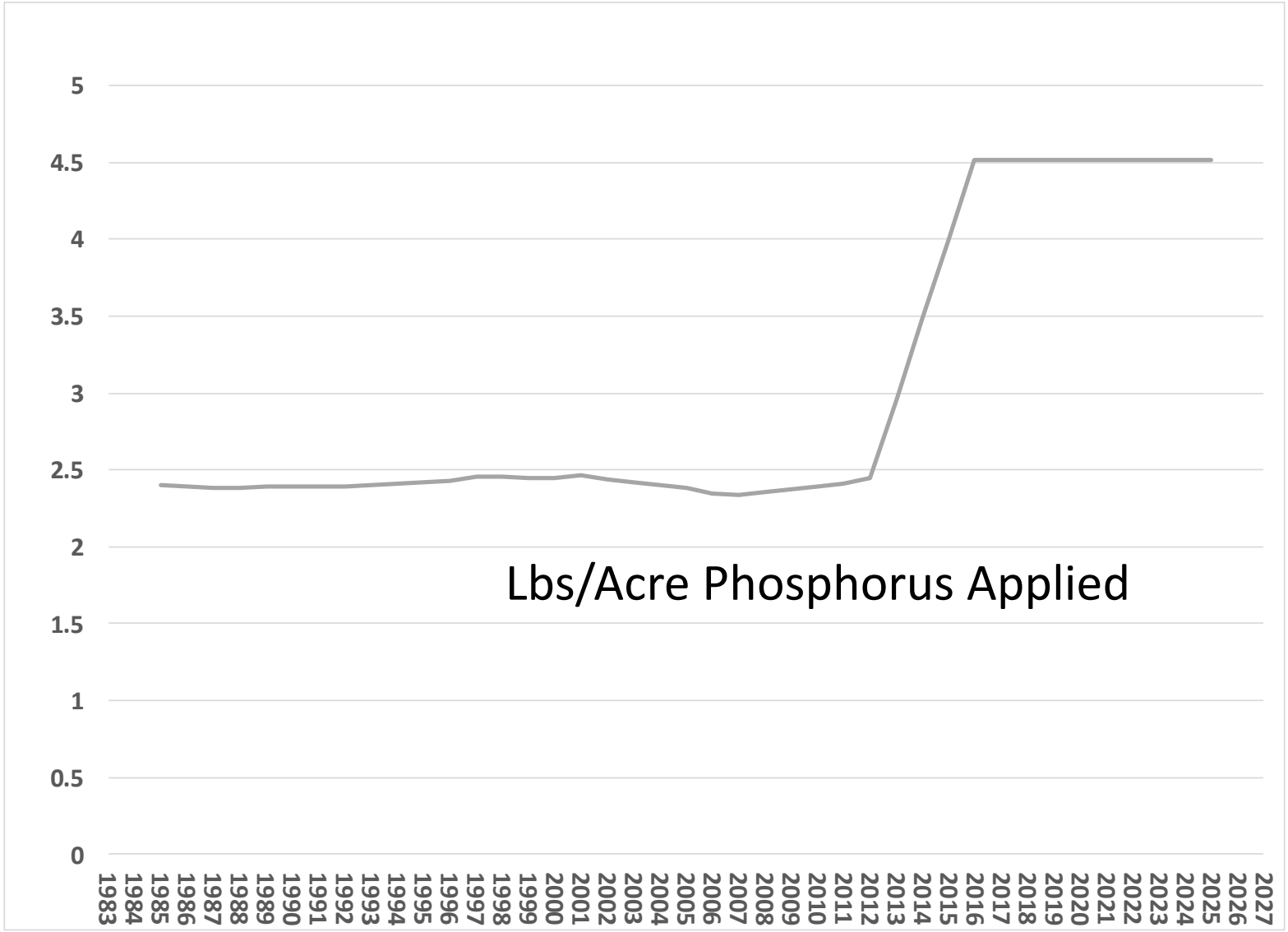

WEST VIRGINIA

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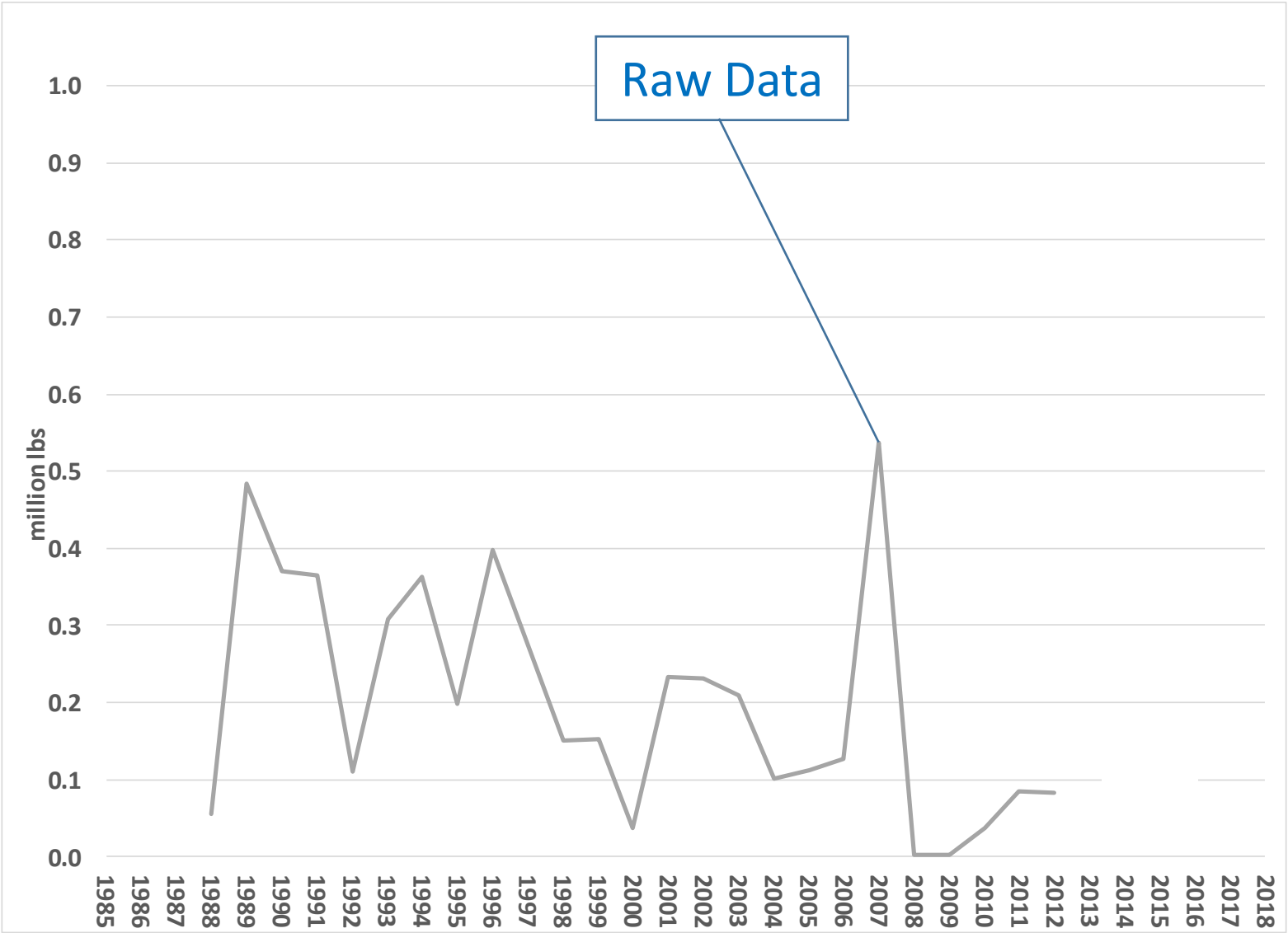

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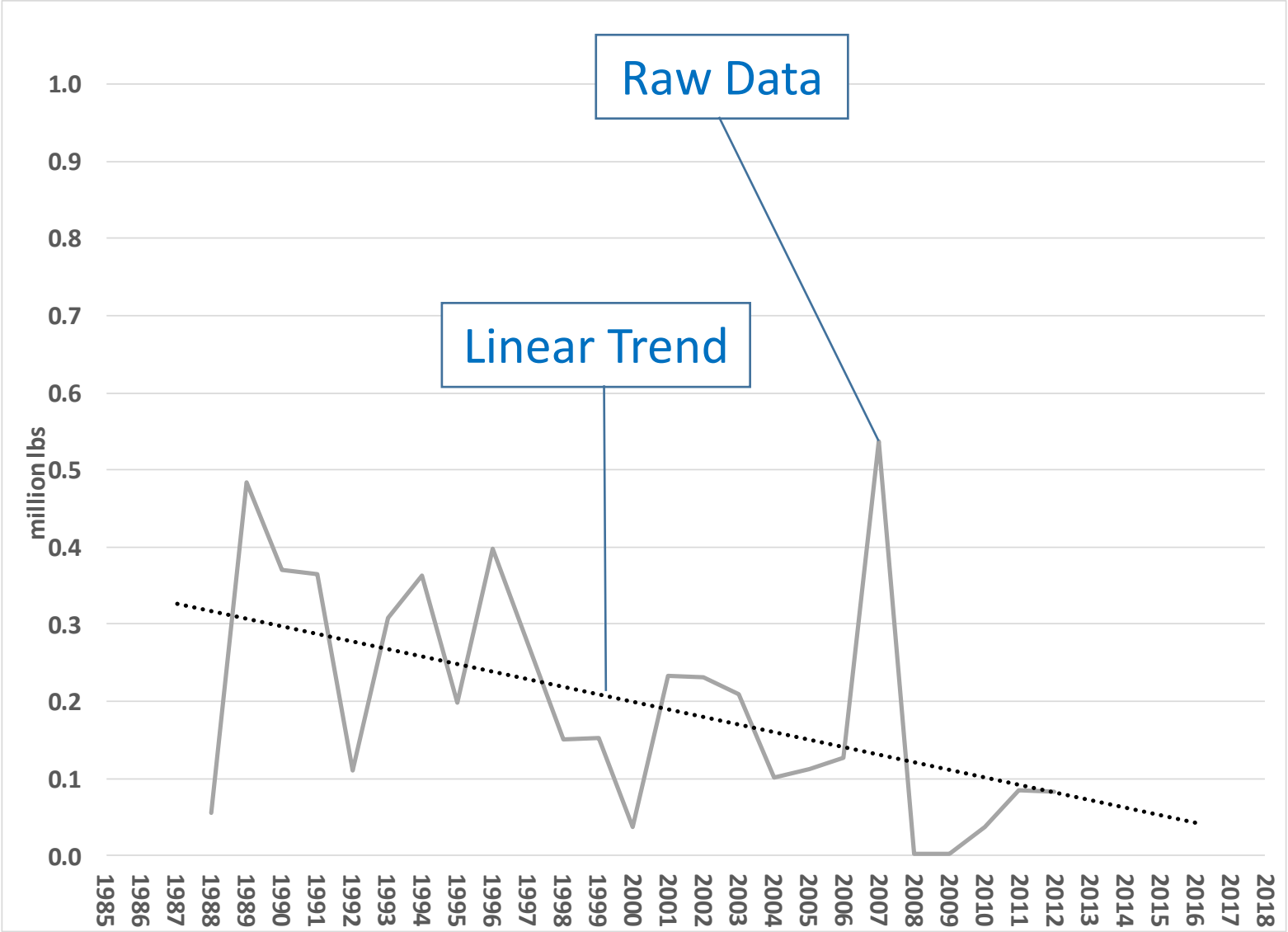

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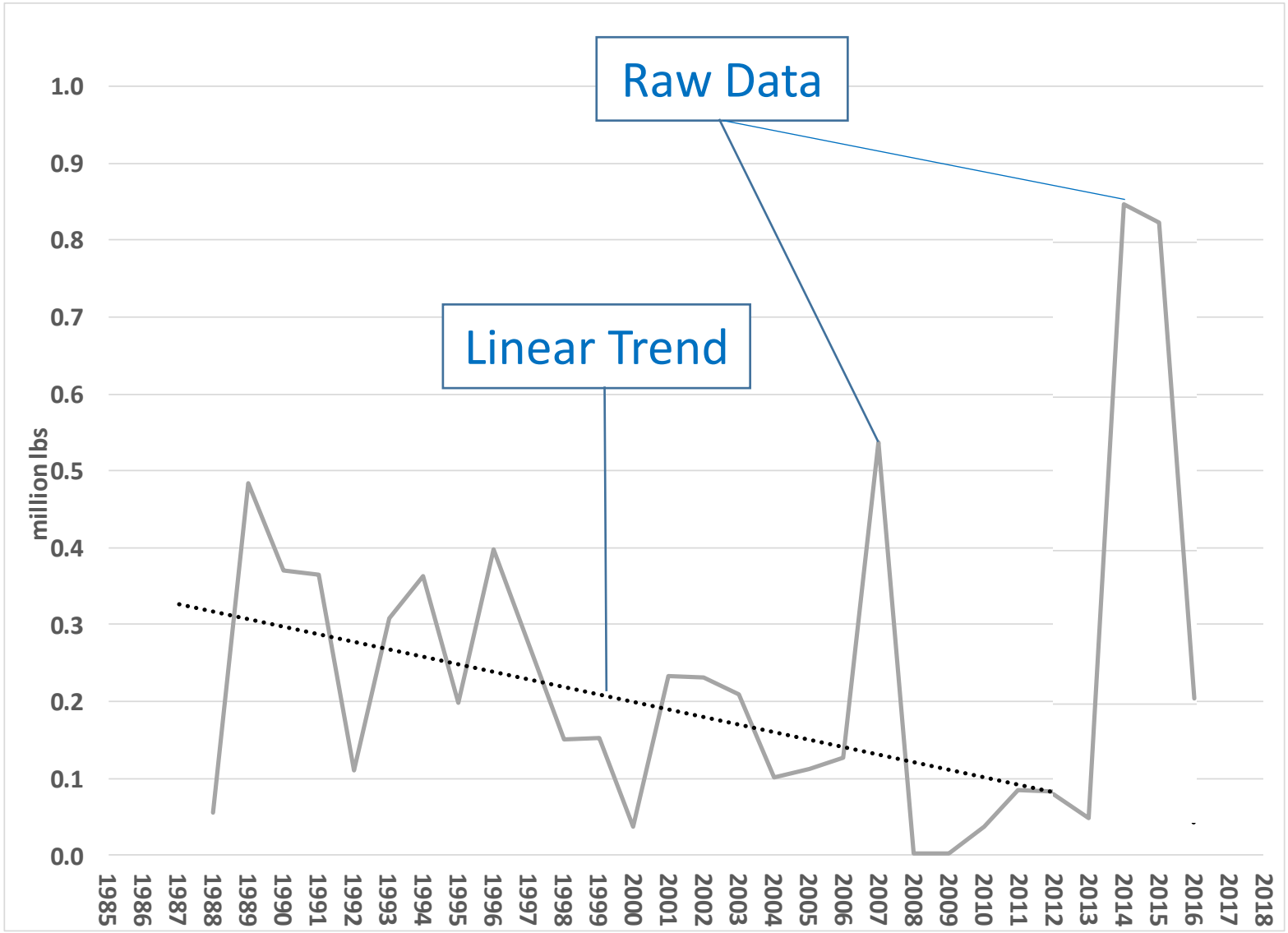

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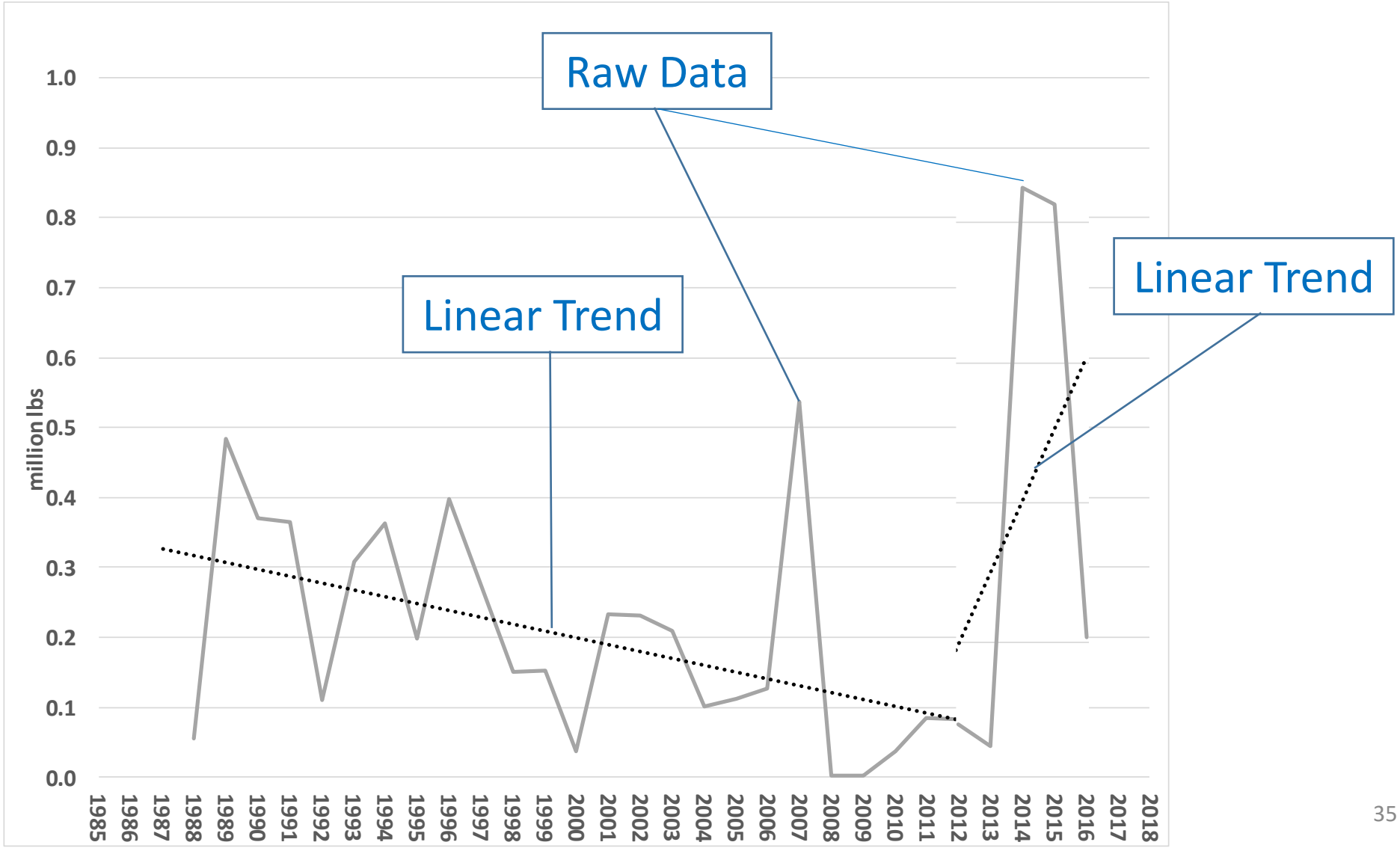

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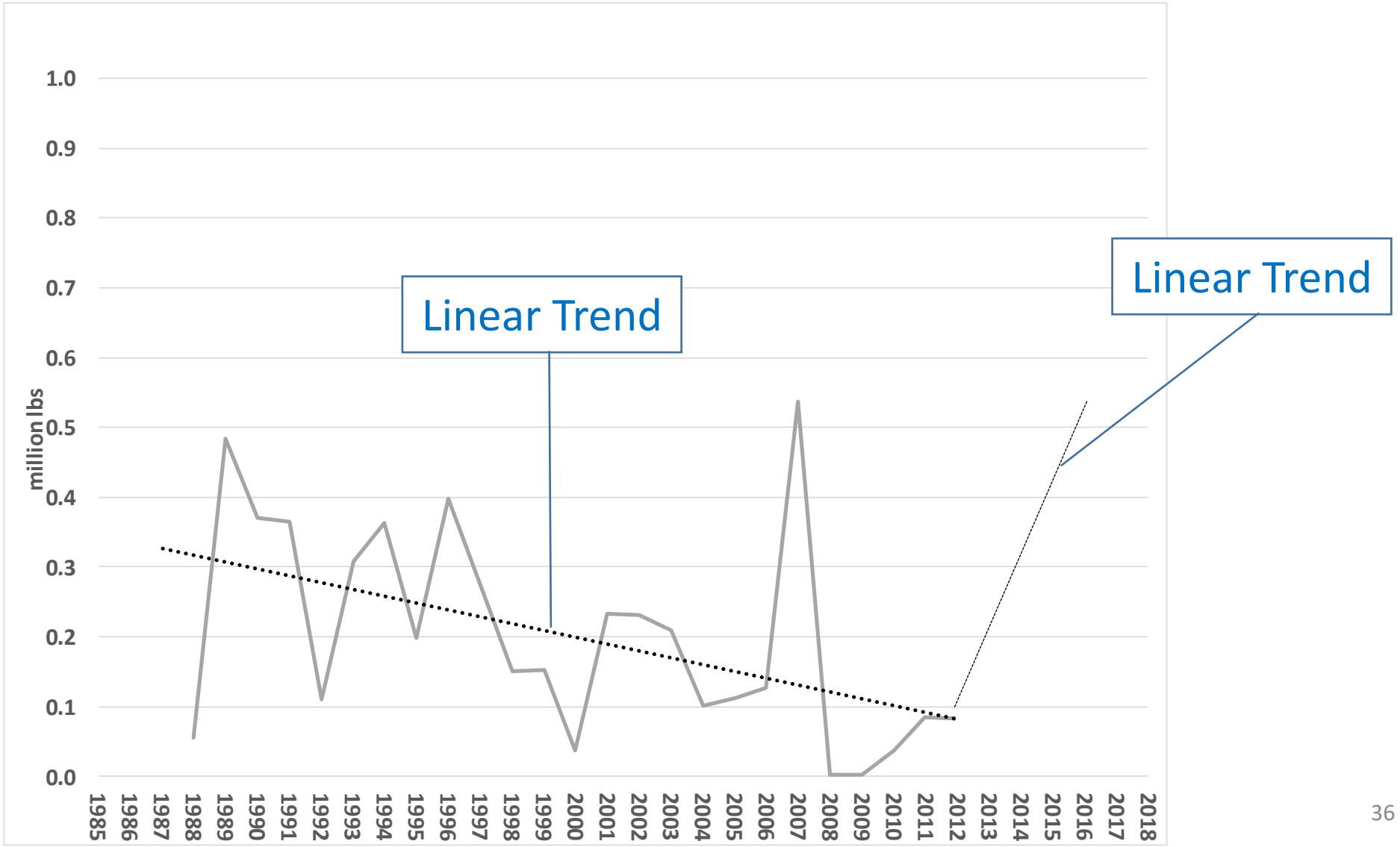

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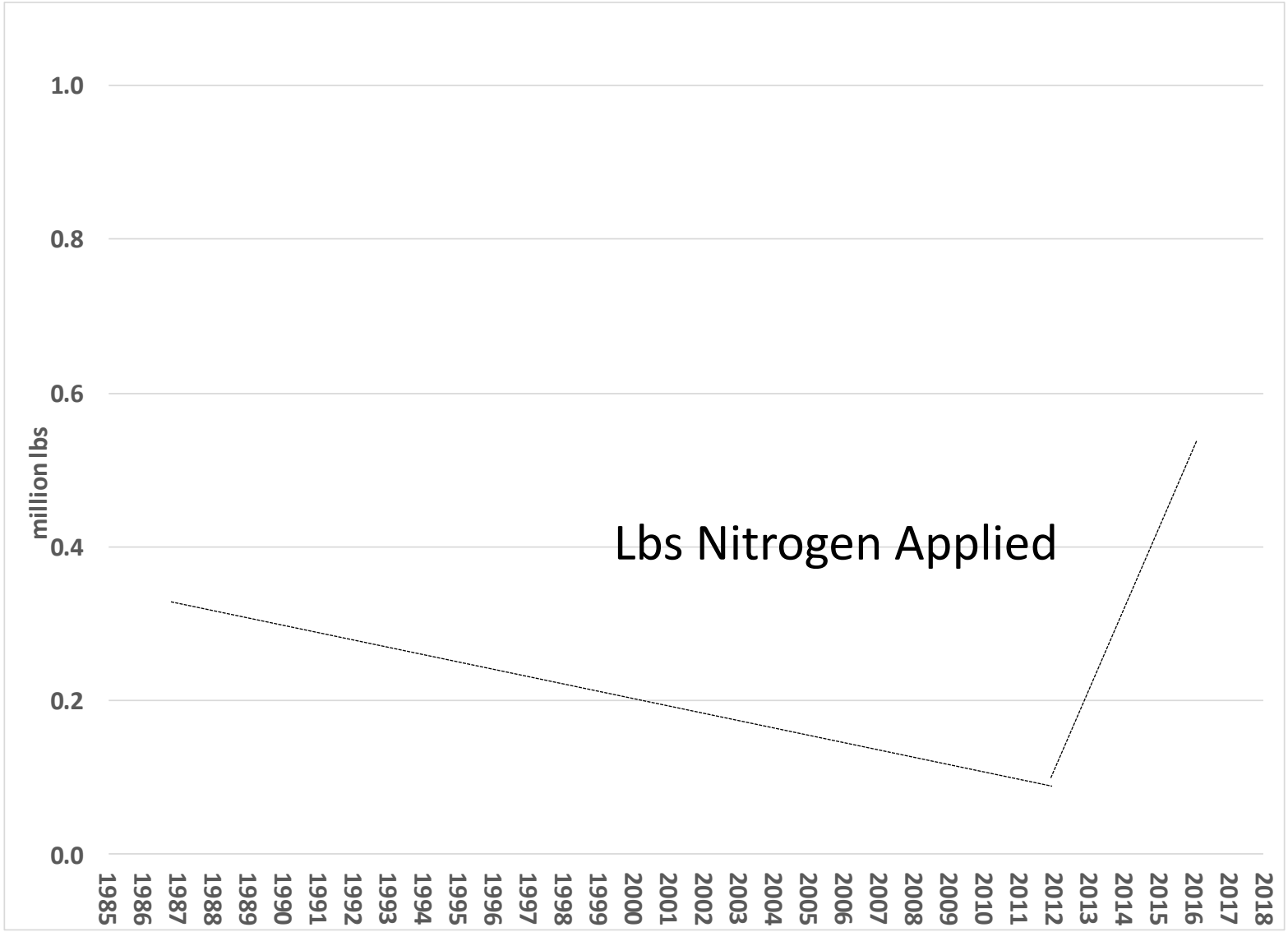

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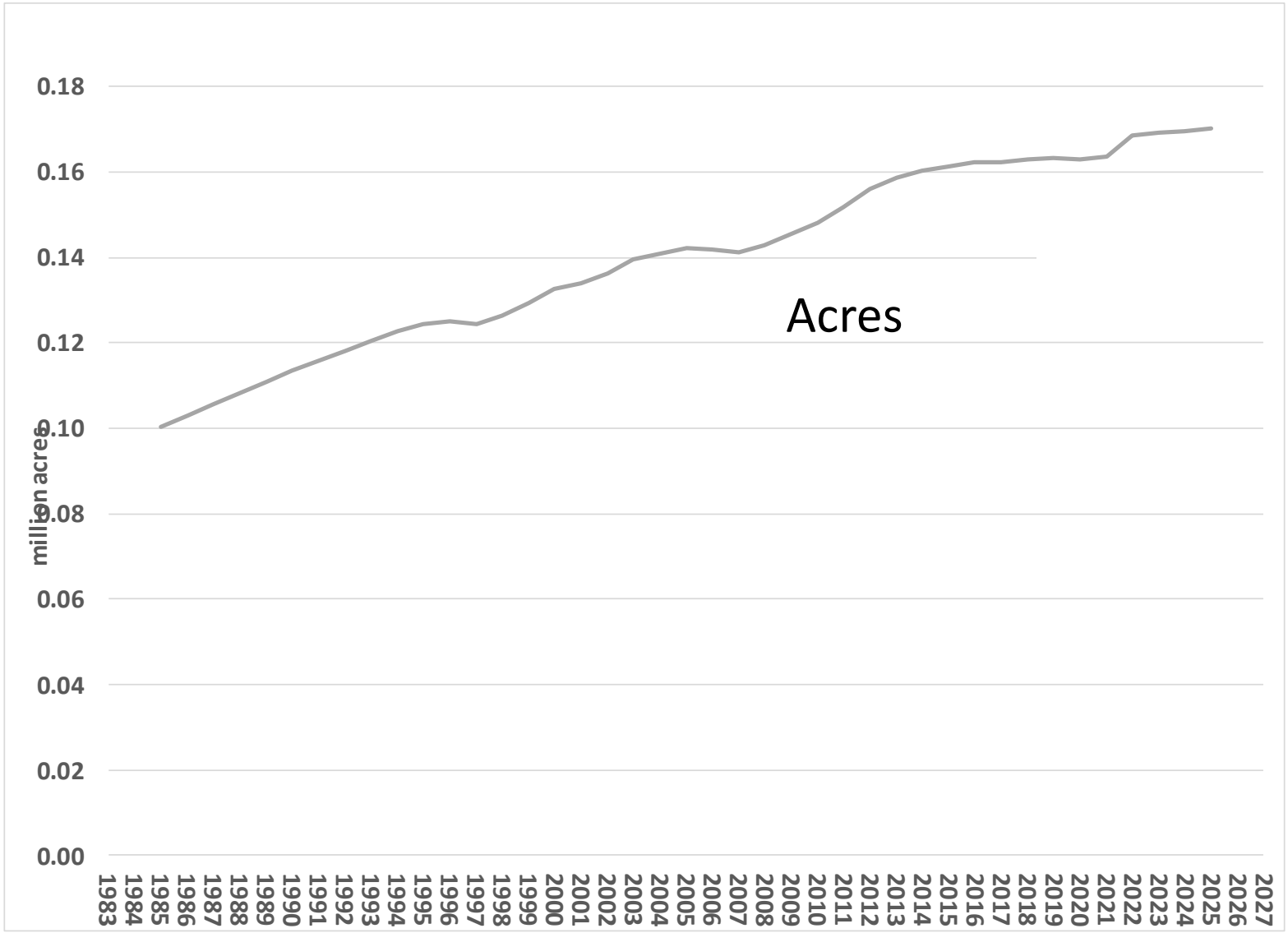

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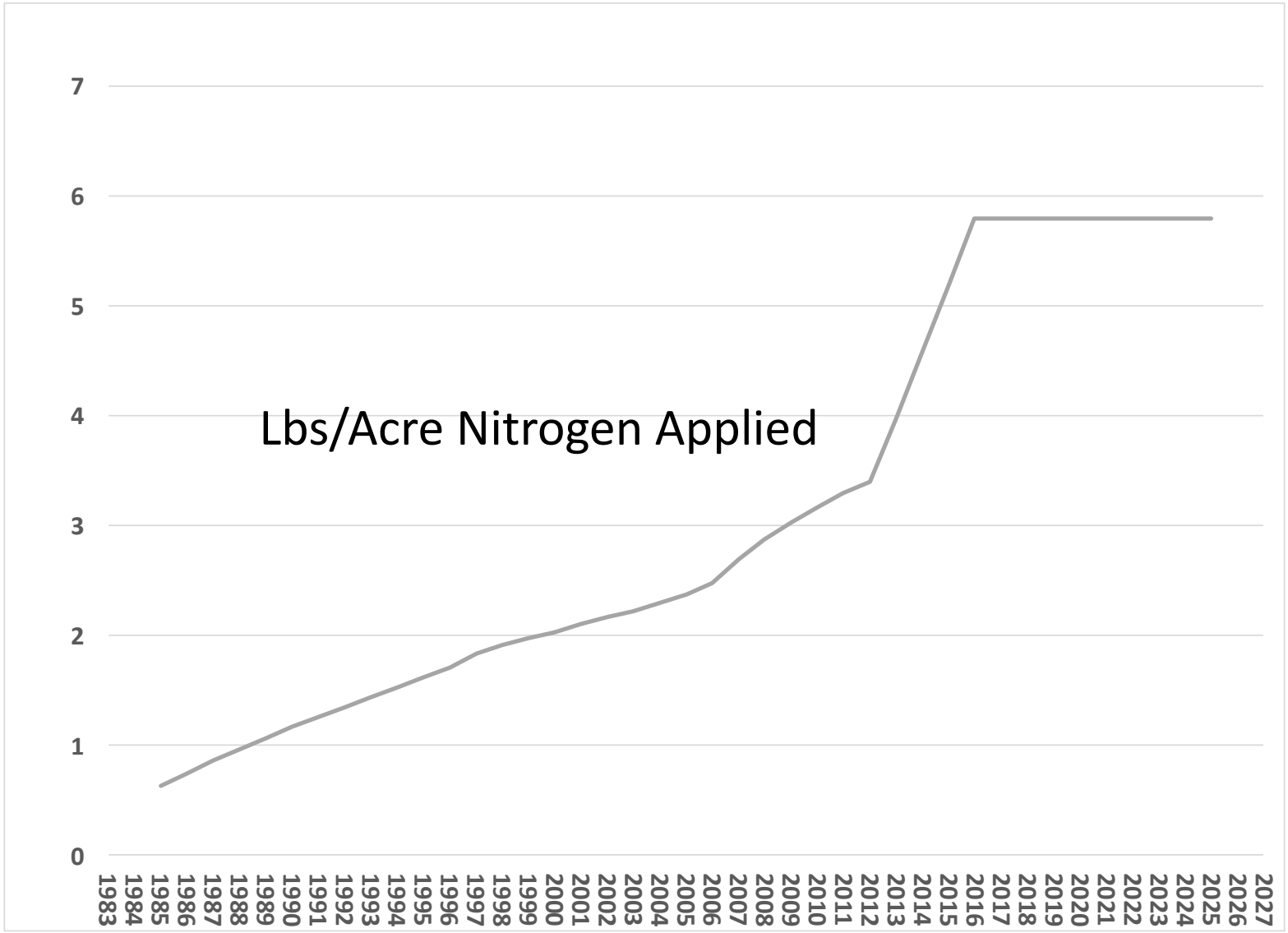

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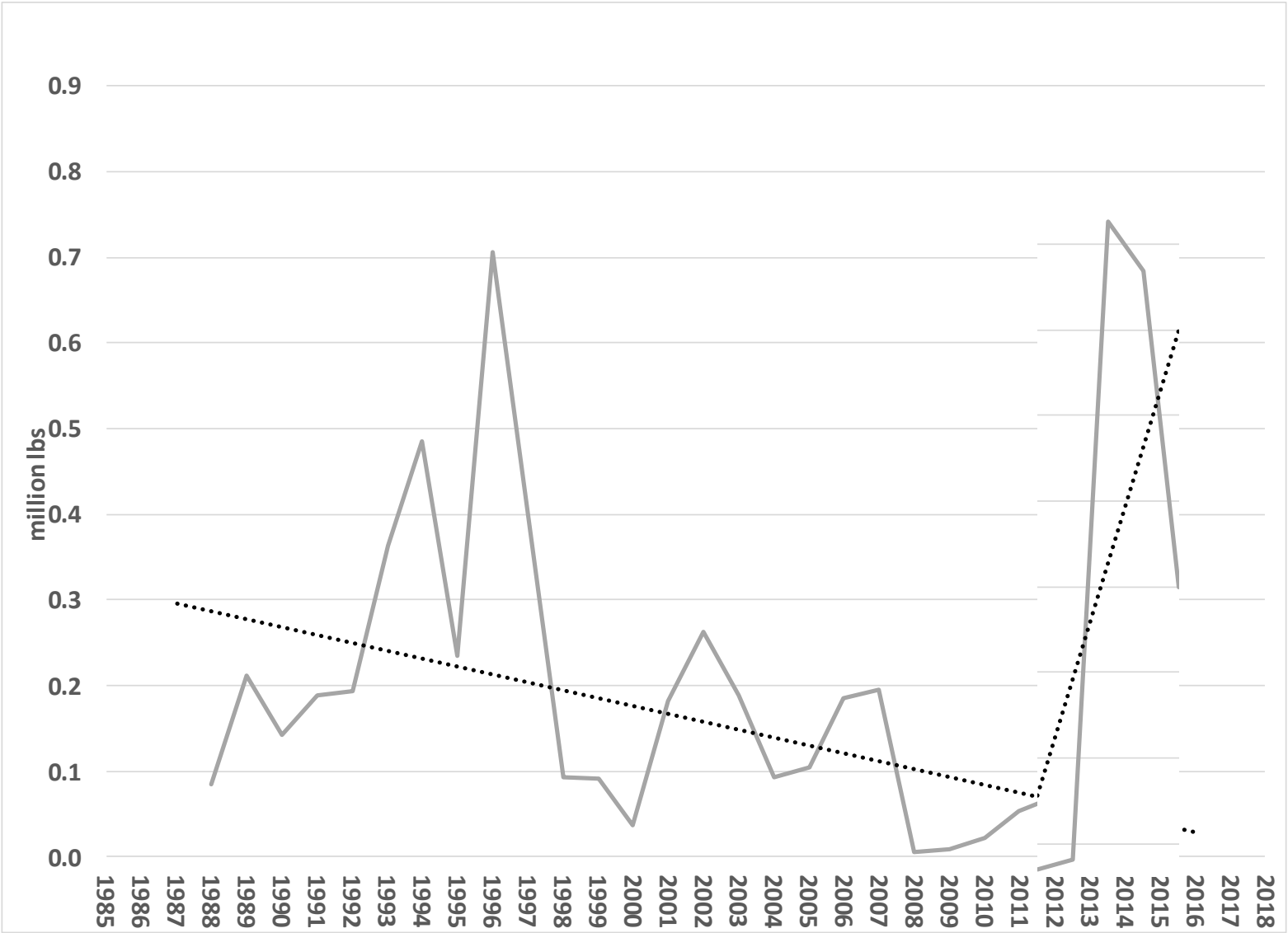

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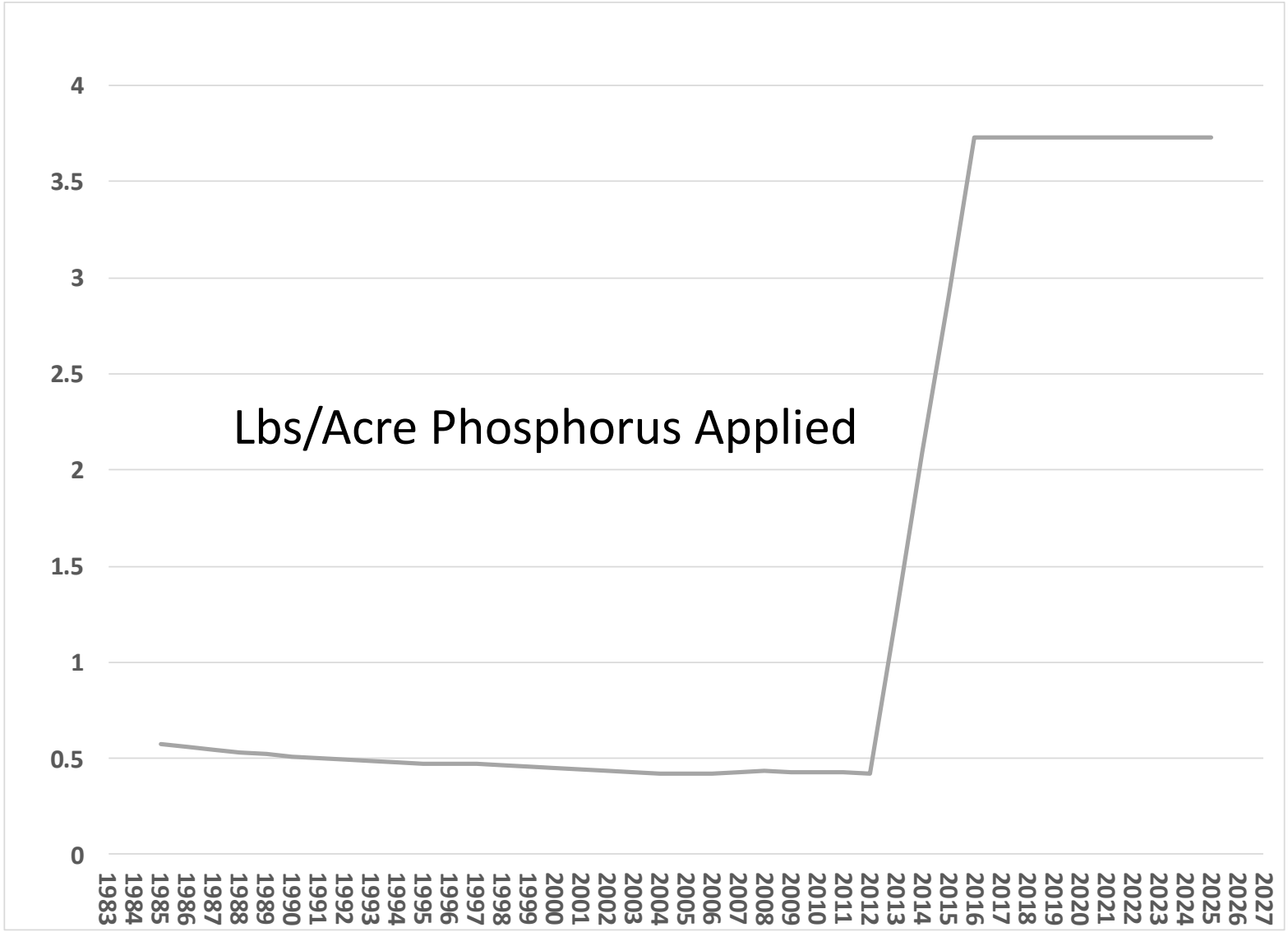

DISTRICT OF COLUMBIA

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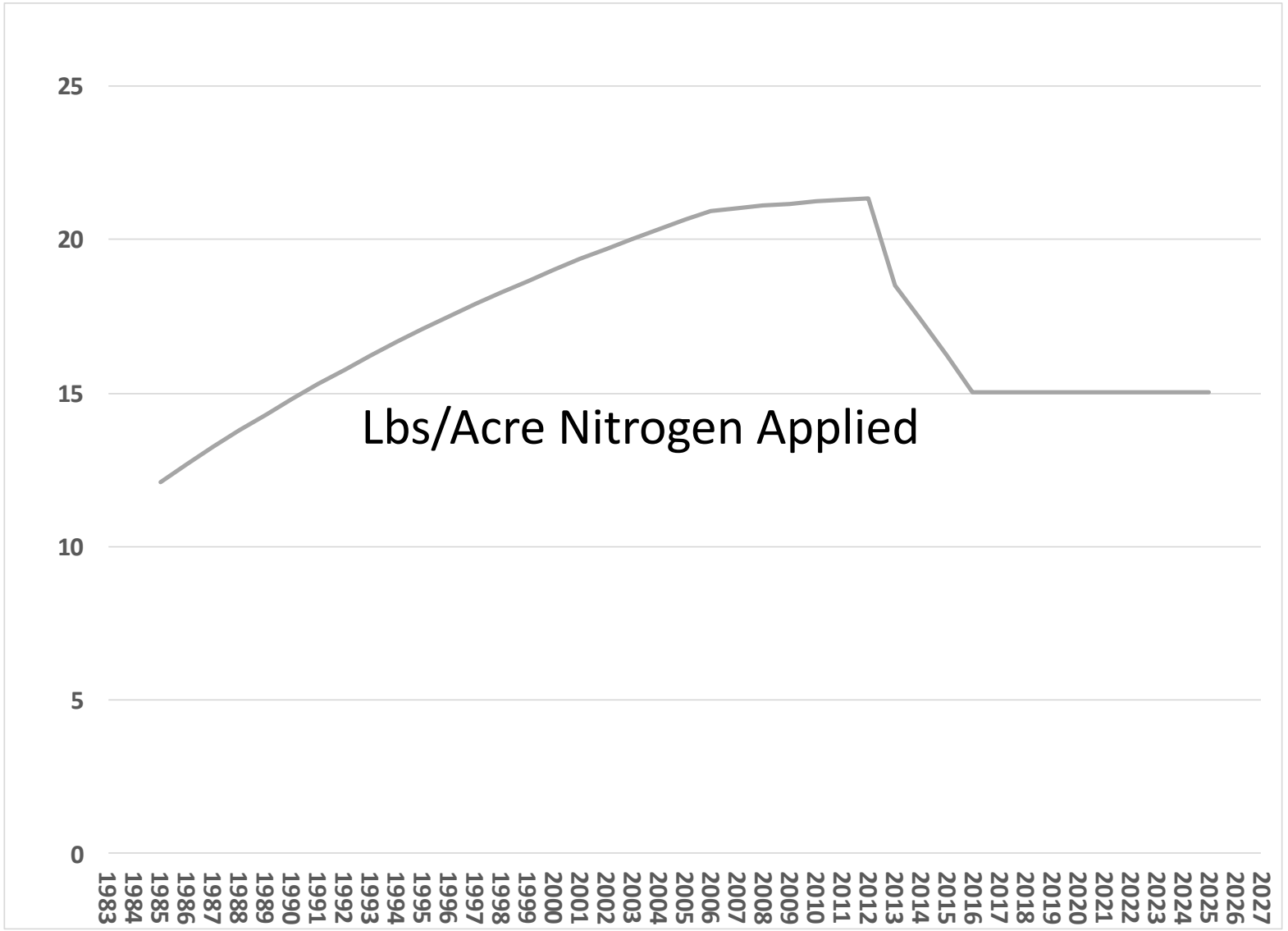

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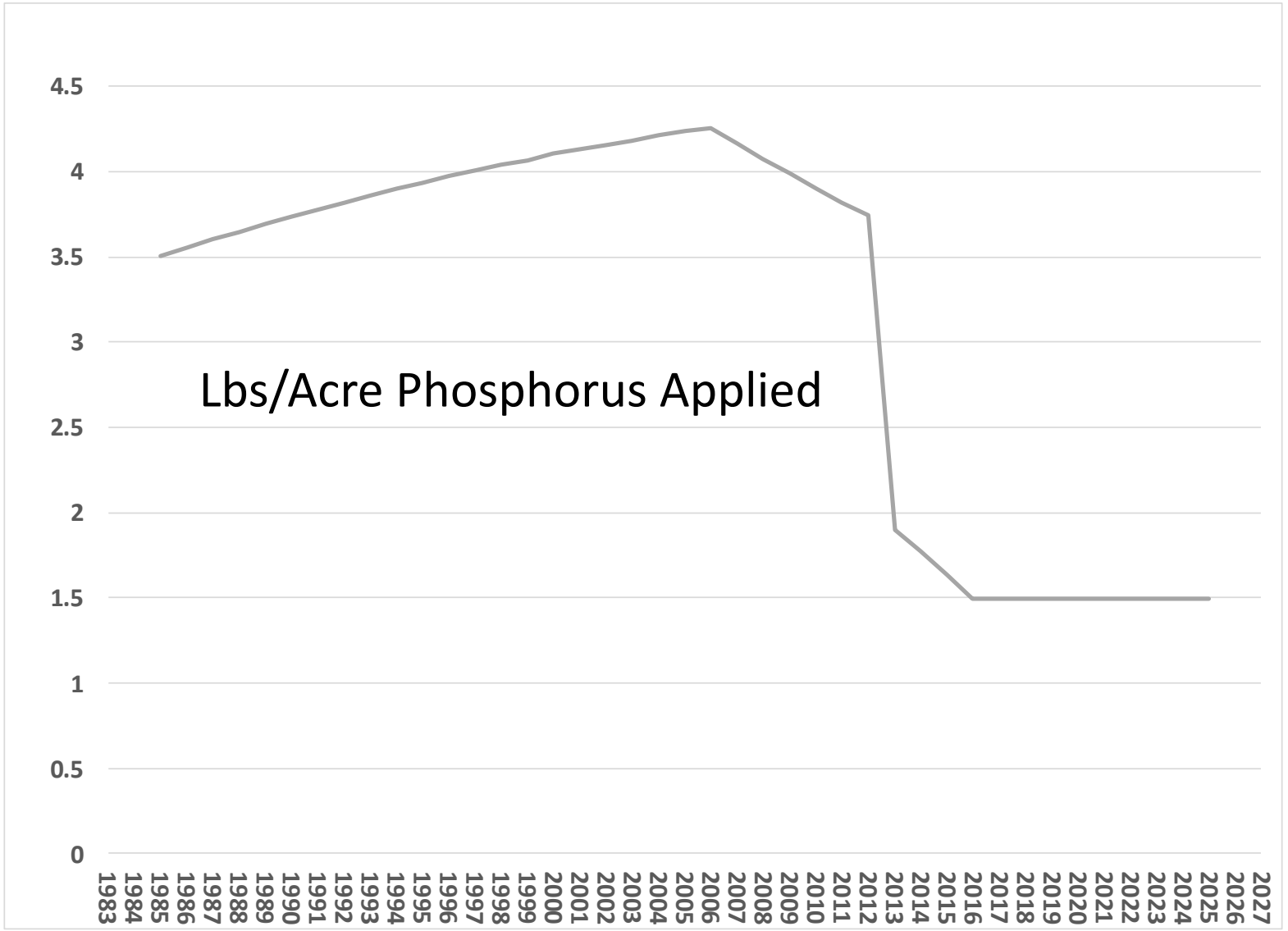

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CAST-21 Urban Fertilizer Application Rates

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Turfgrass Nutrient Application Rates

Phase 6 Model

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

Turfgrass Nutrient Application Rates

Core Urban Nutrient Management Practices

Ten core lawn care practices that minimize the risk of N and P export

(States may modify individual practices to meet unique terrain and conditions as long as they document the nutrient reduction benefit):

1) Maintenance of dense cover of grass or conservation landscpaping to reduce runoff, prevent erosion, and retain nutrients;
2) Reduction or elimination of fertilizer through choosing not to fertilize OR reducing application in areas of low need OR applying less than one pound of total nitrogen per 1,000 square feet;
3) Prohibition of application before spring "green up" and after the grass becomes dormant;
4) Use of slow release nitrogen fertilizers;
5) Sweeping of fertilizer off of impervious surfaces;
6) Prohibition of fertilizer application within 15 to 20 feet of any water feature, and management of the prohibited zone as a grass, meadow or forest buffer;
7) Recycling of clippings and mulched leaves on the lawn to keep them out of streets and storm drains;
8) Minimum mowing height of 3 inches;
9) Use of other practices to increase the porosity and infiltration capability of your lawn to treat stormwater; and
10) Consultation with local extension service office or lawn care company to receive advice, including, but not limited to, soil test analyses.

Turfgrass Nutrient Application Rates

Phase 6 Model

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

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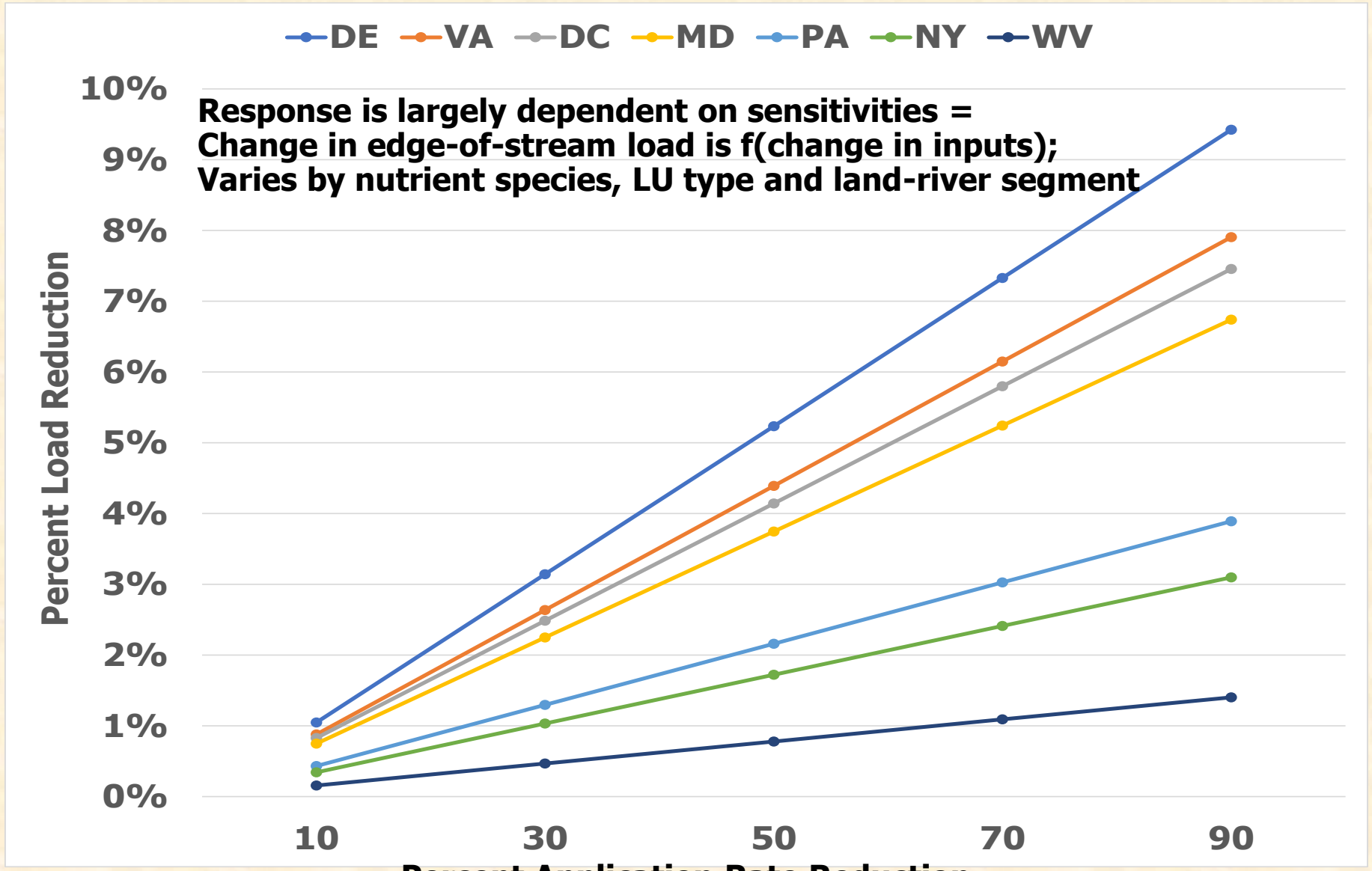
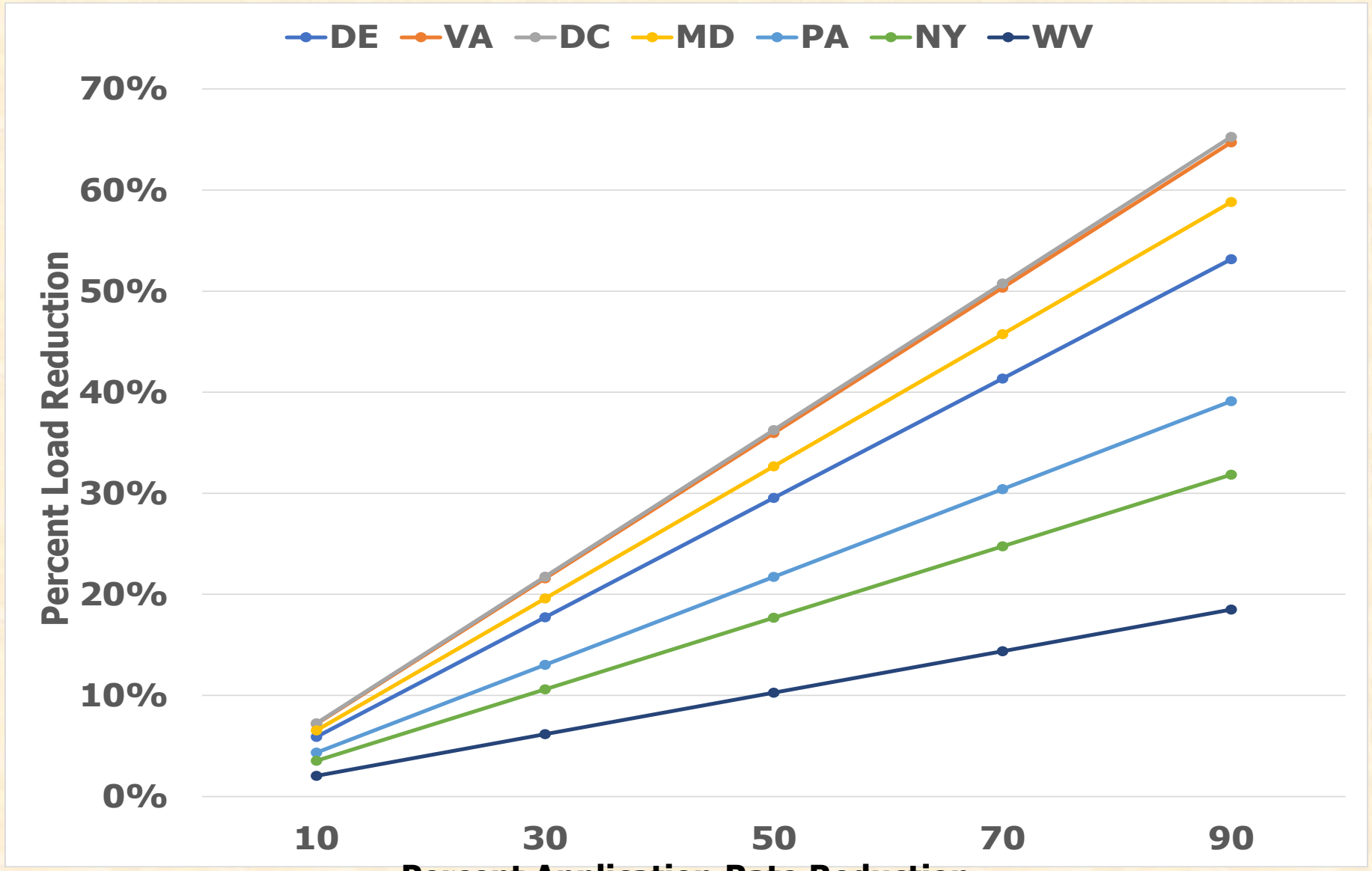
Change in Load with Change in Applications

Nitrogen



Change in Load with Change in Applications

Phosphorus



Change in Load with Change in Applications

Nitrogen

LoadSource	Nutrient Species	P6 Sensitivity
Turf Grass (Non-Regulated + MS4)	NH3	0.005
Turf Grass (Non-Regulated + MS4)	OrgN	0.009
Turf Grass (Non-Regulated + MS4)	NO3	0.033
Tree Canopy over Turfgrass (Non-Regulated + MS4)	NH3	0.004
Tree Canopy over Turfgrass (Non-Regulated + MS4)	OrgN	0.007
Tree Canopy over Turfgrass (Non-Regulated + MS4)	NO3	0.023