

# Fertilizer Expert Group Agricultural Fertilizer Recommendations

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# Agricultural fertilizer investigation: Background

The PSC has concerns with the agricultural fertilizer data used in CAST

A formal request was made to examine Phase 6 and 7 solutions

No formal group existed to investigate Phase 6 agricultural fertilizer

The Fertilizer Expert Group was created with State, Federal, and Industry representation to make agricultural fertilizer recommendations

# What did the Fertilizer Expert Group do?

Solution	Activity	Completion	Comments	Total Percent Finished
Phase 6 short term (FEG)	Meet individually with jurisdictions to discuss data	X	Completed: Dec 2022	90
	Discuss initial findings with CBP advisory group	X	Completed: Feb 28th 2023	
	Hold first full group meeting of FEG	X	Completed: March 1st 2023	
	Complete data review of preprocessing methods and ag inputs	X	Completed: April 1st 2023	
	MB informal briefing	X	Happens monthly	
	USDA presentation to AgWG and WQGIT	X	Completed: AgWG- April 2023; WQGIT- May 2023	
	Analyze compatability of new data sources	X	Completed: June 5th 2023	
	Summarize investigation results and brief PSC	X	Completed: IN PROGRESS	
Phase 7 long term (AMT)	Participate in Phase 6 solutions		In progress through June 2023	
	Create living workplan document outlining order of tasks	X	Completed: March 13th 2023	
	Make decisions for Phase 7 model	~	In progress through 2025	

# What were the groups findings?

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No data set, other than AAPFCO, was found that could provide county level coverage of fertilizer across the entirety of the Chesapeake Bay Watershed.

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The existing AAPFCO fertilizer sales tonnage data used by the CBP can be updated based on information provided by representatives from AAPFCO.

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State reported fertilizer sales tonnage data have far less latency than current AAPFCO data and share historic trends.

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Current USDA-NASS surveys are not practical for determining fertilizer applications at a county scale across the watershed.

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It is possible to create new NASS surveys that are region specific although the benefit of doing this might be outweighed by the costs.

# What did the FEG recommend for Phase 6?

1) Prior to release of a new CAST version, AAPFCO and Direct State reported data should be collected and incorporated into CAST following subsequent recommendations

2) For data covering 2016 and before, AAPFCO fertilizer sales tonnage data should be used.

3) For data covering 2017 and after direct state reports will be collected and assimilated assuming three or more out of six states provided data.

4) The watershed-wide fertilizer sales will be used up through the last year in which conditions under recommendation 3 are met.

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# Caveats:

3) For data covering 2017 and after direct state reports will be collected and assimilated assuming three or more out of six states provided data.

If less than three of six states provide data directly then AAPFCO fertilizer sales tonnage data will be used.

If at least three of six states provide data directly then state data will be used with nonreporting states data being estimated by...[currently evaluating the three methods below, but will end in a single recommendation

In cases where states do not submit data directly but do submit to AAPFCO the AAPFCO data will be utilized rather than a projection.

When conditions for recommendation 3 are met subsequent data will not replace fertilizer data from previous years.

Calculate the percent change in fertilizer sales.

Continue to use the last year of data.

Use a state-specific trends using the last 5 years of available data.

# Pros and Cons

Calculate the percent change in fertilizer sales.

- **Pro:**
  - Incorporates newer information than AAPFCO alone
  - Reduced data latency
  - Works well if all states are assumed to have similar fertilizer sales behavior
- **Con:**
  - Does not have a single data set to cover each state (some states are extrapolated)
  - Does not work well if states fertilizer sales trends are independent.

Continue to use the last year of data.

- **Pro:**
  - Faster model update time with less effort to update annual data due to reduced data collection and analysis.
- **Con**
  - Can lead to potential inequalities of inorganic nutrient distribution amongst all states using a watershed fertilizer stock approach.
  - Watershed fertilizer stock benefits of reduced fertilizer use are not manifested for all states equally.
  - Can be easily gamed.

Use a state-specific trends using the last 5 years of available data

- **Pro:**
  - Works well if all states fertilizer sales trends operate independent of each other.
  - Trends are set with more recent fertilizer sales data
- **Con:**
  - Sales trends may be based entirely off available AAPFCO data which are older than state reported data (2016)
  - Trends developed from historic sales data (AAPFCO) may not be reflective of current and future trends.



For states that did not report data the recommendation is to:

Calculate the percent change in fertilizer sales.

# What did the FEG recommend for Phase 7?

1) Re-examine the use of both farm and nonfarm categories of AAPFCO fertilizer in calculating fertilizer sales totals.

2) Further examine alternative fertilizer data sets. (e.g. TFI)

3) Examine the use of additional fertilizer *application* datasets to ground-truth sales-based application estimates.

4) Re-examine outlier removal and filling methods.

5) Examine state stock calculations vs watershed wide

6) Examine projection methods for phase 7 (how to create data beyond the last known year)

# Summary:

## For Phase 6:

- We should be using direct state reported data
- In order to avoid the minority of states dictating trends thresholds for reporting should be used.
- For states that do not have reported data we should use a percent change from the previous year for reporting states to determine the unknown portion.

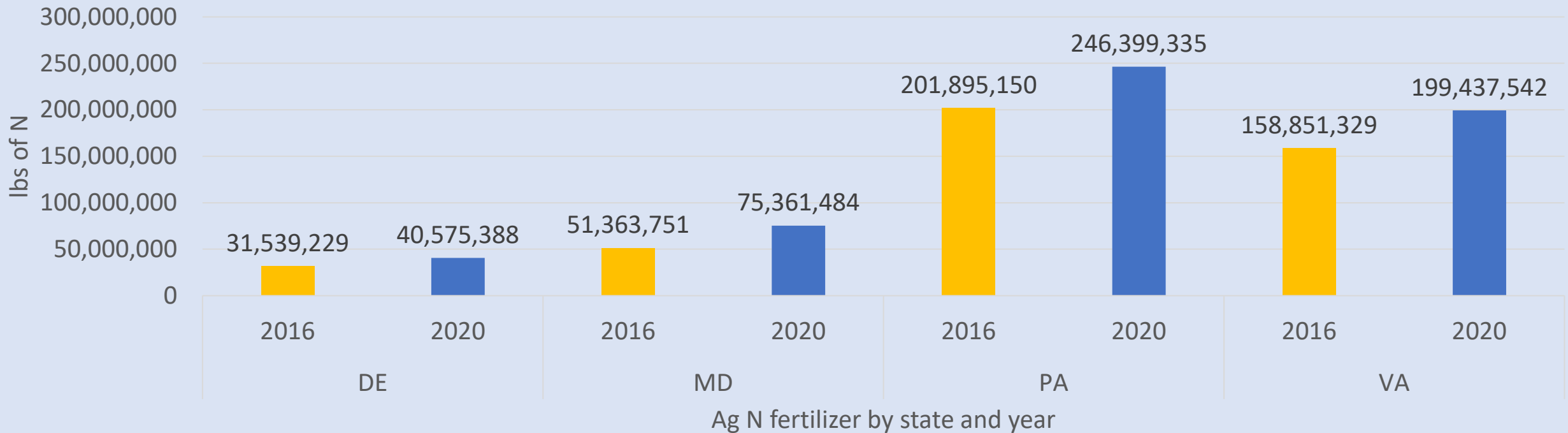
## For Phase 7 the AMT should:

- Conduct in depth searches for different sales and application data sets.
- Evaluate differences in data processing.

Questions?

# State ag N fertilizer change

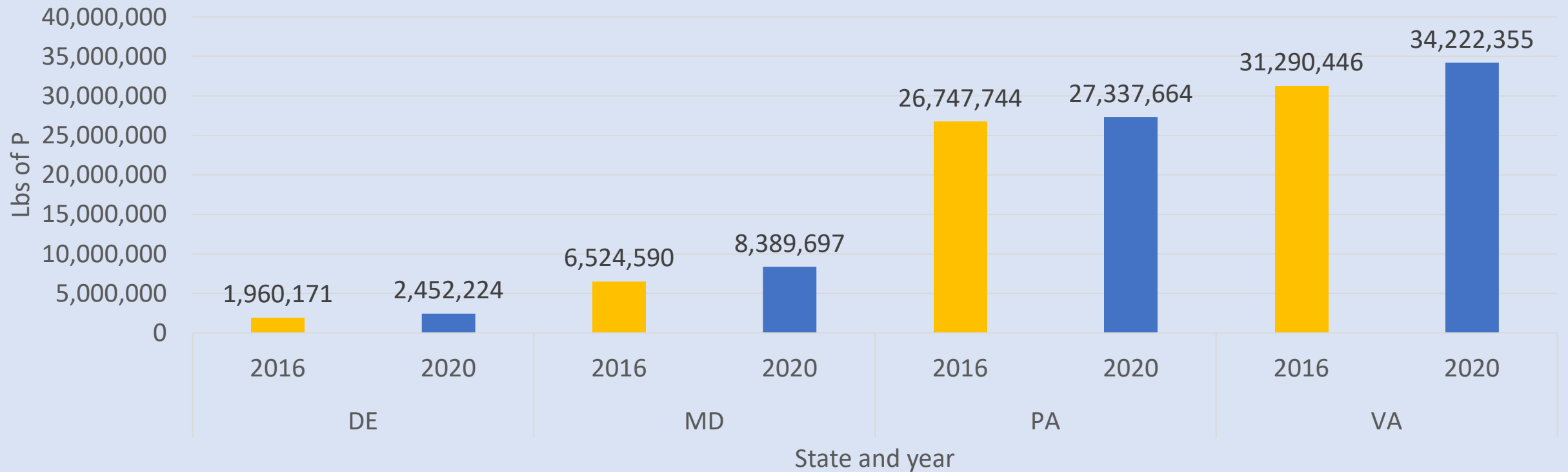
State reported data Agricultural N fertilizer lbs 2016 and 2020



State	% Difference 2016-2020
DE	+25
MD	+38
PA	+20
VA	+23

# State ag P fertilizer change

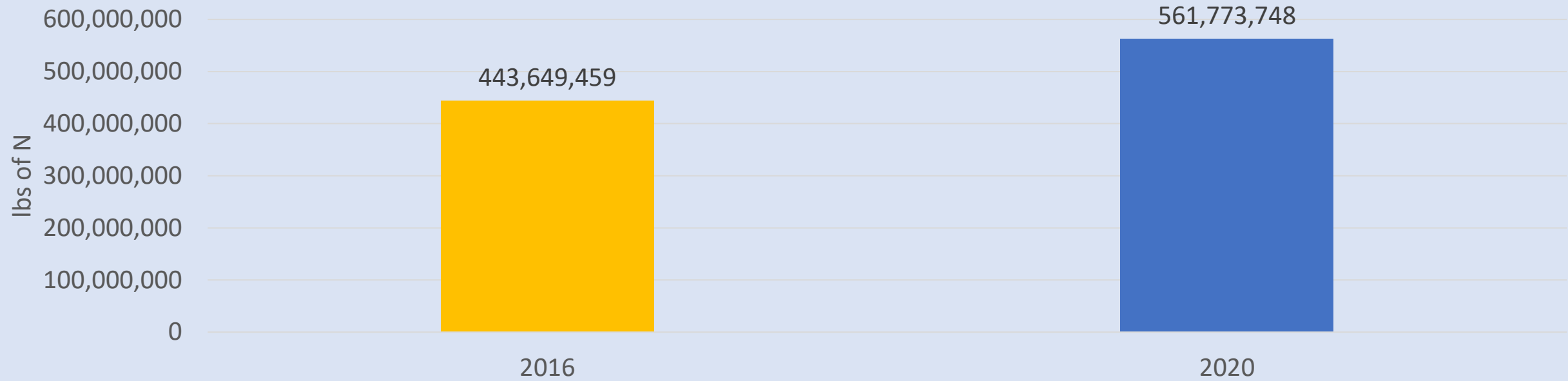
Total State reported data Agricultural P fertilizer lbs 2016 and 2020



State	% Difference 2016-2020
DE	+22
MD	+25
PA	+2
VA	+9

# Total watershed ag N change

Total State reported data Agricultural N fertilizer lbs 2016 and 2020

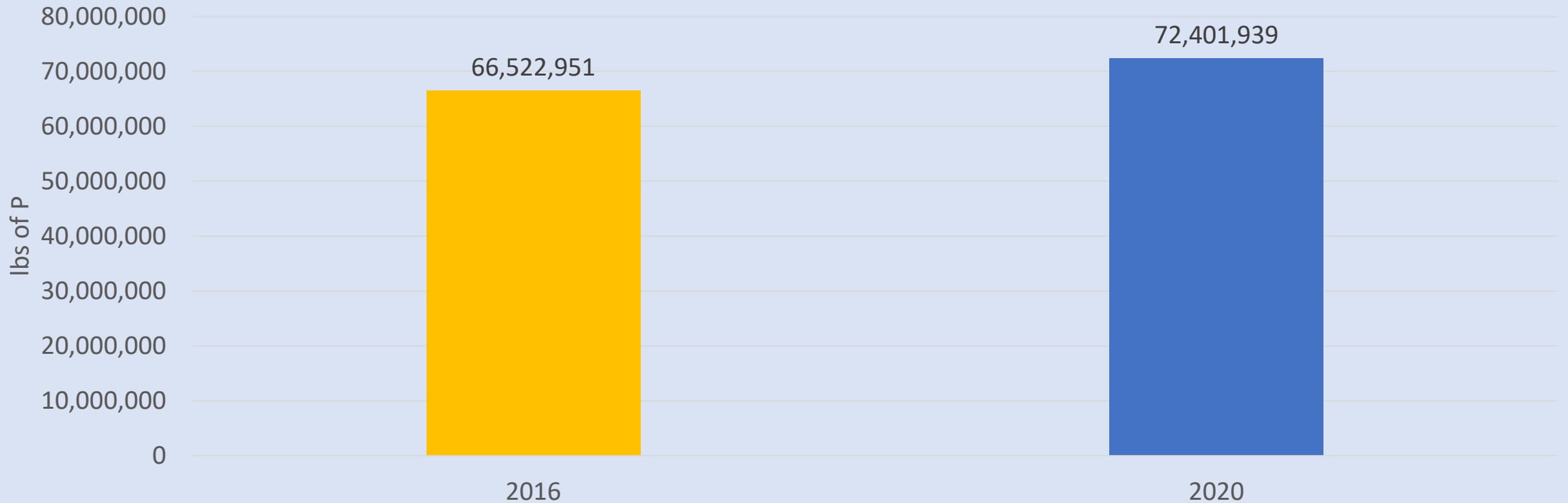


Ag N fertilizer total by year

% Difference 2016-2020  
+24

# Total watershed ag P change

Total State reported data Agricultural P fertilizer lbs 2016 and 2020



% Difference 2016-2020

+8