

## **KEY TAKEAWAYS:**

1. The Chesapeake Bay Program currently utilizes AAPFCO fertilizer sales tonnage data as well as state recommended application rates and USDA soil amendment expenditure data to determine fertilizer applications.
2. State reported fertilizer sales tonnage data from PA and DE have strong historic agreement with AAPFCO data from the same period.
3. State reported fertilizer sales tonnage data have far less latency than current AAPFCO data.
4. Current USDA-NASS surveys do not have improved fertilizer data compared to AAPFCO.
5. It is possible to create new NASS surveys that are region specific.
  - a. Time, money, and response rate may reduce the feasibility to create these new surveys and contribute improved information.
6. Multiple organizations, including Plant Nutrition Canada and The Fertilizer Institute, utilize AAPFCO data to determine fertilizer applications.

## **Action Items:**

- Set follow up meeting dates, (1<sup>st</sup> Monday of each month)
- Collect state fertilizer sales tonnage data from MD, NY, WV, VA and compare to AAPFCO.
- Create webpage to house documents and group information.
- Coordinate a meeting with Plant Nutrition Canada to compare the processing of AAPFCO data to the CBPO methods.

## **MINUTES:**

### **Background [01:00-01:40]:**

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#### **Introduction: The Long and Short of it, A timeline for working with fertilizer data – 01:00-01:10 [10 min (Tom Butler, EPA)]**

This group will serve as a formal committee to develop short-term, interim resolutions to fertilizer data concerns before moving forward with CAST 2021 as well as long-term resolutions for Phase 7 model.

- Kevin DuBois asks when we can discuss additional information.
  - Tom says that we will have an open period at the end if we do not talk about them throughout the presentation.

#### **Background: Chesapeake Assessment Scenario Tool and how it uses Inorganic Fertilizer data– 01:10-01:40 [30 min (25 min presentation 5 min discussion) (Kaylyn Gootman, EPA)]**

CAST currently utilizes manure inorganic fertilizer data from the Association of American Plant Food Control Officials. We will examine how these data are processed and what other data sets are applied to these data to create the current fertilizer stock for the watershed.

- Alex Echols asks if a part of the county is within the watershed than is the entire counties application rate included?
  - Tom says that it would be included but the application isn't.

- Gary Shenk clarifies applications are counted for all counties touching the watershed. But only land uses within the watershed have an application applied to them.
- Dave Dressler asks if fertilizer is counted twice?
  - Tom says the ag census is expenditures so it doesn't give us any tonnage so we can't count it twice. Its just to tease apart fractions within the watershed.
- Alisha Mulkey mentions that AAPFCO only has a bucket for specific years but that after we have no data. We then use the same percentage as our last year of data.
  - Kaylyn adds that this time lag is a critical point.
- James Martin asks if legumes and N fixation in preceding crops considered in application determination.
  - Jess answers that all crops have an application rate and legumes have N fixation rate. They would have fertilizer applied which reduces N fixation if N is applied.
  - James asks if this accounts for residual N following a legume crop?
    - Jess says no, there is a default value in application accounting for soil organic N, 45 lbs/acre and is the only residual. This is part of N fixation NOT application of nutrients.
- Kevin Dubois brings up the costs of urban nutrient management plans which as necessary to address fertilization on DOD lands.
  - Tom says that this is an excellent point and that we are focused on more of an ag perspective today.
    - Kaylyn adds that we get farm and nonfarm data from AAPFCO which can help with this.
- Tom Brusslema brings up removing outliers from AAPFCO county level data do you reconcile with state level data?
  - Tom says we take outliers at the state level, we combine county levels and remove the outliers at the state level.
  - Mark Dubin says we must analyze data for trends to even out annual numbers. We use a smoothing process to reflect the long-term trend.
- James Martin asks about the data collected as part of the Ag Census soil amendment expenditures. There is a lot of room for things in this category. What is supposed to be reported as soil amendments and expenses?
  - Tom says we have Bruce from NASS who can potentially discuss this.
  - Bruce says he can cover this in his presentation.

## **Potential New Data Sources [01:40-03:00]:**

### **State reported fertilizer tonnage sales data – 01:40-02:00 [20 min (10 min presentation 10 min discussion) (Tom Butler, EPA)]**

We will examine the potential for utilizing state reported fertilizer sales tonnage data. These data have been compared to the AAPFCO fertilizer data used by CAST. Data reported directly from states can potentially help eliminate the latency issues associated with AAPFCO data.

- James Martin asks why peaks appear in several of the years?
  - Tom says for there isn't a clear answer since the people who would be present don't work there anymore.

- Justin Lontz confirms that the peaks in 2015 were due to people leaving the position and there being a gap between the new personnel.
- Tom adds this occurs in each jurisdiction its not unique to any one state.
- Dave Montali adds this is why we smooth data.
  - Tom agrees and says that some of these points may be removed as they could be outliers. He also adds that application isn't necessarily the load but that smoothing can help address these.
- Mark says that this is why the AgWG chose to use smoothing so that multiyear trends could be used to eliminate the high variation.

**USDA NASS and Survey Data – 02:00-02:20 [20 min (10 min presentation 10 min discussion) (Bruce Boess, USDA-NASS)]**

The National Agricultural Statistics Service conducts surveys on agricultural data. We will examine the potential to utilize these data in CAST. A presentation regarding the types of surveys and availability of data will be provided.

- Tom asks how representative chemical surveys are of the fertilizer applications in PA?
  - Bruce says they calibrate to the planted acres in those states and its representative to the US planted acres.
- Ben Hushon asks what the response rates are?
  - Bruce says it's around 30%
- Dave Montali asks if people responding indicate their participation in Nutrient Management plans.
  - Doug says they do collect some of this in terms of how often they use methods of monitoring pests, so they do get at some of that.
- Tom asks what is the level of effort that goes into making a survey? How feasible is a region-specific survey?
  - Bruce says show us the money. They do a lot with EPA external agreements, and they can give cost estimates, but they have a lot of work.
- Mark Dubin follows up with Doug and asks about integrated nutrient pest management systems and says nutrient management is very different from IPM plan. He wants to double check if NM is asked on the surveys as well?
  - Douglas says they don't dive into NM they're more basic yes, no questions. In terms of NM, they done publish data on the topic, ERS might have some additional information, but NASS doesn't.
- Mark asks if data is published by state?
  - Douglas says its published at the program state level, so several states make up a program and they are combined. Six of the states with the highest production gives 90% of coverage in the US of the crop so that becomes the program. Will also publish individual state information if state is in the survey.
- Jeff asks for soil amendment expenditure data, what model is used to expand the 30% response rate? Is this done at the county level?

- Bruce says these data start at the county level and are there is an expansion of who responded. Ag census methodology is extreme and data area expanded.
- James earlier question about soil amendments category?
  - Bruce says census expenses are one category for soil conditioners, lime and fertilizer, it's a one-line item you can't break that out.
  - James Martin assumed this was a one-line question, is there any sense of what is fertilizer from this category?
    - Tom Bruulsema says that they ran into issues with greenhouse heavy counties in Can. And wondered is that was considered in the states?
    - Bruce says he would assume so.
- Tom asks about surveys in general, when it comes to increased numbers of surveys there is survey burnout? Do all response rates drop when more census' are created?
  - Bruce says yes, these responses drop across the board. Provide options to do ARMs survey vs Ag Census.
  - Doug adds that the chem use program used to have one of the top response rates since it was field enumerated. Since they pandemic they have seen these numbers drop.
- Mark Dubin adds his observation that at UMD they have seen a lag in respondents for state surveys as well. They are looking for alternative methods to improve response rates.
- Dave Montali asks if we only use expedition census to distribute the total state load of N and P to counties. Is that correct? He says our process might be flawed by the presence of greenhouses.
  - Tom clarifies that we are using expenditures to get a fraction of ag in the watershed and that we distribute county amounts by crop need.
  - Dave asks if we use expenditures to distribute the state load of N and P from AAPFCO?
    - Tom believes that we sum all the watershed before breaking it out.
    - Dave asks if scaling by expenditure happens at the entire watershed scale after summing counties?
    - Tom says yes,
      - Mark Dubin confirms this due to limited ability to use data. Regarding greenhouses we see they are a leaky system and thinks it's appropriate to include greenhouses with field ag work as well.

**The potential for industry supplied data sets: An international perspective– 02:20-02:40 [20 min (10 min presentation 10 min discussion) (Tom Bruulsema, Plant Nutrition Canada)]**

We will examine the potential to utilize industry supplied inorganic fertilizer data. We hope to gain a better understanding of the types of data which might be supplied by industry representatives.

- Alex Soroka asks if NuGIS data have been published in a spatial data set such as raster or polygons?
  - Tom Bruulsema says that what we see is what is published. There is a GIS version of his map and that is the available product. He adds you can download county or 8-digit HUC tabular data for each unit.

- Mark Dubin asks what his 30M land use data source is?
  - Tom Bruuslema says it's a cropland data layer from NASS
    - Mark adds some irregularities have been found due to low response rates.
    - Tom Bruuslema thinks it's based on satellite data?
      - Mark says they use several sources of information but is similar to what is used now as well.
- Ben Hushon asks if model takes into account yield removal?
  - Tom clarifies Ben is referring to CAST and says there is uptake, it isn't treated as a plant growth model, but this is a constant value.
- Greg asks what sources IFA use to develop this data set? Producer surveys?
  - Tom Bruuslema says they go to members including national fertilizer associations and do a lot with FAO collaboratively as well. They do a lot of work with industry agronomists employed by member companies.
- Alex Soroka asks for the data download.
  - Tom Bruuslema will distribute these, and Tom Butler will distribute this as well.
- Kaylyn suggests comparing AAPFCO processing methods with CBPO and the Plant nutrition Canada.
  - Tom Bruuslema says that would be great.
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**The potential for industry supplied data sets: A local perspective from The Mill – 02:40-02:50 [10 min (5 min presentation 5 min discussion) (Ben and Tim Hushon, The Mill Fertilizer Company)]**

We will hear from The Mill, a regional fertilizer company with locations in Maryland and Pennsylvania. The Mill will describe its background as a company in addition to its ability to contribute to understanding the issues associated with fertilizer use and water quality.

- Tom asks what Ben's perspective is on the types of data we can gather from the fertilizer industry?
  - Ben says that if we can use more up to date state data that would likely be a better way to go. With regard to spikes, it may be tied to crop rotations. Regionally weather can impact spikes since it can alter the crop types and fertilizer plans. Surveys are filled out due to a feeling of obligation at smaller farms but at larger farms today there is a much larger delay due to the time required.
- James Martin asks if Ben has anything to add about agronomic optimum vs economic optimum yield rates.
  - Ben says all trials are based on dollars and ROI. In general, larger farms focus on that. It's less about top yields now and more about returns on investment.
- Tom asks if we can get definitions on split vs precision application?
  - Ben says split application is taking the same amount of total fertilizer application and dividing it into multiple applications. Precision application is where you zone sample a field and apply fertilizer based on soil yield history to ensure you do not waste fertilizer on the lower quality soils in the field.

**General Discussion and Closing – 02:50-03:00 (10 minutes)**

- Dave Montali asks for the next steps of the group

- Tom says that we will plan to meet at least monthly, create a website and look into data sources more.
- James Martin says that this was a good start, but we need to be conscious that a number of different data sources are all from the original data, AAPFCO. He wants us to be cautious that we don't focus solely on AAPFCO but other data sources.
  - Dave Montali says that it seems like AAPFCO is the ultimate sources. The latency is a large issue and that by the next meeting we need to see if we can get state submitted data to eliminate that issue.
    - Tom thinks this is a good suggestion and that we will need to get other states data. He sees everything as leading back to the states. He would like to work to get same data from other states similar to DE and PA.
- Mark says these are good points and that the original sources is the states which is likely better data. He thinks AAPFCO can close the latency gap.
- Tom will make this meeting recurring and email states for fertilizer sales tonnage data.

#### Attendees:

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|---|--|
| • Ruth Cassilly (UMD)                                       | • Albrecht, Greg (NYS department of Agriculture and Markets) |
| • Lontz, Justin M. (DDA)                                    | • Gianino, David (VDACS)                                     |
| • McDonnell, Lee (EPA)                                      | • Philip Davidson (MDA)                                      |
| • Ben Hushon (The Mill Fertilizer Company)                  | • Tom Bruulsema (Plant Nutrition Institute)                  |
| • Dressler, David (PA Bureau of Plant Industry)             | • Alex Echols (Campbell Foundation)                          |
| • Gootman, Kaylyn (EPA)                                     | • Montali, Dave (Tetra Tech WV)                              |
| • Sweeney, Jeff (EPA)                                       | • Williams, Candiss (NRCS)                                   |
| • Gary Shenk (USGS)   | • Soroka, Alexander M (USGS)                                 |
| • Davis, Cassandra M (DEC)                                  | • Mark Dubin (UMD)   |
| • Boess, Bruce (USDA-NASS)                                  | • Ruth Cassilly (UMD)  |
| • Farmer, Douglas (USDA-NASS)                               | • David Wood (Chesapeake Stormwater Network)                 |
| • Mclean, Kevin (DEQ)                                       | • Lane, Cecilia (DOEE)                                       |
| • Alisha (MDA)  | • Martin, James (DCR)  |
| • Jessica Rigelman (J7 Consulting)                          | • Kevin Du Bois, (DoD)                                       |
| • Elizabeth Hoffman (MDA)                                   | • Davis, Christina   |
| • Clint Gill (DDA)  | • Leanna Nigon (The Fertilizer Institute)                    |
| • Marel King (CBC)  | • Champion, Jonathan (DOEE)                                  |
| • Dell, Curtis – (USDA ARS)                                 | • Tillman, Leon (USDA-NRCS)                                  |
| • Linton, Chad (WV DA)                                      | • Veith, Tamie (USDA- ARS)                                   |
| • Helen Golimowski (Devereux Consulting)                    | • Josh Arbaugh (WV)  |
| • Morawski, Jan (NYS department of Agriculture and Markets) | • Tom Butler (EPA)   |

