

## Agricultural Modeling Team (AMT) Meeting

June 13<sup>th</sup>

09:00 AM – 11:00 AM

[Meeting Materials](#)

### Summary of Actions and Decisions

**Decision:** The AMT approved the [May minutes](#).

**Action:** Tom will reach out to the state chemist points of contact, copying the respective AMT representative, to collect updated state data including fertilizer tonnage. Examples of data fields requested include: Year, State, FinalFIPsRepPeriod, FarmReal, RealTonsRealLbs, Nconc, Pconc, FarmNLbs, NonFarmNLbs, UnknownNLbs, FarmP205Lbs, NonFarmP205Lbs, and UnknownP205Lbs. Members are asked to provide any information they have on updated state fertilizer data to Tom ([Butler.Thomas01@epa.gov](mailto:Butler.Thomas01@epa.gov)) and Joseph ([jdelesantro@chesapeakebay.net](mailto:jdelesantro@chesapeakebay.net)) by July 11<sup>th</sup>.

**Action:** AMT members are asked to provide feedback on potential methodologies for the processing and scale of inorganic fertilizer. Members with specific data requests or clarifications should reach out to Tom ([Butler.Thomas01@epa.gov](mailto:Butler.Thomas01@epa.gov)) and Joseph ([jdelesantro@chesapeakebay.net](mailto:jdelesantro@chesapeakebay.net)) within the next two weeks.

**Action:** Tom and Jess will coordinate offline to confirm that fixation in CAST does not include non-leguminous fixation.

**Offline:** This was confirmed to be only fixation from leguminous crops.

**Action:** Members with additional information on the systems to animal units conversion as it relates to mortality composting should contact Jess ([jrigelman@j7llc.com](mailto:jrigelman@j7llc.com)) or provide that information at the July meeting.

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### Meeting Minutes

#### Statement of purpose:

*To discuss Inorganic fertilizer data sources and processing in CAST, in addition to N fixation, and animal systems excess for Phase 7.*

#### Decision items:

1. Approve the [May minutes](#).

**Decision:** The AMT approved the [May minutes](#).

#### Announcements:

- May 22 meeting of the Land Use Loading Ratio Subgroup
  - Improved our understanding of how to potentially split land uses in literature.

#### **Introduction/Recap: 09:00-09:15 [15 min (Zach Easton, Virginia Tech)]**

Zach went over the feedback regarding our path forward to the end of September. This included our topics and the timeline for dealing with them. **Note:** a proposed Phase 7 timeline extension request was made to the Management Board for very specific AMT items, including inorganic fertilizer data, broiler information, and layer information. If the extension is agreed upon, the

AMT would continue to meet monthly through early next year (February 2026) to discuss these items only.

**Discussion:**

**Ken Staver:** I was curious about the comment about reverting back to Phase 6. When we get CAST runs right now, they are Phase 6 runs? When I see CAST 23, what is that? Is that Phase 6 or Phase 7?

**Tom Butler:** CAST 23 that anyone can use is a Phase 6 model. What we do for this group is we have asked Jess, and she's been really great about it, to set up a new environment to run a new version of CAST implementing all the changes we've made. So, like plant available nitrogen for acres of grains with manure and without manure, anything that we're talking about with the new crop yields, those are not in any of the versions. We are running and showing you results from a version of CAST that is made implementing each of these as the decision is made and as testing has been requested. So, that's Phase 7 for us as it stands, is not anywhere else. It's essentially on this one platform, but Jess is the expert on that. So, maybe I've spoken wrong.

**Ken Staver:** So, if you go to the CAST site, it's Phase 6 stuff?

**Jess Rigelman:** That's 100% correct. The stuff that I'm doing in my environment, sharing results to you, are called Phase 7 because they're changes to Phase 6. What they are talking about here is reverting to Phase 6. That doesn't mean, as a whole, we're going to revert to Phase 6 if no decisions are made. It just means if we don't decide on something, then the Phase 6 methodology for a certain topic is going to stay that way. An example would be how we get data from the ag census. We haven't really discussed that in this group as far as crop acres, but we are going to stick with the Phase 6 methodology because no one's really brought up an issue with it. I'm probably bringing up something that's going to upset people but, we had a methodology for Phase 6 yields. Joseph has given us a new method. We've adopted that. So, we're not going to stick with the Phase 6 yield methodology. We're going to go to Phase 7, because we voted on that and decided. So, reverting to Phase 6 just means if we can't decide on something, we're stuck with the Phase 6 method. Sometimes it's ok to be stuck with the Phase 6 method because we think it works. Others, like fertilizer, obviously, everybody doesn't think it works. So, we are going to have to come up with something for that.

**Ken Staver:** Right, ok. So, the fertilizer sales data that we are using now on the CAST website, that's a Phase 6 thing, right?

**Olivia Devereux (in chat):** When using CAST, scroll to the bottom of any page and you can see the version. Chesapeake Bay Program Office Phase 6 - 7.14.1. Updates to this version (not Phase 7), is under <https://cast.chesapeakebay.net/About/UpgradeHistory>

**Tom Butler:** Yes. It does bring up a point that I do want to make clear. Say we get into a discussion about fertilizer, and this is kind of why this extension talk has come up, and we can't agree on what to do. We know it's bad, but we can't agree on what to do, that would be reverting fertilizer to Phase 6. Everything else, as Jess has said, would stay changed that we've decided on. The issue becomes if everyone thinks Phase 6 is so bad that we can't have a Phase 7 with the current version, that's where I think a lot of that discussion needs to happen. I think that's the concern is that we'll run into some of that because they are big issues. Fertilizer has been called out by name, so I want to make sure there is time to do it, and that's kind of the rationale for bringing it up.

**Ken Staver:** Right, that makes a lot of sense to me. I can't see us abandoning that one just because the calendar kind of gets away from us.

**Inorganic fertilizer 09:15- 10:05 [50 min (20 min presentation 30 min discussion) (Joseph Delesantro, ORISE)]**

We compared several inorganic fertilizer datasets in addition to examining how various factors correlate with fertilizer applications. The AMT also walked through how inorganic fertilizer data is processed in CAST and collect feedback on what partners would like to see modified from this process. Additional data was requested from states. [Informational, Feedback requested](#)

**Discussion:**

[Robert Sabo](#): Tom, thanks for bringing this up. The Falcone data set leverages the USGS data that you have that has a 1.2% difference. But it's been acknowledged, at least by EPA, that the 2017 Falcone model values are about 10% bias positively, nationally, for 2017. EPA got the state level sales data across the United States, there's about 10% difference. I guess, for the Bay Watershed, it's about a 40% difference. So, yeah, I just want to emphasize that is a modeled value using the previous USGS estimates as a response variable, and then they use a variety of predictors, like the Census expenditure data. So, yeah, there is a definitely positive bias for that 2017 Falcone data.

[Dave Montali](#): Is this all positive? So, all these other data sets predict more nitrogen applied than what we are?

[Tom Butler](#): Generally speaking, yes.

[Cassie Davis](#): Sorry if I missed this, but do any of these datasets utilize the AAPFCO data?

[Tom Butler](#): Yes.

[Cassie Davis](#): All of them?

[Tom Butler](#): Yeah, in some capacity. So, like Robert said, Falcone is based off a USGS product. The USGS product is based off of, in some forms, AAPFCO. The Cao\_Lu is an academic way of doing it that has AAPFCO data baked in. NuGIS does use AAPFCO. They have a different way of allocating applications. They have kind of a geographic center point for cropland and then they apply based on a ring. Outside of that, there's a lower probability, and then that counteracts with other counties. So, that leads to some differences. The TREND data set I'll actually talk about a little bit more, but that's basically kind of an aggregate. It has a number of different datasets, again including some of that AAPFCO data. So, they all kind of, in some form, have a tie to it. Although it's not maybe the direct application, it does inform, in some capacity, these datasets.

[Cassie Davis](#): Got it. We have been struggling in New York to get that AAPFCO data. So, I think 2016 was the last time we were able to report?

[Robert Sabo \(in chat\)](#): NuGIS is a **The Fertilizer Institute** product

[Tom Butler](#): Yeah, so that's the last report we have from AAPFCO. That, I think, is an extrapolation that AAPFCO uses for a few years. I'm not sure. I need to look at the details on that. In our data for CAST, we have a slightly changed method that I will get to further down in this presentation, where we do not have information beyond 2016 for fertilizer for West Virginia or New York. We do have state supplied data, which is the AAPFCO data set. It's just prior to going to AAPFCO. So, the states will report it to AAPFCO. AAPFCO kind of standardizes it across the whole country, and then we buy a report. We've asked for the states for that. So, for Maryland, Pennsylvania, Virginia, and Delaware, we do have that. We essentially take all four of those and the behavior and the trend from them and apply that to New York's 2016 point and West Virginia's 2016 point. So, that's essentially how we're moving forward now. So, there are values through 2020, although they're more based on the behavior of the other four states who

supplied information. So, very good point there, Cassie. I do want to make that clear. I will talk about that a little bit more later.

**Ken Staver:** Tom, can I just ask about the Y axis on this graph?

**Tom Butler:** Sure.

**Ken Staver:** So, percent relative to CAST. So, the first bar, that Cao\_Lu is .2% greater than what we have in the model? So, where we have 100 pounds, it has 100.2 pounds?

**Tom Butler:** Yeah.

**Ken Staver:** Alright. But I see the 46% on top of the bar. It says 1.4. So, it's not really a percent, is it?

**Tim Larson (in chat):** Falcone is off the chart.

**Tom Butler:** So, it is a percent. The Falcone is off the chart. There would have to be a break, and you wouldn't see Cao\_LU, USGS, NuGIS. They would be lines.

**Ken Staver:** Right, so all 4 of the other ones are within a percent of what we are currently using?

**Tom Butler:** Yes, and there is a point to build off of. So, I'm glad you picked that up. It'd be a break, and then these would just be the bottom. You would see nothing, and then you'd see a line, a single bar.

**Alex Soroka:** I remember bringing up some of the Falcone plots of, for example, a comparison against Delaware, and it was significantly higher than what CAST estimated for Delaware. I think we talked about that a couple of months ago. Another conversation, I think maybe it was with Sabo or Joseph, we saw that it was actually a couple of counties that really swayed that. So, are there a couple of counties that's pushing Falcone very high, or is it an across the board 46% higher?

**Tom Butler:** There are 5 counties. I don't know what they are.

**Alex Soroka:** I know one of them was in Delaware, and that is partially what pushed that far off the map. It might have been Kent.

**Tom Butler (in chat):** 42029, 42071, 42011, 10001, 10005

**Tom Butler:** Those are the FIPS in the chat. It is worth noting, I think that those are big. There are others that I think do drive it as well, but there are 5 of these that are real outliers that do drive that. I don't think it's entirely on level even if you remove them, but it does get much better. If I had to speculate, I could, but I don't really want to in front of a group. But, Alex, to your question, yes. Those are also included here.

**Olivia Devereux (in chat):** DE: Kent and Sussex.

**Robert Sabo:** I just want to emphasize again this Falcone 2017 value is a modeled value. It is not constrained by sales receipts, but it was trying to replicate what the sales receipts data from the USGS data set from 1987 to 2012 was telling us. So, I just want to emphasize that this is a random model using a variety of predictors, trying to predict what the previous USGS values were, and then using that set of predictors in 2017 from the Census to predict with the county level. So, I wouldn't even pay too much attention to the Falcone 2017 value. We did that out of necessity because we didn't have sales receipts for county level fertilizer data.

**Tom Butler:** Thanks, Robert, and I will kind of speak to a little bit more of this going forward. I think, in general, the takeaways are that CAST is a slightly lower prediction. Results are pretty comparable, as Robert said, except for Falcone.

**Olivia Devereux (in chat):** PA: Chester, Lancaster, and Berks counties.

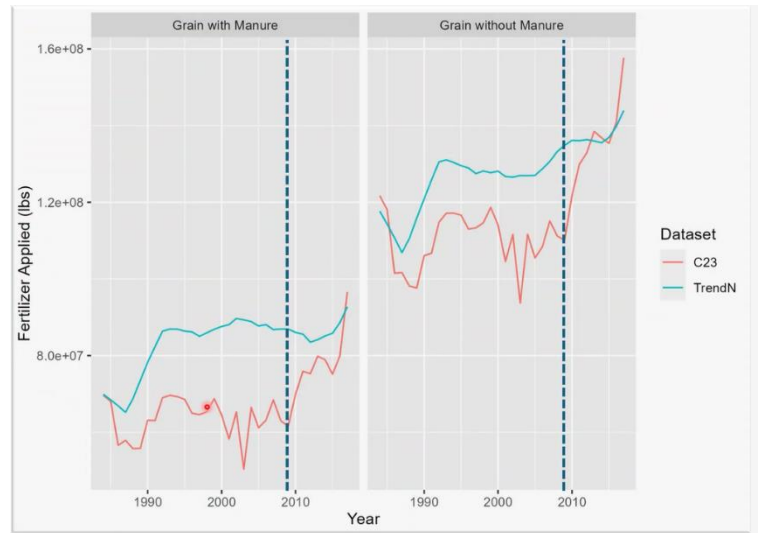
**Robert Sabo (in chat):** Falcone 2017 value was a projection we had to make because the sales data was not available... The **Falcone dataset** used the USGS dataset for 1987 to 2012 and then makes a prediction of what the 2017 value should be to generate a continuous time series.

### Trends Since 2009

**Robert Sabo:** I just want to compliment you and Joseph for a fantastic analysis. I think it's very compelling. It's also just nice to see how, if nitrogen fertilizer is cheaper, farmers hedge and maintain they yields and just try to get a little more security, because they can't control the weather, but they can control how much nitrogen they apply to try to protect their yields. If fertilizer is significantly cheaper, it makes sense that they are applying a little bit more than needed.

**Tom Butler:** Thanks, Robert, and I will give Joseph a huge shoutout. He's the brains behind this. I know he'd be doing a better job articulating this, but I think it's important for everyone here to see because this is essentially what we are finding in terms of looking at surpluses, price indexes, the fertilizer data that we have.

**Ken Staver:** I think it's good. But this sort of thing has been literally done for decades in terms of how farmers make decisions, and the price of corn, it's not the fertilizer price. Generally, how this analysis is done is it's the price of fertilizer relative to the price of corn. I guess I would first go back to where you had the red and blue line. The big difference was early where your other method almost was like we were underpredicting, which is part of our problem with our trend, right? So, you are saying well they both have the upward trend, which makes sense, but what's the blue line there?



**Tom Butler:** This is one of those different datasets. This is that TREND that's 1.4% bigger. That's a different data set than CAST.

**Ken Staver:** This is not Falcone. This is one that was relatively close. So, if you look at that graph again, and this is part of our problem, I think we've been bludgeoned with CESR on the starting point of 2009. CESR says look how horrible this is since 2009. So, if you look at the blue line here, this, intuitively in terms of the real world from the ag side, makes a little more sense.

Approaching 2009, we were low somehow. So, it looked like we were doing fantastic on our N use efficiency. Then, all of a sudden, it shot up since 2009. They're both up since 2009, but the one was higher before 2009, right? The TREND line? The TREND, since whenever it starts up, is much closer to the uptick in yield. Whereas, what we have in CAST, is the uptick that far exceeds yield in terms of its uptick. It's going up way faster than yield is going up. So, I think that the before 2009 period is just as important to consider as since 2009. So, it's kind of like where you are when you start. You see again and again it's the analysis in CESR. Well, that's the red line, whereas, we're talking about a situation here where maybe the blue line is what has really happened. What'd you say was the Ken method was? Something per unit of yield?

**Robert Sabo (in chat):** The trend data is the USGS dataset

**Robert Sabo(in chat):** TREND from danyka byrnes uses the USGS dataset, to be clear

**Robert Sabo (in chat):** once again TREND did not have sales receipt constrained data for 2017. What they did was use national fertilizer consumption and applied a county ratio.

**Tom Butler:** Yield divided by application.

**Ken Staver:** How we do nutrient management planning is applied N per unit of yield. So, it is flipped, right? The one pound per bushel. That's the standard kind of thing that flips around. It was in Karl's Bay Journal article about the 1 pound. Everybody talks about the 1 pound per bushel. This is the opposite, right? This is bushels per pound. So, the way we do it in nutrient management is applied N per expected bushel. That also has really shot up, but that's how nutrient management is done. There's some noise here, but the take home message to me is nutrient management in terms of N applications, which are supposed to be based on maximum economic yield, are just not being followed. It's not totally doing what we set out to do. So, if everybody gets convinced that this is all real, then the bottom line is you better go back and look at your nutrient management programs because we went from .9 pounds of N per bushel to 1.3 watershed wide on corn, our biggest N using crop in the watershed since 2009, with all these efforts for nutrient management. So, it looks good, but if this is real, if everybody concludes this explains why it is the way it is, then we have a real problem in terms of our N management, because we will not BMP our way out this. That's why we are disappointed about the progress on our WIPs.

**Alisha Mulkey (in chat):** Ken, I would not make broad statements like that. Maryland is increasing on-farm audits and ensuring compliance. That % is increasing

**Olivia Devereux (in chat):** Yes, it varies by state.

**Tom Butler:** Ruth, I know your hand is up, but we did have some discussion about this earlier at the office hours, and I want to make sure they made it into the main meeting, because I think this point here is likely getting at some of the concerns that we heard from jurisdictions earlier, and I want to give them time to voice them.

**Ken Staver:** I do have to just say, as a farmer, when I do my nutrient management plan, they don't say since nitrogen is cheap, you can put on 20 more pounds. This is just in Maryland where it is regulatory, if I put on 200 when my yield goal was 180, and they come back to me and I get audited, they don't say, well, nitrogen was cheap, so it's ok. That's not how it works.

**Alex Soroka (in chat):** Can I have this data to regress against N loads?

**Tom Butler (in chat):** we will get you the data

**Tom Butler:** In understand, Ken. This is watershed wide, so this is not necessarily just in Maryland.

**Ken Staver:** I know. What's another suspicious thing is the curve, just because the way the bucket is handled, they all track exactly the same. They track exactly the same. Corn without manure, since 2009, every state almost went from around .9 to 1 pound per bushel, up to 1.2/1.3. So, for 180 bushel yield goal, you are talking about putting on a significantly higher amount of N.

**Tom Butler:** Yeah, so I think the point is we need to discuss what to do with this. Is it real? What do people think about this having seen it? This has implications all across the board, and I'm not accusing anyone in any program of anything. I have no dog in that fight. I want to get the best information in here. I have no input on any of that whatsoever. I am not attacking anyone in any capacity. If this is not real, and it's not right, we need to find out what is. This is looking at it in the lens of some of the real world applications or correlations to the price index. It's looking at it in relation to yields. It seems like it's compelling that the trends, although as you said, Ken, maybe we underpredicted and then over predicted, but this is saying the trends are fairly consistent with other things.

**Ken Staver:** That blue line, pre-2009, it's significant. Why are they different? I am trying to look at your scale. It's kind of a tough scale to work with in my head, but they're pretty different, right?

**Robert Sabo:** Ken, your concern is about post 2010? So, what's going on, again with TREND, Danyka Byrnes' work, she actually uses the USGS data set 1987-2012. But, once again, for 2017,



this academic group, Danyka Byrnes, did not have the 2017 sales receipt constrained data. So, she used national consumption values for fertilizer from the industry and then just used a county ratio. So, nationwide, fertilizer use has been relatively constant, bouncing around 12 teragrams. So, that's essentially what is going on. Why the TREND data is lower in 2017 relative to CAST 23 is CAST 23 actually has sales receipts. Once, again, that trend in 2017 value is a projection.

**Ken Staver:** I am more interested in 1990-2010. Why is the TREND so much higher? Am I reading this wrong? What's the deal here?

**Robert Sabo:** It's probably partly tied to the bucket. Of course, USGS, their tonnage, they take the state level, county level tonnage reports, and they don't do any spreading for that fertilizer. Whereas, the Bay Program aggregate everything by states. Not all of Pennsylvania is in there. So, that's probably partly at play. We can drill into the data at the county level to see where the deviations are coming from, if that could be helpful for you.

**Ken Staver:** If CESR does the blue line analysis, it looks like N use is up, but if we match it against yield, I would suspect the blue line is tracking yield. Whereas, the red line is going up since 2009 way faster than yield. This is not N use efficiency. This is just total N use, and the blue line kind of looks like, to me, what I would expect. The red line, since 2009, is like we are in a heap of trouble if this is true. So, that's why I am interested in the blue line. So, maybe we had our problem from 1990-2010, and we kind of fixed in since then. But, when you fix it all at once, it looks really bad.

**Ruth Cassilly (in chat):** Rather than a failure in NMPs, perhaps it points to the fact that economic factors in agriculture will trump the improvements in the nutrient management programs- farmers are struggling to make profits in the face of low commodity prices and increasingly challenging weather patterns, in response to that they will use more fertilizer to ensure they maximize yield- we need to address these economic factors and the system as a whole to make meaningful progress

**Robert Sabo (in chat):** of the utmost importance is states make sure the tonnage reports are correct.

**Alisha Mulkey (in chat):** @robert, state chemist are housed separately in most of our agencies. We have little leverage over their data collection methods - which are driven by authority that isn't about WQ

**Elizabeth Hoffman (in chat):** Also, AAPFCO doesn't even enforce that all states report to them each year. For those we rely on trends.

**Tom Butler:** Ken, you brought up a segue, and I am going to use it. We actually took those two data sets, and we ran them through CalCAST. So, I'm going to run through what that means and everything there.

**Robert Sabo (in chat):** For TREND data--> "For the period 2012–2017, we estimated county-scale N fertilizer inputs based on national fertilizer use data (1994–2017), which we scaled to individual counties based on established ratios of county to national-scale use for the period 2008–2012 (USDA, [2018](#))."

### CalCAST Results

**Ken Staver:** I'm not going after agriculture. I'm probably one of the few people on this call that actually does this. So, I don't have a garden. It's farming. So, you spend lots of money on fertilizer, and you're trying to figure out what your grain is going to be worth, and you try and grow it. So, I'm not going after agriculture. I'm just dealing with what we are trying to do here. That's all, and making sure what we are trying to do is right. I saw Alisha had a comment. All I am saying is that nutrient management in Maryland is required. There aren't exemptions. It's required. People talk about voluntary all the time. Well, Maryland it's required. I have been

audited. Not everybody is audited every year, but you do get audited and, when you do, I have never been treated in a way that said the price of fertilizer was low, therefore you can put on more. That's not how it works. So, that doesn't change my nutrient management plan on paper. I'm not taking a shot at agriculture. I actually think something is going on here that we are kind of misrepresenting 2009. I'm not convinced of it. It runs counter to what my experience is in terms of what's going on out there. It seems like it's an excessively sharp upward trend, but definitely nothing about agriculture having any kind of villainous side to it. This is just science. This is just working numbers. It seemed like there were some people hearing this from a wrong perspective. I didn't intend to sound a certain way, so sorry about that.

**Tom Butler:** I do want to articulate that no one in this meeting is attacking anyone. We really want to figure out if this is real and, if not, how to make it better. I am not trying to bash anyone. I am not trying to imply anything. I don't want anyone's language here to be construed in that way, because we are working towards the same goals. So this is, again, trying to be an open space here to get through these.

**Robert Sabo (in chat):** it will be helpful for the group to see how trends truly evolve once we get the state 2021-2024 data.

**Alisha Mulkey:** Yes, this should be collaborative. My comment in the chat earlier in response to Ken, and Ken knows this as well as anybody, the Maryland regulations is not about the price of fertilizer. It's not about the bushel price of the corn. It is, every year, the expected yield, relative to those land grant recommendations. Like he's just said, Maryland has regulated in that way for decades. We have added staff. We are doing more compliance farm visits every year. We are seeing that compliance increase year over year. It's not 100%, nor would it be. But, what's going to be important to a state agency like us is that, however we think about the data set, we have to be able to demonstrate the effectiveness of those nutrient management BMPs. So, my interest would be taking some of this data down from this watershed scale to more of a state picture and letting us see what some of these states look like side by side. Thinking about, in the case of Maryland, where we are actively sending people to the field verifying those plans, that should be reflected in how the applicants are being applied in the model, because we know it to be true, the same way we verify other BMPs. So, that's Maryland's ask is that however we get to trends in the methodology, that it gets a little more state specific than what is this watershed bucket right now. We can keep talking about what that data looks like. The state chemist data is not necessarily going to get better. So, I'm not disagreeing. But, the agencies don't have a lever to correct the QAQC, and we need to all know that going into it. Another state can speak up if they can do it differently. I think Delaware had a little more control with their state chemist, but that is not the case in most of the states. So, we need to acknowledge that as we are thinking about if we continue to look at the AAPFCO data.

**Ruth Cassilly (in chat):** Talked about this in the office hours, will offer it for the larger meeting- to improve the fertilizer data collected at the state level, it would be advantageous to have a policy/legislative discussion with Chesapeake Bay Commission to determine if collaborative (all jurisdictions) policy or legislative efforts could improve the ability to collect improved data

**Dave Montali:** If you evaluate the nutrient management plans, you audit them, and, if for whatever reason the producer did not put on as much as prescribed in the nutrient management plan, Would you still call that compliant? I.e. going back to the idea that if the price is high and the farmer's judgement is I am not going to spend that money, it's too much risk, I am going to put on less, he would still be compliant with his nutrient management plan, correct?



**Alisha Mulkey:** Yes, Dave. As I said, it's very binary. This is the land grant recommendation relative to your expected yield, and it's a yes or no. So, less than that would still be considered compliance in Maryland.

**Dave Montali:** I'm trying to get back to Tom's point that it seems like the actual amounts being applied are contingent upon what yield they aim at, plus the price. Then, when we look at CAST in 2009 as compared to something else, it seems like the amount we have there is much less. If that's coincident with the price being high, is there some explanation there? Why is CAST so low in 2009 and has shot up so much post 2009, coincident with a drop in cost? Is it possible that compliant farmers with their nutrient management plans just simply said, no, I'm not putting 150 on, I am only putting 130 on, because it costs too much.

**Alisha Mulkey:** Dave, was that a question directed at me?

**Dave Montali:** No. The part that made me think about that was you saying we go out and assess them. We go in the fields, and we call them compliant, but compliant doesn't necessarily mean that they didn't underapply in years where the price was high. That's what I was trying to get at.

**Alisha Mulkey:** I would agree with that, Dave. I would just add that, in Maryland's case, we could consider that a precision nutrient management technique, right? That is a reportable BMP, and we have a different mechanism of trying to capture that portion, but that's probably a separate conversation.

**Jess Rigelman:** I understand the whole nutrient management thing, and that all makes sense. I know that we're talking about maybe, instead of using sales data, trying to use something else. But, if we were to continue using sales data, I am not going to argue if that is right or wrong. I don't know this to the level of detail I did in the past as I haven't worked with it for a while. Maryland's sales data has shot up since 2014 with the trends that we're seeing with a lot of the states. So, what I am wondering is, is that we've been using sales data along, it has shot up, is there something that you would be aware of in the collection of that data in the more recent years that would cause that data to show the sharp increase as the years passed? Like is it taxed differently? I'm not arguing any of these points, I'm just wondering why the AAPFCO data has shot up so much and if the states have any kind of explanation for that. We may be stuck using the sales data, so if there's a better way we could use it, that would be great.

**Robert Sabo:** On the NuGIS side, in the coastal plain, excluding the Delmarva, but the coastal plain on the Western shore, the Piedmont, and the Ridge and Valley province of Maryland, they've had amazingly low negative agricultural surplus values for nitrogen, which is astounding for 5-10 years. So, it seemed like farmers were greatly under fertilizing their fields based on the NuGIS data platform that's maintained by the Fertilizer Institute. So, it's not outside the realm of possibility that they have boosted their fertilizer application rates to get out of that strong negative territory.

**Tom Butler:** Thanks, Robert. I might lean back towards the state reps to see how they view it, because even if they don't have the handle on the exact data, they would know more than I think we would.

**Alisha Mulkey:** I would have to take Jess' question to the state chemist to see if there's been anything different in the methodology. Their authority is the same, but if there's been something relative to data collection, pricing, or accounting in that time window, we'd have to ask them. So, I will circle back to you on it.

**Jess Rigelman:** I just keep wondering why AAPFCO data keeps going up, but I do understand your points about nutrient management, and application should be going down, and that you have a lever for that. So, those two trends are at odds, and I am just trying to figure out if there's something different about the AAPFCO data that changed. So, I appreciate that.

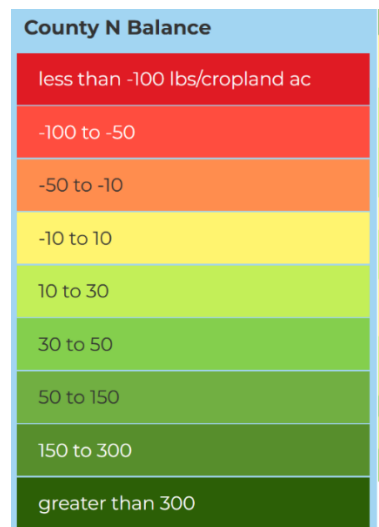
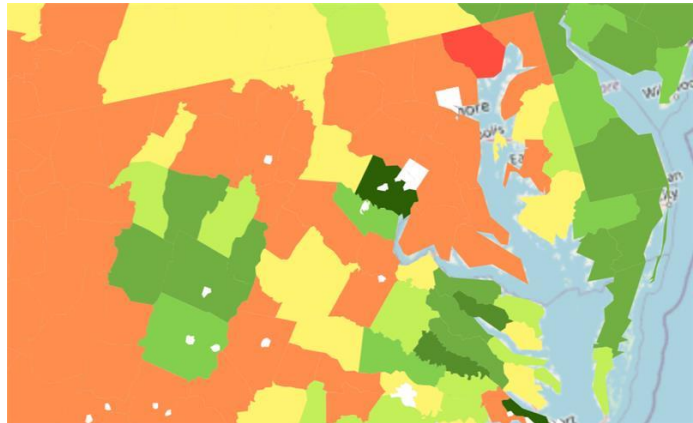
Robert Sabo (in chat): total cropland mass balances: orange, red, and yellow is negative balance

Clint Gill (in chat): We just had our state chemist give us an update for 2024 and we had a statewide decrease in fert sales by 11% for DE

Olivia Devereux (in chat): How many acres of farmland were lost during that same period?

Clint Gill (in chat): I don't know the answer to that, Olivia, but we had increasing fert sales as we were losing farmland from 2020-2023, so I think the drop in 2024 was mostly cost of fert and price of grain. But that's wild speculation.

Robert Sabo (in chat):



Ken Staver: I'm not an expert at all on fertilizer. Only at my own scale. Nitrogen is blended, fertilizer is blended for agriculture. So, it will come in one form and then blends get made for field application. I know that the products that are available change over time. You don't have the same products now that you had in 2000. Some of them are the same, but some of them are different. So, how they get blended and how they get accounted for, Mark always seemed to be concerned that, possibly in an accounting system when blends were made, there was a double counting. But, that was just a comment he seemed to make quite often. I don't know the veracity of it.

Jess Rigelman: Would that blending trend be more prevalent in later years versus earlier years?

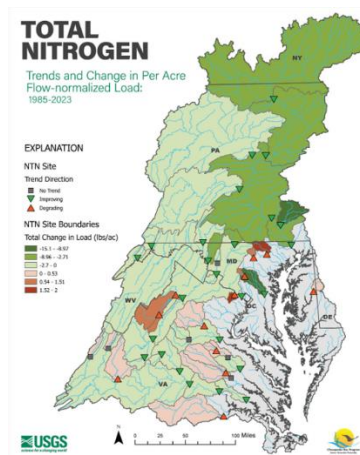
Ken Staver: I don't know, but something possibly changed in product transportation and the accounting system. But, Jess, you said something about going down. There's no expectation of total use going down? We would hope that the N use efficiency would at least hold the same, right? Not so much that the use would go down?

Jess Rigelman: Yeah. It's just, right now, what's showing with sales is going higher than yields. So, that's why I am wondering how they got so out of whack, and if it's an accounting issue since, like I said, we are looking at sales data.

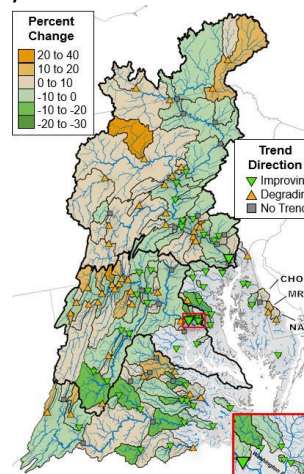
**Tom Butler:** If I could take on a comment Clint has seen here, he's talking about an update for '24 about a statewide decrease. What we have here for the price index also seems to indicate a rise going up here, and maybe that would line up with what we've seen.

**Olivia Devereux:** I was graphing these data yesterday, and there seemed to be quite a bit of county variation between the crop yield and fertilizer, with both crop yield and fertilizer, and some trended perfectly together. As yield went up, fertilizer went up. Others, the slope of the line for one was much greater than the slope of the line for the other. Looking at it watershed wide is one thing, but we also need to look at the acres. Delaware, particularly Sussex County, probably outside of the Bay, but they've been developing very quickly. So, I think there are probably a lot of different things going on. People are making a lot of comments. I think everybody is right, but not for the whole watershed. It really does seem to be a specifically state by state and county by county situation.

**Scott Heidel (in chat):**



**Alex Soroka (in chat):** Here's the 10 year 2014-2023



**Robert Sabo (in chat):** MD farmers created a very low floor that would be difficult to sustain in the western coastal plain, piedmont, and mountain provinces.

**Dave Montali:** It seems to me like Ken's point about 2009 being so low is a big part of this problem. The TREND methodology seems to have a smoother slope to it and an evaluation, at least for the time period when we have sales data, I think we should explore that methodology and see if we can use it. I don't even know the differences, but that methodology makes a better

line that will alleviate some of this problem. We can talk about what to do when we are predicting the future but, at least for the past, if we could get that trend line rather than our CAST line, it wouldn't show such a vast difference in the recent time period.

**Tom Butler:** So, I think we did make that attempt with this CalCAST run. So, that impact was more muted than we had thought. I think that might get at it a little bit. We can certainly talk more about that, though. We are short on time here, so I do want to turn through the rest of this presentation, because there are other parts to this, too.

**Robert Sabo (in chat):** Dave, the 2012-2017 TREND data is a projection of sales data. or TREND data--> "For the period 2012–2017, we estimated county-scale N fertilizer inputs based on national fertilizer use data (1994–2017), which we scaled to individual counties based on established ratios of county to national-scale use for the period 2008–2012 (USDA, [2018](#))."

#### What Should We Do?

**Tom Butler:** We want to make some changes. So, there are a couple parts to this that people have made comments to. The first, Clint, you said you have updated state data. I suspect this is true for most of the states. So, Maryland, Virginia, Delaware, and Pennsylvania, if we could collect information from you, I would put this call out to everyone, but those are the four states I know who have it. If we could get that and see if we could see how that's shaping up, perhaps that is more realistic. For the processing, do we want to do that state scale? That's what we are hearing. Where do we want to do that? Do we want to do that right at the beginning? If we want to totally switch to a different method, that's fine. But, I want to bring up these points so we can discuss them a little more, because people have hinted at them. This is kind of an official data call here. What I've got is a table for all the points of contact for state chemists who we've talked to for each of the jurisdictions. We want to try and update that data and see how that impacts this. I think that's a good first step. Try and get that so we can run it, probably not by next meeting, but at least get it due the next meeting so we can see what we'd want. Those fields are listed here for what we would hope to get from you guys. So, I want to make that data call. I don't know if it's possible for West Virginia and New York. We have a method to deal with that, but I want to put that call out as a first step. I also want people to discuss a little but if the state scale is fine. It seems like that's the case. So, we can certainly look at how we want to do that. If there were suggestions, I'd be open to those. So, formal data request, and please drop any comments you have on scale in the chat.

**Clint Gill (in chat):** Tom, are you reaching out to the Chemists, or are the state reps?

**Tom Butler:** Clint, I can certainly reach out to a point of contact with the state chemist if that is what people would prefer. Please email me from your jurisdiction, and I will put you on a contact with your state chemist so that we have someone represented there. I think that's a good way to do it. So, I will plan on including someone, probably the representative from this group, and your state chemist.

**Clint Gill (in chat):** Nope just making sure, thanks!

**Ken Staver:** We were talking about the grassland- N use on hay and pasture- and actually putting more N on grassland, I guess. Some states were at one point. Some states were at another point. Seems to me if we're going to go that way, the state level really makes more sense if people aren't going to handle that issue in the same way. I don't have a big dog in that grassland fight, but if someone starts saying we know we are using more N on our grassland and that would take some off of other land uses, then it shouldn't be watershed wide if they're the only state that's sort of going down that path.

**Dave Montali:** You know my failings with state chemists and trying to get data. I will check and see if that contact is still appropriate, but what we really want is state data post '17? Is that what we have already? We have AAPFCO through '17, and we don't have anything after that date?

**Tom Butler:** For NY and WV, 2017 through as recently as you can get it. For the others, it's 2020 through the most recent. 2017, '18, '19, '20 are what we have from MD, PA, VA, and DE. So, I would ask for that.

**Dave Montali:** Theoretically, you can now get, with states compliant giving it to you, '23 or 24 sales data, right?

**Tom Butler:** That would be the hope. I know some indicated they take a year or two for their QA, so that's something we have to contend with. But, updating it from 2020 sounds like it would reveal some new results.

**Robert Sabo (in chat):** I am hopeful the fertilizer sales trajectories stabilize post-2020, and the 2014-2020 period was just an adjustment.

**Tom Butler:** So, again, we'll be reaching out for the contacts for updated data. Any comments on scale, we understand state, but in that process there might be some wiggle room. So, we might have to test things out and come back to you with that. But, we'll probably reach out for clarifications on that. If you have anything you want to see explicitly, please reach out within the next two weeks.

**Action:** Tom will reach out to the state chemist points of contact, copying the respective AMT representative, to collect updated state data including fertilizer tonnage. Examples of data fields requested include: Year, State, FinalFIPsRepPeriod, FarmReal, RealTonsRealLbs, Nconc, Pconc, FarmNLbs, NonFarmNLbs, UnknownNLbs, FarmP205Lbs, NonFarmP205Lbs, and UnknownP205Lbs. Members are asked to provide any information they have on updated state fertilizer data to Tom ([Butler.Thomas01@epa.gov](mailto:Butler.Thomas01@epa.gov)) and Joseph ([jdelesantro@chesapeakebay.net](mailto:jdelesantro@chesapeakebay.net)) by July 11<sup>th</sup>.

**Action:** AMT members are asked to provide feedback on potential methodologies for the processing and scale of inorganic fertilizer. Members with specific data requests or clarifications should reach out to Tom ([Butler.Thomas01@epa.gov](mailto:Butler.Thomas01@epa.gov)) and Joseph ([jdelesantro@chesapeakebay.net](mailto:jdelesantro@chesapeakebay.net)) within the next two weeks.

## **Nitrogen Fixation 10:05-10:30 [25 min (10 min presentation 15 min discussion) (Tom Butler, EPA)]**

The AMT walked through how N fixation works in CAST currently and how it will change when we utilize the new yield data for Phase 7. **Informational.**

### **Discussion:**

**Dave Montali:** The seemingly significant increase in fixation, what's driving that?

**Robert Sabo (in chat):** increased soy yields!

**Candiss Williams (in chat):** I have to log off but I want to let folks know that I have a new role at NRCS, the National Nutrient Management Specialist. CPS 590 Nutrient Management will be reviewed this year. Please reach out if you have comments or questions.

**Tom Butler:** I would have to dig a little bit deeper. Jess, if you had any insight as to why we saw an increase in fixation happening from 2009 onward, I'd be open, but I would have to dig more into that.

**Jess Rigelman:** In general, it is that the acres of soybeans increase, but not only that. The yield of soybean increased. So, that is why you have an increase in fixation, because the fixation is based on yield, and yield for soybeans have that upward trend.

**Ken Staver:** The scale only starts at 140, so it looks like it's more than it is, and I think it's like 4 pounds of fixation for bushel. So, 20 pounds is only like a 4- or 5-bushel increase. So, that kind of is not that much really. But, I do have a question. So, was some kind of fixation algorithm changed? Why is there the difference between the Phase 6 and Phase 7? Are we putting less manure on soybeans?

**Jess Rigelman:** Fixation is based on yield. Our yield methodology changed. But, also in Phase 6, we have one yield which is the application attracting yields. So, that expected yield. In Phase 7, this methodology is based on the weather independent yields. So, it's not only different yields, but also the weather independent yields as opposed to the application attracting yields.

**Ken Staver:** Ok, so it's totally a yield increase between 6 and 7. Makes sense.

**Alex Soroka (in chat):** Please note that this graph is dramatic, but the scale starts at 300 and ends at 400. So this is really movement in the 20-30% range.

**Tom Butler:** Yes, Alex, thank you for the comment. The scale starts at 300 and goes to 400, so take that into account.

**Robert Sabo:** In regards to the CalCAST simulation experiment, when you compare TREND fertilizer versus the CAST 23 fertilizer, did that incorporate the weather independent yields that Joseph has developed and this fixation update?

**Tom Butler:** That I believe did have the new yields in it. I would need to talk with Isabella offline, though, unless Jess knows. I'm pretty sure it does.

**Jess Rigelman:** No. We had to use Phase 6 stuff for that. So, it wasn't the new yields. It's just new fertilizer. That was the only difference.

**Robert Sabo:** I know there's promising increase in soy yields, which is a good news story, but was there also corresponding increase in soy acreage that partly explained this increase in total mass flux?

**Jess Rigelman:** Yes.

**Robert Sabo:** Great. It's just interesting because you have a 20-30% increase in fertilizer use, but also a corresponding increase in soy acreage. It's kind of an interesting puzzle to put together.

**Ken Staver:** On loads, it's a little different with soybeans, because there's a little excess for every extra bushel produced. If we are just in fixation mode, there's a little extra excess fixation, the way the model handles it, for every bushel. So as the soybean yields go up, it's the opposite of grains where you're using your fertilizer more efficiently. You actually get a bump in loads as the yield goes up with soybeans.

**Robert Sabo:** We struggle with something similar, Ken. Do we assume that soy fixation removal has a surplus implication of 0 or, as you said, is there a little bit leftover? That's one thing at the national inventory we are trying to figure out as well. So, I'd be interested to see what you guys decide.

**Bill Keeling:** I did want to have one comment on the fixation. We are all clear that this is leguminous fixation and we're not talking about non legumes fixing, at least not at those levels?

**Tom Butler:** It's leguminous, yes.

**Bill Keeling:** Early in Phase 6, there was a high level of fixation. It was like 150 pounds for fescue. So, just want to make sure we're not doing that again.

**Tom Butler:** I will look into that to make sure that's the case. I don't believe that is the case. I'll talk with Jess offline to make sure that is the case.



**Action:** Tom and Jess will coordinate offline to confirm that fixation in CAST does not include non-leguminous fixation.

**Offline:** This was confirmed to be only fixation from leguminous crops.

**Animal Systems Excess Discussion 10:30-10:55 [25 min (10 min presentation 15 min discussion) (Bill Keeling, VA DEQ; Tom Butler, EPA)]**

It has been brought to the partnership's attention that circumstances have arisen where BMPs are being submitted in excess of what CAST shows possible. In these cases, excess BMPs are not given credit within CAST. We examined potential causes and solutions for this. [Informational](#).

**Discussion:**

[Olivia Devereux \(in chat\)](#): How many states are reporting the actual number, not the default?

[Jessica Rigelman \(in chat\)](#): only VA

[Dave Montali](#): Thanks for the heads up on animal waste management systems cutoff. That one has taken me aback, and I'm going to look. Something tells me that isn't right that 46% of what we submit is getting cut off. I haven't seen that in past years. There's some cutoff, which I think I understand, but is it possible that that is representative of not only like true excess but of expiration of practices or not?

[Bill Keeling](#): Expiration wouldn't even make it from NEIEN into CAST if it had a failure or was out of lifespan. So, this is what was submitted to CAST.

[Dave Montali](#): Ok. I'll have to look into that. With regard to riparian excess, I know that's a big issue. I think it is related to the default credit that we get by milestream or by acreage, and there may be some nuances for states like West Virginia that report acreage that they get too much credit. But, I talked with folks earlier this week, Auston, and I think a path forward may be for me, you, and Elizabeth, because I heard Elizabeth Hoffman has opinions on the issue as well, but this may be something that we can talk about and work through the Watershed Technical Workgroup side rather than the AMT side. I don't think we're going to get into how we model animal time, confinement in the pasture and the riparian. I don't think that's really the issue as much as how we credit when we only know area of practice implemented.

[Bill Keeling](#): The riparian fence, you suggest that the WTWG be the group that

[Elizabeth Hoffman \(in chat\)](#): MD is scheduled to meet with Auston next week, happy to talk more after that and hearing more. We do have questions, more so around exclusion fencing.

[Bill Keeling](#): So, you're suggesting the riparian fence issue that I currently am showing actually be the Technical Workgroup that kicks that around and not the AMT?

[Dave Montali](#): Let's talk about it first. Let's talk about that individually and see what the best path for looking into that would be.

[Bill Keeling](#): I don't want to speak for Tom, but I am sure he'd be glad for that to not be on the AMT's menu- anything that can be passed around to somebody else. But, what I understood is these CAST factors are being looked at by the AMT and the aspects that might lead to excess may be in some of those factors and how they're used in the model and/or derived. So, if they're already looking into some of that, then that might work better with the AMT. But, I don't really care which group at the Bay Program is the deciding body at some of these as long as it is kicked around, discussed, and a decision is come to. It doesn't have to be the decision I would think is right, just that we do this and kick it around, talk about it, and come to some kind of decision.

**Elizabeth Hoffman (in chat):** For AWMS, our excess tends to be poultry and real world populations fluctuating quicker than census and CAST keeps up. But glad Bill is bringing up, need to look more closely at MD #s and can follow up with you (Dave) and Bill or whomever.

**Jess Rigelman:** I have several issues to address, but I'll talk about the access area first. We've had meetings with four of the states. We have not met with Pennsylvania and Maryland yet, and we are meeting with them next week on some excess analysis I've done. For the most part, that has excluded these three BMPs because I know you wanted to introduce it, and I wanted to have the states have a look at their data first because I have some real questions about potential duplicated as they relate to animal waste management systems. Again, I'm not saying they are duplicates, but I just wanted some numbers from the state. But, to get to access area, we talked with West Virginia a couple of days ago. So, there are two factors here. Number one, Virginia is the only one that actually reports animal units. The other states rely on defaults, which is fine. The default is like 17.6 animal units per 1,000 feet of fencing. However, most states don't report a length and width. They just report acres. So, what Dave is talking about, what we assume is if you just report acres, then we have to get the length out of that. So, we assume that a narrow buffer is 10 feet wide, and we assume a normal buffer is 35 feet wide. So, if your data is dominated by buffers that are greater than 35 feet when we calculate your length fence, you're going to get a lot more length of fence and, therefore, more animal units. So, I think the thought is maybe we should assume that a normal buffer isn't the minimum of 35, but is more than that, and that's something that I think would be in general, maybe not part of the AMT, but I agree in general that one needs to be looked at. Either of the defaults or both of the defaults could be changed. I have no dog in that fight. As far as animal waste management systems and mortality composting, there is a lot of excess. I have quite a few theories and potential things that we can look at. But, like I said, I wanted the states to be able to look at their data and try to address some things that I think could be misreported or could be duplicates and, if it's not, that is fine. I have no judgement there. I just want to get a greater idea of the accuracy of the data that can be dealt with, so that I can start to look at some of these solutions. Then the plan was that I would come to the group next month with these ideas. I think there are some factors as you said, Bill, as far as how we convert systems into animal units. We have one number per systems, which I believe the AMS developed based on animal waste management systems. Should that conversion rate be the same for mortality composting and waste management systems? Is that number a cap load for a mortality facility when, maybe, they're not reporting at capacity. I guess every farm isn't at capacity, yet we're assuming when they report systems, that it's working at capacity. Those are some questions that I have and will bring this in a much more structured manner to the workgroup next month, and I appreciate Bill bringing this up. But, I am more than willing to hear anybody's theories and stuff on this today. So, I don't mean to cut it off as in we're going to talk about it next month, but I just wanted to say that we are thinking about it, and we do appreciate that you've brought it up, and we will be back with more information.

**Bill Keeling:** One little wrinkle in that is I think most animal waste systems are designed for the permit maximum number of animals. That may not be what's placed. So, that could be a little disconnect if people are reporting the capacity of the system is designed for X, when Y is the actual number going in. Sometimes, or at least for Virginia for the permitted data, where we had placement numbers that were different than permit max, we used the placement numbers based on the inspection data. So, as I remember, it was a majority of the overall permit operations, at least in recent reporting, had their numbers lowered based on what was actually placed according to permitted inspection data. So, I believe different states are going to have different capabilities regarding this sector and what they can bring forward.

**Dave Montali:** Historically, I've looked at submitted versus credited and have not ID'd an animal waste management system cutoff except for two counties, turkeys, periodically coming back as getting cutoff based on the idea that the submitted BMPs, or the animal units applied for those, were less than the animals that have occurred. In other words, as time has gone on, the model side there's less animals, so they're getting 100% coverage, and that is the extent of excess impact animal waste management that I've seen over the years. So, I'm really trying to understand if there's something different about 2024 progress that would suggest 46% of our AUs are getting cutoff. I've got to look into it, but is this a 2024 issue or is this an issue that is pervasive over time?

**Bill Keeling:** When I put this together, I was using the February 14<sup>th</sup> scenario that was available on CAST. So, I haven't gone back to look at the official final to see if the numbers changed. But, I had initially done this slide on February 7<sup>th</sup>, and there was no difference between the February 7<sup>th</sup> and the February 14<sup>th</sup> in terms of this particular BMP. So, this was what was right out of CAST submitted credited reports for that particular scenario when I was putting it together. So, if it's changed subsequently, just be aware.

**Jess Rigelman:** If it would have changed, it would've been minor. This is an issue that is happening from year to year. I don't know about in West Virginia's case. Maybe they had a jump this year, I'm not sure. But, I would imagine that Bill's numbers are either 100% correct or, if they weren't, it would have been minor adjustments. You can easily run this on 2023, but I'm guessing you're going to see lower numbers for sure, but similar.

**Dave Montali:** Samuel and I addressed the potential duplicate email you sent and, basically, we find for the animal waste management system there's no duplicates. It just happens to be the same value for a number of different contracts. Our input database for animal waste management system hasn't changed much year to year, but I don't really think that I've seen submitted versus credited in the past have this drastic of an impact. So, I'll have to look into it. Thank you.

**Jess Rigelman:** I saw the email that came in from Sam during this, and I skimmed it, but I will need to dig into it further. But, you and him also brought up another point about older records and defaults, so that will be something else that I'm going to add to the list of things that can be looked at.

**Bill Keeling:** Jess, just for your information, the permitted facilities are identified as potentially duplicate. I'm going to be sending you aerial photos showing their proximity to each other, their different permits, their different contracts, but they have the exact same number of critters per facility. So, if you apply the same factors out of CAST to calculate animal units, they are identical. It's just how it looks but, so far, I've not seen any duplication in the Virginia animal waste management data.

**Jess Rigelman:** Ok, that's good to know. Thank you to all of you for looking into it.

**Elizabeth Hoffman (in chat):** for mortality composting, we are credited for the extent but there is not a load associated, correct? that was never decided upon, I thought. so the BMP doesn't "offset" anything because there was no agreed upon "load". Or did that change and I missed it?

**Elizabeth Hoffman:** I think my question was for Bill, but it might be more for Olivia or Jess. For mortality composting, we are credited for the extent reported, but there's not a load associated, right, because that was never agreed upon?

**Jess Rigelman:** Correct. There is no, for lack of a better word, "dead animal" load. But, we have animals and we don't factor in a mortality rate, meaning we assume those animals are alive. Therefore, that's why we have the BMP credited as a part of that feed space load.

**Bill Keeling:** To be honest, Virginia, the reason our excess is 0 and we have such little submitted is, I ran a scenario in CAST both 19 and 23 of the 22 progress scenario, and I removed all of Virginia's composters, and our loads went up 2 pounds in CAST 19 and around 10 pounds in CAST 23, statewide, for over 300 BMP records. That, to me, was meaning there's no benefit really for reporting these. This one BMP was part of an MEB for an IJA contract, and that's why it got reported. Otherwise, we don't consider it a cost-effective BMP worth reporting. But, thank you for the opportunity to go into this and to have opportunity for discussion. If any of the three needs to go somewhere else, I'm ok with that. It's just if some of these factors are being looked at by the AMT, it would seem this would be the time for them to understand and provide guidance.

**Elizabeth Hoffman (in chat):** I like keeping it close to AMT to start.

**Tim Larson (in chat):** hasn't bird flu resulted in high numbers of composted birds?

**Tom Butler:** Thanks, Bill. I appreciate that, and I'm sure the relevant conversations will take place here. We did have a comment from Tim in the chat asking about compost birds from the bird flu. My understanding was I thought that these were not for mass mortality events, but I will let people who know more speak to that.

**Olivia Devereux:** That's correct, Tom. There's no mass mortality in the model.

**Bill Keeling:** There are also no reporting mechanism or numbers that get sent to me to be passed onto the Bay Program related to mass composting or extra high mortalities, or however you want to characterize it.

**Jess Rigelman:** I just wanted to add one more thing. Mortality is one of these things that is, for the most part, almost every state reported by systems, and that's why I think that is something that we need to look at in this group. The systems to animal units conversion, especially as it relates to mortality composting. Because, like I said, I'm pretty sure that systems to animal unit conversion was developed in Phase 6 based on animal waste management systems and, I'm no expert, but I don't know if the same conversion should be used. They're two different types of systems in my mind. So, that will be something that I will bring up. So, if anybody has information on that for the next month, I would appreciate it if you either bring it up there or send it to me. That would be great.

**Olivia Devereux:** That's a great segue, mentioning next month. Tom, can you tell us what's on the agenda for next month? I'm probably asking because I am eager to get to the point where we talk about the nutrient concentrations in manure, because we can't replicate the method from Phase 6, and I don't know how to explain that.

**Tom Butler:** So, next month we're on track to talk about the scale of fertilizer, try and make a decision on that, as well as further refinements for any of the sources or things like that. We want to look at the land use loading rate ratios contingent on getting that up, and then try and put a bow on this BMP excess as best we can. That's at least our plan for now, and that's what we have coming up. But, I will pass it to Zach to kind of lead us to more of a close out there. Sorry, Olivia, if that doesn't give you a clear answer as to where that one goes, but we can talk more offline.

**Zach Easton:** Tom, you just gave a recap of next month. So, I guess I will add that all three of the items on the agenda for next month are currently listed as decisional. So, I think we'll be following up offline with what needs to occur for those items for next month.

**Action:** Members with additional information on the systems to animal units conversion as it relates to mortality composting should contact Jess ([jrigelman@j7llc.com](mailto:jrigelman@j7llc.com)) or provide that information at the July meeting.

**Recap/Closing 10:55-11:00 [5 min (Zach Easton, VT)]**

**Adjourn – 11:00**

Up Next:

Office Hours: Friday, July 11<sup>th</sup>, 2024, from 8:00 - 9:00 am.

AMT Meeting: Friday, July 11<sup>th</sup>, 2024, from 09:00 - 11:00 am.

Participants

Zach Easton, VT  
Tom Butler, EPA  
Samantha Cotten, DNREC  
Cassie Davis, NYSDEC  
Elizabeth Hoffman, MDA  
Scott Heidel, PA DEP  
Helen Golimowski, Devereux Consulting/CBPO  
Eric Hughes, EPA  
Jessica Rigelman, J7 Consulting/CBPO  
Contractor  
Arianna Johns, VA DEQ  
Karl Blankenship, Bay Journal  
Tim Larson, VA DCR  
Dave Montali, Tetra Tech  
Nicholas Moody, VA DCR

Olivia Devereux, Devereux Consulting/CBPO  
Ruth Cassilly, UMD/CBPO  
Joseph Schell, DNREC  
Auston Smith, EPA  
Robert Sabo, EPA  
Alex Soroka, USGS  
Clint Gill, DDA  
Tyler Trostle, PA DEP  
Holly Walker, DNREC  
Candiss Williams, NRCS  
Tad Williams, VA DCR  
Patrick Thompson, EnergyWorks  
Bill Keeling, VA DEQ  
Alisha Mulkey, MDA  
Ken Staver, UMD/Wye

\*\*Common Acronyms

AgWG- [Agriculture Workgroup](#)

AMT- [Agricultural Modeling Team](#) (Phase 7)

BMP- Best Management Practice

CAST- [Chesapeake Assessment Scenario Tool](#) (user interface for the CBP Watershed Model)

CBP- [Chesapeake Bay Program](#)

CBPO- Chesapeake Bay Program Office (houses EPA, federal partners, and various contractors and grantees working towards CBP goals)

CBW-Chesapeake Bay Watershed

CRC- [Chesapeake Research Consortium](#)

EPA- [United States] Environmental Protection Agency

PSC – [Principals' Advisory Committee](#) (CBP)

STAC- [Scientific & Technical Advisory Committee](#)

TMDL- Total Maximum Daily Load

WQGIT- [Water Quality Goal Implementation Team](#)