



Agricultural Modeling Team

June 12, 2026

9:00-11:00AM

[Visit the meeting webpage for meeting materials and additional information.](#)

Purpose: To hear updates on the structure of the partnership and stay informed regarding model development.

Summary of Actions & Decisions

Action: The AMT will continue to meet through the completion of the Phase 7 Model (through 2027). The AMT will remain an action team under the Clean Water Goal Team and will be called upon as needed for agricultural data inputs and future model/Phase updates beyond Phase 7.

Action: The AMT will continue to review data for informational/familiarization purposes (no changes) to help aid in the official Model review post February 2027. The tentative AMT timeline is as follows:

- a. Stage 1: Source Data (April 1- July 31). *No Changes.*
- b. Stage 2: Input Data (August 1- October 31). *No Changes.*
- c. Stage 3: Output Data (November 1- February 1, 2027). *No Changes.*
- d. Post February 2027: Examine loads and connect to information from the associated source/input data. *Make changes as needed.*

Action: Tom Butler, EPA, will update the manure generation diagram slide to note manure transport and manure treatment as the transport BMPs in manure generation diagram.

Action: AMT members are encouraged to note areas of potential concern as a result of these bi-monthly reviews of source, input, and output data and begin internal jurisdictional discussions ahead of the official model review period.

Action: Following the meeting, the source data discussed on the call will be circulated to the group. Please reach out to Tom Butler (Butler.Thomas01@epa.gov) with any questions and/or additional requests for calculations or information.

Post Meeting Note: Data was distributed via email from Caroline Kleis (Kleis.Caroline@epa.gov) on 6/12 and is also accessible on the calendar page linked [here](#). Please contact Tom Butler (Butler.Thomas01@epa.gov) and Caroline Kleis (Kleis.Caroline@epa.gov) if you are unable to access this data file.

Action: AMT members should reach out to Tom Butler (Butler.Thomas01@epa.gov) and Caroline Kleis (Kleis.Caroline@epa.gov) with any topics you would like to discuss at the August 14th AMT meeting.

Meeting Minutes

I. Introduction & Announcements

Lead: Tom Butler, EPA

Tom briefly went over the ongoing discussions surrounding the structure of the AMT within the Chesapeake Bay Program Partnership. This agenda item was designed to keep AMT members up to date on whether the group is required to meet beyond its currently planned lifespan. In particular, Tom noted the ongoing changes within the partnership to simplify/streamline workgroups. In the short term, the AMT will continue to review data inputs until the completion of Phase 7 (through 2027). Long term, this group will become a renewable action team and may be brought back for relevant data updates as the expertise is needed.

Actions:

1. The AMT will continue to meet through the completion of the Phase 7 Model (through 2027). The AMT will remain an action team under the Clean Water Goal Team and will be called upon as needed for agricultural data inputs and future model/Phase updates beyond Phase 7.

II. Data Updates

Lead: Tom Butler, EPA

We examined source data that goes into CAST including Land Use acres and nutrient applications. Review of this data was for informational purposes only and was intended to provide background information to members. Once the modeling tools have been completed and outputs are available, these data will serve as a foundation for a comprehensive review.

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Discussion Notes (By Slide Topic):

Manure Generation Diagram

Scott Heidel (in chat): Can we add MTT into the mix, please?

Tom Butler: For the purpose of this, you might see things like that manifesting within this process before you get to the “applied to crops” box. I am not sure if that is specifically where you wanted

to see it. I don't know if we inherently want to go through the process. When we are looking at BMPs, it is not necessarily stepwise. We kind of have the whole pool that is acted on. If we wanted to look at manure treatment technologies more specifically, we can certainly do that, and I can follow up with you about that, Scott.

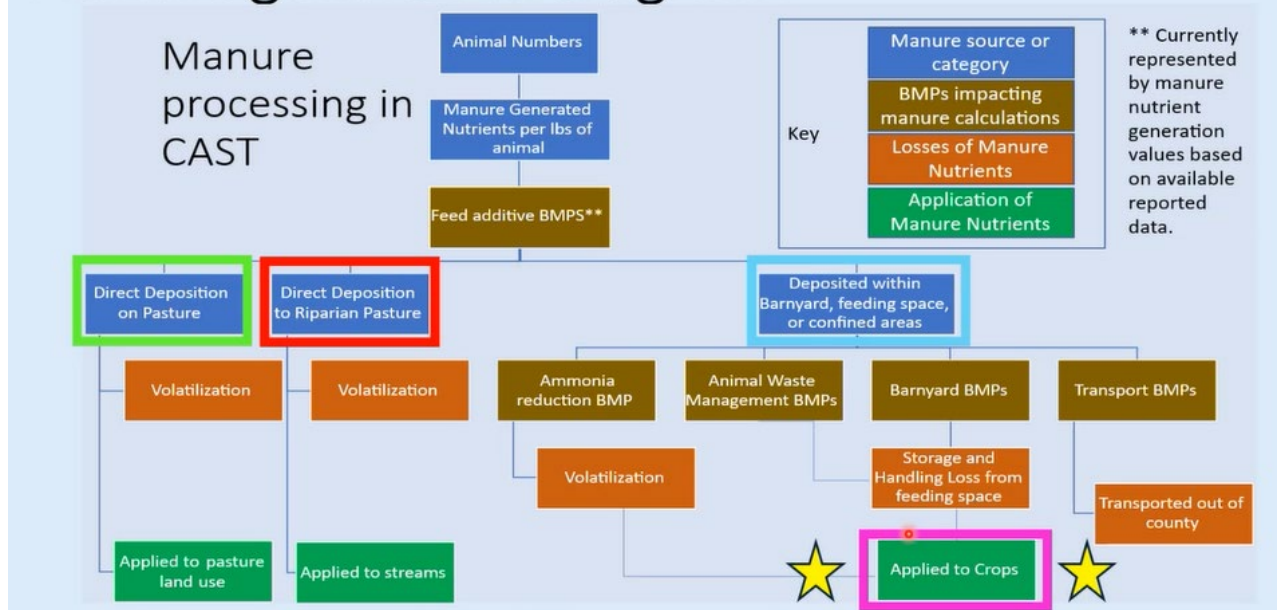
Jess Rigelman (in chat): Transport BMPs are MT and MT

Tom Butler: Jess has already hinted manure treatment technology and transport kind of behave the same. So, thank you, Jess.

Clint Gill (in chat): If we could change that box to Manure Transport and Treatment it might make it more clear.

Scott Heidel (in chat): Especially considering combustion is not transport

Manure generation diagram:



State-Specific Annual Stored Manure Nitrogen Profiles

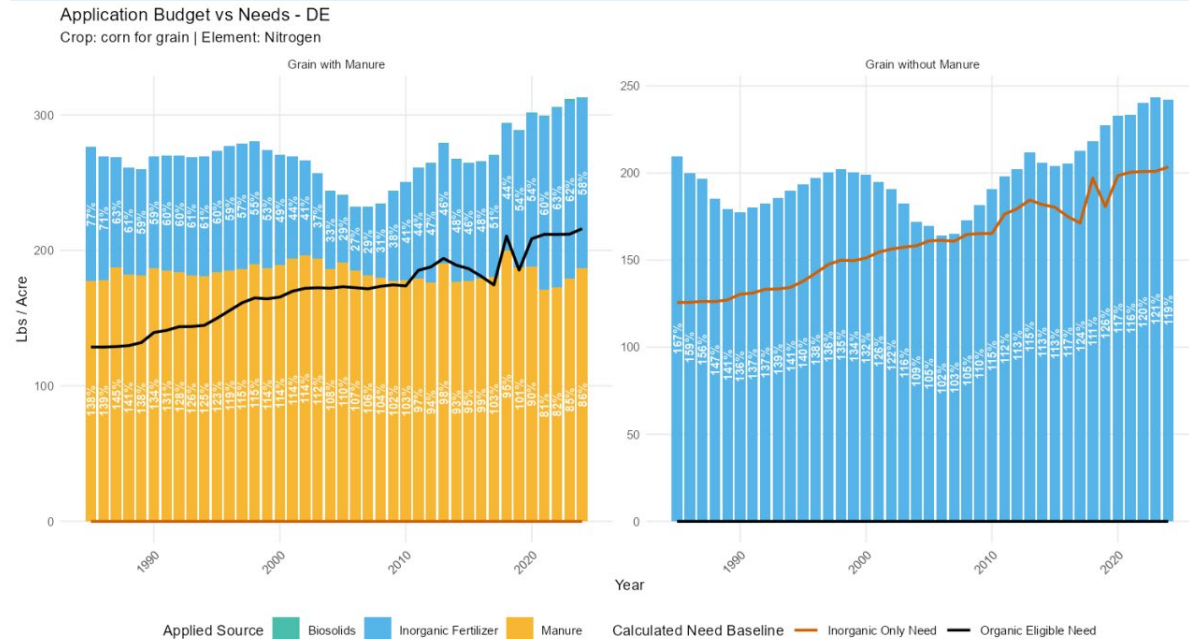
Alisha Mulkey (in chat): This is manure N using new poultry data, correct?

Jess Rigelman (in chat): Alisha, yes.

Tom Butler: Alisha, yes. This is using that new poultry data. This is using any new information that anyone provided for nutrient concentration. So, that's the poultry effort that we had, as well as some stuff that Virginia had provided in September.

State-Specific Corn for Grain Application Budgets vs Needs for Nitrogen

Hunter Landis: Just making sure I understand the percentages on the left. If you add the percentage for the orange and the blue, that's the total percentage of nitrogen applied?



Tom Butler: Yes, relative to the need. In other words, if you were applying 100%, you would be matching the bars to the line, and it would say 100%. In this case, there is an application over that 100%, so it is manifested here. It's just broken out so you can see what is for manure versus inorganic fertilizer. In Delaware, it tends to be less of an over-application where you don't have manure. We've seen in Delaware that there is a significant amount of broiler litter, so that can be a part of this.

Hunter Landis: Is this scenario based on the original or earlier version of manure allocation, meaning less going to pasture or hay than we had?

Tom Butler: Great question. This is with the new updates, so with the more accurate representation of hay high and pasture high land uses. That affects Delaware, Virginia, Maryland, West Virginia, and New York.

Dave Montali: The need line is inclusive of nutrient management impacts, right?

Tom Butler: Yes. Good question.

Joseph Delesantro (in chat): Just to clarify again, the "need" is really an application goal.

Hunter Landis: I know you mentioned manure transport in the earlier slides. Is manure transport considered here, or would that be considered later potentially?

Tom Butler: Yes. That is considered prior to this. I will change the manure generation diagram based on the feedback I've gotten. But transport and treatment BMPs would be placed in this order. So, once we get the "applied to crops", which are the buckets shown in the [stored manure nitrogen profile figures], this is what we are seeing in terms of that organic source. So, we've already seen that transport taking place.

Tom Butler: Noted, Robert, thank you.

County-Specific Examples: Page County (Corn for grain) and Union County (Corn for silage)

Robert Sabo (in chat): 50% NUE in poultry hotspot with large proportion of pasture in Page County seems reasonable. This will be highly sensitive to assumptions about how manure is applied to pasture.

Hunter Landis: Is NM applied here yet?

Tom Butler: At this point, we have NM applied. Just to be clear, this is one of the extreme cases. Most of them are not like this.

Hunter Landis: You kind of acknowledged some of the realities in Page County. One is it is a geographically fairly small county that does have a high poultry concentration. There are some crops there that are enough to kind of get attention and some nutrients. It is also a litter transport source county. One of the logistical issues we have is that the litter moves out of the county, but it doesn't always get tracked because it is moving on some narrow mountainous roads versus going onto a larger highway that has a scale, which is what we require for our transport and tracking. It is interesting to see it like this. I think there are things we know about the county, about the manure, and potentially about nutrient management. I am just wondering out loud, and I don't know if this data exists. If we had data that said every crop acre in that county had nutrient management on it, and we verified it to the degree we say we verify, then that would say that we would have only put one pound of nitrogen per bushel produced which would be at that 100% or 1 ratio. I don't know that I actually have a question. You can't say that we know we put down this much. So, it went somewhere else. We just don't have data to say it went somewhere else.

Tom Butler: I really appreciate that, because what you've just thought out loud about is the exact type of thing that we would want you guys to get out of this and start to think about. Maybe you could talk to manure haulers or something and figure it out. Maybe there is a way to look at that and see if there was a BMP related thing or if it was something else. So, I really encourage that. That is the exact type of thing I want to come out of this. Hunter, maybe you could take that and talk to people within Virginia and maybe see if there's something there. I would encourage other people to think along those lines as well.

Dave Montali: I was just curious if you looked at Phosphorous and if Page County is a high soil P county.

Tom Butler: I didn't. I can provide the data.

Dave Montali: It looks like one of West Virginia's counties in the past where they were one of our hot spots for transport driven by phosphorous, but maybe not as extreme on the nitrogen. If this is semi accurate, then what should go with this is high soil P as well.

Tom Butler: I didn't. I can provide the information, and people can dive in however we need to.

Dave Montali: I was just curious.

Tom Butler: Good point. That is good for the future as well. Thanks.

Ken Staver: On the inorganic side, we don't break inorganic fertilizer by county level, right?

Tom Butler: It breaks it into the whole state and then the need gets applied based on the organic. So, it is not technically, but it kind of mathematically ends up broken, but it can go anywhere.

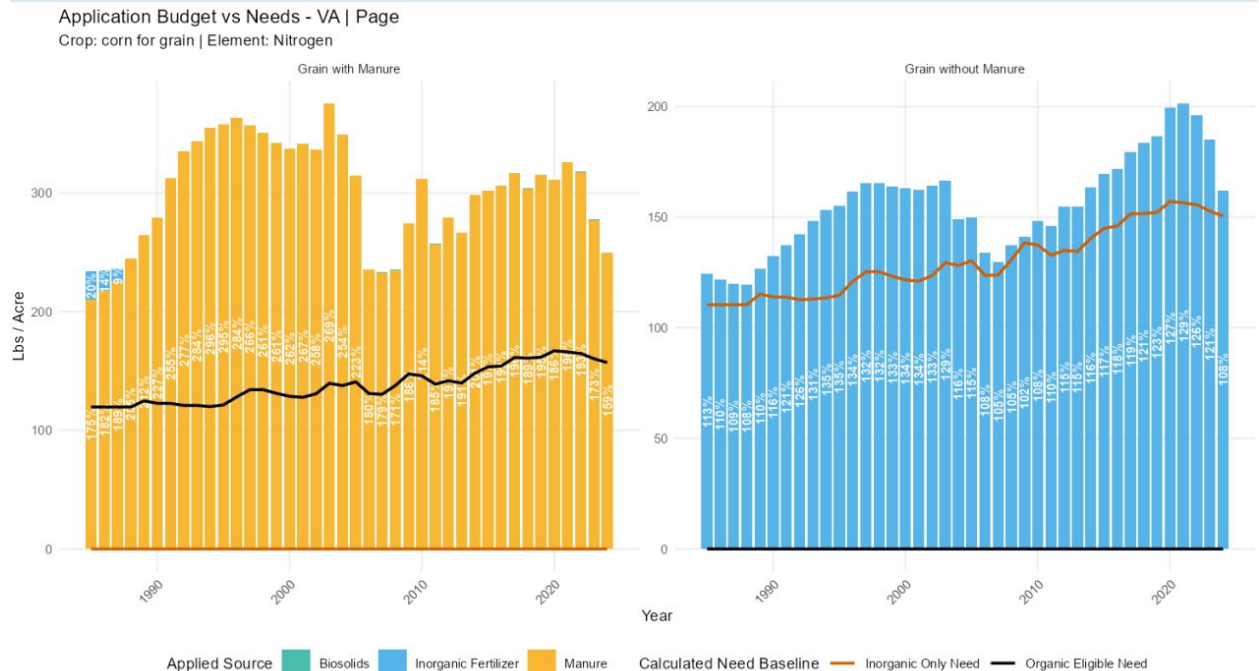
Ken Staver: Right, but for the grain without manure for a state, wouldn't the inorganic grain without manure look the same for every county in terms of the ratios because you don't have specific fertilizer for a county? Why would one county look any different in terms of the ratio of inorganic applied relative to the yields?

Tom Butler: That would depend on the other crops involved. Say you didn't have enough manure for your corn grain with manure, then you applied inorganic there. It could pull it off and the acreages of those could skew it. Then all the other crops in the same category, because we have most of them in the first, they're all asking for inorganic. So, if you had a lot of grain in one county in addition to the corn, that could be pulling things. Jess might have comments on that.

Jess Rigelman: We apply the biosolids, we apply the manure, and then we have that statewide bucket. At that point, we take that statewide bucket and split it into counties based on the remaining crop need in each county. So, at that point, it is no longer a state bucket. We toyed with the idea in Phase 6 of basically keeping it one large bucket and spreading it using just the algorithms. We never really got any traction for that. So, we stayed with this methodology of splitting it into counties and then spreading it using the curves. So, that just didn't change for this

version. So, yes, there are in a way county-wide buckets, but that is after those are determined after the manure and biosolids are spread.

Ken Staver: Right. So, the total numbers would be different because the acres are different, and all that sort of thing. But, in terms of the pattern here in the graph, if you look at corn throughout Virginia in a county for grain without manure, would the ratio of applied versus inorganic only need look different, or do all the counties basically have that same pattern? That's not a county specific thing since we don't have county specific fertilizer data.



Jess Rigelman: It would be different because each county's remaining need, in order to create those buckets, would be different. So, in a county with a lot of specialty crops, they might have more remaining need because another county might have had a lot of grain with manure. So, therefore, that is filled whereas a lot of the other counties' need isn't filled. So, it definitely could have different patterns based on the types of crops grown in a county.

Ken Staver: I feel like there is no use thinking about what is unique in Page County in terms of the right-hand graph because that's really not fundamentally based on any information you have from Page County other than the acres of corn, right? You don't really know about the fertilizer that's actually applied in Page County. Whereas, you know what animals are there so you can make assumptions that the animal nutrients stay in the county or do not. But, for the fertilizer, we're sort of putting it there with the model. So, it's not like, oh, this is what's going on in Page County. It looks like it does because of how the model distributes the state fertilizer bucket, right?

Joseph Delesantro (in chat): Sure.

Tom Butler: I am in agreement on that as well. The information is really in the animal population telling us the organic sources.

Ken Staver: From then on, we (the model) make it look how it looks after that.

Dave Montali: I am just trying to think as if I were a Pennsylvania person. I noticed in these plots, in contrast to the Virginia county where all the corn for grain was made up with manure and there was no inorganic applied, it seems like even though the need is taken up by manure, on top of that they are getting inorganic fertilizer. So, I guess my question is should we be looking at our inorganic? We just have so much inorganic that it's got to go on top of there? Or is it something about the timing of inorganic that forces some amount of it to go on top of that manure?

Tom Butler: So, Dave, the point you brought up about timing, there is a file that would have specified when things are eligible for manure or if they are not. I would need to look at the specifics on that to see what was relevant here. I can dig into that.

Jess Rigelman (in chat): Timing will not affect this

Tom Butler: Jess is saying the timing has no effect. So, then it comes down to the application algorithm and what gets nutrients and how much of it. Looking at the fertilizer, Pennsylvania has kind of tended to have a lot. So, this does kind of track their record overall of the mid 2000s where they have fertilizer. I can't speak exactly to the specifics of that without digging a little bit deeper myself.

Dave Montali: The other thing is, and I am trying to remember this, but I think Pennsylvania said they don't have high hay or high pasture. So, they are not getting from their fertilizer bucket amounts applied on those crops, right?

Tom Butler: That is accurate. They are the only jurisdiction that does not have the new high hay and high pasture land uses. For everyone else here, those are the ones that we asked you guys to tell us the percentages of historically and how they are represented in the future where you'll have pasture and hay that receive higher applications. They are the only ones that do not have those, so that definitely could be impacting this.

Alisha Mulkey (in chat): When will you share the data with states so we can evaluate our counties?

Hunter Landis: I am wondering how this county works or maybe how the data works. Is there corn for grain in this county? I am just wondering what the corn for grain would look like. I assume these yellow and blue bars get up to a ceiling of receiving that manure and then it gets moved to the next crop down the line. Is that right?

Tom Butler: Silage and grain are in the same manure category. I would have to look, so I am speculating, but I am speculating this might be a higher dairy county and that they might grow most of their corn for silage rather than grain, which might impact the acres. I did not look that up, so I don't know that. Scott or Denise might know that better than me. But, Hunter, that could very well be a part of it.

Hunter Landis: That's good enough for me.

Denise Uzupis: I don't necessarily have a great answer for Union County. They are supposedly a pretty fertile county. They do tend to have a higher corn for grain, but I am just talking generally. I don't think I could give a great answer on that. I don't know if Scott can either without doing a little bit of research. I still struggle with this whole idea that the sales of fertilizer in one year is being applied in one year. I am a little frustrated with these representations and feeling like Pennsylvania is over applying, and I just don't think that's the case. Unfortunately, the sales numbers are the only thing we have to use, but I just don't feel like it is an accurate representation of what's really going on out there. So, I just want to throw that out there. As far as Union County goes, I know it is on average pretty high corn for grain, but I don't know year from year.

Joseph Delesantro (in chat): Fertilizer sales is spread over several years based on the application goal.

Tom Butler: I appreciate that. I see Joseph's comment. So, those were the methods that were done there. I don't mean to be dismissive of that comment, Denise. I certainly don't want it to be the impression that we are trying to label anyone or do anything here. This is kind of the result as we have it here. If there is concern about that, I think that discussion between you and Scott is exactly what we want to come out of this. If something is different than what we are showing and there's information to support that, we want to make sure that is the case. In the future for the review, we certainly want that discussion to happen internally as a result of this, if that is at all helpful. I can't speak necessarily to more of the specifics.

Ken Staver: Just a side question- the big one (silage with manure) looks like a steady trend going on. In the left-hand figure, the double cropped land, why does the manure use per acre go up so dramatically over the last ten years? The middle graph just looks like there is this trend. It seems

like something really happened on the double cropped land with manure. What's the story behind that?

Tom Butler: I don't have the skinny on that. I unfortunately went mostly for the silage. I would have to dig.

Ken Staver: The double cropped land in Union County, is that like a winter rye crop and corn silage? Is that the double cropped? Or is there a soybean crop in there? What are the double cropped crops?

Tom Butler: I would have to look at that list that they have. I don't know which it falls into off of the top of my head.

Ken Staver: That question spilled over into the Cover Crop Expert Panel. It's always been an ongoing thing as the farmers report on their NASS report their haylage crop in the winter as a crop. Then you start having double cropped situation. If it's a cover crop, that just gets harvested and doesn't get reported as haylage, then it stays as a corn silage acre and not double cropped acre, right? So, you don't even account for the removal of the nutrients in the haylage. The winter cereal chopped harvest doesn't even come into the budget at all. Now, there's always been a question about whether or not farmers report the winter haylage (or however you harvest it) as a crop on the NASS report.

Tamie Veith (in chat): Random question -- is inorganic fertilizer with taxes cheaper, for some reason, in PA than in neighboring states?

Tom Butler: That's valid. It's there on the screen. So, I can look into that a little bit, Ken. I can provide the data as Alisha has asked for here after the meeting is over. I will circulate this so people can do some digging there and hopefully together people can come up with answers for some of these questions. I did not look at the double crop breakdown here, so I apologize.

Ken Staver: Double crops on the Delmarva are mostly wheat, winter cereal, and a soybean crop. So, there's no nitrogen applied on the soybean crop. In a dairy situation, where their double crop is silage in a winter cereal that is harvested, both crops need nitrogen. So, there certainly will be a removal with both crops and there might be applications with both crops. So, there probably are because most concentrated dairy areas, as soon as they cut corn silage, they spread manure. In a lot of places in the Fall, they are putting a crop out there to get some winter forage. So, those are two really different double crop scenarios in terms of nitrogen inputs and the nitrogen removals of the crops. Details- all these little nasty details!

Tom Butler: I certainly appreciate them more and more every time I look at figures. Thanks, Ken, that's good input.

Scott Heidel: Thank you very much and really appreciate all this information and analysis. Just a side note, we definitely need to look into the manure treatment technologies because we just had 15 miles of stream de-listed in Berks County where we have our most effective manure treatment technology. It's removing about 900,000 pounds of total nitrogen per year. So, I think there is a direct relation between that and the delisting of those streams that were impaired for agriculture. We are also going through steps currently to improve upon our tracking of manure transport. We currently have a brokerage program that is a little challenging to get the numbers out of. So, we are definitely trying to improve the data as well as the reporting of our data. But, for instance, when we try to model the Manure Treatment Technology, it is just breaking apart in the model. That has to be improved upon because it is just not providing the credit that it should be getting.

Jess Rigelman: For the entire calibration data set from 1985-2024, there have been no Manure Treatment Technology BMPs reported by any state. So, that is not a factor here because it is just not being reported.

Scott Heidel: I think it is not being reported because when we run scenarios, we don't get any credit for it.

Joseph Delesantro (in chat): I think farm fertilizer treatment are exempt from most taxes. This is a point Gary had made on occasion, but I don't know first-hand. There are "inspection fees", but I don't know much about them.

Mark Dubin (in chat): The situation that Ken is describing was identified as a possible issue in the WV panhandle in conjunction with crediting their cover crop program acreage., e.g., the limited reporting by producers of their winter cereals used for hay ledge and grazing.

Tom Butler: Scott, I appreciate your perspective on this, and I certainly want to recognize that it's a concern. We did a dive into this when we were looking at things initially, and people had mentioned a cap and all of those things together. The big thing that we found is when we had varied manure transport with and without things like nutrient management, the big catch for that is that if nutrient management was not reported in conjunction. This was in scenario mode because you're talking scenarios. When we actually have data for fertilizer, manure, etc, which we have through 2024, that would tell us the amounts. But then we got into those scenarios, which I think is what you're referencing, that's not a projection per se, but we have the percentage of the application goal met. So, in those cases, without something like nutrient management/core nutrient management in place, the result of having those treatments in place was we needed to have that fertilizer applied because that's what had been reported when there was information. So, I don't want to discourage anyone from reporting a manure treatment technology or transport. I think one of the bigger things we found was that the core nutrient management implementation in states, for example in Maryland, it had been the case where they had had those things in place, and it showed the benefit there. It was capping what was applied. So even though those percentages didn't change, the overall amount did. So, I would encourage that if that was the case, then some of those things would be maybe put in place. In terms of the reporting, I suspect they'd line up. But I think that was one of the bigger things we had found- nutrient management, in conjunction with the treatment, was what was capping the scenario and to be more realistic is what people would describe state. But definitely appreciate the perspective there, Scott. I really am happy that you guys are working on kind of improving that data stream. I always encourage people to do things like that. I think it's wonderful. Just recognizing that we had looked through this, and people had agreed it wasn't necessarily broken. It was perhaps a little bit of that reporting snag and what some of those things did in conjunction.

Ken Staver: If these things are doing a major change on the flow of nitrogen in these animal systems, you're just changing the overall budget of the county. I don't know what the manure treatment technology is if it's denitrification, or if it's compost or whatever, where you're putting nitrogen back in the air instead of going on crop fields. It just has to come out of the land application budget somehow. I'm not sure we should try to do it like a BMP efficiency factor. It should be the nutrients should come out of the out of the bucket. In the old days, they used to talk about "poofing" nutrients. They're really being poofed if the process puts the nitrogen back in the atmosphere and it's not available for land application. Somehow there needs to be an accounting system, but somebody needs to provide some data on it. So, if you're putting 50% of your manure N is being taken out of the flow, there's got to be a way to capture it. It's just another version of manure transport, except it's being transported out of a land system, though. But there's got to be some information. Jess says nothing's been reported and then you say, well, we don't report it because we don't get any credit for it. Well, somehow that's not reasonable. That sounds like a not a very good place to be overall. If you are doing it, come up with an estimate of what's not there. So that's my thought.

Scott Heidel: I fully agree with you, Ken, and I appreciate that comment. We're definitely compiling all of that information. It's going to go in next year with our updated QAPP. But we're going to need to start thinking about this in more of a mass balance, because I think that the manure that you can see here in the orange will definitely be dropping down. It's going to bring us under crop need because if we're seeing streams that are getting delisted in close proximity with these operations, clearly the nutrients have been removed.

Ken Staver: I can't speak to that because I don't know what they were listed for, whether it was bacterial or nitrogen or phosphorus. So, you can do things a lot better with the same amount of nutrients and still have better streams. So, it's not necessarily a nutrient budget thing that de-lists

streams, but I'm not really arguing with you. I'm not saying it's definitely a one-to-one kind of thing. But I just would encourage you to try and get a handle on how you're changing your mass balances. Are these mostly anaerobic digesters or what are you talking about?

Scott Heidel: It's a treatment train, so there is some hydrolysis, and some are combustion. There are microbial interactions for denitrification. So, it's multiple things at each unit. It's not just one system.

Ken Staver: Right. I know it's a lot of work to do the mass balance part, but it seems like somebody in there sort of knows what's going on and can tally it up. Anyway, it's interesting. It's encouraging.

Jess Rigelman: I wanted to respond to you, Ken. That's exactly how manure treatment technologies work on our model. They work exactly like manure transport. If you're taking land manure out of your system, just like manure transport, and putting them in these systems, it is a decrease in manure. So, it is a little bit different in that you can treat that manure and the product of that can be land applicable again with reduced nitrogen. But for the most part, manure treatment technologies are exactly like manure transport. But, as Tom said, it needs to be coupled with nutrient management in order to reduce your crop application goal to see your real benefits. So, it's working exactly how you think it should, at least in my opinion, and it is how you described it.

Ken Staver: Whether you have nutrient management or not, it does take manure nutrients out of a county, right?

Kate Bresaw (in chat): If we are backfilling with inorganic, then even with NM and manure transport/manure treatment, then I'm not sure how that is realistic. Digesters can't be reported as manure treatment. We're doing it, Ken.

Jess Rigelman: Yes, but as Kate is pointing out in the chat, it's going to replace that with fertilizer. Yes, it will replace it in scenario mode, but it will not reduce in this mode because we are dealing with buckets of manure and buckets of fertilizer. So, yes, in this case, if manure treatment technologies were reported during the calibration, it would take manure out of the system and not apply it, and those manure numbers would be much lower. So, it would be in Pennsylvania's best interest to report that data.

Ken Staver: Right, but then we get back to the whole problem of when you put more inorganic fertilizer on a manure acre, the N load goes up. So, that one is still hanging around too.

Jess Rigelman: Yes, but it is my understanding that a lot of this is coupled with nutrient management in the places that it's being produced. So, that nutrient management would help address that. I am not disagreeing with you, but that is part of it. It should be coupled with nutrient management.

Tom Butler: That's a great discussion, and I think the chat has actually been circling around that. We had a question about inorganic fertilizer being cheaper in Pennsylvania due to taxes, with the understanding that a lot of these agricultural products might be tax exempt. Kate has obviously made the comment about the back filling, so I appreciate that. Mark Dubin has put in a comment saying that Ken's description, I believe this was on double cropping, is relevant to potentially some places in West Virginia. It looks like the chat pretty closely lined up with additional comments for this. So, I certainly encourage that and appreciate everyone weighing in there. Scott, I think you had two questions when you started and we've only talked about one. I forget what the other one was. Did you want to go through that one?

Scott Heidel: I just think that the summary that the manure is being treated has to get reduced, or we're not going to see any kind progress being made in the model. I realize you want to see it coupled with manure management and nutrient treatment plans and everything like that. But, when you do the mass balance, the manure is being reduced, and I think it needs to be a little bit more basic than it's only going to be reduced if you have a nutrient management plan. It's reduced regardless. So that, I think, is the biggest sticking point that I have. If you're going to reduce it and then say, well, you didn't have all the plans in place so we're going to increase it with

inorganic, if that's a product of the model, we're going to have to back check this with monitoring because the model is just not representing reality at that point.

Tom Butler: I know Jess has a comment and I want to let her go. I think we're starting to blur the lines between things. What I've shown here is not a scenario. This is the data. So, if you had that manure transport removing it, I think the point's been made that you would not see it here. So, when we're talking about the scenario mode where we have the backfilling, this gets at what Ken and Kate were saying which is, that's how you would counteract that data in scenario mode. But if it was reported, you would see that reduction in this. This is not scenario. This is the data that we have. So, obviously Joseph can speak more to the monitoring because this is all going to be calibrated based on the monitoring. I don't know how many stations there are. Joseph, it's like 158 stations or something, right? But I just wanted to draw that kind of distinction there.

Joseph Delesantro (in chat): 214 for N

Jess Rigelman: No, you drew it correctly. Again, we're not talking about backfilling with fertilizer here because we're in calibration mode. But, in scenario mode, we're going to calculate the fraction of crop need met, meaning if it were reported here, the manure would go down, and all of this would go down. Therefore, in scenario mode, the fraction of crop need met would be much less. So, as I said, in any case, it removes it from the system. Manure treatment technologies will remove it. It will reduce your fraction of crop need met so that when are in scenario mode, loads will be less. So, as I said previously, it's in Pennsylvania's best interest to have that data reported, especially during calibration mode.

Tom Butler: Yeah, thanks, Jess. Joseph put in the chat that it's 214 monitoring stations for nitrogen. I think there was a comment made before about the applications we have here in the acres, and I just wanted to highlight that there is a difference in Pennsylvania. They do not have those high acres of pasture or hay, and that could be playing a role in this as well. So, there's a lot of things at play. Again, I think it's really great to foster that discussion around these because any number of those things can impact this, whether it's the reporting of the treatment technologies in calibration mode that would then potentially reduce the application that you had in scenario mode or whether it was a change in those acres that you had and how that would affect the application spreads. So, there's a number of things. Again, I want to really highlight that the point of today is to get those discussions going, and I really think we're getting to that point. So, I think this is somewhat successful in that regard. But I definitely wanted to open it up to others.

Robert Sabo: Fantastic presentation. Also, great discussion. I really enjoyed it. I learned a lot. One thing that strikes me, Tom, with these graphics is that you're really down in the weeds. There have been multiple layers of assumptions that have been implemented when you're looking at these plots. If the states are interested, they can see it in a consolidated fashion. So, okay, we have three different types of silage assumptions and models at play. What is just the aggregated silage system within a county, within a state? What's the aggregated corn for grain? Just so they can see how it plays out. I think that could be pretty edifying and useful, and they can see how these different assumptions are playing out. When we actually look at corn for grain as an entire system, we're at 110% of application relative to crop need. So, it's essentially a 90% NUE. So, I thought that could be helpful in edifying, and I think that it'd just be simple tabular calculations that you could generate. I know we're all stretched super thin, but just seeing this, there's so many layers of assumptions and modeling applications at play. It could be helpful just to aggregate grain/corn grain. Even if you want to just say this is the total principal crop land. So, I'd be happy to further discuss if that's helpful for the states, but if they thumbs down, that's fine too. I just wanted to see if that could be helpful. I'd be willing to help with some of those calculations.

Tom Butler: Thanks, Robert. I appreciate that. The data sheet that I have is aggregated in a number of different ways. You could do by the load source, you could do by crop, you could do by any county, you could do by state, you could do the whole watershed even. So, I think a lot of that is me getting as specific as possible here. So, that might be just in the data sheet that I distribute. I can do that, and if that's not enough for people, maybe they can reach back out, and

we can do some further calculations. But definitely a good insight. Obviously, this is very in the weeds, and so I appreciate that perspective.

Robert Sabo: Overall, I think when you look at the total cropland perspective, this is looking pretty reasonable. Even most of the slides I saw are pretty reasonable with what we see in NUGIS, the national nutrient inventory, and some other independent academic mass balance-based analyses. So, really cool stuff, Tom. Nice work.

Tamie Veith (in chat): Good point about the taxes. The thought behind my question was I just wondered if there was substantial purchasing across state lines of fertilizer. It is not likely. But if so, it could potentially speak to the feeling that fertilizer purchases in PA are indicating overly high applications.

Tom Butler: Yeah, thanks, and there's a lot of people involved. All of you guys here get as much credit from me on this. Again, I just wanted to highlight that, as we're looking at like Union County and Page County, these were some of the extreme examples. As Robert just indicated, on average, I think things are much more in line with what you might expect. If we aggregated it, it might produce that result. So, I certainly appreciate that. I see a follow up here from Tamie. It's a very good point, Tamie. That's one of the reasons I think in the previous iteration, there was the desire to have that whole watershed wide stock so that you wouldn't have that. So, that I think was something people have discussed, but I'm certainly open to hearing more feedback on that. It could definitely be a rationale. In talking even with state chemists, I don't know how tracking across that would work because you're generally buying in one spot and then you don't report where you apply it. So, we've had to come up with some of these rules, and I think that's where we ended up. So definitely want to acknowledge that that's a thing. Denise, maybe you have more comments on that.

Denise Uzupis: You're correct. We don't have any way to determine where it's purchased. We require them to report where the product is sold in each county in Pennsylvania, but we don't require them to tell us if it's out of state, and they may or may not even know. So, I don't think we have the ability to be able to track that particular aspect of fertilizer sales.

Joseph Delesantro (in chat): We will produce residual plots and tabulated data. Residual being difference between the predicted load of N and the observed N load. You will be able to see how well predicted loads match observations downstream of thorny practices or counties.

Mark Dubin (in chat): Tom, you are correct in the assumptions for a watershed-wide fertilizer purchase and use for P6.

Tom Butler: Thank you, Joseph, Joseph is indicating here that we'll be able to see how well predicted loads match observations downstream. So that is again, I think, speaking a little bit more to what Scott had asked for in terms of seeing those monitoring results compared. Mark also provided a historic fact check here. Yep, that was one of the assumptions for the watershed wide fertilizer purchase and use in Phase Six. So good to have that confirmation. Thank you, Mark. I don't have anything else to share here. I did want to show a few quick next steps. I think we've already started to narrow in on some of the potential areas of concern, and I think some of those internal discussions are actually probably going to take place because of this, hopefully. But that's really the goal of this. We'll keep doing this until we have some more concrete things in terms of outputs. So, we'll have more information on a number of these things. I will circulate this data. So, I can send this out today after the meeting's over. I'll send you the application, everything there, and people can look at that as they want. If there are no other questions or comments, though, then that's kind of the end of today's running order. Was there anything else people wanted to look at for this data, questions they had about it, anything just in general procedural orders? I'll open the floor here for a few minutes, and if not, we can wrap it up early.

Dave Montali: When are we meeting next, and what are we going to do?

Tom Butler: August 14th and more of this.

Dave Montali: Any specific topics or just further discussing what we discussed today?

Tom Butler: We can do more of what we've discussed today. If you have any topics in particular, you'd like, please email them to me so we can set those up. I think we want to look a little bit more at some of the animal numbers and populations. So, we're kind of crop heavy today. I showed a little bit of the yields. We showed the applications there. But, I think animals and populations is something people want to dive into. So that will likely take up some time two months from now. That's kind of the plan that we currently have.

Dave Montali: Ok, sounds good.

Eric Hughes (in chat): Great work, Tom.

Ken Staver: It's just raw data, and the reason it seems important is because you're taking plant available N and you're basically substituting it for N that's fixed. So, it is a substitution that's important in terms of the N budget because right now, we're not putting very much manure on legumes. P based management has made it a little bit more prevalent here in Maryland because it moves manure around more. So, folks are using manure for the P and the K and the sulfur on soybeans and not so worried about the N. So anyway, it would make space for more fertilizer N, which is why it's important. So you don't have the excesses. But states have to have some interest in thinking about it, and if they don't, it's going nowhere. We're just going to put it all on corn and grass hay crops, but it does happen. I don't know how to get the information. So, anyway, just a thought on the overall N bucket, since we're talking about other things that take N out of the plant available N bucket.

Alisha Mulkey (in chat): @ Ken. TBD. We want to see raw data first.

Tom Butler: Thanks, Ken. Alisha put a comment in the chat that it's to be determined. They want to see the raw data first.

Ken Staver: I'm just a guy on the AMT. I do water quality research. So, all I do is drive by fields where they apply poultry litter and plant soybeans. I know everything's changed so much with maybe less alfalfa compared to corn silage now. I'm not an expert. I just hear those kinds of conversations that corn silage has become more of a thing. But just because you had open ground and you need the other nutrients on alfalfa, manure goes on alfalfa fields sometimes. It would make dealing with the fertilizer N a little easier. It would come closer into line with what our expectations are for nutrient management if we were putting it on places that we aren't currently putting it. I guess that is what I'm saying. If there's no interest in exploring it at all, then somebody does have to provide the data, and I don't know where you get it. But it has to come from nutrient management plans, which is what I always go back to. Somebody has to look at nutrient management plans and do some kind of summarization of some areas and say, where is this stuff really going? But if we're always going to work at really high-altitude levels, then we're going to be stuck doing what we're doing now, which is talking over these assumptions that we're making. People on the ground are saying, well, it's not really that way. But if we always look from high altitude, that's all we're going to be able to do. So, if you don't burrow down, you can't really do much better.

Tom Butler: That's appreciated, Ken, and I'll open it up to see if anyone else had a comment on that point or if there was anything anyone wanted to add. All right, well, hearing nothing, I think we're at a spot where we can wrap things up about 30 minutes early. Thank you all for your effort with this, the help getting things together, the help getting to where we are, your help looking through it now, and your continued help in the future. If anyone has any questions, let me know. If you have any comments offline, please email me or Caroline or Zach, and we'll try and get ready for the next one. Thank you all. I appreciate it.

III. Wrap-Up

Lead: Tom Butler, EPA

IV. Adjourn

Next Meeting: August 14, 2026 from 9:00AM-11:00AM

Attendees:

Tom Butler, EPA
Caroline Kleis, CRC
Alisha Mulkey, MDA
Doug Bell, EPA
Brooke Walls, DDA
Cassie Davis, NYSDEC
Curtis Dell, USDA-ARS
Clint Gill, DDA
Hans Schmidt, MDA
Scott Heidel, PA DEP
Eric Hughes, EPA
Jess Rigelman, J7 LLC/CBPO Contractor
Joseph Delesantro, Koniag
Hunter Landis, VA DCR
Tim Larson, VA DCR
Mark Dubin, VA Cooperative Extension
Dave Montali, Tetra Tech
Tyler Trostle, PA DEP
Denise Uzupis, PDA
Tamie Veith, USDA ARS
Rachel Owrutsky, DNREC
Robert Sabo, EPA
Candiss Williams, NRCS
Kate Bresaw, PA DEP