Agricultural Modeling Team (AMT) Meeting

August 9th

09:00 AM – 11:00 AM

Meeting Materials

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Meeting ID: 246 929 423 243

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Dial-in by phone: +1 202-991-0477,913721509# United States, Washington DC

This meeting will be recorded for internal use to assure the accuracy of meeting notes.

Summary of Actions and Decisions

Decision: The AMT approved the July 2024 meeting minutes.

Action: Submit remaining comments and feedback to Tom (Butler.Thomas01@epa.gov) regarding additional changes you want to test in CAST related to the PAN and manure application calculations and processes.

Action: Jurisdictions will evaluate whether they can provide on the ground application rates for counties from sources including but not limited to nutrient management plans.

Meeting Minutes

Statement of purpose:

To evaluate potential improvements to manure applications and data sources for Phase 7.

Decision items:

1. Approve the July minutes

Decision: The AMT approved the July 2024 meeting minutes.

Announcements:

- NRCS Success story: Can Agriculture Improve Water Quality? With Data-Driven Voluntary Conservation, the Answer is Yes.
    - Upcoming webinar 2:00 p.m. eastern on August 22 legacy phosphorus

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

Zach provided a quick recap of the AMT progress to date and the group's timeline.

Manure applications in CAST 09:15-09:45 [30 min (10 min presentation 20 min discussion) (Tom Butler, EPA)]

Tom showed a potential improvement to the realism in applying manure to multiple Land Uses in CAST. This entailed a deeper dive into a focused application to the land uses of grains and silage with manure. Informational.

Discussion

Clint Gill: For the group one curve, which line does it follow after the inflection point of 120%?
Tom Butler: It is the same line that the group 2 land uses follow, it is just covered up by the yellow line.
Clint Gill: That matches up with what I remember, thanks.
Tom Butler: This does bring up a good point on the way this operates. Essentially, we are putting manure down on all of these Land Uses at a certain point, until we reach 120% of crop need. After this point we change the applications which is most sharply seen in the legumes do to their N fixing behavior.
Ken Staver: We should also be looking at biosolids which are applied in some counties. But these are fairly well specified.
Tom Butler: This is a good point. We do have a separate set of curves specifically for biosolids which I believe are specified by state. But to be sure I'm going to defer to Jess on this.
Jess Rigelman: Yes, we have separate curves for each of these sources. The biosolids is state supplied so we know what county it is going down on.
Tom Butler: It is worth noting that, although the curves go up to 300%, we are not normally getting to these areas of the curve. That would only occur in extreme circumstances.
Ken Staver: Then I think we don't want to spend too much time on it.
Olivia Devereux: I don't know why we've always shown it to 300%. A line is a line but if we aren't dealing with those locations then why are we even showing it? I think it is confusing and should be taken out.
Ken Staver: Yea, I think it's confusing since normally the right half of that doesn't exist.
Bill Keeling: When you say Northumberland what state is that? Because there is a Northumberland in VA.
Tom Butler: Good catch Bill, this is in Pennsylvania.
Ken Staver: Have the acreage adjustments been made on this graph based on using plant available nitrogen?
Tom Butler: The second bar is labeled proposed and is based of the new method which utilizes plant available nitrogen.
Ken Staver: So we are looking at two things at one time basically?
Tom Butler: That is correct.
Ken Butler: Can we see the difference in acres? We may have seen that in previous months.
Tom Butler: Here are the acres, which we saw in June.
Ken Staver: It seems to me like it is improvement but it would be a good idea to see if these numbers were something that the states could provide data for comparison? That way we could tell if the results were closer to something like nutrient management plans.
Tom Butler: It would be great if there was data from the states. What does the group think of this?
Dave Montali: We can try in WV, but I would make the comment that if you've got manure it's going on your corn first.
Tom Butler: Thanks Dave, what do other states think?

Cassie Davis: Nutrient management plans are a BMP that would then be applied to a farm. I don't know if it would make sense to look at a nutrient management plan because that would give us a post BMP condition.
Tom Butler: Thanks Cassie, that's a good point, anyone else?
Bill Keeling: It was mentioned earlier that there are a handful of counties which might go over 100% of nutrients required on the application curves. I'm thinking Rockingham? Maybe it would be a good idea to work based off these counties with excess.
Tom Butler: To clarify are you suggesting that we tailor our approach to operate on the exceptions rather than the average behavior?
Bill Keeling: I think that these are the highest loading land river segments in terms of their impact. Characterizing that is important to us so that we can get the most improvement out of these areas.
Tom Butler: Ok, that's a good point.
Gary Shenk: In the counties where there's not a lot of dairy and there's just a little bit of silage with manure maybe those counties should drive the rule rather than adhere to it.
Ruth Cassilly: It also has to do with how many nutrients are available and those will go down regardless.
Tom Butler: Thanks, Ruth.
Mark Dubin: I think Bill has a point in that I don't see many silage acres not getting manure.
Dave Montali: All that sounds reasonable. The experts are saying you don't really have silage without manure.
Cassie Davis (in chat): I apologize, what data would we be looking for in farm management plans? Amount of manure applied and on what type of land use?
Tom Butler (in chat): That would be it, yes.
Ken Staver: The fraction of needed N is going to be high on corn, consistently higher I think.
Gary Shenk: It is important to remember that we want change over time and that the prediction we are making is change since 1995. We should be able to say that if the trend is like this, we should accommodate change in that factor over time. If we have some documented knowledge, we can change it over time in the model if it makes it a better prediction.
Ken Staver: If we don't get a hold of some real information then it seems like we are just working at guesses.
Gary Shenk: Documentable expert opinion, that's a thing, and it's a thing that is used at the Bay Program. So, if we got the expert opinion from this group that could be a documentable source of information.
Mark Dubin: This provides a good opportunity for us to look at a change over time.
Bill Keeling (in chat): How does an NM plan change crop need?
Jess Rigelman: It lowers the application rate, so grain with manure application is higher if you don't have nutrient management.
Bill Keeling: I don't see where nutrient management impacts that, maybe we should think of a better term for these applications like a goal.
Gary Shenk: Application goal is the better term for sure.
Bill Keeling: Maybe we should say that instead of need or uptake.
Tom Butler: I don't mean to cut this discussion off, but we are running up against a deadline. Speaking to Ken's point about trying to have data to compare this to from the states, that is

something we would like to do. Is it possible to collect information to compare CAST results too?
Clint Gill (in chat): DE does not have the ability to make definitive statements on what manure goes to what land use. We collect data on individual farms through annual reports of total manure applied farm-wide, as well as acres of each crop farm-wide. We may be able to make inferences based on that data but I'm not sure. In terms of access to NM Plans, we see those in inspections only, so any data we could produce with that would be anecdotal, and I'd have to ask our inspectors if they have a feel for what those breakouts would be.

Action: Submit remaining comments and feedback to Tom (Butler.Thomas01@epa.gov) regarding additional changes you want to test in CAST related to the PAN and manure application calculations and processes.

Action: Jurisdictions will evaluate whether they can provide on the ground application rates for counties from sources including but not limited to nutrient management plans.

Industry Data: Poultry 09:45-10:45 [60 min (30 min presentation 30 min discussion) (Mark Dubin, UMD and Paul Bredwell, USP&EA)]

Mark and Paul provided an overview of how livestock industry production data has been integrated in the existing Phase 6 modeling tools, and the opportunities to improve the data sources to be used in Phase 7. The discussion focused on the potential to collect relevant production information directly from the poultry industry to update, replace, and/or supplement existing model data sources. Informational.

Discussion
Joseph Delesantro: I was just wondering what the progress has been in terms of getting buy-in from additional producers and where you are in terms of what percentage of the total birds in the watershed do you think we currently have buy-in from? One of the things that is important to us in the Modeling Team is to make sure that we get values that are consistent across the watershed and are as comprehensive as possible.
Paul Bredwell: Great question. I've talked to every single one of the integrators in the watershed. The data that they will give us will give us 100% of the birds that are placed within the watershed. The birds are owned by the companies. Those birds are transferred to the farm, the farmer is paid to care for those birds, raise those birds, and then send them back to the harvest plants for processing. So, the population that we will get, assuming we get 100% buy-in from the integrators within the watershed, we would have the actual 100% of number birds that were hatched in the watershed and, again, collecting the data points, we would know where they were placed, how many were placed, how many were harvested, and then we have the mortality beyond that. If we get 100% of buy-in from the integrators, we will know to the single chick how many birds are in the watershed.
Joseph Delesantro: I'm trying to piece together my own timelines here. So, you would be looking for feedback or a green light from this group that you would then go to all the

integrators to try to establish that feedback. Then, at that point, you'd be able to come back to us and say, yes, we've got all of the integrators or yes, we've got 90% of the integrators?
Paul Bredwell: You hit it right on the mark. Yes, absolutely.
Joseph Delesantro: Thank you.
Olivia Devereux (in chat): Paul, How many producers are members of US Poultry? I imagine that membership is not mandatory.
Paul Bredwell (in chat): Olivia, there are few producers that are "dues paying members" however we provide support to producers through the integrators membership.
Dave Montali: Thanks, Paul. There are so many different aspects when you say modeling poultry. The last conversation was going to the counts, the production. My question is, in the Phase 6 watershed model documentation, you can see how we characterized litter production from broilers and that's in terms of the amount of litter produced per pound of bird and the nitrogen and phosphorous dry weight concentrations. In light of the change in house management that's occurred over time, what do you think about what we've got, and is anything going on to research that aspect of our characterization of manure?
Paul Bredwell: What I know is that the characterization has been as accurate as you can get at this point of time. What we're going to find if we move forward with this data collection effort is you're going to get some variation. The producers manage their barns by-and-large according to their historical knowledge of the farm. You might have some farmers that clean out once a year. They'd like to clean the farms out once a year, they want to do that. You have other farms that operate on very extended litter cleanout frequencies. I've talked to producers around the country and within the watershed where they've operated on litter within their barn for a three-year period. They cake out, of course, and they add top dressing, but I think, moving forward, we're going to see that there's maybe a bigger variation and, in my opinion, I think that's good for the modelers to know. I think it's going to give a greater sense of comfort for the producers and the companies within the watershed to know that we're looking at those variables. I understand that there are limitations around the model and the model is, in my mind, I look at it as a black box. I couldn't begin to understand it, and I'm somewhat awed by Gary and Jeff and others who work with this and make it work. If we can provide more accurate data to them and it helps them, that's our hope.
Dave Montali: What we did in the past models is we operate on an annual basis, and we say a pound of broiler makes this much litter of this quality. When it goes to trying to deal with litter transport, what I hear is, because of the change in management, we don't have that amount of litter that we had before and need to improve water quality based on that old characterization, we can't do it. We can't get that much litter. I don't know if anything is true, but do you think that, on an annual basis, the amount of litter generated by poultry is the same now as it was before?
Clint Gill (in chat): Agree with Dave, anecdotally, the full cleanouts are getting farther apart. Many producers are windrowing litter between flocks, this means fewer annual tons of litter coming into the system. I think if we're going to change concentrations of nutrients in litter, that MUST come in conjunction with re-assessing a realistic tons of litter produced per year.
Paul Bredwell: Generally, I would say no and here's why. We have driven our feed conversion ratio down drastically. If you look at the feed conversion ratio in 1980 and even 2000/2010 to what it is now, we will eventually get our feed conversion ratio down to one or below one. So, if you're feeding those birds less, it's got to affect the manure generation, right? I mean feed in,

feed out, and we're still growing those birds to market weight. I'm very comfortable in saying is the manure generation and the nitrogen and phosphorous concentration the same as it was ten years ago, no, it's not. It's very likely lower and we saw that in the turkey project, right? I think we are going to see similar things in the data coming from the broilers, and the layers, and the pullets as well.

Dave Montali: Basically, what I'm hearing you say is the way we have things characterized is probably not accurate anymore. But will we have information in time for Phase 7 to change it?

Paul Bredwell: A lot of that depends on the window we have. It's my understanding that we have until October of next year to collect and get this data off to the modelers. Tom, if that's wrong, I apologize. I think we can do it by then. The question is, we've got to go back, and we've got to harvest backward too, right. I've made that very clear to the integrators that we've got to go backward so that we can compare what was occurring in let's just say 2018 to what's occurring in 2023 and 2024. I think, hopefully, that will start to give us this lookback and ability to compare where we were 5/6 years ago to where we are now and answer your question. It's important that we do that.

Ruth Cassilly: There are two things in my mind going on here. One is production data in terms of population and the other is nutrients and nutrient concentrations. When you were going through your PowerPoint in terms of nutrient concentrations, you mentioned the phytase BMP sort of being factored into your nutrient concentrations for the calculations you are churning out. We also have that as a BMP that would be eligible to be applied. So, there's some concern first of all with that point like what's going into your calculations in terms of nutrient concentrations and, if you're including those types of best management practices, do we need to reevaluate the ability to apply those as a BMP? I have other points I wanted to make in terms of working with the land grant universities and with the EPA to generate more accurate nutrient concentrations, that sounds good. I'm concerned with how those arrangements are going to be made. What kind of agreements are going to happen? If the reporting is going to be that we are going to get data from everyone in the entire industry, every year from now on, to give the model consistency, that would be good. But I don't know if that information exists right now in terms of what's going to be the capacity of the industry to actually work with the land grant university to keep this information as accurate as possible in terms of what is the nutrient concentration of the litter being generated. In terms of population data and production cycles, we've historically been getting that information from the Census and the annual NASS production numbers, and I keep coming back to the point that Mark made earlier that, despite that, Adams County 6 million layers were missing from that data and I'm wondering why? Why not go from the aspect of we are going to start reporting this data accurately, industry-wide, through the NASS Census and through the Ag Census, to keep those numbers as accurate as possible and work with NASS? There's already a privacy component there and it's already happening at a county level. In the past we know that's obviously not been accurate reporting because we've had large numbers missing. Another avenue that I'm thinking about is the CAFO permitting. I know that differs among states and that states have regulatory authority from EPA as to how they mandate what's reported and the BMPs generated. It seems like that's another reporting avenue that we may be overlooking that would give more mandatory consistency with what's being reported, rather than relying on U.S. Poultry to continue to report into the future, which I have some concerns with. Unless we have an agreement that says that's going to be consistent, going back to Joseph's point, we want to try and have these numbers consistently,

how are we going to ensure that going into the future? Those are concerns I have in general. I just wanted to air them so that going forward with this conversation, we can consider some of those things.

Paul Bredwell: All great points. As far as the phytase thing goes, I'm glad it's a BMP but, quite frankly, phytase is used all across the industry. So, I understand that you have to adjust the BMP potentially, remove it, if we're going to use it in another way to refine the nutrient content. I think in a broad reply, your comment about collecting it continually down the road to make sure that we got the data continuing to go in the model, I agree with you. Finances are always an issue. I will tell you this- U.S. Poultry, since we started the Turkey Project, has committed close to about $100,000 now to be part of that process. When we started the Turkey Project, there was some money that came out of the EPA to pay for the teams that were going out to the farms. So, moving forward, yes, we would have to potentially identify revenue forces. There are a whole lot of things that have to fall into play moving forward. I'd be happy to have a side conversation with you. I probably didn't answer all your questions or address all your issues. But all valid points, thank you.

Elizabeth Hoffman (in chat): Agree, litter amendments as a BMP should almost be a default in the model, similar to those conversations around dairy precision feeding - it's become industry standard.

Ruth Cassilly: @Elizabeth- correction, apparently we have already done away with the Phytase BMP because the increasing efficiency is already factored into the nutrient calculation used in CAST- my apologies for the misinformation- the same is not true for the dairy precision feed BMP

Recap/Closing 10:45-11:00 [15 min (Zach Easton, VT)]

Action Items:

- Discuss: Manure application, and industry data for Phase 7.

Adjourn – 11:00

Up Next:

Office Hours: Friday, September 13th, 2024, from 8:00 - 9:00 am.

AMT Meeting: Friday, September 13th, 2024, from 09:00 - 11:00 am.

Participants

Tom Butler, EPA
Zach Easton, VT
Caroline Kleis, CRC
Tim Larson, VA DCR
Tyler Trostle, PA DEP
Scott Heidel, PA DEP
Arianna Johns, VA DEQ
Joseph Delesantro, ORISE FELLOW/EPA CBPO
Curt Dell, USDA-ARS
Mark Dubin, UME/CBPO
Dave Montali, Tetra Tech, WV, MWG
Alex Soroka, USGS
Cassie Davis, NYS DEC
Olivia Devereux, Devereux Consulting/CBPO

Gary Shenk, USGS/CBPO
Kristen Bisom, WVCA
Clint Gill, DDA
Jessica Rigelman, J7 Consulting/CBPO
Bill Keeling, VA DEQ
Elizabeth Hoffman, MDA
Candiss Williams, NRCS
Kathryn Bresaw, PA DEP
Patrick Thompson, EnergyWorks Group
Helen Golimowski, Devereux Consulting/CBPO
Ashley Hullinger, PA DEP
Ken Staver, UMD/WyeREC
Paul Bredwell, U.S. Poultry and Egg Association

**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
NPDES- National Pollutant Discharge Elimination System
PSC – Principals' Advisory Committee (CBP)
STAC- Scientific & Technical Advisory Committee
TMDL- Total Maximum Daily Load
WQGIT- Water Quality Goal Implementation Team