Agricultural Modeling Team (AMT) Meeting

September 13th
09:00 AM – 11:00 AM
Meeting Materials

Summary of Actions and Decisions

Decision: The AMT approved the August 2024 meeting minutes.

Action: Tom will reach out to states not present on the call as well as those who requested county-specific data. He will provide requested information necessary to facilitate decision-making on this topic at the next meeting.

Action: Please reach out to Joseph Delesantro (jdelesantro@chesapeakebay.net) and Tom Butler (Butler.thomas01@epa.gov), if you have additional feedback on or data requests for manure applications.

Meeting Materials

Statement of purpose:

To decide on manure applications in Phase 7 and discuss potential changes to crop yield and mortality for Phase 7.

Decision items:

1. Approve the August minutes

Decision: The AMT approved the August 2024 meeting minutes.

Announcements:

- September 19th AgWG
  - Discussion of relevant AMT topics.

Introduction/Recap: 09:00-09:10 [10 min (Zach Easton, Virginia Tech)]

Zach introduced today's topics.

Manure applications in CAST 09:10- 09:50 [40 min (15 min presentation 25 min discussion) (Tom Butler, EPA)]

Tom provided a recap of changes made to the acres and manure applications in CAST agricultural Land Uses. The group was asked if they approve of these changes for Phase 7 development. Decision-making on this item will continue at the next meeting. Decisional.

Discussion

Ken Staver: Quick question about group four. The axis is all about percent of crop need. In nutrient management plans, the crop need for soybeans is N. Is that some fraction of fixed N? What's the "need"?
Tom Butler: The X axis is all based on the need of grain and silage and saying that once we hit 50% of the need, nitrogen from manure for grain with silage and manure with silage, we start to apply to that group, too. Once we get 60% of that for group one, we continue to apply to Group 2, and then apply Group 3. Once we hit 75% of that need for Group One, we continue to apply Group 2, Group 3, and then we apply the Group 4.
Ken Staver: I should have asked about the left axis "percent application to crop goal". So, the left axis doesn't really have anything to do with the N need of the crop. It just gets spread evenly across all those acres?
Tom Butler: It get's spread according to the slope of the curve. You would expect a higher application rate relative to need for legumes once you hit 75% of the need for grain and silage. But that would've meant you had to have already fulfilled 75% of the nitrogen requirement with manure only for grain and silage. This is like the sum of all of them. 100% means that everything has been satisfied.
Ken Staver: It seemed like there was some discussion that silage ground should get sort of preferential application. Did you just decide not to go that way?
Tom Butler: I had interpreted, maybe incorrectly, that they should be put together rather than having silage as its first curve and then grains as a second. That discussion led me down the path of thinking that they were to be in the same category. You guys can jump in because if we wanted to test that, sure we can.
Ken Staver: I thought there were some folks from dairy country that said silage ground, really a high percentage of it, gets manure from that farm. That's where silage is grown is where there's cattle of one version or the other. A couple of folks said you can expect a high percentage of manure application on silage ground.
Tom Butler: I think Curt had given us some background information on what happened at the AMS about this.
Mark Dubin: The AMS had originally thought that corn silage would be included in the first group. That's what the group thought at the time on there, but I would agree with Ken. My experience in working with dairy is that it's a very high percentage of corn silage that's going to be receiving manure applications on it, more so than grain corn by far. There probably is a precedence for making that a separate group, if the group wanted to go that direction and make it more of a primary than just lumping it in with grain corn.
Curt Dell: In the AMS, we didn't break it out quite as much, we were just thinking corn should be the first priority. Coming from my perspective here in Pennsylvania, I would say that, yes, silage being a higher priority than gain probably would be good. But, at least, all corn should be higher priority. If we wanted to further break it out to silage as a higher priority than grain on dairies, that would probably make sense. Although some fields, the farmers don't even know if it's going to be harvested for silage or grain. When they plant it, they kind of go by weather and how much silage they have once the bunkers are full. Then they might let it go and harvest for grain only. Back in the AMS, we wanted to make sure that the priority for manure was corn. If we want to parse that further, that would make sense. Definitely our perspective then was just getting a mechanism that manure was going to corn first.
Tom Butler: That's helpful, thank you.

Joseph Delesantro: My read of the literature follows everything that's been said here which is that first priority is corn. But, the literature often to my knowledge rarely splits out corn grain and corn silage. So we don't really have firm values that I know of for what that would be. Just reiterating from the perspective of the literature that corn certainly is the priority but it's not split between grain and silage in that reporting.
Ken Staver: When you say literature, we have how many states involved in this process who have nutrient management programs, and they have information. So, in terms of the national literature, I can probably see what you are saying, but I think we have the ability to drill down a little bit more with all the efforts that's put into nutrient management planning in the Bay Watershed. We can do better than looking at national literature and drawing conclusions about things, given that we now have 1m resolution on satellite imagery and all these forms farmers are required to fill out. I think we have to do better than just falling back on the national literature, which I presume is academic literature.
Tom Butler: That's fair, Ken. I think that if we have that expertise, maybe if anyone else wanted to weigh in, I'm totally open to that. This is a forum. I think if that's what people want to discuss, we can bring it out and say what do you guys think from other states?
Dave Montali: I don't have a strong opinion, but I do recall that we're here in this point because we had the silage away from the corn for grain in the past, and all the work that you've done up to now was to show us what the effect of moving that silage back and lumping it with the corn for grain would be. Whether we need to take another step and be more specific, this group hasn't talked about that. We were trying to make a fix of moving it from other grains back to grain with manure.
Tom Butler: That's a very good point. The added specificity of a silage only category, I had not interpreted that to be the call from last meeting. I was moving it from the other ones to combine it with grain with manure. So, If that's something the group is interested in, and if there are other states that think that's a valid thing to do, or if they see a diminishing return with doing that, that is totally your guys' call. I'm just trying to help shepherd the work, so if that's something we want to do, I think that's fine.
Ken Staver: That's a fair statement Dave brought up. It's a step in the right direction. Nobody really seems to be too keen on another curve. No one is looking for more complications, so maybe take this step and see what it looks like. It's hard to make a call until you see what it looks like, right?
Tom Butler: Ken, that's a great point. To that effect, I've got a list here that I'm going to run through on things that people have asked to see. They happened at office hours, so I want to make sure there's a record of that, and maybe this can coincide with that discussion on how people would want to see maybe a further breakdown.
Ken Staver: If it turns out you've got silage just getting a little bit of manure here and there, I don't know how it's going to look, you know? I guess that's the question.
Tom Butler: Really good points, all around. I think it's good to have those conversations and get them out in the air.
Tom Butler: In the office hours, we had the discussion where people wanted to see a little bit more information. To that end, I would like to name a few counties that people had suggested from states, really in terms of the manure spread algorithm. Once I do that, I think we can continue our discussion about some of these decisions. I had people wanting to see change in

manure spread algorithm in several counties in West Virginia, these included Hardy and Pendleton. Dave, do I have those right?
Dave Montali: Yes, those are the potential disposal counties.
Tom Butler: Ok, thank you. For Virginia, it had been thrown around as Rockingham. Someone from Virginia, did you have any counties you wanted to see more specifics of this for, rather than just Steuben or Northumberland?
Bill Keeling: Rockingham would be a good one. Accomac, probably also Cumberland County.
Tom Butler: Great. Alisha, you had said Frederick, Sommerset, Caroline, and Dorchester. Is that accurate? Anything else?
Elizabeth Hoffman: Yeah, that was accurate for Maryland. You had already shared some other countries when we asked previously as well. Looking for more on the shore.
Tom Butler: Pennsylvania, Kate, we put you on the hook to think about it. I have listed Franklin, Adams, and Lancaster. Did you want to amend those or add to that?
Kate Bresaw: Yeah, why don't you throw Chester on there.
Tom Butler: Clint, I have listed all of Delaware.
Clint Gill: Yeah, we've only got three counties.
Tom Butler: New York? Cassie, are you on? I will try to reach out to Cassie offline. Those are data requests that I've already received from this morning and have now been amended for the second part of this decision. Having gotten those on the record, I'd like to talk through this a little bit and see if people would like to go through with one or both of these decisions. I think the second decision I've seen as a hold with those being comments. So is that kind of how I can register those responses, for at least modifying that manure spread algorithm? If I were to split these two decisions apart and I'm putting in this modify manure spread, everyone I just heard from, would you register as a hold on the chart here?
Scott Heidel (in chat): Yes, please hold on part 2.
Ken Staver: It seems like there's some agreement that we go to plant available N, because that's how nutrient management planning is done. But, we still aren't sure about the algorithm that uses plant available N to calculate the amount of manure per acre, right? Is it a lot of acres, or a few acres? There's another element to that final bottom line effect of that point is, what the curve? Not just that we use plant available N instead of total N, it's what's the curve?
Tom Butler: I'm going to pull up a vote sheet and we're going to walk through these one by one for both of those decision points, and register what people say.
Ken Staver: I feel like there is concurrence that using plant available N makes sense, but that's not the whole issue with that point, right? That's fine if we just agree to do that then we can deal with the 2nd part later, right?
Tom Butler: That's what I would hope for. I've got these split out now. The first thing I want to ask about is, to what extent do you agree with the following? One means not happening. If you're 2-4, you are somewhere in the middle.
Clint Gill: We are very optimistic about this, but I kind of view them as kind of linked together, and I think we need to see what the counties looked like before. I think we're a 2, pending getting a little bit more information.
Elizabeth Hoffman (in chat): MD is a 2
Tom Butler: DE is a hold, pending getting information on the full data set. Elizabeth?
Elizabeth Hoffman: We're a 2 as well, similar reasons previously mentioned at office hours. Waiting to see how they're connected.

Tom Butler: I don't think New York is on here. Scott, I think I saw you had put a two.
Scott Heidel: The hold was for the second part of this, I think we do endorse the plant available nitrogen. So, I'm a 5.
Tom Butler: Tim Larson from Virginia? Is there a fill-in for Virginia? I'll reach out to them offline. Dave, West Virginia?
Dave Montali: I'm struggling between four and five, but four is good for me.
Tom Butler: Jeff Sweeney, EPA?
Jeff Sweeney: Four as well. Reservations being able to accommodate those two's that are on hold.
Tom Butler: Ken, MD?
Ken Staver: If the question is simply starting with plant available manure vs animal units, I'm a 5 on that. That seems to me to be half the question of point one. There's still the shape of the curve that will determine manure acres, but I'm a 5 on that question as it stands.
Tom Butler: Tammie, ARS? Candiss, NRCS?
Candiss Williams: I'm going to go with 4.
Tom Butler: Alex?
Alex Soroka: 4 as well.
Tom Butler: Zach?
Zach Easton: I'm a 5 on this one.
Tom Butler: Ok, I'm going to reach out to Tammie, Tim, and Cassie offline.
Elizabeth Hoffman (in chat): I'm sorry Tom, MD is a 4 for this part. 2 for modifying the manure spread algorithm. Thanks
Elizabeth Hoffman: Tom, I thought it was a singular vote. We're a 4 on this part, 2 for second part.
Tom Butler: Yes, that's my bad. We've split them apart. I appreciate the clarification.
Curt Dell: I guess I am Tammie's alternate. We would probably be a three because we normally stand aside on votes, just because of our agency policy.
Tom Butler: Ok, then I will reach out to Tim and Cassie offline. Clint, just to clarify, this one was based on a separate decision to use plant available nitrogen. The other decision that we would have is to implement those curves. Having said that, does that change what you've said, or are you still wanting to see results?
Clint Gill: I'm still wanting to see results. I think we're almost there.
Tom Butler: I'll get results out to everyone for what they've requested here and reach out to Cassie and Tim offline. That should wrap up the first decision point. For 2, I've got the same thing for Clint, a two. Elizabeth is a two pending the results. Is that correct?
Elizabeth Hoffman: Yes. We wanted to understand some of the other aspects.
Tom Butler: Scott, I think you said you were a two as well?
Scott Heidel: Correct, pending results.
Tom Butler: Tim or Robert from Virginia? Dave?
Dave Montali: Before hearing the others, I would have been a four, philosophically. Since others are a hold, I'm going to check my stuff, too.
Tom Butler: Jeff, EPA?
Jeff Sweeney: Again, a 4.
Tom Butler: Ken, MD?

Ken Staver: I think I go with a four, too, as a step in the right direction. Since we are going to review a lot of stuff, it doesn't matter what I am. I want to be positive since it's as step in the right direction.
Dave Montali: Put me down that way, too. If everyone's going to look at it, I'm going to look at it.
Tom Butler: Curtis, same as last time, 3?
Curtis Dell: Yes, we'll stand aside.
Tom Butler: Candiss, NRCS?
Candiss Williams: Two. I feel like I need more information.
Tom Butler: That's fine, I can reach out to you offline as well and get what you need. Alex, USGS?
Alex Soroka: That's a four.
Tom Butler: Zach?
Zach Easton: Same, a four.
Tom Butler: I will work very diligently to get all these counties ready. I will likely make a slide deck that has all of them and try and send it out within the next two weeks.
Scott Heidel (in chat): Thank you, Tom! We appreciate your efforts and help on this.
Joseph Delesantro: In addition to putting together the county specific data, if people have other ways they would like to see the data, please let us know, because we are happy to generate different types of plots for different analysis or splits.

Decision: No decision was reached this month, a new attempt at consensus will be made next month.
Action: Tom will reach out to states not present on the call as well as those who requested county-specific data. He will provide requested information necessary to facilitate decision-making on this topic at the next meeting.
Action: Please reach out to Joseph Delesantro (jdelesantro@chesapeakebay.net) and Tom Butler (Butler.thomas01@epa.gov), if you have additional feedback on or data requests for manure applications.

***Post Meeting Note:** As of 9/17, Tom has reached out to all the people mentioned above. If you would still like information ahead of the October meeting, please reach out to Tom Butler (Butler.thomas01@epa.gov).

A summary of votes and comments are provided below:

Decision 1: The acres of Grains with Manure should be determined using Plant Available Nitrogen in Phase 7.

Role	Name	Affiliation	Vote	Notes
Signatory	Clint Gill	DE	2	Pending getting information on the full dat set for 3 counties
	Elizabeth Hoffman	MD	4	Want to see how results are connected to second decision
	Cassie Davis	NY	2	Questions about where PAN comes from
	Scott Heidel	PA	5	
	Tim Larson	VA	2	requested infromation on several counties (Amelia, Buckingham, Cumberland, Page, Rockingham, Accomac, Albemarle, Augusta, and Bedford Counties)
	Dave Montali	WV	4	
	Jeff Sweeney	EPA	4	want to accommodate others with hold
At-Large	Ken Staver	UMD	5	wants to see the algorithm of the curve for determining manure acres (sees as a part 2)
	Curtis Dell	USDA-ARS	3	stand aside on votes(agency policy)
	Candiss Williams	USDA-NRCS	4	
	Alex Soroka	USGS	4	
	Zach Easton	VT	5	

Decision 2: We should modify the manure spread algorithm to create a fourth group as shown in the presentation for Phase 7.

Role	Name	Affiliation	Vote	Notes
Signatory	Clint Gill	DE	2	Pending getting information on the full dat set for 3 counties (kent, new castle, sussex)
	Elizabeth Hoffman	MD	2	Pending getting information on the full dat set for several counties (Frederick, Somerset, Caroline and Dorchester)
	Cassie Davis	NY	3	Based on CAST 2023 Progress nutrients applied report, we only have one county (Schuyler, NY) that distributes nitrogen from manure above the crop need for Group 1 and distributes to Group 3.
	Scott Heidel	PA	2	Pending getting information on the full dat set for several counties (chester, franklin, adams, lancaster)
	Tim Larson	VA	2	Bill keeling provided input to see several counties (Rockingham, Accomack, Cumberland)
	Dave Montali	WV	2	step in the right direction, want to see counties (hardy, pendelton)
	Jeff Sweeney	EPA	4	
At-Large	Ken Staver	UMD	4	step in the right direction
	Curtis Dell	USDA-ARS	3	agency policy
	Candiss Williams	USDA-NRCS	2	needs more information (reach out to get what is needed)
	Alex Soroka	USGS	4	
	Zach Easton	VT	4	

Crop Yield trends 09:50-10:30 [40 min (20 min presentation 20 min discussion) (Joseph Delesantro, ORISE; Tom Butler, EPA)]

We discussed the results of adding in updated crop yield trends progress being made to improve long term crop yields. This included multiple potential approaches for estimating yields from the Five-Year Census of Agriculture using correlations to crops with existing annual yield data. Informational.

Discussion

Scott Heidel: I just had a little bit of concern knowing that it's looking like the trajectory is continued growth. We are experiencing land use conversions in Pennsylvania, and I believe across the watershed as well, where we're losing crop land, available agricultural land, in general. So, I would just hope there could be at least some understanding of that and maybe a plateau rather than a continued increase in outputs.

Joseph Delesantro: That's a great point and that is actually captured in the results that Tom will show, which are the integration of both acres planted and yields. The stuff that I just talked about is all about the yield per acre. Tom will talk about the total yield being that yield per acre times the acres planted which, as you say, are generally decreasing throughout the watershed.

Alex Soroka: When I was looking at the yield estimation and using the crop growth regions, I was thinking it's great when we have enough information in the county, but in places where there's a

difference between the crop growth region model and the ag census data, it may be good to catalog those places where you have a large difference between the two. Those could be a point for us to talk with states in the future saying, hey, we could use a little bit better resolution here to understand what's happening. For the no yields decreases rule overtime, I'm wondering if, during those periods where we're seeing yield decreases, if those are periods where we would likely see a decrease in input to those acres, or no? I'd like to hear what the states thought on that.

Joseph Delesantro: Yeah, that is definitely a question for the states. I'd be curious to hear if there's any thought on that as well.

Olivia Devereux: We are using the sales data for fertilizer at this point and that is by year, so I think that would be taken into account.

Kate Bresaw: If it's expected yield, farmers are going to apply to what they anticipate, as far as weather fluctuations are concerned. Economics might be another story. If we're looking at sales data, obviously that's problematic because it's a little bit old. If fertilizer is more expensive, they may or may not be applying it because there's another alternative that is less expensive.

Tom Butler: Bill, you're in Virginia, what would your input be? We were talking about no trends decreasing, I think we're trying to figure out if that might be true in the states in terms of things like weather fluctuations. Obviously we are talking expected yields, but how farmers might apply based on their expected yields if things weren't ideal in a weather or economic scenario.

Bill Keeling: My experience with farmers that I've dealt with was that they tend to remember the really good years, and that's what they shoot for. If something happens that causes less than that yield, droughts, etc., that's an oh well.

Alex Soroka: That's a vote for no yield go down.

Mark Dubin: Typically, when we're looking at making fertilizer recommendations, it's based on the best years out of a period of time. Three out of five, or whatever that is, and that's intentional as to base a gap over poor yield years due to drought or other conditions. It doesn't make sense for a producer to plan on those lower yields because they're not economically profitable. So, there's not much sense in planning for a non-profitable year and basing your applications on it. So, you're going to shoot for a profitable year instead. Pretty much as Bill said, the producers are going to look at the positive side versus the negative on their application because, if you do otherwise, you're setting yourself up for failure and a non-profitable production.

Bill Keeling: It may be different now, but when I was working in the field, there were not many farmers that had good yield records year over year to do it best three out of five. That's why they remember the good years and try to forget the bad ones.

Ken Staver: I think the thing that got us in trouble, using census data that was every five years, is when you only get a point every five years, you can hit a bad year regionally, which is what we did. In 15 years, we had two bad ones. If you base your curve on a data point every five years, that's why it looks the way it did. On the economics part, there is some element to it- corn prices, fertilizer prices. But farmers, when it's hard times and it's really lean, they tend to cut back on P and K which are their sort of soil reserves they can use for a year. So, they say this year I am just going to draw down my soil reserves. But N, you can't really do that. If we're just talking about nitrogen, the economics are less of a factor than for P and K. People definitely cut back on P and K applications when it's tough times. Plus, when you come out of a drought year, you didn't pull as much P and K off in the previous year as you would have in a good year, so

your soil reserves are a little higher. Whereas for N, lots of times after a dry year, it all leeches out anyways. So, you can't really rely on last year's unused N in the next year. For the bottom line on all this about delivered loads and meeting the TMDL, the difference between what the crop takes up and what we apply, has to do with the loads generated in CAST. So, if we're underpredicting yields, we are going to get higher predicted loads. So, this is not about attracting fertilizer applications, this is about delivered loads and meeting the TMDL. We don't want to "cook the books", but we also don't want to underestimate yields. It's going to give us a problem that we are about ready to deal with, with the new fertilizer sales numbers that are going to create major heartburn in terms of meeting the N goals for the TMDL. It's bigger than just drawing fertilizer, it's about how your delivered loads shake out. The fertilizer number is a fixed number, so we are estimating yield. The fertilizer number is a sales number, so we are stuck with pounds of N. We've got to get the yield right or we are going to have more excess N than we should.

Olivia Devereux (in chat): P6 is using annual NASS data plus the 5-yr census

Tom Butler: I do want to make one clarification here, and that is to the comment about fixed fertilizer amount. That is true when we have the fertilizer sales data but, in some years, we have several years of a lag. When we have that lag of sales data, we know our yields because we have annual NASS data that gets put into this currently. But from the last year that we have both yield and sales data, that fixes a relationship of fertilizer to the yield. Moving forward, in years where we don't have a fertilizer data as an actual number, it is a proportion to meeting the crop's nitrogen requirement. It is not necessarily a fixed nitrogen stock for fertilizer. Manure is different. That's county by county and that's animal units, so that factors in differently. But the fertilizer is locked in as a proportion. It's not that we have fertilizer as an actual fixed number for every single year because, in many cases, we do not have fertilizer data from 2024. So, for a few years, we are going to see kind of a relationship rather than the actual number.

Ken Staver: In the CAST 23 runs that I looked at; the amount of N applied for amount of grain produced was increasing. It was not fixed. What we would call your surplus was increasing on corn. So, when you say it's a fixed ratio, I didn't see that.

Tom Butler: Yeah, so if the yields go up, you are going to use more fertilizer overall based on the relationship. It's not that it's a fixed amount.

Ken Staver: This was more N per unit of grain produced. So, what I'm saying is this was not just going up proportionally with the grain yield. With the CAST 23 runs I looked at for corn, the amount of N applied per unit of grain produced was going up. Ok?

Tom Butler: Ok, I need to see the runs that you are looking at.

Olivia Devereux (in chat): Yield is not shown in CAST, but is used to derive the data. Not sure where you saw that.

Ruth Cassilly: The latest year in CAST 23 that we have fertilizer data for is 2020. So, if you are looking at years up to 2020, you could see increases because it's based on actual data. But after that, it is projected, and so it would be based on what Tom had just pointed out which is a ratio of crop need met for every county.

Tom Butler: Thanks, Ruth, and I think Olivia's got a comment similar to that. Ken, I would want to see that data and look through it with you offline.

Ken Staver: So, in terms of Olivia's comment, yield is not shown in CAST, but what's shown in CAST is converted from yield to plant uptake. You can get yield from the CAST plant uptake because that's what the plant uptake data in CAST is based on, is the yield data. You don't get

plant uptake data from NASS, you get yield. I'm just working it back to what the original data was.
Tom Butler: I know we are focused on a lot of these things, and they are important. But, we also have to recognize on the schedule we did want to start talking about fertilizer next month, and fertilizer is going to be a very important topic. So, I don't want to short fertilizer necessarily with talking about a lot of these things. I'm not saying they aren't important, but I think maybe fertilizer is more important.
Dave Montali: Expected yields, is that what we're looking at? Expected yields?
Joseph Delesantro: Yes, all expected yields.
Elizabeth Hoffman (in chat): For future, fertilizer discussions: https://www.nass.usda.gov/Newsroom/2024/07-24-2024.php, https://www.morningagclips.com/new-usda-watersheds-report-provides-insight-into-agricultural-data/, "Additionally, the report indicated the number of farmland acres treated with commercial fertilizers, lime and soil conditioners declined nationally by over 16 million acres between 2017 and 2022."

Ken Staver: Tom, I have a question about organic crop need. I thought organic was just based on how much manure was available. Why is there a difference between the line and the bars? We don't predict organic need, we have an amount of manure N that's available and that's what gets applied, right?
Tom Butler: I think there were eligibility requirements on what could be organic.
Olivia Deveruex: It had to do with the timing for planting. I think it was applying. Some of it had starter fertilizer had to be inorganic only. So, that's where that probably came from. You made the graph, but that's my guess.
Tom Butler: I think that probably played a part. I think we may have removed some of those requirements because of what we did in Phase 6, but I'll dig.
Ken Staver: I never thought of it as organic as a need. It is what it is.
Tom Butler: It's the amount that's eligible. So, it could receive more than what you are saying is there, but you are probably not applying as much. Basically, the manure in Lancaster is not able to meet it. There are BMPs put in place here, so there may be more manure in Lancaster than what is actually applied. They may be doing things with manure, you might transport it.
Ken Staver: I'm sorry, I have to make sure I understand this graph. I thought the yields were going to go up, but I am looking at the grain without manure and it looks like it's going down. Am I reading this wrong?
Tom Butler: You are reading this correctly. We have not implemented the fix Joseph has found. This is based off of old data. We looked at this, yields were lower, Joseph found a solution based off that. I'll let you talk, Joseph.
Ken Staver: There's going to be a fixed proposed bar, too, right?
Joseph Delesantro: That's right, Ken. Looking at these land uses now is probably not super useful in terms of the absolute values shown here. This is more kind of like this is how we're going through the testing of these values in CAST, this is what we will be showing you hopefully next month with the next iteration. But the absolute values in here are already out of date. We've got a lag on that because it takes us a while to actually get things through CAST. If there are other ways you would like to look at this data beyond what Tom and I have shown you, please let us know and we can start to prepare it in additional ways.

Candiss Williams (in chat): dotted line vs solid is what/which again?
Tom Butler: Sorry, Candiss. The dotted line is the current and solid is proposed.
Ken Staver: Right, but the proposed is going to be further adjusted.
Candiss Williams (in chat): Put on the slide what we are seeing. But solid is 'new' for all slides.
Tom Butler (in chat): our apologies on the posted version we had the lines labeled. I just need to update it with one more of Joseph's slides.
https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Crop-yields_9.24_03.pdf
Ken Staver: In 2020, what you have as new is lower than the old one, which is why the bar graph was lower in 2020 in terms of fertilizer per acres, right?
Joseph Delesantro: That's correct.
Dave Montali: In my mind, I'm not trying to understand these because I think we need to wait until next month. We have too many different things going here. But, I did have a question about the sorghum. Is that one that you're going to apply the doesn't go down rule, or one that you're not going to apply that to?
Joseph Delesantro: I would not apply the doesn't go down rule to sorghum, even though watershed-wide, it has been increasing. There are a lot of areas where it is very flat and where it's very variable from year to year because of whether or not sorghum is cut for silage or harvested for grain. So, I would advocate not for applying the doesn't go down rule to that one.
Dave Montali: Ok. Basically you are saying this variability we can live with because it is not a big player?
Joseph Delesantro: That is my opinion, but of course I would love input on that. Yes, you are correct, it's not a big player in terms of nitrogen application.
Dave Montali: Looking at these graphs, I picked up on the smoothness which is a good thing overall. We don't want drastic changes and all this stuff because that's not the way the world works. So, it was the one that jumped out as still highly variable from year to year in my eyes anyways.
Tom Butler: I think we are good on this one. I think we got some input on where to go.

Animal Mortality in CAST 10:30-10:55 [25 min (15 min presentation 10 min discussion) (Tom Butler, EPA)]

We began discussions related to an existing animal mortality expert panel report which would break out mortality nutrients from the existing manure nutrient pool. This also advises on how to implement BMPs. Discussion revolved around where the mortality load will manifest within CAST load sources in Phase 7. Informational.

Discussion

Olivia Devereux (in chat): Link is https://cast.chesapeakebay.net/EstuaryTrends/AnimalUnits
Bill Keeling: Looking at those percent reductions in Phase 6, I ran a scenario where I took a 23 progress input and removed every record that we had, which was several hundred. I did this in CAST 19 and 23. In CAST 19, the net result statewide for Virginia was 2 pounds. For CAST 23, it was 10. That's noise. These BMPs in effect have no current benefit, and these percentages have completely disincentivized reporting this BMP, at least for Virginia. So, just a little perspective.
Tom Butler: You said two and ten pounds?
Bill Keeling: Yup. You are looking at .12 percent, right? That's a fraction of one percent reduction. If you don't see a 5 or 10 percent reduction in a BMP in the model of this scale, it's probably

going to be in that margin of noise. We summarized the basin output to 100,000 pounds plus or minus so, when I see that kind of return, I have to wonder why report it? It's a lot of work to report a BMP.
Tom Butler: I'd be interested to see what other people had to say about that. Maybe some other states?
Victor Clark: I just wanted to point out that the slide that we should have up right now is the one actually from the expert panel that says what the reductions are. This, as you said earlier, was a best effort at dealing with the current situation. This is not reality. The reality is on a couple slides ahead where it says the actual benefits of each of the BMPs. That's the reality, and that's what the expert panel found. We had trouble plugging that into the model, which is why we are here doing Phase 7. We have an opportunity to make those numbers work going forward. The other thing to point out is that this is a load source input reduction BMP. It is identical to manure transport. So, every pound that is removed is literally removed from the watershed. So, it has real impact, it's not just around the edges. The other point, too, is that we're not trying to solve for the whole amount. Meaning that, if a farm produces 100 tons of manure/mortality, we're not trying to zero out 100 because I think we all agree that whatever number you want to come up with, 90, 95, 98 percent of it, is useful and can be used properly. So, the amount that is excess, and again everybody has a different number in mind, the excess amount, let's say that it's five percent. If one of these BMPs reduces something by 2.5 percent, we've just solved 50 percent of what the problem is. It's only 2.5 percent of the total, but it's 50 percent of what we've identified as the excess. I think that should help put it in perspective a little bit.
Olivia Devereux: I think Victor's points are important, and Bill's are too. The report was something like 100 pages and I want to say something like 75 of those pages were really about the data Victor was talking about which is what is the nutrient concentration in the mortality. That's what we didn't have in Phase 6 and need for Phase 7, so we have an explicit source. That might motivate states like Bill Keeling to report those BMPs that are being implemented and are happening. So, good data that we have now that we didn't have before on what the nutrient content is of those dead animals.
Ken Staver: Tom, did you have a slide that showed the percent that the mortality was of nutrients relative to the manure production? So like for broilers, what this is saying is that chicken broilers that died during production, the nutrient content of those carcasses is equal to 1.3-2.4 percent of the manure nutrient N.
Tom Butler: It originates with mortality. This could be overall manure N mortalities. So, it's the farm nutrients whether they split it out as manure or mortalities. This is what is originating on that farm.
Ken Staver: Well, the mortalities is a tiny part of that. The only thing I would say is our estimates of manure nutrients, we've been having presentations like that monthly for years it feels like. So, if we're talking about one percent of the manure nutrients on a farm are mortality, if we got our estimate of manure nutrients within ten percent of what they actually are, we'd be doing really good, I think. This is a small number relative to our precision of estimating manure nutrients and the problem is dealing with mortality, in a good way, is something we want to do. So, we don't want to deemphasize good practice with mortalities, but if these are the percent, we are talking about 1 percent of manure nutrients are mortality, we're plus or minus ten percent at best on our nutrients. But we don't want to disincentivize doing good things with mortality. Wasn't

someone on here really pushing freezers a couple years ago? I think they were cost sharing freezers somewhere. So, it's been around for a long time.

Victor Clark: To follow up on your point though, if you want to put the number 10 percent, you want to say there are 10 percent excess nutrients that, below the other 90 percent, are being utilized legitimately, and there's only 10 percent excess. If that's the case, then this 1.3-2.4 percent is 10 percent of the problem.

Ken Staver: I understand your point. There's validity to your point in general, I'm just saying we're really struggling to get our nutrient quantities right. I don't disagree with your point.

Victor Clark: I was just trying to make the point that when you compare it to what the problem is, and if the problem is let's say 10 percent excess, then 1.3-2.4 is a significant reduction of the problem.

Dave Montali: I don't think there's any way of getting around it. It's a small load relative to water quality. We need to have a way to report it for those that want, but we can't go any way other than the science to say it's more valuable than it really is. I would just say, in the whole scheme of all the things this group needs to talk about, this one is not really a big deal in my mind. The other complicated thing is that the way we characterize litter is inclusive of these things. So that may be another little jab that comes out later is like well if you're going to represent it independently, do we need to adjust our characterization of litter because we are doing that? This could get really detailed, and I think what we all need to keep in mind is that no matter what, it isn't a very big load.

Victor Clark: One follow-up to Dave's point- that is a choice. One of the two choices would be separate this out and deal with it separately or leave it with manure and just apply these BMPs to the manure load without separating it out. So, we don't necessarily have to separate that out to achieve that, but that is an option, yes.

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

Action Items:

- Decision: Manure applications
- Discuss: Crop yields update, and mortality for Phase 7.

Adjourn – 11:00

Up Next:

Office Hours: Friday, October 11th, 2024, from 8:00 – 9:00 am.

AMT Meeting: Friday, October 11th, 2024, from 09:00 – 11:00 am.

Participants

Zach Easton, VT	Elizabeth Hoffman, MDA
Tom Butler, EPA	Gary Shenk, USGS/CBPO
Caroline Kleis, CRC	Curt Dell, USDA-ARS
Olivia Devereux, Devereux Consulting/CBPO	Clint Gill, DDA
Kate Bresaw, PA DEP	Scott Heidel, PA DEP
Emily Dekar, Upper Susquehanna Coalition	Eric Hughes, EPA

Mark Dubin, UME/CBPO
Dave Montali, Tetra Tech, WV, MWG
Ruth Cassilly, UMD CBP
Tyler Trostle, PA DEP
Kristen Bisom, WVCA
Bill Keeling, VA DEQ
Patrick Thompson, EnergyWorks Group
Victor Clark, DE/Farm Freezers
Candiss Williams, NRCS
Helen Golimowski, Devereux Consulting/CBPO
Lisa Duriancik, NRCS
Ken Staver, UMD/Wye
Hunter Landis, VA DCR
Joseph Delesantro, ORISE Fellow/EPA CBPO
Alex Soroka, USGS

**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