



Agricultural Modeling Team

August 14, 2026
9:00 AM-11:00AM

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

Purpose: To inform members of relevant changes to partnership protocols, AMT timeline and model development.

Summary of Actions & Decisions

Action: Tom Butler, EPA, will update the example calculations used in the slide showing how to calculate pounds of nitrogen from animal populations/manure numbers.

Post Meeting Note: Complete. You can access the updated slides [here](#).

Action: Tom Butler, EPA, will correct the slide “what if we don’t have a direct data source?” to have 2.25 flocks per year be listed under the pullets calculation, instead of the broilers and turkey calculation.

Post Meeting Note: Complete. You can access the updated slides [here](#).

Action: AMT staff will send Phase 7 data broken down by county and animal type to AMT members.

Post Meeting Note: Complete. You can access the data [here](#).

Meeting Minutes

I. Introduction & Announcements

Lead: Zach Easton, VT; Tom Butler, EPA

Tom announced that Suman Budhathoki, UMCES, is a new member of the Modeling Team. Suman introduced himself to the group. Welcome, Suman!

Tom briefly went over the ongoing discussions surrounding the structure of the AMT within the Chesapeake Bay Program Partnership. In particular, Tom noted the updated [Governance and Management Framework](#) and changes to the voting procedures. The AMT will continue to function as an Action Team, sunseting once the group has accomplished its task, and the AMT will be renewed as needed for future model development needs.

II. Data Updates

Lead: Tom Butler, EPA

The AMT examined the animal population source data that goes into CAST, which is tightly connected to manure generation. Review of this data was for informational purposes only and was intended to provide background to members on population trends. Once the modeling tools

have been completed and outputs are available these data will serve as a foundation for a comprehensive review.

Actions:

1. Tom Butler, EPA, will update the example calculations used in the slide showing how to calculate pounds of nitrogen from animal populations/manure numbers.
2. Tom Butler, EPA, will correct the slide “what if we don’t have a direct data source?” to have 2.25 flocks per year be listed under the pullets calculation, instead of the broilers and turkey calculation.
3. AMT staff will send Phase 7 data broken down by county and animal type to AMT members.
 - a. Post Meeting Note: Complete. You can access the data [here](#).

Discussion Notes:

Alisha Mulkey (in chat): What is the last year for horse surveys?

Tom Butler: I would have to look that up, Alisha. I don’t know off the top of my head. I will make a note of that unless Joseph or Jess have that off the top of their heads.

Jess Rigelman (in chat): I think it is 2007

Alisha Mulkey (in chat): TY Jess. Will email you separately.

Dave Montali: A couple slides back- the assumed 2.25 flocks per year number jumped out as wrong for West Virginia, but that might be because we make small broilers. The number I had in my head was six. So, I guess that is used when you don’t have NASS information for broilers or turkeys, right? You’d have to go to the Census and then figure it out. 2.25 seems like it can’t be a universal number.

Clint Gill (in chat): Apologies, I was on the road so I couldn't type, but Dave, we are also 5-6 flocks per year for broilers on the Delmarva

Tom Butler: Yes, that's why I've tried to caveat this with the example equations here. Joseph can jump on and correct me to the specificity of that.

Joseph Delesantro: This is all in that Appendix from the Poultry Litter Subcommittee. So, any sort of details we can provide in this meeting would be very thin compared to what you can get from reading the couple pages from that Appendix. I will try to find a good link for that to drop into the chat. But, none of the pieces that went into these two equations have changed since Phase 6 of the Model.

Dave Montali: Ok. Again, this is more of a stop gap when you have to go down the path outlined in the previous slides. If you had NASS production per state then you wouldn’t need to do this, right?

Joseph Delesantro: This is actually step 1. This is the primary step for how turkey and broiler populations are decided. The data that comes from the county is inventory, and the data that we have available at the state is production. Those two pieces of information go into that equation that Tom was just showing. Then if the annual state level data from the survey is missing, that's when we start to go through that hierarchical process of looking to the poultry production, value survey, and then if it's still missing, we would substitute that state value using the smaller of the last report or 500,000.

Dave Montali: Ok, thanks.

Joseph Delesantro (in chat): [P6ModelDocumentation/3ABCDG_TerrestrialInputsAppendices.pdf](#)
App. A is the PLS Report

Ken Staver: [In the example calculation for getting from animal populations to nutrients], that’s like one animal unit. That’s one steer. It can’t be 788 pounds of N per month. That’s almost as much as a steer. That’s $\frac{3}{4}$ of it’s body weight in nitrogen excreted.

Tom Butler: Maybe I didn’t put a 12 in there. I’ll look at my examples more clearly. I probably made a calculation error in my example. I will be more careful with my units when I am doing this.

Joseph Delesantro (in chat): Broilers and Turkey's correction: Flocks are used for pullets, NOT broiler and Turkeys where Survey statewide production values are assumed to include the multiple flocks. Countywide Birds Produced/Year = Statewide Birds Produced/Year X (Countywide Ag Census Inventoried Birds/Ag Census Statewide Birds Produced)

Clint Gill (in chat): Thank you Joseph, that makes a lot of sense. New Castle is a tough one to model, especially for layers, there is a single operation in the watershed

Manure Processing in CAST

Scott Heidel (in chat): MTT could be treated from other counties as well as within the same county.

Jess Rigelman (in chat): Yes, when reporting MTT, you report the county where the manure is from.

Tom Butler: I do see a comment here from Scott. Jess has already answered that. Yes, when reporting it, you report the county where the manure is from. That will come up a little bit later in some of the slides. I've got stored plant available nitrogen from manure. So, you're going to see a pool of manure that's coming after all of this has happened. So, you will see that, within that, there are BMPs kind in place that is reflecting transport out, treatment of, and then transport into the county. So, it's kind of that balance overall as it's ready to be applied to the crops.

Overview of State Consolidated Livestock Summary Profiles

Dave Montali: Two slides back [referencing numbers for PA], is that inclusive of Hillandale layers or not?

Tom Butler: Yes, it is, since this is Phase 7.

Andrew Leight (in chat): The PAN includes import/export manure. Not just how much is produced in County. Important to note since import/export may be between states.

Tom Butler: That is correct. That's a really good point. There is definitely transport that happens, as we've noted in that earlier figure. So, within some of these points, you may be seeing that the animal population isn't inherently matching up. You might see an example where the animal population doesn't appreciably change, but the nitrogen does. That could be an artifact of some of that transport between states or counties or areas like that. So that's a very good point, A.K. Thank you.

Ken Staver: To the point of plant available N, don't the states have different nutrient management planning equations for doing plant available from a manure application? I wouldn't imagine that everyone's on the same page on that.

Tom Butler: I can't speak to how different everyone is but, for our purpose, we've standardized it kind of ignoring inherently how they would have that application. So, the BMP effect would be different, and that reduces the amount we'd apply. But, for this, we've tried to go about the population and the waste generated and the dry fractions ourselves, so that we kind of have that consistent foundation.

Ken Staver: But the plant available even has a tillage/non-tillage component to it because, when you don't till it in, you get more volatilization in the field. So, is that plant available including all the ammonia when it leaves the storage system?

Tom Butler: At that point, there is volatilization happening. There are ammonia emissions that are happening. When we're applying those BMPs, it's trying to be consistent so that with each state, regardless of what they have, we're treating nutrient management in a similar fashion. That gets more in those BMP Expert Panels, and I can lean on Jess if I haven't given you a satisfactory enough answer.

Ken Staver: There was a time in Maryland when the question on the litter analysis form had a plant available column right on the form when you sent in for manure analysis and it said no-till, and the ammonia was not valued at all. Now, that's been adjusted a little bit based on the timing for incorporation after it's applied and things like that. So, it's gotten a little bit more

sophisticated. But, there was a time well within the Bay restoration effort where plant available, if it was in no-till, was 0. So, now it's not that. That's part of the incorporation. I'm sure the dairy folks that do injection and everything have a different plant available number. Somebody's on here who could speak to it, but I would think that with the injected, you have a lot more plant available N than you do with just surface applied, right? So, I guess you're just having 100% of the ammonia content as plant available. Is that how this is done?

Tom Butler: Yeah, that's a great point. We use the BMPs to try and regulate for that. So, everyone's starting from a pool, and there's no impact, then the BMPs are applied and that affects it. So, when you're talking about that pool, you're having volatilization occur. We don't have the BMPs for the field application side inherently baked into all those.

Jess Rigelman: We have our volatilization split into the barnyard volatilization and the field volatilization, and the manure injection incorporation BMPs will increase the plant available nitrogen based on relative percentages if you report them.

Ken Staver: So, this number is after the barnyard volatilization has occurred, but none of the field volatilization has occurred. Is that right?

Jess Rigelman: No. This number is both of them. So, both volatilizations would have occurred. The BMPs for barnyard volatilization would have been applied. The BMPs for field volatilization would have been applied. So, it takes those both into account, but you need to report them. They aren't inherently in the manure data.

Ken Staver: The odd part is, in this case, you are not getting rid of N. You are making more N available if you are incorporating it or injecting it.

Jess Rigelman: Yes, so it will increase the amount of ammonia that is plant available in the manure when you report those BMPs.

Dave Montali: Could you go back to the West Virginia slide? What catches my eye are the little spikes. That's a function of the five year Census of Ag and then the extrapolation post that? It seems like it's broilers, and there are what look to be every five year spikes. Am I reading that right? Those are just the true up periods? I am just trying to understand the volatility in the plant available nitrogen line down on the bottom.

Tom Butler: You are on the right track with this one because the Census is really going to manifest in the count/population. The animal units is the weight metric. When we get to the plant available nitrogen, we are probably going to be looking at things that would make the availability change. So, that could be manure transport into or out. It could be animal waste management systems. So we're sort of decoupling a little bit from the Census and the nitrogen because we're using additional information here, and then we have to put the BMPs in place. So, you might be seeing a little bit more of the impact of transport, treatment, or waste management systems. We have a few more specific counties that maybe can get a better look at this. I can keep going and try and dig there.

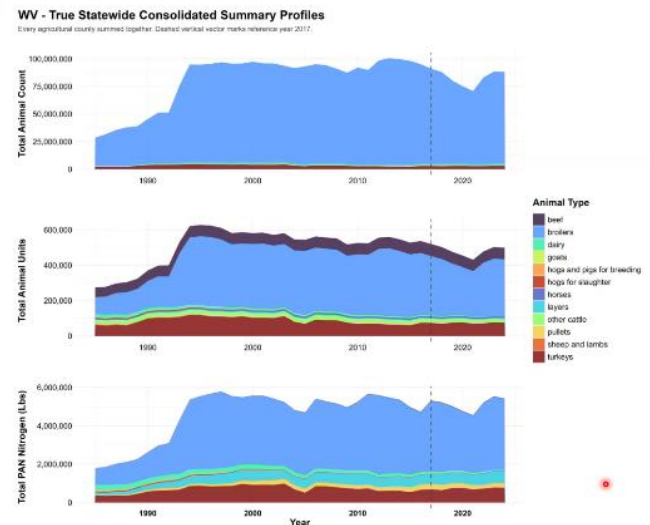
Dave Montali: There are lots of things going on. It just seems like it's in 2022 where the animal counts of broilers are trending down. That low inflection point, is that 2022?

Tom Butler: I think it's '22. Maybe it's '21. These start of the double exponential smoothing.

Dave Montali: I think I noticed that pattern in other states too. Our animal waste management systems are fairly constant. I don't think that's a reason. I will look into it more.

Joseph Delesantro (in chat): Broilers and Turkey's correction: Flocks are used for pullets, NOT broiler and Turkeys where Survey statewide production values are assumed to include the multiple flocks. Countywide Birds Produced/Year = Statewide Birds Produced/Year X (Countywide Ag Census Inventoried Birds/Ag Census Statewide Birds Produced)

Clint Gill (in chat): Thank you Joseph, that makes a lot of sense. New Castle is a tough one to model, especially for layers, there is a single operation in the watershed.



State Summaries of Plant Available N

Andrew Leight (in chat): Spikes in PAN here certainly related to manure transport

Alisha Mulkey (in chat): @auston flagging anomaly years like 2014 in carroll. this is imported manure.

Auston Smith (in chat): Thanks a lot Alisha for this flag, Tom and I are working with all jurisdictions to identify the various records tied to these county records to see what changes are needed to inputs as we approach the year of review in 2027.

Tyler Trostle (in chat): Alisha/Auston. For PA records sending Manure to MD in 2014: We are still investigating the records brought to our attention by Auston and Jess that may be causing abnormalities. Please bare with us during this time to do an even deeper pull and review. Thank you.

Dave Montali: I was just going to comment on what Andrew said that those spikes have got to be something about manure transport. He said they definitely are.

Tom Butler: I appreciate that. It certainly is one of the larger factors influencing this. I've mentioned animal waste management systems. Dave, you've hinted those are fairly constant in West Virginia, but manure is traveling across state lines as well. So, that's something to note there.

Robert Sabo (in chat): Rockingham county has second highest total population for beef cows, may you please clarify definition?

Tom Butler: Are you asking for the definition of beef, Robert?

Robert Sabo (in chat): Yes.

Tom Butler: Beef cattle in the pasture. I will get the census definition that we have aligned with this.

Joseph Delesantro: I think it's just cattle beef. I can double check that.

Tom Butler: I'm not sure if you're trying to hint at if it includes finishers. We can talk a little bit more offline if you had a different meaning behind that, Robert. But for our purposes here, it's beef cattle.

Joseph Delesantro: We have dairy cows, we have beef cows, and then we have other cattle. I'm pretty sure that those designations come directly from the Census.

Tom Butler: We can follow up with that as needed.

John Lancaster: I had a clarifying question back on the statewide consolidated summary profiles. The total PAN accounts for the fraction of time in confinement for animal type, correct?

Tom Butler: Yes.

John Lancaster: Ok, I just wanted to make sure I understood it correctly. Thank you.

Dave Montali: Bottom line is all the methods that you're showing examples of here are exactly equal to Phase 6? We haven't changed anything, right? What has changed since Phase 6?

Tom Butler: It's a new Census which is something. Most of this is fairly consistent with Phase 6. It's really the data adding onto the record that is the biggest takeaway here.

Jess Rigelman (in chat): States have upgraded their BMP history

Alisha Mulkey (in chat): New Delmarva poultry assumptions are here, correct?

Dave Montali: Right. So, there are new inputs but, methodology wise, it's the same amount of N and P per pound of dry manure for all the animal types and the methodology for how to fill in the gaps relative to when we don't have our primary info source, is all equal to Phase 6. I don't think this group has jumped in and changed anything, right?

Tom Butler: No. Jess put in the chat that BMP histories have changed. So that's an impact there. But, you're right, Dave, we've looked at more at the fertilizer side. We haven't looked at changing the projections here. We've looked at crop yields. But the only thing here is that BMPs have changed and then there's more data on it.

Dave Montali: Ok, thanks.

Joseph Delesantro: I think there were some changes to some of the manure coefficients.

Tom Butler: Yeah, that's right. I think Alisha has hinted at the fact that the concentrations for the manure are different in some places. So, that is a change that was made. Jess, maybe you're going to say that. So, the Delmarva/Virginia, those have changed, I think. So, thank you, good catch. So, there's been a slight change.

Dave Montali: That was a decision of the AMT. Now I remember that. It didn't affect other states, but for Delaware and Maryland, it did.

Ken Staver: On the transport side, can you go Bay wide? I know stuff crosses state lines. If you go Bay wide, do they zero out the out an in numbers?

Tom Butler: I would have to look at that to see what the pluses and minuses are. You are asking for what the mass balance is roughly?

Ken Staver: Yeah.

Tom Butler: I have not done that. I can do that. It does look like Tyler's hinted at this for the PA records at least sending to Maryland in 2014. They're still investigating the records. So, they're looking into it. But you are right, Ken. Large scale, I have not done that. That is something that could potentially be done.

Ken Staver: With the whole NASS reporting thing and the limited number of operations that don't get reported at the county level, the real big ones could sort of fall through the cracks and jump around a lot depending on reporting. So, they can change the numbers. If somebody has a little bit of this or a little bit of that, it isn't going to change the overall numbers. But when you start having these really big operations that sometimes get reported in a county and sometimes don't, then it seems like it could get tricky.

Auston Smith: We are and have already begun to reach out to jurisdictions on some of what's been highlighted here on the slides. By no means will we be reaching out on everything. Other anomalies have shown up as well. So, between now and November (looking at inputs) and then maybe when loads are also available, other adjustments may be needed under that microscope. All of this just an effort to more finely hone what we'll be looking at in 2027 for that Model year of review.

Alisha Mulkey: Tom, will you go back to slide 6? I want to circle back to the broiler inventory method and just confirm Joseph's comment in the chat. So, we're excluding flocks entirely in the broiler count. Is anything different on the Delmarva portion based on new data assumptions specific to Delmarva counties for inventory? I don't think they are, but I just wanted to ask the question for the group.

Joseph Delesantro: Yeah, so correct me if I'm wrong, but I think what we had decided to do in that decision was to use the population numbers that Chris and his group had come up with simply for deriving the maneuver coefficients, but we continue to use the Phase 6 method to define the population values that would then be multiplied by those manure coefficients to generate the final nutrients.

Alisha Mulkey: I'm looking to you or Jess to confirm. I think what you said, Joseph, tracks with my memory, but having not seen some of the data you ingest for processing, I wanted to make sure that the inventory methods, not the nutrient concentration piece, was still coming from Census or annual inventories on broilers, just because the Delmarva population is such a significant part for us.

Jess Rigelman (in chat): Correct!

Joseph Delesantro: That's absolutely correct. I did not receive any population data from Chris. I put together the broiler population values, and everything I pulled came from the five-year Census of Ag and the annual survey. While we have this slide up, the error on this slide is essentially that the assumed 2.25 flocks per year should be bumped up to the top, with the pullets, as opposed to being down with the broilers and turkeys.

Alisha Mulkey: Thanks, that's what I wanted to clarify. I appreciate it.

Robert Sabo: Tom, this is just a wish list item for Phase 8 when that time finally comes. This will of course be relevant for the National Nutrient Inventory as well. It seems like you all have most of the pieces you need to have a livestock based density pasture removal rate. I know right now we have like an aerial pasture removal rate in CAST. But, I think it'd be really fascinating and really useful, especially for the state of Virginia that has a pretty large cow-calf operations, to actually get a pasture removal rate based on livestock density. You got a massive amount of nitrogen/phosphorus being exported out of the state of Virginia heading to the Midwest when those mama cows say goodbye to their baby cows at the stockyard and they get sent West. So, I think that's just a significant flux that might be worth pursuing, developing, and thinking about over the next several years.

Tom Butler: Thanks, Robert. That's a good point and definitely something we can try and work in, once we get through the rush of Phase 7. We'll contact you, and we will work with you.

Robert Sabo: Well, it's something I think would be fun for the entire group to think about over the next several years. How can we get at that? Because you have pasture deposition, we've got pretty good estimates of how many animals are on pasture. So, it could be a pretty valuable management relevant calculation to make at some point.

Alisha Mulkey (in chat): Tom, for slide 5, do we have county pops by animal type to review? we've seen weird CoA distributions for some animals (e.g. pullets).

Alisha Mulkey: Do you have all of the Phase 7 data of broken down already at county and animal type, so we can look for anomalies? In Maryland's case, it's usually been pullets that are distributed into weird counties because of these very issues.

Tom Butler: I will send you this data. It is broken out, so you should be able to see that.

Alisha Mulkey: Ok, I appreciate it. Thank you.

Tom Butler: I will send it to the whole group.

Ken Staver: A while back, we had a conversation about bringing the CAFO data sets into this to check for significant missing sources. Did that all get resolved? Presumably they're all CAFOs. Is that all in here somewhere?

Tom Butler: The Hillandale operation is.

Ken Staver: Maybe that's the only one. Maybe that was a one off kind of thing. I don't know.

Tom Butler: We inquired with everyone if they knew of anything that wasn't showing up, and the answer was no. So, we kind of took that as the closure of that one until we have more time and resources to look into it. But, we polled the departments of ag here to ask if they were aware of anything like that, and the only thing that came up was Hillandale, so that was kind of the resolution that we had.

Ken Staver: There was just a big thing that came out about dairies. Everything is headed towards fewer and bigger operations, so it's going to be trickier and trickier to deal with those things if they don't get reported at the county level.

Tom Butler: That's a good point. We might have to look at that in the future as to how we deal with some of those, because the trend is there. If they fall out or they are done differently, then we will have to adjust as well. So, that's a good point.

Alisha Mulkey: I should know the answer to this. To your point, Tom, about polling states for any undisclosed locations, I can think of one instance in one county, without having the Census data in front of me. If we do say now that we see populations, it looks like Census missed one. Is it too late to work through AMT to add that into the inventory?

Tom Butler: The year of review is probably going to be our opportunity to examine if things are there. This is baked into the calibration now, so we have to look at what the outputs for this will be. We can't make that change now. So, I will not promise that, but I suspect the year of review is going to be a time where, if there is an instance, we'd have the opportunity to look into it.

III. Wrap-Up

Lead: Zach Easton, VT

IV. Adjourn

Next Meeting: October 9, 2026 9:00AM-11:00AM

Attendees:

Zach Easton, VT
Tom Butler, EPA
Caroline Kleis, CRC
Tim Larson, VA DCR
Emily Dekar, USC
Zach Easton, VT
Lisa Duriancik, USDA NRCS
Auston Smith, EPA
Alisha Mulkey, MDA
Andrew Leight, MDA
Dave Montali, Tetra Tech
Scott Heidel, PA DEP
Arianna Johns, VA DEQ
Cass Klingaman, NYS DEC
Joseph Delesantro, Koniag/CBPO Contractor
Karl Blankenship, Bay Journal
Curtis Dell, USDA ARS
Hunter Landis, VA DCR

Tad Williams, VA DCR
Jess Rigelman, J7 LLC/CBPO Contractor
Suman Budhathoki, UMCES
Cassie Davis, NYSDEC
Clint Gill, DDA
Seth Mullins, VA DCR
Tamie Veith, USDA ARS
Rachel Owrutsky, DNREC
Kate Bresaw, PA DEP
Ken Staver, UMD Wye
Alex Soroka, USGS
Robert Sabo, EPA
Ashley Hullinger, PA DEP

Denise Uzupis, PDA
John Lancaster, PA DEP
Tyler Trostle, PA DEP