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Agricultural Modeling Team (AMT) Meeting
April 12th
09:00 AM – 11:00 AM
Meeting Materials

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Summary of Actions and Decisions:

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Decision: The AMT approved the March minutes
Action: Ken Staver will write down and share with the group his proposed method for estimating split on grain with and without manure using what is known about plant available nitrogen per animal unit as opposed to animal units.
Action: Tom Butler will reach out to group members to inquire about and potential new data sources for informing the relationship between grain acres and manure applications.

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Meeting Minutes

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Statement of Purpose:

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To evaluate the crop yield and loading rates/ratios in CAST and discuss potential alternatives for Phase 7.

Introduction/Recap: 09:00-09:15 [15 min (Tom Butler, EPA)]

Tom will provide a quick recap of last month's AMT.

Crop Yield trends 09:15- 09:35 [20 min (5 min presentation 15 min discussion) (Joseph Delesantro, ORISE)]

We will hear several options for predicting the major yielding crops which are used in CAST. The goal is to create a tentative decision on which method is the best improvement on the current methodology. We will then turn towards further discussion and set the stage for next month where we hope to finalize a method for dealing with the smaller yield crops.
SANDBOX DECISION
This presentation and sandbox decision was postponed to a future meeting.

Manure Acre Calculation 09:35-10:55 [80 min (20 min presentation, 60 min discussion) (Tom Butler, EPA)]

We will continue discussion on how manure acres are calculated in CAST. Several group members have brought up a desire to tie this calculation to other metrics, such as Plant Available Nitrogen. Informational.

Discussion
Mark Dubin: Do you have beef cattle represented in here or is it lumped in with dairy?
Tom Butler: No, there is no beef in here. I do have a slide with all animal types. I picked the largest in terms of plant available nitrogen and put them in these graphs. The reason is the beef contribution is much lower. This slide is just picking those largest ones out.
Dave Montali: That's because they don't spend much of their time in confinement and you can't capture that, is that why it's lower? There's certainly more beef than dairy in the watershed.

Tom Butler: Yes, that plays a big role in it.

Ken Staver: Is this the 5 largest animal units or the 5 largest producers of plant available nitrogen?

Tom Butler: The 5 largest producers of plant available nitrogen. I took the 5 largest producing types of livestock for plant available nitrogen, show their populations by state, then show their plant available nitrogen. VA and PA may have a comparable number of overall animals but not a comparable number of plant available nitrogen.

Ken Staver: Would a state like VA be in the top 5 in terms of animal units? In VA beef would be the third highest animal unit but it drops out on the plant available nitrogen part. Currently how we're calculating available units, we're doing it based on animal units and not plant available nitrogen?

Tom Butler: That's correct.

Dave Montali: I think your prior plot recognized that most of the beef manure is not recoverable, they spend most of their time on the pasture. That doesn't go into your manure pile. That confuses things regarding plant available nitrogen. It's not showing up on this plot because you're not recovering a lot of manure that beef makes.

Tom Butler: Yes. They're not in a confined space, you can't recover it, so it has a much lower plant available nitrogen.

Ken Staver: In agronomic speak plant available nitrogen refers to the characteristics of the manure. We have plant available nitrogen recoverable lumped into one thing. Beef manure has plant available nitrogen but it's going on pasture and available to pasture plants. It's not recoverable. We're talking about two categories smooshed together. It's really plant available nitrogen in the recoverable manure you're graphing here.

Tammy Veith (in chat): Should we say recoverable plant available nitrogen?

Mark Dubin: If you're looking at transport of minerals cross-county that should have some relationship to how many acres we're looking at as being eligible, right? It's going to be a post Best Management Practice (BMP) condition to do it but it would have impacts on this.

Tom Butler: Interesting point. What do others think about having BMPs put into this chain?

Ken Staver: If we're doing manure transport across county borders and tracking it, seems like a no brainer to take into consideration in terms of calculating the acres of grain that get manure. It's there and gets applied. The extreme case is you don't have a lot of animal units and you're importing manure. Seems as you move forward and have satellite images with 1m resolution, we'll certainly be accounting for nutrients across county borders especially if we're subsidizing it like in Maryland. Seems straightforward to me to be in the equation.

Tim Larson (in chat): Virginia has poultry litter test results with nutrient content. A lot of data is available. Our poultry litter test results require sampling so there is data for that if anyone is interested in looking at that.

Mark Dubin: We tapped into that database that Tim mentioned with the work with VA Tech. We also used it when we looked at the poultry layer subcommittee report. It's been used and is a great resource, thank you.

Chris Bosch: I was wondering if any of the other states are familiar with their own Concentrated Animal Feeding Operations (CAFO) programs and whether they all require testing of the manure in covered CAFOs. In DE we do. It's most relevant here to chickens.

Alisha Mulkey (in chat): MD does require manure analysis for CAFO permits annually.

Ruth Cassilly: Do we have a clear picture of how each state is tracking manure transport and for which animal types?

Alisha Mulkey: For cost shared manure transport we track animal generating farm and destination farm. We know there is transport outside of the cost share program but don't have a good mechanism of tracking that piece by animal type and tonnage as well.

Ruth Cassilly: Thanks. I haven't seen that information anywhere and think it would be helpful to have that expanded for each jurisdiction so we have that information.

Alisha Mulkey: We're submitting that into NEIEN so anything we know is submitted for progress.

Ruth Cassilly: Yes. I'm just curious about what's happening beyond cost share. I think industry might be tracking. PA tracks through nutrient tracking forms. Everyone does it a little differently.

Dave Montali: Regarding cost sharing programs data, I know we know how much it is, the data we have is only related to cost share, there's so much manure transport we can't track. With regard to analytics, they primarily track wet tones. You have to be careful when you ask for data, there's nuances between wet and dry. I doubt we have information that says what type of poultry it will be, predominantly will be poultry but not sure.

Cassie Davis: From our NY CAFO general permit: "Annual Manure and Other Required Analyses Unless a more frequent sampling is deemed appropriate by the AEM certified planner, all CAFOs must analyze each individual land-applied waste source (manure, litter, food processing waste, digestate, and process wastewater) at least once annually for total nitrogen, ammonium, total phosphorus, total potassium, chloride (if food processing waste is included in the waste), and percent solids in accordance with NRCS NY 590 . In addition, soil tests must be taken at least every 3 years, not to extend beyond the spring of the fourth crop year, in accordance with NRCS NY 590. These records must be maintained on-site as part of the CNMP."

Ken Staver: Regarding the Northumberland vs Steuben: would these two counties have the same fraction when you go through the calculation of splitting the grain acres?

Tom Butler: I was trying to find counties with similar splits of these acres based on animal units. I don't know if it's the exact fraction but similar.

Ken Staver: I think the solids must play a big role here. It looks like Northumberland is a 50/50 split while Steuben only has a third of its grain acres getting manure. So we're doing that calculation on the split but it's not just on the grain acres, it includes all the cropland acres so it didn't come out the same.

Tom Butler: The split is only occurring on grain with and without manure. Theres's more acres of silage in the county of Steuben but the split is only applied to the land use of grain.

Robert Sabo (in chat): Steuben County is more cattle/dairy dominated?

Cassie Davis (in chat): Yes.

Ken Staver: Steuben has a bunch of cropland in addition to the grain acres with silage while Northumberland doesn't. They came up with different fractions so something is different. Steuben is going to have a smaller number on the x-axis than Northumberland. Their split isn't the same.

Jessica Rigelman: You're correct Ken. It's the relationship on that curve of total cropland to total animal units. You don't have that as part of this table here but you're right that it would be further to the left for Steuben with it being a lesser number per total crop land vs the animal units even those are similar between the counties.

Ken Staver: Right because it has all that silage acres that Northumberland doesn't have.

Dave Montali: Why is this so important given the way we distribute manure? Is it really important to do this breakout of grains with or without manure or is it causing more confusion and problems than its

worth? Why don't we say all grains are eligible for manure and let the amount of manure in the county dictate where it goes and meld it?

Tom Butler: We'd have to bring that question to the group. The rationale is they behave differently based on their management history.

Dave Montali: The point being we don't really know, we're just making an assumption that if there is a lot of animal units of manure in the county a higher percentage of that county's corn will get manure but we really don't know what's going on. I'm not clear what the processing of this is.

Robert Sabo (in the chat): The USDA reports a certain percentage of cropland receive manure.

Alisha Mulkey (in the chat): I agree with Dave. Corresponding BMPs don't report to this level anyway.

Alex Soroka: (in the chat): Dave has a good point, the total mass balance maybe more important if we cannot say exactly where the manure is applied.

Gary Shenk: I think it was this way in phase 5 and previous versions of watershed model, we just spread everything out evenly across the county. But when the land use loading rate subcommittee made the decision that manured land uses were 40% higher load and because of history it mattered how much was in that category. The minute you get a teaspoon of manure it goes up 40% in load. If you don't have that split then everything gets that 40% bump.

Tom Butler: If they were all to be combined, we could do that from a modeling standpoint. Ken, you have the expertise to tell us why they should be different.

Ken Staver: The history of water quality research in agriculture – the use of manure plays a big role in trying to deal with nutrient losses of nitrogen and phosphorous. There's a lot about targeting right now such as the CESR report. We know we don't spread manure evenly on the land. Before, we had unrealistically small amounts of manure that weren't worth dealing with. You might as well forget about manure if you're going to spread it out and have counties with 10-20 lbs of manure per acre on it. Everyone is pushing 4 R's for water quality. When you compare inorganic fertilizer vs manure, every category of 4 R approach (rate, placement, timing, form) are more challenging with manure in terms of having the nutrients available when you need it for the crop. It's about managing the availability of nutrients for loss in the root zone. With manure it's harder to match it up because of the nature of the material and operations. If you think of the model as an accounting system and a planning tool, and you want to prioritize, we definitely need to focus on our large animal operations where we have a lot of manure. We know we don't have 365 day storage for some of our animal types, that means we have fall applications. I don't see with all the resources we put into manure management that we just walk away from it and say everything's the same. It runs counter to everything we know.

Dave Montali: I appreciate that Ken but we don't report our BMPs like that. Maybe you want to have it if it can be used but the history is that it's not being used. I appreciate what everyone is saying about why the loading rate is different on areas with and without.

Ken Staver: From a state standpoint if you're paying for an acre of something that gives you a percent reduction and the opportunity to target the higher loss acres you can get more reduction for your money. You do have to prioritize and report it. Whether or not you do it that's another issue, but you do have an opportunity to get a higher reduction for an investment in resources.

Tamie Veith (in chat): I agree with Ken - Land that has had manure applied over time consistently responds very differently from season to season.

Dave Montali: I agree it's a great idea but practically for our state it can't be done. Since we do a lot of the nutrient management planning maybe we have that ability but for any other BMP we don't. In the information we get from federal programs it gives us the practice by county.

Ken Staver: Having the option doesn't hurt though.

Dave Montali: I get it.

Tamie Veith: I kind of agree with both cases. I do targeting for my career. It does really matter where the land has had manure applied. It does get confusing about if we don't get the information in the right place because we don't have the data, it is a lot of work for something we can't capture accurately. I understand where Dave is coming from. It does make a big difference if we do have the data. Over time it looks like it averages out but the impacts in the short time periods make huge differences.

Robert Sabo (in the chat): From a predictive standpoint, the net surplus/mass balance is likely more than sufficient and decreasing the overall surplus should be a key promotion for water quality improvement. However, huc8 subbasins where livestock waste inputs are highest typically have higher surpluses, so it seems important to keep track of.

Robert shared the following images in the chat:
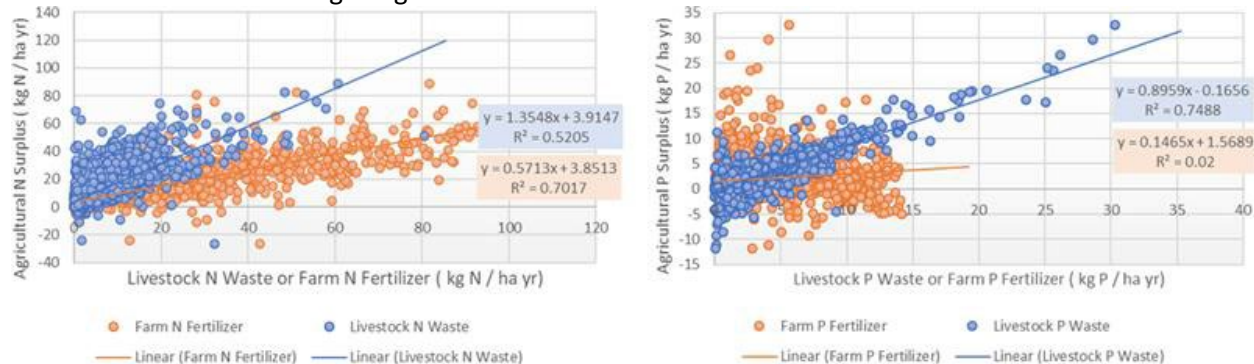
Robert Sabo: I agree that mass balance surplus is sufficient in long run from a predictive standpoint for explaining water quality trends and probably projecting water quality into the future. At the end of the day we do know a certain percentage of cropland is fertilized by manure acres as based on standard USDA reports, and when you look across the contiguous US areas with higher livestock waste inputs typically have higher agricultural surplus values. I can't speak to the 1:1.4 ratio. Especially when you look at phosphorous, HUC 8 sub basin surplus values have no relation between agricultural fertilizer range for phosphorous but there is a strong positive relationship between livestock waste inputs and agricultural surplus values. I think that's what these differences in ratios are trying to get at. Cropland receiving manure and fertilizer typically have higher surpluses than cropland receiving only fertilizer amendments. I agree from a predictive standpoint and it's a key message overall, but I can see the importance of trying to track what areas are receiving manure inputs vs fertilizer inputs.

Alexander Soroka (in the chat): 2112.10988.pdf (arxiv.org) would a dataset on "assumed poultry houses" help us apply manure/spread in the model? See figure 5.

Mark Dubin: There's information in my presentation from last month about those ratios; we did find a range of values with the research so that might be helpful. Regarding what Ken was saying, the other element I see is the driver for manure transport which is an important element of availability of acres to apply to. I think it will be more important as we move forward as we see greater intensification in places in the watershed and reduction in availability of agricultural acres to apply these nutrients to. The AMS also considered this; they had discussion on these questions.

Robert Sabo: Fantastic, I will check out the minutes from last month, Mark. Thanks!

Alexander Soroka: I think we have this information already on the county scale in terms of broiler productions. This would be specifically poultry productions. This is a product from Microsoft AI team for good. At the USGS we had digitized what were poultry houses and retired poultry houses on the eastern shore and they used that as a training database for the rest of the country. All the comments about where you're spreading and how long you're spreading are really important for water quality and load. I think there is a relationship between production and where it's spread. There's the question of whether to keep grain with manure or grain without manure and this could help us determine where it gets spread.
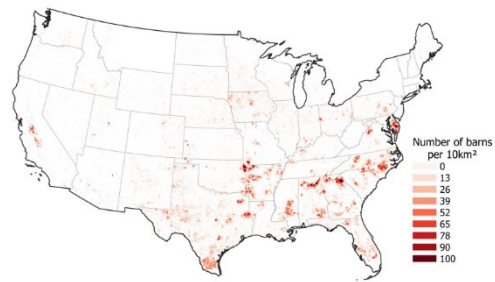

Figure 5: Density rendering of our filtered version of predicted poultry barn locations over the USA. Colors range from 0 barns in a 10km² radius (transparent) to 100 barns in a 10km² radius (dark red).

Ruth Cassilly: That's something Peter [Claggett] and his team are working on doing right now with the most up to date land use imagery (identifying location of animal houses). We will have that information.

Dave Montali: What we're trying to do with determining how many acres of manure is based on the animal units in a county, for which most plant available nitrogen is from poultry. We're doing it a different way than looking at density of poultry houses. We operate on the county scale. For places with a bunch of chickens we already have a way to say what percentage of corn acres that gets manure is higher and we base it on what animal units are available. Are we doing that before or after we consider manure transport? Can't remember.

Jessica Rigelman: It's a pre-BMP condition. It's part of initial setting up of land use. It's just animal units, it has nothing to do with manure and total harvestable cropland from the ag census.

Dave Montali: Ok. Goes back to idea that where the animals are dictates the percent of your acres that are eligible for manure, right?

Tom Butler: In that those animals are in the county, yes.

Ken Staver: We're talking about 2 things: one is the loading ratios, and the other is can we do a better job on this graph. I think it doesn't make sense to calculate the acres getting manure if you don't account for manure that's not even available for spreading. Nutrient management is based on available manure to spread on cropland. This loading thing has been in place for quite some time. We're spending so much time on it because there was a choice made to pick at it. You can always review it but it's taking up a lot of time in meetings.

Robert Sabo (in chat): Will the AU total waste relationship with fraction of land fertilized with manure hold up if it's transformed to N and P?

Dave Montali: So you're [Ken] saying the way it is good and we don't have to worry about it anymore?

Ken Staver: There was a lot of work put into developing it, could you make an improvement, sure. They're not big changes. But the idea is that this is representative of how nutrients are lost from cropland I think is very valid. Any farm and any place in the watershed will vary a bit but the basic principles are valid. I don't see a big reason or a lot to be gained to work on this. I think there's an easy fix to estimate split on grain with and without manure. If we switch to what we know about plant available nitrogen per animal unit as opposed to just going with animal units, and not consider what's been put on pasture or what's going across county lines, we can use this approach but with much better input to do a much better job. It would be even better if people report data. If we have to calculate it, can we do a better job, and I think we have the information to do a better job if we think about how nutrient management is done and align with that.

Chris Brosch (in the chat): Manure LR vs non manure LR is effectively a forcing function that challenges the value of BMPs. If we want to motivate BMPs we should aim to better reflect the BMP condition and guesstimate the non BMP condition like a quasi-penalty.

Tom Butler: There's a lot of discussion around this. If we can't come to an agreement via consensus to change things, the way they will continue to happen is the way they are in phase 6.

Gary Shenk: As a follow up to Ken – what is the method you would suggest? Could you write that down and send it around in an email what in particular you're proposing?

Ken Staver: Sure. I'll do that. Another comment: this mass balance thing keeps coming up. We made a big mass balance in poultry when we brought in phytase and improved phosphorous efficiency in the feeding in poultry. In dairy there's been precision feeding. I heard distilled grain residuals hurt precision feeding efforts. Does anyone think we'll really change mass balances in a big way? We should deal with the reality of what we have as opposed to saying it's all about mass balance.

Chris Brosch: I don't share your fatalistic review, Ken. I think it's in the best interest of AMT to reflect the quality of efforts. Then the states will have the best possible chance to influence the industry to head in that direction.

Ken Staver: I agree.

Robert Sabo (in the chat): a large fraction of Steuben is being deposited on to pasture, correct?

Tom Butler: Not sure, I'd have to look into that and get back to you.

Ken Staver: This makes sense to me. [why is this happening slide] This is not just new coefficients. Tom just got the coefficients out of CAST, right?

Tom Butler: Yes. These are the specific numbers out of CAST.

Ken Staver: From a nutrient management perspective, we care about the plant available nitrogen. This is pretty much what we should be basing on how we calculate manure acres as opposed to the animal units. For the whole Bay watershed do we just want to stick with this curve? Because it's mostly broilers which we know have very low plant available nitrogen numbers. Seems to me this is an easy one to come up with a better relationship for.

Robert Sabo: This is literally manure nitrogen excreted from animals.

Dave Montali: I see that Northumberland is more of a chicken county than Steuben, which is more dairy and beef. When you look at the beef, and there's four times more beef in Steuben than Northumberland, and we recognize the high percentage of their manure or stored plant available nitrogen, more of it goes on the pasture that's not stored, I don't understand why Steuben is 8 times more stored plant available nitrogen for beef when the number of animals is only 4 times more.

Ken Staver: It will boil down to that every state reports time on pasture. Steuben reported lower time on pasture than time on confinement.

Dave Montali: That would explain that. I didn't think the variation was that much, but it's a colder place.

Gary Shenk: I get this part, but I don't get how we draw that new graphic. Does anyone have information on how plant available nitrogen relates to fraction of manured vs unmanured?

Mark Dubin: How much time on pasture vs confinement time is a factor but it's also what the concentration of nutrients are. That's going to create a larger balance of nutrients, so you'll need more acres to cover that to utilize that balance. If you have a lot of animals with relatively low confinement time and/or have a relatively low nutrient concentration value or generation value, than another that has a lot of confinement time and relatively high nutrient generation value, you'll have very different composition of acres. That's why I think the discussion that Ken is describing is how we utilize the time

in confinement vs pasture and the nutrient generation values for the different livestock based on populations.

Robert Sabo: Ultimately do you want to make the x-axis of this graphic animal units nitrogen or animal units phosphorous per harvested cropland and see if relationship holds up?

Tom Butler: Based on the feedback I've gotten I think that's what people are asking for. I have no argument either way.

Robert Sabo: I suspect there will be a relationship.

Ken Staver: If states are reporting the time that the beef are on pasture versus in confinement, I don't think it's unreasonable to ask what a typical nutrient management plan looks like for corn with manure to say how much plant available nitrogen is available and what the typical application per acre is.

Chris Bosch: You're right. But why do we want the model that works at the county scale to look like a real-life field? What do we get as modelers from that? I'm happy to do my best to answer the call for data but what you suggested is a tremendous amount of effort not to mention the political implications in DE of trying to unlock that information that's protected from the public.

Ken Staver: It always seems to be the fallback thing of we can't know that. It wouldn't be hard to do a much better approximation. Planning is targeting. To the extent that we can match reality a little bit it seems like it works better as a planning tool. You could use rough numbers and do much better than we're doing now.

Gary Shenk: Did you just suggest that instead of drawing this curve we assume that if it gets any manure that it gets the full allotment of manure, and decide manured acres based on how many acres it takes to use up all the manure by applying every manure eligible application that can be manured?

Ken Staver: It wouldn't be on supplying the full amount cause generally phosphorous limitation comes in most places. In some cases it might be a fraction, in some it might be 100%. That's where you could get input from states. It's different with dairy vs broilers. Generally yes but it wouldn't be 100%; put it at a rate that's minimum typical. There's a systematic way you could do it. I know it's pretty typical in the mid shore to put on 2 tons per acre of poultry litter. You don't put on the full amount or else you'd blow your phosphorous nutrient management plan.

Gary Shenk: The data here came from somewhere. Are all those blue dots years or counties with a given year? If so can we know what years and counties and calculate the plant available nitrogen from CAST? Can we use the same information and change the x-axis?

Ken Staver: I think Alisha will have to weigh in on MD data. I would be a little fearful to dig in too far to this.

Alisha Mulkey (in the chat): Just FYI, the MDA data was based on 2012-2014 data.

Jessica Rigelman: Manure doesn't just go to grain with and without manure and it doesn't just go to silage, there's 5 other land uses that get manure. How you proportion off the percentage of plant available nitrogen that goes towards corn and sorghum for grain is somewhat based on the curves but you can only use the curves when you the grains with and without manure to find. There's a catch 22.

Mark Dubin: Phase 7 is looking at a very different scale of representation, dropping it down to a smaller scale. Over the years if we're looking at large scale the math is different. Smaller scale makes it more difficult. I think that's one of the reasons to look at something closer than reality is the scale we'll be working at which is very different from what we've been working with for past versions.

Alisha Mulkey: We knew county and general crop type. Animal type was assumed based on dominant livestock in county. Others then made the relationship in the curve.

Gary Shenk: I presented to the WQGIT in January. There are 3 versions of the watershed model: CAST which will be as it was; CalCAST is the statistical version that's used to help generate CAST; and the dynamic model feeds the estuarine model. CalCAST has to be at the NHD100k in order to use all the data we want, and the dynamic model has to be at the NHD100k level to get to the estuarine model. Management questions still will be answered by CAST. The WQGIT has not decided what scale. We have to get consensus to get off of Phase 6 on these things. Looking back at opinions in the past few years, I think we'll end up with CAST at the same scale we have now. We'll still be doing these county level assessments. If we want to get into targeting and say where will be most effective at targeting these BMPs, we'll be able to say this part of the county is leakier than another part based on physical parameters, but I don't think we'll be able to get below the county scale and say these farms are using more manure than these other farms.

Dave Montali: Back to the idea about relating percentage of cropland with manure to density of poultry houses at the county scale, is that something we should think about more to replace our existing approach? When you have the chickens more of your corn is going to get manured.

Alisha Mulkey (in the chat): Not in MD due to phosphorous management (PMT) regulations. And we may not have the transport data to know movement.

Mark Dubin: Currently it's based on total animal units in the county, not necessarily how many barns. That's a useful background piece of information but doesn't provide the full context. Those other elements like what is the availability of manure for capture and re-use, and nutrient value of manure, is more relevant. That relates back to need for availability of acres to apply it to.

Ken Staver: We're not talking about trying to use the model to go down to the farm scale. If you have a practice, let's say it's an efficiency of reduction, can a state report a practice as being on the grain of manure acres?

Gary Shenk: Yes. That's true of Phase 6 as well.

Alisha Mulkey: Yes, but we don't.

Ken Staver: From a standpoint of management, as it exists now with the land uses, you can target with some practices. For annual practices you can target two land uses within a county.

Gary Shenk: It is possible; as Alisha said they don't. You could also look at which part of the county is more likely to transport those nutrients and make some decisions. It wouldn't come out in CAST but you could still do that.

Cassy Davis (in the chat): Excess could become an issue.

Ken Staver: In the water quality research world we've known that for a long time, but we always thought that it was out of realm of possibilities in modeling world.

Dave Montali: I think we can deal with it in the model. It's just do we have the information, and do we report it. If I knew we had nutrient management plan on corn with manure in a specific land river segment that's the leakiest in that county, I could report that. That kind of detailed reporting doesn't happen because a lot of times the information is not known, and it increases risk of that practice getting cut off if model doesn't have that amount of land in that smaller scale available.

Ken Staver: If we try to redo the curve for plant available nitrogen, then someone has to provide/know the information on the animal types behind those dots. If that's available, it might not be so hard but I'm not sure.

Mark Dubin: Yeah I think it would be valuable to run the process with some examples and see what the difference was between what we're doing now and how it might affect things if we look at the plant available recovered nutrients. Like Ken said we have the data already in CAST, we'd just be integrating it.

Ken Staver: Since this is MD data I know those points are broilers. They will be much lower for plant available nitrogen. It would be a very different curve for dairy dominated. But I guess do it first and see what it looks like.

Tom Butler: If we wanted to do this the ask would be for information on this. Alisha said this is decade old information. If there is any new information people would think to put in this, please share.

Mark Dubin: Regardless of what's behind the data, it's the same curve. I think we can pick another county and run those numbers and look at differences between counties with different livestock makeup (not just baseline Animal Units).

Ken Staver: Right but they'd have to come up with the data for the y-axis values. We don't have it for anyone but MD right now.

Mark Dubin: That's correct.

Ken Staver: This curve should be more widely applicable if you based it on plant available nitrogen. Then animal type wouldn't matter so much because it's based on plant available nitrogen which puts it all on the same scale.

Mark Dubin: The only part is the recoverable portion is what I'm thinking.

Ken Staver: Yes, recoverable plant available nitrogen. We can do that. Minus or plus transported manure too.

Tom Butler: We can talk further about this within this group.

Recap/Closing 10:55-11:00 [5 min (Tom Butler, EPA)]

Action Items:
- Discuss: crop yields update, and relevant Ag Land Use and manure acres for Phase 7.

Adjourn – 11:00

Up Next:

Office Hours: Friday, May 10th , 2024, from 8:00 - 9:00 am.

AMT Meeting: Friday, May 10th, 2024, from 09:00 - 11:00 am.

Participants:

Thomas Butler, EPA-CBPO
Mark Dubin, UME-CBPO
Chris Brosch, DDA
Jeff Sweeney, EPA-CBPO
Dave Montali, TetraTech,WV, MWG
Eric Hughes, EPA
Jessica Rigelman, CBPO
Cassandra Davis, NY DEC
Gary Shenk, USGS-CBPO
Clint Gill, DDA
Elizabeth Hoffman, MDA
Ken Staver, UMD Wye REC
Elizabeth Hoffman, MDA
August Goldfischer, CRC
Tim Larson, DCR

Joseph Delesantro, CBPO Modeling Team
Alisha Mulkey, MDA
Dylan Burgevin, MDE
Ruth Cassilly, UMD-CBPO
Alexander Soroka, USGS
Arianna Johns, VA DEQ
Curtis Dell, REE-ARS
Tamie Veith, USDA-ARS
Patrick Thompson, Energy Works
Tad Williams, DCR
Candiss Williams, FPAC-NRCS, DC
Robert Sabo, EPA
T. Victor, Clark DOJ

**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