Agriculture Workgroup (AgWG)
Meeting Minutes
September 21, 2023
10:00 AM – 12:00 PM
Meeting Materials

Summary of Actions and Decisions

Decision: The AgWG approved the August meeting minutes.
Action: VOTING MEMBERS (at-large + signatory) - please contact Chris Brosch (chris.brosch@delaware.gov), Tom Butler (butler.thomas01@epa.gov), and Eric Hughes (hughes.eric@epa.gov) prior to the October meeting with feedback on his presentation and where you stand in terms of approving the changes to the manure application eligibility file for Phase 6 CAST. We will be seeking a decision on this in October.

Meeting Minutes

Introduction

10:00 **Welcome, introductions, roll-call, review meeting minutes** – Jeremy Daubert, AgWG Chair.

- Roll-call of the governance body
- Roll-call of the meeting participants- *Please enter name and affiliation under "Participants" or in "Chat" box*
- New AgWG Coordinator: Eric Hughes, EPA- CBPO (Hughes.Eric@epa.gov)
- **Decision:** The AgWG approved the August meeting minutes.

Data & Modeling

10:05 **Manure application eligibility and timing in CAST (40 min) –** Chris Brosch, DDA.

The current timing and eligibility file in CAST has erroneous information for several jurisdictions. This existing file has created unrealistic results for manure applications to agricultural crops for these jurisdictions. In October, the AgWG will be asked to make a decision to alter the existing file to improve the realism of simulations.

Discussion

Alex Echols (in chat): Do you make any distinctions between injection vs surface application - recognizing there is not yet a practical chicken litter injection option - but is for other forms of manure
Chris Brosch: Yes, injection is its own BMP. It is not a consideration in the eligibility and timing file that we're talking about changing today. It's not relevant to this proposal.
Leon Tillman: This would assume that the manure is applied before inorganics?
Chris Brosch: Yes. In the sequence of timing that will still exist, manure is applied first. Fertilizer has always in Phase 6 been calculated based on the remaining crop needs.
Leon Tillman: This change would be bay-wide, correct?

Chris Brosch: Yes. Wherever a situation exists where the land use and the crop are both manure eligible.
Dave Graybill: The last slide mentions that this would apply if the crop/land use allows it. When wouldn't that be allowed?
Chris Brosch: In every county, there exists corn that can be grown with or without manure. That usually is a pretty diverse split. Over 90% in Kent County, DE are manure eligible for corn, but there are a few that are not. There are some crops that are just not manure eligible in any form. Usually crops that are minimally processed before they hit the market - asparagus for example - are modeled as not being manure eligible.
Kristen Hughes Evans (in chat): Would this approach assume that 100% of the manure eligibility is met with manure? And is that actually accurate? I know farmers that are concerned about using too much manure in terms of soil phosphorus levels, so they don't use as much as they are allowed to by their nutrient management plan. In addition, some farmers can't get as much manure as they would like.
Chris Brosch: No, it's based on how much manure is available in the county. There are only roughly 10 counties across the watershed where the manure eligibility could be met with manure produced in that county. Those are the counties we expect to go into disposal mode, where manure goes onto crops above the crop need level. It's relatively rare. To give it 100% in counties that don't have that would not be accurate. Those are all real-world issues that cannot be easily modeled because we model at a county level.
Leon Tillman: Has there been discussion with other jurisdictions about how this would affect them?
Chris Brosch: Yes, the first part of my presentation covered that. PA and VA would like an equitable option. I know NY took the opportunity to look at a test that was run for Phase 7 purposes to see how this would affect NY in absence of a CAST-23 run. We are still waiting on the CAST23 run until Jess gets back.
Jeremy Daubert: What is the timeline for the scenario?
Chris Brosch: It's being worked on. We don't have an ETA on the release.
Ken Staver: The loads go down in CAST but I think the reason is because the way the model handles the manure and inorganic. The more manure you put on an acre relative to inorganic, your load goes down. That's an inconsistency in the model that will be fixed in P7, so I'm not sure we should make this change now if it will change in the future.
Chris Brosch: I somewhat disagree. Yes, the sensitivity to the model of manure N is lower than the sensitivity to fertilizer N. That's the same as saying we create less pollution by using the equal amount of lbs of manure N as we do fertilizer N. The problem I'm trying to fix is sending county crops into disposal mode that shouldn't go there because a lot of counties that are getting manure on soybeans, which is only happening because we've artificially reduced the maximum amount of manure that traditional crops would assimilate. Kent County soybeans should not be getting manure to the tune of 10 lbs of N to the acre.
Ken Staver: That's a tiny amount of manure application.
Chris Brosch: Yes, but it's forcing more nutrients into that county as a whole when you're suppressing the amount of crop need that can be met by manure on corn.
Ken Staver: So if your state sales give you that amount of N, it seems like it is what it is.
Chris Brosch: State fertilizer sales doesn't determine how much fertilizer is assigned to DE. It's watershed-wide and it's distributed to counties based on their crop need, the amount that is not being met by manure. If we suppress the crop need that is not being met by manure in all of DE, it is going to send more fertilizer into my state from other states, so we're getting more nutrients than our crops can use because once the fertilizer back fills there's remaining manure

that gets spread on top. That's the disposal sequence that is happening in more places than it should.
Ken Staver: So you're saying in DE, in the model, you put the restricted amount of manure on because the model restricts you, then you meet crop need with fertilizer, and then you put more manure on top of that in disposal mode for corn?
Chris Brosch: That's right. If we turn that off, corn across the Chesapeake Bay can assimilate the manure in counties that it's generated and the fertilizer can be spread to the other crops that need it more efficiently.
Dave Graybill: As you're talking about manure in its entirety, whenever you throw more manure of any type onto a corn crop, wouldn't there be a problem with your P and K? Is that maybe why the limiting factor of 25 was put in CAST? Trying to understand that decision.
Chris Brosch: I don't know why that value was decided on. Farmers manage nutrients economically. We're trying to approximate that in the model by applying nutrients in sequence to grain acres, then pasture acres, then leguminous crops, because it's a N based system in this model. P fertilizer is spread sequentially and separately. To perfectly replicate a farmers decision would be impossible because they are all different, so trying to manage a county sized farm in the average logic that States were asked to do when they produced this file.
Dave Graybill: From a farmer perspective, if your soil P levels are too high then you automatically limit that high P manure.
Chris Brosch: Yes, but that's a field specific tool and we can't make field-specific decisions in this model. We use a separate P subroutine to estimate the P loss, which takes into account manure and fertilizer applications of P and how much crops can assimilate P. This runs in the background based on how much P gets applied. P is modeled as an accompaniment to N.
Dave Graybill: If the soil capacity of P isn't as high in DE with sandy soil as it would be Lancaster, for example, with loam, wouldn't there be a difference?
Chris Brosch: Yes the model is sensitive to differences in soil.
Dave Graybill: So then your proposal could inadvertently cause us to overapply P in DE?
Chris Brosch: Based on the results we ran for Phase 7 tests, the P lbs per acre in soybeans is actually lower. It does rise on corn but the removal potential is almost 50 lbs and we're only putting between 30 and 40, so I wouldn't expect the simulation to get worse on P. I think my proposal is more optimized in the model. When we developed P6 we just overcontrolled the nutrient spread.
Ken Staver: But that's what DE submitted. Maybe you should just change in DE
Chris Brosch: The other states wanted the chance to change their files as well. It needs to be equitable.
Ken Staver: I'm not sure this is equitable. Also, we still haven't dealt with the question of how putting more manure on puts more down on corn acres. A problem might arise when we change the sensitivities for Phase 7, and then the states plan on having those reductions that we see from this proposal, but then it gets taken away once Phase 7 gets released.
Chris Brosch: Fair point. We won't get Phase 7 until roughly 2028 though. In the meantime, I think we need this fix.
Elizabeth Hoffman (in chat): MD agrees with what Chris is presenting. This feels like a fix to how we assumed things were working and it's a change in the focused realm of Ph6 until we get to discuss Ph7. Those "boxes" are not state designated in terms of what we're allowed to make decisions and when. We appreciate the work Chris has done on to deep dive on this in an attempt to provide better information. It does make it hard to decide on portions of the equation when there are other moving parts, but it's still better than continually feeling like we have to wait to fix anything.

Chris Brosch (in chat): Thank you Elizabeth, Leon, Jim and Steve for your feedback. It is in the direction of consensus. Those with concerns, please reach out by phone or email. chris.brosch@delaware.gov or 302-632-7036.

Action: VOTING MEMBERS (at-large + signatory) - please contact Chris Brosch (chris.brosch@delaware.gov), Tom Butler (butler.thomas01@epa.gov), and Eric Hughes (hughes.eric@epa.gov) prior to the October meeting with feedback on his presentation and where you stand in terms of approving the changes to the manure application eligibility file for Phase 6 CAST. We will be seeking a decision on this in October.

10:45 **Agricultural Land Use Categories (40 min) –** Peter Claggett, USGS, Katie Walker, Chesapeake Conservancy.

Chesapeake Conservancy and the CBP Land Data Team are revising the land use/land cover model to produce new data using imagery from 2021/22, which will be released in June 2024, for inclusion in the Phase 7 CAST model. They presented to the AgWG in August and returned this month for an informational presentation and additional discussion on mapping processes and potential new classes, including new mapping efforts related to animal operations and the further separation of pasture and hay.

Discussion

Jill Whitcomb (in chat): Question - if CAST-23 is the last model update until Phase 7 (vote TBD at PSC later this month), what will this 2024 land use / land cover update be used in / go toward?

Peter Claggett: This will not be used in CAST-23. There has been discussion that we will use the new ag census and high-resolution land use data to assess internally how things may have changed and how they would affect things in preparation for Phase 7.

Jill Whitcomb (in chat): LU/LC scope will need to also evaluate how BMPs are able to be included on those ag LU versus cutoff.

Peter Claggett: Yes, that's a great indication for why we are mapping animal operations. That will narrow down the scope if we want to have humans interpret these entities to see what kind of structural BMPs or other types of BMPs we can see.

Leon Tillman (in chat): With LU class determination, how does the AI account for ag bmp impervious surfaces? There are practices that address nutrients through impervious surfaces and animal operations.

Peter Claggett: What we see as impervious, we map as impervious. It would be TBD if we want to qualify them as part of a BMP practice.

Katie Walker: The inclusion of AI in the process isn't used for the land use classification or determination. It was used as an ancillary data layer that narrows down what may be an animal operation with different levels of confidence. And we don't determine active versus abandoned animal operations.

Leon Tillman: Is AI going to be used to identify sites that would require on-site determination if it's active or inactive for the land use classification? Or would it be classified based on the AI and then the associated nutrient loads or applications associated with that land use type would be applied?

Katie Walker: First we'll determine what confidence interval we will use with the AI. It's just helping us determine this classification. We will also do an iterative review of the data that will be completely separate so there are opportunities to fix features outside of the use of this particular layer. In terms of P6 roll up or proposed P7 roll up - one of the reasons we are investigating this

is because they roll up into the developed land use for CAST. Peter has been looking into having these "tagged' and then treated as feed instead so that we're better representing the water quality implications of these features on the landscape.
Peter Claggett: None of this is affecting Phase 6. Everything will roll up into the P6 land uses if the partnership decides to keep those land uses. This could refine the spatial accuracy of where we have feeding space in the watershed, but may or may not affect the area of feeding space.
Kristen Wolf (in chat): Without having this presentation material prior to the meeting today, and with Peter and Katie soliciting AgWG input on mapping processes and potential new classes and mapping efforts related to animal operations and the further separation of pasture and hay, PA requests that they bring this back for full discussion at the October meeting in order to allow jurisdictions time to review this information with Land Use WG and other partners. Coordination across WGs on this is important and provides context.
Scott Heidel: Are you able to identify recently implemented riparian forest and grass buffers within ag areas? A lot of the buffers we installed during 2013-2017 were not showing up. Could those be looked into more closely?
Katie Walker: In terms of forested buffers, it's probably a height issue. We have a threshold height for which those are captured, so they might not be tall enough yet. Also, we'll be doing a stakeholder review during the first quarter. Contact me and Peter if you want to be on the distribution list. If there are areas for you to see improvements, we'd love to hear it.
Peter Claggett: @Kristen, the Ag Modeling Team (AMT) will be dealing with Phase 7 and how ag land uses will be represented. Our plan is to work with them closer and then update this group periodically as needed.
Kristen Wolf: If you're soliciting input, it would be helpful to have the materials in advance.
Katie Walker: From our perspective the term feedback means that we would like to get a temperature check for how the group feels about our progress.
Peter Claggett: Just to clarify this presentation is informational and we are providing and update.
Elizabeth Hoffman: What did you mean when you mentioned impervious and other land uses coming from animal operations from a load perspective? There is a lot of work being done with sediment and erosion control with SWCD, but we don't capture those as BMPs because there's not a load in the model.
Peter Claggett: When we talk about land uses for Phase 7, if the AMT is entertaining specific new uses or wants to put BMPs on a land use that doesn't exist yet, that would be another reason why we'd want to quantify that from a land use perspective. So we just want to be prepared for changes that may be coming down the road.

Accounting & Reporting

11:25 **Manure injection in CAST (30 min) –** Kristen Hughes Evans, Sustainable Chesapeake, Eric Rosenbaum, PA4 Alliance, Helen Golimowski, Devereux Consulting.

Sustainable Chesapeake presented an analysis of CAST done with its partners, the PA 4R Alliance and Devereaux Consulting. These results showed the nutrient reductions associated with broader adoption of manure injection.

Case Study: Purchased Equipment

4R Economics – 6,000 gal/A Dairy Manure

Annual cost per acre, based on 250A of injection / year for 10 yrs	SURFACE APPLICATION + NO-TILL + NMP	INJECTION + NO-TILL + NMP	INJECTION + NO-TILL + ADVANCED NM
Application Equipment	$21	$52.4	$52.4
Labor, Fuel, Maintenance	$0	$10	$10
Fertilizer	$37.8	$18.90	$0
Sidedress Application	$18	$0	$0
Adaptive Management	$0	$0	$10
Planning Costs	$1.00	$2.00	$2.00
Annual Cost	$77.80	$83.3	$74.4

Discussion

Ken Staver: Lbs per acre gain in fertilizer? How much more N available for injection?

Eric Rosenbaum: It varies based on the ammonia concentration. In general, it doubles it.

Ken Staver: And that's in lbs of N?

Eric Rosenbaum: Correct. We can save money on application costs and eliminate the cost of fertilizer directly.

Wrap up

11:55 **New Business & Announcements (2 min)**

- **AMT update:**
  - Crop Yields
  - Land Use Categories
- **Other Announcements? -** send to Jackie Pickford (Pickford.Jacqueline@epa.gov) for inclusion in the "Recap" email.

11:57 **Review of Action and Decision Items (3 min)**

12:00 **Adjourn**

Next Meeting

Thursday, October 19th: 10AM-12PM, Call-in Zoom

Participants

Jackie Pickford, CRC
Tom Butler, EPA-CBPO
Jeremy Daubert, VT
Kathy Braiser, PSU
Eric Hughes, EPA-CBPO
Elizabeth Hoffman, MDA
Mark Dubin, UME/CBPO
Scott Heidel, PA DEP
Victor Clark, Farm Freezers
DE
Kristen Hughes Evans,
Sustainable Chesapeake
Steve Levitsky,
Phospholutions
Tyler Echard, PA
Helen Golimowski, Devereux
Consulting CBPO
Henter Landis, VA DCR
Natahnee Miller, PA DEP
Ashley Hullinger, PA DEP

Dave Montali, Tetra Tech WV
MWG
Karl Blankenship, Bay Journal
Alex Echols, Campbell Foundation
Tyler Trostle, PA DEP
Cassie Davis, NYSDEC
Leon Tillman, USDA/NRCS
Amanda Barber, NY
Kristen Wolf, PA DEP
Chris Brosch, DDA
Christina Lyerly, MDE
Cindy Shreve, WVCA
Clint Gill, DE
Dave Graybill, Farm Bureau
Emily Dekar, USC
Eric Rosenbaum
Greg Gulibon
Hunter Landis, VA
Jeff Hill, YCCD
Jenna Schueler, CBF
Jim Riddell, VA Cattlemen
Jeff Sweeney, EPA
Katie Walker, Chesapeake Conservancy
Ken Staver, UMD
Marel King, CBC
Matt Royer, Penn State
Nick Hepfl, HRG
Nicole Christ, MD
RO Britt, Smithfield Foods
Ruth Cassilly, UMD-CBPO
Seth Mullins, VA
Steve Levitsky
Tyler Trostle, PA DEP
Peter Claggett, USGS-CBPO

**Common Acronyms
AgWG- Agriculture Workgroup
AI - Artificial Intelligence
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
DPF – Dairy Precision Feeding
EPA- [United States] Environmental Protection Agency
FWS – [United States] Fish and Wildlife Service
K - Potassium
LU/LC - land use / land cover
N - Nitrogen
NEIEN- National Environmental Information Exchange Network
NFWF- National Fish and Wildlife Foundation
PA DEP- Pennsylvania Department of Environmental Protection
PSC – Principals' Advisory Committee (CBP)
PSU- Penn State University
P - Phosphorus
P6 - Phase 6 (CAST/Watershed Model
P7 - Phase 7 (CAST/Watershed Model)
TMDL- Total Maximum Daily Load
WQGIT- Water Quality Goal Implementation Team
WTWG- Watershed Technical Workgroup
UMD- University of Maryland