Agriculture Workgroup (AgWG)
Meeting Minutes
August 17, 2023
10:00 AM – 12:00 PM
Meeting Materials

Summary of Actions and Decisions

Decision: The AgWG approved the July meeting minutes.
Action: Please provide comments on Phase 7 agricultural land use categories to Katie Walker, Peter Claggett, and Mike Evans (pclagget@chesapeakebay.net; kwalker@chesapeakeconservancy.org; mevans@chesapeakeconservancy.org). They will return to the AgWG in September for additional feedback from the group.
Decision: The AgWG approved the methodology for **PA's non-intrusive verification pilot project**. This will be accepted for 2023 Progress and onward.
Decision: The AgWG approved the methodology for the **Virginia Tillage Survey Verification project.** This will be accepted for 2023 Progress and onward.
Action: Contact Chris Brosch (Chris.Brosch@delaware.gov) with any questions, comments, or concerns on DE's manure application timing and eligibility presentation. The AgWG will be asked to vote on this in September.

Meeting Minutes

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*
- **Decision:** Approval of minutes from the July AgWG call.

Data & Modeling

10:05 **Agricultural Land Use Categories (20 min) –** Peter Claggett, USGS, Katie Walker Chesapeake Conservancy, and Mike Evans, 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. They are soliciting the input of the AgWG on mapping processes and potential new classes, including new mapping efforts related to animal operations and the further separation of pasture and hay. At this meeting, they presented contextual information and topics for consideration. In September they will seek additional discussion and input from the AgWG.

Discussion
Leon Tillman: How do you determine pasture versus hay in instances where it may be a pasture field that has cuttings for hay?
Katie Walker: It will depend on these input data layers (CDL, NLCD). Even if it's multi-use, it will be put into one category or the other, but we're open to how we make that determination if you have feedback.

Jill Whitcomb (in chat): How will the improvements/refinements to LU/LC relate to BMPs reported and excess/cutoff issues related to domains?
Peter Claggett: Currently there is no relation to the land use we're mapping and the BMPs except for the fact that certain BMPs are only eligible on certain land uses. But detecting BMPs with the land use - that is not something we do currently. In terms of acres of cropland and pasture for cutoff, that is currently planned to be based on the land cover data in the Phase 7 model, but not for Phase 6.
Alex Echols (in chat): Will the update feature more on assessing specific agronomic practices as well as structural practices?
Peter Claggett: We can't detect those things currently. We can narrow down where BMPs may be located and then additional field inspection might be able to identify those BMPs as a separate discussion.
Jill Whitcomb (in chat): How will the LU/LC differentiate animal housing types and animal housing that is populated versus those that are no longer in use?
Peter Claggett: Right now we are just planning to map animal operations in general. Getting more specific for dairy and poultry will be reserved for ancillary data, not directly included in the classification. We are not able to tell if the animal housing is populated at this time.
Katie Walker (in chat): This is not something we are looking to do at this time.
Mark Dubin (in chat): What is the definition of hay barren as a land use?
Peter Claggett: Hay barren land use are areas where, for example, the cropland data layer (CDL) would say this is a hay area but our land cover data would map that field as perhaps partially bare, partially vegetated. So the barren portions of the field might be hay barren and the vegetated parts would be hay - low veg.
Katie Walker (in chat): Bare lands as identified by the land cover data that are considered hay based on input data layers such as CDL or NLCD.
Alex Echols (in chat): Will the pasture feature assess AMP grazing?
Steven Guinn (in chat): AMP?
Alex Echols (in chat): Apparently not everyone knows what AMP grading is. Here is a good 101 http://standardsoil.com/our-approach/amp-grazing/. It is a widely used term in agriculture
Alex Echols (in chat): On cropland will you assess hydrology and conservation drainage?
Katie Walker (in chat): No - this is outside the scope of work for creating the land use/land cover data, but there are other ongoing projects that may be looking into these topics.
Mark Dubin (in chat): How is pasture barren related to loafing lots as a land use?
Katie Walker (in chat): A loafing lot, depending on whether it is vegetated or not, would likely be classed as pasture barren or pasture herbaceous. For any structures that are a part of that lot, we are looking to call them "Ag Structures" as opposed to just "Structures".
Jim Riddell (in chat): So will this match up with the USDA -NRCS allowance for mixed use-hayfields also used as pastures on many farms.
Katie Walker (in chat): Jim, if there is a data layer, other than the ag census, that would be useful for looking into this, please let us know!
Jill Whitcomb (in chat): It will be difficult to draw conclusions on the "intensification of agriculture" unless the LU/LC are looking at new animal buildings and drawing conclusions there, then, it seems.
Katie Walker (in chat): Jill, in tagging structures that are within the animal operations bounding boxes as ag structures, our hope is to note where there is change between the time steps for new structures. This would be an opportunity to lower the AG>DEV change, and instead let those new structures still be a part of the AG footprint. We will highlight this more (and visually) at next month's meeting! Thanks.

Steven Guinn (in chat): For a easy way to look at CDL https://croplandcros.scinet.usda.gov/
Peter Claggett (in chat): We are just focused now on quantifying new/additional structures as "ag intensification" vs conversion to urban development.
Elizabeth Hoffman (in chat): Wouldn't AMP be similar to rotational grazing and then be a BMP?
Cassandra Davis (in chat): I believe AMP is called Precision Intensive Rotational/Prescribed Grazing in the CAST model
Mark Dubin (in chat): Alex - the CBP Partnership currently uses the NRCS management definition of prescribed grazing, or intensive rotational grazing, versus AMP as the management practice.
Leon Tillman: How does separating pasture and hay affect the nutrient loads attributed to the LU classifications with respect to this adjustment looking year over year or every couple of years?
Katie Walker: The new data will be using 21/22 imagery. Right now the timestep isn't annual, but over a 3-5 year time period.
Ken Staver: In that case, in your example with wheat - it's not always the same crop for the entire year, so how would that be classed?
Katie Walker: Our understanding from previous conversations was that folks wanted to see winter wheats classed as cropland - the land use that's happening for large portion of the year has significant impacts on water quality so it would be more useful to be mapped as cropland.
Ken Staver: I agree with that, I'm just concerned about it staying wheat for any length of time.
Katie Walker: Our data doesn't specify whether or not its winter wheat - it's all aggregated into one as cropland.
Alex Echols (in chat): My concern is how are management practices assessed.
Peter Claggett (in chat): We will not be able to identify grazing practices with the NAIP imagery and our current mapping approach.
Steven Guinn (in chat): CDL differentiates between double crops and single crops
Jill Whitcomb (in chat): Not sure how to deal with strip cropping where hay is grown in a rotation? To Ken's point.
Katie Walker (in chat): It would be helpful to get feedback on which class makes more sense for it to be under - my personal perspective being that if it is being used for crop production at any point throughout the year, it should be cropland. The soil disturbance/structure would be more similar to other cropland, regardless of the rotation, no?
Steven Guinn (in chat): The majority of wheat in DE is double cropped.
Kathy Boomer (in chat): Alex raises important questions about accounting for practice implementation. Water management practices continue to be overlooked despite their influence on soil health processes and hydrologic connectivity affecting our river system flow regimes and aquatic habitat conditions.
Katie Walker (in chat): This data layer is just a determination of land use, and not an accounting of management on those landscapes. There are other efforts that are looking into those topics.
Kathy Boomer (in chat): Will you be able to characterize the vegetation in and adjacent to the concentrated flow paths?
Peter Claggett (in chat): @Kathy Boomer we can tell if concentrated flow paths are vegetated (herbaceous, shrub, or trees) or unvegetated (barren) but we cannot identify the type of vegetation beyond these general classes. Our cropland vs pasture vs hay classes come predominantly from the Cropland Data Layer and National Land Cover Dataset.
Kathy Boomer (in chat): Peter, the vegetation classification and hi-res hydrologic data could be helpful to identifying where there's opportunity to manage hydrologic connectivity through conservation drainage (including infield controlled drainage, edge-of-field, and edge-of-stream water filter/storage practices). TNC has been successful with generating such maps. Results

have been helpful to building willingness to adopt practices and also informing how best to engineer the practices.
Jill Whitcomb (in chat): Looking at the Topographic Wetness Index in PA gets at the hydrologic connectivity issue. Also, considering the new published research from PSU on the "Manureshed" should be considered for identification of real opportunities for water quality influence.
Peter Claggett (in chat): We can overlay our hyper-res stream data (under development by the Chesapeake Conservancy and UMBC) on the land use/land cover data to identify agricultural ditches, roadside ditches, and streams. However, we won't know and cannot tell how those ditches are being managed.
Leon Tillman (in chat): Land use classification feedback: Similarly to Ken's comment, it's concerning that with the split if a field is used for hay for that time it will remain that land use with respective nutrient loads until it's reassessed 3-5 years later. While it may be used for pasture within that time. This disregards the dynamics of the field use over time. USDA-NRCS uses a land use with a management modifier, where it can be a pasture field with a hayland modifier meaning it's predominantly pasture that may have hay cut on it.
Peter Claggett (in chat): @Leon Tillman are you requesting three classes: pasture, hay, and mixed pasture/hay?
Steven Guinn (in chat): @Leon Tillman One suggestion from the 2016 Lark, et. al CDL BMP paper would be to use multiple years of CDL to assign a majority use.
Leon Tillman (in chat): @Peter Claggett I would say yes because the proposed change is rigid relative to how on farm production may need to change year to year based on inputs, economics, infrastructure, etc. For a field to be locked into either land use for that length of time and considering the differing nutrient needs, it can swing progress quite a bit. Has there been any piloting of this to show how much nutrient loads would be changed within a county or geographic area?
Peter Claggett (in chat): Nothing that was presented today will impact Phase 6. For Phase 7, separating Pasture and Hay will impact the spatial distribution of these two load sources and their associated BMPs within a county. Delivered loads could be impacted if changes to the spatial distribution of these land uses within a county impacts their relative proximities to modeled waterways and the Bay.
Mark Dubin (in chat): Would not hay barren for a land use be a temporary condition dependent on the timing of the harvest and the imagery?
Peter Claggett (in chat): Yes. Please note that our classification is a hybrid of land use (hay) and land cover (barren). We do it this way so the classes can be collapsed to pure land cover or pure land use- to inform a greater variety of applications. For Phase 6, we only report "pasture/hay" acres by land-river segment. Phase 7 may be able to accommodate pasture, hay, and perhaps mixed pasture/hay. The temporary land cover class, "barren" vs low veg will likely be ignored by Phase 7.
Steven Guinn (in chat): The CDL uses multiple images at different times in order to reduce the harvest timing issue. But it is definitely a major problem in the grassland hay distinction
Mark Dubin (in chat): As Jim and Leon have noted, harvesting forage/hay from livestock pastures recognizes the common management practice of increased production of cool season grasses early in the growing season, which may exceed the forage needs of the livestock. It is dependent on the type of forage present, the weather, and livestock pressure, but represents a temporary land use which is predominated by livestock grazing for the remainder of the year.
Peter Claggett (in chat): At the next AGWG meeting, please provide feedback as to the percentage of pasture/hay in each state that is mixed or separate. If the dominant practice is

mixed pasture/hay- then we should probably not separate them. We had heard that at least in the West Virginia panhandle, the two practices were predominantly separate.

Accounting & Reporting

10:25 **Pennsylvania Verification Pilot Project (30 min) -** Scott Heidel, PA DEP, and Joshua Glace, Larson Design Group (LDG)

The Non-Intrusive BMP Verification methodology and associated SOP was presented in addition to the results of the Tetra Tech independent review. The AgWG was asked to approve the methodology so that BMPs verified using this method can be applied to 2023 Progress**.**

Discussion

Ken Staver: Is there any way to determine if these are all new BMPs? Or is there a possibility that these are in place when the bay restoration started? What if they aren't additional practices, they could be baseline.

Josh Glace: This program identifies both. Historical documents help us establish practices that may have fallen out of their lifespan that need to be reverified, but also identifying new BMPs that individuals may have been doing on their own.

Ken Staver: When you look at aerial maps, what percentage of area are you covering?

Josh Glace: We identified around 1100 BMPs and from that, 810 BMPs could be verified from the roadway. About a 75-80% hit rate on those we identified aerially.

Ken Staver: So you look at everything?

Josh Glace: Yes, we look at everything and then filter out based on distance, etc.

Ken Staver: When you have aerial info does that have all practices on it from the NRCS database?

Josh Glace: Within PA those practices are part of an approved plan - NRCS practices will be filtered out before we even go look at them.

Kathy Braiser: Are we being asked to approve the method to be approved anywhere?

Josh Glace: We are asking for approval of the methodology to then be used in other parts of the watershed.

Hunter Landis (in chat): Jeremy, was the TT review proposed/discussed at the last meeting?

Jackie Pickford (in chat): The results were not, but we mentioned it was happening.

Jill Whitcomb (in chat): Jon did a great job of hitting the very tight deadlines on this independent review. CBPO had requested that a third party independent review be conducted on July 18.

Ken Staver: Methodology sounds reasonable, but if you go into a typical watershed it would be good to see what this adds to the mainstream NRCS state conservation efforts. Are we finding 10% more of something or doubling it? What is this yielding?

Jill Whitcomb: I see your point. I think a lot of this comes down to the overarching fact that the jurisdictions have to figure out ways to continuously verify any and all BMPs regardless of location and age. This is one of the methodologies that has been brought to us by LDG working with PA counties. It's only a subset of the resource improvement (RI) practices, not the NRCS practices.

Frank Schnieder: We could better answer that question after we start doing this, Ken. It's really a time and money thing. Not efficient use of time or money.

Ken Staver: My only concern would be the issue of it picking up practices that were established at our baseline.

Auston Smith (in chat): EPA votes to stand aside. It is very difficult to determine if BMP's detected with this new methodology have already been reported to the CBP office through USDA NRCS. This can lead to possible double counting of already existing BMPs. Also, due to the nature of the TMDL to measure change over time, there is concern that there is inadequate information regarding BMP implementation dates for some of the BMP projects. Without clearly enumerated implementation dates, some BMPs are reported as "new" when they could have been on the landscape for many years, therefore not accurately reporting change on the landscape through time.
Leon Tillman (in chat): @Auston Smith To the double counting concern: Jurisdictions make the determination if USDA BMPs are reported for crediting. And after the PA-NRCS-USGS data aggregation pilot and one done in VA, there is an ability for USGS to do the identification of BMPs that could potentially be double counted and removed as needed.

Decision: The AgWG approved the methodology for PA's non-intrusive verification pilot project. This will be accepted for 2023 Progress and onward.

10:55 **Virginia Tillage Survey Verification (30 min) –** Stuart Blankenship, and James Martin, VA DCR

Virginia completed a tillage survey of the cropland in the Chesapeake Bay Watershed during the Spring of 2022. The group will hear from TetraTech who conducted a review of the methodology at EPA's request. The Virginia team presented on the changes that resulted from the review findings and answer any questions from the work group regarding the methodology presented to the group last month. They sought AgWG consensus to accept the Virginia methodology and to allow Virginia to submit the results of this survey for use in the Chesapeake Bay Model beginning with 2023 Progress.

Discussion
Ken Staver: Looking down the road with technology improvements and AI, are drones just out of the question?
Stu Blankenship: I'm not sure. If there's a better method than transect survey we can investigate that.
Ken Staver: They've been used in cover crop verification.
Stu Blankenship: My only hesitation for drones is that I think it would be a lot of area to cover. Also hesitant about landowner approval.
Ken Staver: I was just thinking about in addition to the transect survey for photography purposes, drones might allow you to see a larger area in the photos.
Jeremy Daubert: Definitely legal issues with flying over private property.
Dean Hively (in chat): We are working on tillage classification using satellites, rather than drones, which has large-scale application and could be paired with photo and transect data for validation.
Frank Schneider (in chat): Drone use can be tricky and is not received well by ag producers. We really limit its use to educational events in Pa.
Dave Graybill (in chat): Major issues with drones over private property.
Kathy Boomer (in chat): John, Stu, and All: Do you know if anyone has explored partnering with NASA? They're looking to work with partners who are collecting ground and airborne data to improve their satellite products in support of ag and water management.

Dean Hively (in chat): Kathy - happy to discuss this - our work is NASA funded
Mark Dubin (in chat): CTIC is planning to publish new national CRM data based on remote sensing imagery.

Decision: The AgWG approved the **Virginia Tillage Survey Verification methodology.** This will be accepted for 2023 Progress and onward.

11:25 **Manure application eligibility and timing in CAST (30 min) –** Chris Brosch, DDA.

Inconsistencies with the timing and eligibility file in the current version of CAST have led to unrealistic results for manure applications to agricultural crops in Delaware and Maryland. Chris Brosch reviewed the issue and a proposed solution. The AgWG will be asked to vote on this in September for inclusion in CAST-2023.

Discussion
Alex Echols (in chat): On manure management component of the nutrient unit - does the system distinguish between injection and surface application and type and timing of application? Critical - for example well done injection retains 80%+ of nutrients where some forms of surface application loose 80%+
Ken Staver: When you group fertilizer and manure, the "waterbed" for animal manure is the county, but for fertilizer the "waterbed" is the entire watershed.
Chris Brosch: When we transport manure out of the county, it will affect the waterbed in the receiving county, which will also impact the fertilizer that can be called upon. They operate at different scales but it's all interconnected.
Mark Dubin (in chat): Alex - the CBP Partnership has recognized management BMPs for manure incorporation or injection, as well as application timing. Please feel free to contact me for additional information
Ruth Cassilly (in chat): @Alex- manure injection is a CBP BMP.
Jill Whitcomb (in chat): What is the purpose of this decision matrix, when CAST isn't a process model?
Jill Whitcomb (in chat): Manure application to full-season soybeans is not in line with what we discussed with the AMS membership (that the intent was to capture the MAP and DAP applied as starter).
Ken Staver: The axis is only 5 lbs of N so it doesn't change the overall picture very much.
Chris Brosch: We can't make that assumption. It does change things.
Jill Whitcomb (in chat): As PA reviewed CAST-19 and CAST-21, we identified a real issue during that QA/QC associated with nutrient loads on full season soybeans. I concur with Chris's assertion, the same issue was showing up in PA.
Alisha Mulkey (in chat): Same in MD on full season beans.
Jill Whitcomb (in chat): What is on this table shows what a parameter change in DE and parts of MD would do to the rest of the watershed if nothing else was changed, right?
Chris Brosch: Yes but MD eastern shore counties are matching the change DE made.
Ruth Cassilly (in chat): If I remember correctly the issue related to full season soybeans was related to the assumption that a starter application of fertilizer is used on full season beans vs. no application for double cropped soybeans, it was not related to manure.
Jill Whitcomb: Since CAST is not a process model, would you recommend that the timing and eligibility process aspect be eliminated completely across the watershed? if that were the case, would it deal with that waterbed effect?

Chris Brosch: Difficult question to answer. Based on the 3 test counties I presented, Lancaster county is not optimized to spread the manure that is being produced there. Lancaster will end up in a disposal sequence probably with any timing changes. Kent county DE would not. I would recommend PA to look at it and I'm happy to help if needed.
Greg Albrecht (in chat): Thinking we should consider providing all jurisdictions the option to re-evaluate their timing settings (?).
Alisha Mulkey (in chat): @Greg. Agree
Jill Whitcomb (in chat): @ruth, looking at the bar graphs, it does not look like any fertilizer is being applied in the high loading counties, like Lancaster.
Dave Graybill (in chat): Timing settings is a new piece of this puzzle for me.

Action: Contact Chris Brosch (Chris.Brosch@delaware.gov) with any questions, comments, or concerns on DE's manure application timing and eligibility presentation. The AgWG will be asked to vote on this in September.

Wrap up

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

- **Chesapeake Community Research Symposium 2024.**
  - The next CCMP symposium will take place June 10-12, 2024 at the Crowne Plaza Hotel in Annapolis, Maryland. The scope of the symposium will include presentations on environmental research and science. The theme of the 2024 symposium is Chesapeake Bay Restoration: Managing Water Quality for Living Resources in a Changing Climate.
  - Proposals (1000 words or less) due **October 2nd** to allison@greenfinstudio.com.
- **Cover crop BMP verification hybrid method**
  - Present AgWG approved cover crop survey hybrid method to WQGIT for update to verification protocols (August).
- **Other Announcements? -** send to Jackie Pickford (Pickford.Jacqueline@epa.gov) for inclusion in "Recap" email.

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

12:00 **Adjourn**

Next Meeting

Thursday, September 21st: 10AM-12PM, Call-in Zoom

Participants

Jackie Pickford, CRC
Tom Butler, EPA-CBPO
Jeremy Daubert, VT
Kathy Braiser, PSU
Elizabeth Hoffman, MDA
Greg Albrecht, NY
Frank Schneider, PA SCC
Seth Mullins, VA
Cindy Shreve, WV
Marel King, CBC
Leon Tillman, NRCS
Dave Graybill, Farm Bureau
Paul Bredwell, US Poultry & Egg Association
Emily Dekar, USC
Jim Riddell, VA Cattleman Association
Tyler Groh, PSU
Nick Hepfl, HRG
Tyler Trostle-PA DEP

Jill Whitcomb, PA DEP
Ashley Hullinger, PA DEP
Scott Heidel, PA DEP
Ruth Cassilly, UMD CBP
Katie Walker, Chesapeake Conservancy
Kristen Hughes Evans, Sustainable Chesapeake, NFWF Field Liaison
Alisha Mulkey, MDA
Cassie Davis, NYS DEC
Clint Gill, DDA
Auston Smith, EPA
Nicole Christ, MDE
Peter Claggett, USGS
Helen Golimowski, Devereux Consulting, CBPO
Matt Monroe, WV Department of Agriculture
here
Jon Harcum, Tetra Tech
Stu Blankenship, Virginia DCR
ken staver UMD Wye
Jeff Hill YCCD
Kaylyn Gootman, EPA CBPO
Hunter Landis, VA DCR
Alex Echols. Campbell Foundation
Mike Evans, Chesapeake Conservancy
Natahnee Miller, Pennsylvania DEP
Steven Guinn Geospatial Modeler Chesapeake Conservancy
Steve Storck, Chesapeake Conservancy
Jenna Schueler, Chesapeake Bay Foundation
Josh Glace - LDG PA
John Clune - USGS
Kristen Saacke Blunk. Headwaters LLC
Mark Dubin, UME/CBPO

**Common Acronyms
AgWG- Agriculture Workgroup
AMT- Agricultural Modeling Team (Phase 7)
BMP- Best Management Practice
BMPVAHAT- BMP Verification Ad Hoc Action Team
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
CDL - cropland data layer
CRC- Chesapeake Research Consortium
DPF – Dairy Precision Feeding
EPA- [United States] Environmental Protection Agency
EPEG – Expert Panel Exploratory Group
FWS – [United States] Fish and Wildlife Service
MUN – Milk Urea 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
STAC- Scientific & Technical Advisory Committee
SWG – Small Watershed Grants Program
TMDL- Total Maximum Daily Load
WILD - Chesapeake Watershed Investments for Landscape Defense Grants Program
WQGIT- Water Quality Goal Implementation Team
WTWG- Watershed Technical Workgroup
UMD- University of Maryland
USDA-ARS- United States Department of Agriculture-*Agricultural Research Service*
USDA-NASS- United States Department of Agriculture-*National Agricultural Statistics Service* USDA-NRCS- United States Department of Agriculture-*Natural Resources Conservation Service*