Agricultural Modeling Team (AMT)
Meeting Minutes

May 10th , 2024
09:00 AM – 11:00 AM
Meeting Materials

Summary of Actions and Decisions

Decision: The AMT approved the April 2024 meeting minutes.

Sandbox Decision: The AMT will continue to use the Phase 6 agricultural land uses for the purposes of testing additional changes during the development of Phase 7.

Meeting Minutes

Statement of purpose:

To evaluate the impact of losing NASS county level data on CAST and determine if changes should be made to the Land Uses currently utilized by CAST.

Introduction/Recap: 09:00-09:15 [15 min (Zach Easton, Virginia Tech)]

Zach provided a quick recap of the AMT progress to date, as well as the timeline and following announcements:

- **Decision:** The AMT approved the April 2024 meeting minutes.
- NASS discontinues select 2024 data collection programs and reports
    - The group started to discuss the implications of this change in the second half of the meeting. There will be further discussion at a future AMT meeting.

Agricultural Land Uses 09:15- 09:45 [30 min (10 min presentation 20 min discussion) (Tom Butler, EPA)]

We have had multiple discussions pertaining to what the Agricultural Land Uses should be in Phase 7. The group reviewed the current Land Uses and discussed whether changes should be made. There was a recap presentation followed by a sandbox vote. The goal was to gauge if the group feels that there should be changes made for Phase 7. Sandbox Decision

Discussion

Lisa Duriancik (in chat): On your prior slide (pie), when you say it doesn't change watershed load, do you mean the Bay or do you mean HUC 8s or smaller within that? Thank you.
Tom Butler: I was talking about county-scale. The total ag load for the watershed stays the same.
Tom Butler: Do we want to continue using the current ag land uses for Phase 7?
Ken Staver: In terms of sandboxing - there was a suggestion that the way we're doing it now was double counting the effect of land uses. Gary did an analysis of keeping the land uses the same

and it was shown that it was *not* double counted. I thought that was sandboxing and we already were shown this.
Tom Butler: Yes, he did show that. I want to nail down what we want to do for the land uses more specifically.
Ken Staver: Right, I'm just saying we made a sandboxing decision already so I don't want to do that again.
Tom Butler: Are we okay with using the land use categorization the way it currently is? Can we make a tentative decision about this?
Bill Keeling: If what we're talking about results in no benefit for NM on pasture, I don't foresee other workgroups agreeing with that. The current list of land uses was not useful for planning for WIP3. If they exist in the background then that's one thing. but when we're going to plan for WIP4, it will be distilled under cropland/in the land class sector, not the specific land uses.
Dave Montali: Yeah, the people using this model for planning restoration will probably not pay attention to the specificity and can probably use the broader land use class. Maybe tweaking open space or legume, but generally will probably think in terms of crop, pasture, hay, etc. That said, I think if we have something more simple it may be easier to explain or communicate, but it could also cause problems elsewhere.
Chris Brosch: Are we inherently endorsing the manure/without manure land uses? Because I don't want to do that. I agree with Bill. Need to address NM issue on pasture. Also, for planning purposes, the specificity is important because the planners in the state that build a roadmap on how to accomplish WQ goals with real BMPs need to be able to target higher loading land uses that the load goals tell us are higher loading. Our progress reporting is less specific than this list because we don't have an easy way to track as specific as these land uses.
Bill Keeling: In WTWG, I didn't think any state said that they used this for WIP3 planning. You have to agree that the land use is representative of the area that you're targeting. The combination of NASS at a county-scale, fertilizer that is state-wide, and manure data that is county-wide - this doesn't produce a tool that helps with targeting in our experience. For targeting, we refer more to the people on-the-ground that know which farms have manure and then target those BMPs to those particular operations in a county that may not exist in the model world. I don't think the data going into the model supports this kind of segmentation.
Chris Brosch: I agree. And it will get harder without the detail we're getting at the county scale from NASS. Need to prepare ourselves for that. However, in DE, we've had a hard time using our BMPs that we can get voluntary adoption on to get towards our goals, so we've needed to target at a very specific level in our plans.
Olivia Devereux: For NM on pasture, that is a BMP issue and not a land use issue. the BMP needs to be reevaluated. It could be solved via land use but it would be more straightforward to reevaluate the BMP in the context of the definition of pasture. In terms of the LUs listed here, I don't see this level of detail being used for planning or reporting purposes. This leads to a level of complexity that has had the effect of confusing people on how to use CAST because there's too much detail that they don't have in their data and they don't know how to use. The collapsing of those would be helpful, especially if we are losing some of the NASS data. The high-res LU data from USGS separates cropland from pasture and that's it. The other categories come from other sources of data that may be less reliable. We should consider that for this decision. Lastly, as we add GIS capacity to CAST we will only be able to spatially see pasture and cropland since that is the only data that is spatially explicit, so that could lead to a disconnect.
Bill Keeling: I disagree about the NM issue. Pasture is the reference land use and has a loading rate of ~15 lbs per year, but that is below the NM standards. That isn't correct. We need to describe a pre-BMP condition for that land use.

Olivia Devereux: I think the issue is not whether or not we have four different pasture land uses. The issue is the loading rate for that land use needs to be updated to reflect a pre-BMP condition. It wasn't done that way in Phase 6, but we could decide to do that in Phase 7. It doesn't have to do with whether or not we have pasture as a land use though, it is a separate issue with the loading rate.
Bill Keeling: Also, open space should be its own thing. It shouldn't be tied to the ag or urban sectors. We need a better definition for what constitutes open space.
Olivia Devereux: I agree, Bill.
Tom Butler: We can address those issues moving forward, Bill, but I want to get peoples thoughts on the land uses.
Alisha Mulkey (in chat): MD would like to sandbox the LUs to consolidate them. We think there is room for improvement. We'd like to consolidate with and without manure, as well as the grain categories. Going directly to the land classes might be too far, but we'd like to consolidate the land use categories.
Bill Keeling: Can you confirm if the non-point source pie attributed to ag is proportional to what the watershed characteristics are? For example, the sector breakdown would vary from watershed to watershed and it wouldn't be a static number everywhere, right?
Tom Butler: Yes, it varies spatially. If we were to change the land uses, it wouldn't change the overall ag load in the entire CBW, but it may change spatially from watershed to watershed.
Alex Soroka: Not a jurisdiction but I am in favor of consolidating with and without manure.
Alisha Mulkey: MD is also in agreement with Bill K. We plan at the farm level to address resource concerns and apply BMPs. This is different from how the model can discern the land uses and how we report BMPs.
Bill Keeling (in chat): Not sure it matters here but the only entities that will be required to use the resulting CAST tool will be the partner jurisdictions. For their WIPs and annual progress runs.
Dave Montali: Way that USGS maps hay is different from how we map hay. Is that an issue? Also, we average everything out by the way we report if we are reporting on land classes and not land uses.
Ken Staver: Why is having more specific land uses a negative thing if we states can just report on land classes? Especially if they are being used for planning and targeting purposes. I guess I don't see an advantage of simplifying these. Also, I thought we needed a consensus to make a change and not a consensus to stay the same. I'm confused. We could definitely improve the way we determine manure application rates and the break between manure and without manure because we know we have a very limited data approach right now, but I guess I still think they should be separated out.
Olivia Devereux (in chat): Splitting things out and then lumping them back together introduces error. Land with/without manure and corn for grain and corn for silage. All are split out using ag census data, and then people are putting BMPs on a general land classes/categories, and then we distribute those BMPs on the specific land use/categories, but then there is criticism that the data available to split up the data into categories is not as accurate as folks would like. It's fine if folks want to go that way, but there is just error that's introduced because of it.
Chris Brosch: (in chat): I'd like to register disagreement with the interpretation of Gary's previous presentation on the effect of removing the land use load targets. I think he only presented that results show a different distribution of load, it did not confirm or deny duplicating effects.
Elizabeth Hoffman (in chat): One way it hurts is because it "cuts off" the footprint of crediting those BMPs, so we report at land class but as it allocates across the smaller groupings it can "cut

off" and not credit that BMP for certain land uses. So if we don't have that level of detail, we can't fully credit those BMPs in the model because we don't report them at the land use level.
Bill Keeling (in chat): CAST represents each load source or sector so the public sees a set of numbers and it is very confusing when they hear we do not track or report at that scale.
Jeff Sweeney (in chat): I find this discussion interesting because it seems we're headed to more simplicity in the land use categories - like we had in Phase 5 version of the model. One of the reasons we have the land use categories in Phase 6 is that it was felt that we need categories with more understandable crop names - to users. My other comment is that we need a discussion of feed space area as an agriculture category.
Tamie Veith (in chat): I thought we were voting on changing Land Use instead of keeping current. We have spent a lot of time on this and we need to move on.
Zach Easton: I agree with everyone's comments that there could certainly be improvements, but I'm not convinced that simplifying it is the way to go. It sounds like a data and communications problem, not a land use and BMP problem. The high degree of specificity is good because it could incentivize treatment of those high loading land uses. So I support keeping the land uses the same.
Tamie Veith (in chat): The current categories are useful to translate real data to CAST though. So I guess keep?
Bill Keeling (in chat): What real data?
Alex Soroka (in chat): In our voting rules, didn't a "1" mean we have to keep working on the issue?
Tom Butler: Traditionally, yes. I think I need to change the wording on this decision item though.
Tamie Veith (in chat): Sorry, that was sloppy. Farm and field level data before we aggregate up to CAST level.
Bill Keeling (in chat): Ag Census data is used in cast at the county scale and disaggregated based on various assumptions. The data is only as real as the assumptions are good.
Scott Heidel (in chat): Thank you and I just would like to see some modeling done with various scenarios so we have an idea of how all of the potential changes will impact loads and BMP reductions. Same would apply to any changes in general; need to see modeling as well.
Joseph Delesantro: Can we get some feedback on how to do voting better next time around?
Chris Brosch: We should never be voting to keep something the same. We should be voting on consolidating the land uses.
Ken Staver: I agree.
Elizabeth Hoffman (in chat): Agreed, vote on change, not agree to remain. Notes would capture suggestions for that change.
Tamie Veith (in chat): Tom, that makes sense. Maybe a few votes: "consolidate manure vs. non manure"; "consolidate [specific grain categories]".
Alex Soroka (in chat): Some of us weren't working on this during P5 and don't have the institutional memory.

To the following statement: <u>We should continue using the current ag Land Uses for use in Phase 7.</u> NO consensus could be reached, this means that we remain with the current Phase 6 practice. Therefore, the AMT will continue to use the Phase 6 agricultural land uses for the purposes of testing additional changes during the development of Phase 7.

We have recorded the comments of each member regarding their stance on keeping the Phase 6 land uses for Phase 7. See document here.

NASS Annual County Level Data 09:45-10:55 [70 min (20 min presentation 50 min discussion) (Tom Butler, EPA; Joseph Delesantro, ORISE)]

Due to a restriction to the appropriations provided to USDA NASS, annual surveys with county level data on multiple crop and animal types will be discontinued. The group discussed the potential impacts of this data loss on the future CAST development and potential paths forward for Phase 7. Informational.

Discussion

Dave Montali: Is there going to be this data at a larger scale? or just no data?
Tom Butler: My understanding is that they will have state-level data. We use state level data for livestock, turkey and broilers, I think. We have a method to break that down.
Dave Montali: It won't be regional then?
Joseph Delesantro: We haven't been able to confirm that. The wording of the press release stated that since the ag district scale is technically considered state level data we may be able to retain that ag district scale data, but we haven't gotten a clear response from NASS yet on that.
Dave Montali: In my mind, if we do have the data at the ag district scale and if this is a temporary one-year thing then I don't think this is that big of a deal. We'll just have to proportion it.
Lisa Duriancik: There was some follow-up within USDA after the last meeting and we shared the impact that this would have on CBP. Not sure what will come out of that. Also, it was determined that this impacts the US greenhouse gas inventories and that's a big deal for this administration so perhaps there will be some change.
Alex Soroka (in chat): Similar to Lisa (USDA), we've been pushing this around the USGS as it impacts many programs from water use in the nation to regional/national nutrient modeling. We have internal groups working up responses which someone in leadership will transmit. Hopefully these data could come back in 25'.
Jeff Sweeney: We use annual data for some of the animal types as well. Is anyone working on that part as well as the cropland? I think we maintain a number for broilers.
Tom Butler: My understanding is that they use state-scale annual data and it's disaggregated to counties based on the census proportion for each of those animals. Might not be as big of an impact as it would be for crops.
Jeff Sweeney: The spatial scale for animals is a statewide number. and they will continue to report at that spatial scale. Is that correct?
Tom Butler: Yes, correct.
Ken Staver: There is a manure number per county that's based on county animal numbers. The only time it goes up to the state level is when you have really big operations and there's only one or two operations in a county. For things that are not scarce like dairy in counties then its reported at a county level.
Tom Butler: We get county level data for broilers and turkeys, but what is used in CAST is a state-scale annual number that is broken down to the county-level based on proportions from the ag census.
Bill Keeling (in chat): This speaks to the scientific justification for using this source as a basis for development of land use acres. Particularly at the proposed segmentation scale loads will be calculated.
Bill Keeling: NASS data has always been an issue because of disclosure problems, which is what Ken was referring to. But it's what you do with that disclosure, how you redistribute it, and what assumptions are used. In VA there is a significant difference between permitted animal

operations as compared to NASS census data. So in many counties we know the manure numbers used in CAST are in error. Also, when they update CAST with new 5-year census data there are dramatic changes in the land uses as they are currently calculated. It may have to do with the assumptions governing the interpolation of the data. Phase 7 segmentation will be way more refined than what we currently have. So what is the justification for taking these very large crude datasets down to such fine segmentation and using those interpolated data to say what the acreage is and that it will help us with targeting? Or help explain anything to the public assuming we can handle that volume of data?
Tom Butler: We use NASS because it's universal and publicly available. I don't know that there is finer data to use.
Joseph Delesantro: Totally understand, Bill. The modeling team is meeting about this issue later this week so maybe we can dive more into it then.
Lisa Duriancik (in chat): USDA - with a very informal and unofficial poll by me - determined that there is a big negative impact on several important conservation related efforts within USDA: CEAP (Watersheds Assessments, Cropland Assessment In-Stream modeling SWAT+, and Grazing Lands assessment). Also LTAR Manure sheds project. A new ACPF manure tool that will be released this month. And US GHG inventories produced for the US Gov by USDA and EPA.
Lisa Duriancik (in chat): This includes both crop and livestock data that are used, so we communicated impact for both sources.
Alex Soroka (in chat): Lisa I will follow up by email about how this information got communicated.
Alex Soroka (in chat): Here is a webinar from NASS (which I haven't viewed yet). It is supposed to give information on available data to stand in for recently discontinued programs (such as county level estimates): USDA - National Agricultural Statistics Service - Data Users Meeting
Dave Montali: I think we should do what we can with the data up as far as we can, and then if there is regional data, we simplify proportionate to the counties for the year or two that is missing, and go on from there.
Chris Brosch: I agree with Dave. We have noticed the tanking response rates for the ag census. It's adding fuel to fire about the utility of that for modeling. The value of the dataset diminishes if less people are responding. I think the most viable alternative is to use historical pieces of data as information to build data sets for the present.
Tom Butler: What kind of data would we use for that? Would folks be interested in industry data? Annual implementation report style data?
Chris Brosch: I think the annual implementation reports that some states have is a great indicator to be able to take statewide data from NASS and proportionate out to the county scale. Wherever we have overlap with annual implementation report information with historic ag census county level data, we should be able to make pretty strong inferences about how some of those crops change into the future.
Ruth Cassilly: Perhaps in addition to what Chris suggested above, we could use state CAFO and AFO permitting data at the county level.
Jeff Sweeney: It's a fraction of what's regulated and unregulated that we depend on the states to provide and update regularly. We get a lot of questions about what is regulated versus unregulated. So we need to keep those divisions in there.
Olivia Devereux: Yes, we need to keep them separate. The reason we ask for the proportions instead of the numbers is because the states didn't have the actual numbers, they only had the proportions. But if there is better data now then we could update that. Also, one of the catches with all of this data is that we have a long modeling period from 1985 to 2025 and presumably beyond that. The new data source needs to go back to 1985. Right now we take the trend from

recent data sources and use it to project backwards, but if we wanted to use older data sources and take the trend from there and project forwards, we could do that as well.
Scott Heidel (in chat): I think we should use satellite imagery since we can determine crop type/species as well as timing of specific crops/cover crops and also various BMP types to a high degree of accuracy spatially. This would also reduce cut offs and excesses of BMP implementation as the two datasets would be in alignment has context menu/
Ken Staver: That doesn't account for yields or animals though, only the crop area/land use. Maybe there needs to be a committee that looks into rethinking data sources and moving towards more direct, higher quality ways of getting the information we need. Also, some of these data sources that exist that are considered totally unavailable could potentially be aggregated somehow so that no personal information is shared. For example, federal crop insurance data might include some info about yields and perhaps is available at an aggregate form.
Scott Heidel: Our pilot project for conservation tillage BMP implementation accounts for both crop type and the spatial information.
Alex Soroka (in chat): For major crops we could possibly use Cropscape? CropScape - NASS CDL Program (gmu.edu). Sure it's got issues with multiple cropping practices but the general "corn, soy, wheat" is generally good in recent years. To get yields maybe then you could look at total grain sales over the state and make an average?
Joseph Delesantro: I think there was a reason why the USGS land data team didn't adopt CropScape but let me double check with Peter Claggett. Also, just a reminder that the model requires both temporally and spatially consistent data. So if we have usable data but it isn't consistent in those ways, we may have to apply our own statistical maturation to it. Not saying it can't be done, just something to think about.
Chris Brosch (in chat): Industry date for chickens is the best data source we have. This has been true for years and they do share in places.
Lisa Duriancik (in chat): I think it would be useful if the Bay Program or some Bay group would communicate in a letter to NASS on the impact of their decision this year. Even if methodology is shifted in the future, continuing in the near term provides an opportunity to validate methodologies for historical continuity of data sets over the long term. It is important for NASS to understand the impact of their decision and plan.
Tom Butler: I am aware of a few efforts underway within the CBP to write a letter so I will see where these stand.

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

Adjourn – 11:00

Up Next:

Office Hours: Friday, June 14th, 2024, from 8:00 - 9:00 am.

AMT Meeting: Friday, June 14th, 2024, from 09:00 - 11:00 am.

Participants

Jackie Pickford, CRC
Tom Butler, EPA-CBPO
Zach Easton, VT/Chair
Alex Soroka, USGS
Alisha Mulkey, MD
Alisha Mulkey, MDA
Arianna Johns VA DEQ
Bill Keeling, VA DEQ

Chris Brosch, DDA
Clint Gill, DDA
Curt Dell, USDA-ARS, University Park, PA
Dave Montali, Tetra Tech, WV, MWG
Elizabeth Hoffman, MDA
Eric Hughes, EPA-CBPO
Helen Golimowski, Devereux Consulting CBPO
Hunter Landis, VA DCR
Jeff Sweeney, EPA
Jessica Rigelman, J7 Consulting, CBPO contractor
Joseph Delesantro, EPA CBPO
Karl Blankenship, Bay Journal
Ken Staver, UMD WyeREC
Kristen Bisom, WVCA
Lisa Duriancik, NRCS
Olivia Devereux, Devereux Consulting, CBPO
Ruth Cassilly, UMD-CBPO
Scott Heidel, PA DEP
Tamie Veith, USDA-ARS
Tad Williams, VA DCR
Tyler Trostle, PA DEP

**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
N - Nitrogen
NASS - National Agricultural Statistics Service
NM - Nutrient Management
PSC – Principals' Advisory Committee (CBP)
P - Phosphorus
Sandbox Decision – A tentative decision made via consensus; these are made to allow for more focused testing of CAST.
STAC- Scientific & Technical Advisory Committee
TMDL- Total Maximum Daily Load
USDA: United States Department of Agriculture
WQGIT- Water Quality Goal Implementation Team