Agriculture Workgroup (AgWG)

July 20 - 21, 2016

Face-to-Face Meeting Summary

U.S. Geological Survey
5522 Research Park Drive
Catonsville, MD 21228

Meeting materials: http://www.chesapeakebay.net/calendar/event/23301/

Action and Decision Items:

DECISION: The AgWG reached consensus to approve the Manure Treatment Technologies Panel Report recommendations for submission to the WTWG, with the understanding that the policy group process and the Modeling Workgroup decision will clarify the panel's recommendations in the context of the overall Phase 6 Modeling Suite and for water quality trading programs, but that the outcome of the policy group and the decision of the Modeling Workgroup do not change the panel's technical assessment of the total N and P that leaves the 'black box', and remains available for field application or transport in the modeling tools.

DECISION: The AgWG reached consensus to approve the Cover Crops BMP Expert Panel's preliminary report.

DECISION: The AgWG agreed to hold their upcoming meetings on Wednesday, August 24th, Wednesday, September 7th, and Thursday September 22nd. By Thursday, September 22nd, the AgWG expects to have the 5 priority panel reports to approve for inclusion in the Phase 6 model. The September 15th meeting date will be held tentatively in case a conference call is needed.

ACTION: The AgWG should provide comments to the AMS on the Beta 3 documentation in advance of Friday August 19th to prepare for the AgWG August 23rd meeting. Comments should be sent to Matt Johnston (mjohnston@chesapeakebay.net) and Lindsey Gordon (Gordon.lindsey@epa.gov).

DECISION: The AgWG reached consensus on making a formal recommendation to use the Beta 3a(1) approach to represent nutrient spread for N and P in the Beta 4 version of the Phase 6 model.

ACTION: The Nutrient Management Panel will work on developing explanatory materials that may be used to help communicate the panel recommendations to stakeholders.

DECISION: The AgWG agreed to move forward with PA Agricultural Remote Sensing Pilot Project's data collected for the Potomac River Basin. EPA will provide statistical support to examine the validity of the methodology and verification of a subset of the project data. EPA will also provide additional technical

support to PA DEP to analyze data in terms of how it will be submitted for historical calibration in the Phase 6 model. The statistical workup and historical dataset will be presented back to the AgWG during the September meeting, where the AgWG will decide whether to approve the methodology for input into the model.

ACTION: Interested AgWG members should contact Lindsey Gordon (Gordon.lindsey@epa.gov) and Mark Dubin (mdubin@chesapeakebay.net) if they would like to volunteer to serve on the ad hoc committee to review the Phase 6 E3 scenarios in preparation for AgWG review and approval.

Wednesday, July 20 10:00 AM – 3:00 PM

Welcome, introductions, review meeting minutes Workgroup Co-Chairs

- Meeting minutes from the July 14th conference call were approved.

Manure Treatment Technologies Panel Report D. Hamilton, J. Hanson

Doug Hamilton, Panel Chair, presented the Manure Treatment Technologies BMP Expert Panel's final recommendation report for AgWG approval. The presentation included a track changes version of the report, a review of all comments received during the review period, and panel responses to the comments. Jeremy Hanson, Panel Coordinator, provided the status of several external partnership discussions, e.g. the Modeling Workgroup and the Management Board, concerning air modeling and policy implications of the panel report.

- Jim Cropper: What would be the cost of gasification pyrolysis versus composting? Even though composting releases a lot of ammonia, and the other two release N2 gas, does the cost justify having such an effective way of releasing N2?
  - Hamilton: The panel did not look at the cost of the technology. I would guess that even though there's ammonia loss during composting, you would have much more volatilization loss when it's land-applied through gasification. And there's a lot to justify the cost other than pollution reductions.
- Ted Tesler: It seems we're offering an approval in advance of a final report, and I worry about substantive changes moving forward?
  - Hanson: We pointed out the two tables that will need to be updated based on the MWG decision, and the policy group will clarify certain trading aspects, but they won't affect the panel's recommendations of the treatment affects.
  - Tesler: My recent observation is there's a trend of what the expert panel report says, but the AgWG can choose to accept those recommendations, but that the panel reports are becoming gospel. The workgroup needs to remember that we have the final say in what we choose to implement from the panel report.
- Ann Swanson: One thing I was impressed with is the ability for the workgroup members to comment on the report and identify those areas where there were things we needed to raise to the expert panel that required some change. And the changes that were made, I felt, were very responsive and impressive. So the way you're flagging potential

policy issues and the changes that might be needed with respect to air emissions, are wholly appropriate. I understand Ted's comment as a cautionary measure that we are still in charge.

- Bill Angstadt: On Ted's point – what are our options? Can we accept this science report and sunset this expert panel, and then wrestle with what we do with their work? The tables with 85% as a BMP efficiency can't survive. We've never had a situation where we're waiting for the modeling tech note on what we're going to do. GIT procedures are clear that we can't approve this without understanding how it will be included in the model.
    - Mark Dubin: Good questions. As Jeremy mentioned, the policy and modeling processes are external to the AgWG, but we do have the ability to base the AgWG's opinion on the technical merit of the report. This process will move forward regardless, to the WTWG and WQGIT. The panel won't be sunsetted; they still have the rest of the partnership review process to go through.
    - Angstadt: We have a specific procedure: that the modeling team has to present a tech note with an expert panel report so we have the answer to how it fits into the model. Would we be waving that?
    - Hanson: We have Appendix A, which will be updated, but that's more of a WTWG issue in particular. Until the MWG makes a decision and we go to the WTWG, Appendix A will not be revised.
    - Matt Johnston: In the past with urban BMPs, we've completed the technical piece to go in front of the WTWG, but we've also invited the source sector workgroup to speak on the panel recommendations. So if you sunset this group, you can still ask Jeremy and I to come back with the technical appendix in August, and the AgWG can approve it.
    - Angstadt: If we as a workgroup take no action on this today, does that stop the policy group and the modeling team?
    - Dubin: It doesn't stop the process; those are separate actions to the AgWG. If we don't take an action today, it probably would weaken our position with the MB with the policy, because the MB has to bring opinions about their role in the process. Some of the members feel that it's not in their domain to be addressing these questions, and others feel it is. So there's going to be discussion how the MB plays a role in NM types of policy decisions; that will happen first. Whatever results from that will inform this.
    - Angstadt: When we start talking about trading, is it a partnership issue or an individual state issue? Those are similar discussions.
    - Ann Swanson: I don't necessarily agree with Mark's characterization. I would say that it does weaken your position. Because if you don't have an opinion, then someone can ride right over you.
- Ed Kee: I would ask that we consider the expert panel's recommendations, and sideline these policy and modeling workgroup issues. It's our job to make a recommendation on these issues and consider the merits of the TP and TN recommendations.
    - Jason Keppler: I would be in favor of approving it as well, but I would caution that it's too early for us to sunset the panel.
        - Group agreed that the panel would not be sunsetted until it has achieved WQGIT approval.

- Tim Sexton: This panel has done a very good job in assessing these reductions, and I make a motion to approve this report. Seconded by Steve Taglang and Ann Swanson.

DECISION: The AgWG moved to approve the Manure Treatment Technologies Panel Report recommendations for submission to the WTWG with the understanding that the policy group process and the Modeling Workgroup decision will clarify the panel's recommendations in the context of the overall Phase 6 Modeling Suite and for water quality trading programs, but that the outcome of the policy group and the decision of the Modeling Workgroup do not change the panel's technical assessment of the total N and P that leaves the 'black box' and remains available for field application or transport in the modeling tools.

SB Beta 3 Calibration Inputs and Beta 3a and 3b Nutrient Spread Results M. Johnston, C. Dell

Matt Johnston, UMD-CBPO, and Curt Dell, AMS Chair, reviewed the Scenario Builder (SB) Tool inputs that will inform the Beta 3 calibration of the Phase 6 model, including the assumptions and results of the different nutrient spread approaches from the Beta 3a and 3b Scenario Builder. Detailed information on these results can be found on the Agriculture Workgroup webpage under the Projects & Resources tab, under the heading 'Phase 6 Scenario Builder Review'.

- Mark Dubin: I want us to remember that you have LGU recommendations, but some of the acres in a county may be non-NM, so they will have higher application rates. So you may need more fertilizer application to make up the LGU recommendation.
- Robin Pellicano: You said all counties have some fraction that needs to be filled by inorganic fertilizer? Does that mean there's no county with 100% of crop need supplied by manure?
  - Johnston: Not quite. It means that some of our crops can't receive manure; they absolutely have to receive fertilizer. So there will always be some fertilizer applied. We also have automatic inorganic fertilizer just before planting, which even happens in manure situations.
- Bill Angstadt: Are you still adding in a starter fertilizer assumption on top of AAPFCO sales? And on this issue of fertilizer sales on top of manure when there are non-manured acres that are forced to receive inorganic fertilizer even though there may be plenty of manure.
  - Johnston: It's not on top of the sales; it just tells us that there is inorganic need for corn. And the issue with non-manured acres is true in a lot of instances.
- Jason Keppler: Can you clarify if NM BMP was applied in this scenario of MD AIR data compared to plant-available applications?
  - Johnston: Yup – I can't remember the compliance (~70%), but all of these scenarios have NM in them. So for each acre, you get the LGU recommendation for N, but for P that's not the case. If we brought in NM for P, then all of the P-values should decrease.
  - Jason Keppler noted that the MD AIR data assumed 100% compliance, and may differ from the beta 3a(1) results, which factors in the reported 70% compliance rate.
- Concerns from the group on the P-application estimates, and how they may be unrealistic compared to what farmers are applying in the real-world.

- Ron Ohrel: The last two bullets – bringing applications closer – closer to what?
    - Johnston: If more manure N was available in a backfill approach, you would need less inorganic fertilizer.
- Alisha Mulkey: The modeling team collected soils data. Does it exist at the county level and could it help with this discussion?
    - Gary Shenk: We have some soils data for some counties for some years. In order to run the model, we need complete datasets everywhere for all time. In order to generate that, we're using the APLE model, which requires inputs. We need this input analysis run before we can get the soils data completed.
- Jim Cropper: I think you're seeing with fert sales that P is reduced in large part probably due to NM. So that is the end result; these other methods where you haven't accounted for NM are going to be at least 50% higher in P.
- Tim Sexton: If we're using fert sales, do we have the option to use something besides AAPFCO?
    - Johnston: I don't know what else exists at the moment.
    - Sexton: Could we use sales data from one of those other sources – NuGIS and others?
    - Johnston: There's a lot of concern over how NuGIS uses their data, and those other models actually rely on AAPFCO sales data as well, so that would be a bit circular. If we choose fertilizer sales, I think we've stepped beyond anyone else in the nation on how to use that data.
- Lindsay Thompson: First off – thank you for this presentation. To your last question – whether we would use 3a1 or 3a if we go with fertilizer sales. Would the 3a1 approach be a hybrid be a hybrid between 3a and 3b in that it incorporates LGU recommendations/updated application tables in order to determine crop need, rather than solely relying on commercial fertilizer from AAPFCO?
    - Johnston: Correct. The distribution to counties would remain the same.
    - Brosch: The 3a1 just puts more emphasis on underlying assumptions that we revise between beta 3a and 3b.
- Ted Tesler: I think the ag census soil amendments would potentially also include manure as an amendment.
    - Johnston: We don't think so; it's soil conditioners and amendments, lime, and fertilizer.
    - Sexton: Soil conditioners can be lime that didn't meet requirements, so you can sell it as conditioner.
    - Dubin: It's a commercial product as well, not a raw product.
- Jack Meisinger: On your backfill method, on the legumes, did you allow the legumes to fix their N like land grants recommend no fertilizer on it?
    - Johnston: We used the crop application goal table. So for soybeans, the CAG for N is ~5 lbs/acre, which could be met with inorganic fertilizer. But the soybeans will fix a lot more from the atmosphere.
    - Meisinger: Because the actual line in the table is 0 across the board.
    - Alisha Mulkey: For full-season we said 5-10 lbs, and for double-cropped, we said 0.

    - Dubin: The reason why that was put in there was because most of the fertilizer formulations of P will include some N as well. That's why there was some number put in for the full-season beans.
- Bill Angstadt: I have a couple of parking lot issues: 1) The STAC review of scenario builder and nutrient spread questions that they're doing based on beta 2. Is anything we're doing here on 3a or 3b going to impact that STAC review? 2) In the trend lines, the N over 30 years – the fertilizer sales have been fairly flat, but as you know, yields over 30 years have hardly remained flat. Acreage is a function there also, but my point is that we need to forecast for the calibration 2025 forecasts. This will be crucial for WIP 3s on how we meet our goals.
- Chris Brosch: I start seeing a reliable drop in P at around 2007. If I'm understanding the decision we're making – using sales data with that drop will force function available P to crops in the nutrient spread down from the green dotted line, more similar to the red-dotted line. As managing a nutrient mgmt. program, that drop in 2007 is pretty consistent with certain things. What I'm concerned about is that if we adopt a force function, logic of applying that smaller pot of P is going to occur after the manure has been spread. So where we have put manure down at an N rate on our commodity crops, we've already done the damage of applying too much P.
    - Gary Shenk: That is correct with the ag land use loading rates subcommittee; they said that for P, the difference in runoff and application rate drive the big differences between crops and application rates. I think it's somewhat mitigated by the bucket-filling effect. Phase 5 was 3b, and that creates something that's very stable in terms of loads, but using sales creates unsteadiness but there's the benefit that we actually are seeing this drop in P fertilizer.
    - Matt Johnston suggested going with fertilizer sales and modifying the approach to the bucket-filling in order to mitigate the fluctuations in applications.

CB Watershed Model Beta Versions Gary Shenk

Gary Shenk, USGS-CBPO, reviewed the Chesapeake Bay Watershed Model (CBWM) Beta 2 and Beta 3 versions, with a particular emphasis on land use loading rates, soil P balances, atmospheric deposition, and the processes within the model that can alter the loading rates through conservation practices. Gary also led an open discussion with the AgWG on questions related to the Beta versions of the Phase 6 Watershed Model and Scenario Builder suite of tools.

- Bill Angstadt: The export rate ratio has come to us several times, but where did you come up with the actual export rate pounds?
    - Shenk: The rates are calculated from the data. And it's been raised that these loads are higher than expected, and we agree. Those loading rates were in beta 2, so we went back and from the MWG perspective we looked at the entire calculation. We decided that the size of the metaphorical pie (total amount of non-point source) was the issue here. And it turned out that the riverine transport assumed in beta 2 was likely too high.
- Tim Sexton: What's the difference between specialty crop high and low?

    - Brosch: The amplitude of the inputs. Low specialty crops would have a threshold of 100 lbs N/acre or less. Like orchards or grapes.
- Bill Angstadt: So you're showing us results from Beta 3 with no practices. So as we look at what we can achieve as E3 reductions, we'll then start to define how far we are or how far we have to go yet.
    - Swanson: And how far the max number of BMPs we know to apply would take us.
- Tim Sexton: Once this dataset is done for atmospheric deposition, and we look at some BMPs like composting that has ammonia emissions or something, and we worry about those emissions being redeposited. That's already accounted for in this model from a regional standpoint, correct?
    - Shenk: In as much as any BMPs in the past are reflected in the concentration data, then this regression model takes anything in the watershed into account. CMAQ takes into account expected future emissions data, but I'm fairly certain that they're not really counting on these agricultural practice changes. The idea is that with the composting and also with the restriction of volatilization from covered legumes, that's going to the MWG next month.
- Bill Angstadt: Since 2010, particularly in PA for these land uses, there's been dramatic decrease of soil test P. What does a decline in soil test P mean to the model?
    - Shenk: I don't think there's anyone who studies soil P and thinks it's possible to have drastic changes, so we need to model it that way – by slowly drawing it down. This is better than the alternative, which is runoff.
    - Angstadt: There's another dataset by the NuGIS/IPNI folks. Their declining trends are not as severe because they have a larger dataset.
    - Shenk: We have to be careful of what the datasets show.
- Bill Angstadt: You said that fertilizer and manure inputs are insensitive relative to soil P history. So what does that mean for us in terms of SB? Are the Mehlich sensitivities going to over-ride anything we're doing?
    - Shenk: We're not using the fertilizer/manure/uptake sensitivities in that part of the model, but we are using them as inputs to the APLE model to create the soil P history.
    - Angstadt: So when we review the EOS loads from SB, this upward or downward trend in APLE would either increase or decrease those loads as we move through the model?
    - Shenk: That's correct. The load that's expected in every scenario is dependent upon that year's soil. As the application history changes, the soil history and load history changes too.
- Angstadt: When you do these sensitivities on fertilizer based on 5.3.2, will you have to use the SB fertilizer approach to do new inputs for Phase 6?
    - Shenk: No because that was a calibrated model to the loads it had. If we fed it different loads, we wouldn't get better answers because it's no longer calibrated.
    - Angstadt: When we have the backfill in 5.3.2, we had sensitivity because the more fertilizer the more load. Now that we may not backfill, that would change the sensitivity to the load. SPARROW is the same way.

- Shenk: But there isn't a change in magnitude, it's a change in trend. For P, we're using Phase 6 inputs in APLE. So this is just about N. The loads change because of BMPs and sensitivities and other things, and we're working in all of those areas. Just because we use 5.3.2 inputs as one measure to calculate a sensitivity, doesn't mean we're going to get the same everything out. We're changing everything, and using those 5.3.2 sensitivities as the global averages, but their modified by everything downstream.
- Sexton: He's discussing the raw data, and this has nothing to do with what we discuss with the BMPs on the outputs side of the model. This would change the coefficient on the raw data in the land use.

- Ted Tesler: Are other changes in manure handling and nutrients incorporated into Phase 6 yet?
  - Johnston: Yes – there are changes in amount generated and deposited in the barnyard compared to pasture, in the amount that's lost in the barnyard, and the loss factor is something the AWMS is supposed to give us.

PA Agricultural Remote Sensing Pilot Project for the Potomac River Basin D. Coleman; et al

Pennsylvania State Conservationist Denise Coleman, USDA Natural Resources Conservation Service, along with project representatives, provided a presentation on the recently completed remote sensing pilot project conducted in selected counties in the Potomac River Basin of Pennsylvania. The project employed a team of NRCS staff and contractors to identify and verify agricultural conservation practices that have been implemented on agricultural operations over a period of time using a series of remote sensing imagery. Practices identified by the project were cross-referenced with documented USDA practices implemented under federal financial incentive programs to avoid double counting. The NRCS project was partially financed through Chesapeake Bay Program Grant funds from the PA Department of Environmental Protection.

- Matt Johnston: Did you find any ways to streamline it more?
  - NRCS: We didn't go down that route, but someone has to identify it as the grass waterway. NASS is currently exploring that opportunity with different types of covers, and different resolutions.
- Jason Keppler: Were your interpreters able to determine whether the practices met an NRCS standard?
  - NRCS: That was not part of the scope of the project, so that was not involved in our work.
  - Keppler: Were you able to determine what kind of land use conversion took place?
  - NRCS: That information was only available when an interpreter could definitively make a conclusion as to what the land use was prior.
- Jason Keppler: You mentioned that you tried to avoid double counting of projects through toolkit and things that were never reported. Is there a process to avoid that double counting?
  - NRCS: We gave our data collectors our toolkit data, so that's how they answered whether there was a conservation plan, etc. We would assume the plan was already accounted for if the farm did have a conservation plan.

- Kristen Saacke Blunk: Could you pick out secondary characteristics of a practice? Like erosion areas near a barn with gutters?
    - NRCS: That is possible, but certainly not appropriate in all instances.
- Ann Swanson: I know that over time, the more you get used to reading the imagery and then field testing it, the better you get at it. Some of the charts show that 85% of the riparian buffers were undetected in the model, or 73% of the BMPs. I can't help but wonder what that means to our effort. If you were to extrapolate out and put it in the model, we'd be in compliance and have clean water. And if there really are all those practices out there, then are all our efficiencies over-estimating?
    - NRCS: There's no question by the error rate that those practices are in the watershed. How do you extrapolate that is another issue entirely? As we've been proofing this concept, we've had some pointed questions – can this be done as efficiently in Lancaster Cty? And we want to know what the model has taken into account already. Some of these practices could be legacy or voluntary.
    - Gary Shenk: The model estimates how many core practices from the mid-90's to meet water quality standards. If these things were in place in the mid-90's, it doesn't change anything. If they were implemented in the 2000s, then your point has some traction. For forest buffers, they were probably there for a long time.
- Swanson: How do you use this remote sensing to then apply it to the time element?
- Jeff Hill: So you found a lot of BMPs and we know they may not meet NRCS standards. I wonder what standards they would have to meet to get into the model?
    - Karl Brown: That's why this is proof of concept. We can pick up dates through multiple years of imagery. As you do a sample, you can begin asking some of those questions that may not have been in the scope of this project, about how to evaluate the practices as to whether they meet an RI standard or not.
- Bill Angstadt: Remember that we're trying to get practices in place by 2025 to eventually achieve water quality. The real challenge is figuring out how to extrapolate this data into NEIEN.

Adjourn Day 1

Thursday, July 21 9:00 AM – 3:10 PM

Welcome, introductions, review meeting minutes Workgroup Co-Chairs

Cropland Irrigation Panel Membership M. Dubin

Mark Dubin reviewed the comments received from the partnership on the AgWG recommended membership of the Cropland Irrigation BMP Panel. The partnership review comment period closed on Friday July 8, and no comments were received that would necessitate a change to the AgWG's prior decision to approve the draft membership.

- The AgWG approved of the panel membership.

Cover Crops BMP Expert Panel Preliminary Report K. Staver

Ken Staver, Panel Chair, provided updates on the panel's work, and presented the revised Cover Crops BMP Panel preliminary report for AgWG approval.

- Marilyn Hershey: On the MD state totals, does the green only represent haylage, or does it include other crops like triticale?
    - Ken Staver: I was told that the winter cereals that are harvested are picked up in the NASS ag census data in the haylage other than alfalfa category. It could include some other haylage other than a winter cereal haylage.
- Motion from Tim Sexton and Ted Tesler to approve the report.

DECISION: The AgWG reached consensus to approve the Cover Crops BMP Expert Panel's preliminary report.

Update on Effort to Represent Double Cropping in Phase 6 Model M. Johnston, S. Golt

Matt Johnston, UMD-CBPO, and Skyler Golt, UMD, updated the AgWG on the development of a possible new approach to representing double cropping systems with improved methods for the Phase 6 model. The new approach utilizes common cropping systems information from the states coupled with USDA-NASS cropland data imagery and 5-year Agriculture Census data.

- Ed Kee: I would suggest that fall fertilization of wheat or barley should go exclusively into the second year, because there's a fair amount of small grains that don't receive any N in the fall.
    - Jason Keppler: In MD, we don't have a fall application of N unless a FSNT indicates it needs one.
- Dubin: Also consider Ken's presentation on cover crops and how BMPs may apply to this, so that applications can still fall in the right timing in the model.
- Bill Angstadt: In the past couple of years in PA, we have a new cropping pattern. Farmers want to grow full season corn and soybeans, so no small grains. But dairy farmers want land, so they're doing seasonal rentals. After the corn is harvested, they rent the land to grow small grains. Is that land practice considered in here as a double crop?
    - Matt Johnston: This is actually what we found between the current method and the proposed method. The current method captures traditional rotation, but if you bring in the hay/forage/small grain-hay phenomenon, you increase the amount of double cropping.
- Tim Sexton: Two things: according to Wade, about 95% of the time small grain doesn't benefit from a fall application. Secondly, a recent paper confirms that the organic fraction of manure applied in fall mineralizes in the winter months. So whatever you do in the fall, it's actually going to that spring application anyway, so I concur with Ed as to where it should go.
- Jason Keppler: I'm trying to figure out how commodity cover crops would fit into this, and the mechanics of how you would apply fall N back to the previous corn crop. Would the model

assume more N is going on corn than what the recommendation is, or would you modify the application rate?

  - Johnston: We would take all of the crops that overwinter, and we would ask for the version of the crop that does and does not overwinter. What do applications look like by themselves and on this rotation during the winter? Every state could tell us what their applications are. But the land uses are also important for cover and soil runoff. This process would allow us to get small grains down on your corn land use in the fall so it's not fallow in the winter – this would decrease runoff from the corn land use in the model.
  - Ken Staver: Any time you stick closer to what's actually happening in reality, you don't trap yourself in a weird situation later down the road. I also think that putting fall N on based on state input makes it easy to mesh with the commodity cover crops practice.

- Alisha Mulkey: I feel like the AMS has already answered this question and we've already given you this information. So why isn't that input able to be reflected? If you start blending these land uses, it starts making it difficult to look at the data and cross-check it with AIR data.
- Chris Brosch: This is starting to look a lot like commodity cover crops. If you're attempting to build this in as a base condition, you're undermining the ability of the BMP to count the efficiency.
  - Johnston: We're just talking about moving the fall application; the BMP efficiency can still be developed.
- Kee: It seems to me like you're getting a lot of suggestions to put everything into one year.
- Tim Sexton: It's kind of a mis-representation to believe all of our small grains are followed by soybeans. There are some double cropped soybeans behind small grain, but when they're harvested a lot of the cropland is fallow. So whatever year it is in the rotation is how it should be represented.
- Dubin: Matt will be coming back to us later with a more polished version with this.
- Chris Brosch requested that the AMS get to consider this approach during their upcoming meetings.

Chesapeake Bay Commercial Swine and Turkey Production Pilot Projects T. Sexton, M. Dubin

Tim Sexton, VA Department of Conservation and Recreation, and Mark Dubin provided a detailed update of the ongoing Penn State and Virginia Tech pilot projects to collect and develop commercial production and nutrient generation data for swine and turkeys with Pennsylvania and Virginia, and potentially adjoining states. The projects are using a methodology based on the Poultry Litter Subcommittee approved recommendation report for Broilers. The resulting project information and methodologies will be incorporated into a formal recommendation report for review and recommendation by the AgWG for inclusion in the Phase 6.0 modeling tools to more accurately represent annual nutrient generation from commercial swine and turkey operations across the Bay jurisdictions.

- Paul Bredwell: I thought I heard you say the integrators weren't cooperating, but they are. Cargill said they have forward confidentiality to bring it to Mark.
    - Dubin: We haven't gotten any information yet, except from their paralegal. But we are working with them, and we're working on cooperative agreements with other companies as well.
- Ted Tesler: Is the intent to replace the NASS county data, or is it a way to correlate that data going forward?
    - Sexton: It could do two things – to say the ag census has relevance, or to say the NASS data has it. In a particular area, you may not show up but the purpose of this is to say yes – it's a very close comparison, or the trend line is such that it's worth our while to collect this data and we will not use NASS or the ag census in the future. Or something along those lines.
    - Dubin: And in order to go back to 1985, we'll have to continue using the ag census. But we can create a new relationship between these data. But if we don't have cooperation from all of the integrators, we'll have to go back to using NASS.
    - Rich Batiuk: We've been working on this for a while now, too. So I challenge the AgWG to look down the road to work with our agribusiness and integrators.

Discussion of Phase 6 Model Schedule Workgroup Chair et al.

The AgWG discussed the upcoming decisions and deadlines for completing the Phase 6 Chesapeake Bay Watershed Model suite of tools. Additional information can be found in the AgWG 2016 Rolling Timeline, available on the AgWG website under the Projects and Resources Tab.

- The AgWG is planning to release the reports of its BMP panels soon, and will hold a partnership-wide 30-day comment and review period. The reports need to be approved by the partnership by September 30th in order to be included in the final Phase 6 model.
- Bill Angstadt: The rolling timeline says today starts the 30-day comment period for the AMS.
    - Johnston: That is kind of a misnomer, because we have the documentation for each one of our beta versions. The documentation is currently posted for beta version 2, and in the last month the MWG said it is an on-going review period.
    - Angstadt: WQGIT suggested the AMS have a June 1st finished product. So I want to know when we are going to have a finished product of scenario builder, or at least nutrient mass balance so we can look at how it connects with other elements.
    - Johnston: We will continually make incremental improvements, and will continue to do so until you tell us to stop.
    - Angstadt: The calibration is going to be done and WIP IIIs are going to be done based on this final product that we want to see.
    - Sexton: We will begin work on the WIP IIIs in November and they'll be due next spring.
- Batiuk: I think we're going for enough stability by September-October so that you guys will feel comfortable, and there may be some panels that don't get in there. We've been talking to James and Teresa from the WQGIT to plan this out. But beta 3 is not locked down; if there are issues,

we know what we've agreed to the decision rules, but we can make county-specific changes and other changes.

  - Angstadt: I'm talking about nutrient mass balance in SB, not BMPs. But Rich, you've been involved in setting up the charge for STAC's SB science review. They're supposed to have questions written, and releasing a final report in August. So why are we doing a science review of something that no-one in this room thinks is done yet?
  - Batiuk: My sense is that there are some decisions that haven't been made yet, but the report will come back to this group. And we could talk to STAC about going back to review particular elements that have been changed; that way it's a little bit iterative.
  - Dubin: There was some discussion of whether STAC found something significant, if they would have enough time to make adjustments.

- Johnston: In the current nutrient spread, manure incorporation is assumed as no incorporation. So some of these decisions rely on the BMP panels. We've provided what the panel needs at this point.
  - Angstadt: But how are you going to track and verify some of these things? Would it be better to build in a more realistic volatilization number into SB to begin with in order to account for that?
  - Kee: Right – and in DE, we can't do that. But how many panel reports do we have to deal with and approve, assuming they can get in before the Phase 6 deadline?
  - Dubin: About 6 at this time. Some other panels will not finish before the September 30th deadline.
- Ed Kee noted that if panel reports are late within a few days of the September 30 deadline, then there should be some leeway on the part of the modeling team to get the reports included in the Phase 6 model.
- Lindsay Thompson suggested getting comments on the documentation of Scenario Builder to the AMS started. She requested the AMS give an update on this review to the AgWG in August or September. Also noted the various different items in the current version of beta 3 that may need to be changed.
- Mark Dubin noted that the AgWG meeting schedule may need to shift over the next few months.
- Mark and Ed suggested the AgWG concentrate on model input data, E3, and BMP panel reports during the August and September meetings. Also teed up the idea of the having 2 meetings in September in order to get panel reports approved.
- Group agreed to require updates from all AgWG panels during the August 24 meeting, beginning at 9 AM in Annapolis.

DECISION: The AgWG agreed to hold their upcoming meetings on Wednesday, August 24th, Wednesday, September 7th, and Thursday September 22nd. By Thursday, September 22nd, the AgWG expects to have the 5 priority panel reports to approve for inclusion in the Phase 6 model. The September 15th meeting date will be held tentatively in case a conference call is needed.

ACTION: The AgWG should provide comments to the AMS on the Beta 3 documentation in advance of Friday August 19th to prepare for the AgWG August meeting. Comments should be sent to Matt Johnston (mjohnston@chesapeakebay.net) and Lindsey Gordon (Gordon.lindsey@epa.gov).

AgWG Recommendation on Methods for Representing Nutrient Spread in Phase 6 Scenario Builder

M. Johnston

Matt Johnston, UMD-CBPO, briefly reviewed and answer remaining questions on the Scenario Builder (SB) Tool inputs and results of the Beta 3a and 3b nutrient spread approaches for Scenario Builder. Detailed information on these results can be found on the Agriculture Workgroup webpage under the Projects & Resources tab, under the heading 'Phase 6 Scenario Builder Review'.

- Lindsay Thompson: What's the motivation for developing 3a(1)?
    - Johnston: So 3b is really all about crop goal from the LGU, and we wanted to see if we could bring that in if the group decided to use fertilizer sales. We brought it up at the webinar and the AMS so people could chew on it.
- Johnston: From a calibrated model, for a 30-year period, it probably doesn't matter what you pick for N because they're different but there really is no trend. For P, it might.
- Jim Cropper suggested using the P trend in the way it's presented on slide 17 from Matt's presentation. He suggested trying to change it from a straight-line function to some type of binomial.
    - Johnston: The colored bars are the actual pounds, and the lines are just showing if there's a trend or not.
- Lindsay Thompson: The fertilizer sales data is something we've been working on for 2-3 years at this point. It seems like up until recently when we saw the changes, AgWG had approve to move forward with using fertilizer sales. Then, there was some potential concern about the difference between the LGU and fertilizer sales data. My question si for those concerned about not using LGU recommendations in the 3a, does 3a(1) ease those concerns in any way?
    - Brosch: The biggest concern of mine with 3a, both versions, would be that crop need is driving how much fertilizer gets put down on a county from the watershed pool. Because the nature of the sales data includes non-nutrient items, I agree that 3a(1) is a better approach for distributing those sales. There's just extraneous data influencing 3a.
    - Coale: And it puts additional weight on those recommendations or requirements, and less weight on NASS data and economic data.
- Motion put forward to accept Beta 3a(1) as the method to represent nutrient spread by Tim Sexton and Jason Keppler.
- Jim Cropper: The only problem I have is with P, since you may not need any P if you've done a soil P test, and this method wouldn't drive down the P in any counties.
    - Thompson: But in this approach, we still have that finite bucket of commercial P available, after manure has been applied. This finite bucket will be applied up to the LGU recommendations.

- Bill Angstadt: Fertilizer sales watershed-wide needs to be smoothed.
    - Johnston: Take the total need from corn w/o manure and corn that received manure but still has crop need, and add those up – that's the counties inorganic need.
    - Cropper: But if they're transporting manure around the county, how do we know that some corn acres that supposedly aren't supported to receive manure actually are?
- Jack Meisinger: I think it's a bit premature to be there yet until we hear from the nutrient management panel.
    - Kee: That may be true, but we need to make a decision now or it goes to the WQGIT.
    - Thompson: The nutrient spread decision will obviously impact a lot of BMPs, however thi sis a model-data input, big-picture issue, and we need to make this decision based on the best available data, and the method that is the most defensible.
    - Angstadt: So 3a(1) becomes the baseline to put our BMPs against.
    - Sexton: Then it would need to be the NMP, CCP, and AMS would all work within this space. And Jack – there's a lot that I won't be able to see until we see a full model run with BMPs plugged into it. If we don't set these parameters and then let the efficiencies of the BMPs get stacked into it, then we will have this fatal flaw period to try and fix what's wrong. If we don't do this, it shortens the time frame that we get to review this.

DECISION: The AgWG reached consensus on making a formal recommendation to use the Beta 3a(1) approach to representing nutrient spread for N and P in the Beta 4 version of the Phase 6 model.

Nutrient Management Panel Recommendations Update F. Coale

Frank Coale, UMD, briefly reviewed the panel recommended structure for representing Nutrient Management in the upcoming Phase 6 modeling tools, and update the AgWG on the progress made by the Nutrient Management Panel in developing recommendations for the draft-final panel report.

- Chris Brosch: So what does non-NM for P look like?
- Karl Brown: Are the modifications on the supplemental menu cumulative, or a single adjustment rate?
    - Coale: Our stance is that you can get 1 credit for rate, placement, and timing if there are different practices that resulted in each change. We're still considering whether to credit doing more than 1 practice per category.
- Tim Sexton: In order to get credit for the supplemental section, you have to first meet the core requirements. Once we get past that, if we follow PSNT recommendations, and someone adjusted their rate, then I would report that in addition to the core requirement on top.
    - Coale: Correct.
- Jason Keppler: I see you're considering sub-surface injection/incorporation, but we have another panel that's also considering that.
    - Coale: That's right. This would be the same question the MIIP is considering, but with inorganic fertilizer since they are not considering that piece.

- Matt Johnston: So states have reported core nutrient management up until this time, which is just acres of written plans. Does this say the states will have a different definition so they can collect a subset of p?
    - Coale: Most likely, you'll probably need a new definition and reporting.
- Karl Brown: Are the N and P independent in this BMP?
    - Coale: Yes – you can have an acre that got credit for P and not for N.
- Bobby Long: The P-Index contains recommendations developed by LGUs, so are you considering LGU recommendations in this?
    - Coale: There are situation where you have a soil test P level that advises against adding P. But if you go through the process and find an assessment that recommends you add P, then you can go ahead and do that.
- Matt Johnston: Can the P efficiencies be stacked? IE – can a single acre be under more than one of those?
    - Coale: Yes. But we haven't figured out how the math works yet – whether it's cumulative or what.
- Sexton: And these are going to be edge of field?
    - Coale: Yes.
- Question from Chris Brosch on how these values will be incorporated into the model. Whether there will be a separate application table for Non-NM acres.
    - Johnston: Row A, B, F, and G are already in all of our beta versions. There's the LGU rec for every acre of grain with manure. If a state reported that acre under NM, it received 1.0 times the LGU rec. If it wasn't under NM, it received the non-NM efficiency times the LGU recommendation.
- Request from Tim Sexton for informational documents to help explain the structure of the recommendations.
- Ed Kee put out a request for increased transparency from the modeling team on all matters after October.
- Round robin of jurisdiction's opinions on the panel recommendations at this point:
    - Virginia: Based on our previous experience with communicating nutrient management to our constituents, we realized that after all was said and done, it was not as difficult as we had previously thought. We agree that the concept is a do-able feature, and we'd be glad to help any other states discuss how we got the ball rolling.
    - Maryland: We're comfortable with the approach. We share concerns of verification and working backward on historical data, but we have a strong NM program and have adjusted annual reports accordingly, so we can do the same to educate our farming community and incorporate any changes in our verification process.
    - West Virginia: We have serious concerns in the voluntary nature of our program, and are not very comfortable with this approach. We're heading down a path to 0 credit for NM.
    - Delaware: The logic is something we agree with. We're not 100% on board with the efficiencies, but at the end of the day, when we're trying to implement verification of

BMP, having the governor of fertilizer sales adds some security. The utility of annual reports may not be going up, and there's two sides to that as well.

- Pennsylvania: To penalize an acre simply because it doesn't have a plan is something we'll have to wrestle with on the non-livestock side of the equation. We may have to develop a program to collect this manure management data in order to be able to report this.
- New York: We'll see how this works and looks on a per acre basis using Tableau. Our challenge will be reaching out to those farms that aren't doing the C and D level nutrient management, but may be doing core practices and us getting them captured for load reduction credit.

ACTION: The NMP will work on developing explanatory materials that may be used to help communicate the panel recommendations to stakeholders.

01:30 **PA Agricultural Remote Sensing Pilot Project for the Potomac River Basin** S. Taglang, T. Tesler

Steve Taglang and Ted Tesler, PA Department of Environmental Protection, briefly reviewed the outcomes of the recently completed remote sensing pilot project conducted in selected counties in the Potomac River Basin of Pennsylvania. The project employed a team of NRCS staff and contractors to identify and verify agricultural conservation practices that have been implemented on agricultural operations over a period of time using a series of remote sensing imagery. Pennsylvania will be recommending the inclusion of this methodology and verification process in the partnership's BMP Verification Guidance documents.

- Tim Sexton: I am very supportive of remote sensing, but I think what you're trying to get is at least some placeholder into the inputs side of the bay model, and I support that as well. I have a problem with 5% of initial verification.
  - Tim Sexton: My motion would be that you take what you've learned from NRCS, and determine what of the BMPs you have good enough data for, statistically speaking, to be able to use as an input to the Bay Model in September. Based upon that, you would report back to the AgWG in the September meeting with what you've learned, and tell us what you learned that didn't work out so well.
  - Jason Keppler: I support Tim's recommendation that it comes back before the AgWG for final approval. I have concerns about NRCS practices being reported without on-the-ground verification.
  - PA DEP: these would be reported as RI practices instead.
  - Keppler: Well then there need to be modifications put forward through the RI process as well.
- Marel King: They didn't go through that RI process, and I heard that they didn't even go through the process of matching these up with the Bay Program definitions. So all of that would still have to be done.

    - PA DEP: They couldn't sign off on them, but they registered them as meeting those standards based on their own determinations.
    - Karl Brown: For NRCS to look in this methodology for practices that they knew they couldn't determine were NRCS practices, is a huge leap in PA. We were asked to test the methodology, and I think the proof of concept works. Of course there are still issues, but overall it's a huge leap forward.
- Matt Johnston noted that there was still flexibility if the September 30 deadline was not met.
- Motion from Tim Sexton and Rich Batiuk: The AgWG agreed to move forward with PA Agricultural Remote Sensing Pilot Project's data collected for the Potomac River Basin. EPA will provide statistical support to examine the validity of the methodology and verification of a subset of the project data. EPA will also provide additional technical support to PA DEP to analyze data in terms of how it will be submitted for historical calibration in the Phase 6 model. The statistical workup and historical dataset will be presented back to the AgWG during the September meeting, where the AgWG will decide whether to approve the methodology for input into the model.

DECISION: The AgWG agreed to move forward with PA Agricultural Remote Sensing Pilot Project's data collected for the Potomac River Basin. EPA will provide statistical support to examine the validity of the methodology and verification of a subset of the project data. EPA will also provide additional technical support to PA DEP to analyze data in terms of how it will be submitted for historical calibration in the Phase 6 model. The statistical workup and historical dataset will be presented back to the AgWG during the September meeting, where the AgWG will decide whether to approve the methodology for input into the model.

Phase 6 E-3 Scenarios for Agriculture M. Dubin

Mark Dubin provided an overview of the planned development of new Phase 6 E-3 (Everything by Everyone Everywhere) scenarios in preparation for future planning targets such as the Phase 3 WIPs. Mark will be asking for volunteers to serve on a small ad hoc committee to review the Phase 6 E-3 scenarios in preparation for AgWG approval.

- Ted Tesler, Alisha Mulkey, and Bobby Long volunteered to serve on the ad hoc committee.

ACTION: Interested AgWG members should contact Lindsey Gordon (Gordon.lindsey@epa.gov) and Mark Dubin (mdubin@chesapeakebay.net) if they would like to volunteer to serve on the ad hoc committee to review the Phase 6 E3 scenarios in preparation for AgWG review and approval.

Adjourn Day 2

Next Meeting: Wednesday, August 24th Face-to-Face at Bay Program Offices in Annapolis, MD

Participants Day 1:

Name	Affiliation
Lindsey Gordon	CRC
Mark Dubin	UMD
Ed Kee	DDA
Lindsay Thompson	DE-MD Agribusiness Association
Bobby Long	VA DCR
Tim Sexton	VA DCR
Bill Angstadt	Angstadt Consulting
Bill Chain	CBF
Jeremy Hanson	VT
Matt Monroe	WV DEP
Dave Montali	WV DEP
Gary Shenk	USGS
Chris Brosch	DDA
Clint Gill	DDA
Jason Keppler	MDA
Alisha Mulkey	MDA
Rachel Rhodes	MDA
Robin Pellicano	MDE
Skyler Golt	UMD
Samantha Wood	UMD
Ann Swanson	CBC
Doug Hamilton	OK State
Matt Johnston	UMD
Frank Coale	UMD
Karl Brown	PA DEP
Ted Tesler	PA DEP
Steve Taglang	PA DEP
Kristen Wolf	PA DEP
Ron Ohrel	U.S. Poultry and Egg Association
Jeff Hill	Lancaster County Conservation District
Greg Albrecht	New York
Jim Cropper	Northeast Pasture Consortium
Jack Meisinger	USDA ARS
Olivia Devereux	Devereux Consulting
Marilyn Hershey	Ar Joy Farms, LLC
Kristen Saacke-Blunk	Headwaters, LLC

Participants Day 2:

Name	Affiliation
Lindsey Gordon	CRC
Mark Dubin	UMD

Lindsay Thompson	DE-MD Agribusiness Associates
Ed Kee	DDA
Kristen Saacke Blunk	Headwaters LLC
Tim Sexton	VA DCR
Bobby Long	VA DCR
Steve Taglang	PA DEP
Karl Brown	PA DEP
Ted Tesler	PA DEP
Jason Keppler	MDA
Alisha Mulkey	MDA
Rachel Rhodes	MDA
Robin Pellicano	MDE
Chris Brosch	DDA
Clint Gill	DDA
Matt Monroe	WV DEP
Dave Montali	WV DEP
Greg Albrecht	NYS
Matt Johnston	UMD
Skyler Golt	UMD
Samantha Wood	UMD
Frank Coale	UMD
Ken Staver	UMD
Bill Angstadt	Angstadt Consulting
Jeff Hill	Lancaster county Conservation District
Rich Batiuk	EPA
Jeff Sweeney	EPA
Marel King	CBC
Marilyn Hershey	Ar Joy Farms, LLC
Ron Ohrel	Mid-Atlantic Dairy Association
Paul Bredwell	U.S. Poultry and Egg Association
Bill Chain	CBF
Jim Cropper	Northeast Pasture Consortium
Jeremy Hanson	VT
Steve Dressing	Tetra Tech
Curt Dell	USDA
Jack Meisinger	USDA
Joe Montenegro	