MEETING MINUTES

Jan 13, 2021

10:00 AM-11:30 AM

Ad Hoc Group- CAST CONCERNS

**Participants:**

Loretta Collins, UMD

Clint Gill, DE

Jason Keppler, MDA

Cassandra Davis, NYSDEC

Emily Dekar, USC

Ted Tessler, PA DEP

Bill Angstadt, Angstadt Consulting

Brady Seeley, SCC

Kate Bresaw, PA DEP

Tim Sexton, VA

WV?

Ken Staver, UMD

Jeremy Hanson, VT

Mark Dubin, UMD

Olivia Devereux, Devereux Consulting (CAST Team)

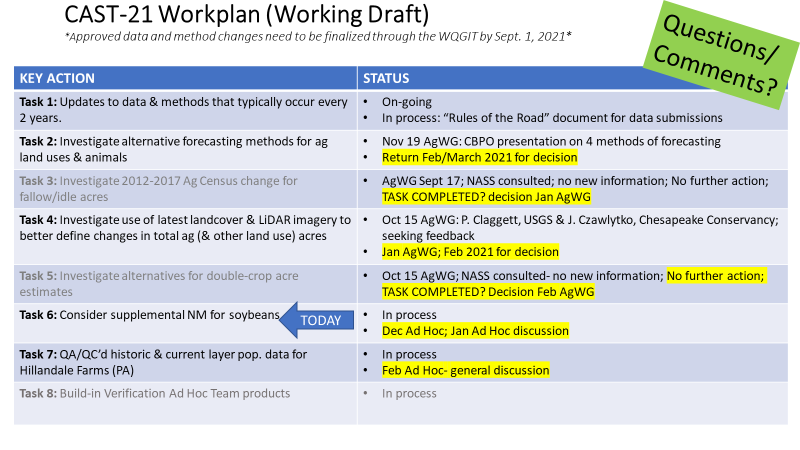
Jess Rigelman, J7 LLC (CAST Team)

**ACTION:** PA will work on gathering information to better understand what real-world soybean management looks like. Other jurisdictions are encouraged to do the same.

**ACTION:** Clarify with CBPO how the simulation of how N assumptions are handled in the model (e.g. reduction of N fixation in the model with applied N).

**ACTION:** Heavy Use Area Protection (Loafing Lot) retired from the list of concerns.

**CAST-21 Workplan Progress Updates**

****

**Task 6: Nutrient Management on Soybeans**

**Loretta Collins:** PA has clarified their request related to NM on soybeans since the December call to be an ask for supplemental NM on soybeans for N [placement and timing] is that correct?

**Ted Tesler:** The issue is the supplemental credits. That it is barred or not considered. Nutrient placement and timing will have an impact on nutrient loss to the environment.

**Loretta Collins:** For states, however you track and report NM, it will get credit. The issue is complicated. I think there is a rock and a hard place between NM as a BMP for water quality, versus how we apply credit in the model. Yesterday I sent you a summary of what I understand at this point as far as the rationale for the recommendations of the NM Expert Panel. The panel discussed NM on soybeans to reach the recommendations but did not explicitly explain in the written report how they came to the determination for full-season soybeans. There is a recommendation for supplemental, it’s a 0% effectiveness because the Panel did not consider N application on soybeans a form of NM.

**Ted Tesler**: Would soybean acres be enforced in scenario builder by backout? Is there a way to sort out soybean acres that the reported NM would not touch them?

**Olivia Devereux:** There are load sources in the model and the BMPs are applied to different load sources.

**Ted Tesler**: So NM would not be applied to those acres? In the data I get, I don’t know what acres the BMP is specifically applied to.

**Olivia D**: So you are talking about from Practice Keeper or your BMP data warehouse. You don’t know what land use the BMP is applied to. Then when you submit to NEIEN you would leave that field blank, there is a default that is filled in because you can only report what you know. NM core can go on soybeans.

**Jess Rigelman**: The default load source for that BMP group is either ag or crop/hay. Then it is going to get proportioned to any individual load sources under ag, so soybeans would get NM applied at whatever effectiveness exists for that load source. For supplemental NM on soybeans the N efficiency is zero.

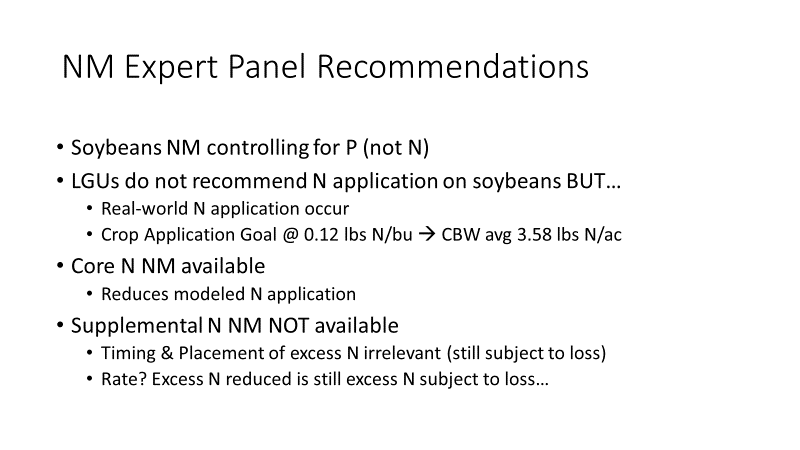
**Olivia D**: The NM BMPs for N and P are separate, but the states typically will report the same numbers for N and P implementation [presumably NM for both N and P reside in the same plan]. But that is irrelevant to which BMP can go on which land use.

**Loretta C**: I feel like right now we are having a tracking & reporting discussion. I am not familiar with how each state does tracking in their own house, but understand that each one has unique circumstances that inform the process that is used. The state figures out how to square what the partnership has approved for BMPs with how it is tracked and reported. What I hear from Ted is that PA is reporting NM plans, but not to specific land uses and the model sorts that out. PA is not reporting NM on corn vs soybeans, etc., correct?

**Ted T**: Yes. I just needed to understand that NM is distributed to soybean acres. The supplemental for timing and placement is zero for N and we are still interested in getting credit for that.

**Olivia D**: When you submit to NEIEN, the default is row crops and NM will be apportioned among them, based on how much of each [crop] you have.

**Loretta C**: There is a question about what the driving issue is as far as N load changes with CAST-19. Is it the ag loading rates, the ag census, or the lack of the N supplemental option for soybeans? I am trying to conceptually frame what we really need to understand as a group. [Review slide]



**Bill Angstadt**: For Olivia- In CAST 19 for full-season soybeans: 100% of N is applied 20 days before planting. If the N goes down with P (e.g., MAP or DAP) that would be done at 0 days in the row. There is a 20-day window there for a BMP. Whether that has agronomic effect or not for loss?- but it is a change in timing. As far as placement of N (manure or fertilizer) under the placement BMP- applications are made with setbacks from surface water features.

**Olivia D**: Since soybeans have the option of having N applied, whether that happens or not depends on the amount of N that is available to be applied- even if it is a tiny amount. How it is applied based on the 4Rs would be relevant.

**Bill A**: Back to the AgWG- some decision on application of N on full-season soybeans, edge of field loads-is it applied 20 days before planting vs at planting? And with placement, if there is appropriate setbacks for fertilizer or manure does that also have equivalent value to that same setback on other crops?

**Ted T**: Those are good points and I see a discontinuity between what the EP recommendation of no benefit vs the model which is saying there are nutrients applied. The model is giving us nutrient loads. It is assuming applied nutrients. And [we have] an EP report that is saying there is no benefit to the BMP.

**Loretta C**: So you are saying that whereas the model assumes timing is impacting loads, the EP is saying for N on soybeans there is really no benefit for timing. The model makes assumptions about timing that the EP doesn’t.

**Ted T**: Yes. We have a load that we cannot apply a BMP to. The idea that there is zero uptake is wrong. At least on placement, there should be some benefit for that. With the TMDL and the tracking and reporting of BMPs, we need to show that there is a benefit for doing this and I think realistically there is.

**Ken S**: The problem you have with the 5 lbs [N theoretically applied with MAP or DAP] is the reduction efficiencies were for the whole load. They are applied to the whole load for that crop. Setting manure aside- With fertilizer let’s assume you are applying 5 lbs of N to soybeans. The coefficients were designed to be applied to the whole load. I agree that it is always beneficial to have sub-surface application for water quality. But applying that coefficient to the whole load when we are really only talking about that 5 lbs of applied N is not appropriate. I think that is where it got dismissed [by the EP]. The core credit is that you did not apply any N. So than if you want the supplemental on [top of] Core NM (which assumes that N was not applied) that is a little bit of a problem. I don’t think it is bad science as much as things that don’t match up.

**Olivia D**: The 3 supplemental BMPs work as an efficiency of percent reduction on the total load, not just the 5 lbs applied to that crop. It is applied to the total load on that crop- Speaking from the modeling perspective.

**Mark D**: The EP felt the applied N was such a small attribute of the total N involved. You are not controlling the N fixation at all. So if you are looking at edge-of-stream, it was insignificant compared to the total load available of the fixation aspect.

**Loretta C**: The states are working to be sure that they are getting credit for everything that is being implemented. But for this issue, it seems what you are asking for is not going to be consequential to your bottom-line for load reduction goals.

**Mark D**: To Bill’s comments, there are multiple ways of applying N related to timing- management is nuanced.

**Loretta C:** We also need to consider the BMP protocol and Expert Panel process.

**Ken S**: One way of moving forward: Can the states try to get a baseline estimate of what is happening on soybeans? Dealing with the baseline instead of theoretical management systems…

**Ted T**: That is a great point.

**Mark D**: The first step is to get a handle on what is actually happening in the states. The Panel did not really have that information. It would be helpful to get that information.

**Loretta C**: The Crop Application Goal assumes that a small amount of N is being applied to soybeans and from a modeling perspective how does this work?

**Olivia D**: There are some counties where there is a great deal of manure to be applied. If you remove soybeans as an option of where to put it down that would increase N applications to other land uses. Mathematically as a distribution, having some availability to put N down [on soybeans] is important, regardless of the real world.

**Loretta C**: I would assume the counties of concern would be the high manure counties. My sense would be that in a high manure county, the benefit of supplemental BMPs may be lost in the wash.

**Jess R**: If there is manure or fertilizer applied to soybeans, it does reduce the amount of N fixed by the crop so in a way- it is not a 1:1- but it will impact N fixation. So adding manure or fertilizer is not necessarily a bad thing because in goes into the total overall N load calculation.

**Olivia D**: We found, especially in DE, that the increase in loads on soybeans is attributed primarily to N fixation.

**Loretta C:** I am not sure what the steps are at this point. The change in loads does come back to N fixation which seems more related to loading rates than the BMP. We need to follow a process to change an approved Expert Panel recommendation.

**Ted T**: I will point out that we have more soybeans every year and that even a little benefit can add up over many acres. I am of the mind that we should do a little bit more homework to see what is really happening on the ground.

**Ken Staver**: That [referring to Ted] with a deeper dig on how the soybean thing is being simulated. Both together would be a way to go forward.

**Loretta C**: So we need- 1. Better understanding what real-world management is within each state. 2. Clarify simulation of how N assumptions are handled in the model (e.g. reduction of N fixation in the model with applied N).

**Ted T**: #2 is an easier task than #1.

**Loretta C**: Everything in the model is reactionary. Nothing can be changed in isolation. Tweaking anything has unintended consequences.

**Mark D**: I worked with Jack Meisinger on N fixation suppression and that got into the model. Worked on it as an adjunct project, as well as the nutrient spread curves.

**Loretta C**: That is somewhat contrary to what I indicated in the summary I drafted. In part, that N application is not going to impact the biological activity related to N fixation, so adding N is not going to affect N fixation- it is excess N.

**Mark D**: We were looking at if from a non-NM perspective where you are applying much more N than is needed. It was more to represent that dynamic. Everything has to be hinged on a baseline that there is no NM. The other features (BMPs) are added on top of the baseline. We are talking about a relatively small amount. If you put down 1 lb of N it does not suppress 1 lb of N fixation.

**Ken S**: If it is not a lb for lb, than what is it? What is it in the model?

**Jeremy Hanson**: Hopefully it is in the model documentation. Section 3.6: N fixation. There is a citation in there from Meisinger.

**Ken S:** So we just have to figure out how that manifested itself in the model.

**Loretta C**: Generally, we can point to N fixation.

**Mark D**: This was an issue in cover crops as well, that release of N from stubble with lack of cover [crop].

**Ken S:** Plus it’s the only N BMP on soybeans, what else are you going to do? You can get that 5 lbs off, but that is it. It’s critical with so many acres and nothing to do.

**Mark D**: The only way to suppress N fixation is to add N, which does not help reduce N loads.

**Loretta C**: Full-season soybeans are a significant N load source via N fixation. There is what is being considered an uncontrollable load. Before we go about making a change to the EP recommendations, we have a couple steps along the way: One is clarify simulation of how N assumptions are handled in the model (e.g., reduction of N fixation in the model with applied N)- then we consider if there needs to be a change but that seems like something we would want to consider for the next phase of the watershed model. The better understanding what real-world management is within each state? Where do we go from here? The states need to help us with that.

**Ken S:** One of the questions is yield. Changing the ratios. Fixation is driven by yield. Where does yield come from? What is the yield differential between full season and double crop?

**Mark Dubin:** NASS provides county-level annual yields for full-season only.

**Ken S**: In the CAST runs I saw, full and double were different. In the north they would be more different than in the southern part of the watershed.

**Mark D:** The NASS yields have always been low.

**Loretta C:** That is bad from the standpoint of accurate data, but could if you are looking to reduce your modeled loads. Lower yields=less fixation.

**Ken S:** I take that back. Double crop and full season are identical in the counties I looked at.

**Loretta C:** Than how is the fixation affected if the yields are the same?

**Mark D**: The model would have the full season growing out in the field for longer.

**Loretta C**: So it is not the yield it is the time factor [impacting N fixation in the model].

**Mark D**: If the average yield is low, but the applications are based on a higher yield than you are making a higher application than what that yield is, that potentially creates its own source of [over application]. So if you have 125 bu corn and the manure/fertilizer is applying at a higher yield [e.g. 175 bu]

**Loretta C:** But then you are assuming that the fertilizer and manure are accurately accounted for. We could be over or under estimating those as well.

**Mark D**: That data is coming from different places.

**Loretta C:** My point is that there are margins of error in all these different inputs, so comparing one off of another is tricky. I see the ag loading rates as something that we need to take another look at. Having NM supplemental would be good, but with all the cogs in the machinery, I don’t know if it is worth it as far as load impacts [even if we can justify it]. Whenever we focus on one thing, we miss other things.

**Ken S:** But we have to keep moving forward. Manure distribution and fert sales and N fixation is all an issue- but we need to make a note of it to fix it. Anything that is good we should try to encourage. Let’s nail down what happens in the simulation process. It’s all mathematics.

**Loretta C**: So you are saying we should encourage the things that are good. NM is good. I don’t know what to do here with giving a credit to supplemental, as that would be changing an EP recommendation that was approved.

**Ken S:** The credit for N only came up because of the change in loads when the ratio changed from full and double crop. We need to be sure we are looking at the problem with that change. We need to nail down what is driving these changing loads. What is making it difficult to address these loads?

**Loretta C:** Does PA agree with engaging the two steps to getting some clarification on what is happening?

**Ted T:** I think we have a path forward. How are plans written? How are rotations handled? How is manure being applied? How that differs in different crop systems. How the model simulates and tries to bring that together with the real world. The TMDL is tracking out performance of metric and getting Core NMP and Supplemental NMP acres on the ground. We have counties that have doubled in poultry and soybeans acres. The challenge is to grow right. I think we can get there. I would not discount that we can get there for CAST-21.

ACTION: PA will work on gathering information to better understand what real-world soybean management looks like. Other jurisdictions are encouraged to do the same.

ACTION: Clarify with CBPO how the simulation of how N assumptions are handled in the model (e.g. reduction of N fixation in the model with applied N).

**Ag Input Issues: Status Updates**

**Winter Crop BMP**

* Charlie White will be discussing research at the AgWG in January.

**Dairy Precision Feeding**

* PA has a team working on it. Making progress. Get everything together by June. Collecting and analyzing data for a report back to the AgWG.

**Heavy Use Area Protection**

* NY has no concerns.
* PA indicated desire to be able to report NRCS practices directly to NEIEN, but has a work-around.

**RECOMMENDATION:** Heavy Use Area Protection (Loafing Lot) retired from the list of concerns.

**Fertilizer Sales Data**

* **Jason Keppler:** Still working with MD state chemist. They have a Microsoft Access database. The other states may be using the same system. Further updated to come.

**Review of Action Items**

**ACTION:** PA will work on gathering information to better understand what real-world soybean management looks like. Other jurisdictions are encouraged to do the same.

**ACTION:** Clarify with CBPO how the simulation of how N assumptions are handled in the model (e.g. reduction of N fixation in the model with applied N).

**ACTION:** Heavy Use Area Protection (Loafing Lot) retired from the list of concerns.

11:30 **Meeting Adjourned**