December 17, 2020
10:00 AM-12:00 PM
AgWG Meeting Minutes

Calendar Page Link:
https://www.chesapeakebay.net/what/event/agriculture_workgroup_conference_call_december_2020

This meeting is recorded for internal use to ensure the accuracy of the meeting minutes.

Workgroup Areas of Focus

Accounting & Reporting ● Implementation ● Innovation

Data & Modeling ● CBP Assignments

Summary of Actions and Decisions

Decision: The AgWG approved the November meeting minutes.
Action: Contact Ken Staver (kstaver@umd.edu) with further questions and comments regarding his discussion on the cover crop BMPs.

REMINDER: Interested parties are asked to send additional feedback/questions/requests regarding alternate methods of forecasting agricultural data to Sucharith Ravi (sravi@chesapeakebay.net). A decision on how to forecast ag data will be sought in early 2021. **CAST-21 Draft Workplan: Task 2**

REMINDER: (**Oct Action**) Interested parties please reach out to Peter Claggett (PClagget@chesapeakebay.net) and Jacob Czawlytko (jczawlytko@chesapeakeconservancy.org) with further feedback regarding mapping and forecasting ag acres. *Peter will be returning to the AgWG in early 2021 seeking a decision on the methods introduced on October 15*. Jake and Peter discussed changes to come in the way the CBP maps agricultural acres through use of high-resolution imagery with examples based on 14 prototype counties, as well as a new method for forecasting ag land to 2025. **CAST-21 Draft Workplan: Task 4**

Meeting Minutes

10:00 **Welcome, introductions, rollcall, review meeting minutes** Workgroup Chair

- Roll-call of the governance body
- Roll-call of the meeting participants- *Please enter name and affiliation under "Participants" or in "Chat" box.*
- Approval of meeting minutes from the Nov 17th Conference Call
    - **Decision:** AgWG November meeting minutes approved

Data & Modeling

Cover Crops Discussion (45 min) Ken Staver

Ken Staver, UMD, is a current at-large AgWG member and has contributed to all previous cover crop CBP panels, including serving as chair of the most recent CBP Phase 6 Cover Crop Expert Panel. He reviewed the definitions and rationale for effectiveness values assigned to the traditional and commodity cover crop BMPs and lead discussion on related issues of land use applicability and the possible approaches for the proposed "Winter Crop BMP" to address over-wintering forage crops receiving fall manure.

Questions/ Discussion:

Loretta Collins: Any follow up questions on commodity cover crop, I know a lot of folks struggle with it.
Kristen Hughes Evans [from chat]: Ken - thoughts on double cropping systems? E.g. dairies that are applying manure in fall and spring and growing a forage crop (triticale/rye) over the winter.

Ken Staver: I was sort of headed that way. Is it a cover crop if you harvest the forage? Obviously for dairy it is a cover crop. There are multiple issues. You need to define the baseline. If the cover crop was just harvesting something in the fall, then absolutely. If the baseline was something else from that. Whether you want to hand that the crux of the issue with N reduction is what you were doing and what you are doing now. I think someone was working on that at Penn State in the late 80s on how many cover crops you could get off of an acre while using manure. It's really about defining your baseline.
Amanda Barber [from chat]: So the baseline assumes an early planting date too then. What happens when CCC with 30 lbs N is applied late? Is there an added loss/penalty?

Ken Staver: If you plant late and apply manure and your option is not getting credit for applying a manure. You really want to withhold the manure application if it's going to be late and you won't get any uptake in the fall. I have some slides later that might help with this issue. In terms of losses, and you are trying to encourage a practice with the lowest N loses, you want early planting (maximizes uptake). Overall early planting is best for total N reduction. In terms of baseline, if it is planting N that's where you have the biggest change in losses.

Kristen Hughes Evans [from chat]: I think the baseline IS double cropping with fall manure application.

Mark Dubin [form chat]: Ken, if you didn't mention it earlier, the CC Panel added Triticale to the Commodity CC species list.

Amanda Barber [from chat]: Timing seems to be the critical factor. I understand the concept. And agree that the baseline is the key. Could we use a baseline that is the worst case and credit better scenarios?

Ken Staver: that issue has been kicking around forever. It's kind of like winning the biggest loser contest. Really what we want to do is to characterize things as accurate as possible. If the worst case is what is going on than by all means make some changes, but if it's not then you are writing something down and giving it, a credit and it doesn't make a difference.

Greg Albrecht [from chat]: Good discussion. I think we should play with the idea that the baseline is fall manure without cover crop. Some farmers (and it depends on the year, too) will terminate and plant corn silage earlier and others will wait a bit, harvest for forage, and plant a shorter season corn hybrid. I realize this scenario is perhaps more relevant in the northern reaches of the Watershed.

Tim Sexton: What about the Hessian fly?
Ken Staver: They aren't interested in it as much anymore
Tim Sexton: That has to do a lot with the dates that were established, and some states have not changed that.
Dave Graybill [from chat]: Is there a typical start date of the cover crops that is part of your baseline calculations. Noting differences throughout the watershed.

Ken Staver: Really for us the standard is after the Hessian fly date. Rye is really not a preferred host for Hessian fly, there are a lot of these sub issues involved.
Gurpal Toor [from chat]: Excellent talk and overview, Ken. No doubt that CC are good at using residual fall N in winter. But once CC are killed, N is released back in spring, when corn is just being established (with little N uptake needs). So looking at the whole crop rotation cycle with CC, N will be lost in spring vs. a rotation without CC where N will be lost in winter. Curious to hear your thoughts on it.
Ken Staver: we did the spring kill and tracked Nitrate in the spring. And this is why there is a push for delayed spring dates. Basically, we have opposite problem where N is low in the spring with low soil water nitrate. As long as the cereal is growing N is low. When the soil warms up and nitrification kicks in. The rye biomass is really slow release. If you are planting corn and not enough N, then you will have unhappy corn. It's not a tradeoff but it is a balancing act. Having N come out here than waiting. It's not just a seasonal trade off.
Greg Albrecht: I would like to think about this double cropping system in the dairy sphere. I think it's more characteristic to have a bare corn silage ground and apply it in the fall. And whether that's a traditional cover crop or a commodity crop we can sort that out. I am trying to discipline myself to not get tied into that. What is the N-loss difference between these two scenarios? After corn silage harvest compared to N-loss with saw manure with a cover crop that is harvested. Those two scenarios will often occur on the same farm in the same year or from year to year depending on spring conditions.
Ken Staver: If there is a lot of fall manure application if you can plant a cover crop with silage is all positive to me, how it shows up in the crediting system is a transactional thing we need to work out. If you are not applying additional N, the harvest option is overall preferable because then you are pulling the residue off and some phosphorous.

***Post**-Meeting Response to chat questions:*

AGWG members,
On the last work group call we had a long presentation and discussion about cover crops. Near the end of the second overtime a couple of chat questions came in that needed more time but felt like everyone had had more than enough for one session… here is an attempt to deal with them as briefly as possible given their complexity and importance.
From Gurpal Toor to Everyone:

"…No doubt that CC are good at using residual fall N in winter. But once CC are killed, N is released back in spring, when corn is just being established (with little N uptake needs). So looking at the whole crop rotation cycle with CC, N will be lost in spring vs. a rotation without CC where N will be lost in winter. Curious to hear your thoughts on it."

"Can you share the papers that show a mass balance of N in a rotation with and without CC? I have not seen much in peer-reviewed literature"

So the two basic questions are 1) does nitrate taken up in the fall by cover crops just get leached in the spring suggesting only timing of loss is being affected but not the annual loss, and 2) I think has to do with how cover crops affect N mass balance in rotations.

On question 1, no, N taken up in the fall is not released in the spring and lost before corn can take it up. The short term recycling of N from winter cereals back into plant available soil N is slow, and in most cases the greater concern rather than spring leaching losses is corn N deficiency because of cover crop scrubbing of all soil nitrate and high C:N ratios of cover crop residue that can immobilize mineralized soil N. This gets to be more of an issue with later kill dates. Checked with Jason Kepler at MDA and average cover crop kill dates are mid-April so really not all that far before corn uptake kicks in. Small amounts of ammonium (virtually no nitrate) do leach out cover crop residues after kill down but still need to be nitrified before being vulnerable to leaching. So even if you kill a cover crop early, cold temps will limit conversion to nitrate of any ammonium coming out of the cover crop residue. For the sake of argument, say nitrate taken up in the fall was all released when the cover crop was terminated. Without a cover crop, that nitrate was going to be exposed to 6 months of precipitation (20+") before any possible uptake by corn versus around 1 month of spring precipitation (~4") if it was all released on April 1 as you supposed. So even if your statement about release in the spring was correct, risk of leaching loss still would be reduced because of nitrate immobilization during the winter. Bottom line, bigger issue with winter cereal cover crop N is that it is not available early the next year to a corn crop so can't really put N cost savings, at least in the short term, in the cover crops benefit column. Too bad as that would help promote implementation. The uptick in soil nitrate in the spring kill date slide after cover crop termination is primarily from eliminating uptake capacity of mineralized soil N, not release from the cover crop residue.

On question 2 (I will try to be briefer), cover crop nitrate is so small relative to the total soil N pool that any effects are almost impossible to measure. If anyone wants to take a deep dive into crop-soil N budgets I suggest a publication from a former AGWG member and NM and cover crop panel member Jack Meisinger:

J.J. Meisinger and G.W. Randall, 1991. Estimating nitrogen budgets for soil-crop systems. In: (R.F. Follett, D.R. Keeney, and R.M. Cruse, eds.) Managing nitrogen for groundwater quality and farm profitability. Soil Science Society of America, Madison, WI. pp 85-124.

Here is a quote for why you don't see many direct measurement papers in today's fast paced publish or perish academic world:

"Directly estimating the changes in organic N storage is a formidable task because it requires repeated sampling of a constantly managed ecosystem over a long period."

Just a quick example to make the point:

-top foot of soil weighs about 4 million pounds/acre, soil C:N tends toward 10:1 mass basis

-@2% organic matter, contains 80,000 lb OM, 40,000 lb carbon and **4000** lb N/acre

-cover crop uptake of 20 lb nitrate-N environmentally significant and reduces annual losses ~ 50%

-raising soil OM from 2.0% to 2.1% takes net addition of 2000 lb C and **200** lb N/acre to top foot

-10 years of cover crop N and C (~25% into soil OM) additions raise soil OM from 2.0 to 2.1%, a change which generally cannot be measured directly at the field scale

Of course these numbers are general and will vary with soil type and whether or not manure is in the equation but they give some idea of the scale of the issue. Not as brief as I had hoped, but the bottom

line is that there is an ever growing body of direct measurement of reductions in inorganic N losses from crop systems using cover crops, much of the N seems to go into the slow release soil organic N pool, but the effect on the total soil N pool is minor and very difficult to measure. Tillage probably plays a bigger role than cover crops on soil N and C pools. I would not want to be the person responsible for directly verifying soil carbon sequestration credits.
I also have attached an old cover crop paper from work done here at Wye (maybe even qualifies as "dusty"). It has some long term groundwater nitrate data (an integrator of annual leaching losses), which verifies that in this particular setting and time frame N was not just temporarily stored in cover crops only to be lost in the spring. Some older papers are cited and plus there are countless newer papers showing similar results. There also is a section about spring management challenges related to N availability for the next crop.
Hope this helps clear things up a little and that everyone has a safe and happy holiday.

Ken Staver
Associate Research Scientist

CBP Assignments

Ag Data Concerns Review (30 min) Loretta Collins

The CAST concerns ad hoc group has been meeting monthly since September to discuss the draft "CAST-21 Workplan" items and additional concerns that were raised by the AgWG's jurisdictional membership. Loretta Collins, AgWG coordinator, provided an update on progress of both the Workplan and additional concerns solicited from the state jurisdictions over the summer.

Questions/ Discussion:

No questions/ comments at this time.

Nominations for 2021-2022 Term Chair

Time to answer any questions regarding the nomination and voting process for 6 At-Large positions open for the 2021-2022 term. Additionally, the vice- chair position is still open. Nominations are welcome to fulfill the remainder of the two-year term, ending in February 2022. The vice- chair is expected to rise the chair position for 2022-2023 term. **All nominations are due NO LATER than January 22nd.**

New Business & Announcements

- **2021 Innovative Nutrient and Sediment Reduction Grants Program**
  - The National Fish and Wildlife Foundation (NFWF), in partnership with the U.S. Environmental Protection Agency (EPA) and the federal-state Chesapeake Bay Program partnership, is now soliciting Letters of Interest for the 2021 Chesapeake Bay Innovative Nutrient and Sediment Reduction (INSR) Grants program. Click here for more info.
- **2021 All-Bay (All-Virtual) Agriculture Network Forum**
  - The watershed-wide forum brings together NGO, local, state, and federal ag conservation leaders and partners to share best practices, network together, discuss collaborative implementation strategies and opportunities for accelerating and scaling up nutrient and sediment load reductions.
  - Click here for more info and be kept informed.
- **Making Cover Crops Pay Webinar Series: Using Cover Crops to Improve Soil Fertility**

    - February 10, 2021 10:00 AM - 11:30 AM: This session hosted by Charlie White will review ways to determine nitrogen credits and cover recent research from across the state. Charlie will also discuss how non-legume cover crops cycle nutrients from previous crops and manure applications.
    - https://extension.psu.edu/making-cover-crops-pay
- **Non-Urban Stream Restoration** EPEG – In progress
- **Animal Mortality** Expert Panel Report – Finalizing report, webinar announcement early 2021.
- **Other Announcements? -** send to Loretta Collins (lcollins@chesapeakebay.net) for inclusion in "Recap" email
- **STAC sponsored event.** *Reach out to Kathy Boomer: kboomer@foundationfar.org for more info regarding our stakeholder engagement workshop, sponsored by STAC, TNC,WFF, and FFAR*

Review of Action and Decision Items

Decision: The AgWG approved the November meeting minutes.
Action: Contact Ken Staver (kstaver@umd.edu) with further questions and comments regarding his discussion on the cover crop BMPs.

11:55 **Adjourn**

Next Meeting:

Thursday, January 21st, 10AM-12PM: Conference Call

Call Participants
Loretta Collins, UMD
Gary Felton, UMD
Hilary Swartwood, CRC
Clint Gill, DDA
Elizabeth Hoffman, MDA
Bill Tharpe, MDA
Greg Albrecht, NYDEC
Amanda Barber, NYDEC
Frank Schneider, PA DEP
Barbie Elliott, WVCA
Ben Heckner, WVCA
Seth Mullins, VA DCR
Tim Sexton, VA DCR
Marel King, CBC
Ken Staver, UND
Matt Kowalski, CBF
David Graybill, PA FB, Dairy Operator
Paul Bredwell, U.S. Poultry & Egg Assoc
Jeremy Daubert, VT
Peter Hughes, Red Barn Consulting
Emily Dekar, USC
Gurpal Toor, UMD

Kathy Boomer, STAC/ FFAR
Kristen Hughes Evans, Sustainable Chesapeake/ NFWF Field Liason
Bill Angstadt, Mid Atlantic 4R
Katie Walker, Chesapeake Conservancy
Ted Tesler, PA DEP
Ruth Cassilly, UMD
Mark Dubin, UMD
Elliott Kellner, WVU
Patrick Thompson, EnergyWorks Group
Jeremy Hanson, VT
Karl Blankenship, Bay Journal