

NRCS 590 Nutrient Management Standard Team

MEETING NOTES

Thursday, November 30, 2023 ▲ 9:00am – 2:30pm ▲

Columbia Co. Administration Building, 112 East Edgewater Street, Portage, WI 53901 ▲ Rooms 113/114 ▲

9:00 Welcome (Kate, Team)

Goal: Attendance and review the meeting objective.

Attendance: Kate Brunner, Mike Stanek, Travis Engels, Carl Hahn, Aaron O'Rourke, Morgan Kepler, Andrea Topper, Cody Calkins, Andrew Craig, Matt Ruark, Daniel Smith, Kyle Much, Sara Walling, Eric Hurley

Absent: None

Guests: Davina Bonness

Please keep in mind this team process:

- Allow each other space and flexibility. Work through ideas together and allow for "first drafts" and growth in the conversation.
- Maintain a degree of confidentiality with the stories. Individual thoughts stay here; the learning and team work leaves the room.

Mike is presenting at annual business meeting for WAPAC meeting in Feb. for early outreach. Also presenting at a nutrient applicators mtg on Feb 20, 2024 (Kevin Erb organizing).

9:05 Notes Review (Kate, Team)

Goal: Review and approve previous meeting notes.

Draft meeting notes from the 10/26 meeting were emailed around to the team. Team reviewed some resources that will inform the discussions today. Some open action items—a few topics will be discussed in-meeting today and some Kate will continue to track as longer term items: presentations and input from Laura Good and Kevin Masarik, and some edits to the standard related to the use of book value.

No comments or questions on the notes. Kate will finalize and post Oct. notes online for public.

9:15 NR151 Silurian Dolomite Restrictions (Aaron)

Goal: Review the NR 151 performance standard and manure spreading restrictions in areas of Silurian dolomite bedrock.

Chapter NR151 of Wisconsin Administrative Code has manure management requirements. In [NR 151.075](#), there are Silurian bedrock performance standards that apply to specific areas of the state with Silurian dolomite bedrock shallower than 20 feet. Rule came as a result of numerous private

wells with fecal bacteria, and a work group with EPA, DNR and citizen involvement. Details on the presentation slides with summary of discussion below:

- Implementation of NR151 perf standards is different for CAFOs and non-CAFOs.
 - Requirements for CAFOs as permits modified or reissued and compliance assessed as part of annual reports.
 - Non-permitted farms work with counties for implementation with DNR support based on inquiries and complaints. Possible grants and technical assistance.
- Restrictions decrease as depth increases
 - 0-2' depth – mechanical appl manure prohibited
 - 2-20' depth has options for application rate/nutrient restrictions, application timing, or pathogen reduction
 - Requirements specific to depth ranges of 2-3', 3-5' and 5-20'.
 - Manure applications vary for solid vs liquid manure with max liquid rates specified by soil type.
- Depth to bedrock determined by either in field verification (DATCP standard) or best available map (SNAP Maps). Still not clear what to do with the data to update “official” maps, though WGNHS working out a grant to help with map updates.
- Pathogen reduction option variables – how frequently sampled and how sampled (e.g. right out of digester vs in pit vs in pit for a long time, timing of agitation).
- Pretillage exemption for long term no-till fields or established perennial crop.
- If frozen or snow-cover in areas with 0-5' to bedrock, then mechanical application and headland stacking prohibited.
- There are setbacks specific to Silurian BR areas—community wells, private wells, direct conduits to groundwater, concentrated flow channels, etc.

The NR151 requirements wouldn't be repeated in the standard though could be referenced. Some details could be refined, like definition of “frozen” – using NR243 definition or based on effective incorporation or dates (Kewaunee Co has dates in their ordinance).

9:45 Kewaunee Co. Groundwater Data (Davina Bonness)

Goal: Summary of the nitrogen and pathogens groundwater trends relative to change in manure spreading restrictions in the Silurian bedrock area. Discuss proposed standard edits.

Davina Bonness of the Kewaunee County Land and Water Conservation Department presented on the implementation of manure spreading restrictions and groundwater trends both before and after the change. Some key points of the presentation and team discussion:

- Kewaunee Co is very heavy in agriculture and shallower karst throughout the county though mostly in north part of county. They have ordinance to implement NR 151 performance standards and also have other recent improvements like more split applications, stacking pads, cover crops and no-till fields. They also have been able to develop relationships with the producers and manure haulers.
- Kewaunee Co actively worked to document and map karst features and depth to bedrock, often as part of annual farmland preservation walkovers.
- They have had voluntary well testing since 2004, with variations in which wells and analyses. Some sampling events were randomized wells and others focused on targeted wells in areas of concern or where concentrations were previously elevated.

- Since manure spreading changes, they've seen E coli and coliform go down, particularly in areas with shallow bedrock. E coli down to 0 where bedrock is <5', even in wells where nitrate elevated.
- The E coli is slightly higher in some wells with 5-20' to bedrock, where manure used (where rock is 0-5' depth, manure is replaced with fertilizer).
- They have also seen some isolated areas with deeper bedrock where nitrates have gone up. Nitrates appear to be localized. If they pull out the cluster in this village then nitrates trend down. They are looking into this area separately.
- Will continue nutrient management improvements, and well monitoring.
- Also looking at NMPs for both CAFOs and non-CAFOs and verify they are being implemented and updated, confirm plan matched actual.

10:30 Break**10:45 Cover Crops (Matt)**

Goal: Review current research on cover crops and nutrient cycling. Discuss additional cover crop language for standard.

As homework from the last team meeting, the Team reviewed the Mark Reidel paper on cover crops: https://socwisconsin.org/wp-content/uploads/2023/05/Reidel_NTPS-Annotated-Bibliography-FINAL-DRAFT-web-upload.pdf to inform a discussion related to cover crops in the 590 standard.

Matt Ruark presents on cover crop research related to nutrient cycling. There is separate cover crop standard though there is tie-in to nutrient management (e.g. biomass and nutrient uptake) so some cover crop language could be added to 590. Some key points of the presentation and discussion including possible changes to standard based on research for cover crops:

- There are many variables to cover crop and nutrient uptake— plant species, winter kill (or not), seeding rates, fertilizer rate, geography (soil, weather, etc.), and also some unknowns.
- Using lower seeding rates does result in lower sprout biomass though there is still adequate soil coverage for erosion control and larger root biomass.
- They see different results in different parts of the state. Data doesn't include sandy soils and there's potential for the opposite results.
- This research shows no adjustments to manure if below 1000 lbs/acre cover crop biomass. Biomass 1000-2000 lbs is for short time period since growth takes off quickly in spring.
- The updated data is not incorporated into SnapPlus – not in current 590 or A2809 right now so it's not yet justified. In SnapPlus if there's a cover crop, then reduce the nitrogen from the manure—adjusts the manure credit per Table 3 of the Ruark, West, Siemering UW Extension document: [Cover Crops, Manure and Nitrogen Management](#).
- Team discusses some specifics.
 - On lower end, using winter rye cover crop at 30 lbs/acre with 75% coverage has ~1,200 lbs biomass.
 - What about other species?
 - Winter rye is cheapest, overwinters well, and is what NRCS pays more for.
 - Inflation Reduction Act funding references a higher level of conservation with multispecies cover crops, which should have more biomass and more coverage than rye alone but limited proof/research on specific mixtures.

Mixtures only do better if enough days before freezing so options are limited: after corn silage, legumes or brassica wouldn't grow and radishes grow poorly...and are also outside of seeding dates in the tech note.

- Arlington research shows these other covers after corn silage may actually not grow until the next year. Cover crop with legume cutoff is Aug 8 whereas winter rye planting is until Oct. 31 for NRCS and SEG funding and works even later if no funding cutoff.
- Winter kill covers didn't have negative effect on nitrogen uptake. If no growth in spring, then no N credit.
- Interaction with fall applied phosphorus products (DAP)? It may change based on timing and soil temp—many scenarios. This variability and uptake could be captured in SnapPlus. In practice, potash and phosphorus are spread in the fall since the coops don't have manpower in the spring and would need multiple passes.
- Next up for ongoing research: manure application variations, more on-farm research for different soil types.
- In summary: The standard would reference "current" land grant university recommendations, keeping the window open for updates. Reference to the Ruark Extension publication will be added. Standard would indicate credit based on biomass density in non-sandy soils.

12:00 Lunch, provided**12:30 N Cycling and Documentation (Mike, Aaron)**

Goal: Present clarification and correction to the existing language (Criteria A.1.i. in current WI standard) related to N cycling and documenting N need.

At the last meeting, Team discussed that item A.1.i. of the current standard statement related to nitrogen utilization and excessive rain is confusing – both how it's worded and how to use the external references. To provide clarity, Aaron and Mike worked together to refine the language for this updated standard.

Adaptive Nutrient Management is defined in the standard and detailed in Tech Note Appendix 3 to allow the producer more than recommended nutrients, esp. after big rain. Although defined, it's a confusing term since "adaptive management" is used in other contexts. 2015 standard includes on-farm research, though there's no component about loss in current standard. This was a compromise area in 2015 standard. If there is a fully fertilized field then adding rescue N is lost and likely impacting water quality. Team discusses the list of methods to evaluate and document need for supplemental N, and how to apply them.

Resources informing the discussion:

- WI Technical Note – Conservation Planning-WI-TN-1.
- Laboski, Carrie. Implementing Adaptive Nutrient Management as part of a 590 Plan. Proceedings of the 2016 WI Crop Management Conference, Vol. 55.
- Laboski, Carrie. Evaluating Nitrogen Loss after Heavy Rainfall. Proceedings of the 2016 WI Crop Management Conference, Vol. 55.
- University of Minnesota Supplemental Fertilizer Nitrogen Worksheet. Journal of Extension (joe.org) Vol. 43, Number 3. June 2005.
- Iowa State University Extension. Sensing Nitrogen Stress in Corn, July 2006.

Laboski paper allows for up to 46 lbs N after a heavy rainfall, and considers N loss from leaching—rainfall and leaching are two separate approaches. Note: 46 pounds N is the minimum application (that's 100 lbs product). Team discusses to maintain both options, though will be addressed separately:

1. **Additional N after rainfall** ("rescue N") - Team wants to keep this excessive rainfall adjustment in the standard and if so, is Laboski paper still the best reference or is there a different source for rescue N treatments? NRCS can put Laboski papers in the FOTG for a more permanent link.
2. **N loss from leaching** for adaptations based on specific in-field data. Current standard is complicated and references need improvement (e.g. approaches specific to WI).

In practice, N is often split-applied—some when seeding and some when knee higher (or taller). Rescue N would be considered if less than knee high and they wouldn't likely be at the max application rate at that point since farms typically plan to split apply. In some soil types split applying doesn't have benefit so front loading the nitrogen in 1 application is preferred.

Options:

1. Rescue N – certain amount rain as close to the field as possible
 - a. How to define much rain? What about multiple storms in sequence? Saturation of soil before the storm?
 - b. How frequently? – for example, allowed maybe 3 out of 10 years
 - c. Could base this on total annual quantity of N – e.g. can't exceed the MRTN rates by more than X%
 - d. Consider split applications (it currently says this just for P soils but could be expanded). Could also add this to SnapPlus.
2. Adaptive – try a study and advance option.

Vegetable and cranberry producers may rely on tissue sampling. Potatoes often apply rescue N multiple times (could be up to 5x) based on tissue sampling.

If in an area of groundwater susceptibility and wellhead protection zone, then could also consider groundwater recharge. Reidel paper includes a figure of average recharge and a table of groundwater recharge rates matched to equivalent proposed nitrogen performance standard. This approach doesn't necessarily match MRTN and university application recs.

The nitrate tool that was in the works under an NRCS grant with UW (with Francisco Arriaga and John Jones?) has stalled, but could get new life. Standard won't bank on the tool being available but could be a future option. Nitrogen Index is referenced in current standard and the only option is RUSLE2 which doesn't include enough options and variables to be accurate.

Team will consider new options and update standard language. **HOMEWORK:**

1. **Aaron, Kyle and Carl** will discuss rescue N and prepare updated standard language that includes agronomic recommendations.
2. **Mike, Travis, Andrew, and maybe Sara (as her time allows)** will prepare some updated standard language related to nitrogen and groundwater protection and present to the team at Jan. meeting. DATCP has a 2-page summary on 590 requirements for protection of

groundwater and surface water as a reference to use in this homework:

<https://datcp.wi.gov/Documents/NM590Summary2015.pdf>

Break as needed

1:30 Continue to Review Existing Standard (Mike)

Goal: Continue to review and discuss components of current WI standard to carry forward into the next draft standard, focusing on Sections A. Criteria for Surface and Groundwater Resources and B. Criteria to Minimize Entry of Nutrients to Groundwater.

Portions of the standard were referenced throughout the meeting, specific edits not discussed.

2:15 Meeting Review (Kate)

Goal: Identify topics/goals for the next meeting and review Action Items.

No Dec. meeting due to holidays. Next meeting date is Jan. 25, also at Columbia Co office Room 113/114 conference room.

Planning for upcoming meetings:

- Laura Ward Good is scheduled to present (on P Index? SnapPlus?) in January. We have a lot to discuss on nitrogen so this will be postponed until February. February meeting will be to discuss P and surface water.
- Kate will ask Kevin Masarik to join January meeting for presentation and input. He may also review the updated language on nitrogen and groundwater protection if ready in time. Specific questions for Masarik to address:
 - Provide an exec sum of his research, how to integrate updated research and his tool into the standard gw protection criteria?
 - Does it make sense to apply the N budgeting calculator? Could this be referenced directly in the std or as guidance doc?
 - Could the Reidel table (2.2 lbs/acre) be integrated into the tool? [tool may be only good for sands]
 - Other thoughts about current standard?

Action Items developed today:

1. Carried forward from previous meeting: **Mike and Kate** will prepare revised standard language to cover changes discussed related to the use of book value. Report back at future team meeting.
2. **Aaron, Kyle and Carl** will discuss rescue N and prepare updated standard language that includes agronomic recommendations. Present language for team review/response at 1/25/24 meeting.
3. **Mike, Travis, Andrew, and maybe Sara (as her time allows)** will prepare updated standard language on nitrogen and groundwater protection for team review/response at 1/25/24 meeting.
4. **Kate** will reach out to Kevin Masarik to see if he can present to the team (on N) on January 25.
5. **Kate** will reach out to Laura Ward Good to see if she can present to the team (on P) on February 22.

6. **Kate** will prepare draft meeting notes for today then forward to full **Team** for review.
7. **Kate** will finalize notes from the Oct. 26 meeting and post on SOC team website.
8. **Kate** and **Mike** will prepare agenda for Nov. 30. Kate will send to the full team with preparation materials 1 week in advance.

2:30 End