

NRCS 590 Nutrient Management Standard Team

MEETING NOTES

Tuesday, March 19, 2024 ▲ 9:00am – 2:30pm ▲

Sauk Co. West Square Building, 505 Broadway Street, Baraboo, WI 53913 ▲ Room 213 ▲

Agenda-In-Brief:

9:00 Welcome (Kate, Team)
9:05 Notes Review (Kate, Team)
9:15 Review of P Index and other P-Related issues (Laura Ward Good and Hava Blair)
10:15 *Break*
10:30 Continue Review of P Index (Laura Ward Good and Hava Blair)
12:00 *Lunch, provided*
12:30 Entry of Nutrients to Surface Water (Mike, ~~Eric~~)
Break as needed
2:15 Meeting Review and Next Steps (Kate)
2:30 *End*

9:00 Welcome (Kate, Team)

Goal: Attendance and review the meeting objective.

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

9:05 Notes Review (Kate, Team)

Goal: Review and approve 2/22/24 meeting notes and action item reports.

Next national 590 standard is in the works and Mike and Eric will likely see a rough draft to the internal NRCS group in about 2 months. They won't be able to share this with the team but can relay to the team the areas of changes.

Draft notes from the 2/22 meeting were emailed to the team. Some open action items—a few topics will be discussed in-meeting today and some Kate will continue to track as longer term items. A few action item updates:

- **Mike** will pursue input from others at NRCS (Jen Smith?) on language for P soils and permeability. Aaron is also looking into DNR's evaluation of saturated soils.

- Carried forward: Mike will be updating the standard text from team discussions and prepare revised standard language (e.g. related to the use of book value (10/26/23), rescue N (2/22/24)).
- **Sara** will look further into accessing historical, updated soil temperature data. Sara, Dan and Travis found some resources:
 - One interesting resource that shows average county freeze dates (and justification to move/remove the Oct date) is <https://mrcc.purdue.edu/freeze/freezeatetool>
 - The Midwestern Regional Climate Center has an online Soil Temperature Climatology mapping tool: https://mrcc.purdue.edu/clim/Soil-T-About?utm_medium=email&utm_source=govdelivery. This system is summarized [here](#) which also links to a brief fact sheet.
 - There is also a Michigan State University Enviro-weather site at <https://mawn.geo.msu.edu/>. The site contains some recent (2023) weather station data for multiple areas around the state. The Wisconsin stations all appear to be retired, but the data is still logged/stored and contains temps, soil temps, soil moisture and precipitation.
- **Dan, Andrea and Kyle** will make further revisions to Criteria to Minimize Entry of Nutrients to Groundwater based on team discussion, expanding the subgroup to include **Mike and Andrew**. This breakout group met and identified some specific areas of improvement.
 - **Kate** will send their file to the full Team to review and comment.
 - **Team** should review and identify what's missing, what's they are too restrictive on, what needs more restrictions. Email your thoughts to this breakout group so they can better prepare for next meeting, when this will be discussed further.

Team did not have any comments or questions on the Jan. meeting notes. Kate will finalize and post notes online for public.

9:15 Review of P Index and other P-Related issues (Laura Ward Good and Hava Blair)

Goal: Respond to team questions related to the P Index.

Laura Ward Good and Hava Blair from the UW Soil Science Department were invited today to present and answer team questions related to the P Index and other P-related issues for the 590 standard. At the previous 590 team meeting, the team identified some specific questions to help Laura and Hava prepare:

1. How did P Index settle on 6 and 12 for annual vs course of a rotation? Team understands that it was based on Pleasant Valley watershed evaluation; is there more depth to understand more about these numbers?
2. If we move from PI of 6 to 4 do we take some tools out of the toolbox (like low disturbance manure)? [Team has noted that PI of 6 is in NR code so changing is complicated.]
3. What is the relationship of T and PI?
 - a. Erosion – on field with same rotation and P addition, increasing rotational erosion will increase the rotational P index.
 - b. Tolerable soil loss (tons/ac/yr) – no real relationship between that and P Index.
4. Do we want to further allow the P Index to build soil test P?
5. What are we missing in implementation of PI (e.g., weaknesses, misuse)?

6. How are leached P and dissolved reactive P being dealt with in PI? Team understands it's in SnapPlus but should something be done with that information (e.g., to mitigate dissolved P losses)?
7. How has the PI advanced since the last standard? Are there things you would change in the standard to be more protective or more realistic related to P?

They see the purpose of NM is to minimize risk of nonpoint source pollution to surface and groundwater. Their work is related to P specifically.

Who uses PI?

- 590 and NR243 Nutrient Management Planners (main users)
- Farmer led P reduction accounting
- DNR establishing baseline P index
- Pay for performance uses (past and potential)

PI wasn't set up to address impaired waters and TMDLs; there is now catch-up to be done. Could there be restricted areas (like watersheds with P TMDLs) identified for lower phosphorus planning criteria (tie NM with water quality conditions)? TMDLs apply to point sources unless there is water quality trading; voluntary for ag.

1. History and Background of P Index –
 - a. States needed a method of P loss assessment and find less risky places to place manure greater than crop need.
 - b. WI, IA and MN used model-based approach
 - c. PI looks at edge of field runoff, sediment bound P and dissolved P from soil and manure and fertilizer
 - d. Soil test has good relationship with what's water soluble, and total P concentration in soil (would be similar results for both Bray and Mehlich methods).
 - e. Stratification factors (based on tillage) are built in.
 - f. Smaller particles (silt and clay) have higher P concentrations than larger particles.
 - g. Soluble P Index –
 - h. Manure equations are very complicated – generally, dissolved P losses increase with the amount of soluble P on the surface and with the proportion of water that doesn't infiltrate.
 - i. Monitoring shows higher P in winter runoff.
2. P Index Equation Changes currently being made to make it more precise.
 - a. RUSLE2 isn't getting updated and NRCS has no plans to. Climate data is static and ends possibly in the 1990s. NRCS was (is?) going to switch to WEP so they held off on some model changes until they could also work in WEP related changes. There were many years delay in WEP changeover but didn't happen so UW refreshed their efforts.
 - b. Sediment P concentration refinement – P was previously underestimated.
 - c. Revised winter runoff estimation using RUSLE2.
 - d. Need refinement for runoff dissolved P concentration. Most WI soils modelled well, but some sands/loams did **not** have good correlations for dissolved P concentration. This is still being evaluated.
 - e. Adjustments in manure and fertilizer P effects on soil surface soluble P--related to tillage type (previously categorized all tillage together) and surface additions of fertilizer and manure to avoid double counting.

3. Not Updated – field-to-stream P delivery – assumed path from field to water is a straight, constant slope flow channel. Doesn't account for landscape and meander, deposition, erosion. There is data available around much of the state (like APCF and Lidar), but it's a larger effort to develop the information, tweak the model, and test. A future researcher will need to take this on.
4. Limits, how different from model
 - a. Why 6? Came out of 2005 590 tech committee.
 - b. Annual P Index of 12 came from group pushing for the NR151 P Index standard.
 - c. 2005 TAC could not figure out how to use the staged P Index limits with different management techniques given the year-to-year variations in estimated P loss in typical dairy rotation.
 - d. Management for 2-6 PI – PI should not increase over 4 years or length of average rotation. Over 6 would be to implement NMPs to decrease the PI.
 - e. Why is annual P Index of 12 **not** used? ATCP 50 references NR151.04. If you have a Nutrient Management Plan, you are assumed to be in compliance with P Index.
 - f. Pleasant Valley research was not a test of P Index limits or informed those limits. It did show that it worked to use the P index as part of a targeted approach to bring down stream P loads.
5. Implementation Weaknesses - The P Index is a tool for field scale P loss assessment.
 - a. Limited to one slope, one soil type per field - Currently using NRCS dominant critical soil approach as being most protective of resources—conservative for soil loss but not always for P loss. In reality, fields have multiple soil types with different characteristics and the steep slope may actually be left forested for example. Soil loss is only for that soil type and not the entire farm.
 - i. SnapPlus does allow for modification of soil map boundary for unique situations.
 - ii. For water quality trades, DNR is allowing more detailed/accurate mapping for the field.
 - b. Tile drainage – P Index doesn't account for P reaching surface water via tile drains.
 - i. P Index may be capturing tile runoff in some way as surface runoff since it's just diverted, draining surface runoff from ponded areas or concentrated flow channels.
 - ii. Surface water runoff is not same as tile, and pattern tiles are not often used in WI. Most tile in WI is random.
 - iii. Snap Plus has option to include tiles but not a good factor to use for P loss since drainage area and watershed surface area don't necessarily match up.
 - c. P Index uses just sheet and rill erosion. Particulate P losses from in field channel erosion aren't accounted for either.
6. Policy
 - a. If PI limits moved from 6 to 4, to we lose some tools (e.g. LDMI)? If a tool works for P loss reduction, then it's going to bring P index down.
 - b. Do we want to further allow PI to build soil test P? If you stay under 6, more can be applied. Over the years, P will build up in the soil if manure is applied greater than the plant needs. [Clarification for chart on slide: Strip till is no till with planter disturbing 30% of surface.]
 - c. They looked at different trends in soil test P, including avgs and medians and found that although soil test P is higher than needed to support crops it may not be increasing. The county level data doesn't show the outliers that are particularly high P levels.
 - d. How are leached P and dissolved reactive P being dealt with in PI? Team understands it's in SnapPlus but should something be done with that information (e.g., to mitigate dissolved P losses)?
 - i. Soluble PI can be used to examine effective practices and field conditions on runoff dissolved P management.

- e. Policy changes that Laura thinks could be considered for the standard to be more protective and more realistic related to P.
 - i. Lower the PI to less than 6 since 6 is not protective of water quality.
 - 1. The standard should be protective of water quality and NR 151.04 doesn't dictate the standard.
 - 2. How low? What factors to consider? Likely a high of 2.5 or 3. NR243 has a winter acute loss PI of <4 with some additional factors.
 - ii. Require soil test P limits plus PI.
 - 1. This would need to consider variations and inconsistencies in rotations. Rotation in field often differs from the plan. There would need to be some framework to standardize information for rotations.
 - 2. Reasonable place to start from could be to apply no more than crop recommendations (e.g. 35 is "excessively high" for most crops).
 - 3. About 1.1 AU to acre maintains but doesn't build phosphorus in soil.
 - iii. Have a soluble PI and a total PI limit (though not sure what is a good soluble PI)
 - iv. Use most runoff prone soil in field for the soluble PI. Right now, it's looking at the most erosion-prone soil.
- 7. She looked at some comparisons of current PI and revised PI on an example field - the particulate P went up a little and dissolved P went down a little.

Team discusses what a more restrictive PI or a soluble p restriction would look like in practice. It would be helpful to explore how it would look on a real-farm. A subgroup of this team will look at a couple NMPs and apply a more restrictive PI and present results at next team meeting. Kyle will send Mike an NMP or two to use. Laura and Mike will look at these fields with adjusted PI approach and Mike will report back at next team meeting.

Team acknowledges that if the PI changes in this standard, it wouldn't be implemented until NR151 was updated. There is frequently (always?) the need for updates between changes to ATCP rules, NR rules and standards.

10:15 Break**10:30 Continue Review of P Index** (Laura Ward Good and Hava Blair)

Goal: Continue team discussion to better understand P Index.

See notes above.

12:00 Lunch, provided**12:30 Entry of Nutrients to Surface Water** (Mike, Eric)

Goal: Review and identify adjustments to Additional Criteria to Minimize Nutrients to Surface Water (current Section IV.C.), with particular focus on **P buildup in soil** and **P management strategies** (P Index and soil test). Determine approach to non-responsive soil test ranges, building soil test P until a more restrictive range (50ppm-100ppm).

Team reviews section IV,C, Additional Criteria to minimize entry of nutrient to surface water together onscreen and identifies areas for editing.

- Non-responsive soil test ranges –
 - Rather than using term “non-responsive soil test range”, team would like to tie this into A2809 language and use “high” (see Table 7.1 of A2809). The new national language bullets for “high risk” mitigation will be applied where soil test P is “excessively high” per A2809.
 - No mechanical application of manure or fertilizer other than starter when soil test P is >200ppm.
 - This type of language doesn’t account for precision ag, and Team agrees that VRT should be incorporated into standard. This could be referenced here but specifics omitted (like 2-3 acre grid, etc.) and/or detailed in a tech note. PARKED FOR FUTURE DISCUSSION ON INCORPORATING VRT

Break as needed**2:15 Meeting Review (Kate)**

Goal: Review Action Items and prepare for the next meeting.

Cody, Travis, Andrew, and Mike will meet to prepare changes to the current standard language related to ephemeral erosion and edge of field practices. They will report back with recommendations at the next team meeting.

Eventually the team will have breakout groups look into possible edits to winter spreading and setbacks—this will be considered as possible next steps at the end of the next team meeting.

Next meeting date is **April 25, 2024**. This and the May meeting will be at the Juneau County Services building, 200 Hickory Street, Room 209, Mauston WI. Kate will update meeting calendar entries.

What are next meeting topics?

- Dan, Andrea, etc. will summarize their work and get team feedback/concurrence on changes to Criteria to Minimize Entry of Nutrients to GW section of current standard.
- Mike will report back on his findings for what a more restrictive p index or soluble p number would look if applied.
- Ephemeral erosion and edge of field practices

Action Items developed today:

1. Carried forward from previous meeting:
 - a. **Mike** and **Kate** will prepare revised standard language to cover changes discussed related to the use of book value. Text will be reviewed at a later date, in context with broader standard.
 - b. **Sara** will look further into accessing historical, updated soil temperature data. This is a longer term item that will take some time.
 - c. **Mike** will take the info from subgroup on Rescue N and input to standard language and also prepare guidance doc. He will bring in others on the team for support. As part of this, Mike will confirm with engineers what NRCS uses as “excessive rainfall” in their calcs and define in this tech note.
2. **Kate** will send out the work from Nutrients to GW subgroup to the team. **Team** should review and identify what’s missing, what looks too restrictive, what needs more

restrictions. Email thoughts to Andrew, Dan, Andrea, Kyle and Mike and they will be ready to present/discuss at next team meeting.

3. What would it look like if there were a more restrictive PI or a soluble p restriction? **Kyle** will send Mike an NMP or two to use. **Laura and Mike** will look at these fields with adjusted PI approach and Mike will report back at next team meeting.
4. **Cody, Travis, Andrew, and Mike** will meet to prepare changes to the current standard language related to ephemeral erosion and edge of field practices. They will report back with recommendations at the next team meeting.
5. **Kate** will prepare draft meeting notes for today then forward to full Team for review.
6. **Kate** will finalize notes from the Feb. 22 meeting and post on SOC team website.
7. **Kate and Mike** will prepare agenda for April 25 meeting. Kate will send to the full team with preparation materials 1 week in advance.

2:30 End