



Standards Oversight Council (SOC)

Developing effective technical standards that protect Wisconsin's natural resources

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NRCS 380 Windbreak-Shelterbelt Establishment and Renovation Standard Update Team **MEETING NOTES**

Wednesday, June 29, 2022 ▲ 1:00pm – 3:30pm ▲

Online meeting

1:00 Welcome & Introduction (Kate, Allan)

Goal: Welcome and review today's meeting objective.

Attendance: Kate Brunner, Allan Braun, Mike Stanek, Eric Hurley, Matt Wilson, Peter Wisniewski, Michael Demchik, Roy Diver, Drew Zelle, Tony Johnson, Jeremiah Auer

Absences: Mic Armstrong, Shannon Rohde

Guests: Richard Straight, USFS; Greg Zwicke, NRCS; Allison Costa, NRCS

Notes Review (Kate)

Goal: Review and approve 5/25/2022 draft meeting notes.

Draft notes from May meeting were emailed to the team for review.

- 2 Action Items retained related to future meetings – Mic and Jeremiah will present on nursery stock and seedlings at a future meeting, and Shannon will host field tour on July 27.
- No other questions or comments to the notes were raised by the team, so Kate will post online as final.

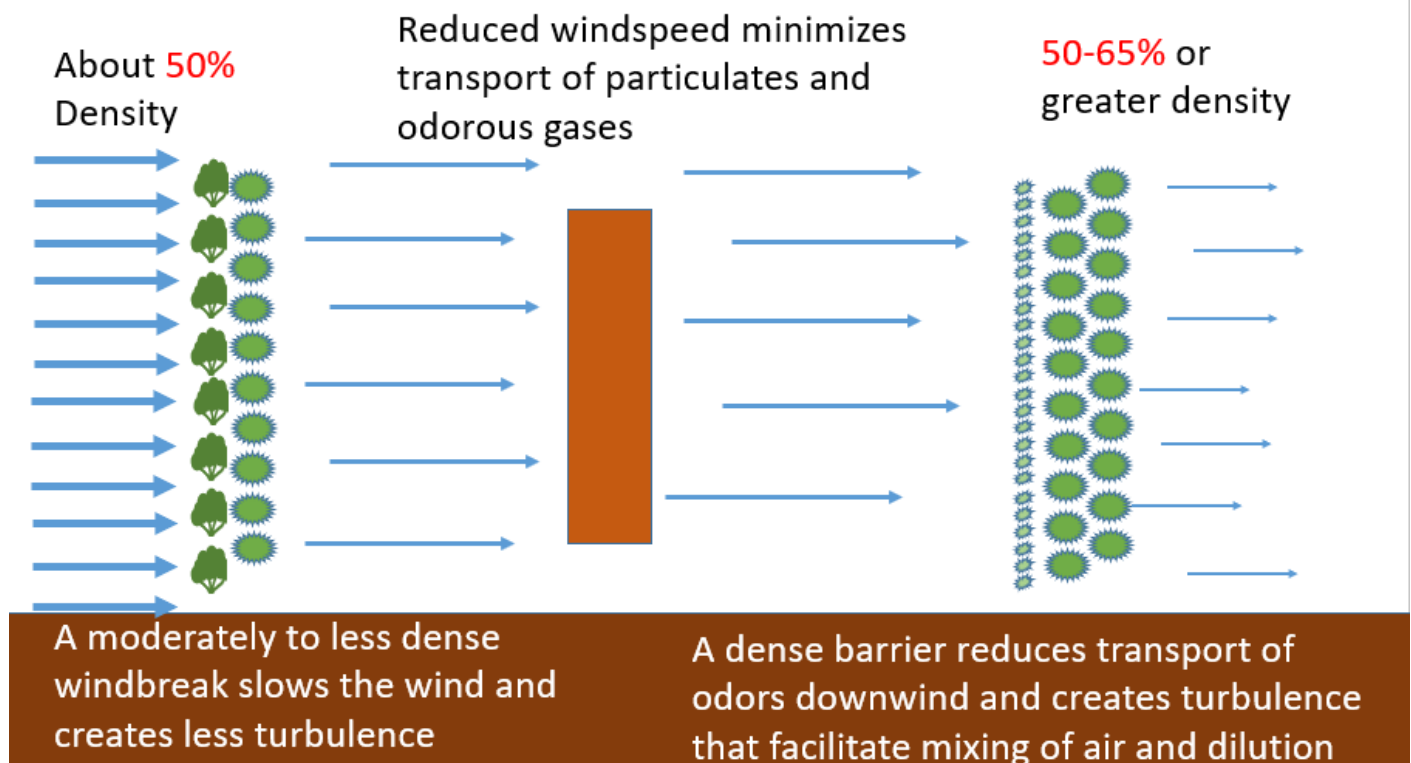
Windbreaks to Improve Air Quality (Richard Straight, USFS; Greg Zwicke, NRCS; and Allison Costa, NRCS)

Goal: Discuss use of windbreak for reduction of airborne particulate matter, chemicals and odors. Team Q&A.

The team is joined by Richard Straight of U.S. Forest Service; Greg Zwicke of NRCS; and Allison Costa of NRCS. Rich had joined us at the previous meeting and was introduced then. Greg and Allison comprise the national air quality and atmospheric change team for NRCS.

Richard presents briefly on the usage of a windbreak for control of chemicals or orders and discussion with the Team follows. Some key points of team discussion with these experts:

- Odor and noise – windbreak research is not as specific or robust as it is for soil erosion or crop responses.
- Shelterbelts mitigate odor by:
 - Dust and aerosol deposition – reduced windspeed facilitates deposition of particulates.
 - Physical interception - Trees with needles attract and hold particulates better, shrubs provide greater density close to the ground.
 - Dilution of odor plume – greater tree height increases the size of the quiet zone, greater tree height helps induce mixing air and dilution, and greater density increases turbulence and facilitates dilution of odor.
 - Sink for pollutants – trees with needles have greater surface area to absorb gases.
- For odor it's most useful to have 50% density hardwood+conifer windbreak upwind of odor, then **another** 65%+ density windbreak (maybe up to 80% as space and soils will allow) with shrubs+conifer downwind of the odor. This 2-windbreak system encourages calm at the odor source then turbulence downwind for dilution.
 - Upwind side: A moderately dense barrier slows the wind and creates less turbulence. Spacing would be 10H-15H from the upwind to the odor source for useful wind speed reduction. If odor source is naturally ventilated, you want to encourage ventilation and wouldn't want the upwind windbreak too close.
 - Downwind side: A dense barrier reduces transport of odors downwind, and creates turbulence that facilitate mixing of air and dilution. Spacing would be 2H-5H (closer to 4H-5H for natural ventilation) from odor source to the downwind windbreak but this distance depends on whether odor source is enclosed with forced air ventilation or is naturally ventilated. Fan exhaust will need its own separation distance (2-4x fan diameter) to limit back pressure.
 - Fully enclosed structure also acts as its own windbreak but the calculations still look at the height of the designed windbreak (typically taller?).
 - Rich showed this graphic below. Team may use something like this in guidance document, and could also include distances.



- Growing season density though spring and fall are likely the time when windbreak is more critical.
- Density estimates are subjective—difference between 50% and 65% is hard to see optically vs aerodynamically.
- Taller trees upwind will increase the area of reduced windspeed and helps encourage dilution.
- Conifers should be included in windbreaks for odors – greater surface area to absorb gases and trap particulates, year-round density.
- Forced air buildings exhaust larger concentrations of particulate – be mindful in species selection and distance of windbreak from the fan exhaust. Shawn Belk and Paul Patterson have researched odor mitigation in forced air animal operations.
- Research (Tyndall) also shows that producers with windbreaks tend to get less complaints about odor—even if no change in odor drift, effort is being made and odor source is out of sight. Odor is subjective.
- The guests aren't familiar with research on windbreaks for health benefit (e.g. pathogen reduction).
- The guests haven't experienced issues with slowing down the wind too much and creating a hazard (like gas accumulation around a manure storage pit). There is enough air flow through a windbreak designed for odor management and you wouldn't want to block air flow.
- Windbreaks could also have negative effects—they can bring in vectors.

- Rich shows the Team a video of a smoke test showing how the air travels through and over the windbreak. Smoke test was a 60-70% dense windbreak with 2 rows of red cedar. Keep in mind that smoke particles are smaller than the particulate that windbreaks typically are designed for. The file is too large to email but **Kate** will connect with Rich to get a copy of the video, then she will distribute to the **Team**.
- Windbreaks for odor are typically two windbreaks—one upwind and one downwind of the odor source. The distance for each should consider a lot of factors including whether building is naturally or mechanically ventilated, management of snow deposition and resulting melt water. Team would like to avoid over-complicating

Technical Standard Language Review (Allan)

Goal: Review federal standard language and identify changes for new WI standard.

The Team reviewed some standard language related or odor with our guests, then continues to review and edit the standard file on-screen. Some key points of team discussion:

- Chemical purpose – pesticide drift mitigation is a useful purpose and there is room for more specific criteria, possibly for the guidance document over the standard. This can be left up to the certifier for deliberate flexibility. Is there a different density, herbicide resistant tree species, etc. that could be cited? Matt Wilson has a contact that may know of National Organic Program resources to cite or borrow from.
- Additional Criteria to Provide Shelter is very similar to Additional Criterial to Reduce Energy in Structures and it appears repetitive. There are two distinct purposes but additional criteria overlap. The density is 65% in the shelter section and the more conservative number is preferred by the Team.
- Windbreaks typically not used for shade (for house or livestock), and the criteria is low-end density compared with the rest of the standard. Silvopasture provides criteria for shade on a pasture. There is concern about removing shade reference under the Additional Criterial to Provide Shelter because windbreaks are an easier entry point for agroforestry--Silvopasture approval requires a grazing management plan so it's a greater commitment. The shade-producing windbreaks statement could be moved to considerations since this is not substantial use of a windbreak. Team also supports removing "excessive heat" from the shelter purpose statement.

Break

Continue Review of Technical Standard Language (Allan)

Goal: Continue review of federal standard language and identify changes for new WI standard.

See above.

Plan of Action (Kate, Allan)

Goal: Identify next steps and review Action Items.

Next meeting will be an in-person tour of Hancock Agricultural Research Station on **July 27** from noon -4:00 pm. Kate is working with Shannon on the details and he will lead the tour. The general plan is:

- 12:00-1:00: Lunch - Kate will bring in lunch provided by SOC. Please let her know if you have any food restrictions/preferences.
- 1:00-3:30: Tour - Shannon will take us around with the research station wagon.
- 3:30-4:00: Meeting - We'll sit down back at the research station for a short discussion on whether the tour raised issues that may result in changes to the standard.

Kate will follow-up with Shannon on what team wants to see:

- What specifically does team want to see?
 - Mixed species conifer-hardwood plantings,
 - Windbreaks with shrubs,
 - Windbreak that's been renovated or that is close to needing renovation,
 - Living snowfences (both successful and not),
 - Failed windbreaks.
- Any biosecurity or safety or other facility policies we should know about?

What is remaining to complete this project?

1. August 31, 2022 meeting – wrap up the first draft of the revised standard text.
2. Initial Review by small group of experts (2-3 weeks) – Please let Kate know of any experts you'd like to be considered for the Initial Review. The team will decide together from this pool of names. Once the list is decided, Kate will then reach out to make sure they are interested and available. During review steps, team can shift to work on the guidance document.
3. Team responds to comments.
4. Broad Review open to the public (2-3 weeks).
5. Team responds to comments.
6. NRCS publishes standard.

Action Items developed today:

1. Continued from previous meeting: Mic and Jeremiah prepare presentation on stock and seedlings to inform the guidance document that team will work on after the standard is out for review.
2. **Kate** will connect with Rich to get a copy of the windbreak test video, then she will distribute to the **Team**.

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3. **Matt** will look into National Organic Program resources to cite or borrow language related to windbreaks for chemical drift.
4. **Allan** will edit text where some wordsmithing notes remain based on team discussions and expert input.
5. **Full Team** should let Kate know of any experts you'd like to be considered for the Initial Review.
6. **Kate**: finalize and post meeting notes from 5/25.
7. **Kate**: draft 6/29 meeting notes and sent to **Team** for review and comment.
8. **Allan and Kate and Shannon**: prepare agenda for 7/27 tour and send to team one week prior to meeting.

3:30 *End*