From: Gunderson, Larry (MDA)
To: Wolf, Katie (MDA)
Subject: FW: Comment on Draft Nitrogen Fertilizer Rule
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Attachments: Yield 360 Yieldbook 2017.pdf

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From: Craig Poling [mailto:craigpoling@senteksystems.com]
Sent: Friday, June 30, 2017 10:02 PM
To: Gunderson, Larry (MDA) <larry.gunderson@state.mn.us>; Montgomery, Bruce (MDA) <bruce.montgomery@state.mn.us>
Subject: Comment on Draft Nitrogen Fertilizer Rule

Larry and Bruce,

I attended the Draft Nitrogen Fertilizer Rule listening session in Farmington MN yesterday. I thought that the MDA team did an excellent job of explaining the proposed rule to the public.

At the meeting I asked the question regarding when the UMN nitrogen Best Management Practices (BMPs) were last updated. As I recall, the answer to my question was 2007 with the exception that the BMP for sandy soils was updated approximately 3 years ago.

The reason that this is relevant is that recent research results (i.e. 2015-2016) on side dress nutrient use efficiency (NUE) demonstrate the potential benefits of side dressing at later vegetation growth stages than V7. The goal should be to feed the crop closer to when the crop needs to be fed. This leaves less time between when the nutrients are applied and when the crop absorbs and uses the nutrients. By minimizing the gap between when nutrients are applied and when they are needed by the crop we minimize the time during which nutrients can be lost to the environment (i.e. for example due to leaching or other loss mechanisms). This increases nutrient use efficiency (NUE), increases crop yields, decreases the amount of fertilizer needed, and decreases environmental impact.

For example, corn plants use 75% of their total annual nitrogen after vegetation growth stage V10. In order to decrease the time gap between nitrogen application and crop nitrogen uptake we must be able to apply nitrogen, if needed, at later growth stages (i.e. V8 - VT). With modern sensor technology (i.e. for example optical sensors) it is now possible to sense whether or not a crop needs additional nitrogen and to apply it where, when, and in the quantities needed. With modern nitrogen application technology (i.e. for example Y-DROP technology) it is now possible to safely and efficiently apply nitrogen at later crop growth

stages. This gives growers much greater flexibility in nitrogen side dress application dates (i.e. crop growth stage) and results in improved nutrient use efficiency, higher yields, decreased amounts of fertilizer needed, and decreased environmental impact.

In summary, the most recent nitrogen management research suggests that growers should me encouraged to apply nitrogen closer in time to when the crop needs the nitrogen (i.e. using modern sensors and equipment to determine optimal nitrogen rates and timings). Since optimal nitrogen rates and timing will vary from growing season to growing season due to changing environmental conditions from season to season, it would be unwise to impose a mandatory date by which all side dressing must be accomplished (i.e. for example V7 as specified in the old BMPs). Specifying an ad hoc fixed growth stage by which nitrogen side dress must be accomplished could be counterproductive and result in decreased nutrient use efficiency, reduced yields, increased amount of fertilizer needed, and increased environmental impact.

I recommend updating the nitrogen Best Management Practices (BMPs) to allow side dressing at vegetation growth stages later than V7 using emerging precision agriculture technologies such as optical remote sensing and Y-drop technology.

On a final note, it should be noted that nitrogen deficiency in corn is often reliably detectable using optical remote sensing only at vegetation growth stages later than V7. Therefore, insisting that all side dressing on rain fed corn be accomplished by V7 could exclude one of the most promising methods for improving nutrient use efficiency and minimizing nitrate nitrogen environmental impact. I have attached some recent nitrogen trial results for your consideration. I look forward to hearing from you. Best regards. Craig.