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Subject: New preventative tool to protect Source Water Quality from CAFO and Anhydrous Ammonia Nitrogen fertilizers

Mr. Weller and fellow USDA friends-

I appreciate your response dated Sept. 7, 2016 which was in response to the message you received from President Barack Obama's office. I do understand the current design and usage of RUSLE2 and that it currently does not track fertilizer loss. But that's the point. It easily could be extended to do so. As you state in your letter, "Controlling soil erosion is one of the first steps to minimizing nutrient runoff from fields." So we both agree that RUSLE2 is a solid foundational tool. Additionally, several state programs are using the RUSLE2 results as minimum inputs into their permit approval processes and putting too much weight on them to attest to fertilizer's comprehensive runoff flow pattern. And I'm sure there is no debate that Source Water quality is worsening in many cases today due to contamination from nitrogen fertilizers.

To sum it up:

1. There is a dire gap in the process – no truly comprehensive tool,
2. RUSLE2 results are being misused today because of the gap (good intentions/bad science),
3. But if we were to extend RUSLE2, it is the best foundational tool to extend upon to fill the gap.

If you have other ideas or suggestions, please feel free to email or call me. Doing nothing is not an option. Below you will find a much more consolidated and detailed version of my request.

I hope this finds you all well,

Veronica Lack

Concerned Citizen, Iowa Farmer and Source Water Drinker

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## **“NFPI” - New preventative tool to protect Source Water Quality from CAFO and Anhydrous Ammonia Nitrogen fertilizers**

Within the United States, the State of Iowa is now testing at the highest levels of all states in Nitrogen fertilizer contamination of its Source Waters. Other states have identified continuing year over year increases as well. Obviously this a huge health concern for drinking water quality/safety as well as several other significant issues linked to it such as “the dead zones” downstream of the Mississippi River. Every day the issue of fertilizer contaminated Source Water is expanding and gaining greater awareness in the United States. While much work has been done to stem this tide, it is not enough. This is a call to action.

**Urgent Issue:** Source Water Nitrogen contamination from CAFO and Anhydrous Ammonia Nitrogen fertilizer by way of Point Source pollution.

**Primary Goal:** Reduce levels of Nitrogen from CAFO and Anhydrous Ammonia Nitrogen fertilizers in Source Water (groundwater AND surface waters).

**What we need the USDA to do:** Expand the RUSLE2 software application and algorithm to provide a clear determination and feedback as to whether it is appropriate to apply CAFO and Anhydrous Ammonia Nitrogen fertilizers on a submitted farm plot (e.g. RUSLE3). In addition, the USDA should mandate the submission of all new “RUSLE3” required information from the requestor/farmer (to allow the software to provide the suggested determination).

**Background:** Released in 2003, the Revised Universal Soil Loss Equation 2 (RUSLE2) estimates soil loss from rill and inter-rill erosion caused by rainfall on cropland. RUSLE2 is used to predict the long-term average rate of rill and inter-rill erosion for several alternative combinations of crop system and management practice. It also considers specified soil types, rainfall patterns, and topography. When these predicted losses are compared with soil loss tolerances, RUSLE2 provides specific guidelines for effective erosion control BUT NOT currently for evaluating nitrogen fertilizer Point Source Pollution controls. RUSLE2 results usage goes well beyond USDA purposes. It is depended upon for many other determinations. For example, in many states it is a required prerequisite when applying for a CAFO Fertilizer Application Permit. Unfortunately, when used for that purpose, the RUSLE2 results can typically only represent a partial picture of the runoff/flow of Nitrogen-based fertilizers away from its intended destination. Thus making it an incomplete control at best.

While the RUSLE2 software application does not currently have all of the input attributes and calculations necessary to perform the newly suggested Nitrogen Source Water protection feedback, it is the best and natural place to implement the suggested changes due to its current adoption and similar use case. Said another way, RUSLE2 is used to control erosion and in this case we need to control fertilized-based Nitrogen inflow into Source Water. They are both based on many of the same information and the proposed RUSLE3 changes naturally build upon the existing RUSLE2 framework.

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**Requested change - Specifics:** The intent of the changes suggested for RUSLE2 (previously submitted in 2008 by Adam Lack) is to expand the software program to incorporate additional inputs and calculations to adequately support the USDA/NRCS evaluation of CAFO and/or Anhydrous Ammonia Nitrogen fertilizer application upon specific farm plots. Today the RUSLE2 feedback is limited to erosion/soil loss but in fact its widespread industry usage goes well beyond that putting too much emphasis on its Soil Condition Index. This computed attribute is used in many cases as the predominant deciding factor in CAFO fertilizer application permit decisions which isn't what it is fully adequate or meant to do. It should only be used in conjunction with a newly designed calculated attribute (“Nitrogen Fertilizer Protection Index” or “NFPI”). The suggested changes would be to layer on top of the existing RUSLE2 framework (and software program) allowing it to continue to provide the existing capabilities and reporting while simultaneously supporting specific guidance on limiting the application/usage of Nitrogen fertilizer to farm ground. A listing of the requested changes is below.

Newly required inputs (mandated to be submitted by the “RUSLE3” applicant):

- Copies of Tile maps (with location based GIS references)
- Depths of all Tile included in maps
- Locations of all Tile inlets/outlets
- Locations of all Surface Water inlets/outlets
- Copies of drainage easements and permits

The software algorithm would be extended to include the following new functionality:

- Overlay tile maps from submitted plan(s) onto existing NRCS GIS farm ground data.
- Compare submitted information to NRCS 's existing data on drainage easements and permits, tile maps, surface inlets/outlets, slopes, and documented waterways.
- Identify and account for material variances between the submitted information (plan) and existing NRCS data. This ensures alignment between NRCS data and the current reality of the drainage.
- Apply minimums for tile depth against the submitted plan.
- Apply minimums for soil depth against the submitted plan.
- Apply limits for various outlet types (examples: sinkholes, ag drainage wells and French drains would be considered unacceptable outlet types; surface tile outlets would require maximum depth limits, etc.) against the submitted plan.
- Apply minimum buffer distance limits around sinkholes, swales, ponds, lakes, tile inlets, rivers, farm-through waterways and intermittent streams based on the slopes and soil types in NRCS files (like HEL or NHEL).
- Develop a new calculated data attribute (aka “Nitrogen Fertilizer Protection Index” – NFPI). This would be used to apply an overall “grade” to a submitted plan (very similar to the existing “SCI” and “STIR” values) based on its Nitrogen fertilizer controls effectiveness.
- Ultimately the software would provide a new report that builds upon the existing RUSLE2 reports (such as the Erosion Calculation Report) to show the suitability of the submitted fertilizer management plan's calculated effectiveness in protecting against inappropriate Nitrogen fertilizer loss into Source Waters. It would additionally provide improvement suggestions wherever it found deficient areas of the submitted plan.

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**Some examples of the many benefits that will be realized once this is place:**

- USDA will have a comprehensive view of water flow across farm plots including tile maps and other new attributes.
- USDA will have the ability to improve upon existing erosion models with the expanded information set.
- The USDA ARS RUSLE program’s previously invested capital will be directly leveraged ensuring its continued usage while simultaneously filling a desperately needed gap in water quality conservation.
- The new report will identify submitted plan weaknesses related to CAFO and Anhydrous Ammonia Nitrogen fertilizer that are being missed today due to incomplete information review.
- State run CAFO and Anhydrous Ammonia Nitrogen fertilizer application permit programs will have increased integrity and strengthened controls due to the new report.
- The new tool will also be useful in supporting several programs under the EPA’s Clean Water Act as well as individual states Drainage Law programs.
- **Most importantly, we will now have a comprehensive and much strengthened tool to assist in the protection of our Source Waters from two of the most pervasively used Nitrogen-based water-soluble fertilizers.**

We welcome your feedback and are willing to work with anyone in the United States government or their partners to assist in implementing this proposal.

Sincerely:

Veronica Lack & Benjamin Lack

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