

Preliminary Economic Impact Analysis  
WT 15-16

This rule package proposes agricultural performance standards that will apply in Silurian bedrock areas. The performance standards are designed to minimize the risk for pathogen delivery to groundwater in these areas. Silurian bedrock is located in the eastern portion of the state, including areas of Brown, Calumet, Dodge, Door, Fond du Lac, Kenosha, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Racine, Walworth, Washington and Waukesha counties.

Within the Silurian bedrock area, the rule sets forth spreading rates and practices that vary according to the depth to bedrock. Not all of these practices are required to be applied together throughout the Silurian bedrock area. Instead, the practices to follow are dependent on soil depth ranges over Silurian bedrock, including 0-2 feet, 2-3 feet, 3-5 feet and 5-20 feet. The rule provides options for compliance, depending on soil depth. The department's preliminary draft economic analysis considers the costs for various changes in practice that may result from the proposed rule requirements.

**Restrictions on Manure Application**

In areas with less than 2 feet of soil depth above Silurian bedrock or saturation, the rule prohibits the mechanical application of manure. Most of the croplands with less than two feet of soil over Silurian bedrock are located in Door and Kewaunee counties. Permitted CAFOs are already required to follow this prohibition, so CAFO farms will incur no additional cost. For non-permitted farms, increased costs may include the price of commercial fertilizer needed for fields where mechanical application of manure is not allowed. Other costs may include renting additional farmland on which to spread manure if a farmer cannot shift manure application to other fields. The department estimates the cost for farmers who convert to commercial fertilizer would be approximately \$150<sup>i</sup> per acre; the average price per acre for renting additional crop land in Wisconsin is \$134<sup>i</sup> per acre. These compliance options - use of commercial fertilizer and renting additional crop land - may also be used for areas with more than 2 feet of soil depth to bedrock.

**Cover Crop or Pre-Tillage Requirements**

For areas of the state with 2-3 feet, 3-5 feet, and 5-20 feet of soil depth above Silurian bedrock, the rule contains requirements for how producers apply liquid and/or solid manure to minimize the risk of leaching pathogens through the soil column into groundwater. Pre-tillage and incorporation or injection requirements apply unless cropland is in long term no-till or has perennial or established crops. Establishing a cover crop is a cost shareable best management practice through the state runoff management grant program, so farmers would pay 30% of the cost of a cover crop and the state would pay the cost share rate of 70%. Based on the average cost of establishing a typical cover crop such as Cereal Rye<sup>ii</sup> (\$20.60 per acre), the department estimates the cost of a cover crop would be approximately \$6.18 per acre for a farmer and approximately \$14.42 per acre for the state.

Cropland that does not implement perennial or cover crops will have to be tilled prior to liquid manure application to break up macropores and reduce the risk of manure leaching through the

soil column. No mechanical application of liquid manure is allowed unless pre-tillage is completed and manure is injected or incorporated within 24 hours. In areas with 2-3 feet and in areas with 3-5 feet of soil depth, no mechanical application of solid manure is allowed unless the manure is incorporated within 72 hours. The department estimates the cost of tillage (pre-tillage or incorporation) would be approximately \$15<sup>iii</sup> per acre.

If a farmer chooses incorporation or injection, the rule prohibits the incorporation or injection of manure at specified depths, depending on the amount of soil above the Silurian bedrock. The department estimates the average cost to inject manure is \$80<sup>iv</sup> per acre, while the average cost to incorporate manure with tillage equipment is \$15 per acre. Given these options, the department anticipates that farmers will choose incorporation over injection.

### **Reduced Application Rates**

The rule provides specified manure application rates as a compliance option for all soil depths greater than 2 feet. Liquid manure application rates are based on the type of soil. Reduced application in some areas may increase the manure hauling cost to other croplands. The department estimates the increased hauling may cost approximately \$3 per acre of cropland if a farmer chooses to comply by reducing application.

### **Timing of Manure Application**

If a farmer chooses the timing of manure application for compliance (manure must be applied within 10 days of planting or to a growing crop), additional manure storage capacity may be required. Any cost associated with holding manure for a longer time before land application would be building more manure storage, which is a cost shareable best management practice through the state runoff management grant program (cost share rate for manure storage 70%). The department estimates the cost of additional storage would be approximately \$500<sup>v</sup> per cow.

### **Pathogen Treatment Facilities**

Other options to comply with the requirements include reducing pathogens in manure before application using pathogen treatment facilities (manure digesters and manure composting). For liquid manure the average capital cost to construct a complete digester system that reduces pathogens to 500,000 CFU/ml or less is estimated to be \$1,500 per cow<sup>vi</sup>. Given this cost, the department anticipates that producers will choose other less costly compliance options such as reduced application rates or timing of manure application.

### **Setback Requirements**

Setbacks and restrictions apply throughout the Silurian bedrock area where manure applications are prohibited. These setbacks include the following features: community system, private system, direct conduit to groundwater, channels, closed depression and slopes draining to Silurian bedrock greater than 6% with a defined channel. Compliance actions in those areas could include increased use of commercial fertilizer and possibly the leasing of additional croplands for manure application. The department estimates the cost for farmers who convert to commercial fertilizer would be approximately \$150 per acre; the average price per acre for renting additional crop land in Wisconsin is \$134 per acre.

## Summary

Based on the department's preliminary analysis, the department estimates the cost of the requirements of this rule to be a moderate economic impact (less than \$20 million). The costs would be shared through the state cost share grant programs and between cropland owners within the Silurian bedrock area.

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i United State Department of Agriculture, Economic Research Service. "Commodity Costs and Returns: Corn, 2010-2015". Accessed June 6, 2017. <https://www.ers.usda.gov/data-products/commodity-costs-and-returns/>

ii Schnitkey, G., J. Coppess, and N. Paulson. "Costs and Benefits of Cover Crops: An Example with Cereal Rye." *farmdoc daily* (6):126, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, July 6, 2016. <http://farmdocdaily.illinois.edu/2016/07/costs-and-benefits-of-cover-crops-example.html>

iii University of Wisconsin, Eau Claire. "Wisconsin Agricultural Land Prices" <http://counties.uwex.edu/eauc Claire/files/2014/04/Wisconsin-Ag-Land-Prices-2008-2013.pdf>

iv University of Idaho Extension, 'Cost of Liquid Manure Application Systems,' Bulletin 888, 2014.

v University of Wisconsin Center for Dairy Profitability, 'Transitioning in Steps: Costs of Modernization,' February, 2005.

vi Cooperative Extension System, "Economics of Anaerobic Digesters for Processing Animal Manure," October 27, 2015. <http://articles.extension.org/pages/19461/economics-of-anaerobic-digesters-for-processing-animal-manure>