

WT-15-16 Response to EIA Comments

The Department received comments from various stakeholders on the Draft Economic Impact Analysis (EIA) for the proposed changes to ch. NR 151, Wis. Adm. Code, permanent rule WT-15-16. Comments not related to the proposed EIA are not addressed, including those related to costs associated with legal fees, road repairs, Total Maximum Daily Loads (TMDLs), and requests to apply the rule to additional areas of the state. The proposed draft rule which will have a public hearing and public comment period during Fall 2017. Below are comments on the EIA taken from letters received, and beneath each comment is the Department response.

Comment from Dairy Business Association (DBA) 1:

The proposed rule revision would implement a tiered system of performance standards for part of the state with a particular type of bedrock and shallow soils. The shallower the soil, the stricter the performance standards would be. The department has not identified the total number of acres that would be impacted by the revisions, let alone the number of acres that would fall into the various soil depth brackets. This makes an accurate estimate of the proposed revisions' cost impossible. This very fundamental question should not have been left unaddressed by the EIA.

Department response to DBA comment 1:

The department identified total possible number of cropland acres with 0-2 feet and 0-5 feet depths to bedrock that could be impacted by the proposed rule in the EIA using an analysis completed during several technical advisory committee meetings. The department's methodology to quantify cropland acres with 0-2 feet and 0-5 feet depths to bedrock can be reviewed at <http://dnr.wi.gov/topic/nonpoint/documents/nr151/20161115/EvaluationShallowSoilsOverCarbonateBedrockWI.pdf>. The department has quantified the number of cropland acres for 0-2 feet and 0-5 feet using available data, but not the cropland acres for 2-3 feet and 5-20 feet because accurate data to conduct this analysis are not available. The EIA assumes that not all cropland acres with 0-2 and 2-5 feet depth to bedrock currently receive manure, or if manure is applied, it is not used to meet the entire crop nutrient need. To assume that all of those cropland acres receive manure would overestimate cost and impact.

A review of all of the Nutrient Management Plans within Silurian bedrock would be needed to identify all of the cropland acres impacted by this rule. The department lacks the legal authority to access all Nutrient Management Plans. However, the economic information provided can be used in combination with depth to bedrock maps or SnapMaps by landowners with a current Nutrient Management Plan to determine the least-cost management option for their operation.

Comment from DBA 2:

The EIA is correct that farmers in the impacted area will need to rent more land as they are forced off fields with shallow soils or need more land because of reduced manure application rates. However, the department's analysis underestimates the cost farmers will face in increased rent. First, even though it is presented as a statewide number, the department appears to use national data to guess at the average land rent. Even a statewide number would not be as valuable as region-specific calculation, which could have been calculated using NASS statistics¹. Even this higher value would not truly reflect the land costs farmers would face because this rule will force land values and rents in regulated and neighboring areas to rise significantly. The rent increases will be greatest for land with deeper soils. At the same time, land with shallow soils could be less expensive to rent if this rule is implemented. Farmers that own a lot of land with shallow soils will likely have to rent more land at inflated prices while they see their existing farm devalued. The impact of these revisions on future land rents will likely create a perverse incentive for the least regulated farms to gravitate toward applying manure on the most sensitive soils, undermining the intent of the rule changes. Unfortunately, this point and any consideration of how the rule will shape land values and rents going forward has been completely left out of the draft EIA.

¹Using the average of the non-irrigated cropland rent price for the designated counties under the proposed rules shows us the actual rent cost is around \$150 per acre, not the \$134 per acre used in the draft EIA. USDA, National Agricultural Statistics Service, Wisconsin Ag News–County Cash Rent, Sept. 9, 2016, https://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/County_Estimates/WI_County_Cash_Rent_09_2016.pdf.

Department response to DBA comment 2:

The proposed rule associated with this EIA does not assume cropland will be taken out of production and require renting more land to offset such acreage loss. The EIA did not speculate on land rental values resulting from the proposed rule.

This rule addresses manure applications on Silurian bedrock and includes options for continued agricultural production on all existing cropland acres. DNR estimated the non-irrigated cropland rental rate at \$134 per acre. The rental rate used for this analysis was very close to the Wisconsin statewide average (\$131/acre) and the Silurian bedrock county average (\$136/acre) rental rates. Using NASS data, as suggested by DBA, DNR limited the analysis to the Silurian bedrock counties and determined the \$136/acre rental rate.

Based on these assumptions the economic impact is estimated to be moderate (less than \$20 million).

Comment from DBA 3:

It appears the same national data that served as the basis for the land rent estimate was used to estimate the cost of substituting commercial fertilizer for manure on crop fields. An attempt to find regional or state-specific data would be preferable. Making the switch from manure to commercial fertilizer has several other “costs” that are less easily quantified, but they should be noted: nitrate issues in nearby wells would probably get worse; long-term soil health and the higher yields associated with it could suffer; and there is a societal cost to using commercial fertilizers that are made up of components that must be shipped from across the globe, instead of locally-produced manure.

Department response to DBA comment 3:

The Department agrees that there are additional costs associated with switching from manure to commercial fertilizer and these are difficult to quantify. Farmers have options of what fertilizers to use in the future. Without making assumptions on an acre by acre basis, it is difficult to quantify the fertilizer costs. Because of the challenge in identifying all possible cost variables, the analysis used available data sources to support the resulting cost estimates.

Comment from DBA 4:

The EIA uses a study from Idaho as its source to estimate the average cost to injecting manure, which would be a requirement for some impacted land depending on soil depth and the type of manure being applied. More accurate, Wisconsin-specific numbers can and should be calculated².

² USDA, National Agricultural Statistics Service, Wisconsin Custom Rate Guide 2013, March 2013, https://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/custom_rates_2013.pdf.

Department response to DBA comment 4:

The proposed rule requires incorporating or injecting manure on shallow bedrock soils. The analysis used a \$15 per acre tillage cost to comply with this requirement because it was the lower cost compliance option when compared to the cost of injecting manure. When comparing the tillage rates within the Wisconsin Custom Rate Guide 2013 to the \$15 per acre tillage cost variable used for this analysis there is very little difference between the two rate estimates, thus there is no significant change to the economic impact analysis.

Comment from DBA 5:

In addition to requiring the purchase or rental of more land, reduced manure application rates will also add to manure transportation costs. The EIA references this and estimates the additional hauling cost at \$3 per acre. This may be a reliable figure, but no citation is provided for it, nor is there any rationale given for how it was arrived at if it is an internally generated number.

Department response to DBA comment 5:

DNR's rationale for the additional hauling cost of \$3 per acre was based on the following:

- The average manure hauling cost was \$15 per acre, a cost already incurred from current manure applications at crop N needs.
- The majority of soil types with reduced rates in the proposed rule are limited to 13,500 gallons per acre.
- The nitrogen need for corn crop is met at 16,500 gallons per acre (assumes concentration of 10 lbs. of N per 1,000 gal).
- The requirement for reduced rates on 2-5 foot shallow bedrock soils resulted in about a 20% reduction in manure applied per acre $((16,500 - 13,500)/16,500)$ gallons per acre).
- The remaining 3,000 gallons per acre of manure is applied to other acres which increases the manure hauling cost by 20% (20% of \$15 per acre equals \$3 per acre).

Comment from DBA 6:

One of the compliance options provided by the proposed rule for certain shallow soils would be to treat manure to kill pathogens. The rule sets a target pathogen level that farmers would be expected to achieve. Anaerobic digesters, which are already used on a small number of farms, are cited as one way to reach these reduced pathogen rates. In the EIA, DNR estimates the cost of using a digester at \$1,500 per cow. The source cited by the DNR gives a range of \$1,000 to 2,000 dollars per cow, so it might be more appropriate to use that same range. The cost of digester technology varies drastically depending on organic matter, bedding type and region, just to name a few variables. Wisconsin is home to global leader in on-farm digesters, but that company is very cautious in making specific cost estimates. Regardless of the accuracy of the DNR's cost estimate for using a digester, little thought was given to whether a normally functioning digester can actually meet the pathogen reduction requirements outlined in the proposed rule. Whether the digester costs \$1,000 per cow or \$5,000 per cow, a multi-million-dollar digester would be a poor investment in the impacted area if it cannot reduce pathogens sufficiently. We have yet to be reassured by any company involved in the installation or operation of these digesters that the specific level proposed by the rule would be obtainable. There are other methods to reduce pathogen levels, but their cost or practicality is not explored in the EIA.

Department response to DBA comment 6:

Building a manure treatment system (digester or other technology) is one of several options to comply with the proposed rule. If a farmer selects the digester option to comply with the proposed rule, DNR assumes this would include an analysis that the digester can meet the pathogen reduction requirements.

Comment from DBA 7:

In most soil-depth brackets, farmers will be expected to combine various practices in order to comply. The EIA looks at these practices in isolation. The cost and workability of combining the different performance standards is not examined. For example, the requirement that manure be applied within ten days of planting might appear to be cost neutral on its face. However, the reality on some farms is that the delay in application time could require additional manure storage capacity, which would be very costly. We recognize that the complexity of the systems at play make it hard to estimate all the costs of compliance. DNR likely recognizes that also, but it would be good if the department made more of an effort to acknowledge this complexity in the EIA.

Department response to DBA comment 7:

The department recognizes there is substantial complexity when assessing costs for complying with the proposed rule and such complexity makes it difficult to estimate all costs of compliance for multiple farms each having a different number of cropland acres with different depths of shallow bedrock soils, as well as different manure storage capacity. Every EIA involves making multiple assumptions to estimate costs to account for such complexity. This EIA was no different.

Comment from DBA 8:

The DNR minimizes the true cost of these rule changes by exaggerating the potential for using cost-share dollars to offset expenses. The EIA gives the impression that cost-share dollars are always available to cover 70 percent of the costs associated with implementing the new targeted performance standards. This is not accurate. First, not all farms will be eligible for cost-share funds. Even when cost-share is available, farms are not always reimbursed for a full 70 percent of the project. Finally, the economic benefit of receiving cost-share dollars may be reduced by other strings attached to these funds. For example, a farm may need to spend \$500,000 to install some practice to comply with NR 151. The farm might only be eligible for cost-share if it also implements additional facility upgrades that are unrelated to NR 151. If a farmer must spend \$350,000 on other upgrades to qualify for the \$350,000 in cost-share for NR 151 practices, it would not be fair to say the NR 151 compliance only costs the farm \$150,000.

Department response to DBA comment 8:

This EIA assumes there are some cost-share dollars available to cover 70 percent of the costs associated with implementing the new targeted performance standards. It does not assume that cost-sharing to 70% will be available in all situations. For example, Targeted Runoff Management (TRM) grants are capped at \$150,000 and may not be enough to pay for a new manure storage system in entirety. Notice of Discharge (NOD) grants do not have a cap amount, and may pay for 70% of the entire manure storage system if the noncompliance results in a discharge. When the farmer meets the requirements for economic hardship, TRM and NOD may have to provide up to 90% cost sharing. DNR does not require farmers to pay for facility upgrades unrelated to NR 151 compliance.

Comment from DBA 9:

The department needs to clarify which of the proposed new requirements would be applicable to non-CAFOs absent cost-share funds. This topic was repeatedly discussed during Technical Advisory Committee meetings. Are outright prohibitions on spreading liquid manure on ground with less than two feet of soil or the new setbacks applicable to all farms or just CAFOs and a small handful of others? If they are applicable to all farms, the cost of compliance for non-CAFOs is not adequately addressed in the EIA. If these new rules are not applicable to all farms, that will reduce the cost of the proposed new rule, but it will also hinder its effectiveness. It appears likely that more than half of the livestock in the affected area is on non-CAFO farms. If that manure is left largely unregulated, it is hard to see how these new rules will do much of anything for water quality. Indeed, some of the new rules would be almost completely pointless. A prohibition on liquid manure on two feet or less of soil does not mean much if it is only applied to CAFOs that already are prohibited from applying any manure on that shallow of soil.

Department response to DBA comment 9:

The proposed rule prohibits spreading liquid manure on ground with less than two feet of soil over shallow bedrock and includes setbacks from direct conduits to groundwater and related features. These requirements apply to all farms in Silurian bedrock, regardless of size. The EIA assumed CAFOs were already meeting the 0-2 foot prohibition, because that requirement already exists for permitted CAFOs. The economic analysis reflects the costs to non-CAFO farms to meet that requirement. With respect to setbacks we assumed CAFOs met some, but not all of the rule setback requirements because the standards go beyond what is required of permitted CAFOs. Non-CAFOs were not meeting these requirements.

Comment from DBA 10:

The EIA completely ignores the large cost of infield soil-depth verification. It is possible that DNR has avoided addressing the costs associated with this type of verification because it plans to leave the development of verification guidelines to the Department of Agriculture. We admit that makes estimating the cost associated with verification a challenge, but it is disingenuous to not consider such costs as direct results of this rule revision. Furthermore, these costs will be substantial because verification will be required on farms that have soil depths at or near 20 feet. There is no easy way to determine soil depth in those cases. Multiple costly excavations might be required for the same field. Not only is the cost of soil-depth verification not specified (probably because the department has no idea what it would be), but the total cost of these verifications is greater than just the expense of doing the borings or excavations. After all, there is a cost associated with the time it takes farmers to complete this verification when they would otherwise be engaged in other farm work. This is especially important since the verification would probably be done during the short windows of time in the spring and fall outside of the growing season; these are the busiest possible time for a farmer.

Department response to DBA comment 10:

The proposed rule does not require verifying bedrock depth greater than 5 feet. DNR agrees there is a cost associated with this verification. There are various options available to farmers to verify depth to bedrock. The Department is committed to working with the Department of Agriculture to develop verification guidelines as required by ATCP 50.

Comment from DBA 11:

To contain the significant costs associated with the proposed rule, farmers should not be required to do infield soil-depth verifications unless they want to. We have existing soil-depth maps that were relied on during the crafting of this rule. Farmers should be able to rely on these maps too. They should only have to do infield verification if they are trying to demonstrate that the existing maps are inaccurate and they have deeper soils than those maps indicate.

Department response to DBA comment 11:

Farmers are only required to do in-field soil-depth verification on 0-5 feet in the proposed rule. This shallow depth makes verification relatively less costly. CAFOs are already required to complete in-field soil depth verification before mechanically applying manure on 0-2 feet depth to bedrock. The EIA assumes the practice of field verification is already occurring where a farm is following a nutrient management plan. A tenant of nutrient management planning is to check the fields before nutrient applications.

Comment from DBA 12:

Compliance costs in some of the impacted area could be significant. Those costs and increases in land values and rents could threaten the survival of some farms, particularly at a time of sustained low milk prices and tight credit markets. Other farms might stay in business but choose to relocate part or all of their operations. Both these impacts will affect the economy beyond the farm that ceased or moved operations. Farming and agribusiness is one of the largest economic drivers in our state. In some of the counties that will be most heavily impacted by this rule, the role of agriculture in the local economy is even more significant. These costs are hard to predict or quantify now, but they should not be discounted. Dairy farmers and members of the agribusiness community take these rules seriously, and so should regulators. The current EIA appears to be a half-hearted attempt to calculate the true economic impact of the proposed rule. It is less the result of careful analysis and more an attempt to move the proposed rule revisions forward with as little scrutiny as possible. The reliance on national or out-of-state figures when Wisconsin or region-specific numbers could be found with little effort is disappointing. DBA appreciates the opportunity to be heard on this matter. We understand the desire for targeted performance standards in certain areas of the state; however, DBA believes the entire impact of proposed regulations should be better understood before promulgating new rules.

Department response to DBA comment 12:

We agree the costs described above may be hard to predict and that compliance costs in some local areas could be significant if a majority of cropland acres on a farm are prohibited from manure spreading due to 0-2 foot depth to bedrock where the farm relies solely upon manure to meet crop needs.

The EIA provides a careful analysis of costs and impacts to farms. It uses assumptions where uncertainty exists. The public review and comment period associated with promulgating rules allows opportunity to scrutinize the proposed rule revisions and provide additional information.

Comments from Lincoln Township Board of Supervisors, Kewaunee County:


To whom it may concern:


We are writing in regards to the Economic Impact Analysis being conducted relative to the revisions to NR151. Our concern is that the economic study is only accounting for one of the many economies that are impacted by the proposed edits. What is not being taken into account are the costs being borne by the communities where the existing regulation has failed to protect the ground and surface water that residents and taxpayers rely on to live.


We believe that these "other costs" (conservatively estimated at over \$25 million) should be used as an offset to the calculated agricultural segment's EIA. We would be remiss to not point out that our constituents are keenly aware, and remind us frequently, that the ag segment already receives significant taxpayer assistance in the form of subsidies and cost sharing. Costs to comply with rules and regulations, regardless of whether they are existing or evolving, should be treated as a cost of doing business, a requirement for any other business or industry. While it is a nicety for the state to be concerned about the costs to the agricultural industry, the state's primary responsibility should be to the taxpayers and the costs they are burdened with by not instituting these more rigorous protections.

Please feel free to contact us with any questions or concerns.

Town of Lincoln Board of Supervisors


Cory Cochart, Town Chair


Nick Cochart, Supervisor #1


Jesse Jerabek, Supervisor #2

Economic Impact Analysis of CAFOs on Lincoln Township, Kewaunee County, Wisconsin

Cost to develop ground water protection strategies - Kewaunee County has local zoning: each Township develops their own ordinances. To properly protect ground and surface water, and to do so in a manner that is defensible, the Town will need to enlist the help of scientists and attorneys. In Lincoln Township, we have already spent well in excess of \$70,000 to develop maps and data that support our ordinances. This includes \$43,500 for groundwater mapping¹, \$17,000/year for semi-annual well testing of 25 wells for up to 10 years², \$4460 (Lincoln Township's portion of the \$10,510 project) for a one-year well testing program of 10 wells³, and \$5000 for a Whole House Water Treatment Pilot Study⁴, plus annual expenses for the DNR-trained stream water sampling for testing⁵.

Purchase of Water treatment systems and clean water supply - Continued loss of water quality will require homeowners' purchase of whole house systems at a cost of \$7,000 to 16,000 per home⁶, with a median cost of \$11,500. There are 362 housing units in Lincoln Township⁷. A random sample (not "self-selected") of 320 homes in Kewaunee county found that 34.4% were contaminated with bacteria or unsafe levels of nitrates⁸. Assuming that the Town of Lincoln is representative of Kewaunee County, this equates to 110 homes in the township that require water treatment systems. At a median cost of \$11,500 per system, a conservative total is \$1,265,000 to assure that all township residents have water that is safe to consume. And this assumes that no more wells are found to be contaminated.

Cost of more frequent water testing - Experts have stated annual testing of wells is not sufficient; quarterly testing at a minimum should be required to adequately analyze the groundwater safety situation⁹. At a cost of \$50 per quarterly test for 362 households in Lincoln Township, the incremental cost exceeds \$72,400 per year.

Loss of tax base – At least one family in the neighboring Town of Pierce has had their property taxes lowered due to proximity to a CAFO. According to the Town of Lincoln Tax Assessor¹⁰, a 20% reduction in assessed value due to proximity to a CAFO, well contamination due to manure spreading, and pervasive odors from the CAFO lagoon that impinge on use of house and property is a reasonable average percentage to use.

The total assessed value of all property in the Town of Lincoln in 2017 was \$98,184,300. The total assessed value of all residential class properties in the Town of Lincoln in 2017 was \$47,863,500¹¹. If a conservative estimate of only 10% of the 34% of the town residents whose wells have been tested and have exhibited excessive nitrate and / or bacteria were to apply for and be granted a 20% reduction in their property taxes, the total tax impact would exceed \$320,000.

Township Legal fees - No doubt, the Wisconsin Dairy Business Association or others who feel threatened by ground and surface water protection will bring legal actions as they did against the Town of Lincoln in 2014. That action, in which the town prevailed, cost the township over \$14,000 in legal fees¹². Given the track record of the WDBA, (and the fact that they filed a law suit against the DNR just last week "charging that the agency has exceeded its authority by issuing and enforcing 'blatantly illegal

rules related to the permitting and operation of large Wisconsin livestock farms”¹³) this is likely only a warning shot of what to expect in the future.

In addition to unforeseen legal challenges, the Town of Lincoln budgets \$10,000 annually for legal counsel¹⁴.

Cost for road repairs – According to the Wisconsin Towns Association, a typical newly normally paved 50 year township road with 3" of asphalt over 6" of gravel will only last 10 years under condition from a 1750 cow dairy that receives 5000 trips annually from the CAFO.¹⁵

Lincoln Township has three CAFOs: one with over 6000 cattle, one with over 5000 cattle, and one with over 2750 cattle¹⁶. Given three CAFOs and this number of cattle, the town roads see considerably more abuse than the example offered by the WTA, even though the CAFOs use some county roads for their traffic. With an average annual budget of nearly \$175,000 for road repair over the past 10 years¹⁷, it is estimated that about 50%¹⁸ or about \$87,000 is attributable annually to CAFO wear and tear.

TMDL program - As the County is already in the unfortunate position to have all our major waterways on the EPA's impaired list, the cost to taxpayers to put each of those watersheds into the TMDL program is in excess of \$60,000 apiece. The cost of an eventual taxpayer funded cleanup would be in the millions of dollars.

Based on the above analysis, the Town of Lincoln either has incurred or could have conservatively estimated one-time expenses of \$1,729,000 due to CAFOs operating in Kewaunee County and the township. Recurring annual expenses amount to nearly \$170,000. These are real and documented costs for the Town of Lincoln!

There are 14 townships in Kewaunee County that are impacted by land spreading of manure from CAFOs. Extrapolating from Lincoln Township, the total one-time cost to taxpayers in Kewaunee County could easily equal (or exceed) \$24,206,000. Annual expenditures could equal or exceed \$2,380,000.

Additional Kewaunee County Land and Water Conservation Department staff – Additional staff are needed to work with home owners and farmers. One additional person per year in only a five year period costs the taxpayers over \$250,000 in total compensation.

Loss of common resource – Priceless.

Department response to Lincoln Town Board Supervisors, Kewaunee County:

Potential costs associated with groundwater protection strategies, water treatment systems, water testing, additional staffing, and loss of tax base or property values, described above do not change the estimated cost to comply with the proposed rule.

Comments from Clean Wisconsin, Clean Water Action Council, Midwest Environmental Advocates, and Wisconsin League of Conservation Voters:

August 7th, 2017

To: Pam Biersach

From: Clean Wisconsin, Clean Water Action Council, Midwest Environmental Advocates, and Wisconsin League of Conservation Voters

Prepared by: Scott Laeser, Water Program Director, Clean Wisconsin, and Paul Mathewson, Staff Scientist, Clean Wisconsin

Subject: Economic Impact of Proposed NR 151 Targeted Performance Standards

The draft NR 151 rules recently issued by the Wisconsin Department of Natural Resources to address drinking water contamination in Northeast Wisconsin represent a good step towards better managing livestock waste that is polluting groundwater. It is imperative that the Economic Impact Analysis (EIA) conducted for these rules consider the benefits cleaner drinking water will provide for Wisconsin citizens in the affected counties. Reducing well contamination in parts of WI exceptionally vulnerable to groundwater pollution from surface sources like livestock waste will reduce health risks and health costs for Wisconsin citizens, save taxpayers and citizens money on well replacement or water filtration systems, and improve real estate values and quality of life for all residents in vulnerable areas of the state regardless of whether their well has been contaminated to date.

Additionally, the federal and state government, counties, and local municipalities spend tens of millions of dollars each year managing non-point source agricultural pollution. Just this year, Wisconsin committed up to \$20 million to fund manure digesters that could in theory help reduce groundwater contamination by treating manure and reducing pathogens before that waste is spread on farm fields (WPSC, WDNR, WDATCP 2017). Numerous cost share and grant programs help farmers build manure management infrastructure, develop plans to carefully apply manure to minimize groundwater and surface water contamination, and install field conservation practices that help retain water and the nutrients and pathogens in it. These are all continuing costs citizens and taxpayers bear as part of efforts to responsibly manage manure and reduce water pollution from agricultural sources. The proposed rules will incrementally reduce this burden for addressing water contamination from livestock pollution.

We present below research that documents tangible economic benefits resulting from clean drinking water and ask the WI DNR to incorporate these benefits into the EIA.¹

Economic effects of contaminated groundwater on property values

¹ Note: all dollar figures presented below have been converted into 2017 dollars from the original study using the Bureau of Labor Statistics inflation calculator to provide consistency across different study years.

The limited studies available indicate that groundwater contamination can affect property values, much like the better-studied relationship between surface water quality and property values. Such potential costs should be considered in the EIA, particularly since this is likely to be an issue when the contamination is as widely-known as it is in the affected counties. It is also important to note that the studies found that the value loss is only temporary and values rebound once the contamination is addressed, underscoring how rules like these can have a real economic impact on property values.

While studies on the effects of groundwater microbial contamination on property values are lacking, of most relevance, Guignet et al. (2016) investigated the effect of agricultural contamination (nitrates, pesticides, and metals) of Florida property values and found a 2-6% decline in value as a result of contamination. Higher reductions were found when contamination exceeded regulatory standards (e.g., health standards); properties declined in value 7-15% when nitrate levels exceeded twice the regulatory standard.

Other relevant studies to consider:

- a. Boyle et al. (2010) found that Maine home prices declined 0.5%-1.0% for every 0.01 mg/L arsenic contamination above the regulatory limit.
- b. Case et al. (2006) found a 4.65% reduction in prices of Scottsdale, AZ, residential condominiums where groundwater was contaminated by volatile organic compounds.
- c. Malone & Barrows (1990) found that nitrate contamination of residential property wells in Portage County, WI, created costs like sellers' remediation or treatment of the problem prior to sale.

Economic Value of Avoided Illnesses

The value of avoided illness is another important economic impact that should be considered. Table 1 summarizes studies investigating household-level costs of relevant gastrointestinal illnesses from contaminated drinking water sources or incidental exposure to contaminated water from recreation. Except for severe cases, the majority of the cost comes from lost productivity (i.e., work days lost). Where visits to health care providers are involved, the listed costs underestimate the full economic impact of the illnesses because they do not include payments made by insurance companies.

An additional study of a 24-day salmonella outbreak from contaminated drinking water in Alamosa, CO (Ailes et al. 2013) calculated costs to insurers, businesses and government in addition to households. The study calculated that the city's 156 businesses lost over \$500,000 due to closures and additional expenditures for clean

water and ice. Governmental organizations were calculated to spend over \$700,000 in response to the outbreak. Of total outbreak-related costs calculated in the study, the largest percentage was borne by households (33%), followed by governmental organizations (26%), and businesses (24%).

Economic Value of Avoidance Measures

A third category of important economic impact that should be considered is the cost of measures being taken to avoid drinking contaminated water, such as purchasing bottled water, buying treatment devices or digging new wells. The revised rule should reduce the need for people to take such measures. Table 2 summarizes findings from studies quantifying costs to avoid contaminated drinking water.

Other figures to consider relating to avoidance costs:

- The Wisconsin Department of Administration’s Fiscal Estimate for this rule revision states the average cost to replace a contaminated well at \$12,000 (WDoA 2017).
- An April 22, 2016, Door County Pulse article quotes Stonehouse Water Technologies as saying that the filtered dispenser system they donated to Algoma High School to provide clean drinking water to area residents costs \$8,000-\$9,000 plus \$1,500 for installation and \$4,000- \$5,000 for annual maintenance and filters (Lundstrom 2016).
- The Groundwater Collaboration Workgroup’s Final Report recommended a one-time appropriation of \$300,000 for reparations including providing safe water supplies, treatment systems, and new well construction, as well as \$10,000 annually to supply emergency clean water supplies (GCW 2016).
- Costs estimated to be associated with the temporary water supply program authorized by Wis. Admin. Code Ch. NR 738.
- Costs estimated to be associated with the well compensation program under Wis. Admin. Code Ch. NR 123.

Table 1. Summary of studies of household-level gastrointestinal medical costs associated with exposure to contaminated drinking or surface water.

Exposure	Medical Costs	Costs Included	Source
Recreational exposure from swimming or wading in six US states (AL, IN, MI, MS, OH, RI).	Mean cost per case of acute gastrointestinal illness was \$189 (range: \$7-\$1,396)	Medications, doctor visit, ER visits, lost productivity.	DeFlorio-Barker et al. 2017
Recreational exposure from various boating-related activities in Chicago-area waterways.	Mean cost per case of acute gastrointestinal illness was \$212 (range: \$4-\$3,381)	Medications, doctor visits, ER visits, lost productivity.	DeFlorio-Barker et al. 2017
Recreational exposure from Orange County, CA, beaches	Mean cost per gastrointestinal illness was \$51	Doctor visits, lost productivity.	Dwight et al. 2005

<i>Cryptosporidium</i> outbreak in Milwaukee, WI, drinking water supplies.	Per case costs for mild illness was \$196; moderate illness cost \$804; severe illness cost \$13,220.	Hospitalization, doctor visit, ER visits, ambulance transport, medications, lost productivity.	Corso et al. 2003
<i>Giardia</i> -contaminated groundwater in Luzerne County, PA.	Per case costs calculated to be \$912-\$1,208.	Hospitalization, doctor visit, ED visit, lab tests, medications, lost productivity.	Harrington et al. 1989

Table 2. Household costs of contaminated drinking water avoidance

Contamination	Avoidance	Cost	Source
Giardiasis in Luzerne County, PA	Transporting water, boiling water, buying bottled water	Monthly household costs of \$239-\$753.	Harrington et al. 1989
Bacterial, mineral, and organic in rural WV	Transporting water, boiling water, buying bottled water, installing home systems, repairing water systems	Monthly household costs of \$50-\$56.	Collins & Steinback 1993
Giardiasis in Milesburg, PA	Transporting water, boiling water, buying bottled water	\$25-\$66 per month	Laughland et al. 1993
Perchloroethylene in College Township, PA	Transporting water, boiling water, buying bottled water, installing home systems	\$41-\$50 per month	Abdalla 1990
Trichloroethylene in College Township, PA	Transporting water, boiling water, buying bottled water, installing home systems	\$25-\$55 per month.	Abdalla et al. 1992
Nitrates in MN	Bottled water	\$213 (range: \$40-\$672) per year.	Lewandowski et al. 2008
Nitrates in MN	Reverse osmosis: system not specified (presumably point-of-use)	\$97 (range: \$28-\$224) per year.	Lewandowski et al. 2008
Nitrates in MN	Distillation system	\$1076 (range: \$213-\$3,360) initial cost.	Lewandowski et al. 2008
Nitrates in MN	New well	\$8,064 (\$3,360-\$16,800) initial cost	Lewandowski et al. 2008
Nitrates in MN	Reverse osmosis: point-of-use system	\$497 (up to a 4-person household) per year.	Sargent-Michaud et al. 2006.
Nitrates in MN	Reverse osmosis system: point-of-entry system	\$1,510 (2-person household) - \$3,072 (4-person household) per year.	Sargent-Michaud et al. 2006.
Nitrates in MN	Bottled water	\$777 (2-person household) - \$1,555 (4-person household) per year.	Sargent-Michaud et al. 2006.

In conclusion, we look forward to seeing an economic analysis of the impacts of these proposed rules that considers both the moderate and reasonable, though not insubstantial, costs this rule will present for agricultural producers as well as the clean water benefits it will provide to every citizen in Northeast Wisconsin that lives in the counties impacted by the rules. Thank you for considering our comments.

Please direct any follow up to:

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REFERENCES

- Abdalla CW. 1990. Measuring economic losses from ground water contamination: an investigation of household avoidance costs. *Water Resources Bulletin* 26:451-463.
- Abdalla CW, Roach BA, Epp DJ. 1992. Valuing environmental quality changes using averting expenditures: an application to groundwater contamination. *Land Economics* 68:163-169.
- Ailes E, Budge P, Shankar M, Collier S, Brinton W, et al. (2013) Economic and Health Impacts Associated with a Salmonella Typhimurium Drinking Water Outbreak -- Alamosa, CO, 2008. *PLoS ONE* 8: e57439. doi:10.1371/journal.pone.0057439
- Boyle KJ, Kuminoff NV, Zhang C, Devanney, M, Bell KP. 2010. Does a property- specific environmental health risk create a “neighborhood” housing price stigma? Arsenic in private well water. *Water Resources Research*. doi: 10.1029/2009wr008074
- Case B, Colwell PF, Leishman C, Watkins C. 2006. The impact of environmental contamination on condo prices: a hybrid repeat-sale/hedonic approach. *Real Estate Economics* 34: 77-107.
- Collins, AR and S Steinback. 1993. Rural household response to water contamination in West Virginia. *Water Resources Bulletin* 29: 199-209.
- Corso PS, Kramer MH, Blair KA, Addiss DG, Davis JP, Haddix AC. 2003. Cost of illness in the 1993 waterborne cryptosporidium outbreak, Milwaukee, Wisconsin. *Emerging Infectious Diseases* 9: 426-431
- DeFlorio-Barker S, Wade TJ, Jones RM, Friedman LS, Wing C, Dorevitch S. 2017. Estimated costs of sporadic gastrointestinal illness associated with surface water recreation: a combined analysis of data from NEEAR and CHEERS studies. *Environmental Health Perspectives* 125: 215-222.
- Dwight RH, Fernandez LM, Baker DB, Semenza JC, Olson BH. 2005. Estimating the economic burden from illnesses associated with recreational coastal water pollution: A case study in Orange County, California. *Journal of Environmental Management* 76:95-103.
- Groundwater Collaboration Workgroup. 2016. Final Report: June 2016. Available at: <<http://dnr.wi.gov/topic/Groundwater/CollaborationWorkgroup.html>>. Last accessed August 4, 2017.
- Guignet D, Walsh PJ, Northcutt R. 2016. Impacts of ground water contamination on property values: agricultural run-off and private wells. *Economics of Water Quality* 45: 293-318.
- Harrington W, Krupnick AJ, Spofford Jr WO. 1989. The economic losses of a waterborne disease outbreak. *Journal of Urban Economics* 25: 116-1137.
- Laughland AS, Musser LM, Musser WN, Shortle JS. 1993. The opportunity cost of time and averting expenditures for safe drinking water,” *Water Resources Bulletin* 29:219-229.
- Lewandowski AM, Montgomery BR, Rosen CJ, Moncrief JF. 2008. Groundwater nitrate contamination costs: a survey of private well owners. *Journal of Soil and Water Conservation* 63: 153-161.
- Lundstrom J. 2016. Company wants to expand Algoma Water Pod program. *Peninsula Pulse*, April 22, 2016. Available at: <<https://doorcountypulse.com/milwaukee-company-wants-expand-water-pod-program/>> Last accessed August 4, 2017.

Malone P and R Barrows. 1990. Ground Water Pollution's Effects on Residential Property Values, Portage County, Wisconsin. *Journal of Soil and Water Conservation* 45: 346–348.

Sargent-Michaud J, Boyle KJ, Smith AE. 2006. Cost effective arsenic reductions in private well water in Maine. *Journal of the American Water Resources Association* 42: 1237-1245.

Wisconsin Department of Administration. 2017. Fiscal Estimate & Economic Impact Analysis. WT-15-16. New agricultural performance standards for farms that apply manure in areas of the state with shallow soils over Silurian bedrock (sensitive areas). Available at:
<<http://dnr.wi.gov/news/input/documents/rules/WT1516FiscalEstimate.pdf>> Last accessed: August 4, 2017.

Wisconsin Public Service Commission, Wisconsin Department of Natural Resources, Wisconsin Department of Agriculture, Trade, and Consumer Protection. 2017. Integrated anaerobic digester system program: request for proposals & application template. Available at:
<<https://psc.wi.gov/Documents/OEI/RFP/RFPerrata.pdf>>. Last accessed August 4, 2017.

Department responses to comments received from Clean Wisconsin, Clean Water Action Council, Midwest Environmental Advocates, and Wisconsin League of Conservation Voters:

The EIA mentions possible impacts to property values and average cost of well replacement due to contamination. Local sources of data related to property value loss were not available or have a large variability in cost, and therefore, were not included in the EIA. The potential costs of well replacement, illness, or property value loss resulting from groundwater contamination do not affect the cost of compliance with the proposed rule.

