



JOHNS HOPKINS  
CENTER *for* A LIVABLE FUTURE

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Minnesota Pollution Control Agency  
520 Lafayette Road N  
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*Disclaimer: The opinions expressed herein are our own and do not necessarily reflect the views of the Johns Hopkins University.*

Dear Commissioner Kessler,

Thank you for the opportunity to comment on the Minnesota Rules Chapter 7020 governing animal feedlots (Revisor ID: R-04928).

We are researchers at the Johns Hopkins Center for a Livable Future (CLF), an interdisciplinary academic center at the Johns Hopkins Bloomberg School of Public Health dedicated to advancing equitable, resilient, and sustainable food systems through science and systems-based approaches. CLF has actively researched the public health implications of industrial animal agriculture since our founding in 1996.

As the Minnesota Pollution Control Agency (MPCA) begins rulemaking on planned amendments to the rules governing animal feedlots, we commend your efforts to gather new information, research and understanding regarding agriculture and the environment. In this comment, we first provide a brief explanation of the link between agriculture and public health as it pertains to feedlots and the application of manure to agricultural land. Next, we provide references to key research on manure application and water quality, including the health effects of high nitrate levels in surface and groundwaters.

### **1. Impacts of feedlots on environmental public health**

Agriculture is a major contributor to the degradation of local community environments and water sources in the US. Research has shown that many of these communities located near large animal feedlots bear the undue burdens of poor environmental quality, poor health and poor economic conditions and that this is experienced disproportionately more by communities of color, low socioeconomic status and vulnerable populations.<sup>1</sup> These conditions are emblematic of the environmental justice issues faced by many rural communities. We highlight this point as the MPCA has highlighted its commitment to environmental justice in decision-making. We urge the agency to consider this lens and the disproportionate impacts that revisions to the animal feedlot rules may have on already burdened communities in Minnesota.

The agricultural application of chemical fertilizers and manure are key sources of environmental and water pollution that compromise our environment and harm public health. Overapplication of manure and waste from these facilities can contaminate surface and groundwater with an array of health hazards.<sup>2,3</sup> For example, antimicrobial residues<sup>4</sup>, pathogenic bacteria and antibiotic resistance genes<sup>5</sup> have been found in surface and groundwater near concentrated poultry feeding operations. One study conducted in the Chesapeake Bay watershed found higher levels of nitrates (a form of nutrient pollution)

and antibiotic-resistant pathogenic *E. coli* in waterways closer to poultry farms with larger numbers of animal<sup>6</sup>. Similarly, antibiotic-resistant *Salmonella* and *enterococci*, as well as fecal indicator bacteria<sup>7</sup>, were detected in the surface waters where swine waste runoff occurs. Numerous studies have demonstrated that humans can be exposed to waterborne contaminants from livestock and poultry operations through the recreational use of contaminated surface water and the ingestion of contaminated drinking water.<sup>8,9</sup>

## **2. Additional resources on the application of manure and water quality**

Given that the MPCA is seeking new information and research on the impacts of manure practices on water quality and public health, we strongly recommend that the agency review and incorporate findings from the following (and referenced) scientific studies and resources into its rulemaking:

- Jones, CS (2024). Water Pollution – Regional, National and Global Impacts. In J. Merchant & R. Martin (Eds.), *Industrial Farm Animal Production, the Environment, and Public Health*. Johns Hopkins University Press.

Specifically, regarding high levels of nitrate in surface and drinking waters:

- Exposure to elevated levels of nitrates in drinking water is associated with adverse health effects, including cancer<sup>10,11</sup> and birth defects<sup>12</sup>.

Specifically, regarding nutrient runoff and the impacts of climate change:

- Nutrient runoff (including nitrogen and phosphorus) has also been implicated in the growth of harmful algal blooms which may pose health risks for people who swim or fish in recreational waters, or who consume contaminated fish and shellfish.<sup>3,13</sup> Exposure to algal toxins has been linked to acute gastrointestinal illness, liver damage, and other adverse health effects.<sup>14,15</sup> Harmful algal blooms and water contamination events are expected to occur more frequently due to extreme weather events induced by climate change<sup>16</sup>.

We look forward to reviewing and further commenting on any forthcoming revisions to the Rule. Thank you for considering our comments.

Sincerely,

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## References

1. Donham KJ, Wing S, Osterberg D, et al. Community health and socioeconomic issues surrounding concentrated animal feeding operations. *Environ Health Perspect* 2007; **115**(2): 317–20.
2. Graham JP, Nachman KE. Managing waste from confined animal feeding operations in the United States: the need for sanitary reform. *Journal of water and health* 2010; **8**(4): 646–70.
3. Burkholder J, Libra B, Weyer P, et al. Impacts of waste from concentrated animal feeding operations on water quality. *Environ Health Perspect* 2007; **115**(2): 308–12.
4. Campagnolo ER, Johnson KR, Karpati A, et al. Antimicrobial residues in animal waste and water resources proximal to large-scale swine and poultry feeding operations. *The Science of the total environment* 2002; **299**(1-3): 89–95.
5. Hubbard LE, Givens CE, Griffin DW, Iwanowicz LR, Meyer MT, Kolpin DW. Poultry litter as potential source of pathogens and other contaminants in groundwater and surface water proximal to large-scale confined poultry feeding operations. *Science of The Total Environment* 2020; **735**: 139459.
6. Amato HK, Wong NM, Pelc C, et al. Effects of concentrated poultry operations and cropland manure application on antibiotic resistant *Escherichia coli* and nutrient pollution in Chesapeake Bay watersheds. *The Science of the total environment* 2020; **735**: 139401.
7. Heaney CD, Myers K, Wing S, Hall D, Baron D, Stewart JR. Source tracking swine fecal waste in surface water proximal to swine concentrated animal feeding operations. *The Science of the total environment* 2015; **511**: 676–83.
8. Rosenberg Goldstein RE, Cruz-Cano R, Jiang C, et al. Association between community socioeconomic factors, animal feeding operations, and campylobacteriosis incidence rates: Foodborne Diseases Active Surveillance Network (FoodNet), 2004-2010. *BMC Infect Dis* 2016; **16**(1): 354.
9. Murray RT, Cruz-Cano R, Nasko D, et al. Association between private drinking water wells and the incidence of Campylobacteriosis in Maryland: An ecological analysis using Foodborne Diseases Active Surveillance Network (FoodNet) data (2007-2016). *Environmental research* 2020; **188**: 109773.
10. Essien EE, Said Abasse K, Cote A, et al. Drinking-water nitrate and cancer risk: A systematic review and meta-analysis. *Archives of environmental & occupational health* 2022; **77**(1): 51–67.
11. Picetti R, Deeney M, Pastorino S, et al. Nitrate and nitrite contamination in drinking water and cancer risk: A systematic review with meta-analysis. *Environmental research* 2022; **210**: 112988.
12. Brender JD, Weyer PJ, Romitti PA, et al. Prenatal nitrate intake from drinking water and selected birth defects in offspring of participants in the national birth defects prevention study. *Environ Health Perspect* 2013; **121**(9): 1083–9.
13. Backer LC, Manassaram-Baptiste D, LePrell R, Bolton B. Cyanobacteria and algae blooms: Review of health and environmental data from the Harmful Algal Bloom-Related Illness Surveillance System (HABISS) 2007-2011. *Toxins (Basel)* 2015; **7**(4): 1048–64.

14. Lad A, Breidenbach JD, Su RC, et al. As We Drink and Breathe: Adverse Health Effects of Microcystins and Other Harmful Algal Bloom Toxins in the Liver, Gut, Lungs and Beyond. *Life (Basel)* 2022; **12**(3): 418.
15. Young N, Sharpe RA, Barciela R, et al. Marine harmful algal blooms and human health: A systematic scoping review. *Harmful Algae* 2020; **98**: 101901.
16. Schaffer-Smith D, Myint SW, Muenich RL, Tong D, DeMeester JE. Repeated Hurricanes Reveal Risks and Opportunities for Social-Ecological Resilience to Flooding and Water Quality Problems. *Environmental science & technology* 2020; **54**(12): 7194–204.