June 15, 2023

Kelli Book
Iowa Department of Natural Resources
502 East 9th Street
Des Moines, IA 50319-0034
afo@dnr.iowa.gov

Dear Ms. Book:

The undersigned organizations offer the following comments on the draft rules regulating animal feeding operations.

The undersigned organizations have worked to improve water quality in Iowa for decades. These range from the Iowa Environmental Council (IEC), an alliance of more than 100 organizations, to locally-led grassroots groups that are focused on protecting their health and nearby natural resources. Members of our organizations hike, fish, paddle, swim, and recreate in and around lakes, rivers, and streams throughout the state. And like other Iowans, our members rely on the State of Iowa to provide access to safe, clean drinking water.

While we continue to support the consolidation and simplification of existing rules, we are concerned that the rules the Iowa Department of Natural Resources (DNR) has proposed are not sufficient to protect water quality from continued pollution. DNR's draft rule removes definitions and rule language that provides clarity and accessibility for the public. DNR has and must use statutory authority to protect water for drinking, recreation, and aquatic life. We focus our comments on:

- siting issues related to karst terrain;
- manure management requirements and enforcement;
- construction requirements that do not adequately protect water quality; and
- ensuring public process and transparency.

These comments recommend rule language that would improve water quality protections. We also identify changes proposed in the draft rules that we support.

We encourage DNR to adopt all these changes to improve the implementation of the rules and fulfill DNR's statutory obligations.

Sincerely,

Allamakee County Protectors - Education Campaign

Common Good Iowa

Environmental Law & Policy Center

Food & Water Watch

Iowa Citizens for Community Improvement

Iowa Environmental Council

Jefferson County Farmers and Neighbors

Poweshiek CARES

Socially Responsible Agriculture Project

Southern Boone County Neighbors

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I. Animal Feeding Operation Rules Must Mitigate Pollution of Iowa's Waters

Iowa faces serious pollution of its drinking water sources, including both surface and groundwater. Most of the pollution comes from agricultural nonpoint and point sources, including manure produced by animal feeding operations (AFOs) and concentrated animal feeding operations (CAFOs). Large AFOs (also known as CAFOs) are expanding faster in Iowa than all other states combined.[1] The Iowa Department of Natural Resources (DNR) has proposed updates to the AFO rules to address a statutory requirement to review rules every five years and to implement Executive Order 10, which requires agencies to conduct a retrospective review of existing rules. This rulemaking provides an opportunity to mitigate the pollution from AFOs and benefit Iowans across the state.

Agriculture is the primary source of pollution in Iowa, including 92 percent of nitrate and 80 percent of phosphorus entering surface waters.[2] Much of that pollution originates as manure that is applied to cropland without prior treatment. To address that pollution source, statute requires plans to manage manure application. The proposed rules fail to address the fundamental problems of manure application and oversight by allowing facilities to avoid submitting plans entirely, allowing inappropriate application rates and locations, and failing to ensure compliance through permitting and enforcement.

In submitting these comments, we incorporate the comments and rationale submitted to DNR on October 18, 2022, which requested changes to an earlier draft of rules and provided significant background on the threat to water quality posed by AFOs and CAFOs.

These comments address three main areas. First, the authority for rulemaking on this topic is broad and the rules must address the potential water quality impacts from AFOs and CAFOs. Second, the comments provide information relevant to the retrospective review required by Executive Order 10, including the requirement to identify the costs of the proposed rules. Finally, the comments provide recommendations on specific rule provisions for which we request changes.

II. Legal Authority for Rule Making

The Environmental Protection Commission (EPC) is the only commission or department charged with adopting regulations to protect ambient water quality. It has broad statutory authority to "Develop comprehensive plans and programs for the prevention, control and abatement of water

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[1] Madison McVan, "GRAPHIC: Majority of new CAFOs were built in Iowa last year," Investigate Midwest, June 8, 2023, available at https://investigatemidwest.org/2023/06/08/graphic-majority-of-new-cafos-were-built-in-iowa-last-year/.

[2] "Iowa Nutrient Reduction Strategy – A science and technology-based framework to assess and reduce nutrients to Iowa waters and the Gulf of Mexico" (hereinafter "NRS"). Updated December 2017. Section 1.2 at 8.

pollution."[3] DNR is charged by law with the responsibility "to prevent, abate, or control water pollution."[4] DNR recommends rules necessary to implement the programs assigned to the EPC, then implements the rules adopted by the EPC.[5]

The EPC is charged with adopting requirements regarding the construction of AFOs. Iowa Code section 459.103(1) states:

> The commission shall establish by rule adopted pursuant to chapter 17A, requirements relating to the construction, including expansion, or operation of animal feeding operations, including related animal feeding operation structures. The requirements shall include but are not limited to minimum manure control, the issuance of permits, and departmental investigations, inspections, and testing.

This statute gives the EPC broad authority to regulate AFO siting and construction requirements.[6]

In adopting rules regulating AFOs, the EPC must ensure that "Manure from an animal feeding operation shall be disposed of in a manner which will not cause surface water or groundwater pollution."[7] The rules DNR has proposed do not fulfill those statutory obligations.

III. DNR Must Address Benefits of Clean Water Under Executive Order 10.

On January 10, 2023, Governor Kim Reynolds signed Executive Order 10. The Order required each state agency to "perform a retrospective analysis" of its rules as well as rescind and re-promulgate any rules the agency wants to adopt. The Order also requires a "rigorous cost-benefit analysis of existing administrative rules." In conducting the cost-benefit analysis, DNR must ensure that it accounts for the benefits provided by the rule it proposes.

In evaluating the benefits and costs of rules, agencies are to use a "red tape review rule report"[8] template created by the Governor's office. The template requires agencies to describe the benefits of the rule, whether the benefits are being achieved, the costs to the public, the costs to the agency implementing the rule, and whether the costs justify the benefits.

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[3] IOWA CODE § 455B.173.
[4] IOWA CODE § 455B.172.
[5] IOWA CODE §§ 455B.103(2); 455B.174.
[6] *See also* IOWA CODE § 455B.173(12) (providing the EPC authority to "Adopt, modify, or repeal rules relating to the construction or operation of animal feeding operations, as provided in sections relating to animal feeding operations provided in chapter 459, subchapter III").
[7] IOWA CODE § 459.311(3).
[8] "Red Tape Review Rule Report Template," Iowa Department of Management, available at https://dom.iowa.gov/resource/red-tape-review-forms-templates/red-tape-review-rule-report-template (last visited June 14, 2023).

Agricultural pollution that leads to poor water quality externalizes costs, imposing a burden on other Iowans. This burden includes a range of costs to the public in terms of health effects, economic impacts, and ecosystem services.

A. Health costs of poor water quality

Poor water quality, particularly nitrate pollution, increases the incidence of cancer, birth defects, and other health problems. These problems are not just theoretical; long-term medical research has revealed these effects specifically in Iowans. In particular, we note that nitrate in drinking water can cause blue-baby syndrome, birth defects, bladder cancer, thyroid cancer, and other cancers.[9] Even concentrations below the Safe Drinking Water Act standard of 10 mg/L may cause a range of health problems, including cancer.[10]

A 2019 analysis published in *Environmental Research* assessed the potential health impacts of nitrate exposure at a large scale, calculating the disease cases attributable to elevated nitrate in drinking water.[11] The analysis concluded that each year, "2939 cases of very low birth weight, 1725 cases of very preterm birth, and 41 cases of neural tube defects could be related to nitrate exposure from drinking water." In addition, the estimate of nitrate-attributable cancer cases per year ranged from 2,300 to 12,594. This risk is not evenly distributed across the country. As applied to Iowa, the estimated annual cancer cases attributed to nitrate range from 2.3 to 10.43 per 100,000 people, or as many as 313 cases statewide each year (about 2.5% of the national total).[12] For reference, Iowa's estimated minimum nitrate-attributable cancer rate (2.3 per 100,000) is greater than the estimated maximums of its neighbors to the north and south (2.1 and 1.99 per 100,000 for Minnesota and Missouri, respectively), and Iowa's estimated maximum is nearly 100 times greater than the state with the lowest estimated maximum (0.11 in Mississippi).[13]

The poor health outcomes lead to significant medical costs. The *Environmental Research* article estimated medical costs due to nitrate-attributable cancer cases nationwide between $250 million

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[9] "Nitrate in Drinking Water: A Public Health Concern For All Iowans," Iowa Environmental Council (Sept. 2016), available at https://www.iaenvironment.org/webres/File/Nitrate_in_Drinking_Water_Report_ES_Web.pdf (citing Brender, Jean D; Weyer, Peter J; Romitti, Paul A; et al. 2013. Prenatal Nitrate Intake from Drinking Water and Selected Birth Defects in Offspring of Participants in the National Birth Defects Prevention Study. *Environmental Health Perspectives*, Vol. 121(9):1083-1089. http://ehp.niehs.nih.gov/1206249/).

[10] *Id.*

[11] Temkin, A., Evans, S., Manidis, T., Campbell, C., & Naidenko, O. V. (2019). Exposure-based assessment and economic valuation of adverse birth outcomes and cancer risk due to nitrate in United States drinking water. *Environmental research*, *176*, 108442.

[12] *See* "Interactive Map: Nitrate Attributable Cancer Cases for each state," EWG (2019), available at https://www.ewg.org/interactive-maps/2019_nitrate/map/ (last visited June 8, 2023).

[13] *Id.*

and $1.5 billion annually.[14] While Iowa's share of the nation's population is less than one percent, Iowa's share of cancer cases was about 2.5 percent of the total;[15] if medical costs are applied proportionally, Iowa's medical costs attributable to nitrate in drinking water range from $6.25 million to $37.5 million per year.

Indirect losses related to the health effects are even larger, accounting for IQ point losses from preterm births, economic losses from disability, and life-years lost due to premature death.[16] These estimates total $1.4 to $6.7 billion annually nationwide.[17] Iowa's proportional share would be $35 million to $167.5 million per year.

These estimates are likely low as applied to Iowa. The study used only public water supply data, and assumed that private well data would be similar to the public water supplies. Public water supplies must meet the Safe Drinking Water Act (SDWA) standard of 10 mg/L nitrate.[18] Monitoring data from Iowa's private wells reveals that, in fact, private wells have significantly higher nitrate concentrations: 12 percent of tested wells had average nitrate concentrations that exceed the SDWA standard.[19] The estimates above "present[] a conservative scenario with respect to private well users' exposure to nitrate."[20]

B. Direct economic impacts of water quality treatment

Beyond health effects, poor water quality forces water utilities to increase treatment and reduces positive water-based tourism and recreation. Iowa DNR itself has identified the communities at risk and the potential costs to treat the water if agricultural sources do not reduce their loads. These impacts will be disproportionately felt by smaller and low-income communities.

Iowa DNR has previously identified 260 communities that face increasing nitrate in their drinking water supplies.[21] These communities have a few options: dig deeper wells to access a cleaner aquifer; connect to a surface water supply; connect to a regional drinking water provider; or treat

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[14] *Id.*
[15] *See* "Estimated Nitrate Attributable Cancer Cases for each State," Environmental Working Group, available at https://www.ewg.org/interactive-maps/2019_nitrate/map/ (last visited June 13, 2023).
[16] Temkin (2019) at 8.
[17] *Id.*
[18] 40 C.F.R. § 141.62.
[19] *See* "Iowa's Private Wells Overrun With Agricultural Contaminants," Iowa Environmental Council (Apr. 24, 2019), available at https://www.iaenvironment.org/newsroom/water-and-land-news/iowas-private-wells-overrun-with-agricultural-contaminants (last visited June 8, 2023).
[20] Temkin (2019). The cost estimates are in 2014 dollars, and with inflation would be approximately 27 percent higher in 2023 dollars. *See* https://www.bls.gov/data/inflation_calculator.htm.
[21] Donnelle Eller, "High nitrate levels plague 60 Iowa cities, data show," Des Moines Register (July 4, 2015), available at https://www.desmoinesregister.com/story/money/agriculture/2015/07/04/high-nitrates-iowa-cities/29720695/.

the groundwater before distribution.[22] Almost 50 Iowa communities have already been forced to take action to address nitrate contamination in drinking water supplies.[23]

The 2019 *Environmental Research* paper referenced above also assessed potential drinking water treatment costs. Nationwide, the treatment costs for communities with elevated nitrate range from $102 million to $765 million for ion exchange systems, or as high as $1.47 billion for reverse osmosis systems.[24] On a per capita basis, ion exchange treatment for very small systems would amount to $666 per person per year.[25]

Des Moines Water Works and Cedar Rapids Water Department serve approximately 725,000 customers and draw from surface waters with significant nitrate pollution.[26] If the treatment cost per capita were $229, in line with the cost for systems up to 100,000 people, the total cost for customers of just those two utilities would be $165 million.[27]

In the shorter-term, Des Moines Water Works has an ionization treatment that can cost $10,000 per day to operate.[28] It serves to reduce nitrate concentrations to the maximum contaminant level of 10 mg/L, rather than eliminating nitrate altogether; thus, these costs do not fully avoid all of the costs associated health effects described above. Des Moines Water Works has also begun a process to drill new wells to acquire cleaner source water for $30 million.[29] This cost is also to ensure compliance with drinking water standards, rather than elimination of all pollution. DNR estimated the costs for wastewater treatment of nutrients, including nitrogen and phosphorus, in early 2019.[30] DNR concluded that wastewater treatment by 19 facilities serving 9,515 people would cost $205 million.[31]

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[22] Tang, C., Lade, G. E., Keiser, D., Kling, C. L., Ji, Y., & Shr, Y. H. (2018). *Economic Benefits of Nitrogen Reductions in Iowa*. Center for Agricultural and Rural Development, Iowa State University.
[23] *Id.* at 11.
[24] Temkin (2019) at 12.
[25] *Id.*
[26] "About Us," Des Moines Water Works, available at https://dmww.com/about_us/index.php (last visited June 10, 2023); "EWG Tap Water Database," EWG, available at https://www.ewg.org/tapwater/search-results.php?stab=IA&searchtype=largesys (last visited June 10, 2023).
[27] *See* Anne Schechinger and Craig Cox, "America's Nitrate Habit Is Costly and Dangerous," Environmental Working Group (Oct. 2, 2018), available at *https://www.ewg.org/research/nitratecost*.
[28] Des Moines Water Works, "NEWS RELEASE: Des Moines Water Works begins operation of Nitrate Removal Facility because of nutrient spikes in raw source water," June 9, 2022, available at https://www.dmww.com/news_detail_T37_R328.php.
[29] Kate Payne, "Des Moines Water Works Advances Plans To Build New Wells In Light Of River Pollutants," Iowa Public Radio (Apr. 22, 2021), available at https://www.iowapublicradio.org/ipr-news/2021-04-22/des-moines-water-works-advances-plans-to-build-new-wells-in-light-of-river-pollutants.
[30] Iowa Department of Natural Resources, "Fiscal Analysis of Impacted Facilities Spreadsheet" (Attachment 2 of Environmental Protection Commission Denial of Petition for Rulemaking), Feb. 12, 2019, available at https://www.iowadnr.gov/Portals/idnr/uploads/epc/20190219epc.pdf?ver=QoO-SQ2XwBs_ezPGHchk6w%3d%3d#page=78.
[31] *Id.*

Point of use treatment in individual households can cost even more per capita.[32] A 2012 study found the following costs, as subsequently summarized by Iowa State University analysts, for individual households and small public water supplies.[33] Adjusting those costs for inflation would increase the values by approximately 40 percent.[34]

Table 1. Cost ranges for treatment of nitrate in drinking water.

Estimated Annual Cost Range (Adapted from Vivian B. Jensen et al. 2012)		
	Single Household	**Small PWS (1,000 Households)**
Water Blending	N/A	$200,000 - $365,000
Well Reconstruction	$860 - $ 3,300	$80,000 - $100,000
Drill New Well	$2,100 - $3,300	$40,000 - $290,000
Install POU, Reverse Osmosis Unit	$250 - $360	$223,000
Pipeline Connection to Existing System	$52,400 - $185,500	$59,700 - $192,800
Trucked Water	$950	$2,850
Bottled Water	$1,339	$1.34 M
Note: All costs are discounted over a 20 year period at a 5% discount rate, except for the POU estimate and trucked and bottled water costs.		

Applying these costs to Iowans facing high nitrate concentrations reveals the economic impact of treating water. Iowa has 96,497 active private wells[35] and 12 percent of those tested exceeded the drinking water standard for nitrate.[36] Installing point-of-use treatment at those wells, the lowest-cost upfront option, totals more than $4 million after accounting for inflation. Treatment of wells at 5 mg/L or higher would raise the total cost to $7.4 million. This total does not account for the ongoing operation and maintenance costs or the trend of increasing nitrate concentrations in groundwater that will raise the number of wells requiring treatment.

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[32] Tang (2018) at 13.
[33] *Id.* (citing Jensen, Vivian B., Jeannie L. Darby, Chad Seidel, and Craig Gorman. 2012. "Drinking Water Treatment for Nitrate. Technical Report 6 in: Addressing Nitrate in California's Drinking Water with a Focus on Tulare Lake Basin and Salinas Valley Groundwater." Report for the State Water Resources Control Board Report to the Legislature. University of California, Davis: Center for Watershed Sciences).
[34] *See* "CPI Inflation Calculator," U.S. Bureau of Labor Statistics, available at https://www.bls.gov/data/inflation_calculator.htm (last visited June 8, 2023). The Jensen paper used 2010 dollars in its calculations. *See* Jensen (2012) at 28.
[35] "Private Well Services," Iowa Department of Public Health, available at https://tracking.idph.iowa.gov/Environment/Private-Well-Water/Private-Well-Services (last visited June 10, 2023).
[36] *See* "Iowa's Private Wells Overrun With Agricultural Contaminants," Iowa Environmental Council (Apr. 24, 2019), available at https://www.iaenvironment.org/newsroom/water-and-land-news/iowas-private-wells-overrun-with-agricultural-contaminants (last visited June 14, 2023).

C. Recreational and tourism value of water

Poor water quality also affects recreation and tourism. Iowa State University and DNR have conducted a Lake Valuation Project using surveys of Iowa residents.[37] In the most recent survey (2019), more than ten percent of Iowa respondents took an overnight trip to a lake out of state.[38] Iowans spent more than $1 billion in 2019 on single-day trips to Iowa lakes.[39]

Iowans took 21 percent as many overnight trips to lakes in other states as overnight trips to in-state lakes.[40] Overnight trips lead to three times more spending than same-day trips, but by going out of state Iowa loses the economic value of that spending.[41] Having more Iowans stay in state and attracting more out-of-state residents to visit Iowa would increase the economic impact of recreational visits. Unfortunately, the 2019 Iowa Lakes Survey did not quantify these potential impacts.

The study concluded that "Iowa households continue choosing water quality as their most important factor when choosing a lake destination."[42] Just for recreational benefits at lakes, Iowans would be willing to pay an additional $30 million per year for cleaner water.[43]

Water quality directly affects the ability of trout to survive and reproduce, thereby affecting trout fishing. Trout fishing is a major source of recreational spending in Iowa and the Driftless region (Iowa, Minnesota, Wisconsin, and Illinois). A 2016 study analyzing all economic impact of angling in the Driftless area found the economic impact to be more than $700 million.[44] These trout fishing trips have substantially higher economic impact than the typical in-lake recreational visit, with typical spending of $475.[45] Many of the visits are by people from out-of-state, resulting in substantial economic input to the states of the Driftless area.[46] These visits are part of the $6.1 billion dollars that visitors spend on tourism in Iowa each year.[47]

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[37] Wan, X., Ji, Y., & Zhang, W. (2021). *A Report to the Iowa Department of Natural Resources-The Iowa Lakes Valuation Project 2019: Summary and Findings* (No. 21-sr115). Center for Agricultural and Rural Development (CARD) at Iowa State University.
[38] *Id.* at 41.
[39] *Id.* at 102.
[40] *Id.* at 41.
[41] *Id.* at 8.
[42] *Id.* at 134.
[43] Tang (2018) at 21.
[44] Donna Anderson, "Economic Impact of Recreational Trout Angling in the Driftless Area," Nov. 2016, at 11.
[45] *Id.* at 9.
[46] *Id.* at 10.
[47] "Economic Impact of Visitors in Iowa 2021," Tourism Economics (prepared for Iowa Economic Development Authority), Nov. 2022, available at https://industrypartners.traveliowa.com/UserDocs/research/2021_iowa_tourism_economic_impact.pdf.

The increased costs of poor water quality have disproportionate impacts on people with low incomes. Continued nitrate pollution will increase the health costs or water treatment costs for individuals and communities that already suffer from environmental degradation related to air quality and pesticide contamination.

D. Ecosystem services provided by reduced pollution

Water provides a range of functions that are less easily quantified, but an emerging field called "ecosystem services" seeks to quantify the value provided by natural processes.[48] Beyond the directly quantifiable health costs and economic impacts of water quality for drinking and recreation, indirect services such as wildlife and biodiversity can provide additional benefits.

Appropriate fertilizer application rates and methods will reduce the externalized losses, providing additional ecosystem benefits. These benefits are distinct from human health and recreational benefits, such as the climate benefits from reduced volatilization of nitrate fertilizer, reduced energy inputs, and increased soil organic matter. Properly applying manure use efficiency will also produce improved conditions for aquatic and terrestrial life in Iowa and downstream.

Agriculture is the largest source of greenhouse gas emissions in Iowa.[49] Manure management accounts for 23 percent of the agricultural greenhouse gas emissions.[50] Fertilizer practices affect greenhouse gas emissions related to soils, which are another significant source.[51] The method of fertilizer application affects the direct emissions of nitrous oxide (N2O), which has a significantly higher global warming potential than carbon dioxide.[52]

Aquatic and terrestrial life in Iowa would also benefit from reduced nitrate losses. Minnesota recently concluded that water above 5 mg/L nitrate presents risk to sensitive aquatic life, and 8 mg/L presents risk to aquatic life more broadly.[53] Many Iowa waterways regularly exceed those

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[48] *See, e.g.*, Keeler, B. L., Polasky, S., Brauman, K. A., Johnson, K. A., Finlay, J. C., O'Neill, A., ... & Dalzell, B. (2012). Linking water quality and well-being for improved assessment and valuation of ecosystem services. *Proceedings of the National Academy of Sciences*, *109*(45), 18619-18624.
[49] "2021 Iowa Statewide Greenhouse Gas Emissions Inventory Report," Iowa DNR (Dec. 27, 2022), at 7, available at https://www.iowadnr.gov/Portals/idnr/uploads/air/ghgemissions/2021%20GHG%20REPORT.pdf.
[50] *Id.* at 8.
[51] *Id.*; "2021 Iowa Statewide Greenhouse Gas Emissions Inventory Report Technical Support Document," Iowa DNR (Dec. 27, 2022), at 9, available at https://www.iowadnr.gov/Portals/idnr/uploads/air/ghgemissions/202%20GHG%20TSD.pdf.
[52] "2021 Iowa Statewide Greenhouse Gas Emissions Inventory Report Technical Support Document," Iowa DNR (Dec. 27, 2022), at 7, 9, available at https://www.iowadnr.gov/Portals/idnr/uploads/air/ghgemissions/202%20GHG%20TSD.pdf.
[53] Philip Monson, "Aquatic Life Water Quality Standards Draft Technical Support Document for Nitrate," Minnesota Pollution Control Agency (Oct. 2022), available at https://www.pca.state.mn.us/sites/default/files/wq-s6-13.pdf.

concentrations. Hundreds of Iowa waters have suffered from fish kills over the last 40 years.[54] Iowa has a limited number of Outstanding Iowa Waters and trout streams; high pollution concentrations have affected the quality of waters across the state. The AFO rules present an opportunity to mitigate the pollution that has harmed aquatic life for decades.

Easier to quantify are the direct savings to agricultural producers who would no longer spend money unnecessarily. The science assessment in the state's Nutrient Reduction Strategy found that applying fertilizer at the maximum return to nitrogen (MRTN) would result in annual savings of $32 million/year while achieving a significant reduction in nitrate pollution.[55] Manure provides a significant fraction of crop needs, with some counties having all crop needs met by manure alone.[56] By requiring manure management plans to account for other sources of fertilizer, most fields in the state would have to comply with this requirement. Thus, the AFO rules could capture much of the $32 million in savings estimated by the NRS.[57] Although MRTN is not designed to limit application to crop nitrogen usage, the reduced inputs would have additional ecosystem benefits.

E. Total Range of Costs

In total, the externalized pollution costs for health care, water treatment, recreational impacts, and ecosystem services in Iowa are significant. Strong rules and enforcement of manure storage and application could significantly reduce nitrate entering Iowa's surface water and drinking water, thereby reducing or avoiding those costs. Table 2 summarizes the potential costs of manure pollution for each category, much of which could be avoided by adequate regulation.

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[54] Monica Cordero, "Animal waste and agrochemicals are leading cause of fish kills in Iowa waterways," Investigate Midwest (June 1, 2023) available at https://investigatemidwest.org/2023/06/01/animal-waste-and-agrochemicals-are-leading-cause-of-fish-kills-in-iowa-waterways/.
[55] NRS, *supra* note 2, §2.2 at 27.
[56] "Too Much Manure? Can Iowa use all its manure for fertilizer?" Iowa State University Extension, Publication AE 3608 (Apr. 2017). Available at https://store.extension.iastate.edu/product/15121.
[57] The number of CAFOs has grown in Iowa since both the NRS estimate and the manure sufficiency assessment, suggesting that manure would provide an even larger percentage of crop needs today.

Table 2. Estimates of Annual Costs of Nitrate Pollution in Iowa.

Category	Lower estimate (million $)	Upper estimate (million $)
Medical expenses	6.25	27.5
Indirect medical costs	35	167.5
Public water supply treatment costs	165	165
Private well treatment costs	4	7.4
Recreational impacts	>30	>30
Ecosystem services	Unknown	Unknown
Total	**240.25**	**397.4**

The AFO regulations must be designed to prevent water pollution,[58] thereby reducing or avoiding many of the public costs above. For example, the Nutrient Reduction Strategy found that applying nitrogen at MRTN would result in a 9 percent reduction in nitrate in surface water. Since the NRS was adopted, nitrogen application rates have resulted in an 11 percent increase in nitrate, which has more than offset conservation practices.[59] By setting a lower manure application rate (MRTN) and preventing leakage from manure storage structures, the AFO rules have the potential to reverse this trend and achieve roughly a 20 percent reduction in nitrate loading in surface water.

Reducing over-application of nitrate has a disproportionate effect on water quality because a higher share of nitrogen is lost as the application rate increases.[60] In other words, a higher fraction of nitrate is lost when more is applied, so reducing the excess nitrate application has a larger benefit on water quality.

The AFO rules cannot single-handedly stop all nitrate losses to drinking water sources, but several facts suggest they can make a difference. AFO siting correlates with groundwater quality degradation.[61] Manure makes up a significant portion of total nitrate fertilizer applied in the state.[62] The science assessment in the Iowa Nutrient Reduction Strategy found proper manure application could achieve a significant reduction in nitrate pollution.[63] Ensuring manure is properly applied can lead to significant water quality improvements and reduce health impacts.

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[58] IOWA CODE § 459.311(3).
[59] *See* "Iowa Nutrient Reduction Strategy – Water Quality," Iowa State University, available at https://www.arcgis.com/apps/dashboards/29460d40c6a74379a90b42f3e770db07 (last visited June 14, 2023) (showing 11 percent increase in nitrate load due to corn-soybean N application rates).
[60] *See* Vetsch, J. A., Randall, G. W., & Fernández, F. G. (2019). Nitrate Loss in Subsurface Drainage from a Corn–Soybean Rotation as Affected by Nitrogen Rate and Nitrapyrin. *Journal of Environmental Quality*, *48*(4), 988-994.
[61] Zirkle, K. W., Nolan, B. T., Jones, R. R., Weyer, P. J., Ward, M. H., & Wheeler, D. C. (2016). Assessing the relationship between groundwater nitrate and animal feeding operations in Iowa (USA). *Science of the Total Environment*, *566*, 1062-1068.
[62] "Too Much Manure? Can Iowa use all its manure for fertilizer?" Iowa State University Extension, Publication AE 3608 (Apr. 2017). Available at https://store.extension.iastate.edu/product/15121.
[63] NRS, *supra* note 2.

In conducting its cost-benefit analysis, DNR has an obligation to fully account for the potential benefits in reducing pollution. Accounting only for the direct costs to AFO facility owners would ignore the public benefits provided by clean water. The accumulation of impacts demonstrates that even a partial reduction in nitrate loading to surface waters would provide significant economic benefits to Iowans across the state.

IV. DNR Must Adopt Rules that Protect Water Quality.

To fulfill its statutory authority and obligation to prevent water quality impairment, DNR needs to develop rules that will reduce pollution from AFOs and avoid the significant costs described above. The following comments recommend changes that would reduce water quality impacts of manure and AFOs more broadly.

A. 65.1. DNR Must Close Loopholes in Common Ownership (LLC loophole).

DNR made significant changes to the definitions to eliminate repetition of statutory terms. The number of definitions was reduced from approximately 150 to 80 in the most recent proposed rules. This makes it more difficult to determine which terms in the rule are defined. By completely removing the words and phrases from the definition section rather than retaining the word and citing to the statutory definition, the user is less likely to know which words and phrases need defining and will lead to less efficiency and more difficulty in compliance. We recommend retaining the terms in the definitions list and simply reducing the definition to say "...has the same meaning as in Iowa Code section xxx.xxx" This is common practice within the different sections of the Iowa Code itself. This would also address the fact that several deleted definitions are not contained in the referenced sections, including "abandoned AFO structure" (code section 459.201(4)), "adjacent for open feedlot operation" (459A.103(1)(b)), "adjacent—air quality for confinement feeding operation (partially defined in 459.201(1)), and "adjacent—water quality" (459.301 and discussed below).

We have specific concerns about several definitions that determine whether AFOs are treated as single operations.

1. "Owner"

Under statute, two or more AFOs under common ownership or management are deemed to be a single AFO if they are adjacent or utilize a common area or system for manure disposal.[64] Treatment as a single, larger operation can trigger regulatory oversight not applicable to small AFOs. Thus, clear meanings of "common ownership or management" and "adjacent" have great importance.

[64] *See* IOWA CODE § 459.301(1).

As described in 2022 comments submitted by Jefferson County Farmers and Neighbors, Inc., many CAFOs in Jefferson County should be treated as a single site based on adjacency and how they are operated in fact, but are owned by separate limited liability corporations that fall outside the statutory definition of common ownership. Even if these LLCs have common ownership, the AFOs avoid regulatory oversight.

For example, in Jefferson County, Casey Diehl and Tracy Diehl (a husband and wife) established two separate CAFOs, but later combined the separate CAFOs into one larger CAFO entitled "Casey Diehl Home Site." This decision did not require a Master Matrix or a construction permit. Furthermore, the Diehls also built two CAFOs, located at the same address, entitled "Casey Diehl Site #1 Hawk Farm" and "Diehl Pork Site #2-Hawk Farm." "Casey Diehl Site #1 Hawk Farm" is owned by Casey Diehl and "Diehl Pork Site #2-Hawk Farm" is owned by Diehl Pork LLC and Tracy Diehl, respectively. These sites are less than 1,250 feet from one another.[65]

To clarify "common ownership," the department must clarify who is considered an owner, and recognize that one property or structure may have more than one owner. We recommend the rule specify that an owner's interest in an LLC or other corporation falls within the definition of "owner":

> *"Owner"* means ~~the~~ a person who has legal or equitable title to the property where the AFO is located, ~~or the~~ a person who has legal or equitable title to the AFO structure~~s~~, or a person who has an ownership interest in a partnership or corporation that has legal or equitable title to the property or AFO structures. "Owner" does not include a person who has a lease to use the land where the AFO is located or to use the AFO structures. ~~"Owner" includes a person's ownership interest in a partnership or corporation with legal or equitable title to the property.~~

Iowa Code section 459.301(1) includes "common management" in the determination of whether two or more CAFOs are deemed to be a single CAFO. However, the definition of "common management" is not clear, as it simply refers to 'significant' control of day-to-day operations without specifying what degree of control is considered significant. The ambiguity of this "I'll know it when I see it" type of assessment can be manipulated and is not in the best interest of the department: it will lead to inconsistent interpretation and enforcement of the rules. We recommend the definition of "common management" be amended to a more quantifiable and objective standard.

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[65] The sites are approximately .20 miles (1056 feet) from one another. This data was calculated utilizing the latitudes and longitudes of the CAFOs located at the DNR's website. The coordinates of "Casey Diehl Site #1 Hawk Farm" are 41.08376 N and -91.85016 W. The coordinates of "Diehl Pork Site #2-Hawk Farm" are 41.08528 N and -91.84699 W.

"*Common management"* means ~~significant control by~~ an individual who has or shares the ability to determine ~~of~~ the management of the day–to-day operations of each of two or more AFOs.

2. "Adjacency"

Whether two CAFOs are considered adjacent has far-reaching implications, beyond that they may be treated as a single CAFO. The determination of adjacency is different for air quality and for water quality purposes and is dependent upon the sizes of each AFO. These detailed parameters have been removed from 65.1, the definition section of the rules. The *air quality* definition now only cites the relevant statute, which one must then find and consult to determine adjacency. But this is still better than the *water quality* definition, which has been entirely removed and cannot be found in the incorporated references. It is in a section of Iowa Code 459 that is not listed at the beginning of the section. This definition is only in section 459.301.

This is a further problem as other sections of the draft rules actually refer to rule definitions that are not there. For example, proposed section 65.106, Confinement feeding operation and stockpile separation distance requirements**,** reads, in part, "If two or more confinement feeding operations are considered one operation as provided in 567—65.1(455B,459,459B), definitions of 'Adjacent—air quality' and 'Adjacent—water quality,' the combined animal unit capacities of the individual operations shall be used for the purpose of determining the required separation." One of these definitions no longer exists in the recent draft.

We recommend that the definition for "Adjacent—water quality for confinement feeding operations" be reinstated in 65.1 in its entirety, or at a minimum with reference to the relevant Iowa Code section, such as below:

"*Adjacent—water quality" for confinement feeding* has the same meaning as in Iowa Code section 459.301.

B. 65.3, 65.201. DNR Should Not Delete the Departmental Evaluation Rule.

IEC and ELPC's petition for rulemaking requested a revision to rules 65.5(3) and 65.103(5), which allow DNR to evaluate environmental impacts of proposed facilities. Under the existing rule, the DNR may deny a construction permit, disapprove a nutrient management plan, prohibit construction, or impose permit conditions to avoid or minimize the adverse impacts. The petition sought to make the DNR evaluation mandatory, rather than optional.

The EPC declined to adopt the petition's recommended changes and adopted DNR's recommendation, which took the position that the DNR lacks authority to implement the

Departmental Evaluation rule.[66] In the proposed rule changes, the departmental evaluation rule has been removed entirely.

The Administrative Rules Review Committee of the Iowa Legislature objected to the rule.[67] The ARRC stated that:

> It is the opinion of the Committee that Code chapters 459 and 459A establish the procedures and standards relating to the issuance of construction permits and the approval of manure management plans, and that the Department does not have authority to create additional procedures and standards by rule. The master matrix was created by Code section 459.305 in order "...to provide a comprehensive [emphasis added] assessment mechanism in order to produce a statistically verifiable basis for determining whether to approve or disapprove an application for the construction, including expansion, of a confinement feeding operation structure..."

The ARRC objection goes on to explain its position that the master matrix is the exclusive method of siting confinement operations.

There are several problems with DNR's position and the proposal to remove the rule entirely.

First, an objection by the ARRC does not invalidate a rule.[68] An objection allows the rule to remain in place, but shifts the burden of proof upon enforcement of the rule.[69] DNR has never used the Director's Discretion rule in practice, perhaps because of the objection, and therefore a court has never ruled on the legality of the rule. It remains in effect.

DNR has stated that it lacks legal authority to enforce the rule and has referred to advice provided by the Office of the Attorney General.[70] The broad authority of the EPC to undertake rulemaking directly contradicts this position. DNR must consider site-specific impacts to water quality and natural resources to ensure the regulatory structure for CAFOs appropriately prevents and abates pollution, fulfilling the EPC's mandate in Iowa Code section 455B.173. Iowa Code expressly allows DNR to consider site-specific environmental impacts in the master matrix.[71] Adopting the language as a requirement in rule is necessary to ensure AFOs do not cause undue environmental

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[66] Iowa Environmental Protection Commission, "Denial of Petition for Rule Making" (Feb. 15, 2022) at 8.
[67] *See* objection to rules 65.5(3) and 65.103(5) in 567 IOWA ADMIN. CODE ch. 65.
[68] IOWA CODE § 17A.4(3)(c). In addition, commentators have questioned the constitutional validity of the ARRC's role and implications of ARRC objections. *See* Jerry Anderson and Christopher Poynor, "A Constitutional and Empirical Analysis of Iowa's Administrative Rules Review Committee Procedure," 61 DRAKE L. REV. 1 (2013).
[69] *Id.*
[70] Iowa Environmental Protection Commission, "Denial of Petition for Rule Making" (Feb. 15, 2022) at 8.
[71] IOWA CODE § 459.305(2).

harm to drinking water sources or groundwater. This is necessary to fulfill the EPC's duty to prevent and abate water pollution and to prevent disposal manure from causing water pollution.[72]

Iowa Code also contains more specific authorization for DNR to impose site-specific conditions. Section 459.308 authorizes DNR to require, "As a condition to approving an application for a construction permit….The installation of a related pollution control device or practice" for an unformed manure structure at a confinement.[73] This provision expressly allows DNR to impose the types of site-specific or case-specific conditions in construction permits provided in existing rule 65.5(3).

With respect to open feedlots, the ARRC's objection references chapter 459A generally, but relies entirely on the master matrix as the basis for the objection. Open feedlots are not subject to the master matrix.[74] Even if the objection were valid, it should apply only to confinement operations subject to the "comprehensive" regulation provided by the matrix. In contrast, open feedlots have no scoring system for siting and, under existing rules, can often avoid submitting construction permits and nutrient management plans. Sites that can comply with existing rules also create a substantial risk of water quality pollution, and in fact are causing pollution today.

Because the master matrix does not apply to open feedlots, Chapter 459A gives the DNR broad authority to regulate open feedlots to ensure discharges meet water quality standards. Section 459A.104 allows regulation by rule of all open feedlot structures, with the intent to control open feedlot operations and effluent from the facilities. Discharges that cause violations of water quality standards are a method of establishing noncompliance with the rules.[75] Thus, DNR must regulate facilities to ensure discharges will not cause a violation of water quality standards. If DNR determines that a particular facility's discharge will cause a violation of water quality standards, it must prevent the discharge. Rule section 65.201 implements that obligation and DNR should not delete it.

C. 65.5. DNR Should Clarify Transfer of Title Notification.

Proposed section 65.5 addresses transfers and the notifications required. We appreciate the clarification that the notification to DNR must be in writing, not a phone call.

DNR did not adopt other changes we recommended, including notice to the public and specifying that the master matrix must be completed by the transferee. We recommend the following changes to the language of proposed rule 65.5:

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[72] IOWA CODE §§ 455.173, 459.311(3).
[73] IOWA CODE § 459.303(6).
[74] IOWA CODE § 459.305 (implementing the master matrix and referring only to confinement operations).
[75] IOWA CODE § 459A.401(3).

> **567—65.5(455B,459,459A,459B) Transfer of legal responsibilities or title.** If title or legal responsibility for a permitted AFO or an animal truck wash facility is transferred, the person to whom title or legal responsibility is transferred shall be subject to all terms and conditions of the construction permit and these rules. The person to whom the construction permit was issued and the person to whom title or legal responsibility is transferred shall notify the department, in writing, of the transfer of legal responsibility or title of the operation within 30 days of the transfer. The person to whom responsibility is transferred shall publish a public notice containing the information in section 65.106(2)(a) in a newspaper having general circulation in the county. The director shall post notice of the transfer on the department's website. Within 30 days of receiving a written request from the department, the person to whom legal responsibility is transferred shall submit to the department all information needed to modify the construction permit to reflect the transfer of legal responsibility. If the transfer results in a facility under common ownership exceeding 1000 animal units, the transferee shall complete the master matrix and present the results to the county according to the procedures in section 65.106. A person who has been classified as a habitual violator under Iowa Code section 459.604 shall not acquire legal responsibility or a controlling interest to any additional permitted confinement feeding operations for the period that the person is classified as a habitual violator.

The proposed changes ensure DNR and the county will have a record of the transfer and that the owner cannot bypass the obligation to complete a master matrix.

D. 65.7. Proposed Karst Protections Are Inadequate.

On August 11, 2021, IEC and ELPC submitted a petition for rulemaking to the Environmental Protection Commission requesting greater protections for karst terrain and drinking water sources from AFO siting, including the ability for the DNR director to individually evaluate environmental concerns. The Environmental Protection Commission voted on February 15, 2022, to deny the petition and adopt DNR's basis for denial. Part of DNR's basis for denial was a promise to incorporate karst protections in a broader rule review.

As described below, the proposed rules would not protect against the water quality problems raised in the 2021 petition for rulemaking.

1. Risks of Constructing on Karst

Karst is a landscape formation created by dissolving bedrock that may contain sinkholes, sinking streams, caves, springs, and other features.[76] Karst is associated with soluble rock types such as limestone, marble, dolomite, and gypsum.[77] A typical karst landscape forms when much of the water falling on the surface interacts with and enters the subsurface through cracks, fractures, and holes that have been dissolved into the bedrock.[78] Scholarship on karst shows that there is grave risk in building CAFOs on karst terrain[79] and the rules should address that risk.

Iowa Code prohibits unformed concentrated animal feeding operation (CAFO) manure structures within 25 vertical feet above karst terrain.[80] Formed concrete structures are allowed with certain protections in place.[81]

DNR has proposed to delete the definition of what qualifies as "karst terrain" in section 65.1. The remaining definition therefore reverts to the statutory definition at Iowa Code section 459.102(35). This definition includes rock that is "characterized by closed depressions, sinkholes, or caves." Section 65.7(2) indirectly modifies this definition by stating that "If a 25 feet vertical separation distance can be maintained between the bottom of the formed proposed formed structure and limestone, dolomite, or other soluble rock then the structure is not considered to be in karst terrain."

The rules should require greater vertical separation distance from karst terrain and the recommendations in existing rules should be transformed into requirements. The petition for rulemaking sought to increase the vertical separation between formed manure storage structures and soluble rock from five feet to 25 feet at rule section 65.15(14)(c)(2): "A minimum ~~5~~ 25-foot layer of low permeability soil (1 × 10–6 cm/sec) or rock between the bottom of a formed manure storage structure and limestone, dolomite, or other soluble rock is required…."[82]

Our 2022 comments provided evidence supporting this increased separation distance, including evidence of past storage structure failures and analysis from the Minnesota side of Iowa's primary

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[76] *Karst Landscapes*, NATIONAL PARK SERVICE, https://www.nps.gov/subjects/caves/karst-landscapes.htm (last visited June 14, 2023).
[77] *Id.*
[78] *Id.*
[79] *See* Van Brahana et al., CAFOs on Karst—Meaningful Data Collection to Adequately Define Environmental Risk, with a Specific Application from the Southern Ozarks of Northern Arkansas, US GEOL. SURVEY SCI. INVEST. REP. 5035, 97.
[80] IOWA CODE § 459.308(3).
[81] IOWA CODE § 459.307(4).
[82] Petition at 4.

karst formation.[83] Based on the history of structural failure in karst, we reiterate our recommendation that DNR adopt a 25-foot vertical separation distance requirement.

Existing rule allows less than five feet of separation for formed manure storage structures "designed and sealed by a PE or NRCS qualified staff person."[84] It is recommended, but not required in the existing rule, that the formed manure structure be constructed aboveground if there is less than five feet of separation. The proposed rule at 65.7(3)(a) would require a minimum separation of at least five feet between the formed structure and the soluble rock. The proposed rule at 65.7(3)(b) would require either five feet of non-porous material, non-soluble bedrock, a two-foot compacted clay liner, or a geosynthetic clay liner for vertical separation distances between 5.01 and 15 feet. This approach has the same flaws we identified in our 2022 comments and will not prevent failures of manure storage structures.

Five feet of vertical separation does not adequately prevent formation of sinkholes and failure of manure storage structures. Minnesota DNR concluded that sinkholes can form with less than 50 feet of vertical separation between karst and the surface.[85]

The low level of soil permeability assumed in the rule (1 x 10-6 cm/sec, equal to 0.01 µm/sec) is unrealistic for the type of soil present in the karst region of Northeast Iowa at the depth below manure storage structures.[86]

In addition, clay liners have a long history of leaking. In proposing the clay liners as an option, DNR ignores NRCS guidance that specifically noted clay liners can leak in karst terrain and that alternatives provide greater protection:[87]

> Many rural domestic and stock water wells are developed in fractured rock at a depth of less than 300 feet. Some rock types, such as limestone and gypsum, may have wide, open solution channels caused by chemical action of the ground water. Soil liners may not be adequate to protect against excessive leakage in these bedrock types. Concrete or geomembrane liners may be appropriate for these sites. However, even hairline openings in rock can provide avenues for seepage to move

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[83] *See* 2022 Comments at 9-10.
[84] IOWA ADMIN CODE r. 567-65.15(14)(c) (2023).
[85] Adams, R., et al. "Minnesota Regions Prone to Surface Karst Feature Development." Minnesota Department of Natural Resources (2016), at 4, available at http://files.dnr.state.mn.us/waters/groundwater_section/mapping/gw/gw01_report.pdf.
[86] *See* Meyer Bohn, Joshua McDaniel, and Bradley Miller, Geospatial Laboratory for Soil Informatics (Jan. 2019), available at https://glsi.agron.iastate.edu/2019/06/19/saturated-hydraulic-conductivity-gssurgo/ (showing soil permeability rates higher than the low-permeability soil described in the proposed rule, as described in 2022 comments at 13-14).
[87] "Agricultural Waste Management Field Handbook," USDA NRCS, Appendix 10D (Mar. 2008), at 10D-10, available at https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17767.wba.

> downward and contaminate subsurface water supplies. Thus, a site that is shallow to bedrock can pose a potential problem and merits the consideration of a liner.

Iowa's climate exacerbates the risk of clay-lined manure storage because they "are subject to desiccation and/or they may be affected by freeze and thaw cycles after the ponds have been pumped out and have not yet completely refilled with manure and water."[88]

In its latest draft, DNR has proposed geosynthetic clay liners (GCL) as an alternative. But GCLs have significant problems if installed improperly. For example, "GCLs also have little tensile strength at overlapped panel seams, where mechanical bonding is absent... The bentonite component of GCLs is capable of self-healing small (less than 1-inch diameter) punctures, but larger punctures or penetrations where foreign material fills the hole can increase leak rates."[89] This is particularly relevant for manure storage. When a manure storage structure is being emptied, equipment could puncture the GCL and unintentionally increase the leak rate.

Furthermore, utilizing GCLs on sloped areas requires prudent planning and design.[90] The proposed rule at 65.7(3) does not have a required thickness for the geosynthetic clay liner and it does not have any direction for installation on varied surfaces. This lack of guidance is problematic because if the GCL is too thin[91] or installed on a sloped surface incorrectly, it is subject to potential punctures, and therefore, leakage.

Although GCLs are advantageous because of their low hydraulic conductivity, there are numerous factors that impact hydraulic conductivity.[92]

The different permutations of GCLs impact their hydraulic conductivity. DNR's proposed rule also does not acknowledge the different configurations of GCLs. [93]

> According to their manufacturing process, the GCLs can be classified into three groups. The adhesive-bonded GCL is composed of a bentonite layer attached to the upper and lower geotextiles with a water-soluble adhesive without any

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[88] Aley, T. "The Karst Setting," Journal of the Missouri Speleological Survey (2022) at 120.
[89] *Guidance for the Use of Geosynthetic Clay Liners (GCLs) at Solid Waste Facilities*, Bureau of Waste Management Wisconsin Department of Natural Resources, https://dnr.wi.gov/files/PDF/pubs/wa/WA823.pdf (last visited June 6, 2023).
[90] *Id.*
[91] *See Lecture 22 Geosynthetic Clay Liners and Geomembranes*, Mass. Inst. Tech., https://ocw.mit.edu/courses/1-34-waste-containment-and-remediation-technology-spring-2004/9a58d7a289e6479309294a960db3b7a6_lecture22.pdf.
[92] *See* Brown, L. C. & Shackelford C. D. (2007). Hydraulic Conductivity of a Geosynthetic Clay Liner to a Simulated Animal Waste Solution. *Transactions of the ASABE, 50*(3), 831–841. https://doi.org/10.13031/2013.23148.
[93] Monkul, M. M. & Özhan H. O. (2021). Microplastic Contamination in Soils: A Review from Geotechnical Engineering View. *Polymers, 13*(23), 4129. https://doi.org/10.3390/polym13234129

> reinforcement. The needle-punched GCL is manufactured by punching the needle-like fiber particles from the upper geotextile through the bentonite layer to the lower geotextile. Due to the reinforcement provided by the needle-punching process, the migration of the bentonite from the GCL is mostly prevented in this type. The stitch-bonded GCL is another reinforced GCL type. For the stitch-bonded GCL, the upper and lower geotextiles are stitched together with parallel oriented yarns by keeping the bentonite layer inside the GCL [71,72,75].

In addition, the "the concentration and types of solutes in the permeant liquid play an important role in determining the hydraulic conductivity of bentonite-based barriers."[94] This is particularly relevant for the GCLs utilized on karst terrain because the compounds of the animal waste from the storage structures differ and can cause differing hydraulic conductivity. As such, "actual animal waste solutions with higher ionic strengths than used in this study would be expected to result in higher k values than those reported in this study."[95] This quote suggests that GCLs are less effective for animal waste because of the ionic strength results in more permeable GCLs. Therefore, while the hydraulic conductivity of the GCLs is relatively low, it is impacted by the manure itself, which can cause the hydraulic conductivity to rise.

Consequently, we recommend a minimum thickness for the installed GCLs to mitigate the impacts of the animal waste on the integrity of the GCL.

To address the proposed rule's inadequate protection against catastrophic failure of manure storage structures in karst, we recommend the following language for section 65.7(3):[96]

> Except as provided for in subrule 65.7(5) related to the construction of a dry bedded confinement feeding operation structure, in addition to the concrete standards set forth in subrule 65.108(10) or Iowa Code section 459.307 if not constructed of concrete, a person constructing a formed structure on karst terrain shall comply with the following:
>
> *a.* No construction of any type of structure shall be permitted within ~~5~~ 15 feet vertical separation distance between the bottom of the formed structure and underlying limestone, dolomite, or other soluble rock;
>
> *b.* Between ~~5.01~~ 15.01 feet and ~~15~~ 25 feet vertical separation distance between the bottom of the formed structure and underlying limestone, dolomite, or other soluble rock ~~one~~ both of the following are required: (1) a minimum 5 feet continuous layer of low permeability soil (1 x 10-6 cm/sec) or non-soluble bedrock ~~or~~ and (2) a 2 feet thick compacted clay liner or 25 millimeter thick geosynthetic

[94] Brown, L. C. & Shackelford C. D. (2007). Hydraulic Conductivity of a Geosynthetic Clay Liner to a Simulated Animal Waste Solution. *Transactions of the ASABE, 50*(3), 831–841. https://doi.org/10.13031/2013.23148
[95] *Id.* at 838.
[96] In this and following recommendations, Environmental Organizations' recommended changes are in red text.

clay liner must be constructed ~~directly~~ beneath the floor of the structure. The design of the formed structure must be prepared and sealed by a PE or an NRCS engineer.

Statute implicitly allows construction of formed manure storage structures on karst.[97] If DNR is unwilling to increase the separation distance for formed structures to a degree that will prevent water quality from being degraded, we recommend that formed manure storage basins in karst terrain be required to install an impermeable membrane to prevent leakage. One such alternative (for a clay liner) involves a "complex system of layering and includes a lateral drainage layer above the clay liner to limit fluid pressures above the clay."[98] The design had significant depth, and as such, "the freezing zone never propagated into the clay."[99] A complex system ensures that the risk of leakage is minimized, which addresses the risks presented by Iowa's climate.

The recommended changes are consistent with the NRCS recommendations for impoundments in karst terrain.[100]

2. Soil Corings and Soil Reports

The requirements for karst terrain presume that the applicant knows whether a structure is actually above karst terrain. That depends entirely on the sufficiency and accuracy of soil corings that measure the depth to karst. In 2022, we made a number of comments about how to ensure that the karst assessment is reasonably accurate.[101] DNR did not incorporate those suggestions.

In proposed section 65.7(1)(b), a professional engineer, NRCS staff, or a qualified organization must submit a soil report based on two soil corings or test pits for a formed manure storage structure. This number of samples for a manure storage structure is grossly inadequate. This approach incorrectly presumes that the karst topography follows a smooth plane, and two samples will accurately demonstrate the depth to the soluble bedrock. Karst bedrock is highly variable. Another example of this is the documentation of bedrock sampling for the Supreme Beef facility. Borings under and near the manure storage structure at Supreme Beef showed that the bedrock elevations varied by 35 feet, as shown in Figure 1.[102]

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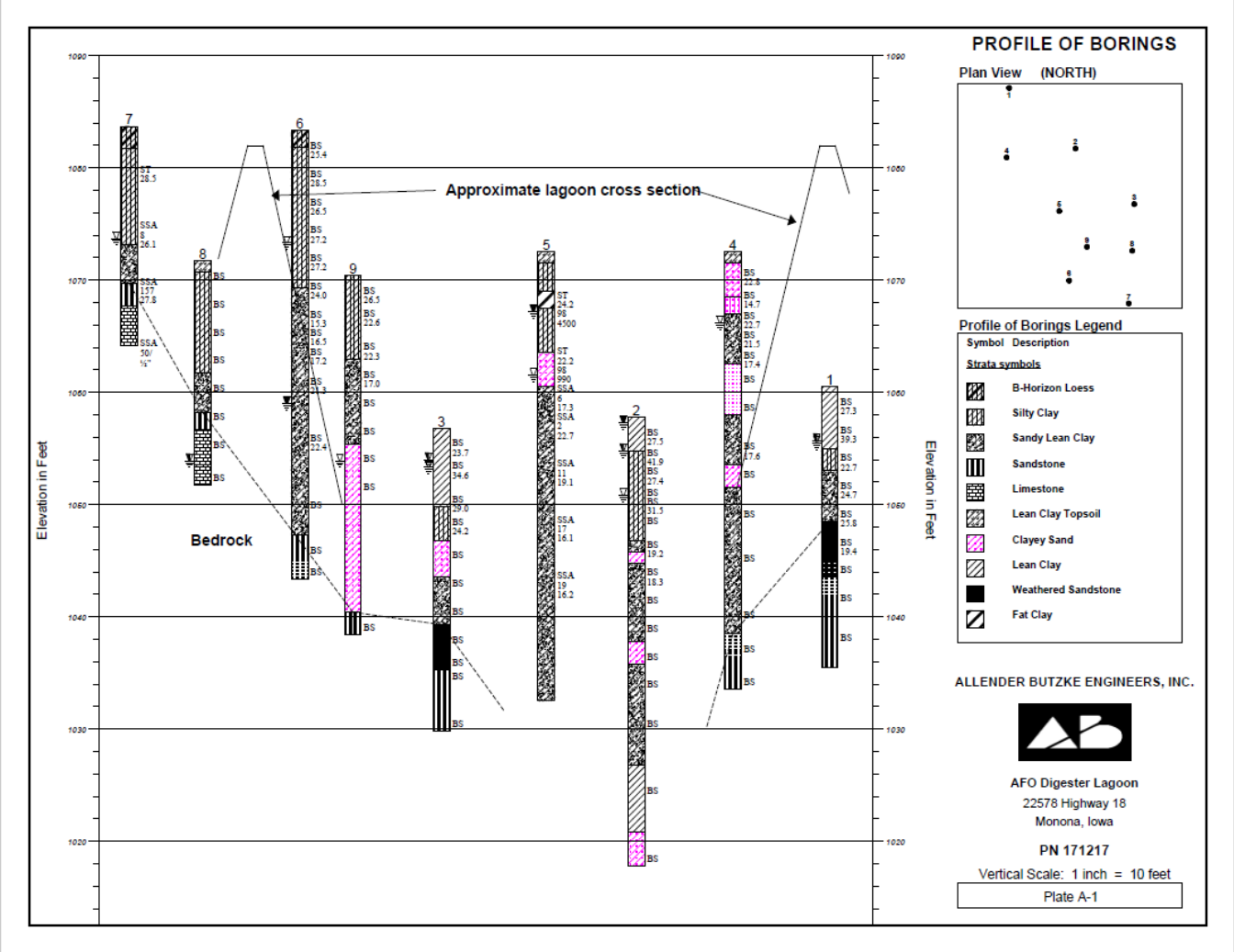
[97] IOWA CODE § 459.307(4).
[98] Miller C. J. & Lee J.-Y. (1999). Response of landfill clay liners to extended periods of freezing. *Engineering Geology*, *51*(4), 291–302. https://doi.org/10.1016/S0013-7952(98)00070-2
[99] *Id.*
[100] "Agricultural Waste Management Field Handbook," USDA NRCS, Appendix 10D (Mar. 2008), at 10D-10, available at https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17767.wba.
[101] *See* 2022 comments at 10-11.
[102] "Geotechnical Exploration, AFO Digester Lagoon, 22578 Highway 18, Monona, Iowa," Allender Butzke Engineers Inc., June 8, 2017, at 5 (summarizing bedrock depth as ranging from 1035' to 1070'.

Figure 1. Supreme Beef Manure Basin Borings.



The rules should require more than two corings and the corings should represent a cross-section of the area under the manure storage structure. Test pits outside the structure are not adequate because the karst directly under the structure may be at a significantly different elevation. Similarly, well logs from other locations do not demonstrate that karst is at the same elevation below the storage structure. If any coring shows inadequate separation distance, the structure should be prohibited above that location. Additional test pits would reduce this risk. The proposed rule states that the corings should be taken to a minimum of 15 feet; however, measuring to a depth of 15 feet is inadequate because it does not determine whether karst exists within 25 feet. If the corings are taken to a minimum of 25 feet, then the corings will ascertain whether karst terrain exists. We recommend the following change to section 65.7(1)(b):

> *b.* If the proposed formed structure is located in potential karst terrain, a PE licensed in Iowa, NRCS qualified staff or a qualified organization shall submit a soil report, based on the results from soil corings, or test pits ~~or acceptable well log data~~, describing the subsurface materials and vertical separation distance from the

> bottom of the proposed structure to the underlying limestone, dolomite or soluble rock. A minimum of ~~2~~ 6 soil corings spaced equally within the structure ~~or 2 test pits located within 5 feet of the outside of the structure are required if acceptable well log data is not available~~. The soil corings shall be taken to a minimum depth of ~~15~~ 25 feet below the bottom elevation of the proposed structure or into bedrock, whichever is shallower. Any limestone, dolomite, or soluble bedrock in the corings ~~or test pits~~ shall be considered the bedrock surface rather than augur refusal. After the soil exploration is complete, each coring ~~or test pit~~ shall be properly plugged with concrete grout, bentonite or similar materials and completion of this activity shall be documented in the soil report. If 25 feet vertical separation distance can be maintained between the bottom of the formed proposed formed structure and limestone, dolomite, or other soluble rock then the structure is not considered to be in karst terrain.

Similarly, section 65.7(4) requires only one coring to establish whether a site with potential karst can maintain the 25-foot separation that allows construction of unformed manure storage structures. Because the karst has variable depth, we recommend more than one coring.

> **65.7(4)** *Unformed structures.* The construction of unformed structures, including structures at SAFOs, is prohibited in karst terrain or an area that drains into a known sinkhole. In potential karst, at least ~~one~~ six corings at least 25 feet apart shall be taken to a minimum depth of 25 feet below the bottom elevation of the proposed unformed storage structure or into bedrock, whichever is shallower. If a 25 feet vertical separation distance can be maintained between the bottom of the unformed structure and limestone, dolomite, or other soluble rock then the structure is not considered to be in karst terrain. No intact or weathered bedrock, including sandstone, shale, limestone, dolomite, or soluble rock, shall be removed or excavated during the construction of a storage structure.

The additional corings would decrease the risk of vertical separation distances of less than 25 feet from karst. Maintaining adequate separation fulfills the prohibition in statute against unformed manure structures within 25 feet of karst terrain.[103]

3. Removal of Bedrock

We support the inclusion of the following language including "weathered" in 65.7(2) and 65.7(4) for the reasons listed in our 2022 comments:

[103] IOWA CODE § 459.308(3).

> No intact or weathered bedrock, including sandstone, shale, limestone, dolomite, or soluble rock, shall be removed or excavated during the construction of a storage structure.

The rules do not define "intact or weathered bedrock," but this term is important for understanding whether a structure maintains the required separation distances. Removing the epikarst (i.e., the uppermost, weathered layer of karstified rock) exposes the soluble rock below to further and more direct weathering. This increases the risk of developing new sinkholes or other failures in a structure above the site. We urge DNR to retain "weathered bedrock" in the rule.

E. 65.9. DNR Must Adopt the Floodplain Map as Proposed.

The proposed rules include adoption of a floodplain map by incorporating it into the AFO Siting Atlas on the DNR website.[104] This fulfills a legislative directive dating to 2002.[105] The proposed rules make clear that applicants must provide the map layer for a proposed site as part of a construction application[106] and that confinements on the floodplain of a major water source are prohibited.[107] We support the adoption of the floodplain map and the requirement for its use. As explained in the Petition for Rule Making, climate change is expected to exacerbate the intensity and frequency of storms in Iowa, including rainfalls. Ensuring that DNR maintains and updates the floodplain map regularly will be important to ensure adequate protection for water quality in the future.

We remain concerned about the numerous AFOs that exist in the 100-year floodplain and expect to address that issue in the future.

F. 65.101. Land Application Requirements Must Prevent Pollution.

The proposed rules should incorporate proper nitrogen application rates as a requirement, as DNR now proposes to do. We are disappointed that DNR has proposed to delete existing language specifying other best practices for manure application.

Land application of manure to tile-drained land can rapidly lead to water pollution if the manure is liquid or is quickly followed by precipitation. We recommend adding a provision to test tile drainage following land application of liquid manure or precipitation following manure application by adding the following paragraph to section 65.101(2):

> e. For liquid manure applied to land with subsurface drainage, the manure applicator shall sample water quality from any tile monitoring points or outlets on

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[104] Proposed rule at § 65.9.
[105] 2002 IOWA LAWS ch. 1137, sec. 32.
[106] Proposed rule at 65.9(3).
[107] Proposed rule at § 65.9.

> the property downgradient of the manure application. The applicator must submit at least one monitoring sample to a certified laboratory each year and electronically provide to DNR the results for total phosphorus, nitrate-nitrogen, and E. coli within 30 days after receipt.

The proposed rules delete a section of recommendations (existing rule 65.3(5)) that contain best practices for manure application.[108] While some of these recommendations relate to application rates that should be mandatory, including our recommended nitrate application rate changes to rule section 65.111(13), other recommendations are not otherwise incorporated into rule. For example, existing rules advise on best practices for emergency application to frozen or snow-covered ground. DNR should adopt those as enforceable requirements. If DNR does not believe it has legal authority to adopt a particular recommendation as an enforceable standard, it should retain the provisions as recommendations. Including the recommendations in rule would demonstrate prudent and generally accepted management practices. While they may not be enforceable, they provide important information to manure applicators about how to minimize risks to water quality.

65.104. Construction Permit Applications.

The name of the corporation that owns the livestock (integrator) should be included in order to ascertain if there is common management. We recommend the following language for section 65.104(1):

> **65.104(1)** *Construction permit application.* Application for a construction permit for a confinement feeding operation shall be made on a form provided by the department. The application shall include all of the information required in the form. At the time the department receives a complete application, the department shall make a determination regarding the approval or denial of the permit in accordance with subrule 65.105(5). A construction permit application for a confinement feeding operation shall be filed as instructed on the form and shall include the following:
>
> *a.* The name of the applicant and the name of the confinement feeding operation including mailing address and telephone number.
>
> *b.* The name of the current landowner or the proposed landowner of the land where the confinement feeding operation will be located. For a corporate landowner, an applicant must provide the names of all parties with an interest in the corporation.
>
> *c.* The contact person for the confinement feeding operation, including mailing address and telephone number.
>
> *d.* The name of the corporation that owns the livestock (integrator).
>
> …

[108] *See* IOWA ADMIN. CODE r. 567–65.3(5); proposed rules at 31-32.

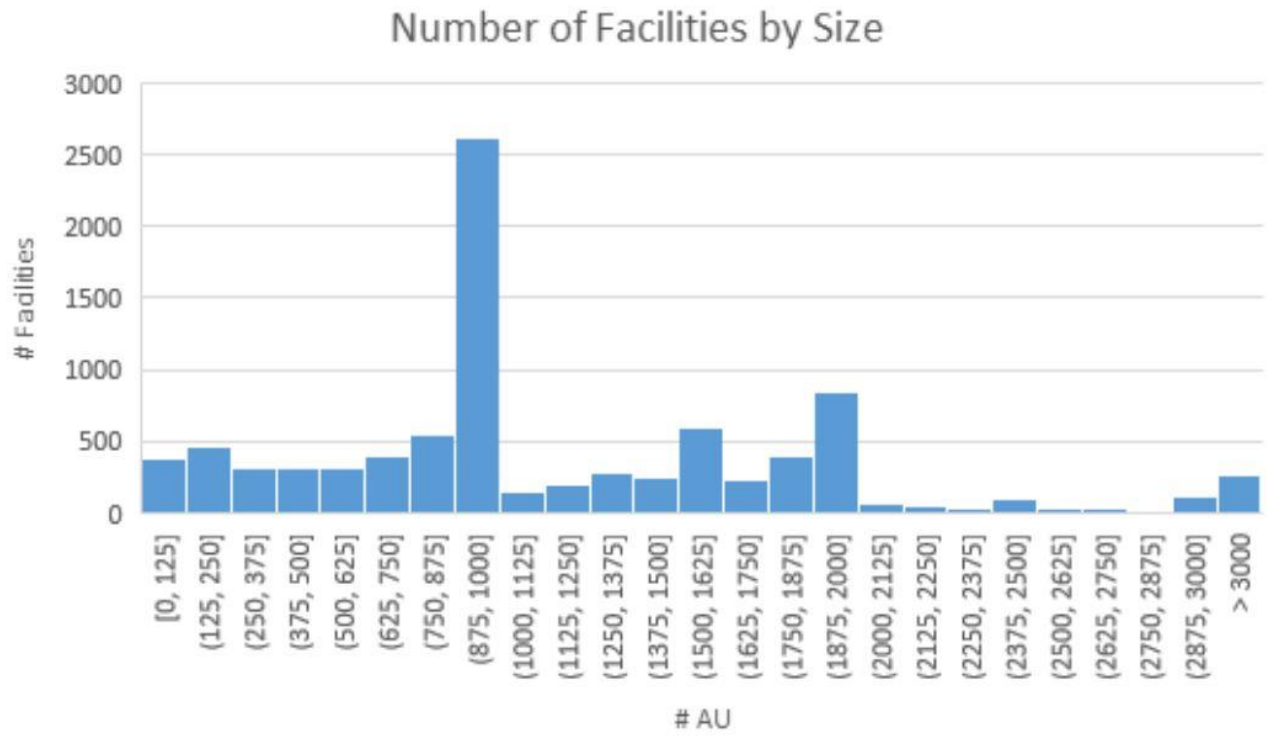
> ~~l~~*m*. The names of all parties with an interest or controlling interest in the confinement feeding operation who also have an interest or controlling interest in at least one other confinement feeding operation in Iowa, and the names and locations of such other operations along with the official legal business documents for the LLC listing each owner and their percent of ownership interest along with the signature page must be submitted with a signed affidavit verifying the ownership interest.
>
> …
>
> *r.* Documentation that copies of all the construction permit application documents have been provided to the county board of supervisors or county auditor in the county where the operation or structure subject to the permit is to be located, and documentation of the date received by the county. Statements made in an application for a construction permit are required under section 455B, subchapter III, part 1. Violators are subject to any of the actions pursuant to section 455B.175 and potentially subject to penalties pursuant to section 455B.191.

This language will remedy a problem with LLC ownership and common management. Clarifying that common ownership interests in multiple LLCs owning otherwise adjacent AFOs is shared ownership and renders the adjacent facilities a single AFO for purposes of Chapter 65. This additional information will close this longstanding loophole.

State law requires that confinement facilities with 1000 or more animal units (AU) complete the master matrix and submit a manure management plan for DNR approval because 1000 AU constitutes a large CAFO. For open feedlots, 1000 AU triggers the requirement for a nutrient management plan. Smaller facilities, however, do not have to submit a master matrix or management plan for DNR approval. As evidenced by Figure 2, data from DNR's AFO database[109] shows that many facilities operate just below the 1000 AU threshold.

[109] *See* "Reports and Letters," Iowa DNR, available at https://programs.iowadnr.gov/animalfeedingoperations/Reports.aspx.

Figure 2. Number of AFO Facilities in Iowa by Size.



Because DNR does not require submission of ownership documentation, it is unclear how many of the 2500 facilities just below the 1000 AU threshold in fact have common ownership or common management.

G. 65.108. DNR Inappropriately Reduced Monitoring Requirements.

In the rulemaking petition filed in 2021, IEC and ELPC proposed to increase groundwater monitoring requirements at confinements and open lots with earthen manure structures to reduce the risk of unremediated groundwater contamination. We recommended a similar approach in our 2022 comments. This proposal was consistent with Iowa Code, which expressly allows DNR to require water quality monitoring for unformed manure structures.[110] This monitoring is necessary to address the high frequency of nitrate contamination in private wells.

DNR has rejected that approach entirely. Rather than increase the monitoring at unformed manure storage structures, the proposed rule does not add groundwater quality monitoring requirements at any unformed manure structures. DNR should ensure facilities identify and stop pollution at the source of contamination because individual well owners do not consistently test their wells for

[110] IOWA CODE § 459.303(6).

contaminants.[111] We continue to recommend the following addition to the proposed manure storage structure design requirements, now proposed to be adopted in section 65.108:

> 65.108(15) *Groundwater monitoring.* The owner of an AFO with an unformed manure storage structure must install and operate a groundwater water pollution monitoring system. Two or more groundwater sampling wells 25 or more feet apart must be installed between 5 feet and 25 feet outside the toe of the berm on the downgradient side, or on opposite sides if the site has no slope. The operator must submit samples from the monitoring device to a certified laboratory at least once per year and electronically provide to DNR the results for total phosphorus, nitrate-nitrogen, and E. coli within 30 days after receipt.

This monitoring information would provide better source assessment and could help exclude AFO structures when DNR investigates fish kills, releases, or other nitrate events. DNR should make this data publicly available, just as monitoring data for permitted facilities is public.

When drainage tile lowers the water table at a facility, the drainage tile should also be monitored to ensure no lateral leakage into the drainage tile. The proposed rule at 65.108(1)(b) would require that "during the tile inspection of an unformed manure storage structure shall be removed and rerouted in or in an area outside the inspection trench." This language is ambiguous: does the structure have to be re-routed *in* the trench? Does it have to be re-routed *outside* the trench? As phrased, the rule would allow either option. Because existing tile drainage should be re-routed to avoid the facility, we recommend the following change:

> b. Drainage tile lines discovered during the tile inspection of an unformed manure storage structure shall be removed and rerouted ~~in or~~ to separate external tile lines from the structure in an area outside the inspection trench.

The same language appears in section 65.206(1) and 65.304(1). We recommend parallel changes in these sections. Routing existing tile lines below the facility to the inspection trench could serve as part of a monitoring system, but the rule as proposed does not specify that. If that is DNR's intent, the rule should make that clear.

H. 65.108. DNR Must Strengthen Storage Design Requirements and Monitoring.

The proposed rules at section 65.108(1)(c) would allow tiles located under the manure storage structure to remain in place during operation of the facility, provided that they are tied into the perimeter drain tile. This requirement would directly connect any leaks from the facility to the drain tile that lowers the groundwater. As proposed by DNR, this is a recipe for disaster because

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[111] *See* "Iowa's Private Wells Overrun With Agricultural Contaminants," Iowa Environmental Council (Apr. 24, 2019), available at https://www.iaenvironment.org/newsroom/water-and-land-news/iowas-private-wells-overrun-with-agricultural-contaminants (last visited June 8, 2023) (55,000 wells out of 230,000 wells tested).

it ensures that any leak quickly reaches surface water. This system could act as a leak detection system, but the rules do not require frequent monitoring. Moreover, tying the tiles under the facility to the perimeter tiles will make it more difficult to isolate the source of a leak. DNR should not adopt such an egregious change. We recommend the following change to 65.108(1)(c):

> The applicant for a construction permit for a formed manure storage structure shall investigate for tile lines during excavation for the structure. Drainage tile lines discovered upgrade from the structure shall be rerouted around the formed manure storage structure to continue the flow of drainage. All other drainage tile lines discovered shall be rerouted, capped, plugged with concrete, Portland cement concrete grout or similar materials. Drainage tile lines installed at the time of construction to lower a groundwater table may remain where located even if located under the floor; however, the tile lines must be plugged with concrete or grout ~~tied into the perimeter drain tile~~.

Unformed manure storage structures must have berms to contain manure and ensure adequate freeboard that prevents overtopping.[112] Manure releases have resulted from breached basins at both confinements and open lots in Iowa.[113] DNR has proposed additional criteria for the berms that will ensure the berms do not erode and do not have steep slopes. We support these criteria in proposed rule 65.108(8) because they reduce the risk of overtopping or breaches of earthen berms. We also support the language proposed in rule section 65.206(7) setting minimum standards for settled open feedlot effluent basins.

In section 65.206(2)(c)(3) (and in 65.207(4)(c)(3)), we support the proposed change to the soil drilling methods that determine the soil profile using methods that do not result in soil layer mixing. This clarification will ensure soil corings provide useful information in evaluating the soil profile.

I. 65.111 and 65.208. DNR Must Require Online Submission of MMPs and NMPs.

MMPs and NMPs provide the regulatory tools by which DNR seeks to prevent manure from causing water pollution. To achieve this goal, the plans must be accurate and enforceable. The proposed rules largely maintain the existing language, which has led to the water quality problems described in Section I and in our 2022 comments. DNR has proposed not to require online submission of MMPs and NMPs including geospatial information for fields.[114] Continuing to allow paper submissions reduces transparency and decreases efficiency. DNR must revise the rules to require online documentation, including geospatial mapping.

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[112] Proposed rule 65.109(7).
[113] *See, e.g.*, DNR HSI spill nos. 053019-WSW-1300, 110415-JFP-0900.
[114] Proposed rule 65.111(3).

Iowa statute requires DNR to provide for methods of processing electronic applications and payments, and "every extent feasible provide for the processing of permits and manure management plans required under this subchapter using electronic systems."[115] Although DNR does allow electronic processing of MMPs, its approach allows applicants to submit electronic documents that are scanned documents – functionally similar to a paper submission for purposes of review.

DNR's current operating approach makes oversight and enforcement difficult and inefficient. More than 9,000 AFOs have registered in Iowa.[116] DNR's records show that 6,663 facilities have an MMP or NMP.[117] Each of these plans contains a list of individual fields on which it will apply manure, resulting in tens of thousands of individual fields subject to enforcement by DNR.[118] To evaluate these plans against existing plans, DNR staff or the public would have to visually compare descriptions or maps of the listed fields in MMPs or NMPs for nearby facilities.

Verifying manure application rates is a function only DNR can carry out.[119] AFO operators can update their MMPs on-site, which DNR can inspect. Having only paper copies or scanned maps means that DNR has no efficient way to determine whether fields are shared among MMPs and NMPs. When IEC requested MMPs and NMPs through an Open Records Act request in 2020, seeking fields that overlap with fields proposed by Supreme Beef, DNR staff responded that "there is no electronic query method in place to determine fields shared among multiple MMPs/NMPs."[120]

This inefficiency has practical effects. Paper copies increase costs for DNR, which must review, approve, and maintain these submissions on an ongoing basis. DNR's method to identify potential overlap with a new NMP is to review the plans from every nearby facility one at a time based on paper plat maps.[121] DNR is either taking substantial staff time to do this for every new plan or failing to do so at the risk of Iowa's water quality. Requiring electronic geospatial information as part of the MMP/NMP submission would vastly accelerate and improve the accuracy of the review process.

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[115] IOWA CODE § 459.302(2).
[116] Iowa DNR Animal Feeding Operation Database, available at https://programs.iowadnr.gov/animalfeedingoperations/FacilitySearch.aspx (last accessed Sept. 20, 2022).
[117] *Id.*
[118] For example, the Supreme Beef NMP requested approval to apply manure to 45 fields.
[119] Manure application records are confidential by statute. IOWA CODE § 459.312(12).
[120] Email from DNR Records (dnr.records@dnr.iowa.gov) to Michael Schmidt (Dec. 17, 2020).
[121] *Id.*

DNR's failure to require electronic, geospatial MMP submissions is inconsistent with the purpose of section 459.302. Agriculture has moved to a digital age, the legislature has directed DNR to do so, and the proposed rules fail to fulfill that directive.

In addition to the lack of transparency, our comments in 2022 pointed out that the lack of clarity frustrates the purpose of the MMPs because applicators are not subject to DNR enforcement if they are not aware of other fertilizer being applied to a field.[122] Our comments also noted agency precedent for requiring geospatial submissions and recommended consistent naming conventions to facilitate comparison.[123]

We reiterate our recommendation to update the MMP submission requirements with the following changes to proposed rule 65.111(3)(a):

> a. The owner of a confinement feeding operation who is required to submit a MMP under this rule shall submit an updated MMP on an annual basis to the department. The updated MMP ~~may~~ must be submitted by ~~hard copy or by~~ online, electronic submittal through a DNR web application. The updated plan must reflect all amendments made during the period of time since the previous MMP submission.
>
> (1) ~~If the plan is submitted by hard copy, the submittal process shall be as follows:~~ The owner of the AFO shall ~~also~~ submit the updated MMP on an annual basis to the board of supervisors of each county where the confinement feeding operation is located and to the board of supervisors of each county where manure from the confinement feeding operation is land-applied. If the owner of the AFO has not previously submitted a MMP to the board of supervisors of each county where the confinement feeding operation is located and each county where manure is land-applied, the owner must submit a complete MMP to each required county. The county auditor or other county official or employee designated by the county board of supervisors may accept the updated plan on behalf of the board. The updated plan shall include documentation that the county board of supervisors or other designated county official or employee received the MMP update.
>
> ~~(2) If the plan is submitted electronically, t~~The submittal process shall be as follows: The owner of the AFO shall submit the updated MMP to the department through the department's electronic web application. Once the submittal has been completed, the department shall provide electronic access of the updated MMP to the public through the online AFO Siting Atlas and database~~board of supervisors of each county where the~~

[122] See 2022 Comments at 27 (addressing proposed rule section 65.111(8)(e); previously proposed as section 65.112(13)(e); existing rule section 65.17(13)(e)).
[123] 2022 Comments at 28-29.

~~confinement feeding operation is located and each county where manure is land-applied~~.

Electronic forms, along with supporting software, would significantly decrease the DNR staff time necessary to review MMPs and NMPs. It would increase transparency and accountability. It would also save costs for public records requests. DNR must make use of the online submissions by populating a database with the information and creating a geospatial layer.

DNR should also specify the electronic geospatial component of manure application locations in proposed rule 65.111(5):

> *a.* The MMP shall identify each ~~farm~~ field where the manure will be applied, the number of acres that will be available for the application of manure from the confinement feeding operation, and the basis under which the land is available. The locations shall be submitted to DNR in an electronic geospatial format. DNR shall add the geospatial data to the online AFO Siting Atlas and AFO database for public access.

If DNR has preferred file formats, it could specify those formats in the rule.

Consistent with these changes, DNR should not make the current state of affairs even worse, which is what it proposes in section 65.111(12) by expressly allowing hard copies of current MMPs. It also proposes to delete language regarding the basis for values in the MMP. Those requirements are not in statute, only in rule. We ask the DNR to revise that change as shown below:

> **65.~~111(12)~~111(7)** *Current MMP*. The owner of a confinement feeding operation who is required to submit a MMP shall maintain a current MMP at the site of the confinement feeding operation or at a residence or office of the owner or operator of the operation within 30 miles of the site. ~~The MMP may be an electronic or hard copy.~~ The plan shall include completed manure sales forms for a confinement feeding operation from which manure is sold. If manure management practices change, a person required to submit a MMP shall make appropriate changes consistent with this rule. If values other than the standard table values are used for MMP calculations, the source of the values used shall be identified.

DNR has allowed electronic MMPs for years. The benefits to DNR of this approach and the limited resources available to the agency justify online submissions.

J. 65.111and 65.209(8). MMP and NMPs Must Fully Address Risks of Water Quality Pollution.

Confinement operations must submit manure management plans (MMPs) if they were built or expanded after May 31, 1985.[124] Most confinements in the state were built or expanded after 1985 and therefore must have an MMP. These plans are the primary mechanism DNR has to ensure compliance with manure application requirements.

1. MMP and NMP Contents

Proposed section 65.111(2) describes the required contents of the MMP. This section used to apply to the portion of manure which will not be sold from "Confinement feeding operations **that will not sell all of their manure.**" The latest version changed the language to now apply to the portion of manure which will not be sold from "Confinement feeding operations **that do not sell manure**." The new language would mean that a CAFO does not need to submit an MMP for unsold manure so long as they sell *some* manure. DNR must not change the applicability of 65.111(2) and must prevent CAFOs from evading manure management regulations on unsold manure by simply selling some manure. In a meeting on June 12, 2023, DNR indicated that the intent was not to exempt confinements that sell any amount of manure.

State law sets content requirements for MMPs and NMPs.[125] DNR has proposed to remove numerous rule requirements that overlap with statutory requirements. We recommend that the required contents of the MMP all be in one place in one document. Many of the required contents of the MMP were removed from 65.111(2) and can now be found only by referring to Iowa Code 459.312(10). In addition to those stated in 65.111(1), the lists of required contents are now spread out amongst three different sections of two different codes, the Iowa Code and the Iowa Administrative Code. While these rules are intended to implement the Iowa Code, including chapter 459 and section 459.312, implementation of these rules would be better served by having the most important provisions included in the rules. MMP required contents in multiple documents makes it harder, not streamlined or efficient, for compliance with manure management planning. It should be straightforward for the department to compile in these rules a single list of contents that shall be submitted in each MMP.

Open feedlots, regulated under a different chapter of statute, do not have to meet the same requirements. An open feedlot must submit a Nutrient Management Plan (NMP) with a construction permit,[126] but only if they have at least 1,000 animal units.[127]

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[124] IOWA CODE § 459.312(1).
[125] IOWA CODE §§ 459.312(10), 459A.208(7).
[126] IOWA CODE § 459A.205.
[127] IOWA CODE § 459A.208.

The MMPs and NMPs must document the nutrient concentrations of manure, as well as the locations, timing, and rates where the operation will apply the manure.[128] The AFO "shall not apply manure in excess of the nitrogen use levels necessary to obtain optimum crop yields."[129] Nor shall the manure rates exceed the phosphorus index.[130] These restrictions should act as a limitation on application rates and implement the EPC's legal authority to adopt rules that mitigate water quality impacts from AFOs. The plans should also provide adequate information to enforce the requirements. In practice, the plans have failed to do either.

The information provided in MMPs and NMPS determines whether DNR can assess compliance with basic requirements to protect water quality. Inaccurate or insufficient information will lead to water quality problems.

Inaccurate information and calculations can undermine the foundation of a plan. For example, the Supreme Beef NMP assumed a nutrient concentration from a different type of facility; incorrectly classified soil types; miscalculated phosphorus indexes; and failed to identify conservation practices, while assuming conservation practices existed in calculating application rates. These faults demonstrate why DNR must do more than just move rules to new sections. We have several recommendations to improve the accuracy and effectiveness of the plans.

2. 65.111(3), Nutrient Concentrations in Manure and Process Wastewater

When determining the nutrient concentration of manure, existing rules allow MMPs to use the values in Chapter 65, Table 3 or "other credible sources for standard table values or the actual nitrogen and phosphorus content of the manure …. determined by a laboratory analysis … from a manure storage structure with design and management similar to the confinement feeding operation's manure storage structure."[131] The rules do not address how DNR verifies the sampling or the frequency at which manure is tested.

In the proposed rules at proposed section 65.111(3), DNR would allow use of the table values or actual samples from the operation or a similar operation. We recommend the language require documentation of sampling results, rather than making it optional. DNR should update reference to the publication describing sampling practices. Iowa State University has updated the referenced document's title and the publication numbering system.[132]

We recommend the following addition to proposed rule section 65.111(3):

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[128] Proposed rules 65.112; 65.208(8).
[129] IOWA ADMIN. CODE r. 567-65.17(1); proposed rule 65.112(1).
[130] *Id.*
[131] IOWA ADMIN. CODE r. 567-65.17(5); proposed rule 65.112(5).
[132] *See* "How to Sample Manure for Nutrient Analysis," Iowa State University, available at https://store.extension.iastate.edu/product/How-to-Sample-Manure-for-Nutrient-Analysis (last visited June 8, 2023).

> Actual concentration and production values from the operation or a similar operation. If an actual sample is used to represent the nutrient content of manure, the sample shall be taken in accordance with Iowa State University extension publication ~~PM 1558~~ AE 3550, "~~Management Practices:~~ How to Sample Manure for Nutrient Analysis." The department ~~may~~ shall require documentation of the manure sampling protocol or take a split sample to verify the nutrient content of the operation's manure. If actual nitrogen and phosphorus are used for concentration in the MMP, actual manure production must also be used. Any sample used to estimate the concentration of manure must be less than four years old.

3. 65.111(13), Manure Application Rate Calculations

The rate of manure application determines whether excess nitrogen and phosphorus remain unused by the crop. Besides manure, Iowa has substantial synthetic fertilizer sales that provide nitrogen and phosphorus. MMPs and NMPs do not have to account for these inputs. The plans should reflect actual nutrient application rates, not only those from manure.

DNR has proposed rule changes to address the current science for manure application rates by requiring application rates at the maximum return to nitrogen (MRTN), which is consistent with state policy in the Nutrient Reduction Strategy.[133] This change should save $32 million per year.[134] It also has the potential to reverse what Iowa State University has modeled to be an 11 percent increase in nitrate loading statewide resulting from increased nitrate application rates on corn-soybean rotation fields.[135] We support the proposed change to reduce application rates to MRTN.

We recommend the following addition to section 65.111(13)(c):

> c. Nitrogen-based application rates for corn shall be based on current recommendations from an Iowa-based state university for the maximum return to nitrogen. Nitrogen-based applications rates for other crops shall be based on the optimum crop yields as determined in subrule 65.111(4) and crop nitrogen usage rate factor values in Table 4 or other credible sources. The calculation must use a cost factor of at least 0.10. The calculations of manure applied from the facility must account for fertilizer from all other manure and non-manure sources. Liquid manure applied to land that is currently planted to soybeans or to land where the current crop has been harvested and that will be planted to soybeans the next crop season shall not exceed 100 pounds of available nitrogen per acre. Further, the 100 pounds per acre application limitation in the previous sentence does not apply on

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[133] *See* IOWA CODE § 455B.177 (adopting NRS as state policy); NRS, *supra* note 2, §2.1 at 9.
[134] NRS, *supra* note 2, §2.2 at 27.
[135] "Iowa Nutrient Reduction Strategy – Water Quality," Iowa State University, available at https://www.arcgis.com/apps/dashboards/29460d40c6a74379a90b42f3e770db07 (last visited June 8, 2023).

or after June 1 of each year; in that event subrule 65.111(4) and Table 4 would apply as provided in the first sentence of this paragraph.

4. 65.111(12), Phosphorus Index Calculations

Calculating the phosphorus index depends on accurate identification of the soil type and accurate soil tests. The rules rely on the same phosphorus index procedures for NMPs and MMPs.[136] The soil phosphorus index requires calculating the rate of erosion from the field. Existing rules require using "the most erosive soil map unit that is at least 10 percent of the total field area."[137] The proposed rules delete this requirement and instead provides instruction for highly erodible soils and non-highly erodible soils. This provides better guidance than the draft July 2022 rules.

The proposed rules would also allow ephemeral gully calculations consistent with NRCS Technical Note 25. The Iowa electronic Field Office Technical Guide (referenced in Technical Note 25) contains calculation methods for gully erosion.[138] It was last updated in April 2023.[139] DNR could require use of the NRCS calculation method directly.

This was an issue in the appeal of the Supreme Beef NMP appeal decided in 2023, in which the court held that photos of gullies were relevant and admissible.[140] The court pointed out that "The IDNR does not point to any statute or regulation that allows for determining gully erosion from photos."[141] DNR appears to be seeking to remedy this by incorporating photos into rule. Photos can provide evidence that gullies exist, but measuring a gully requires on-the-ground measurements to make calculations.[142]

5. 65.111, Master Matrix Obligations

The Master Matrix is a scoring system to site confinement operations in the state. Several pieces of the matrix provide additional points for approval based on operational practices, such as increasing setbacks for manure application beyond the legal minimum or applying manure to land with buffer strips.[143] These commitments create an ongoing obligation for the facility in its

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[136] *See* proposed rule 65.208(8)(a)(1) (referencing 65.112(16) for phosphorus index procedures).
[137] IOWA ADMIN. CODE r. 567-65.17(b).
[138] "Iowa | Field Office Technical Guide," Natural Resource Conservation Service, available at https://efotg.sc.egov.usda.gov/#/state/IA/documents/section=1&folder=3496 (last visited June 8, 2023).
[139] *Id.*
[140] *Sierra Club Iowa Chapter v. Iowa DNR*, Polk Dist. Ct. No. CVCV062713 (filed Apr. 28, 2023), at 15.
[141] *Id.* at 25.
[142] *See* "Gully Erosion," NRCS, Iowa Field Office Technical Guide § 1-3-2 (April 2023), available at https://efotg.sc.egov.usda.gov/references/public/IA/GULLY_EROSION_2023.pdf (last visited June 8, 2023).
[143] The "Proposed Site Operation and Manure Management Practices" category of the matrix, addressing items 26 through 44, addresses many obligations that apply during facility operations.

handling of manure. Statute expressly requires inclusion of these practices in the initial MMP, but is not explicit about future updates to the MMP.[144] Existing rule fills that gap, requiring maintenance of these practices through the MMP on an ongoing basis.[145] The proposed rules provide no method for reporting to DNR, demonstrating compliance to the public, or enforcing the requirements. We propose the following addition at section 65.106(10):

> 65.111(10) Ongoing master matrix obligations. A confinement that receives points for its score on the master matrix based on operational practices must submit records of compliance with those practices to DNR at least annually.

Without this component, DNR and the public have no assurance that the AFO fulfills its master matrix obligations for the duration of its operations.

K. 65.111(15). Use of Manure as a Soil Conditioner Requires Definition and Limitation.

The proposed rules exempt dry manure being sold "as a commercial fertilizer or soil conditioner" from having to meet the requirements for MMPs. Chapters 200 and 200A do not specify what type of "processing" is required to qualify for treatment as soil conditioners. DNR needs to define the applicability of this process to address the widespread and dangerous use of soil conditioners derived from byproducts of AFOs.[146]

Exempting soil conditioners without defining what qualifies as a soil conditioner creates loopholes for manure application requirements. The proposed rules also fail to address or restrict manure from open feedlots sold for use as a soil conditioner. DNR must amend the rules to prevent AFOs from evading manure management regulations by reclassifying the manure as a soil conditioner.

L. 65.202. DNR Must Ensure NPDES Permit Compliance for CAFOs.

Iowa DNR has delegated authority for National Pollutant Discharge Elimination System permitting, and therefore must ensure that all discharges of point source pollutants to navigable water comply with permit requirements.[147] Iowa has had approximately 400 documented manure releases in the last ten years, demonstrating that releases are a common occurrence. Iowa has more tile-drained land than any other state. Pattern tiling can provide direct conduit for liquid manure to

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[144] See IOWA CODE § 459.305(1)(a) (requiring practices to be included in the initial MMP).
[145] IOWA ADMIN. CODE r. 567-65.17(4).
[146] Donnelle Eller, "Unbearably foul-smelling Iowa pit prompted complaints for weeks; state didn't act until worker died," Des Moines Register (Oct. 5, 2021), available at https://www.desmoinesregister.com/story/money/agriculture/2021/10/05/algona-iowa-pit-fumes-no-violations-before-worker-death-pork-production-peptones/5826240001/.
[147] 33 U.S.C. § 1342; IOWA ADMIN. CODE r. 567-64.4(1).

reach surface water. The liquid manure applied to surface can flow immediately through cracks or fractures in the soil into the tiles without providing any agronomic benefit.[148] These discharges do not quality as "agricultural stormwater discharges" that would be exempt under the Clean Water Act because they are not storm-related.[149] Despite this, very few facilities – less than 2 percent – have obtained discharge permits under the Clean Water Act.[150]

DNR has not proposed adopting suggestions in our 2022 comments. We reiterate the recommendations in our 2022 comments to ensure compliance with the Clean Water Act. Ongoing noncompliance with the Act subjects dischargers and the agency to legal risk.

We have identified several issues regarding NPDES permit compliance in proposed rule section 65.202.

First, section 65.202(2) only applies to expansion of existing AFOs. DNR should modify this section to apply to expansion *and modification* of existing AFOs that meet the definition of a CAFO and discharge to navigable waters. A facility that maintains the same animal unit capacity but changes its design or operations to allow discharges of pollutants would not fall within the bounds of section 65.202(2), but would need to obtain a permit.

Second, a basic component of accountability for Iowans and the DNR should be to know who, or what, owns and influences Iowa's agriculture. Consistent with other recommended changes to address ownership, the DNR's application form under proposed rule 65.202(5) for a NPDES permit should include disclosure of ownership interests, including the entities, their locations, their percentage ownership interest(s), and the beneficial owners of any corporate owners.

The conditions in NPDES permits are critical for protecting water quality. We appreciate the added clarification that CAFO NPDES permits must contain monitoring conditions required by 40 CFR Section 122.48. This change incorporates federal requirements not found in state law. The other proposed requirements in subsection 65.202(7) inappropriately limit DNR oversight. For example, subsection (c) of proposed rule 65.202(7) limits certain manure transfer requirements to "large" AFOs only. These manure transfer requirements should be applied to all CAFOs, regardless of size, in order to prevent point source pollution across the industry and across the state; federal regulations do not provide a basis for differentiation by size.[151]

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[148] *See* Cooley, E., Ruark, M., & Panuska, J. (2013). Tile drainage in Wisconsin: Managing tile-drained landscapes to prevent nutrient loss. *University of Wisconsin–Extension. http://fyi. uwex. edu/drainage/files/2012/06/3-Managing-Tile-Drained-Landscapes-to-Prevent-Nutrient-Loss-DF. pdf (Page consultée le 08/03 2016)*.
[149] *See* 33 U.S.C. § 1362(14) (defining point source to exclude agricultural stormwater discharges).
[150] Iowa Code § 459.311(2) (requiring compliance with the Clean Water Act requirements for permits); IEC analysis of DNR AFO database available at https://programs.iowadnr.gov/animalfeedingoperations/.
[151] *See* 40 C.F.R. § 122.23(e) (making no differentiation by size in regulation of land application of manure).

The proposed revisions to 65.202(7) in subsection (d) would eliminate and reduce monitoring provisions for alternative technology (AT) systems, both in scope (e.g. tile lines) and timing (by reducing parameters analyzed). The changes render AT system monitoring requirements functionally meaningless. Rather than reduce monitoring requirements, DNR should increase the sampling frequency, extend the duration, and maintain the list of parameters in existing rule. DNR has not justified the reduction in monitoring for these relatively unusual operating systems.

Ensuring proper oversight of facilities as they expand and operate requires ongoing reporting and monitoring. We encourage DNR to develop a form for waste transfers, provide transparency for AFO ownership, and require ongoing water quality monitoring at AT systems.

M. 65.209(7). DNR Should Ensure Adequate Public Notice of NMPs.

Proposed rule section 65.209(7) retains existing procedures for public notice of NMPs. Statute requires DNR to maintain a website with information "relevant to making public comments," and DNR may post the NMP on its website.[152] DNR maintains a web page with information about NMPs, but it contains little information to aid the public in making comments about an NMP.[153] The page directs the public to the department's regional field offices to view NMPs and does not list NMPs open for comment.[154]

In declining to adopt our recommendations from 2022, DNR is not facilitating transparent public notices for people who do not subscribe to newspapers. DNR must receive proof of notice from an applicant, which DNR could post on its Open Feedlots webpage or include in emailed newsletters. These low-cost steps would facilitate public input.

Review of NMPs serves an important public purpose. In *Sierra Club Iowa Chapter v. Iowa DNR*, the court identified a number of "oddities" about the DNR approval process for the facility. Polk Dist. Ct. No. CVCV062713 (filed Apr. 28, 2023), at 18-19. The court ultimately held that the NMP included illogical interpretations and application of the law to the facts of the case. *Id.* at 22, 25-28. These issues only came to light due to public review and comment on the NMP for the facility. Refusing to facilitate public review of NMPs creates the ongoing risk of NMPs that suffer similar problems.

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[152] IOWA CODE § 459A.208(5)(c).
[153] "Open Feedlots, Iowa DNR," Iowa DNR, available at https://www.iowadnr.gov/Environmental-Protection/Animal-Feeding-Operations/Open-Feedlots#16333358-nutrient-management-plans (last accessed June 7, 2023).
[154] *Id.*

V. Conclusion

DNR can use this rulemaking to address issues raised in petitions for rulemaking filed in 2021 and 2022 addressing karst, drinking water, and floodplains. DNR can also address the ongoing water quality problems that result from inappropriate production, storage, and application of manure that have increasingly plagued Iowa's lakes, rivers, streams, and groundwater.

Executive Order 10 requires DNR to address the costs and benefits of proposed rules. As discussed above, poor water quality affects all Iowans by increasing risk of poor health outcomes, reducing other economic vitality, and increasing water treatment costs. DNR has the legal authority to reduce the risks to human health and needs to adopt rules to protect all Iowans.

Adopting the proposed changes for vertical separation for karst will prevent the catastrophic failure of manure storage structures that would result in widespread water pollution. Adding monitoring requirements would alert AFO owners and DNR of problems before they become catastrophic. Retaining and strengthening the departmental evaluation rule would fulfill DNR's statutory obligations to protect water quality and could prevent the most egregious examples of AFOs built in ecologically sensitive locations. Adopting DNR's proposed language for a floodplain map would resolve the pending rulemaking petition. We encourage DNR to adopt the changes proposed in our comments to provide protections for drinking water, groundwater, surface water, and floodplains as proposed in Section IV.

Manure is a primary source of pollution to Iowa's streams, rivers, lakes, and groundwater. Ensuring that MMPs and NMPs contain accurate information, propose proper manure application rates, and have proper approval criteria will lead to immediate and long-term water quality improvements. Requiring electronic submission of manure plans will save agency resources, increase transparency, and facilitate compliance and enforcement efforts. In the same way, ensuring compliance with federal and state NPDES requirements in statute will reduce water quality problems while ensuring future compliance. These changes also have statutory support and DNR should adopt these changes to implement Iowa's Nutrient Reduction Strategy.

DNR must also ensure construction of future manure storage structures will not contribute to water quality problems through leaks or other releases to surface water or groundwater. Clearer and stronger triggers for construction permits will ensure appropriate DNR oversight. Stronger construction standards will reduce the risk of future failures. Increased monitoring will catch problems before they become more serious. Reducing water quality pollution from storage structures will require adoption of the proposed changes in Section IV of these comments.

Finally, DNR should adopt a range of changes to other pieces of the rule chapter to close loopholes and ensure the public can properly engage on nutrient management plans. Ensuring that facilities cannot evade regulation by creating affiliated corporations and partnerships will level the playing field for other facilities and ensure adequate oversight by DNR. Public engagement on NMPs will improve the plans, as shown by the Supreme Beef comment process.