September 3, 2024

George Schwint
Minnesota Pollution Control Agency
12 Civic Center Plz., Ste. 2165
Mankato, MN 56001

Re: Comments on Authorization to Construct and Operate a Concentrated Animal Feeding Operation under the National Pollutant Discharge Elimination System (NPDES) MNG440000

Mr. Schwint,

Food & Water Watch, Minnesota Center for Environmental Advocacy, Cleaning Up the River Environment (CURE), and Center for Biological Diversity (collectively, "Commenters") respectfully submit these comments on the Authorization to Construct and Operate a Concentrated Animal Feeding Operation under the National Pollutant Discharge Elimination System General Permit ("CAFO Permit" or "the Permit"). Commenters support MPCA's efforts to strengthen the CAFO Permit in certain respects, particularly the new siting restrictions for vulnerable groundwater areas and the addition of visual monitoring during land application activities. However, additional changes are needed to ensure the MPCA is using the full extent of its statutory authority to safeguard human health and the many Minnesotan ecosystems that rely on clean water. To assist MPCA with its revision, the following comments provide research chronicling the ways in which concentrated animal feeding operations ("CAFOs") continue to threaten Minnesota water quality and identify additional permit measures that are necessary to comply with Federal and State law. Above all, the Permit must require additional monitoring, regular reporting, and heightened oversight of digesters that intensify pollution and incentivize increasingly large-scale operations.

I. Hazardous CAFO Pollutants Impair Water Quality, Threatening Public Health in Minnesota.

According to EPA's most recent estimate, there are 1,566 CAFOs operating in Minnesota, just over 1,000 of which are covered by an NPDES permit.[1] All CAFOs generate and handle large quantities of hazardous pollutants that threaten human health, as well as surface and groundwater quality.[2] Minnesota's CAFOs are no different in this respect. What is unique about Minnesota's CAFOs are their location. Minnesota is known for its wealth of lakes, rivers, and streams, many of which are vulnerable to adverse impacts from CAFO pollution. Minnesota's CAFO industry is also largely concentrated atop the State's karst region, an area typified by fractured bedrock and high connectivity between surface water and groundwater.[3] Permitting CAFOs to operate atop karst landscapes therefore increases the risks CAFO pollution poses to groundwater.

A. *Minnesota's CAFOs generate and handle enormous amounts of pollutants that threaten human health and the environment.*

CAFOs are essentially livestock factories that operate much like sewerless cities.[4] Unlike traditional animal husbandry, where available acreage constrains herd size and waste generation, CAFOs confine huge numbers of animals in small facilities that generate and manage enormous amounts of waste laden with harmful pollutants.[5] These pollutants include nitrogen, phosphorus, bacteria, pathogens, sediments, pesticides, pharmaceuticals, salts, metals, and ions such as

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[1] EPA, NPDES CAFO PERMITTING STATUS REPORT: NATIONAL SUMMARY, ENDYEAR 2023 (May 14, 2024), https://www.epa.gov/system/files/documents/2024-06/cafo-status-report-2023.pdf.

[2] *See, e.g.,* AM. PUB. HEALTH ASS'N, *Precautionary Moratorium on New and Expanding Concentrated Feeding Operations* (Nov. 5, 2019), https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2020/01/13/precautionary-moratorium-on-new-and-expanding-concentrated-animal-feeding-operations; Carrie Hribar, NATIONAL ASS'N OF LOCAL BOARDS OF HEALTH, UNDERSTANDING CONCENTRATED ANIMAL FEEDING OPERATIONS AND THEIR IMPACT ON COMMUNITIES 2–3 (2010), https://stacks.cdc.gov/view/cdc/59792 (attached as Exhibit A); DOUG GURIAN-SHERMAN, UNION OF CONCERNED SCIENTISTS, CAFOS UNCOVERED: THE UNTOLD COST OF CONFINED ANIMAL FEEDING OPERATIONS 42 (Apr. 2008), https://www.ucsusa.org/sites/default/files/2019-10/cafos-uncovered-full-report.pdf (attached as Exhibit B).

[3] Minn. Ctr. Env't Advoc. et al., Petition for Emergency Action under the Safe Drinking Water Act, https://www.mncenter.org/sites/default/files/permalinks/42423-emergency-sdwa-petition-to-epa-with-exhibits.pdf (Apr. 24, 2023) (hereinafter "SDWA Petition"); *see also* FRACTRACKER ALL., *Minnesota Confined Animal Feeding Operations or CAFOs* (May 11, 2016), https://www.arcgis.com/apps/mapviewer/index.html?layers=6d119156229d4e908e22f027bdaee6be.

[4] U.S. GAO, CONCENTRATED ANIMAL FEEDING OPERATIONS: EPA NEEDS MORE INFORMATION AND A CLEARLY DEFINED STRATEGY TO PROTECT AIR AND WATER QUALITY FROM POLLUTANTS OF CONCERN, GAO-08-944 at 18, 20 (2008), available at https://www.gao.gov/products/gao-08-944 ("[T]he amount of manure produced by [CAFOs] can exceed the amount of waste produced by some large U.S. cities.").

[5] *See supra* n.2.

magnesium, sodium, potassium, and chloride.[6] CAFOs also must dispose of hair, feathers, bedding materials, cleaning products, and mortalities.[7]

The potential harm these pollutants can cause is exacerbated when they are handled in liquid or slurry form. According to a soil scientist with USDA's Natural Resources Conservation Service, liquid waste "behaves like water."[8] Because of this, CAFO pollutants easily move through the environment and discharge to federal and state waters as surface flow or via hydrologically connected groundwater. The large swine and dairy operations that have proliferated in Minnesota over the past few decades generally handle liquid wastes.[9]

Among the many CAFO pollutants, pathogens and nutrients are of primary concern because of their prevalence and potential to adversely impact human and environmental health. As mentioned above, CAFO waste is laden with fecal coliform bacteria and other pathogens.[10] Zoonotic pathogens commonly found in manure include *E. coli*, *Campylobacter*, *Salmonella*, *Listeria*, *Cryptosporidium parva,* and *Giardia*, all of which can cause acute gastrointestinal distress, fever, and other dangerous symptoms in humans who drink or have recreational contact with contaminated water.[11]

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[6] 68 Fed. Reg. 7,176, 7,181 (Feb. 12, 2003); JoAnn Burkholder et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, 115 ENV'T HEALTH PERSPS. 308, 308 (Feb. 2007), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1817674/ (attached as Exhibit C).

[7] Environmental Protection Agency, RISK ASSESSMENT EVALUATION FOR CONCENTRATED ANIMAL FEEDING OPERATIONS, EPA/600/R-04/042, at 63, 72–73 (May 2004), https://cfpub.epa.gov/si/si_public_record_Report.cfm?Lab=NRMRL&dirEntryId=85107 (hereinafter, "EPA CAFO RISK ASSESSMENT") (attached as Exhibit D); EPA, MANAGING MANURE NUTRIENTS AT CONCENTRATED ANIMAL FEEDING OPERATIONS at 2-1–2-4 (Dec. 2004), https://www.epa.gov/sites/default/files/2015-08/documents/cafo_manure_guidance.pdf (hereinafter, "EPA, MANAGING CAFO MANURE") (attached as Exhibit E).

[8] David Green, *Frank Gibbs: Liquid Manure Is Too Wet*, STATE LINE OBSERVER (2006) ("The problem is simple. We're watering manure down to where it behaves like water. Let me repeat that. We're watering manure down to where it behaves like water. You don't need to be a rocket scientist to understand that.") (attached as Exhibit F).

[9] HOLLY COOK & LEE SCHULZ, NAT'L PORK PRODS. COUNCIL, THE MINNESOTA PORK INDUSTRY 2021: CURRENT STRUCTURE AND ECONOMIC IMPORTANCE, https://nppc.org/wp-content/uploads/2022/07/Minnesota_.pdf (accessed Sept. 3, 2024) (showing the number of hog farms has declined as the average number of hogs per farm increases); Madison McVan, *Minnesota Farms Are Consolidating and Other Takeaways from the Census of Agriculture*, https://minnesotareformer.com/2024/02/14/minnesota-farms-are-consolidating-and-other-takeaways-from-the-census-of-agriculture/ (Feb. 14, 2024) (showing decrease in number of dairy farms).

[10] 68 Fed. Reg. 7,176, 7,186; Xunde Li et al., *Fecal Indicator and Pathogenic Bacteria and Their Antibiotic Resistance in Alluvial Groundwater of an Irrigated Agricultural Region with Dairies*, 44 J. Envtl. Quality 1435, 1435 (2015) (attached as Exhibit G).

[11] Tucker Burch et al., *Fate of Manure-Borne Pathogens during Anaerobic Digestion and Solids Separation*, 472 J. Envtl. Quality 336, 336 (2018) (attached as Exhibit H); 68 Fed. Reg. 7,176, 7,263.

CAFOs use a slew of antibiotics, hormones, and other pharmaceuticals to deal with these pathogens and keep animals alive in such concentrated and stressful environments. These products end up in CAFO wastes and ultimately make their way into nearby surface waters and domestic wells.[12] While the individual risks presented by each drug used on Minnesota's CAFOs are too numerous to detail here,[13] pharmaceuticals used on feedlots are commonly associated with endocrine disruption and reproductive disorders in fish and other aquatic wildlife.[14] One study that specifically examined the impacts of CAFO effluent on fathead minnows found that "[w]ild fish collected below a feedlot exhibited altered reproductive biology."[15] Further, the widespread use of antibiotics for non-therapeutic purposes in livestock animals also drives selective pressure for antibiotic-resistant bacteria, increasing health burdens for impacted humans and animals.[16] Researchers studying water pollution from a CAFO-dense area in California found "significant potential risk of groundwater contamination with antibiotic-resistant bacteria derived from CAFOs even if the subsurface environment is not suitable to transmit pathogenic bacteria."[17] Tellingly, those researchers concluded the paper by highlighting the importance of "continuous and effective groundwater monitoring" to safeguard public health.[18]

Nutrients, though naturally occurring in the environment, pose their own unique risks to animal and plant life when unnatural quantities are added to ecosystems. Excessive amounts of nitrogen and phosphorus in water create hypoxic dead zones where fish and other aquatic species cannot survive.[19] Further, high nutrient concentrations create algal blooms that can be toxic to

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[12] 68 Fed. Reg. 7,176, 7,236, 7,238; Laura M. Bexfield et al., *Hormones and Pharmaceuticals in Groundwater Used as a Source of Drinking Water Across the United States*, 53 Envtl. Sci. & Tech 2950, 2950–51, 2958 (2019) (attached as Exhibit I).
[13] *See generally* Manvendra Patel et al., *Pharmaceuticals of Emerging Concern in Aquatic Systems: Chemistry, Occurrence, Effects, and Removal Methods*, 119 Chem. Review (2019), https://pubs.acs.org/doi/10.1021/acs.chemrev.8b00299 for a list of pharmaceuticals that have been researched and their impacts on aquatic species.
[14] Edward F. Orlando et al., *Endocrine-Disrupting Effects of Cattle Feedlot Effluent on an Aquatic Sentinel Species, the Fathead Minnow*, 112 Envtl. Health Perspectives 353, 356 (2004) (attached as Exhibit J); Joan A Casey et al., *Industrial Food Animal Production and Community Health*, 2 Current Envtl. Health Rep. 259, 266 (Sept. 2015) (attached as Exhibit K).
[15] Orlando, *supra* n.14, at 356.
[16] Ya He et al., *Antibiotic Resistance Genes from Livestock Waste: Occurrence, Dissemination, and Treatment*, 3 Clean Water 1 (2020), https://www.nature.com/articles/s41545-020-0051-0 (attached as Exhibit L).
[17] Xunde Li et al., *supra* n.10 at 1445; Fabienne Wichmann, *Diverse Antibiotic Resistance Genes in Dairy Cow Manure*, https://doi.org/10.1128/mbio.01017-13 (2014).
[18] *Id.*
[19] EPA, *The Effects: Environment*, https://www.epa.gov/nutrientpollution/effects-environment.

humans, pets, and wildlife that come into contact with impacted waters.[20] The economic cost of a single major harmful algal bloom can climb to tens of thousands of dollars, and the cumulative cost of the U.S.'s algae problem may be as high as 100 billion dollars annually.[21]

Bacteria in the environment convert nitrogen from manure into nitrates, another hazardous pollutant. Ingesting water contaminated with nitrates is associated with dangerous human health conditions like colorectal cancer, thyroid disease, birth defects, premature births, and methemoglobinemia (a potentially fatal condition commonly known as "blue baby syndrome").[22] Recent research suggests nitrate concentrations as low as 5 mg/L—well below Minnesota's 10 mg/L health standard—are associated with increased risk of cancer and adverse birth outcomes.[23] Importantly, CAFO pollution impacts are often compounded by the synergistic effects of pesticides, like those used in cattle ear tags or on nearby crop fields, whose rows are devoted to growing livestock feed inputs like corn (Minnesota's top crop by acreage).[24] For instance, a 2022 study on drinking water found that high levels of nitrate and atrazine (a carcinogenic pesticide used widely on livestock feed crops in the United States) in combination were correlated with increased likelihood of birth defects.[25]

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[20] MPCA, 5-YEAR PROGRESS REPORT ON MINNESOTA'S NUTRIENT REDUCTION STRATEGY, App'x A at 3 (Aug. 2020), https://www.lrl.mn.gov/docs/2021/other/210420.pdf (hereinafter "5-Year Progress Report"); Univ. of Minn., *HAB: Harmful Algae Blooms*, https://hab.umn.edu/hab-faqs (accessed Aug. 16, 2024) ; GAO, *supra* n.4 at 9, 24-25, 72 (2008); 68 Fed. Reg. 7,176, 7,235; Burkholder, *supra* n.6 at 309; U.S. Office for Harmful Algal Blooms, *HAB Impacts on Wildlife*, https://hab.whoi.edu/impacts/impacts-wildlife/ (last accessed Aug. 30, 2023).

[21] National Centers for Coastal Ocean Science, *Assessing Environmental and Economic Impacts*, https://coastalscience.noaa.gov/science-areas/habs/assessing-environmental-and-economic-impacts.

[22] Mary Ward et al., *Drinking Water Nitrate and Human Health: An Updated Review*, 15 Int. J. Res. Public Health 22 (2018) (attached as Exhibit M); Burkholder, *supra* n.6 at 310; Roberto Picetti et al., *Nitrate and Nitrite Contamination in Drinking Water and Cancer Risk: A Systematic Review with Meta-Analysis*, 210 ENVT'L RES. 112988 (July 2022), https://www.sciencedirect.com/science/article/pii/S0013935122003152 (attached as Exhibit L).

[23] Alexis Temkin et al., *Exposure-Based Assessment and Economic Valuation of Adverse Birth Outcomes and Cancer Risk Due to Nitrate in United States Drinking Water*, 176 ENVIRONMENTAL RESEARCH 1-2 (2019), available at https://www.sciencedirect.com/science/article/pii/S001393511930218X (attached as Exhibit N).

[24] USDA, *2022 Census of Agriculture State Profile– Minnesota*, https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp99027.pdf.

[25] Balkissa S. Ouattara et al., *Investigation of a Possible Relationship between Anthropogenic and Geogenic Water Contaminants and Birth Defects Occurrence in Rural Nebraska*, 14 Water 1, 13 (2022), https://www.mdpi.com/2073-4441/14/15/2289 (attached as Exhibit O); *see also* Louise Boyle, Independent, *US Meat Industry Using 235m Pounds of Pesticides a Year, threatening Thousands of At-Risk Species, Study Finds*, https://www.independent.co.uk/climate-change/news/pesticides-factory-farm-wildlife-food-chain-vegan-b2017811.html#comments-area (Feb. 22, 2022).

Analyses conducted by the Environmental Working Group show multiple Minnesota municipalities with unsafe levels of nitrate in their drinking water.[26] MPCA's latest progress report on the State's official Nutrient Reduction Strategy also acknowledged that "groundwater nitrate is a concern for well water consumption in many parts of Minnesota and a contributor of nitrate to surface waters."[27] Despite Minnesota's progress in reducing other pollutant risks, nitrate concentrations continue to trend upwards in many major rivers and groundwater sources.[28]

B. Minnesota's CAFOs discharge pollution to state waters.

The EPA estimates that approximately 75 percent of all CAFOs discharge pollutants to jurisdictional waterways,[29] and CAFOs in a Minnesota are no exception. CAFOs are specifically designed to maximize production and reduce operator costs by departing from the traditional way of raising animals on the land. Because the amounts of manure and other pollutants generated "frequently exceed the assimilative capacity of land," CAFO-dense watersheds often suffer severe water quality impacts.[30] Decades of inadequate regulation have allowed CAFOs to construct, design, operate, and maintain their facilities such that they discharge significant amounts of waste into state and federal waters, externalizing their pollution costs onto the environment and the public at large. Consequently, this industry is causing severe water quality deterioration that impacts the environment and threatens public health in Minnesota and beyond.

1. CAFOs adversely impact surface water quality.

CAFOs discharge pollutants to Minnesota's surface waters through a variety of pathways. Production area discharges occur when wastewater lagoons overflow or breach, allowing their contents to run off into adjacent surface waters, and when they allow pollutants to seep into

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[26] Environmental Working Group, *Drinking Water in Rural Communities is Threatened by Farm Pollution*, https://www.ewg.org/interactive-maps/troubleinfarmcountry/fertilizer.php#.WvsS49PwbOQ; Environmental Working Group, *National Nitrate Analysis of Large and Very Large Drinking Water Systems*, https://www.ewg.org/interactive-maps/2021-national-nitrate-analysis/map/.
[27] 5-YEAR PROGRESS REPORT, *supra* n.20, at 30.
[28] 5-YEAR PROGRESS REPORT, *supra* n.20, at 18–21, 30–31.
[29] 73 Fed. Reg. 70,418, 70,469 (Nov. 20, 2008) (explaining that only about 25 percent of CAFOs are not designed to discharge).
[30] *See e.g.,* American Public Health Association, *supra* n.2 ("Over the last several decades, food animal production in the United States has shifted from an extensive system of small and medium-sized farms to one characterized primarily by large-scale industrial operations that concentrate large numbers of animals in small geographic areas."); Hribar, *supra* n.2; Gurian-Sherman, *supra* n.2, at 10.

hydrologically connected groundwater.[31] Production areas also discharge wastewater because some operations are so large that they cannot possibly manage all contaminated run-on water or feasibly prevent cattle from accessing streams. Additionally, CAFOs often stockpile silage in massive mounds and manure in uncovered windrows, both of which produce contaminated wastewater that can run off from production areas.[32] These pollutants discharge to surface waters through ditches and canals; manure and wastewater handling infrastructure such as pipes, pumps, and storage facilities; leaking equipment; and ventilation systems.[33]

Land application areas can pose an even greater risk of discharges. Application of CAFO waste to saturated or frozen fields leads to runoff and has been shown to significantly increase total dissolved phosphorus in the receiving water.[34] This risk is amplified by more frequent and powerful storms driven by climate change.[35] Pressurized irrigation systems and other land application methods can also cause discharges due to faulty equipment or imprecise application. Many land application areas also contain subsurface drainage systems, such as tile drains, that act as conduits to surface waters. Minnesota has approximately 3,266,234 acres of tile drained

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[31] *See* Greg Stanley, *Seventeen Manure Pits Reportedly Overflow at Large Feedlot in Southern Minnesota* (June 26, 2024), https://www.startribune.com/manure-pits-reportedly-overflow-at-16-large-feedlots-in-southern-minnesota/600376074; David J. Erickson, Expert Opinion: Idaho CAFO General Permit at 2–5 (attached as Exhibit P) (hereinafter "Erickson Report"); EPA, CASE STUDIES ON THE IMPACT OF CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS) ON GROUNDWATER QUALITY 93 (Sept. 2012), https://archive.epa.gov/ada/web/pdf/p100f9di.pdf (hereinafter "CASE STUDIES") ("Collectively, these data show that ground water contamination by nitrate can occur at very different types of CAFOs, whether through leaking lagoons, leaking pipes or infrastructure, land application of wastes in excess of agronomic needs, or other factors") (attached as Exhibit Q).

[32] Livestock and Poultry Environmental Learning Center, *Silage Runoff Characteristics* (Mar. 5, 2019), https://lpelc.org/silage-runoff-characterization/ ("Silage leachate is a high strength waste which contributes to surface and groundwater contamination of various pollutants from runoff, direct leaching through concrete storage structures, and infiltration of runoff.").

[33] 68 Fed. Reg. at 7,181; EPA, MANAGING CAFO MANURE at 2-25-–2-26 (discussing voluntary controls to minimize spills and leaks from storage structures), 4-2 (noting that certain CAFOs must have "reception pits…, diversions, sediment basins, and underground outlets"); 4-15 (describing irrigation systems for applying CAFO waste), 7-2 (discussing "unplanned discharges" from pumps and pipes), O-10 (explaining that fields with subsurface (tile) drainage "creat[e] a surface water pollution hazard from direct tile discharge"); EPA, CAFO RISK ASSESSMENT at 52, 72–73; *Nat'l Pork Producers Council v. U.S. E.P.A.*, 635 F.3d 738, 748 (5th Cir. 2011) (agreeing with EPA's position that "litter discharged through confinement house ventilation fans" would be a Clean Water Act violation); Institute of Agriculture and Natural Resources, *Contaminant Pathways*, https://water.unl.edu/article/animal-manure-management/contaminant-pathways ("Runoff from open lots, land application areas, and manure and feed storage units is a common pathway for contaminant transport.").

[34] JASON S. SMITH ET AL., MICHIGAN STATE UNIVERSITY, WINTER MANURE APPLICATION: MANAGEMENT PRACTICES AND ENVIRONMENTAL IMPACT 11–13 (2016), https://soilhealthnexus.org/files/2018/02/ncrwn-winter-manure-app-mngmt-practices-enviro-impact-report-FINAL.pdf (attached as Exhibit R)

[35] Greg Stanley, *supra* n.31.

fields, making Minnesota the third most extensively tile drained state in the United States.[36] However, up to now, MPCA has not required CAFOs to monitor tile drain openings or field edges, leaving the agency and the public in the dark about the pollutant loads and concentrations being discharged to surface waters.

Importantly, manure management plans, which MPCA relies upon to "minimize the risk of surface water and groundwater contamination," are not plans designed to reliably achieve zero discharge. Even under the unrealistic assumption that CAFO operators always comply with their plans,[37] "minimize" is not the same as "prevent." Like nutrient management plans described in EPA's Clean Water Act regulations, manure management plans are "focus[ed] on maximizing crop growth, rather than preventing excess nutrient runoff."[38] EPA has acknowledged that such plans are "insufficient" to prevent discharges, even if CAFOs were always in compliance with those plans.[39] Given this, the manure management plan requirement does not negate the need for monitoring land application areas for discharges to surface water.

2. CAFOs adversely impact groundwater quality.

CAFOs also discharge large quantities of pollutants to groundwater– the drinking water source for more than four million Minnesotans.[40] Land application activities, as well as storage

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[36] Prasanth Valayamkunnath et al., *Mapping of 30-Meter Resolution Tile-Drained Croplands Using Geospatial Modeling Approach*, 7 SCI. DATA 1, 5 (2020), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7406500/pdf/41597_2020_Article_596.pdf (attached as Exhibit S).

[37] Available studies indicate CAFOs regularly apply excessive amounts of manure and process wastewater. *See generally* R. Shepard, *Nutrient Management Planning: Is It the Answer to Better Management?*, 60 J. Soil & Water Conserv. (2005) (finding that 37 percent of farmers with nutrient management plans over-applied nitrogen and 48 percent over-applied phosphorus) (attached as Exhibit T); Colleen M. Long et al., *Use of Manure Nutrients from Concentrated Animal Feeding Operations*, J. Great Lakes Research 6–7 (2018), https://graham.umich.edu/media/files/WLEB/WLEB-Science-Panel-Long-et-al.-2018.pdf (describing observed overapplication in Michigan, and theorizing that overapplication is occurring in other Midwest states, including Minnesota) (attached as Exhibit U); *see also* Bennet Goldstein, Wisconsin Watch, *Poopspotting: How AI and Satellites Can Detect Illegal Manure Spreading in Wisconsin* (March 7, 2024), https://wisconsinwatch.org/2024/03/wisconsin-cafo-ai-satellites-artificial-intelligence-farm-manure-agriculture/.

[38] EPA, Concentrated Animal Feeding Operations: A Primer on the Federal Program 18 (Dec. 2021); EPA, Concentrated Animal Feeding Operations: An Overview of the NPDES CAFO Program Mostly by the Numbers 27 (June 2019); Minn. R. 7020.2225(4)(D) (requiring that Minnesota's manure management plans specify land application requirements based on crop needs).

[39] *Id.*

[40] Minn. Dep't of Health, *Minnesotans with Private Wells Urged to Check their Drinking Water for Five Common Contaminants* (March 11, 2024), https://www.health.state.mn.us/news/pressrel/2024/wellsprivate031124.html; *see also* Minn. R. §§ 7020.2100(2)(B) (requiring many liquid manure storage areas that will be covered by the Permit to be concrete lined, but recognizing that these lagoons can crack); 7020.2100(3)(B) (establishing minimum

of silage and compost on bare ground or other permeable surfaces, allow pollutants to leach through the soil and enter drinking water aquifers.[41] At production areas, animal manure and process wastewater are stored in liquid manure storage areas that "are designed to leak" pollutants.[42] MPCA's regulations permit pollutants to seep from some new or modified liquid manure storage areas at a rate of between 0.018 inches per day (5.29×10^{-7} cm/sec).[43] While such rates may seem inconsequential, liquid manure storage areas often span an acre or more, allowing pervasive seepage to occur.[44] Because past CAFO permits have not required representative monitoring for discharges to groundwater, both MPCA and the public lack information about the extent to which CAFOs are degrading Minnesota waters and contributing to health hazards and harms.

Minnesota is especially vulnerable to adverse impacts stemming from groundwater pollution because the State's geology, hydrology, and changing climate make it vulnerable to rapid subsurface pollutant transport. Southeastern Minnesota—where many of the State's CAFOs are concentrated—is dominated by karst topography, a landscape defined by a layer of porous sediment atop highly fractured bedrock.[45] Groundwater flows easily and unpredictably through karst geology, aided by the region's network of tile drains.[46] Pollutants that enter groundwater in Minnesota's karst region can reach domestic wells located miles from the source of contamination.[47] Subsurface pollutant plumes from liquid manure storage areas that reach

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requirements for some liquid manure storage areas covered by the permit that allow a theoretical seepage rate of 1/56 in per day).

[41] *See* USDA, NATURAL RESOURCES CONSERVATION CONSERVATION STANDARD PRACTICE STANDARD COMPOSTING FACILITY CODE 317, 317-CPS-2 (Sept. 2020) https://www.nrcs.usda.gov/sites/default/files/2022-09/Composting_Facility_317_CPS_9_2020.pdf (describing seepage risks from composting and how to prevent groundwater contamination); EPA, NPDES PERMIT WRITER'S MANUAL FOR CONCENTRATED ANIMAL FEEDING OPERATIONS, EPA 833-F-12-001 (Feb. 2012) at 5-12, https://www.epa.gov/sites/default/files/2015-10/documents/cafo_permitmanual_entire.pdf (hereinafter "NPDES PERMIT WRITER'S MANUAL") ("The floor of a solid manure storage area should be constructed . . . to minimize the leaching of wastes beneath the storage area.").

[42] *Food & Water Watch*, 20 F.4th at 509; Xunde Li et al., *supra* n.10, at 1435.

[43] Minn. R. 7020.2100(3)(B) (permitting a theoretical seepage rate of 1/56 inch—or 0.018 centimeters—per day).

[44] Erickson Report, *supra* n.31, at 4.

[45] SDWA Petition, *supra* n.3, at 1; *see also* Fractracker Alliance, *supra n.3*.

[46] Anthony Runkel et al., *Geologic Controls on Groundwater and Surface Water Flow in Southeastern Minnesota and its Impact on Nitrate Concentrations in Streams* (2014), https://conservancy.umn.edu/items/b927dcae-f4cb-4a6f-96ff-24178aa9b66a (attached as Exhibit V).

[47] JEFFREY ST. ORES ET AL., UNIV. OF MINN. EXTENSION BULLETIN 465, GROUNDWATER POLLUTION PREVENTION IN SOUTHEAST MINNESOTA'S KARST REGION 6 (1982), https://conservancy.umn.edu/bitstream/handle/11299/169069/mn_2000_eb_465.pdf?sequence=1 (attached as Exhibit W).

groundwater can also travel to surface waters.[48] Again, Minnesota's changing climate exacerbates these risks as heavy precipitation increases nitrate concentrations in groundwater.[49]

C. Minnesota CAFOs are contributing to unsafe water quality impairments.

Despite decades of regulation, existing approaches to pollution management at Minnesota's CAFOs have proved insufficient to prevent contamination from marring state waters. Past iterations of the CAFO Permit contained overly lenient effluent limits and did not require representative monitoring to facilitate enforcement. Moreover, approximately a third of Minnesota's CAFOs are not even covered by an NPDES permit.[50] Despite the misconception that a NPDES permit that largely prohibits discharges means CAFOs never discharge, both permitted and unpermitted CAFOs in Minnesota are contributing to water quality impairments that impact human and ecosystem health throughout the State.[51]

Nutrient impairments are particularly concerning due to their impacts to human health and recreational interests. In Minnesota, "[n]early 700 lakes and over 800 river miles have been identified as impaired due to nutrients."[52] Statewide nutrient management strategies are making a difference, but "the magnitude of needed change [in nutrient loading] is so high that current program implementation approaches alone may not be enough to reach [the State's nutrient reduction strategy] goals."[53] While phosphorus concentrations throughout the state are decreasing locally, increased precipitation in southern Minnesota over the past two decades has increased total phosphorus loading, offsetting the benefits of Minnesota's phosphorus reduction strategies for downstream ecosystems.[54]

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[48] Erickson Report, *supra* n.31, at 5; *see also* MPCA, MINNESOTA'S WATER QUALITY MONITORING STRATEGY 2021-2031 (Aug. 2021) at 3, https://www.pca.state.mn.us/sites/default/files/p-gen1-10.pdf (hereinafter "MPCA WATER QUALITY MONITORING STRATEGY") (acknowledging the interconnected nature of surface and groundwater in Minnesota) (attached as Exhibit X).46

[49] Runkel, *supra* n.46, at 35.

[50] According to EPA's latest estimate, there are over 500 CAFOs without NPDES permits in Minnesota. EPA, NPDES PERMITTING STATUS REPORT: NATIONAL SUMMARY, ENDYEAR 2023 (May 14, 2024), https://www.epa.gov/system/files/documents/2024-06/cafo-status-report-2023.pdf.

[51] *See, e.g.*, MPCA, *Compliance and Enforcement*, https://www.pca.state.mn.us/trending-topics/compliance-and-enforcement (last accessed Aug. 26, 2024) (providing enforcement action summaries that document multiple instances of feedlots discharging to Minnesota waters and otherwise not complying with regulatory requirements for CAFOs).

[52] 5 YEAR PROGRESS REPORT, *supra* n.20, at App'x A, 3.

[53] *Id.* at 12.

[54] *Id.* at 25.

Nitrate poses an even more pressing problem given the serious health impacts stemming groundwater infiltration. In many agricultural counties, manure and fertilizer are being applied in excess of MPCA recommendations, leaving thousands of tons of unused nitrogen to runoff into surface waters and seep into groundwater.[55] Although existing data is collected on a volunteer-basis and is therefore incomplete, the Minnesota Department of Agriculture's Township Testing Program shows that elevated nitrate levels in groundwater used for drinking water are pervasive throughout Minnesota CAFO country.[56] As documented at length in the SDWA Petition for southeastern Minnesota submitted to EPA last year, private well testing data confirms widespread nitrate pollution at unsafe concentrations throughout the karst region.[57] Indeed, nitrate concentrations between 5-15ppm are common in groundwater in the uppermost bedrock of Minnesota's karstic plateaus, exposing hundreds of thousands of Minnesotans to unsafe levels of nitrate.[58]

In addition to nutrients, *E. coli* and other pathogens originating on CAFOs threaten humans and wildlife when they reach waterways used for drinking or recreation, or when pathogen-laden CAFO waste is spread onto fields that grow food.[59] Stream and river segments impaired for *E. coli* are densely populated with feedlots,[60] and, according to MPCA's TMDL Implementation Plan for the Upper Mississippi River, inadequate pollution controls at these feedlots are a primary contributor to *E. coli* impairments in the drinking water source for almost one million Minnesotans.[61] In 2013, a study found bovine bacteria in twelve out of nineteen water samples taken from the upper reaches of the Mississippi, as well as tributaries and nearby

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[55] Sarah Porter & Craig Cox, Environmental Working Group, *MANURE OVERLOAD: Manure Plus Fertilizer Overwhelms Minnesota's Land and Water* (May 28, 2020), https://www.ewg.org/interactive-maps/2020-manure-overload/ (in Table 1, approximating tons of manure applied in excess of crop needs).
[56] MN Dep't of Agric., Township Testing Program Update: Final Nitrate Testing Results, May 2022, https://www.mda.state.mn.us/sites/default/files/docs/2022-05/ttpupdate2022_05.pdf; *see also* Fractracker Alliance, *supra* n.3 (showing the location of Minnesota's CAFOs based on 2016 data); Runkel, *supra* n46, at 59.
[57] SDWA Petition, *supra* n.3, at 15–17.
[58] Runkel, *supra* n.46, at 59; Sarah Porter & Anne Weir Schechinger, Environmental Working Group, *Tap Water for 500,000 Minnesotans Contaminated With Elevated Levels of Nitrate* (Jan. 14, 2020), https://www.ewg.org/interactive-maps/2020_nitrate_in_minnesota_drinking_water_from_groundwater_sources/.
[59] FDA, *Southwest Agricultural Region Environmental Microbiology Study (2019-2024)* (June 5, 2024), https://www.fda.gov/food/environmental-studies/southwest-agricultural-region-environmental-microbiology-study-2019-2024.
[60] MPCA, SAUK RIVER BACTERIA AND NUTRIENTS TOTAL MAXIMUM DAILY LOAD 31–37 (March 2018), https://www.pca.state.mn.us/sites/default/files/wq-iw8-47e.pdf.
[61] MPCA, UPPER MISSISSIPPI RIVER BACTERIAL TMDL IMPLEMENTATION PLAN 11 (March 2016), https://www.pca.state.mn.us/sites/default/files/wq-iw8-08c.pdf.

stormwater systems.[62] Accordingly, the 2016 Upper Mississippi TMDL Implementation Plan cites mapping and monitoring of feedlots and agricultural lands that apply manure as "the most important step" in bringing the Upper Mississippi back into compliance with water quality standards.[63]

As their status as a point source polluter suggests, CAFOs pose serious threats to water quality and therefore serious threats to humans, wildlife, and the environment in Minnesota. Given the pollution risks inherent in the industry, changes to the final CAFO Permit are necessary and appropriate to safeguard public health, comply with state and federal law, and preserve Minnesota's natural resources for future generations to enjoy.

II. The Permit Must Include Compliance Monitoring to Facilitate Enforcement of Each Effluent Limit.

The Clean Water Act requires that MPCA implement its NPDES program according to minimum federal standards.[64] Among these requirements, all NPDES permits must include representative monitoring and reporting provisions sufficient to ensure compliance with the permit's effluent limits.[65] Minnesota's Water Pollution Control Act largely mirrors the Clean Water Act's requirements and provides MPCA with the authority to impose monitoring requirements necessary to control CAFO pollution. While the monitoring and reporting requirements MPCA proposed in the draft CAFO Permit are an improvement from the last iteration of the Permit, additional provisions are still needed to ensure Permit compliance, facilitate enforcement against violations, and protect Minnesota's waters from hazardous pollutants.

A. State and Federal law require representative monitoring and reporting to ensure compliance with NPDES permit effluent limits.

NPDES permits issued pursuant to the Clean Water Act "fundamentally rel[y] on self-monitoring" because "[e]ffective self-monitoring reveals permit violations, thereby promoting

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[62] ANDREA PLEVAN ET AL., MICROBIAL SOURCE TRACKING PILOT STUDY 7 (Jan. 2013), https://www.pca.state.mn.us/sites/default/files/wq-iw8-08w.pdf (attached as Exhibit Y).
[63] MPCA, UPPER MISSISSIPPI RIVER BACTERIAL TMDL IMPLEMENTATION PLAN 20 (March 2016), https://www.pca.state.mn.us/sites/default/files/wq-iw8-08c.pdf.
[64] 33 U.S.C. § 1342(b).
[65] *Id.* § 1318(a)(2)(A)(iii); 40 C.F.R. §§ 122.44(i)(1), 122.41(j)(1), 122.48(b); *see also FWW v. EPA,* 20 F.4th 506 (2021); *Washington State Dairy Federation v. Washington Department of Ecology*, 18 Wn. App. 2d 259 (Wash. Ct. App. 2021). *See also Nat. Res. Def. Council v. EPA*, 808 F.3d 556 (2d Cir. 2015); *NRDC v. Cnty. of Los Angeles*, 725 F.3d 1194 (9th Cir. 2013).

enforcement of the [law]."[66] Accordingly, EPA's NPDES permit writers' manual makes clear that "[m]onitoring is performed to determine compliance with effluent limitations established in NPDES permits."[67] Once collected, monitoring data must be reported to the permitting entity, making it publicly available via a records request or government website.[68] Without representative monitoring and reporting requirements, regulators and the public are left in the dark as to whether permitted CAFOs are actually complying with applicable effluent limitations and whether particular CAFOs are causing or contributing to violations of Minnesota's water quality standards. Mere assumptions that implementing technologies and practices will result in permit compliance are impermissible.[69]

In *FWW v. EPA*, the Ninth Circuit Court of Appeals clarified what constitutes adequate monitoring in a CAFO NPDES permit. In that case, the Court held Idaho's NPDES general permit for CAFOs did not satisfy the Clean Water Act's requirement. In doing so, the Court made the flaws in Idaho's permit plain: (1) "[w]ithout a requirement that CAFOs monitor waste containment structures for underground discharges, there is no way to ensure that production areas comply with the Permit's zero-discharge requirements;" and (2) "[t]he Permit has no monitoring provisions for dry weather discharges from land-application areas."[70] The rationale underpinning the Court's holding was simple – "NPDES permits must contain monitoring provisions sufficient to ensure compliance with the terms of a permit."[71] Thus, although the Court's opinion did not explicitly touch on every conceivable production area or land application

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[66] *Food & Water Watch*, 20 F.4th at 516 (*citing Sierra Club v. Union Oil Co. of Cal*., 813 F.2d 1480, 1491 (9th Cir. 1987), *vacated and remanded on other grounds*, 485 U.S. 931, 108 S. Ct. 1102, 99 L. Ed. 2d 264 (1988), *and reinstated and amended by* 853 F.2d 667 (9th Cir. 1988)).
[67] NPDES PERMIT WRITERS' MANUAL, *supra* n.41, at 5-1, 8-2; *see also Food & Water Watch*, 20 F.4th at 516 (*citing Sierra Club v. Union Oil Co. of Cal*., 813 F.2d 1480, 1491 (9th Cir. 1987), *vacated and remanded on other grounds*, 485 U.S. 931, 108 S. Ct. 1102, 99 L. Ed. 2d 264 (1988), *and reinstated and amended by* 853 F.2d 667 (9th Cir. 1988)) (explaining that CAFO NPDES permits "fundamentally rel[y] on self-monitoring" because "[e]ffective self-monitoring reveals permit violations, thereby promoting enforcement of the [law].").
[68] 33 U.S.C. § 1318(b).
[69] *Natural Resources Defense Council v. EPA,* 808 F.3d 556, 565, 583 (2d Cir. 2015) (striking down a NPDES permit for ballast water from vessels because compliance with that permit's water quality-based effluent limitations was merely assumed from compliance with other permit terms and rejecting U.S. EPA's argument that if a vessel was in compliance with the permit's other effluent limitations, the permittee was "generally expected to already be controlling [its] vessel discharges to a degree that is protective of water quality.").
[70] 20 F.4th at 515.
[71] *Id.* at 515 (citing *NRDC v. County of L.A.*, 725 F.3d 1194, 1207 (9th Cir. 2013)).

discharge activity, a NPDES CAFO permit that leaves any effluent limitation unmonitored is unlawful.

Monitoring can take different forms so long as it is appropriately tailored to the monitored activity and generates representative, publicly reported data that assure compliance.[72] But, under no circumstances may the CAFO Permit simply forego monitoring and reporting provisions that satisfy these requirements, even if MPCA hopes and believes that certain best management practices are effective in preventing discharges.

In accordance with the Clean Water Act's cooperative federalist structure, Minnesota state law requirements for NPDES permits largely mirror Federal requirements.[73] With regard to monitoring, Minnesota's Water Pollution Control Act obligates MPCA to include monitoring provisions sufficient to "prevent, control, or abate water pollution" in *all* NPDES permits.[74] Permits must disallow any discharges that would result in exceedances of any water quality standard or loss of any designated use of a water of the state, including loss of underground water as a potable water supply.[75] Of particular relevance here, in Minnesota, the definition of "waters of the state" is expansive and includes not only lakes, rivers, and streams, but also marshes, aquifers, irrigation systems, drainage systems, and "all other bodies or accumulations of water, surface or underground, natural or artificial, public or private" which touch any portion of the state.[76] Under the Water Pollution Control Act, monitoring, effluent sampling, and reporting are all recognized as necessary permit conditions.[77]

B. The CAFO Permit lacks monitoring provisions necessary to comply with State and Federal law.

Commenters understand that MPCA conducts numerous surface and groundwater monitoring activities to assess, restore, and protect the integrity of Minnesota's wealth of water resources.[78] However, as MPCA has recognized, large scale monitoring efforts "generally do not

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[72] *See id.* at 516–17 (finding that daily and weekly inspections of CAFO production area discharge control infrastructure can be "in effect, monitoring requirements"); *NRDC v. EPA*, 863 F.2d 1420, 1434 (9th Cir. 1988) (upholding a "visual sheen test as a method for monitoring compliance of the no discharge of oil limitation").
[73] *See* Minn. R. 7020.0205(E)–(F) (incorporating Federal CAFO regulations into State law).
[74] Minn. Stat. 115.03(1)(a)(5).
[75] Minn. Stat. 115.03(1)(a)(5)(i); Minn. R. 7050.0150(1); Minn. R. 7060.0500–7060.0600.
[76] Minn. Stat. 115.01(22).
[77] Minn. Stat. 115.03(a)(5)(vii).
[78] MPCA WATER QUALITY MONITORING STRATEGY, *supra* n.48, at 1.

provide the data necessary to evaluate changes in water quality attributable to specific sets of management practices," as is necessary to ensure compliance with the CAFO Permit.[79] Nor do they provide facility-specific data identifying unlawful CAFO discharges. MPCA's official water quality monitoring strategy even acknowledges that CAFOs do not routinely conduct effectiveness monitoring for best management practices intended to protect groundwater.[80]

The Clean Water Act and Water Pollution Control Act each mandate that NPDES permits include provisions requiring permittees to monitor for discharges.[81] Provision 16.6 of the CAFO Permit refers to a regulation that requires monitoring provisions in NPDES permits to "yield representative data to determine whether there is compliance with the terms and conditions of the permit or compliance with Minnesota and federal pollution control statutes and rules."[82] However, the Permit does not elaborate on what such monitoring should look like in the CAFO context. Though the CAFO Permit's monitoring provisions are an improvement over past regulatory efforts, additional measures are necessary to ensure Permit compliance and control water pollution from the State's CAFO industry.

1. The CAFO Permit lacks monitoring and reporting requirements needed to ensure compliance with land application area effluent limits.

Despite improvements, the CAFO Permit still lacks monitoring and reporting provisions that are necessary to ensure compliance with, or facilitate enforcement of, effluent limits related to CAFO land application areas. To be clear, Commenters support the new requirement for feedlot operators to conduct downgradient, edge-of-field monitoring during land applications.[83] This provision is necessary to ensure compliance with the Permit's prohibition on discharges from land application areas that do not meet the agricultural stormwater exemption.[84] Edge of field monitoring provides critical information about the efficacy of pollution control practices.[85]

However, this requirement does not go far enough. MPCA must also require CAFOs to submit discharge monitoring reports that chronicle monitoring results at each potential discharge location. A provision requiring submission of monitoring reports would also facilitate easy

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[79] 5 YEAR PROGRESS REPORT, *supra* n.20, at 26.
[80] MPCA WATER QUALITY MONITORING STRATEGY, *supra* n.48, at 49 (listing animal feedlots among the industries that do not conduct regular effectiveness monitoring).
[81] *See infra* Section II.A.
[82] CAFO Permit at 16.6 (citing Minn. R. 7001.0150).
[83] CAFO Permit at 14.3.
[84] CAFO Permit at 26.3.
[85] 5 YEAR PROGRESS REPORT, *supra* n.20, at 26-27.

enforcement against permittees who jeopardize water quality by failing to monitor. Commenters further request that MPCA clarify that "potential discharge locations" includes openings to tile drains and other subsurface conduits. As discussed, tile drains are prevalent across Minnesota's rural landscapes and must be carefully monitored to prevent dry weather discharges that would otherwise go unnoticed and violate the CAFO permit's terms. This is especially true in Minnesota, where data indicates that "nitrogen losses are typically four times higher from subsurface drainage lines compared to surface runoff."[86]

The Permit's edge-of-field monitoring requirement is a step in the right direction, but must be broadened to include all land application discharge locations and effectively enforced. Further, monitoring records must be made available through MPCA's website to keep the public informed about potential hazards and facilitate citizen enforcement. However, the Permit's groundwater monitoring requirements are still lacking. As written, the Permit impermissibly lacks monitoring for subsurface discharges from land application areas. Land application of CAFO waste can result in seepage that can constitute a functional equivalent of a direct discharge just as production area subsurface discharges do.[87] Any such discharges constitute a violation of the Permit's zero dry weather discharge limitation. Further, the Permit prohibits land application of manure or process wastewater that will "exceed the hydraulic loading capacity of the land application site based on soil conditions."[88] Without subsurface monitoring, there is no way for permittees, the public, or MPCA to assess compliance with these requirements.

Monitoring for subsurface discharges from land application areas is not only mandatory under both the Clean Water Act and Water Pollution Control Act but is also feasible for permitted CAFOs operating in Minnesota. The simplest and most effective way to obtain representative monitoring data for land application area subsurface discharges is to require CAFOs to monitor fields using soil moisture probes or lysimeters.[89] Subsurface monitoring is especially important if MPCA continues the inadvisable practice of allowing land application on fields that have not been annually tested for nitrogen.[90]

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[86] *Id.* at 27.
[87] Erickson Report, *supra* n.31, at 6–7; *see also FWW v. EPA*, 20 F.4th at 515 (requiring monitoring for subsurface discharges and monitoring to ensure compliance with the requirement that permitted CAFOs have no dry weather discharges from land application areas).
[88] CAFO Permit at 11.4.
[89] Erickson Report, *supra* n.31, at 10–11.
[90] *See* CAFO Permit at 11.5 (only requiring phosphorus soil testing every four years).

2. *The CAFO Permit lacks monitoring and reporting requirements needed to ensure compliance with production area effluent limits.*

Similarly, the CAFO Permit needs additional provisions to ensure compliance with effluent limits applicable to the production area. Without such monitoring, enforcement becomes extremely burdensome, leaving unlawful pollution unaddressed. To ensure permit terms are enforceable, the Permit must contain monitoring provisions tailored to detect discharges from each production area activity with an applicable effluent limit.[91]

The Permit currently lacks representative monitoring for subsurface discharges from liquid manure storage areas. Permit provision 17.4 instructs covered CAFOs to "develop and employ a system to measure and monitor the liquid level in the LMSA such that the freeboard of the LMSA is maintained." These measurements are designed to ensure against surface water discharges caused by overflow due to a 25-year, 24-hour storm event.[92] But in addition to overflow risks, many liquid manure storage areas designed to MPCA's regulatory specifications are constructed to allow pollution to seep through the storage area liner, contaminating underlying groundwater.[93] Additionally, cracks and tears in liners can cause leaks that accumulate to significant amounts of pollution over time.[94] While depth gauges intended to prevent overflows may alert a CAFO operator to a catastrophic lagoon breach, they are not designed to notify operators about slower, but still significant leaching or leaking to the subsurface. Because Minnesota groundwaters are both regulated as waters of the state and hydrologically connected to surface waters, when liquid manure storage areas are "designed to leak," as many covered by the CAFO Permit are, subsurface discharge monitoring is unequivocally required under state and federal law.[95]

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[91] *See* 40 C.F.R. § 122.48(b) (requiring permits to specify "[r]equired monitoring including type, intervals, and frequency sufficient to yield data which are representative of the monitored activity including, when necessary, continuous monitoring").

[92] *See* CAFO Permit at 17.4 (citing 40 C.F.R. § 412.27(a)(2), which specifically instructs CAFOs to install a depth marker in all liquid manure storage areas to "contain the runoff and direct precipitation of the 25-year, 24-hour rainfall event").

[93] *See* Erickson Report, *supra* n.31, at 3–4 (demonstrating, in the context of another state CAFO permit, that even very low permeability rates can lead to significant pollution discharges due to the large size of some liquid manure storage areas); Minn. R. 7020.2100(3)(C) (permitting continuous seepage at rate of 1/56 inch per day for non-concrete-lined storage areas).

[94] *See Food & Water Watch*, 20 F.4th at 509 (acknowledging that the risk of a liquid manure storage area failing or rupturing "always exists").

[95] *See Food & Water Watch*, 20 F.4th at 517 ("Without a requirement that CAFOs monitor waste containment structures for underground discharges, there is no way to ensure that production areas comply with the Permit's

Monitoring methodologies already in use at CAFOs are available to detect subsurface discharges. MPCA should require each facility to develop a subsurface discharge monitoring plan that includes the "simple and well-established process" of monitoring through a series of up and down gradient wells.[96] As described in the expert report included as an exhibit to this comment, subsurface discharge monitoring plans must include at least two upgradient and three downgradient wells.[97] Where karst features interfere with the ability to identify up and down gradients, CAFOs must be required to use a "double synthetic liner with leak detection or a sump and pump design," or some other equally effective monitoring method.[98] In this event, MPCA should also include provisions requiring inspections to ensure continuous and effective operation of the leak detection or sump pump features, inspections and repairs during cleanouts, regular maintenance and repairs to sump pump and/or leak detection systems, and any other provisions MPCA deems necessary to ensure compliance.

Requiring monitoring wells at CAFO production area boundaries is a logical and effective approach to managing CAFO pollution in a manner that will protect public health and the environment. This approach has several benefits, including ease of implementation, accuracy of sampling results, and the ability to distinguish a single CAFO's pollution load from other pollution sources impacting the same waterway. Moreover, such systems are already in use on other CAFOs,[99] and would also address discharge risks from other production area activities—such as stockpiling manure, compost, silage, and mortalities—which are also known to leach pollutants to the subsurface.

III. MPCA Should Require Facilities with Digesters to Obtain Individual Permits to Ensure Adequate Management of Unique Pollution Risks.

Lastly, MPCA must amend the CAFO Permit to ensure CAFO operators are safely managing the unique pollution risks associated with anaerobic digesters. Anaerobic digesters,

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zero-discharge requirement."); *see also* CASE STUDIES, *supra* n.31, at 6 ("EPA does have authority to control discharges to surface water via groundwater when it has been established that ground water has a direct hydrological connection with surface water."); *see also Cty. of Maui v. Hawaii Wildlife Fund*, 140 S. Ct. 1462, 1468, 1476 (2020) (establishing a non-exhaustive list of factors to consider in evaluating whether subsurface discharges are functionally equivalent to surface discharges).

[96] Erickson Report, *supra* n.31, at 8–9.

[97] *Id.* at 10.

[98] *Id.* at 9–10.

[99] *See* Complaint at 13–14, *United States v. Cow Palace LLC*, Case No. 24-cv-3092 (E.D. Wash., June 26, 2024), https://www.justice.gov/usao-edwa/media/1357701/dl?inline (attached as Exhibit Z)

which produce methane gas from livestock waste, are a false climate solution.[100] Further, digesters incentivize larger CAFOs by creating a market for CAFO owners to profit from livestock waste.[101] With consolidation of Minnesota's livestock industry reducing competition and driving family farms out of business, facilitating large-scale adoption of digesters by allowing facilities with digesters to obtain NPDES coverage under the CAFO General Permit is ill-advised. But, above all, digesters engender unique pollution risks that are not adequately addressed by the CAFO Permit. Because facilities with digesters need additional oversight to prevent discharges, such facilities should be required to obtain individual permits.

In addition to producing methane—a potent greenhouse gas that produces carbon dioxide when burned for energy—anaerobic digesters create a byproduct called digestate.[102] The anaerobic digestion process fundamentally alters the composition of manure and other inputs such that digestate has properties that are distinct from undigested CAFO manure and process wastewater. Among other differences, digestate has more ammonium, higher pH, and more water-soluble nitrogen and phosphorus.[103] This altered composition makes the nutrients in digestate more susceptible to runoff and groundwater infiltration than nutrients in undigested CAFO waste.[104] Anaerobic digestion of CAFO waste also increases pollutant volatility, creating heightened risks that pollutants will be aerosolized and then redeposit in nearby waterways.[105]

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[100] *See generally* FOOD & WATER WATCH, THE BIG OIL AND BIG AG PONZI SCHEME: FACTORY FARM GAS (Jan. 2024) https://www.foodandwaterwatch.org/wp-content/uploads/2024/01/RPT2_2401_GreenwashingBiogas-WEB3.pdf (attached as Exhibit AA).

[101] *Id.*; *see also* CARLIN MOLANDER & MOLLY ARMUS, MAKING A BAD SITUATION WORSE: MANURE DIGESTERS AT MEGA DAIRIES IN WISCONSIN 6 (2024), https://foe.org/wp-content/uploads/2024/06/WI-Case-Study_v2.pdf (attached as Exhibit BB).

[102] Ron Alexander, *Digestate Utilization in The U.S.*, (Jan. 2012), https://www.biocycle.net/digestate-utilization-in-the-u-s/.

[103] Möller & Müller, *Effects of Anaerobic Digestion on Digestate Nutrient Availability and Crop Growth: A Review*, 12 Eng. Life Sci. 242, 242–43 (2012), https://www.ofvi-abc.nl/wp-content/uploads/2024/03/Moller-Muller_2012_Effects-anaerobic-digestion-digestate-nutrients-crop-growth.pdf (attached as Exhibit CC). Moreover, though some studies suggest anaerobic digestion of CAFO wastes also neutralizes pathogens, research shows viable pathogen content of digestate is highly variable. Burch et al., *supra* n.11, at 342 ("Anaerobic digesters inactivated pathogens and fecal indicators, but the extent of inactivation for fecal indicators was generally poor compared with expectations based on the literature.").

[104] USDA, NATURAL RESOURCES CONSERVATION SERVICE, CONSERVATION PRACTICE STANDARD FOR ANAEROBIC DIGESTER at 366-CPS-9 (Aug. 2023), https://www.nrcs.usda.gov/sites/default/files/2023-08/366_NHCP_CPS_Anaerobic_Digester_2023.pdf (attached as Exhibit DD).

[105] Möller and Müller, *supra* n.103, at 246–47.

MPCA therefore cannot assume that typical CAFO manure management plans will adequately protect waterways from digestate leaching and runoff.

Due to the unique hazards associated with anaerobic digesters and their byproducts, facilities using these technologies must be subject to additional best management practices and monitoring protocols that are absent from the CAFO Permit. CAFO waste management and nutrient management planning are based entirely on the characteristics and pollution risk of undigested waste. Digestate waste management requires additional protections and may require a fundamentally different approach to comply with federal law and maintain water quality standards. For instance, the weekly visual inspections mandated by the Permit are insufficient to prevent spills and other accidents that occur with increased frequency at facilities with digesters.[106] Further, digestate composition—and therefore pollution risks—are variable depending on the feedstock used.[107] Digestate risks will be especially variable if MPCA allows up to ten percent of CAFO digester feedstocks to be comprised of non-CAFO waste products, which could include any number of organic materials, including food wastes that could be contaminated with pathogens capable of surviving digestion.[108] Given these risks, any permit covering a CAFO with an anaerobic digester will require additional regulatory oversight, including but not limited to regular digestate testing to ensure CAFOs are not contributing to the spread of illnesses.

Ultimately, the record MPCA has produced in support of this Permit revision demonstrates that the agency has not considered many factors relevant to effectively regulating CAFOs with anaerobic digesters. This lack of consideration is reflected in the failure to include in the CAFO Permit digester-specific provisions related to digestate testing, feedstock limitations, limits on future modifications, or other relevant considerations. As such, the CAFO Permit is plainly not an appropriate tool to regulate facilities with anaerobic digesters. The final

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[106] MOLANDER AND ARMUS, *supra* n.101, at 6.
[107] Alessandra Fusi et al., *Life Cycle Environmental Impacts of Electricity from Biogas Produced by Anaerobic Digestion*, 4 Frontiers in Bioengineering and Biotechnology 1, 15 (March 2016) (attached as Exhibit EE).
[108] *See* CAFO Permit at 29.2(k) (allowing CAFOs with anaerobic digesters to obtain coverage under the Permit so long as at least 90 percent of the facility's digester feedstock is manure, process wastewater, or manure-contaminated runoff); *See* Lauren Russell et al., *A Small Study of Bacterial Contamination of Anaerobic Digestion Materials and Survival in Different Feed Stocks*, 7 Bioengineering 1, 9 (Sept. 2020) (finding that strains of listeria that can cause illness in humans were present in food waste digester feedstock and persisted even after digestion).

permit should make clear that CAFOs with digesters are not eligible for coverage and must instead obtain an individual permit.

IV. Additional Changes to the Final Permit Are Necessary to Protect Water Quality.

Commenters also encourage MPCA to incorporate the following changes to the final Permit:

- To ensure the CAFO Permit includes a monitoring scheme that enables enforcement against particular permittees,[109] all inspection and monitoring results must be submitted to MPCA so that they are publicly available. Ideally, monitoring reports should be posted on a database hosted on MPCA's website for easy access.
- The Permit must mandate that all CAFO infrastructure, including monitoring equipment, be installed and functioning properly before the monitored activity begins. At present, Permit coverage can be approved so long as the applicant provides a schedule for installation of monitoring equipment.[110] This is insufficient. Plainly, to detect discharges, monitoring equipment must be installed and properly functioning before a CAFO can legally operate.
- MPCA must review all liquid manure storage area construction inspection forms to ensure they are complete and properly certified by a professional engineer *before* an applicant obtains Permit coverage. There is no other way to ensure compliance with Permit terms, as MPCA is legally obligated to do.[111]
- Commenters urge MPCA to include guidance in the final Permit to ensure all discharging CAFOs obtain coverage under the Permit or an individual permit. Approximately a third of Minnesota's CAFOs are not presently covered by a NPDES Permit. As explained in Section I.B–C, *supra*, many of these unpermitted CAFOs are discharging to jurisdictional waters and therefore must have NPDES coverage.

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[109] 33 U.S.C. § 1251(e); *see also Waterkeeper Alliance, Inc. v. EPA*, 399 F.3d 486, 503–04 (2d Cir. 2005) (holding that EPA's 2003 CAFO rule violated the Clean Water Act for infringing upon citizens' right to participate in enforcement).
[110] CAFO Permit at 4.5.
[111] 33 U.S.C. § 1318(a)(2)(A)(iii).

- Commenters recommend that the final CAFO Permit include both annual soil testing for nitrogen and subsurface monitoring requirements for land application areas. Additionally, the final Permit should incorporate best management practices for soil testing, including timing restrictions that prohibit testing after a major rainfall event and require testing within two months of when manure or process wastewater will be applied. Applying CAFO waste to fields that have not been recently tested for nitrate substantially increases the likelihood that nitrogen will be applied in excess of crop needs, allowing the nitrogen to travel below the root zone where it cannot be used by the plant. Allowing nitrogen to be applied in this manner violates the requirement that MPCA "establish protocols to . . . ensure appropriate agricultural utilization of the nutrients."[112] Meanwhile, persistent and worsening nitrate impairments throughout Minnesota, but particularly in the southeast where the CAFO industry is concentrated, indicate that nitrogen is entering surface and groundwaters through subsurface pathways. Soil testing in accordance with best management practices helps to ensure that manure and wastewater applications actually minimize seepage.

Conclusion

As written, the CAFO Permit does not comply with the Clean Water Act, Minnesota's Water Pollution Control Act, implementing regulations for those statutes, or the Ninth Circuit's holding in *Food & Water Watch.*[113] Most pressingly, the Permit lacks monitoring necessary to ensure compliance with the Permit's terms, protect water quality, and keep citizens and regulators informed about the ways in which the CAFO industry contributes to water pollution in Minnesota. Based on the foregoing, Commenters respectfully request that MPCA revise the draft Permit to include representative monitoring that will ensure compliance with the all of Permit's effluent limitations, along with comprehensive reporting that will enable enforcement against CAFOs that fail to comply. Lastly, Commenters request that MPCA require CAFOs operating anaerobic digesters to obtain individual permits tailored to control the unique pollution risks those facilities present.

[112] 40 C.F.R. § 122.42(e)(1)(vii).
[113] *See generally Food & Water Watch*, 20 F.4th 506.