Food & Water Watch (Emily Miller)

Please see attached comment, submitted on behalf of Food & Water Watch, Animal Protection New Mexico, and Animal Protection Voters.

June 9, 2026

William Brancard
Chair
Water Quality Control Commission
Harold L. Runnels Building
1190 S. St. Francis Drive
Sante Fe, NM 87505

<u>*Submitted via NMED Public Comment Portal*</u>

Re: WQCC 25-74 (R): In the Matter of Proposed Amendments to 20.6.2 NMAC and 20.6.5 NMAC – Surface Water Quality State Permitting Program

Food & Water Watch respectfully submits these comments on behalf of the undersigned organizations for the Water Quality Control Commission's (Commission) consideration as it conducts the above-captioned rulemaking hearing regarding New Mexico Environment Department's (NMED) draft amendments to the State's Ground and Surface Water Protection rule,[1] and NMED's draft new rule to establish the New Mexico Pollutant Discharge Elimination System (NMPDES)[2] (collectively, "Surface Water Permitting Rules" or "Proposed Rules"). Commenters applaud NMED's efforts to establish a comprehensive surface water permitting program to ensure expansive protection of Waters of the United States under the authority of the Clean Water Act and Waters of the State under the authority of the New Mexico Water Quality Act. While the Proposed Rules are a good first step toward comprehensive water quality protection, the Commission should direct NMED to do more to protect New Mexico's waters from the polluting impacts of concentrated animal feeding operations (CAFOs).

CAFOs are a major—and largely unchecked—source of surface water pollution throughout the country, in large part due to woefully inadequate federal oversight and regulation. To protect New Mexico's surface waters, it is critical that NMED craft a CAFO regulatory program that does more than merely adopt ineffective federal baseline requirements.[3] To that end, NMED must issue robust, CAFO-specific surface water rules that not only achieve the Clean Water Act's fundamental requirements, but also advance the clear mandate provided by the New Mexico State Legislature to create a surface water protection program that surpasses the

[1] *See* Draft Ground and Surface Water Protection Amendments, 20.6.2 NMAC, https://www.env.nm.gov/public-notices/wp-content/uploads/sites/32/2025/08/20.6.2-NMAC-Public-Review-Draft-August-29-2025.pdf.
[2] *See* Draft NMPDES Rule, 20.6.5 NMAC, https://www.env.nm.gov/public-notices/wp-content/uploads/sites/32/2025/08/20.6.5-NMAC-Public-Review-Draft-August-29-2025.pdf.
[3] *See e.g.*, Draft NMPDES Rule at §§ 20.6.5.201(A)(2) and 20.6.5.407(A)(1)(a) (incorporating by reference federal Clean Water Act CAFO regulations without specifying any more stringent state-based standards).

scope of federal law.[4] In particular, NMED's Surface Water Permitting Rules must (1) ensure that all CAFOs discharging to Waters of the State or Waters of the United States obtain the requisite state or NMPDES permit, and (2) all CAFO permits contain strong pollution control measures and monitoring provisions to adequately protect water quality.

Commenters attach for the Commission's consideration public comments submitted to NMED on October 28, 2025 by Food & Water Watch, which document the severity of the CAFO pollution problem, detail how federal CAFO regulations exacerbate the problem by allowing CAFOs to evade permit coverage and failing to ensure CAFO permits protect water quality, and make recommendations for how New Mexico can impose stronger CAFO standards via this rulemaking that far exceed the federal baseline to rectify these critical flaws.[5] To assist the Commission in its evaluation of the Proposed Rules and the need for stronger CAFO requirements, Commenters submit additional evidence and arguments demonstrating that New Mexico CAFOs pose a significant threat to surface water quality and have an extremely poor track record of compliance with surface water regulation, further underscoring the need for stronger regulation and oversight.

A. New Mexico CAFOs Pose a Significant Threat to Surface Water Quality

As explained more fully in our earlier comment,[6] food animal production has changed dramatically over the last several decades, with most livestock and poultry now raised in industrial-scale CAFOs that confine thousands of animals at a time. Nowhere is the shift from pasture-based and family-scale to factory operations more apparent than in the dairy industry, where consolidation has occurred at a faster pace than in almost every other agricultural sector.[7] New Mexico is a prime example of this trend. Over the past 20 years, New Mexico lost approximately half of its family-scale dairies (those under 500 cows) while mega-operations have ballooned.[8] As of 2022, New Mexico mega-dairies[9] each confine an average of 3,685 cows—more than five times the size threshold of a federal large CAFO. This is 20 percent larger than just five years earlier—making New Mexico fifth in the nation for average mega-dairy size.[10] As New Mexico's dairy sector has increasingly concentrated in certain counties and

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[4] Senate Bill 21 (2025). *See also* Draft 20.6.2.7(S)(10) NMAC (incorporating by reference 20.6.4.7(S)(5) NMAC's expanded definition of "surface water").
[5] *See* Food & Water Watch, Re: New Mexico Surface Water Quality State Permitting Program (Oct. 28, 2025) [hereinafter FOOD & WATER WATCH COMMENT], attached hereto as Exhibit 1 (discussing how federal rules allow CAFOs to evade permit coverage and fail to ensure CAFO permits protect water quality).
[6] *See id.* at 2–4.
[7] James M. MacDonald, et al., U.S. Department of Agriculture. Economic Research Service. "Consolidation in U.S. Dairy Farming." Economic Research Service Report No. 274. July 2020 at 11.
[8] *See* Food & Water Watch, *The Urgent Case for a Moratorium on Factory Farms in New Mexico*, 1 (Mar. 2024), https://www.foodandwaterwatch.org/wp-content/uploads/2024/03/1PGR_2403_NMFactoryFarm.pdf.
[9] As used in this comment, the term "mega-dairy" refers to Dairy CAFOs that confine 500 or more cows.
[10] Food & Water Watch, *Factory Farm Nation: New Mexico's Mega-Dairy Problem*, 2 (Sep. 2024), https://www.foodandwaterwatch.org/wp-content/uploads/2024/09/FSW_0924_FFMap_NM-1.pdf.

watersheds, so too have the vast quantities of waste CAFOs generate. According to the most recent agricultural census data, as analyzed by Food & Water Watch, New Mexico's beef and dairy factory farms collectively produce 12.5 billion pounds of manure annually—more than four times as much as the state's human population.[11]

Because the sheer quantity of manure concentrated in certain counties cannot be assimilated by available cropland and CAFO waste contains pollutants not utilized by crops, land application of CAFO waste—a primary disposal method and so-called pollution control practice—invariably leads to pollutant-laden runoff, nutrient pollution, and water quality impacts. Food & Water Watch calculated county-level nitrogen and phosphorous excreted in manure from beef and dairy cows on factory farms in 2022, across New Mexico's counties.[12] In total, 12 out of 13 New Mexico counties with factory farms are overwhelmed by nitrogen and/or phosphorous generated by these operations, lacking available cropland to absorb it all, even in extremely unrealistic spreading scenarios where factory farms have access to every available acre of cropland for nutrient application.[13] The below table reflects the extent to which these counties are overburdened by excess nutrients.

County	**% of Total N Assimilative Capacity***	**% of Total P Assimilative Capacity***	**Beef Cattle on Factory Farms**	**Dairy Cows on Factory Farms**
Chaves	184.1%	240.8%	4,221	60,550
Colfax	-23.8%	-10.9%	5,550	0
Curry	421.6%	406.5%	8,442	70,210
Doña Ana	127.1%	205.6%	0	16,150
Eddy	-5.5%	42.6%	0	8,400
Lea	492.2%	574.9%	0	35,140
Luna	173.1%	234.0%	4,221	8,320
Quay	56.6%	37.5%	4,221	0
Roosevelt	493.2%	540.1%	4,221	66,515
Socorro	189.8%	266.5%	0	7,391
Torrance	127.8%	153.8%	0	3,695
Union	49.3%	5.0%	8,442	0
Valencia	89.7%	154.6%	4,221	3,695

**Total excess nutrients (from factory farm manure and/or synthetic inputs) as a percentage of county cropland's maximum ability to assimilate them, in 2022.*[14]

According to NMED, these industrial-scale livestock operations are causing and contributing to water quality impairments throughout the state. Per New Mexico's most recent

[11] *See* Food & Water Watch, *Factory Farm Manure is Overwhelming New Mexico*, 2 (May 2026), attached hereto as Exhibit 2. In this analysis, "factory farms" are medium and large-scale livestock operations falling into the following Agricultural Census categories: 500 or more beef cattle on feed, and 500 or more milk cows. *Id.*
[12] *Id.*
[13] *Id.* at 1.
[14] *Id.* at 7. *See id.* at 2–6 for methodology.

Clean Water Act §303(d) / §305(a) Integrated Report, animal feeding operations are the probable source of at least 535 miles of impaired streams and rivers.[15] Historical data demonstrate this pollution has persisted for many years without improvement.[16]

As NMED well knows, CAFOs are also a significant source of groundwater pollution in New Mexico, which poses further risk to surface water quality where surface waters are hydrologically connected to CAFO-contaminated aquifers. According to the Department's most recent accounting, at least 143 dairies are collectively authorized to generate and discharge 10,478,618 gallons of polluted effluent per day to groundwater, or 3.8 billion gallons annually.[17] New Mexico law has long recognized the well-documented hydrological reality of interconnection between groundwater and surface water,[18] as well as the significant role CAFOs have played in contaminating the State's groundwater resources.[19] Indeed, studies shows that the watersheds in which New Mexico CAFOs have concentrated have significant connectivity between shallow alluvial aquifers and jurisdictional surface waters fed by groundwater inflows.[20]

In sum, the threats CAFOs pose to New Mexico surface water resources, both through overland runoff and via hydrologically connected groundwater, demand a strong regulatory program to adequately protect state and federal waters.

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[15] *See* New Mexico Environment Department, *Final Draft: 2026-2028 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report*, Appendix B at 7 (Mar. 18, 2026).

[16] *See* NMED, *EPA-Approved 2022-2024 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report*, Appendix B at 5 (Apr. 26, 2022) (526 miles of impaired rivers and streams due to feeding operations); *EPA-Approved 2020-2022 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report*, Appendix B at 5 (Jan. 22, 2021) (526 miles); *EPA-Approved 2018-2020 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report*, Appendix B at 3 (Nov. 1, 2018) (465 miles). Publicly available copies of earlier Integrated Reports do not include Appendix B probable source data.

[17] *See* NMED, *ACS DP Tracking Sheet (Caseload) 2025* (obtained via Inspections of Public Records Act request).

[18] *See City of Alburquerque v. Reynolds*, 71 N.M. 428, 436–37 (1962) ("a prior appropriator from a stream may enjoin one from obstructing or taking waters from an underground source which would otherwise reach the stream and which are necessary to serve the stream appropriators' prior right.").

[19] *See* NMAC 20.6.6 *et seq.* (imposing additional groundwater protection requirements on dairy operations due to their outsized role in contaminating underground water resources). *See also* NMED, OpenEnviroMap (last accessed June 1, 2026) (showing most New Mexico dairies are situated above "high sensitivity" aquifers prone to contamination), https://gis.web.env.nm.gov/oem/?map=egis.

[20] *See* Cadmus Group, Inc. (U.S. EPA Contract Number EP-C-08-002), *Evaluation of Hydrologic Alteration and Opportunities for Environmental Flow Management in New Mexico*, 37 (Oct. 2011), https://www.nmlegis.gov/handouts/WNR%20110711%20Item%200%20NM%20Hydrologic%20Study--Steam%20Flow--Rio%20Grande%20Restoration.pdf (finding 60 percent of the New Mexico watersheds studied received at least one-half of their total annual flow from groundwater sources); United States Geological Survey, *Rio Grande Transboundary Integrated Hydrologic Model and Water-Availability Analysis, New Mexico and Texas, United States, and Northern Chihuahua, Mexico* (2018), https://pubs.usgs.gov/publication/ofr20181091 (documenting the interconnected relationship between ground and surface water in the Rincon and Mesilla Valley areas of Rio Grande Valley, Doña Ana and Sierra Counties, Mexico); Peter Burck and Brian Wahlin, U.S. Committee on Irrigation and Drainage, *Overview of the Pecos River Basin*, 2 (2006), https://api.mountainscholar.org/server/api/core/bitstreams/e799cd0b-2450-444b-9e61-b9f738682ea4/content (characterizing groundwater inflow as a major supplier of Pecos River flow and documenting "[a] direct hydrologic link exists between the surface water sources and the groundwater sources in the Pecos River basin.").

B. New Mexico CAFOs Have a Well-Documented History of Clean Water Act Noncompliance

Further underscoring the need for strong, CAFO-specific regulation is the fact that New Mexico CAFOs have a long history of evading surface water regulation altogether or failing to comply with Clean Water Act permits.[21] Though EPA estimates 75 percent of CAFOs nationwide discharge point source pollution due to their "standardized operational profiles" and thus require a Clean Water Act permit to operate lawfully,[22] only 12 percent of New Mexico CAFOs currently hold such permits.[23] Even for the minority of CAFOs that are subject to Clean Water Act regulation, oversight and enforcement of permitting requirements has been spotty. According to EPA enforcement data, the agency has foregone conducting in-person inspections at the vast majority of New Mexico CAFOs for decades, leaving it up to unpermitted operations to make their own jurisdictional determination as to whether they require permit coverage.[24] Indeed, researchers have noted that "New Mexico is one of the nation's softest regulatory environments for CAFOs" when it comes to Clean Water Act regulation, due to the State's historical reliance on regional EPA staff to issue CAFO permits, "result[ing] in permits [where they exist] that are not specific to local contexts and are more difficult to enforce."[25]

Having enjoyed such a lax regulatory environment, it is no wonder that CAFO compliance with Clean Water Act permit terms and conditions has been historically abysmal. EPA records show that in the last three years alone, the agency has identified fourteen CAFOs in violation of their permitting requirements, with at least 9 CAFOs in significant noncompliance due to the years-long, ongoing nature of their violations.[26] Indeed, in the past ten years EPA has

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[21] *See* FOOD & WATER WATCH COMMENT, *supra* note 5, at 4–8, 24–26, for discussion regarding the nationwide CAFO under-permitting problem and EPA failure to ensure all discharging CAFOs are subject to protective permits.
[22] Revised National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines for Concentrated Animal Feeding Operations in Response to the Waterkeeper Decision, 73 Fed. Reg. 70,418, 70,469 (Nov. 20, 2008).
[23] *See* EPA, *NPDES CAFO Permitting Status Report: National Summary, Endyear 2024* (Jul. 18, 2025), https://www.epa.gov/system/files/documents/2025-09/cafo-status-report-2024.pdf.
[24] *See* EPA, Enforcement and Compliance History Online; Facility Search Results for New Mexico Beef Cattle Feedlots (SIC 0211) and Dairy Farms (0241) (last visited 6/8/2026), https://echo.epa.gov/facilities/facility-search/results [hereinafter NM CAFO ECHO Results]. Of the 136 facility entries returned, only 20 facilities have been inspected in the last 5 years. 49 facilities show no record of on-site inspection, and 32 facilities show a last inspection date of 2009 or earlier. *Id. See also NRDC v. EPA*, 966 F.2d 1292, 1304–5 (9th Cir. 1992) (finding unlawful a Clean Water Act permitting system that allowed regulated entities to "self-report" whether they needed permit coverage).
[25] Vanessa Ehrenpreis et al., *Using Machine Learning to Map Concentrated Animal Feeding Operations*, 5–6 (Jan. 2021), https://mappingforej.studentorg.berkeley.edu/wp-content/uploads/2022/03/NM-CAFO-Report.pdf. *See also* FOOD & WATER WATCH COMMENT, *supra* note 5, at 6–7, 47–70, 87–103 (documenting the critical flaws in federal CAFO regulations resulting in lax permit requirements that are not protective of water quality).
[26] *See* NM CAFO ECHO Results, *supra* note 24. Facilities with violations in the past 3 years include Apache Feedyard, *Big Sky Desertland Dairy*, Bright Star Dairy, Cottonwood Springs Dairy, D & J Dairy (Formerly BJZ Dairy); *Del Oro Dairy*, *Dominguez Dairy*, *Expo New Mexico*, *Mid Frisian Farms, LLC*, *Mountain View Dairy*,

taken no less than eleven formal enforcement actions against New Mexico CAFOs for failure to comply with permit requirements. These permit violations include:

- Knowing failure to rectify continuous, months-long discharge of process wastewater from overflowing waste lagoons to Waters of the United States (1);
- Failure to report unauthorized discharges to EPA or NMED (1);
- Failure to obtain a NPDES permit (1);
- Failure to properly maintain waste containment structures to prevent discharges (4);
- Failure to properly maintain feed storage areas to prevent contaminated runoff (1);
- Failure to properly manage animal mortalities (2);
- Failure to conduct weekly visual inspections of the production area (1);
- Failure to conduct required manure and soil testing (1);
- Failure to line or certify hydraulic conductivity of waste containment structures (1); and
- Failure to submit annual reports for up to five years (7).[27]

The threat CAFOs pose to New Mexico waters, combined with their proven track record of resisting regulatory efforts to address their polluting impacts, demonstrates the need for robust state CAFO regulations that comprehensively address the problem.

Oppliger Feedyard Inc. North, *River Valley Dairy*, *Stark and Sons Dairy*, and Sunset Dairy. The italicized facilities have a "significant" noncompliance status.

[27] *See* EPA, Civil Enforcement Case Report Case No. 06-2018-1788 (Apache Feedyard aka 7-H Feeders), https://echo.epa.gov/enforcement-case-report?id=06-2018-1788; EPA, Civil Enforcement Case Report Case No. 06-2023-1716 (Bright Star Dairy), https://echo.epa.gov/enforcement-case-report?id=06-2023-1716; EPA, Civil Enforcement Case Report Case No. 06-2016-1776 (Cottonwood Springs Dairy), https://echo.epa.gov/enforcement-case-report?activity_id=3600812949; EPA, Civil Enforcement Case Report Case No. 06-2022-1818 (Dominguez Dairy), https://echo.epa.gov/enforcement-case-report?id=06-2022-1818; EPA, Civil Enforcement Case Report Case No. 06-2023-1701 (EXPO New Mexico), https://echo.epa.gov/enforcement-case-report?id=06-2023-1701; EPA, Consent Agreement and Final Order, Case No. 06-2014-1735 (EXPO New Mexico) (May 24, 2014); EPA, Civil Enforcement Case Report Case No. 06-2026-1727 (Oppliger Feedyard North), https://echo.epa.gov/enforcement-case-report?id=06-2026-1727; EPA, Civil Enforcement Case Report Case No. 06-2021-1780 (River Valley Dairy), https://echo.epa.gov/enforcement-case-report?id=06-2021-1780; EPA, Civil Enforcement Case Report Case No. 06-2026-1711 (RKR Feeders), https://echo.epa.gov/enforcement-case-report?activity_id=3604625415; EPA, Civil Enforcement Case Report Case No. 06-2023-1718 (RKR Feeders), https://echo.epa.gov/enforcement-case-report?activity_id=3603450353; EPA, Civil Enforcement Case Report Case No. 06-2021-1751 (Tri K Feeders), https://echo.epa.gov/enforcement-case-report?id=06-2021-1751; EPA, Civil Enforcement Case Report Case No. 06-2026-1725 (Tucumcari Feedyard), https://echo.epa.gov/enforcement-case-report?id=06-2026-1725.

C. The Commission Should Direct NMED to Promulgate a Universal CAFO Permitting Requirement and Strong CAFO Pollution Control Measures

In light of the issues described above, and the failure of EPA to adequately regulate CAFO water pollution at the federal level as described in our earlier comment,[28] Commenters urge the Commission to direct NMED to adopt stronger CAFO-specific surface water permitting rules that ensure (1) all discharging CAFOs are subject to the requisite state or NMPDES permit, and (2) all CAFO permits contain strong pollution control measures and monitoring provisions to adequately protect water quality.

1. Universal CAFO Permitting

Given the demonstrated history of CAFO permit evasion, the Commission should require all CAFOs to obtain surface water permits by imposing a universal permitting requirement across the industry. The Clean Water Act expressly empowers state regulators to create a NMPDES program for CAFOs that imposes more stringent permit standards than the federal floor created by EPA regulation.[29] State law also provides clear supplemental authority for more stringent regulation.[30] Together, these statutory directives allow New Mexico to require all CAFOs to obtain permits, just as other states have done. For instance, Wisconsin has long imposed a universal permitting requirement on all Large CAFOs in recognition of their outsized polluting impact on surface and groundwater quality.[31] Oregon has also recently followed suit, requiring all Large CAFOs that have "the potential to discharge to surface water of the state" to obtain Clean Water Act permit coverage.[32] A universal permitting requirement will allow NMED to exert stronger oversight over CAFO surface water discharges, better police the extent to which CAFOs are improperly claiming discharges qualify as exempt agricultural stormwater,[33] and establish clear prohibitions and monitoring requirements for CAFO discharges that might otherwise go undetected, like discharges via hydrologically connected groundwater.[34]

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[28] FOOD & WATER WATCH COMMENT, *supra* note 5.
[29] *See* 33 U.S.C § 1342(b) (requiring that state programs impose standards at least as stringent as those of the federal program); 33 U.S.C. § 1370 ("nothing in this chapter shall preclude or deny the right of any State . . . to adopt or enforce any standard or limitation respecting discharges of pollutants . . . except . . . such State [] may not adopt or enforce any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance which is less stringent than [federal law]").
[30] NMSA § 74-6-2–74-6-4 (as amended by S.B. 21 (2025)) (providing additional state law authority to expand surface water program coverage to additional waters of the State).
[31] *See* Wis. Admin. Code § 243.11(3) (requiring Large CAFOs that store manure or process wastewater at or below grade or land apply manure or process wastewater to have a WPDES permit).
[32] Oregon Department of Agriculture, *Oregon Confined Animal Feeding Operation National Pollutant Discharge Elimination System General Permit Number #01*, 6 (May 15, 2026), https://www.oregon.gov/oda/Documents/Publications/NaturalResources/NPDES-Permit.pdf.
[33] *See* FOOD & WATER WATCH COMMENT, *supra* note 5, at 4–6 (explaining how CAFOs often evade permitting requirements by exploiting the regulatory exemption for agricultural stormwater discharges).
[34] *See* EPA, *National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges from Concentrated Animal Feeding Operations (CAFOs) in New Mexico (NMG010000)*, Part II.A.1.b.vi (Sep. 1, 2016)

2. Stronger CAFO Permits

The Commission should also direct NMED to codify CAFO-specific permit requirements that exceed the federal baseline, to ensure that CAFO permits, at minimum, address all pollutants of concern present in CAFO waste and all pathways in which these pollutants are discharged, and impose strong pollution control practices to restrict and ultimately eliminate the discharge of those pollutants.[35]

To that end, it is also essential that the Surface Water Permitting Rules require representative water quality monitoring in CAFO permits. EPA has long failed to require CAFOs to meet one of the most basic requirements of the Clean Water Act—water quality monitoring capable of assuring compliance with permit terms. The Clean Water Act's permitting provisions require that permits contain conditions, including conditions on data collection and reporting, to "ensure compliance" with the Act.[36] Yet federal regulations incorporated by reference into the Proposed Rules fail to include any CAFO monitoring provisions capable of ensuring compliance with federal law. Multiple adjudicatory bodies have now agreed that regulators' failure to include representative monitoring requirements in CAFO permits runs afoul of the Clean Water Act.[37] To remedy the legal and practical deficiencies created by inadequate monitoring, NMED must therefore incorporate CAFO monitoring requirements into the Proposed Rules.

Thank you for your consideration,

Emily Miller

("There shall be no discharge of manure, litter, or process wastewater from retention or control structures to surface waters of the United States through groundwater with a direct hydrologic connection to surface waters."). *See also id.* at Part II.D.1 ("The permittee shall document that no direct hydrologic connection exists between the contained wastewater and surface waters of the United States. Where the permittee cannot document that no direct hydrologic connection through ground water exists, the ponds, lagoons and basins of the containment facilities must have a liner which will prevent the potential contamination of surface waters."), https://www.env.nm.gov/wp-content/uploads/sites/25/2017/07/NMG010000-CAFO-NM-20160901.pdf.

[35] *See* Exhibits 2 appended to the FOOD & WATER WATCH COMMENT, *supra* note 5 at 103–161 for detailed recommendations regarding CAFO permitting requirements, including technology-based effluent limitations, best management practices, and monitoring provisions.

[36] 33 U.S.C. § 1342. *See also NRDC v. EPA*, 808 F.3d 556, 580 (2d Cir. 2015) ("Under the [Clean Water Act], NPDES permits must contain conditions that require both *monitoring* and *reporting of monitoring results* of [effluent limitations] to ensure compliance.").

[37] *Food & Water Watch v. EPA*, 20 F.4th 506, 517–18 (9th Cir. 2021); *Wash. State Dairy Fed'n v. Dep't of Ecology*, 18 Wn. App. 2d 259, 299–303 (2021); *Friends of Toppenish Creek*, Washington Pollution Control Hearing Board, PCHB No. 23-002. Other cases involving the same legal question are currently pending before state tribunals in Montana, Colorado, and Michigan. *Upper Missouri Waterkeeper v. Mont. Dep't of Env't Quality*, Case No. DV-16-2023-0001249; *Center for Biological Diversity v. Colorado Dep't of Public Health & Env't*, Case No. 2025CA1546; *In re Michigan Farm Bureau*, Dkt. No. 20-009773.

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On Behalf of:

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EXHIBIT 1

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October 28, 2025

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Submitted via NMED Public Comment Portal

Re: New Mexico Surface Water Quality State Permitting Program

Food & Water Watch respectfully submits these comments in response to New Mexico Environment Department's (NMED) draft amendments to the State's Ground and Surface Water Protection rule,[1] and NMED's draft new rule to establish the New Mexico Pollutant Discharge Elimination System (NMPDES)[2] (collectively, "Surface Water Permitting Rules" or "Proposed Rules"). Food & Water Watch applauds NMED's efforts to establish a comprehensive surface water permitting program to ensure expansive protection of Waters of the United States under the authority of the Clean Water Act and Waters of the State under the authority of the New Mexico Water Quality Act. While the Proposed Rules are a good first step toward comprehensive water quality protection, NMED can and should do more to protect New Mexico's waters from the polluting impacts of concentrated animal feeding operations (CAFOs).

CAFOs are a major—and largely unchecked—source of surface water pollution throughout the country, in large part due to woefully inadequate federal oversight and regulation of this significant category of point source pollution.[3] To protect New Mexico's surface waters, it is critical that NMED craft a CAFO regulatory program that does more than merely adopt ineffective federal baseline requirements.[4] To that end, NMED must issue robust, CAFO-specific surface

[1] *See* Draft Ground and Surface Water Protection Amendments, 20.6.2 NMAC, available at https://www.env.nm.gov/public-notices/wp-content/uploads/sites/32/2025/08/20.6.2-NMAC-Public-Review-Draft-August-29-2025.pdf.
[2] *See* Draft NMPDES Rule, 20.6.5 NMAC, available at https://www.env.nm.gov/public-notices/wp-content/uploads/sites/32/2025/08/20.6.5-NMAC-Public-Review-Draft-August-29-2025.pdf.
[3] *See* FOOD & WATER WATCH ET AL., PETITION TO REVISE THE CLEAN WATER ACT REGULATIONS FOR CONCENTRATED ANIMAL FEEDING OPERATIONS 15–22 (2017), https://www.foodandwaterwatch.org/wp-content/uploads/2021/06/citizens_cafo_cwa_petition.pdf [hereinafter 2017 PETITION], attached hereto as Exhibit 1.
[4] *See e.g.*, Draft NMPDES Rule at §§ 20.6.5.201(A)(2) and 20.6.5.407(A)(1)(a) (incorporating by reference federal Clean Water Act CAFO regulations without specifying any more stringent state-based standards).

water rules that not only achieve the Clean Water Act's fundamental requirements, but also advance the clear mandate provided by the New Mexico State Legislature to create a surface water protection program that surpasses the scope of federal law.[5] In particular, NMED's Surface Water Permitting Rules must ensure that (1) all discharging CAFOs obtain the requisite state or NMPDES permit, and (2) all CAFO permits contain strong pollution control measures and monitoring provisions to adequately protect water quality.

A. New Mexico CAFOs Generate Significant Quantities of Waste Posing Clear Threats to Water Quality

Food animal production has changed dramatically over the last several decades, with most livestock and poultry now raised in industrial-scale CAFOs that confine thousands of animals at a time. Nowhere is the shift from family-scale to factory operations more apparent than in the dairy industry, where consolidation has occurred at a faster pace than in almost every other agricultural sector.[6] New Mexico is a prime example of this trend. Over the past 20 years, New Mexico lost approximately half of its family-scale dairies (those under 500 cows) while mega-operations have ballooned.[7] As of 2022, New Mexico mega-dairies[8] each confine an average of 3,685 cows—20 percent more than just five years earlier—making New Mexico fifth in the nation for average mega-dairy size.[9]

As New Mexico's dairy sector has increasingly concentrated in certain counties and watersheds, so too have the vast quantities of waste CAFOs generate. According to the most recent agricultural census data, New Mexico had 280,066 dairy cows living on mega-dairies, producing 11.5 billion pounds of manure annually—four times as much as the state's human population.[10]

This industrialization of livestock production has led to widespread water pollution. Agriculture is now the nation's leading contributor to water quality impairments in rivers and lakes, with manure responsible for a significant share of that pollution.[11] Decades of research make clear that standard CAFO practices are driving this water pollution crisis. CAFOs store millions of gallons of untreated manure and wastewater in open pits or lagoons, and/or stockpile huge quantities of dry manure, then ultimately dispose of that waste by spreading it onto cropland.[12] In

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[5] Senate Bill 21 (2025). *See also* Draft 20.6.2.7(S)(10) NMAC (incorporating by reference 20.6.4.7(S)(5) NMAC's expanded definition of "surface water").
[6] MacDonald, James M. et al. U.S. Department of Agriculture. Economic Research Service. "Consolidation in U.S. Dairy Farming." Economic Research Service Report No. 274. July 2020 at 11.
[7] *See* Food & Water Watch, *The Urgent Case for a Moratorium on Factory Farms in New Mexico*, 1 (Mar. 2024), available at: https://www.foodandwaterwatch.org/wp-content/uploads/2024/03/1PGR_2403_NMFactoryFarm.pdf.
[8] As used in this comment, the term "mega-dairy" refers to Dairy CAFOs that confine 500 or more cows.
[9] Food & Water Watch, *Factory Farm Nation: New Mexico's Mega-Dairy Problem*, 2 (Sep. 2024), available at https://www.foodandwaterwatch.org/wp-content/uploads/2024/09/FSW_0924_FFMap_NM-1.pdf.
[10] *Id.*
[11] *See* 2017 PETITION at 6–7.
[12] NPDES CAFO Reporting Rule, 76 Fed. Reg. 65,431, 65,433–34 (Oct. 21, 2011); 40 C.F.R. § 412.4.

New Mexico, for instance, current regulations allow dairy CAFOs to collectively generate 8.1 million gallons of wastewater every day—or 2.9 billion gallons a year.[13]

CAFO manure and process wastewater is laden with numerous harmful pollutants that threaten public health, wildlife, and water quality as they make their way into public and private waters both above and below ground.[14] CAFOs discharge pollutants to water through various pathways, including seepage through corrals, waste storage structures, and below land application areas; overflows from waste storage structures; air deposition of volatilized pollutants; and runoff from land application fields and production areas.[15] CAFOs and their pollution are often concentrated in certain regions and watersheds, disproportionately harming environmental justice communities.[16]

Nutrient pollution is one of the primary mechanisms by which CAFOs are contributing to widespread water quality issues and impairments.[17] CAFO waste is high in nitrogen and phosphorous, and when an excess of these pollutants enter waterways via runoff, seepage, deposition, or leachate, the resulting eutrophication chokes surface waters and causes harmful algal blooms to proliferate, posing severe threats to aquatic ecosystems, drinking water sources, and recreation.[18]

In addition to exacerbating nutrient pollution, CAFOs also contribute to the spread of dangerous pathogens.[19] EPA has found that "more than 150 pathogens found in livestock manure are associated with risks to humans, including the six human pathogens that account for more than 90% of food and waterborne diseases."[20] CAFO waste that reaches surface waters or groundwater

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[13] NMED, *Current List of Dairy Permits* (Updated Mar. 2021), available at: https://www.env.nm.gov/gwqb/dairy/.
[14] EPA, LITERATURE REVIEW OF CONTAMINANTS IN LIVESTOCK AND POULTRY MANURE AND IMPLICATIONS FOR WATER QUALITY 2 (July 2013) [hereinafter EPA LITERATURE REVIEW].
[15] SCOTT BRADFORD, U.S. ENV'T PROT. AGENCY, TRANSPORT AND FATE OF NUTRIENTS AND INDICATOR MICROORGANISMS AT A DAIRY LAGOON WATER APPLICATION SITE: AN ASSESSMENT OF NUTRIENT MANAGEMENT PLANS 66 (2011); Michael A. Mallin & & Lawrence B. Cahoon, *Industrialized Animal Production—A Major Source of Nutrient and Microbial Pollution to Aquatic Ecosystems*, 24 POPULATION AND ENV'T 369, 377 (2003); EPA, DRAFT INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2022 5–12, https://perma.cc/UX33-BZLQ (discussing deposition of volatilized nitrous oxide); *see also* THOMAS HARTER ET AL., NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS, ASSESSING POTENTIAL IMPACTS OF LIVESTOCK MANAGEMENT ON GROUNDWATER 4–7 (2014) (charting studies that documented leaching from CAFO corrals and feedlot surfaces, manure lagoons, and land application areas).
[16] *See* Food & Water Watch, *Re: Detailed Study of Concentrated Animal Feeding Operations Point Source Category*, 5 note 6 (June 13, 2025) [hereinafter "CAFO ELG MEMORANDUM"], attached hereto as Exhibit 2. (collecting research and evidence documenting the environmental injustice of CAFO pollution).
[17] *See* GOV'T ACCOUNTABILITY OFFICE, CONCENTRATED ANIMAL FEEDING OPERATIONS: EPA NEEDS MORE INFORMATION AND A CLEARLY DEFINED STRATEGY TO PROTECT AIR AND WATER QUALITY FROM POLLUTANTS OF CONCERN 24–27 (2008) (describing several studies that found degradation caused by CAFO nutrient pollution).
[18] *See* CAFO ELG MEMORANDUM at 6–8.
[19] GOV'T ACCOUNTABILITY OFFICE at 24–28 (describing studies establishing links between CAFOs and exposure to hazardous bacteria and bacterial components such as *E. coli*, *campylobacter*, and endotoxin); EPA LITERATURE REVIEW at 58–63 (listing confirmed and suspected outbreaks associated with manure and describing contamination pathways).
[20] National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs), 68 Fed. Reg. 7176, 7236 (Feb. 12, 2003).

therefore increases the risk of pathogen transmission to animals and humans in the surrounding environment.[21]

Further, feed additives used to promote animal growth and prevent disease, including medically important antibiotics, heavy metals, and hormones, are excreted in animal waste and can similarly wreak havoc on public health and the environment. EPA has found that 80 to 90 percent of administered antibiotics and heavy metals added to feed end up in animal waste, as do large quantities of natural and synthetic hormones.[22] When disposed of, this waste can cause antibiotic-resistant bacteria to proliferate in waterways and result in hormone-induced damage to endocrine and reproductive systems of aquatic species and humans.[23]

B. EPA Clean Water Act Regulation of CAFOs Has Proven Woefully Inadequate

EPA acknowledges its CAFO regulations are inadequate. More than a decade ago, EPA conceded that "despite more than 35 years of regulating CAFOs, reports of water quality impacts from large animal feeding operations persist." 76 Fed. Reg. at 65,434. This regulatory failure can be attributed to two critical flaws in the federal CAFO program: (1) the majority of CAFOs discharge yet evade permit coverage, and (2) the CAFO permits that do exist do not effectively control discharges.

1. Federal Rules Allow CAFOs to Evade Permit Coverage

EPA admits "[m]any CAFOs are not regulated and continue to discharge without NPDES permits" because its "regulations contain definitions, thresholds and limitations that make it difficult to compel permit coverage."[24] In other words, the CAFO under-permitting problem persists not just in spite of EPA regulations, but *because* of them. The Agency further acknowledges that "while many waters are affected by pollutants from CAFOs, many CAFOs often claim that they do not discharge, and EPA and state permitting agencies lack the resources to regularly inspect these facilities to assess these claims."[25] Indeed, although EPA estimates 75 percent of CAFOs discharge due to their "standard operational profiles,"[26] only about 30 percent of CAFOs are currently permitted.[27] This problem is even more stark in New Mexico, where just 12 percent of CAFOs currently hold Clean Water Act permits.[28]

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[21] *See* CAFO ELG MEMORANDUM at 8–9.
[22] *See* 2017 PETITION at 9.
[23] CAFO ELG MEMORANDUM at 9–11.
[24] EPA, *EPA Legal Tools to Advance Environmental Justice*, 75 (May 2022), available at: https://www.epa.gov/system/files/documents/2022-05/EJ%20Legal%20Tools%20May%202022%20FINAL.pdf [hereinafter EPA ENVIRONMENTAL JUSTICE REPORT].
[25] *Id.*
[26] Revised National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines for Concentrated Animal Feeding Operations in Response to the Waterkeeper Decision, 73 Fed. Reg. 70,418, 70,469 (Nov. 20, 2008).
[27] *See* EPA, *NPDES CAFO Permitting Status Report: National Summary, Endyear 2024* (Jul. 18, 2025), available at: https://www.epa.gov/system/files/documents/2025-09/cafo-status-report-2024.pdf.
[28] *Id.*

A fundamental flaw in federal regulation contributing to this under-permitting problem is EPA's expansive interpretation of the Clean Water Act's agricultural stormwater exemption, which exempts a large swath of land-application-related discharges from regulation. The Clean Water Act specifically excludes "agricultural stormwater" from the definition of a point source,[29] but does not define the term, leaving EPA some discretion to interpret the exemption's scope. Despite the express *inclusion* of CAFOs in the statutory definition of point source, EPA has adopted a questionably expansive interpretation, defining "agricultural stormwater discharge" as "a precipitation-related discharge of manure, litter, or process waste water from land areas under the control of a CAFO" where such materials have been applied "in accordance with site specific nutrient management practices."[30] Under EPA's regulatory scheme, therefore, if a CAFO's land application of waste complies with its nutrient management plan (NMP), any discharges associated with precipitation are exempt from Clean Water Act permitting requirements.

In practice, EPA's rules allow operators to easily write off any and all discharges as exempt agricultural stormwater. When EPA promulgated its interpretation of agricultural stormwater, it acknowledged the provision would open the door to rampant permit avoidance unless it took measures to prevent such abuses, like imposing a universal permitting requirement.[31] After the universal permitting provision was ultimately stricken from EPA's CAFO rules,[32] the standalone exemption became the very permitting loophole the agency feared.

That is because EPA's current interpretation of agricultural stormwater has made it virtually impossible for EPA and state regulators to confirm that discharges are actually caused by precipitation events. The rules impose minimal requirements before a CAFO can avail itself of this blanket exemption from regulation. Unpermitted Large CAFOs must simply maintain on-site documentation demonstrating that they are implementing an NMP and make documentation available to regulators upon request.[33] These NMPs are never otherwise submitted or independently verified.[34] In fact, there is no federal requirement that regulators exercise any oversight over unpermitted CAFOs' waste management at any point. Permitted CAFOs avail themselves of the exemption similarly. Although permitted CAFOs submit their NMPs to regulators, they do not have to report agricultural stormwater discharges when they occur or as part of their annual reports.[35] The outcome for either scenario is the same: the CAFO operator may

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[29] 33 U.S.C. § 1362(14).
[30] 40 C.F.R. § 122.23(e).
[31] National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 3031 (Jan. 12, 2001) (concluding universal permitting was "the only way to ensure that all nonagricultural, and therefore point source, discharges from CAFOs are permitted . . .").
[32] *See Waterkeeper Alliance Inc. v. EPA*, 399 F.3d 486, 506–7 (2d Cir. 2005).
[33] 40 C.F.R. § 122.23(e)(2).
[34] *Id.*
[35] 40 C.F.R. §§ 122.42(e)(2), (e)(4).

"claim" the agricultural stormwater exemption by simply doing nothing,[36] and there is no way for regulators to know whether a discharge occurred at all, much less whether it was in fact unlawful.

2. Current Federal Rules Fail to Ensure CAFO Permits Protect Water Quality

Further, EPA concedes that even when CAFOs are permitted, EPA's standards fail to effectively "limit the discharge of pollutants under certain circumstances" and do not allow EPA to "enforce requirements even when discharges have been established."[37] EPA's current permitting standards fail to protect waterways for numerous reasons, chief among them being that NMPs—the primary pollution control practice prescribed by EPA regulations—fail to effectively minimize nutrient loss.[38] EPA has acknowledged that "[r]ecommended manure application rates are agronomic rather than water quality based,"[39] which means "[e]ven if CAFOs were to comply with their NMPs, their standards are insufficient. NMP standards are set by each state, and states typically rely on USDA standards, which focus on maximizing crop growth, rather than on preventing excess nutrient runoff."[40] Nonetheless, EPA's regulations remain premised on the outdated expectation that this agronomic approach will enable operations to minimize nutrient loss and comply with effluent limitations.[41]

The federal regulations also entirely ignore numerous CAFO pollutants of concern. Current CAFO effluent guidelines are based on the fundamental misconception that CAFO waste is comprised solely of manure, which has led EPA to regulate only fecal coliform and manure nutrients that naturally occur in the waste and to disregard numerous other contaminants found in CAFO waste streams—including heavy metals, pharmaceuticals, cleaning products, and synthetic hormones—all of which meet the Clean Water Act and New Mexico States's broad definition of "pollutant."[42]

Further, EPA rules allow CAFOs to engage in numerous practices known to cause discharges and harm water quality. High-risk practices currently allowed by EPA that contribute to water quality degradation include:

(1) Manure storage in unlined and inadequately lined lagoons and impoundments;
(2) Ventilation of pollutants near waters or conduits to jurisdictional waters;
(3) Application of CAFO waste on frozen, saturated, or snow-covered ground;

[36] *Id.* § 122.23(e).
[37] EPA ENVIRONMENTAL JUSTICE REPORT at 75.
[38] *See* CAFO ELG MEMORANDUM at 16–21.
[39] EPA, *Concentrated Animal Feeding Operations: An Overview of the NPDES CAFO Program Mostly by the Numbers*, 27 (Jun. 2019).
[40] EPA, *Concentrated Animal Feeding Operations: A Primer on the Federal Program*, 18 (Dec. 2021).
[41] *See* 2017 PETITION at 42–45.
[42] EPA regulates the various heavy metals used by CAFOs as feed additives as priority pollutants in other contexts. *See* 400 C.F.R. § 423, App. A. Additionally, pharmaceuticals and synthetic hormones added to livestock feed and excreted in livestock waste are clearly "biological materials" and "chemical wastes." 33 U.S.C. § 1362(6); see also *Nat'l Cotton Council of Am. v. EPA*, 553 F.3d 927, 935–938 (6th Cir. 2009) (explicating the broad scope of the terms "biological materials" and "chemical wastes."). *See also* NMSA § 74-6-2(B)–(C); Draft NMPDES Rule § 20.6.5.7(M).

(4) Application of CAFO waste via spray irrigation equipment;
(5) Application of CAFO waste on steep slopes
(6) Manure storage in exposed stockpiles; and
(7) Lagoon design standards based on outdated weather and storm frequency data.[43]

Though EPA recognizes these practices to be high risk, rather than prohibiting them by regulation, it has instead urged states to do so themselves.[44] New Mexico must take this opportunity to do so.

Another critical flaw in EPA's regulations is that they fail to ensure CAFOs are not discharging to jurisdictional surface waters via hydrologically connected groundwater. Under the Clean Water Act, a CAFO is liable for discharges of "pollutants that reach navigable waters after traveling through groundwater if [those] discharge[s] [are] the functional equivalent of a direct discharge from the point source into navigable waters."[45] Thus, if a CAFO has subsurface discharges into a jurisdictional water from its lagoons, it violates the zero-discharge effluent limitation for production areas.[46] Likewise, if CAFO waste applied to fields excessively leaches into hydrologically connected groundwaters, the CAFO violates the minimize standard for land application areas.[47] Federal regulation, however, is completely silent on this subsurface discharge pathway.

Over twenty years ago, EPA acknowledged groundwater contaminated by CAFO pollutants is a "significant transport mechanism" for surface water discharges due to the prevalence of hydrologic connections.[48] This is particularly true for New Mexico, where "groundwater and surface water systems are intimately connected,"[49] and the State's mega-dairies have been major contributors to groundwater contamination.[50] In New Mexico, groundwater is "vital to the health of aquatic, riparian, and wetland ecosystems."[51] Indeed, EPA-sponsored research has demonstrated 60 percent of the New Mexico watersheds studied receive at least one-half of their total annual flow from groundwater sources."[52]

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[43] *See* 2017 PETITION at 46–55.
[44] *See e.g.*, EPA, *NPDES Permit Writers' Manual for Concentrated Animal Feeding Operations*, 4-36, 5-29, 5-30, 6-15–6-16 (Feb. 2012) available at: https://www.epa.gov/sites/default/files/2015-10/documents/cafo_permitmanual_entire.pdf.
[45] *Cnty. of Maui v. Hawaii Wildlife Fund*, 590 U.S. 165, 185 (2020).
[46] 40 C.F.R. § 412.31(a).
[47] *Id.* at § 412.4(c)(1).
[48] 66 Fed. Reg. at 2980; EPA, RISK ASSESSMENT EVALUATION FOR CONCENTRATED ANIMAL FEEDING OPERATIONS 52–53 (May 2004).
[49] New Mexico Bureau of Geology & Mineral Resources, *Groundwater in New Mexico: Our Precious Shared Resource*, available at: https://nmt.maps.arcgis.com/apps/Cascade/index.html?appid=6be697576378473593115c22795593f0.
[50] *See* 20.6.6 NMAC; John Burnett, *New Mexico Dairy Pollution Sparks 'Manure War'*, NPR (Dec. 9, 2009).
[51] Cadmus Group, Inc. (U.S. EPA Contract Number EP-C-08-002), *Evaluation of Hydrologic Alteration and Opportunities for Environmental Flow Management in New Mexico*, 37 (Oct. 2011), available at: https://www.nmlegis.gov/handouts/WNR%20110711%20Item%200%20NM%20Hydrologic%20Study--Steam%20Flow--Rio%20Grande%20Restoration.pdf.
[52] *Id.*

Together, these glaring deficiencies in current federal regulations render them a wholly unsuitable model for New Mexico.

C. NMED's Surface Water Permitting Rules Should Impose CAFO Standards That Far Exceed the Federal Baseline and Ensure All Discharging CAFOs are Subject to Protective Permits

As NMED works to build out its surface water permitting program, it has a unique opportunity to correct the fundamental flaws plaguing federal regulation of CAFO water pollution, and create strong rules that ensure all discharging CAFOs obtain permits that are actually protective of surface waters. However, as currently proposed, NMED's draft Surface Water Permitting Rules only sparingly reference CAFOs as a point source capable of regulation under the program and otherwise provide no substantive check on the point source category aside from incorporating federal CAFO regulations by reference.[53] New Mexico can and should do more to protect state waters from this major pollution source.

The Clean Water Act expressly empowers state regulators to create a NMPDES program for CAFOs that imposes more stringent permit standards than the federal floor created by EPA regulation.[54] State law also provides clear supplemental authority for more stringent regulation.[55] Given the clear deficiencies in EPA rules discussed above, NMED should take full advantage of its authority and create CAFO-specific permit regulations that, at minimum, address all pollutants of concern present in CAFO waste and all pathways in which these pollutants are discharged, and impose strong pollution control practices to restrict and ultimately eliminate the discharge of those pollutants.

Additionally, NMED should eliminate permitting loopholes present in federal regulation so that all discharging CAFOs are covered by permits. For instance, Wisconsin—another major dairy-producing state—has done so by imposing a universal permitting requirement on all Large CAFOs in recognition of their outsized polluting impact on surface and groundwater quality.[56] Based on their review of the current science, Wisconsin regulators adopted a presumption that "all Large CAFOs that land apply manure or process wastewater or that have storage structures at or below grade have actual discharges," and thus require permit coverage.[57] Regulators also narrowed the

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[53] *See* Draft §§ 20.6.2.7(P) and 20.6.2.2305; Draft §§ NMPDES Rule at §§ 20.6.5.7(K), 20.6.5.201(A)(2) and 20.6.5.407(A)(1)(a).
[54] *See* 33 U.S.C § 1342(b) (requiring that state programs impose standards at least as stringent as those of the federal program); 33 U.S.C. § 1370 ("nothing in this chapter shall preclude or deny the right of any State . . . to adopt or enforce any standard or limitation respecting discharges of pollutants . . . except . . . such State [] may not adopt or enforce any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance which is less stringent than [federal law]").
[55] NMSA § 74-6-2–74-6-4 (as amended by S.B. 21 (2025)) (providing additional state law authority to expand surface water program coverage to additional waters of the State).
[56] *See* Wis. Admin. Code § NR 243.11(3) (requiring Large CAFOs that store manure or process wastewater at or below grade or land applies manure or process wastewater to have a WPDES permit).
[57] *Wisconsin Dairy Alliance Inc. and Venture Dairy Cooperative v. Wisconsin DNR*, Appeal No. 2024-AP-458, 2025 Wisc. App. LEXIS 784, at *9 (Wis. Ct. of Appeals, Aug. 27, 2025).

definition of "agricultural stormwater discharge" so that Large CAFOs could only qualify for the exemption if they were subject to a Clean Water Act permit.[58] Both rules have been upheld in state court.[59] New Mexico should follow suit.

To aid NMED in its rulemaking process, Food & Water Watch submits the attached Exhibits, which outline a regulatory roadmap the State can follow to improve CAFO permitting coverage and efficacy.

Thank you for your consideration,

Emily Miller

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[58] Wis. Admin. Code § NR 243.03(2).
[59] *Wisconsin Dairy Alliance Inc.*, 2025 Wisc. App. LEXIS 784 at *16-18, *21-25 (affirming Wisconsin DNR's authority under the Clean Water Act and State law to require universal permitting and upholding state regulatory definition of agricultural stormwater).

EXHIBIT 1

BEFORE THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

FOOD & WATER WATCH, ARKANSAS RIGHTS KOALITION, ASSATEAGUE COASTAL TRUST (MARYLAND), ASSOCIATION OF IRRITATED RESIDENTS (CALIFORNIA), BUFFALO RIVER WATERSHED ALLIANCE (ARKANSAS), CENTER FOR BIOLOGICAL DIVERSITY, CENTER FOR FOOD SAFETY, CONCERNED CITIZENS AGAINST INDUSTRIAL CAFOS (MARYLAND), DAKOTA RURAL ACTION (SOUTH DAKOTA), DALLAS COUNTY FARMERS AND NEIGHBORS (IOWA), DES MOINES WATER WORKS (IOWA), DODGE COUNTY CONCERNED CITIZENS (MINNESOTA), DON'T WASTE ARIZONA, THE ENVIRONMENTAL INTEGRITY PROJECT, GRAND RIVERKEEPER (OKLAHOMA), HELPING OTHERS MAINTAIN ENVIRONMENTAL STANDARDS (ILLINOIS), ILLINOIS CITIZENS FOR CLEAN AIR & WATER, INSTITUTE FOR AGRICULTURE AND TRADE POLICY, INTERFAITH WORKER JUSTICE (NEW MEXICO), IOWA CITIZENS FOR COMMUNITY IMPROVEMENT, JEFFERSON COUNTY FARMERS & NEIGHBORS (IOWA), JOHNS HOPKINS CENTER FOR A LIVABLE FUTURE, KEWAUNEE CITIZENS ADVOCATING RESPONSIBLE ENVIRONMENTAL STEWARDSHIP (WISCONSIN), LAND STEWARDSHIP PROJECT (MINNESOTA), MIDWEST ENVIRONMENTAL ADVOCATES (WISCONSIN), MISSOURI RURAL CRISIS CENTER, MOMS ACROSS AMERICA EASTERN SHORE CHAPTER (MARYLAND), MONTGOMERY TOWNSHIP FRIENDS OF FAMILY FARMS (PENNSYLVANIA), NORTH CAROLINA ENVIRONMENTAL JUSTICE NETWORK, OZARK RIVER STEWARDS (ARKANSAS), PATUXENT RIVERKEEPER (MARYLAND), POWESHIEK COMMUNITY ACTION TO RESTORE ENVIRONMENTAL STEWARDSHIP (IOWA), PRESERVE OUR SHORE ACCOMACK COUNTY (VIRGINIA), AND RIO VALLE CONCERNED CITIZENS (NEW MEXICO),

Petitioners,

v.

SCOTT PRUITT, ADMINISTRATOR,
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

PETITION TO REVISE THE CLEAN WATER ACT REGULATIONS FOR CONCENTRATED ANIMAL FEEDING OPERATIONS

TABLE OF CONTENTS

I. INTRODUCTION

The goal of the Clean Water Act (CWA or Act) is to eliminate the discharge of pollutants into waterways.[1] As one way of making progress toward that goal, the Act generally instructs the Environmental Protection Agency (EPA) to regulate polluters by identifying, and requiring the use of, state-of-the-art pollution-control technology for each industry. EPA has made significant strides in meeting its CWA mandate to regulate point source pollution from most industrial and municipal sources. However, the Agency has made very little progress in its efforts to regulate pollution from concentrated animal feeding operations (CAFOs). As a result, the agricultural sector, including CAFOs, remains largely unregulated and is now the nation's leading source of water quality impairments.[2] The Agency's current CAFO regulations are plainly not up to the task of protecting our waterways from industrial livestock operations.

EPA has attempted to improve its CAFO regulatory scheme over the past fifteen years, but has been largely unsuccessful, in part due to adverse judicial decisions, and in part due to the Agency's failure to craft strong regulations. Court challenges to EPA's rules are responsible for some of EPA's setbacks; the *Waterkeeper Alliance* and *National Pork Producers Council* decisions limited the universe of CAFOs required to obtain CWA permits under EPA's current regulatory approach. Yet the core elements of CAFO permits established in EPA's 2003 CAFO rule are also inadequate, and are still in effect. The current regulations fail to require water monitoring, do not prohibit practices known to harm water quality, generally ignore numerous pollutants of concern, place critical decisions about waste management in the hands of state agencies, and exempt most chronic CAFO discharges from permit requirements through an unreasonably broad reading of the agricultural stormwater exemption.[3] In short, the existing regulations are far too weak, and do not apply to enough of the industry, to protect water quality.

EPA must take further action to fulfill its CWA obligations, and the Agency's 2003 and 2008 rulemaking attempts do not in any way lessen this duty. EPA maintains clear authority to strengthen its approach to CAFO regulation in numerous ways, and has amassed a large volume of new information about CAFO pollution since it put forth the 2001 proposal that largely shaped the current regulations. This petition lays out a regulatory course of action for EPA to better use its authority to control CAFO pollution and further the objectives of the Act.

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[1] 33 U.S.C. § 1251(a)(1).

[2] National Pollutant Discharge Elimination System Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations, 68 Fed. Reg. 7179, 7237 (Feb. 12, 2003) (codified at 40 C.F.R. pts. 9, 122, 123, 412) [hereinafter 2003 CAFO Rule].

[3] *Id.* § 122.23(e). This exemption excludes "agricultural stormwater discharge" from the definition of "point source" though the former term is not defined in the Act. 42 U.S.C. § 1362(14).

Food & Water Watch, Arkansas Rights Koalition, Assateague Coastal Trust (Maryland), Association of Irritated Residents (California), Buffalo River Watershed Alliance (Arkansas), Center for Biological Diversity, Center for Food Safety, Concerned Citizens Against Industrial CAFOs (Maryland), Dakota Rural Action (South Dakota), Dallas County Farmers and Neighbors (Iowa), Des Moines Water Works (Iowa), Dodge County Concerned Citizens (Minnesota), Don't Waste Arizona, the Environmental Integrity Project, Grand Riverkeeper (Oklahoma), Helping Others Maintain Environmental Standards (Illinois), Illinois Citizens for Clean Air & Water, Institute for Agriculture and Trade Policy, Interfaith Worker Justice (New Mexico), Iowa Citizens for Community Improvement, Jefferson County Farmers & Neighbors (Iowa), Johns Hopkins Center for a Livable Future, Kewaunee Citizens Advocating Responsible Environmental Stewardship (Wisconsin), Land Stewardship Project (Minnesota), Midwest Environmental Advocates (Wisconsin), Missouri Rural Crisis Center, Moms Across America Eastern Shore Chapter (Maryland), Montgomery Township Friends of Family Farms (Pennsylvania), North Carolina Environmental Justice Network, Ozark River Stewards (Arkansas), Patuxent Riverkeeper (Maryland), Poweshiek Community Action to Restore Environmental Stewardship (Iowa), Preserve Our Shore Accomack County (Virginia), and Rio Valle Concerned Citizens (New Mexico) (collectively, Petitioners) hereby petition EPA to promulgate new CAFO regulations pursuant to the Administrative Procedure Act (APA), 5 U.S.C. § 551 et seq., and the CWA, 33 U.S.C. § 1251 et seq. The Petitioners collectively represent millions of citizens from across the United States, including many individuals adversely impacted by CAFO water pollution in their communities.

A. Legal Background

a. Citizens' Right to Petition and EPA's Duty to Respond

The citizen right to petition the government originates in the First Amendment,[4] and is codified and applied to federal agency regulations through the APA's requirement that "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule."[5] The APA also imposes an affirmative obligation on EPA to timely respond to this petition, by requiring that "[w]ith due regard for the convenience and necessity of the parties or their representatives and within a reasonable time, each agency shall proceed to conclude a matter presented to it."[6] In the event EPA seeks to deny the petition in whole or in part, it must provide "[p]rompt notice" to the petitioners.[7]

The APA further grants a right of judicial review to "[a] person suffering legal wrong

[4] U.S. Const. amend. I ("Congress shall make no law . . . abridging . . . the right of the people . . . to petition the Government for a redress of grievances").
[5] 5 U.S.C. § 553(e).
[6] *Id*. § 555(b).
[7] *Id*. § 555(e).

because of agency action, or adversely affected or aggrieved by agency action,"[8] which is defined to include the "failure to act."[9] In the event EPA fails to timely respond or improperly denies the petition in whole or part, courts "shall compel agency action unlawfully withheld or unreasonably delayed,"[10] and "hold unlawful and set aside agency action, findings, and conclusions found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."[11]

b. EPA's Duty to Regulate CAFOs under the Clean Water Act

The CWA's objective is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" by eliminating discharges of pollutants into navigable waters.[12] The National Pollutant Discharge Elimination System (NPDES) permitting program is the primary pollution control mechanism available to EPA and the states to regulate point source discharges."[13] When Congress specifically included "concentrated animal feeding operations" in the CWA's definition of "point source,"[14] it demonstrated unambiguous intent to control and continuously reduce discharges of pollution from the CAFO industry through the NPDES program. Developing and implementing effective CAFO NPDES regulations is therefore one of EPA's clearest CWA obligations.

These regulations must ensure that the entire universe of discharging CAFOs is required to obtain NPDES permits, and that those permits will impose adequate conditions to track and restrict the industry's pollution. The CWA requires EPA to meet certain criteria when establishing the permit requirements for a discharging industry. EPA imposes NPDES permit requirements through the development of national Effluent Limitation Guidelines (ELGs) for industrial source categories. ELGs establish the pollution control levels that industries and facilities must achieve for various types of pollutants, and must be based on several technology-based standards for different categories of pollutants.

Existing facilities are subject to: best available technology economically achievable (BAT) for priority and nonconventional pollutants, which include nitrogen, phosphorus, metals, and pharmaceuticals; best conventional pollutant control technology (BCT) for conventional pollutants, which include fecal coliform, biochemical oxygen demand, pH, oil and grease, and total suspended solids; and best practicable control technology currently available (BPT) for all

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[8] *Id*. § 702.
[9] *Id*. § 551(13).
[10] *Id*. § 706(1).
[11] *Id*. § 706(2)(A).
[12] 33 U.S.C. § 1251(a).
[13] *Id*. § 1342.
[14] *Id*. § 1362(14).

pollutants. New sources are subject to more stringent new source performance standards (NSPS) for all pollutants, based on the best available demonstrated control technology (BADT).[15]

EPA must consider various criteria when deriving each standard. BAT must take into account, *inter alia*, facility age, cost of achieving pollution reduction, and non-water quality environmental impacts. BCT must also take these factors into account, but in addition to the requirements that technologies be both available and economically achievable, EPA must consider the reasonableness of the relationship between a technology's cost and the pollution reductions achieved.[16] New source performance standards must "reflect[] the greatest degree of effluent reduction which the Administrator determines to be achievable . . . including, where practicable, a standard permitting no discharge of pollutants."[17]

Such technology-based effluent limitations (TBELs) afford the *minimum* level of water quality protection required by the CWA,[18] and permits must establish such limits for all pollutants present in a discharge.[19] EPA has made clear that state permit writers must address pollutants omitted from federal ELGs by including best professional judgment (BPJ) limits on a case-by-case basis,[20] yet state CAFO permits typically do not control metals, pharmaceuticals, or other pollutants of concern with BPJ limits. EPA has authority to remedy this by including controls for the full suite of CAFO pollutants in its CAFO ELGs.

EPA must annually review, and if appropriate, revise, its ELGs for each source category.[21] In its Final 2014 Effluent Guidelines Program Plan, the most recent final plan at the time of filing, EPA excluded the CAFO point source category from review altogether because it

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[15] *Id*. §§ 1311(b)(2)(A), 1314(b)(4)(A), 1314(b)(1)(A), 1316.
[16] *Id*. §§ 1314(b)(2)(B), 1314(b)(4)(B); Revised National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines for Concentrated Animal Feeding Operations in Response to the Waterkeeper Decision, 73 Fed. Reg. 70418, 70463 (Nov. 20, 2008) [hereinafter 2008 CAFO Rule].
[17] 33 U.S.C. § 1316(a)(1).
[18] 40 C.F.R. § 122.44 ("[E]ach NPDES permit shall include conditions meeting the following requirements . . . Technology-based effluent limitations and standards based on: effluent limitations and standards promulgated under section 301 of the CWA, or new source performance standards promulgated under section 306 of CWA, on [sic] case-by-case effluent limitations determined under section 402(a)(1) of CWA, or a combination of the three, in accordance with § 125.3 of this chapter"); 40 C.F.R. § 125.3 ("Technology-based treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a permit issued under section 402 of the Act").
[19] 40 C.F.R. § 125.3(a)(2), requiring permits to contain technology-based limits for "conventional pollutants," "all toxic pollutants," and "all pollutants which are neither toxic nor conventional pollutants."
[20] *See* 33 U.S.C. § 1311(b)(2)(A); 40 C.F.R. § 125.3(c)-(d); James A. Hanlon, Director, EPA Office of Wastewater Management, *National Pollutant Discharge Elimination System (NPDES) Permitting of Wastewater Discharges from Flue Gas Desulfurization (FGD) and Coal Combustion Residuals (CCR) Impoundments at Steam Electric Power Plants*, Attachment A 1-2 (Jun. 7, 2010) [hereinafter Hanlon BPJ Memo]. Although this Memorandum discussed coal plant discharge limits, the statutory requirement to establish technology-based limits using BPJ is equally applicable across industries.
[21] 33 U.S.C. §§ 1311(e) (requiring that effluent limits be applied to all point sources of discharge of pollutants); 1314(b) (EPA must revise such regulations, at least annually if appropriate). *See also* 33 U.S.C. § 1311(d) (requiring EPA to review, and if appropriate revise, BAT limits every five years). Effluent limitations include "any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters." 33 U.S.C. § 1362.

had revised the CAFO ELGs within the past seven years.[22] In its 2015 Annual Review, EPA determined that the CAFO category was not an ELG priority and that ELG revisions are not warranted, and consequently did not propose any review of the CAFO ELGs in the 2016 draft Program Plan.[23] Yet the condition of America's waterways undeniably demonstrates that the current ELGs are not adequate. When EPA completes its 2016 Program Plan, the November 20, 2008 rule will have been in effect for more than seven years, and EPA must review and revise its CAFO NPDES regulations and ELGs without further delay.[24]

B. Factual Background

The continued growth, consolidation, and increase in operational scale in the CAFO industry over the past several decades, along with growing evidence of the industry's widespread contamination of waterways, demonstrates that EPA's CAFO regulations are inadequate to control CAFO discharges to the extent required under the CWA. Due to the absence of adequate federal and state oversight, CAFOs have become a significant source of water pollution across the U.S.

a. Growth and Consolidation in Animal Production

Animal production has changed dramatically over the last several decades, with a strong trend toward larger facilities and regional concentration of livestock and poultry operations.[25] A majority of animals are now raised in confinement, and may be transferred between several industrial-scale facilities at different stages of their growth.[26] While the total number of livestock

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[22] EPA, Final 2014 Effluent Guidelines Program Plan Sec. 3.2.1, T. 3-1 ("In general, EPA removed an industrial point source category from further consideration during a review cycle if EPA established, revised, or reviewed the category's ELGs within seven years prior to the annual reviews") (July 2015), https://www.epa.gov/sites/production/files/2015-09/documents/final-2014-effluent-guidelines-program-plan_july-2015.pdf.

[23] EPA, Preliminary 2016 Effluent Guidelines Program Plan Sec. 10-1 (June 2016), https://www.epa.gov/sites/production/files/2016-06/documents/prelim-2016-eg-plan_june-2016.pdf. This determination is hard to reconcile with EPA's continued listing of CAFOs as one of its water "enforcement priorities," with the goals of using innovative monitoring and pollution control technologies to reduce CAFO water pollution impacts. *See* EPA, National Enforcement Initiative: Preventing Animal Waste from Contaminating Surface and Ground Water, https://www.epa.gov/enforcement/national-enforcement-initiative-preventing-animal-waste-contaminating-surface-and-ground (last visited Feb. 10, 2017).

[24] In fact, EPA has not undergone a comprehensive review of the CAFO regulations since 2003, when it proposed substantive changes to the CAFO regulations. Aside from affirmatively finding that the BCT limitations in the 2003 rule represent BCT for fecal coliform, the 2008 rule did not revisit the technology-based effluent limits for CAFO pollutants, nor did the minor amendments published without notice and comment in 2012.

[25] Claudia Copeland, *Animal Waste and Hazardous Substances: Current Laws and Legislative Issues*, CRS Report RL33691 1 (Nov. 8, 2011) [hereinafter *Animal Waste and Hazardous Substances*], https://fas.org/sgp/crs/misc/RL33691.pdf.

[26] EPA, *Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality*, EPA 820-R-13-002 5 (July 2013) [hereinafter EPA Literature Review],

animals raised has grown, the number of farms has declined substantially.[27] In fact, since the 1950s the production of livestock and poultry in the U.S. has more than doubled, while the number of operations has decreased by 80%.[28] As a result of this growth, factory farm livestock produced an estimated thirteen times as much waste as the entire U.S. population in 2012.[29]

CAFOs and entire livestock sectors are also increasingly concentrated in certain watersheds and areas of the country, which has increased water quality risks as waste production surpasses land available for disposal. The Government Accountability Office has analyzed this trend, finding that EPA's approach to CAFO regulation under the CWA has been under-protective of water quality, and has allowed CAFO manure generation to surpass cropland in some regions, leading to contamination of surface and ground waters in counties with insufficient cropland to agronomically utilize manure nutrients.[30] Reviewing this trend towards consolidation of manure nutrient production nationwide, the U.S. Department of Agriculture similarly found dramatic increases in manure nutrients relative to the ability of cropland to utilize them between 1982 and 1997.[31]

b. CAFO Water Pollution Impacts

Standard CAFO operation and waste disposal practices have led to widespread water pollution. Numerous studies identify agriculture as the nation's leading contributor to water quality impairments in rivers and lakes, with manure responsible for a significant share of that

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https://www.scribd.com/document/214717740/Literature-Review-of-Contaminants-in-Livestock-and-Poultry-Manure-and-Implications-for-Water-Quality.

[27] *Id*. at 1. For example, the number of dairy farms fell by about 40% between 1999 and 2008, but during the same period, the number of dairy cows decreased by only 16%, while total milk production increased by 18%. John C. Becker & John H. Howard, *A Historical View of the Solutions Offered to Regulate Concentrate Animal Feeding Operations under the Clean Water Act: What Has Been Learned*, 3 Ky. J. Equine Agric. & Nat. Res. L. 71, 75 (2010). Similarly, between 1994 and 2001 the number of hog farms in the U.S. decreased by approximately 120,000 while the number of hogs remained relatively stable. Susan M. Brehm, *From Red Barn to Facility: Changing Environmental Liability to Fit the Changing Structure of Livestock Production*, 93 Cal. L. Rev. 797, 801 (2005). The poultry market peaked even earlier, with the number of broiler chicken farms dropping 35% between 1969 and 1992, while the number of chickens produced tripled. John Marks, *Regulating Agricultural Pollution in Georgia: Recent Trends and the Debate over Integrator Liability*, 18 Ga. State Univ. L. Rev. 1031, 1035 (2002).

[28] EPA Literature Review at 1.

[29] EPA, National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, Proposed Rule, 76 Fed. Reg. 65431, 65433 (Oct. 21, 2011) [hereinafter Proposed CAFO Reporting Rule]; Food & Water Watch, *Factory Farm Nation 2015 Edition* 3 (2015) [hereinafter *Factory Farm Nation*], http://www.foodandwaterwatch.org/sites/default/files/factory-farm-nation-report-may-2015.pdf.

[30] GAO, *Concentrated Animal Feeding Operations: EPA Needs More Information and a Clearly Defined Strategy to Protect Air and Water Quality from Pollutants of Concern* 21-22 (2008), http://www.gao.gov/assets/290/280229.pdf [hereinafter GAO CAFO Report]. *See also Animal Waste and Hazardous Substances* at 1 (noting that in 1997 USDA estimated that 66,000 operations had nitrogen in excess of the "assimilative capacity of the soil," while 89,000 operations had a similar excess in phosphorous).

[31] Robert L. Kellogg, et al., *Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients: Spatial and Temporal Trends for the U.S.*, USDA Pub. No. nps00-0579 75 (2000), http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_012133.pdf. This does not address other manure pollutants that are not agronomically valuable in any quantity.

pollution.[32] Twenty–nine states have specifically identified AFOs as contributing to their water quality impairments,[33] and states with high concentrations of CAFOs "experience on average 20 to 30 serious water quality problems per year as a result of manure management problems."[34] EPA has acknowledged that "[w]ater quality impacts from CAFOs may be due, in part, to inadequate compliance with existing regulations or to limitations in CAFO permitting programs."[35]

Surface water pollution from CAFOs occurs through two major pathways—production areas and land application fields. Spills, runoff, and other unintentional discharges may occur from numerous parts of a CAFO production area, such as manure lagoons, pits, or stockpiles, feed storage areas, livestock confinement ventilation fans, and mortality management areas. A number of factors, including poor facility design, equipment failure, operator error, and extreme weather events, lead to discharges. Operators may also cause releases intentionally if inadequate storage, poor planning, or rainfall accumulation results in overly full waste impoundments.[36]

Surface water pollution from CAFO production areas in various livestock sectors is widespread and has impacted waterways across the country. Hundreds of documented overflows and catastrophic failures of manure storage systems have resulted in large discharges, which in turn have caused toxic stream conditions and large fish kills in numerous states, including Iowa, Wisconsin, Minnesota, Michigan, Missouri, Illinois, New York, Virginia, and North Carolina.[37] In addition, earthen lagoons, and even most lined lagoons, are not designed to retain all wastewater. These storage systems are designed to allow seepage and/or leaking of manure into groundwater, which can lead to jurisdictional discharges into nearby surface waters.[38] Even deep

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[32] David Osterberg and David Wallinga, *Addressing Externalities from Swine Production to Reduce Public Health & Environmental Impacts*, 94 Am. J. Pub. Health 1703, 1704 (Oct. 2004) (estimating that "[c]urrent farming practices are responsible for 70% of the pollution in the nation's rivers and streams"); Claudia Copeland, *Air Quality Issues and Animal Agriculture—A Primer*, CRS Report RL32948 9 (Apr. 11, 2007) [hereinafter *Air Quality Primer*], http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RL32948.pdf.
[33] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434, citing EPA, National Water Quality Inventory: Report to Congress—2004 Reporting Cycle, EPA–841–R–08–001 (Jan. 2009).
[34] Carrie Hribar, Nat'l Ass'n of Local Bds. of Health, *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities* 4 (2010) [hereinafter *Understanding CAFOs and Their Impact on Communities*], http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf.
[35] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434.
[36] *Id.*
[37] *See, e.g.*, EPA Literature Review at 49 (reviewing reported incidences of fish kills); Iowa DNR, Manure Discharge Chart, http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials (last visited Feb. 10, 2017); David Jackson and Gary Marx, Chicago Tribune, Spills of Pig Waste Kill Hundreds of Thousands of Fish in Illinois (Aug. 5, 2016), http://www.chicagotribune.com/news/watchdog/pork/ct-pig-farms-pollution-met-20160802-story.html; Lee Bergquist and Kevin Crowe, Milwaukee Journal Sentinel, Manure Spills in 2013 the Highest in Seven Years Statewide (Dec. 5, 2013), http://archive.jsonline.com/news/wisconsin/manure-spills-in-2013-the-highest-in-seven-years-statewide-b99157574z1-234701931.html; Sara Peach, National Geographic, What to Do about Pig Poop? North Carolina Fights a Rising Tide (Oct. 30, 3014), http://news.nationalgeographic.com/news/2014/10/141028-hog-farms-waste-pollution-methane-north-carolina-environment/.
[38] *See* Natural Resources Conservation Service (NRCS), Conservation Practice Standard 359: Waste Treatment Lagoon (Jul. 2004), https://efotg.sc.egov.usda.gov/references/public/AL/tg359.pdf. *See also, e.g.*, Animal Waste

pit systems that retain waste below confinement buildings, as are common in the hog industry, are reliant on pumping systems and are prone to structural and equipment failures that cause discharges to surface and groundwater.[39]

CAFO discharges also occur due to waste application to cropland in excess of crop needs or under conditions that lead to runoff, such as on frozen, saturated, or sloped ground, or when crops are not in place to uptake nutrients. Many manure application fields also contain direct conduits to waterways, such as tile lines, ditches, grassed waterways, or sinkholes, and application practices do not always properly account for the need for setbacks from these features. As a result of application under any of these circumstances, precipitation, erosion, and other natural processes carry excess nutrients and other CAFO pollutants off of land application fields and into surface waters and conduits to surface waters. Collectively, these discharges are responsible for widespread degradation of U.S. waterways, and due to inadequate tracking and regulation, the full magnitude of their water pollution impacts remains unknown.

CAFO wastes contain numerous pollutants that pose substantial threats to human health and the environment. Specifically, these wastes include nitrogen, phosphorous, pathogens, salts, heavy metals, trace elements, antibiotics, pesticides, and hormones.[40] Pathogens associated with CAFO manure include *E. coli*, *Salmonella*, and *Giardia*,[41] which endanger those who come into contact with contaminated water through swimming, boating, or other recreational activities. EPA has found that "[m]ore than 150 pathogens associated with industrial livestock production are also associated with risks to humans, including the six human pathogens that account for more than 90% of food and waterborne diseases."[42] Various pathogens in CAFO waste can cause symptoms such as diarrhea and an increased risk for severe illness or death.[43]

Management Plan for Lost Valley Ranch Dairy App. A, discussing expected leakage rates from double lined lagoons, http://www.oregon.gov/ODA/programs/NaturalResources/Pages/CAFO.aspx. Although groundwater is not regulated as water of the United States, EPA has a longstanding position that point source discharges into groundwater that then discharge to surface waters via a "direct hydrological connection" are jurisdictional and subject to NPDES permitting requirements. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, Proposed Rule, 66 Fed. Reg. 2960, 3016 (Jan. 12, 2001) [hereinafter 2001 Proposed CAFO Rule].

[39] *See, e.g.*, Iowa DNR, Manure Discharge Chart, http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials.

[40] EPA Literature Review at 2. *See also* 2001 Proposed CAFO Rule, 66 Fed. Reg. at 2976-79; *Air Quality Primer* at 9; *Understanding CAFOs and Their Impact on Communities* 2-3 (Animal wastes contain a variety of pollutants, primarily nutrients, such as nitrogen and phosphorous, as well as organic matter, solids, pathogens such as *E. coli*, odorous/volatile compounds, growth hormones, antibiotics, chemicals used as additives to the manure or to clean equipment, silage leachate from corn feed, or copper sulfate used in footbaths for cows.); David Osterberg & David Wallinga, *Addressing Externalities from Swine Production to Reduce Public Health & Environmental Impacts*, 94 Am. J. Pub. Health at 1704.

[41] Claudia Copeland, *Animal Waste and Water Quality: EPA Regulation of Concentrated Animal Feeding Operations (CAFOs)*, CRS Rep. RL31851 5 (Feb. 16, 2010) [hereinafter *Animal Waste and Water Quality*], http://nationalaglawcenter.org/wp-content/uploads/assets/crs/RL31851.pdf.

[42] 2003 CAFO Rule, 68 Fed. Reg. at 7236.

[43] *Understanding CAFOs and Their Impact on Communities* at 8-9.

Nutrients, primarily nitrogen and phosphorus, are also primary pollutants of concern in CAFO waste, due to their impacts on aquatic ecosystems and public health. Excess nitrogen and phosphorus lead to eutrophication of surface waters,[44] generate algal blooms that can produce toxins harmful to wild animals, aquatic life, and humans who come into contact with them,[45] and cause hypoxic "dead zones," such as occur annually in the Gulf of Mexico and the Chesapeake Bay. EPA has recognized that "[n]utrient pollution is one of America's most widespread, costly and challenging environmental problems."[46]

Antimicrobials, including medically important antibiotics, are also common constituents of CAFO waste, and have been detected in both surface and groundwater samples collected near CAFOs.[47] EPA has found that 80-90% of some administered antibiotics end up in animal waste.[48] While antibiotics are often used to promote the growth of livestock, as well as to fight disease in crowded, unsanitary CAFO environments, their use also promotes antibiotic–resistant infections in livestock and humans and the dissemination of antibiotic–resistant bacteria in waterways near CAFOs and their land application areas. The proliferation of antibiotic–resistant bacteria makes it more difficult to treat infections in humans, significantly increasing the likelihood of hospitalization and the average length of hospitalization in those who become infected.[49]

EPA has previously found that heavy metals including "arsenic, cadmium, iron, lead, manganese, and nickel," some of which are added to feed as micronutrients to promote animal growth, "are commonly found in CAFO manure, litter, and process wastewater."[50] Just as with antibiotics fed to livestock, 80-90% of added arsenic, zinc, and copper are excreted in manure, and subsequent land application can lead to metal accumulation in soils and metal-contaminated runoff to waterways. When metal pollutants are present in CAFO discharges, they can damage aquatic ecosystems and cause a broad set of human health impacts."[51] Researchers have found that the full impacts of metal pollution from CAFO waste, both alone and in combination with

[44] Shauna R. Collins, *Striking the Proper Balance Between the* Carrot *and the* Stick *Approaches to Animal Feeding Operation Regulation*, 2012 U. Ill. L. Rev. 923, 932 (2012).
[45] EPA Literature Review at 47.
[46] EPA, Nutrient Pollution: The Problem, https://www.epa.gov/nutrientpollution/problem (last visited Feb. 10, 2017).
[47] *See, e.g.*, Joanne C. Chee-Sanford et al., *Fate and Transport of Antibiotic Residues and Antibiotic Resistance Genes following Land Application of Manure Waste*, 38 J. Envtl. Quality 1086 (2009); Yi Luo et al., *Trends in Antibiotic Resistance Genes Occurrence in the Haihe River, China*, 44 Envtl. Sci. Tech. 7220 (2010); Pew Commission on Industrial Farm Animal Production, *Putting Meat on the Table: Industrial Farm Animal Production in America* 15-16 (2008), http://www.pewtrusts.org/~/media/legacy/uploadedfiles/peg/publications/report/pcifapfinalpdf.pdf.
[48] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434.
[49] Shane Rogers & John Haines, *Detecting and Mitigating the Environmental Impact of Fecal Pathogens Originating from Confined Animal Feeding Operations: Review*, EPA/600/R-06/021 15 (Sept. 2005).
[50] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65434.
[51] *Id*.

other contaminants, are inadequately understood.[52]

CAFO wastes can also contain large quantities of hormones—both naturally produced and synthetic.[53] While acknowledging that hormone quantities are difficult to estimate due to the lack of reporting requirements, one study estimated that approximately 722,852 pounds of naturally–produced estrogens, androgens, and progestogens were excreted by cattle, swine, and poultry in 2000; accounting for all synthetic hormones in manure, the use of which does not have to be reported, would drive this figure even higher.[54] Hormones and their metabolites are also found in the environment surrounding livestock and poultry facilities, including streams, creeks, and surface waters downstream from beef cattle feedlots,[55] where they can cause serious damage to the endocrine and reproductive systems of aquatic species, lab rats, and human cells.[56]

While CAFO pollution is widespread, it also disproportionately impacts environmental justice communities. Research to date has focused primarily on the hog industry, and several studies have shown that "a disproportionate number of swine CAFOs are located in low-income and nonwhite areas."[57] One study analyzed the locations of large hog CAFOs in 17 states, including Iowa, North Carolina, and Minnesota, which are leaders in hog production where CAFOs had been rapidly expanding. In these three states, the researchers found disproportionate siting and expansion of large hog CAFOs in African American communities in the 1980s and 1990s, and concluded that as hog production shifts from small-scale to large-scale, racial inequity in CAFO siting intensifies.[58] A 2011 study of 16 North Carolina communities concluded that in general, "[i]ndustrial hog operations in North Carolina are disproportionately located in low-income communities of color."[59]

Although many studies have focused on the hog sector, these environmental justice impacts do extend to communities affected by other livestock sectors. EPA recently conducted its own limited analysis of CAFO location in relation to environmental justice populations of concern, and identified areas at risk of disproportional impacts from virtually every CAFO livestock sector: the Delmarva Peninsula, characterized by broiler chicken operations; the Iowa-Minnesota border, characterized by hog, egg layer, and beef feedlot operations; the Carolina

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[52] JoAnn Burkholder et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, 115 Envtl. Health Perspectives 308, 308-309 (2007) [hereinafter *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*], http://ir.uiowa.edu/cgi/viewcontent.cgi?article=1025&context=oeh_pubs.
[53] EPA Literature Review at 40-41.
[54] *Id.*
[55] *Id.* at 45.
[56] GAO CAFO Report at 24.
[57] Kelley Donham, Steven Wing, et al., *Community Health and Socioeconomic Issues Surrounding Concentrated Animal Feeding Operations*, 115 Envtl. Health Perspectives 317, 318 (2007).

[58] Jeremy Arney, Janice E. Johnston, and Paul B. Stretesky, *Environmental Inequity: An Analysis of Large-Scale Hog Operations in 17 States, 1982-1997*, 68 Rural Sociology 231, 244 (2003).
[59] Schinasi, et al., *Air Pollution, Lung Function, and Physical Symptoms in Communities Near Concentrated Swine Feeding Operations*, 22 Epidemiology 7 (March 2011).

lowlands, characterized by hog, broiler, and turkey operations; and the California central valley, characterized by dairy operations. All of these regions have both large numbers of CAFOs and large minority and low-income populations.[60]

Recognition of these environmental justice impacts is growing; the Department of Justice recently cited to the disproportionate impact of a Mississippi egg layer operation's water pollution on a low-income community in its 2015 Implementation Progress Report on Environmental Justice,[61] and Maryland's Wicomico County Health Department was recently compelled to conduct a Health Impact Assessment for a proposed 10-house broiler operation in an 80% African American community.[62] EPA's External Civil Rights Compliance Office also recently investigated North Carolina's swine permitting program and found "the possibility that African Americans, Latinos, and Native Americans have been subjected to discrimination as the result of [North Carolina Department of Environmental Quality's] operation of the [program] . . . ."[63]

CAFO pollution also poses a considerable threat to wildlife in the United States. Exposure to the contaminants discharged from these operations, including heavy metals, pharmaceuticals, and pesticides can harm or kill aquatic species. The fish kill events caused by some CAFO discharges, for example, harm not only these observable fish populations, but are also generally indicative of larger aquatic species losses. Relatedly, reproductive and endocrine disruption from exposure to pharmaceuticals in farm animal waste can result in the reduction and imbalance of impacted species' population numbers.[64] Pollution from CAFOs further harms wildlife and ecosystems though loss of ecosystem biodiversity, including through conversion and encroachment of essential species habitat.[65] These harms are particularly acute for endangered

[60] EPA Office of Water, National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, Analysis under Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations 4 (Oct. 3, 2011).
[61] U.S. Dep't of Justice, 2015 Implementation Progress Report on Environmental Justice 23, https://www.justice.gov/ej/file/870526/download.
[62] Wicomico County Health Dep't, Health Impact Assessment: Proposed Concentrated Animal Feeding Operation in Wicomico County (Apr. 2016), https://www.wicomicohealth.org/file/0/0/Health%20Impact%20Assessment.pdf.
[63] Letter of Concern from Lilian S. Dorka, Director, EPA External Civil Rights Compliance Office to William G. Ross, Jr., Acting Sec'y, N.C. Dep't of Envtl. Quality 1 (Jan. 12, 2017), http://blogs.law.unc.edu/documents/civilrights/epalettertodeq011217.pdf.
[64] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 2981; Food and Agriculture Organization of the United Nations, Livestock's Long Shadow, 209-11 (2008); World Health Organization and United Nationals Environmental Programme, State of the Science of Endocrine Disrupting Chemicals – 2012 vii - xv (2013), http://www.who.int/ceh/publications/endocrine/en/; *see also* J.K. Leet, et al., *Environmental hormones and their impacts on sex differentiation in fathead minnows*, 158 Aquatic Toxicology 98, 98 (2015), https://www.researchgate.net/publication/267870556_Environmental_Hormones_and_Their_Impacts_on_Sex_Differentiation_in_Fathead_Minnows; Ripley, et al., *Utilization of protein expression profiles as indicators of environmental impairment of smallmouth bass (Micropterus dolomieu) from the Shenandoah River, Virginia, USA*, 27 Envtl. Toxicology and Chemistry 1756, 1756 (2008).
[65] USDA, Agricultural Waste Management Field Handbook, Agricultural Wastes, Air, and Animal Resources 3-3 (2012), http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=31441.wba ("Adding wastes to a stream can lower oxygen levels to such an extent that fish and other aquatic life are forced to migrate from the polluted area or die for lack of oxygen."); FWS, Endangered and Threatened Wildlife and Plants; Final Rule to List

and threatened species, where prolonged insecurity or heightened pollution exposure can result in the extirpation and, potentially, extinction of impacted species.[66]

Widespread CAFO water pollution is significantly damaging public health and ecosystems, and although the full extent of this pollution is unknown due to the lack of CAFO permitting and water pollution monitoring, there is overwhelming evidence of EPA's failure to live up to its CWA mandate. The contamination, both expressly authorized and simply overlooked, under EPA's current regulatory approach poses a direct threat to water quality, aquatic ecosystems, and human health. It is therefore incumbent upon EPA to promulgate revised CAFO rules that more effectively confront the environmental and public health risks posed by water pollution from these facilities.

c. Inadequate CAFO Regulation under the Clean Water Act

After more than 40 years of CWA implementation, EPA has acknowledged that it still lacks basic information about where the nation's CAFOs are located and which facilities are discharging pollutants into jurisdictional waterways without required permits.[67] EPA estimates that only approximately 40% of CAFOs are currently regulated under the NPDES program,[68] while as many as 75% discharge as a result of their "standard operational profiles."[69] Despite these major gaps in information and regulation, EPA proved unwilling to stand up to CAFO industry pressure when it abandoned the only nationwide effort it has undertaken in decades to fill these gaps by developing a comprehensive inventory of CAFOs.[70]

This failure by EPA to develop or maintain a CAFO inventory has meant that states must identify CAFOs and determine which are subject to regulation with little guidance or oversight from EPA. Predictably, this has resulted in a patchwork of state programs, inconsistent amounts

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the Topeka Shiner as Endangered, 63 Fed. Reg. 69016, 69017 (Dec. 15, 1998) (For endangered Topeka Shiner populations, "[t]he action most likely impacting the species to the greatest degree in the past is sedimentation and eutrophication . . . resulting from intensive agricultural development . . . . Feedlot operations on or near streams are also known to impact prairie fishes due to organic input resulting in eutrophication."); Blehert, et al., USGS, Investigation of Bacterial Pathogens Associated with Concentrated Animal Feeding Operations (CAFOs) and their Potential Impacts on a National Wildlife Refuge in Oklahoma: Final Report, Project 2N44, 200120004 2 (July 24, 2004).

[66] *See, e.g.,* FWS, CAFOs Feed a Growing Problem, Endangered Species Bulletin, Vol. XXIV No. 1 (January/February 1999), http://www.thefreelibrary.com/CAFOs+Feed+a+Growing+Problem.-a054466913 (In 1998, an 11 million gallon spill of liquid waste from a large poultry operation damaged a wetland vernal pool system in the Merced National Wildlife Refuge, killing endangered vernal pool fairy shrimp and vernal pool tadpole shrimp.).

[67] Proposed CAFO Reporting Rule, 76 Fed. Reg. at 65436.

[68] In 2010, EPA estimated that approximately forty percent of an estimated 19,200 CAFOs were covered by NPDES permits. EPA, National Pollutant Discharge Elimination System (NPDES) Information Collection Rulemaking and CAFOs 1 (Sept. 2010) [hereinafter EPA 2010 NPDES Estimate].

[69] *Id.*

[70] National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, Withdrawal, 77 Fed. Reg. 42679 (Jul. 20, 2012).

and qualities of available information, and widely varying approaches to NPDES permitting. For example, Michigan requires all CAFOs with the potential to discharge to obtain a NPDES permit, and this requirement has been upheld by the state's court of appeals.[71] Wisconsin generally requires all Large CAFOs to obtain NPDES permits,[72] while Iowa has refused to issue a single permit to any of its thousands of confinement operations, despite hundreds of documented discharges.[73] In South Dakota, the state has proposed to allow CAFO operators to choose whether to apply for a NPDES permit or a state no-discharge permit.[74] And Delaware regulations purportedly require all CAFOs that propose to discharge to obtain permits, but the state had only recently begun granting its first CAFO NPDES permits (general permit coverage for broiler chicken operations that land-apply) at the date of this petition's filing.[75]

EPA has not prioritized permitting, even where CAFOs have had documented discharges. In its 2008 CAFO Rule preamble and a memo issued by EPA's James Hanlon in response to the *Pork Producers* decision, EPA improperly conflates the legal question of whether a violation is ongoing for purposes of establishing jurisdiction to maintain a CWA citizen suit with the distinct question of whether a facility is a point source discharger subject to NPDES permitting requirements.[76] Based on this flawed analysis, even CAFOs with documented jurisdictional discharges are often not required, or even encouraged, to obtain NPDES permits, because they can claim to have "permanently remedied" the cause of their violations. This loophole is ripe for abuse, and as we can see in the case of Iowa, where *no* confinements with known discharges have obtained permits, such abuse is rampant.

For these reasons, as well as the additional deficiencies in EPA's approach explained throughout this petition, EPA and states have never come close to satisfying the CWA's obligations to permit discharging CAFOs and exercise proper oversight. EPA remains apparently ignorant of the fact that its regulations on paper have not translated to effective regulation in the real world. For example, Allison Wiedeman of the EPA's Water Permits Division was quoted in early 2016 as saying, in describing the current state of CAFO CWA permitting, "[w]e see that it's working. We know that these facilities have to have permits if they discharge, and so all I can

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[71] *See Mich. Farm Bureau et al. v. Mich. Dep't of Envtl. Quality*, 292 Mich. App. 106, 108 (Mar. 29, 2011).
[72] Wis. Admin. Code Ch. NR 243.11 (2015).
[73] *See* Iowa Dep't of Nat. Res., 2016 Annual Report for Work Plan Agreement Between the Iowa Department of Natural Resources and the Environmental Protection Agency Region 7 (Aug. 1, 2016), http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials.
[74] S.D. Dep't of Env't and Natural Res., Draft General Water Pollution Control Permit for CAFOs (Oct. 2015), http://denr.sd.gov/des/fp/publicnotices/DraftGeneralPermitPN.pdf.
[75] *See* DNREC, Division of Water, Concentrated Animal Feeding Operations, http://www.dnrec.delaware.gov/wr/Information/Pages/CAFO.aspx (last visited Jan. 30, 2017).
[76] 2008 CAFO Rule, 73 Fed. Reg. at 70423; James A. Hanlon, Director, EPA Office of Wastewater Management, *Concentrated Animal Feeding Program Update after* National Pork Producers Council v. EPA (Dec. 8, 2011) (both exclusively citing CWA citizen suit case law).

tell you right now is that the process is working."[77] This head-in-the-sand approach does not protect communities from illegal CAFO pollution.

C. Summary of Relief Requested

Petitioners request that EPA promulgate new CAFO rules that will effectively implement the CWA's pollution control mandate. Specifically, Petitioners request the following relief:

1. EPA should establish an evidentiary presumption that certain CAFOs discharge and are either subject to NPDES permitting or must rebut the presumption by demonstrating they do not discharge;
2. EPA should revise its interpretation of the agricultural stormwater exemption such that no discharges resulting from CAFO activities are exempt as non-point source pollution;
3. EPA must ensure that integrators who meet the CWA definition of owner or operator are co-permitted with contract producers, as the statute has always required;
4. EPA should revise certain definitions in the CAFO regulations;
5. EPA should revise the requirements applicable to all CAFOs, including by requiring water quality monitoring in CAFO NPDES permits to ensure compliance with the CWA and permit terms; and
6. EPA should revise the CAFO ELGs to address additional CAFO pollutants of concern, prohibit practices known to harm water quality, and otherwise strengthen existing requirements.

Petitioners further request that EPA open a docket for this petition and solicit public input on the proposed rule changes.

II. ARGUMENT

EPA's current CAFO regulations are failing to achieve the mandates of the CWA to permit point source dischargers of pollution, require pollution reductions based on appropriate technology-based standards, and ultimately eliminate point source discharges to navigable waters.[78] To meet these mandates, EPA must make certain critical changes to its CAFO regulations.

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[77] Keri Brown, Nat'l Public Radio, When a Chicken Farm Moves Next Door, Odor May Not Be The Only Problem (Jan. 24, 2016), http://www.npr.org/sections/thesalt/2016/01/24/463976110/when-a-chicken-farm-moves-next-door-odor-may-not-be-the-only-problem. Even more recently, former EPA Administrator Gina McCarthy expressed her view that cleaning up agricultural pollution is largely up to voluntary industry practices and the USDA, because EPA is not "in a position to demand it of them." Jenny Hopkinson, Politico Pro Agriculture Whiteboard, EPA's McCarthy: Better That USDA Tell Farmers to Up Their Environmental Game (Oct. 18, 2016).
[78] *See* 33 U.S.C. § 1251(a)(1).

This petition lays out a roadmap for necessary and effective changes EPA must make to its CAFO regulations, addressing the two overarching issues of permit coverage and permit effectiveness. As detailed herein, EPA's existing authority enables it to put a regulatory scheme in place that would ensure all CAFO dischargers are subject to NPDES permits and that those permits adequately limit CAFO discharges and protect water quality. Any action that falls short of achieving these fundamental requirements of the Act would be arbitrary and capricious.

A. EPA'S CAFO REGULATIONS MUST ENSURE THAT ALL DISCHARGING CAFOS OBTAIN NPDES PERMITS

The CWA prohibits the "discharge of a pollutant" by any person from any point source, unless in compliance with a NPDES permit.[79] Nonetheless, as discussed *supra*, EPA's CAFO regulations have failed for decades to reliably bring discharging CAFOs into the NPDES permitting program. Furthermore, the incentive for a majority of CAFOs to seek coverage was diminished by the Fifth Circuit's holding in *National Pork Producers Council v. EPA,* which invalidated the "duty to apply" for a NPDES permit under the 2008 CAFO rules.[80] The lack of a duty to apply has made it difficult for EPA and states to determine whether CAFOs are discharging and to ensure that all CAFO polluters obtain permits.[81]

This general lack of oversight, along with specific regulatory deficiencies, has allowed polluting facilities to evade permitting requirements for decades. The common-sense amendments to EPA's regulatory approach discussed below would close the loopholes that have allowed so many of these point sources to remain unregulated.

a. EPA Should Establish an Evidentiary Presumption that CAFOs with Certain Characteristics Actually Discharge

The overall lack of complete information about the universe of discharging CAFOs, and the persistent and widespread failures by states and EPA to issue CAFO permits to discharging facilities, demonstrates that EPA's current regulations are simply not resulting in permits when required by the CWA. Therefore, in order to create an effective permitting system, EPA must require all CAFOs with certain characteristics—including but not limited to those that have had a documented discharge to a water of the U.S.—to obtain NPDES permits. To do so in a way that is consistent with recent case law, EPA must establish a presumption that certain operations actually discharge, as opposed to having the potential to discharge or proposing to discharge. EPA has clear authority to establish such a presumption, and abundant evidence with which to support it.

[79] 33 U.S.C. § 1311(a).
[80] *See Nat'l Pork Producers Council v. EPA*, 635 F.3d 738, 751 (5th Cir. 2011).
[81] GAO CAFO Report at 17-18 (concluding that data collected by EPA and states on the number of CAFOs, discharge status of CAFOs, and number of permits issued by state authorities are unreliable).

i. EPA Has Clear Authority to Establish a Presumption that Certain CAFOs Discharge

Recent judicial decisions have undermined EPA's previous efforts to require polluting CAFOs to obtain NPDES permits. In *Waterkeeper Alliance v. EPA*, the Second Circuit vacated the requirement for each large CAFO to apply for a permit, or to secure a determination from the relevant permitting authority that that CAFO has "'no potential to discharge' manure, litter or process wastewater."[82] The court held that this requirement exceeded EPA's statutory jurisdiction under the Act because "unless there is a 'discharge of any pollutant,' there is no violation of the Act, and point sources are . . . [not] statutorily obligated to seek or obtain an NPDES permit." [83] The Fifth Circuit echoed this holding in *National Pork Producers Council v. EPA*,[84] vacating a similar requirement that CAFOs that "proposed to discharge" must apply for permits. The practical result of these cases and EPA's interpretation of them has been to place the burden on citizens and regulators to identify discharging CAFOs that require permits *and* demonstrate that discharges are likely to recur—a 'catch me if you can' system that has resulted in widespread failure to require permits at the state level.[85]

However, these decisions do not foreclose further action by EPA. While EPA's authority to require NPDES permits is limited to those CAFOs that actually discharge, the Second Circuit noted, in a footnote to the *Waterkeeper* decision, that EPA had not argued that the administrative record in that case "support[ed] a regulatory presumption to the effect that Large CAFOs *actually* discharge."[86] As such, the court did not consider whether EPA "might properly presume that Large CAFOs—or some subset thereof—actually discharge."[87] The court thus suggested that EPA may be able to martial evidence to support a regulatory presumption that all or certain categories of CAFOs discharge.[88]

Under well–settled principles of administrative law, agencies have the power to establish evidentiary presumptions.[89] EPA recognized this authority when it proposed establishing a

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[82] *Waterkeeper Alliance v. EPA*, 399 F.3d 486, 506 (2d Cir. 2005).
[83] *Id.* at 504.
[84] *Nat'l Pork Producers Council*, 635 F.3d at 750-51.
[85] As discussed *supra*, even when facilities experience documented discharges, some states allow operators to "remedy" the cause of the violation rather than apply for NPDES permits.
[86] *Waterkeeper Alliance*, 399 F.3d at 506 n.22.
[87] *Id.* (citing *NLRB v. Curtin Matheson Scientific, Inc.*, 494 U.S. 775 (1990); *Nat'l Mining Ass'n v. Babbitt*, 172 F.3d 906 (D.C. Cir. 1999)).
[88] In the subsequent *Nat'l Pork Producers Council* case, EPA did not argue that it had established such a presumption in the 2008 CAFO rulemaking; indeed, it argued the opposite. *See* Final Brief of Respondent U.S. EPA at 62, *Nat'l Pork Producers Council*, 635 F.3d 738 (argument heading: "Nothing in 40 C.F.R. § 122.23(j) Alters the Evidentiary Burden for a CAFO Alleged to Have Discharged Without a Permit"). The court therefore offered no opinion on whether an evidentiary presumption could be properly invoked to shift the burden of producing evidence of no-discharge to the regulated entity.
[89] *See e.g., NLRB v. Baptist Hospital*, 442 U.S. 773, 787 (1979); *Nat'l Mining Ass'n v. U.S. Dept. of Interior*, 177 F.3d 1, 6 (D.C. Cir. 1999); *U.S. Steel Corp. v. Astrue*, 495 F.3d 1272, 1284 (11th Cir. 2007); *Cole v. USDA*, 33 F.3d

rebuttable presumption that CAFO lagoons discharge to surface water via groundwater, suggesting a requirement that CAFOs either conduct groundwater pollution monitoring or rebut the presumption of discharge by providing a hydrologist's report demonstrating that no such connection exists at a facility.[90] A court will deem such an evidentiary presumption valid so long as a there is "some rational connection between the fact proved and the ultimate fact presumed, and [] the inference of one fact from proof of another [is] not so unreasonable as to be a purely arbitrary mandate."[91] Regulatory presumptions, i.e., evidentiary presumptions established through rulemaking, are therefore entitled to substantial deference.[92] It follows that, by establishing an evidentiary presumption that certain CAFOs actually discharge, EPA can validly either treat them as discharging facilities or require them to produce evidence that they do not discharge, and therefore should not be subject to the NPDES program.[93] Moreover, case law strongly supports the use of this kind of legal device to increase administrative efficiency, and as a solution to the paucity of reported data pertaining to individual facilities.[94]

ii. EPA Has Sufficient Evidence to Support a Presumption that CAFOs with Certain Characteristics Discharge

In this case, there is overwhelming evidence that many CAFOs actually discharge, so an evidentiary presumption to that effect is appropriate and necessary. EPA's own data already reflect much more than the "rational connection" between the design, construction, and operation of many CAFOs, and their actual discharges, that would be needed to uphold such a

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1263, 1267 (11th Cir. 1994); *Holland Livestock Ranch v. U.S.*, 714 F.2d 90, 92 (9th Cir. 1983); *Chem. Mfrs. Ass'n v. Dep't of Transp*., 105 F.3d 702, 705 (D.C. Cir. 1997).

[90] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3040.

[91] *Mobile, Jackson & Kansas City R. Co. v. Turnipseed*, 219 U.S. 35, 43 (1910); *See also NLRB v. Baptist Hospital*, 442 U.S. at 787; *Atchison, T. & S. F. Ry. Co. v. ICC*, 580 F.2d 623, 629 (D.C. Cir. 1978); *Nat'l Mining Ass'n v. Babbitt*, 172 F.3d at 912. That the fact presumed does not always and inevitably follow from the predicate fact has no bearing on the validity of an evidentiary presumption. *See Cole v. USDA*, 33 F.3d at 1270 ("The mere statement that the fact presumed does not *always follow necessarily* from the predicate fact obviously leaves ample room for some lesser, though still rational, connection between the two," thus the mere possibility of circumstances in which the relationship might not hold true was insufficient to invalidate a regulatory presumption).

[92] *NLRB v. Baptist Hospital*, 442 U.S. at 796 (Justice Brennan concurring); *NLRB v. Los Angeles New Hospital*, 640 F.2d 1017, 1020 (9th Cir. 1981); *N.Y. Foreign Freight Forwarders & Brokers Ass'n v. Fed. Mar. Comm'n*, 337 F.2d 289, 295 (2d Cir. 1964).

[93] The effect of an evidentiary presumption is to shift the burden of proof, but not the burden of persuasion, to the party against whom the presumption is invoked. *See* Fed. R. Evid. 301 ("In a civil case, unless a federal statute or those rules provide otherwise, the party against whom a presumption is directed has the burden of producing evidence to rebut the presumption. But this rule does not shift the burden of persuasion, which remains on the party who had it originally.").

[94] *Chem. Mfrs. Ass'n v. Dep't of Transp.*, 105 F.3d at 706 (upholding an evidentiary presumption, established by rule, as an exercise of the agency's "reasoned judgment," and a "sensible, timesaving device"); *Nat'l Mining Ass'n v. Babbitt*, 172 F.3d at 912 (finding an evidentiary presumption is permissible "when proof of one fact renders the existence of another fact so probable that it is sensible and timesaving to assume the truth [of the inferred fact] . . . until the adversary disproves it"). *See also* 2003 CAFO Rule, 68 Fed. Reg. at 7201 ("It is [] much easier for CAFOs to avoid permitting by not reporting their discharges [than it is for operations in other industries]. EPA continues to believe that imposing a duty to apply for all CAFOs is appropriate given that the current regulatory requirements are being misinterpreted or ignored.").

presumption. Two sets of factors are closely correlated with a CAFO's tendency to discharge, and should inform the creation of one or more evidentiary presumptions. First, even under EPA's untenably broad construction of the agricultural stormwater exemption, CAFOs that apply manure to land as fertilizer should be presumed to discharge, because nutrient management tools are simply not calculated to eliminate discharges, even if optimally designed and perfectly implemented, and should be assumed to result in discharges to surface waters and groundwater with a direct hydrologic connection to surface waters.[95] Second, CAFOs with certain production area characteristics that inevitably cause discharges—such as ditches and conduits that flow to jurisdictional waters, barns that spew pollutants from ventilation systems, or certain types of waste storage structures—should also be presumed to discharge. EPA has already done much of the analysis needed to support a presumption related to facilities with certain production area characteristics, and has concluded that 75% of CAFOs do in fact discharge based on their "standard operational profiles."[96]

1. Land Application Discharges

Land application of manure through spreading, spraying, injection, or incorporation is one of the most common methods of disposal of CAFO waste.[97] Yet EPA's current regulations effectively assume that dry weather land application in accordance with a nutrient management plan (NMP) will result in zero discharge, such that no permit is required. Although the regulations do not expressly state that land application in accordance with an NMP renders a permit unnecessary, the NMP is ostensibly designed to "ensure appropriate agricultural utilization of the nutrients . . . ."[98] As a result, many large CAFOs elect not to obtain permits based on reliance on an NMP.[99] Land application of waste is likely the leading source of CAFO water pollution and must be more effectively addressed through NPDES permitting.

As explained in more detail *infra*, EPA's primary assumption that land application does not result in discharges, absent a precipitation event, is fundamentally at odds with scientific

[95] *See* discussion *infra* Section II.A.b., asserting that such land application discharges should never be exempt from the definition of a point source discharge.
[96] EPA 2010 NPDES Estimate at 1. EPA should also presume that facilities that have experienced one or more documented discharges do in fact discharge, and must obtain permits. The current regulatory scheme defies logic by in effect presuming that a facility with a record of unpermitted pollution will never pollute again, and does not require operators to make any affirmative showing that they have made all necessary modifications to the facility to cease all continuous or sporadic discharges.

[97] *Understanding CAFOs and Their Impact on Communities* at 2.
[98] 40 C.F.R. § 122.23(e).
[99] In Iowa, for example, thousands of large confinement hog CAFOs apply waste according to state "manure management plans," but at the time of filing, not a single one had been issued a NPDES permit. Due to the CAFO rules' limitations, even increased EPA oversight of Iowa's NPDES program, in part resulting from EPA's findings that the Iowa Department of Natural Resources fails to issue permits to CAFOs when necessary, has not compelled permitting of confinement operations. *See* Iowa Dep't Natural Res., EPA/DNR Work Plan Materials, http://www.iowadnr.gov/Environmental-Protection/Land-Quality/Animal-Feeding-Operations/EPA-DNR-Workplan-Materials.

research. Despite the legal fiction implied in EPA's rules, NMPs are not designed as zero discharge plans, either for nutrients or for other CAFO waste pollutants.[100] Numerous studies have recognized that runoff and leaching of contaminants from animal waste occurs even where it is applied at recommended application rates.[101] Because land application practices result in actual discharges, EPA has strong grounds on which to presume that all land-applying CAFOs discharge and have a duty to apply for NPDES permits.[102]

EPA's CAFO effluent guidelines do acknowledge that NMPs are not truly zero discharge, by requiring that *permitted* CAFOs' NMPs "minimiz[e]" nutrient runoff to surface waters.[103] Yet the current rules inexplicably allow Large CAFOs to land apply *without* NPDES permits, in effect assuming that these CAFOs' NMPs are even better and will result in *zero* dry weather discharge. This inherently contradictory scheme fails to protect waterways and has led to far less permitting than the CWA requires. The evidence clearly supports—and in fact dictates—a determination that all CAFOs that land apply waste discharge and require NPDES permits.[104]

2. Production Area Characteristics

Similarly, EPA should presume that CAFOs with certain production area characteristics actually discharge. The production area of a CAFO generally includes, but is not limited to, the animal confinement, raw materials storage, mortalities management, and waste containment areas.[105] Numerous studies and EPA guidance documents recognize that facilities with certain characteristics are associated with discharges to surface waters.

After promulgating the 2008 CAFO Rule, EPA published a guidance document identifying certain features of CAFO production areas, both manmade and beyond the operator's

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[100] *See infra* Section II.B.b.iii.

[101] *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality* at 308 (surveying literature that found high concentrations of nitrogen in surface waters adjacent to sprayfields where animal waste was applied at recommended rates); *see also* L.M. Risse, et al., *Land Application of Manure for Beneficial Reuse,* National Center for Manure and Animal Waste Management White Papers iii (2001), https://www.ars.usda.gov/ARSUserFiles/66120900/SoilManagementAndCarbonSequestration/2001ajfB02.pdf ("Even under ideal conditions, there is still a significant risk of losses to the environment. Agricultural systems leak and elimination of non-point source impacts is practically impossible.").

[102] This petition also requests that EPA strengthen its requirements for land application practices to better protect water quality. However, these two proposals are not in the alternative; because even the requested improvements to the land application regulations would still not eliminate resulting discharges, the presumption of discharge is appropriate and necessary for all CAFOs that land apply, even assuming significantly more stringent nutrient management requirements.

[103] 40 C.F.R. § 412.4(c).

[104] The regulations' failure to account for most non-nutrient pollutants underscores the fact that NMPs are not zero discharge plans. EPA should make further regulatory revisions regarding the agricultural stormwater exemption and the CAFO definitions, as discussed *infra*, to enable it to also require NPDES permits for wet–weather CAFO land application discharges and Medium AFOs that land apply, via establishment of similar presumptions.

[105] 40 C.F.R. § 122.23(b)(8).

control, which support a presumption of discharge.[106] These include: proximity of the CAFO to jurisdictional waters, and whether the CAFO is upslope from such waters; climatic conditions, including whether precipitation exceeds evaporation; type of waste storage system, and the capacity, quality of construction, and presence and extent of built–in safeguards of the storage system; drainage of the production area; and exposure of animal waste and feed to precipitation or other water.[107] As noted previously, EPA has enough information to assess what aspects of CAFO operations are resulting in discharges, and has already used this information to estimate that up to 75% of CAFOs do in fact discharge as a result of their "standard operational profiles;"[108] it therefore can and should re-evaluate these factors in light of available discharge data and establish a list of criteria related to the production area for which it will establish a presumption of discharge.

Ventilation systems also lead to surface water discharges.[109] Chicken house ventilation fans, for example, constantly and intentionally release pollutants such as ammonia, manure, dust, feathers, and feed,[110] and often these pollutants are not kept out of waterways. Many CAFOs are "designed to channel precipitation runoff from the areas around the houses away from the confinement area."[111] At such facilities, contaminants vented from poultry houses will deposit in ditches or waterways that traverse or border production areas.[112] Facilities can also discharge

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[106] EPA, *Implementation Guidance on CAFO Regulations—CAFOs that Discharge or Are Proposing to Discharge* (May 28, 2010), http://www.epa.gov/npdes/pubs/cafo_implementation_guidance.pdf [hereinafter CAFOs that Discharge Guidance].

[107] *Id.* at 2. EPA identified additional factors specific to the production area that determine whether a CAFO will discharge, including:

(1) Whether there are structural controls in place to divert clean water and what condition they are in;
(2) Inspection and maintenance schedules for clean water diversion controls, such as berms, gutters, and channels;
(3) Whether design and maintenance of pipes, valves, ditches, drains, etc. associated with the collection of manure and wastewater from the animal confinement area prevents spills and leakage;
(4) Whether any secondary containment to manage contaminated runoff is designed, operated and maintained to handle all pollutant loads; and
(5) Whether the animal confinement area prevents animals from having direct contact with waters of the U.S.

Id. at 5.

[108] EPA 2010 NPDES Estimate at 1.

[109] EPA guidance indicates that a number of factors contribute to the likelihood that a ventilated confinement house system will discharge, including the way water is drained from the site and proximity to jurisdictional waters. CAFOs that Discharge Guidance at 13.

[110] *Understanding CAFOs and Their Impact on Communities* at 5.

[111] CAFOs that Discharge Guidance at 13.

[112] *See* EPA, NPDES Permit Writers' Manual for Concentrated Animal Feeding Operations, EPA 833-F-2-001 4-18 (2012) [hereinafter Permit Writers' Manual] (noting that pollutants including manure, feathers, and feed fall to the ground immediately downward from confinement building exhaust ducts and ventilation fans and "are carried by precipitation-related or other runoff to waters of the U.S."); *see also Nat'l Cotton Council v. EPA*, 553 F.3d 927, 939-40 (6th Cir. 2009), finding that pesticide pollutants deposited into waterways after their release from a point source, similar to ventilated ammonia emissions that deposit in waterways, are subject to NPDES permitting requirements.

directly via deposition of ventilated pollutants into waterways. A North Carolina trial court has recognized that this constitutes a jurisdictional discharge, finding that ammonia and other pollutants that reach jurisdictional waters after being expelled by ventilation fans are subject to NPDES permitting requirements.[113] EPA should presume that both CAFOs in close proximity to waterways or conduits to waterways that fail to capture ventilated pollutants, as well as CAFOs designed to channel precipitation and production area pollutants off of the facility into ditches and waterways, do in fact discharge.

These findings with respect to land application practices and specific production area characteristics reflect a larger body of evidence that demonstrates that CAFOs with certain practices and characteristics are not only prone to discharge, but they do *in fact* discharge. EPA should use its technical expertise and available research to identify the full suite of practices and characteristics that support presumptions that certain CAFOs discharge in fact, and adopt presumptions based on these determinations. Because the evidence demonstrates that many CAFOs actually discharge pollutants, as opposed to merely having the potential to discharge or proposing to discharge, EPA has clear authority to establish an evidentiary presumption to that effect, notwithstanding the decisions of the Second and Fifth Circuits on previous CAFO rulemakings.

iii. Establishing a Presumption that Certain CAFOs Discharge is Necessary to Achieve the Purposes of the Act

The stated objective of the CWA is not merely to reduce, but to eliminate pollution discharges to navigable waters.[114] Yet the current regime essentially allows CAFOs to determine for themselves whether they are subject to regulation, an approach that has resulted in wildly inconsistent and inadequate permitting at the state level, along with widespread unregulated pollution from CAFOs.[115] Moreover, this scheme's 'zero discharge' fiction discourages states from establishing water quality based effluent limitations (WQBELs) for CAFO discharges into impaired waters, which further hinders proper implementation of the Act and undermines its mandate to achieve compliance with water quality standards. A rebuttable presumption that certain CAFOs discharge is necessary to mitigate these failings and meet EPA's obligations under the CWA.

Under EPA's current approach, the majority of CAFOs are responsible for determining for themselves whether they discharge or are exempt from permitting requirements. But EPA has

[113] *Rose Acre Farms, Inc. v. N.C. Dep't of Env't and Natural Res.*, No. 12-CVS-10 ¶¶ 54, 55 (Jan. 4, 2013).
[114] 33 U.S.C. § 1251(a)(1).
[115] *See, e.g.*, T.J. Centner, *Challenging NPDES Permits Granted without Public Participation*, 38 Boston Coll. Envtl. Aff. L. Rev. 1, 8 (2011) (noting that regulation of unpermitted CAFOs under state law "has been unsuccessful"); Jillian P. Fry, et al., *Investigating the Role of State Permitting and Agriculture Agencies in Addressing Public Health Concerns Related to Industrial Food Animal Production*, 9 PLOS 1 2 (2014), http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0089870.

acknowledged that CAFO operators will not voluntarily subject themselves to regulations, and will therefore not apply for CAFO permits if they are not required to do so.[116] In the preamble to the 2001 proposed CAFO rule, EPA noted that only about 2,500 of the 12,000 CAFOs that should have applied for permits at the time had done so.[117] Based on the continued CAFO–related impairment of neighboring watersheds, EPA concluded that many of these large facilities were "actually discharging" and should have applied for a permit.[118] Years later, the *Waterkeeper* court similarly found that owners and operators of discharging Large CAFOs have historically "improperly tried to circumvent the permitting process."[119] The history of the CAFO regulations' implementation demonstrates, therefore, that CAFOs, and particularly those facilities with no history of documented discharges, have little incentive to seek permit coverage absent a regulatory presumption that they must.[120]

Requiring permit coverage of facilities that actually discharge is not only consistent with the purposes of the Act, but it is necessary to effectuate the *Waterkeeper* court's call for regulation "in fact, not just in principle."[121] Given the overwhelming evidence that CAFO facilities and land application areas are significant sources of point source pollution, and that they are not effectively regulated under the current NPDES program, a decision not to establish a presumption that certain CAFOs actually discharge would be arbitrary and capricious. Moreover, as the next section will discuss, a presumption that all CAFOs that land apply also discharge pollutants would independently follow from a more reasonable interpretation of the agricultural stormwater exemption.

b. EPA Must Revise its Interpretation of the Agricultural Stormwater Exemption to Give Effect to Congress' Intent that No CAFO–Related Discharges Are Exempt from the Act's Permitting Requirements

The failure of the current permitting scheme to effectively limit pollutant discharges from CAFOs is also attributable in part to EPA's strained interpretation of the agricultural stormwater exemption. Despite the fact that the environmental impacts from land application of manure are well known, EPA has adopted an overly broad reading of the agricultural stormwater exemption that has tied its hands from regulating much of this CAFO pollution. This reading, which defines precipitation-related discharges of manure as non-point source pollution when land-applied in accordance with an NMP, rather than as point source pollution subject to the NPDES program, is

[116] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 2963.
[117] *Id.*
[118] 2003 CAFO Rule, 68 Fed. Reg. at 7180.
[119] *Waterkeeper Alliance*, 399 F.3d at 506, n.22.
[120] Cases holding EPA lacks authority to assess administrative penalties for the failure to apply for a NPDES permit have made the situation worse by removing much of the incentive for sporadic dischargers to apply for NPDES permits. *See Service Oil v. EPA*, 590 F.3d 545, 550-51 (8th Cir. 2009), *Nat'l Pork Producers Council*, 635 F.3d at 752-53.
[121] *Waterkeeper Alliance*, 399 F.3d at 498.

contrary to the language and purpose of the Act. Moreover, it virtually guarantees that there will be unregulated runoff of CAFO pollution to waterways—the very concern that prompted Congress to regulate CAFOs as point sources in the first place.[122]

In light of mounting evidence that the current interpretation and permit scheme have generally failed to result in CAFO permitting, allowing pollution from this industry to continue degrading waterways across the country, EPA's current interpretation of the exemption is arbitrary and capricious, and contrary to the CWA. EPA must therefore revise its interpretation of the exemption by bringing it in line with the statutory directive to regulate CAFO discharges as point source pollution.

i. EPA's Current Interpretation of the Agricultural Stormwater Exemption

The CWA specifically excludes "agricultural stormwater" from the definition of point source, but does not define the term, leaving some discretion to EPA to interpret the exemption's scope in light of the statutory context. EPA's current CAFO regulations define "agricultural stormwater discharge" as "a precipitation-related discharge of manure, litter or process waste water from land areas under the control of a CAFO" where such materials have been applied "in accordance with site specific nutrient management practices."[123] CAFO discharges associated with precipitation are therefore considered non–point source pollution, and are exempt from permitting requirements under the NPDES program.

This interpretation has made it virtually impossible for EPA and state regulators to ensure that discharges are actually caused by precipitation events, rather than by over–application of CAFO wastes to fields, or otherwise improper manure management. The rules impose minimal requirements before a CAFO operator is permitted to avail him or herself of this blanket exemption from regulation under the Act. Unpermitted Large CAFOs are simply instructed to maintain on–site documentation demonstrating nutrient management practices that "ensure appropriate agricultural utilization of the nutrients in the manure, litter, or process wastewater" in

[122] *See* S. Rep. No. 92-414, 92-93 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3670 ("Animal and poultry waste, until recent years, has not been considered a major pollutant . . . . The picture has changed dramatically, however, as development of intensive livestock and poultry production on feedlots and in modern buildings has created massive concentrations of manure in small areas. The recycling capacity of the soil and plant cover has been surpassed . . . . Precipitation runoff from these areas picks up high concentrations of pollutants which reduce oxygen levels in receiving streams and lakes . . . . [W]aste management systems are required to prevent waste generated in concentrated production areas from causing serious harm to surface and ground waters."). While the *Waterkeeper Alliance* court did not find this legislative history dispositive on the meaning of the subsequently enacted exemption, it underscores the ambiguity in the statute that affords EPA authority to revise its interpretation.
[123] 40 C.F.R. § 122.23(e).

order to qualify for the exemption.[124] CAFO operators must make such documentation available to EPA or state permitting agencies upon request.[125]

These site-specific NMPs are never submitted to regulatory authorities unless EPA or state agencies specifically request to review a plan, and the rules do not require any independent verification that NMPs are calculated to ensure land application of wastes occurs at agronomic rates.[126] Consequently, despite the fact that land application is a predominant means of CAFO waste disposal,[127] there is no federal requirement that EPA or state permitting authorities exercise *any* oversight to ensure animal wastes will be applied to land at agronomic rates[128] and that any discharges are precipitation-related. The current permitting requirements therefore incentivize CAFO operators to over–apply animal wastes to cropland, while claiming any confirmed discharges are exempt from permitting as agricultural stormwater and avoiding regulation under the NPDES program.

ii. EPA Has Clear Authority to Revise its Interpretation of the Agricultural Stormwater Exemption as Requested in this Petition

Because the term "agricultural stormwater" is not defined in the CWA, the statute is somewhat ambiguous as to the scope of the agricultural stormwater exemption, and EPA is free to revise its interpretation so long as it reflects a permissible construction of the statute.[129] It is well–settled that agencies are "free to change course as their expertise and experience may suggest or require."[130] Over the past decade, the Agency has continued to amass evidence of widespread CAFO land application pollution, increasing scale and concentration of CAFOs and their waste, and persistent failures to require permits for CAFOs whose land application contribute to water impairments under the existing regulatory scheme—precisely the type of circumstances in which an updating of statutory interpretation is reasonable and necessary. The *Waterkeeper* decision in no way diminishes EPA's authority to revise its interpretation. While the *Waterkeeper* court upheld EPA's current interpretation of the agricultural stormwater

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[124] *Id.*; *Id.* § 122.42(e)(1)(vi)-(ix) (specifying additional criteria that land application practices must meet in order to qualify for the "agricultural stormwater exemption").
[125] *Id.* § 122.23(e)(2).
[126] State laws may impose additional requirements.
[127] Marc Ribaudo, et al., *Consequences of Federal Manure Management Proposals: Cost to Swine Operations from Land Applying Manure* 1 (paper presented at American Agricultural Economics Association Meeting, Long Beach, CA, July 28-30, 2002), http://ageconsearch.umn.edu/bitstream/19735/1/sp02ri01.pdf.
[128] Though, as discussed elsewhere in this Petition, even "agronomic" application rates are not capable of achieving zero discharge.
[129] *Chevron v. NRDC*, 467 U.S. 837, 863-64 (1984) ("the fact that the agency has from time to time changed its interpretation of [a statutory term] does not . . . lead us to conclude that no deference should be accorded the agency's interpretation of the statute").
[130] *Ramaprakash v. FAA*, 346 F.3d 1121, 1124 (D.C. Cir. 2003) (citing *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 852 (D.C. Cir. 1970)).

discharge exemption against challenges from environmental groups, it did so based on deference principles, clearly indicating that other interpretations may be more reasonable.[131]

More than a decade after the *Waterkeeper* decision, there is a growing body of factual evidence demonstrating that the current interpretation is in fact unreasonable because it subverts the central purpose of the Act. Evidence of widespread CAFO pollution escaping CWA regulation necessitates a revision of EPA's current interpretation. EPA must adopt the interpretation that no discharges from CAFOs—including from land application areas under the control of the CAFO—are exempt from the definition of point source pursuant to the agricultural stormwater exemption. Even assuming the *Waterkeeper* court properly deferred to EPA's current interpretation in 2005, a mutually exclusive reading of the two terms is the most reasonable interpretation of the agricultural stormwater exemption because it effectuates the plain language of the statute, which provides that CAFOs are to be regulated as point sources, and aims to eliminate pollution from such sources. EPA's revised interpretation of the agricultural stormwater discharge exemption would be entitled to substantial deference, so long as the Agency provides a reasonable explanation for the revision.[132]

iii. The Language and History of the Statute Indicate Congress' Intent to Regulate All CAFO Pollution

Beginning with the 1972 drafting of the Water Pollution Control Act Amendments, Congress made a policy judgment that CAFO wastes were fundamentally different from other types of agricultural pollution. The 1972 Act Amendments encoded this policy judgment, recognizing that the volume and concentration of waste produced by CAFOs necessitated treating these types of facilities differently than other sources of agricultural pollution.[133] There is no general exemption from compliance with the CWA for agricultural pollution sources. To the contrary, the Act broadly prohibits the "discharge of a pollutant," including agricultural wastes,[134] by any person from any point source, including CAFOs.[135] The Act's default rule therefore requires regulation of CAFOs under the NPDES program, as distinct from other sources of agricultural pollution, which were historically exempt.

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[131] *Waterkeeper Alliance*, 399 F.3d at 507 ("Congress has not addressed the precise issue . . . as a result, the operative question we must consider becomes, pursuant to *Chevron*, whether the CAFO Rule's exemption for 'precipitation-related' land application discharges is grounded in a 'permissible construction' of the Clean Water Act."). In other words, the Court at that time found that EPA's interpretation was a permissible one, but not necessarily the most reasonable or the only reasonable interpretation of the statute. *Id.* at 509.

[132] *Chevron*, 467 U.S. at 863-64; *FCC v. Fox Television Stations*, 556 U.S. 502, 515 (2009). The Supreme Court has noted that agency inconsistency "is not a basis for declining to analyze the agency's interpretation under the *Chevron* framework." *Nat'l Cable & Telecomm. Ass'n v. Brand X Internet Servs.*, 545 U.S. 967, 981 (2005).

[133] *See* S. Rep. No. 92-414, 92-93 (1971), *reprinted in* 1972 U.S.C.C.A.N. 3668, 3670. *See also Cmty. Ass'n for Restoration of the Env't v. Sid Koopman Dairy*, 54 F.Supp.2d 976, 981 (E.D. Wash. 1999) (finding that it would "avoid the clear intent of Congress as expressed in the CWA and by EPA in its NPDES regulations" to exempt discharges resulting from the land application of manure from the definition of "point source").

[134] 33 U.S.C. § 1362(6).

[135] *Id.* §§ 1311(a), 1362(14).

The legislative and regulatory history of the 1987 Amendment, which established the agricultural stormwater exemption, make clear that the terms "agricultural stormwater" and "concentrated animal feeding operation" are most logically read as being mutually exclusive. While Congress did not explain the relationship between the new term "agricultural stormwater" and the existing "concentrated animal feeding operation,"[136] the new language was merely added to the end of the definition of "point source," without any alteration of the existing text. Because there is no indication in the statute or in the legislative history that Congress sought to re–address the status of CAFOs as point sources, the 1987 Amendment cannot be read to amend this existing policy judgment. To the contrary, it is well–settled law that "Congress does not alter a regulatory scheme's fundamental details in vague terms or ancillary provisions."[137]

Here, Congress left no indication that it had reconsidered its reasons for including CAFOs in the definition of point source. Nor did it discuss the definition of "agricultural stormwater" in a way that could justify a departure from the meaning of that term as it was understood at the time. Rather, the 1987 Amendment is best read to codify already–existing exemptions for certain types of non–point source agricultural pollution and clarify that the non-exclusive definition of point source was not intended to sweep such non-CAFO farm runoff into the regulatory scheme. By retaining the term "concentrated animal feeding operation," unqualified, in the definition of "point source," the legislative history makes clear that the addition of the "agricultural stormwater" exclusion was not intended to alter the scope of the NPDES program with respect to CAFOs.

The regulatory history preceding the statutory amendment supports the conclusion that Congress did not intend to include any CAFO–related discharges within the meaning of "agricultural stormwater." Prior to the 1987 Amendment, EPA had already established certain agricultural exemptions from the point source definition through rulemaking. The 1980 CWA implementing regulations excluded certain types of agricultural discharges from NPDES permit requirements.[138] Specifically, the regulations excluded from the permit program "[a]ny introduction of pollutants from non–point–source agricultural and silvicultural activities, including runoff from orchards, cultivated crops, pastures, range lands, and forest lands, *but not discharges from concentrated animal feeding operations*."[139] In other words, while certain non–point source agricultural runoff was exempt from NPDES program requirements under the regulations, waste from CAFOs was not considered non–point source pollution, and was therefore ineligible for the exemption. As such, the 1987 addition of an "agricultural stormwater

[136] *Waterkeeper Alliance*, 399 F.3d at 507 ("the Act makes absolutely no attempt to reconcile the two [provisions]").
[137] *See Whitman v. Am. Trucking Ass'ns*, 531 U.S. 457, 458 (2001).
[138] *Consolidated Permit Regulations: RCRA Hazardous Waste, SDWA Underground Injection Control; CWA National Pollutant Discharge Elimination System; CWA Section 404 Dredge or Fill Programs; and CAA Prevention of Significant Deterioration*, 45 Fed. Reg. 33290, 33442 (May 19, 1980) (codified in relevant part at 40 C.F.R. § 122.3(e)); *see also* 48 Fed. Reg. 14146-01 (Apr. 1, 1983) (reorganized version of permit program requirements).
[139] *Id.* (emphasis added). This exclusion was challenged in *NRDC v. EPA*, No. 80-1607 (filed June 3, 1980), but that challenge was dismissed as a result of the agricultural stormwater discharge amendment in 1987. *See* National Pollutant Discharge Elimination System Permit Requirements, 54 Fed. Reg. 246-01, 247 (Jan. 4, 1989).

discharge" exemption is most reasonably read to codify EPA's then–existing exemption for certain non-CAFO-related agricultural pollution.[140] Congress did not indicate any intent to depart from the existing regulatory scheme, so the agricultural stormwater exemption cannot be read to cover CAFO–related discharges.[141]

Because the current interpretation allows the exception to swallow the rule, EPA must adopt the position that no CAFO–related discharges are exempt from regulation as point source pollution under the agricultural stormwater discharge exemption. EPA has authority to revise its interpretation of the exemption, and the proposal to read "CAFO" and "agricultural stormwater" as mutually exclusive would not only be entitled to substantial deference, but would be the most natural reading of the Act, its legislative history, and its regulatory history. A revised interpretation of the agricultural stormwater exemption would also best implement the policy choice underlying Congress' decision to treat CAFOs as point sources of pollution and its intent to eliminate point source discharges of pollution to waters of the U.S.

c. EPA Must Ensure that Permitting Agencies Co-Permit Integrators and other Operators with Producers

EPA has long understood that entities that "exercise substantial operational control over CAFOs" meet the CWA regulatory definition of "operator" and should therefore be co-permitted or required to hold a separate NPDES permit.[142] In the 2001 proposed CAFO rule, EPA acknowledged that integrators are increasingly exercising control over where CAFOs are located, how they raise animals, and how they manage waste, including through production contracts and direct ownership of CAFO livestock.[143] As EPA pointed out, even in 2001 "[p]roduction contracting dominate[d] U.S. broiler and turkey production," and 40% and 30% of eggs and hogs, respectively, were produced under contract.[144] By 2014 just four companies controlled production of nearly one third of U.S. layer hens, and by 2012 more than 60% of hogs were raised under contract and packers owned more than one in twenty cattle slaughtered.[145]

These dramatic increases in processor consolidation and control over CAFOs directly impacts water quality, in part because CAFOs "tend to locate in close proximity to feed and meat packing plants," which leads to increased concentration and "thus rais[es] the potential for increased environmental pressure in those areas."[146] In the tightly controlled broiler chicken industry, this has led to such regional concentration that "in many regions, the scale at which

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[140] *See Concerned Area Residents for the Env't v. Southview Farm*, 34 F.3d 114, 123 (2d Cir. 1994) (holding that CAFOs, which are defined by the Act as "point sources," are "not to be treated as [] agricultural nonpoint source operation[s]").
[141] *See Whitman v. Am. Trucking Ass'ns*, 531 U.S. at 458.
[142] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3023.
[143] *Id*. at 3024.
[144] *Id*.
[145] *Factory Farm Nation* at 10, 11, 15.
[146] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3024.

chicken litter is produced is far more than crops can absorb."[147] Moreover, "[e]very aspect of the birds' care is regulated by the integrator," and as a result, contract growers "do not have control over the inputs . . . including feed, medication, and the chickens themselves."[148] Many of these inputs, such as pharmaceuticals, will end up in the chicken litter. Integrators' many requirements thereby dictate their contract CAFOs' day to day operations, as well as the location, quantity, and characteristics of the waste they produce.

Because integrators and other corporate entities are a driving force behind so many CAFOs' operations and exercise so much control over them, EPA's 2001 proposed rule solicited input on whether it should establish specific factors, such as ownership of CAFO animals or contractual agreements that dictate CAFO activities, that permitting agencies must consider in identifying "substantial operational control." Recognizing that many of these integrators and other entities already meet the definition of an "operator," EPA explained that its "proposal would *clarify*" that such entities "are subject to NPDES permitting requirements."[149] EPA went further and stated unequivocally that it "believes that ownership of the animals establishes an ownership interest in the pollutant generating activity at the CAFO that is sufficient to hold the owner of the animal responsible for the discharge of pollutants from the CAFO."[150] Despite all of these findings, EPA decided to maintain the status quo in the 2003 final rule.

The past 15 years have demonstrated that EPA's hands-off approach has granted far too much discretion to states. In the absence of clear requirements from EPA explaining which entities meet the definition of an operator and must have permits, permitting agencies are simply not requiring co-permitting. In fact, in 2015 the Center for Progressive Reform found that *no states* are co-permitting integrators with their CAFO producers under their delegated NPDES programs.[151] Just as EPA predicted in 2001, a scheme that leaves operator determinations to the state agency has meant that "the state . . . might not make them at all" and operators have continued to "inappropriately . . . avoid liability."[152]

EPA has more recently revisited the idea that unpermitted integrators are operators and should be permitted. In 2010, EPA issued its Chesapeake Bay Compliance and Enforcement Strategy, which was meant to complement the multi-jurisdictional Chesapeake Bay Total Maximum Daily Loads (TMDL) effort to restore the Bay. In the Strategy EPA named CAFO integrator liability enforcement actions in the Bay region among the "immediate" actions it could

[147] Rural Advancement Foundation International-USA, Under Contract: Farmers and the Fine Print, Viewers Guide 24 (2017), http://rafiusa.org/undercontractfilm/press-kit/.
[148] *Id.* at 20.
[149] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3024 (emphasis added).
[150] *Id.* at 3025.
[151] Ctr. for Progressive Reform, *Integrator Liability: Legal Tools to Hold the Biggest Chicken Companies Responsible for Waste* 3, http://www.progressivereform.org/articles/Integrator_Liability_IssueAlert_1502.pdf (Mar. 2015).

[152] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3025.

take to drive pollution reductions while the Bay states put longer-term TMDL programs into place.[153] More than six years later, it has failed to initiate any such actions, and took no action to support citizen litigants when they sued Perdue in federal court for illegal discharges from a Maryland contract operation.[154]

Corporations such as Perdue and Tyson exercise substantial control over their contractors' production process and collect the profits generated. In light of their substantial stake in the venture, they should share in the liability that may result from discharges. Placing the entire permitting burden on producers is not only unfair, but also inefficient: if contracted farmers are wholly liable for the costs associated with water pollution, the integrators who control their operations will have no incentive to minimize the extent of such pollution. Co-permitting integrators would be an equitable step that would also create a sensible incentive scheme and likely to lead to the development of more cost-effective waste management systems.

EPA has already established that many of these corporate entities are CWA operators, but it must now clarify by regulation which entities meet the definition of an operator and are required to obtain NPDES permits. It will be entitled to substantial deference for a reasonable articulation of "substantial operational control," similar to that proposed in 2001. However, EPA must establish a more bright-line test for substantial operational control, rather than leaving that determination to state permitting agencies as previously proposed.[155] In light of the lack of integrator liability for operators that exercise increasing control over CAFOs and their pollution, a failure to impose unambiguous co-permitting requirements on integrators and state permitting agencies would be arbitrary and capricious.

d. EPA Should Revise the CAFO and Production Area Definitions and Designation Authorities, 40 C.F.R. § 122.23(b)-(c)

EPA should revise the definition of production area to resolve uncertainty created by courts, and should revise the CAFO definitions because as written, the current definitions prevent effective regulation of medium and small AFOs that are nonetheless significant sources of water pollution. Moreover, they create incentives for operators to avoid regulation by maintaining herd sizes just below the regulatory threshold. Specifically, EPA should revise its

[153] EPA Office of Enforcement and Compliance Assurance, Chesapeake Bay Compliance and Enforcement Strategy 4 (May 2010), http://www.epa.gov/oecaerth/civil/initiatives/chesapeake-strategy-enforcement.pdf.

[154] *See Waterkeeper Alliance, Inc. v. Alan Hudson*, No. WMN–10–487, 2012 WL 6651930 (D. Md. Dec. 20, 2012). Perdue ultimately prevailed in this case when the court did not find sufficient proof of a discharge from the broiler operation. But the judge's prior order denying Perdue's Motion to Dismiss recognized that integrators who exercise sufficient control over contractors may be held liable as CWA operators. Memorandum on Motions to Dismiss, *Assateague Coastkeeper et al. v. Alan and Kristin Hudson Farm et al.*, 727 F. Supp. 2d 433 (D. Md. Jul. 21, 2010).

[155] *See* 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3025 ("The proposed regulations would provide that a person is an 'operator' when 'the Director determines' that the person exercises substantial operational control over the CAFO.").

CAFO definitions to either eliminate or shrink the "Medium CAFO" category and to make it easier for both state agencies and EPA to designate a Small (or Medium, if EPA retains that category) AFO as a CAFO, such that facilities with the same environmental impact as Large CAFOs are subject to the same degree of environmental regulation.[156]

i. EPA Should Revise the Definition of Production Area

EPA's existing definition of "production area" is appropriately broad and non-exclusive. A reasonable interpretation of this definition should ensure that all Large CAFO-related discharges are subject to the ELGs if they are not from land application areas, and should preclude any application of the agricultural stormwater exemption to discharges from non-land application areas associated with a CAFO. However, the 2014 *Alt v. EPA* decision adopted a strained interpretation of the production area, creating the new concept of a CAFO "farmyard" that it declared eligible for the agricultural stormwater exemption, and thereby created uncertainty where none had previously existed.[157] EPA failed to appeal that erroneous District Court decision, and must now eliminate any purported ambiguity or regulatory gaps through its rulemaking authority.

Of course, if EPA acts to properly limit the scope of the agricultural stormwater exemption, that revision would remedy much of the uncertainty created by *Alt*. However, EPA should additionally clarify the scope of the production area to ensure that all areas associated with the CAFO facility are subject to the CAFO ELGs. EPA can do this by simply adding language to the existing production area definition explaining that each CAFO has a single, contiguous production area that encompasses all listed aspects of the operation and all areas in between, and that the agricultural stormwater exemption may never be applied to discharges from the CAFO production area.

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[156] The regulations divide AFOs into three groups—Large, Medium, and Small, based on the number of animals raised at the facility. All large AFOs are considered Large CAFOs, based solely on the size threshold. But a Medium AFO is only considered a CAFO if it both meets the specified size threshold and satisfies one of two conditions: (1) the facility must discharge pollutants to a water of the U.S. through a man–made ditch, flushing system, or other similar man–made device; or (2) the facility must discharge pollutants directly into a water of the U.S which originates outside of and passes over, across, or through the facility, or otherwise comes into direct contact with the animals confined in the facility. "Small CAFO" is defined in the regulations as any AFO "that is designated as a CAFO and is not a Medium CAFO." Irrespective of size threshold, AFOs can be designated as CAFOs by the appropriate NPDES permitting authority if, upon inspection of the operation, the authority determines that the facility "is a significant contributor of pollutants to waters of the United States." 40 C.F.R. § 122.23(b)-(c). In making this designation, permitting authorities are directed to consider: (1) the size of the AFO and the amount of waste reaching waters of the U.S.; (2) the location of the AFO relative to jurisdictional waters; (3) the means of conveyance of animal wastes and process waste waters to waters of the U.S.; (4) the slope, vegetation, rainfall, and other factors affecting likelihood or frequency of discharge; and (5) other relevant factors. *Id.* § 122.23(c)(2).

[157] *Alt v. EPA*, 979 F. Supp. 2d 701, 711 (N.D. W. Va., Oct. 23, 2013).

ii. EPA Should Revise or Eliminate the "Medium CAFO" Category

While the environmental concerns associated with many Medium AFOs differ only in scale, not type, from those caused by Large CAFOs, EPA's default position under the current regulations is to leave the former unregulated. However, there is evidence that Medium AFOs are significant polluters,[158] and EPA's current approach does not adequately ensure that polluting Medium AFOs are designated as CAFOs or that designated CAFOs are sufficiently regulated.

The current definition of "Medium CAFO" inhibits effective regulation of these facilities in two ways. First, a Medium AFO can only be defined as a CAFO if the operation discharges from the production area directly or via a manmade conveyance, and can only be designated as a CAFO after an on–site inspection demonstrates that it is a significant contributor of pollutants to a water of the U.S.[159] This means that Medium AFOs have no incentive or obligation to seek NPDES permit coverage until they have been caught directly discharging into a jurisdictional water, nor do they have any incentive or obligation to control their land application discharges. Even the most egregious over-application of waste on cropland or application in circumstances that lead to discharges are not grounds for CAFO designation. As discussed elsewhere in this Petition, even permitted CAFOs' NMPs are not "zero discharge" plans; the application practices of facilities with no plans whatsoever are even more likely to lead to discharges. Second, even where Medium (or Small) AFOs are designated as CAFOs, EPA has not promulgated federal ELGs for these facilities, leaving permitting authorities to establish BPJ effluent limitations for these operations on an ad hoc basis.[160]

Despite EPA's failure to comprehensively track the nation's CAFOs, literature and anecdotal evidence indicate that the current size–based Large CAFO definition has incentivized AFO operators to skirt environmental regulations by maintaining animal numbers just under the Large CAFO threshold. One empirical study found, for example, that in the four years after promulgation of the 2003 CAFO Rule, "7.7% of potentially regulated operations near the threshold 'avoided' [regulation] by remaining just below the cutoff."[161] The same study found that "avoidance" is even more prominent among new facilities than among existing

[158] *See, e.g.*, J. Mark Powell, et al., *Environmental Policy and Factors that Impact Manure Management on Wisconsin Dairy Farms*, Proceedings of the Symposium on the State of the Science of Animal Manure 3-4 (2005) (Wisconsin dairy farms with small and medium herd sizes have the lowest manure collection rates, and are often located close to streams or springs; these farms may require "particular attention" with respect to manure management).

[159] 40 C.F.R. §§ 122.23(b)(6), (c).

[160] *Id.* § 412; Permit Writers' Manual at 4-17; EPA, *Producers' Compliance Guide for CAFOs* 5 (2003), https://www.epa.gov/sites/production/files/2015-06/documents/compliance-cafos.pdf.

[161] Stacy Sneeringer and Nigel Key, *Effects of Size-Based Environmental Regulations: Evidence of Regulatory Avoidance*, 93 Am. J. Agric. Econ. 1189, 1190 (2011), http://faculty.smu.edu/millimet/classes/eco7377/papers/sneeringer%20key%202011.pdf.

operations.[162] Summarizing its findings, the study concluded that increased numbers of operations just under the regulatory thresholds between 1997 and 2007 coincided with increased environmental regulations—namely EPA's 2003 CAFO Rule.[163]

Producer–oriented publications from various agricultural extension networks further support this common–sense finding. In a document entitled "How to Avoid CAFO Status," soil specialists at the Colorado State University Cooperative Extension recommended that AFO operators inspect their facilities to determine whether any of the size or discharge criteria that would render such facilities CAFOs were met—and if so, "change it, so you won't be defined or designated as a CAFO in the future."[164]

While EPA adopted this three–tiered system in order to ease states' burdens in revising CAFO regulations, many of which had included this structure prior to the 2003 Rule,[165] as implemented, this system arbitrarily exempts a large number of operations approaching the Large CAFO size threshold and their land application practices from regulation, and encourages circumvention of laws governing permitted facilities. Given these failings, EPA should either eliminate the "Medium CAFO" category altogether and expand the Large CAFO category to include these facilities, or remove the requirement that a Medium AFO directly discharge from the production area to qualify as a CAFO. Such a revision, particularly if made in conjunction with the proposed revision to the agricultural stormwater exemption, would bring many discharging Medium AFOs into the NPDES permit program and significantly benefit water quality.

iii. EPA Should Impose Meaningful Limits on States' Discretion in Designating AFOs as CAFOs

Current CAFO regulations allow states an inordinate amount of discretion in determining whether to regulate Small or Medium AFOs by designating them as CAFOs. Such a designation requires that a facility be "a significant contributor of pollutants to waters of the United States."[166] The term "significant" is not defined in the regulations, however, so state permitting authorities have an enormous amount of leeway in determining whether to designate an AFO as

[162] *Id.* at 1202 (noting that "new entrants exhibit a 10.5% avoidance rate, while that for continuing operations is only 5.2%").
[163] *Id.* at 1207-09; *see also* Bradley Crawford, *Going Half Hog: CAFOs Downscale in the Face of Regulation*, Chicago Policy Review (May 3, 2012), http://chicagopolicyreview.org/2012/05/03/going-half-hog/.
[164] Jessica G. Davis, How to Avoid CAFO Status, Colorado State University Cooperative Extension.
[165] *See* 2003 CAFO Rule, 68 Fed. Reg. at 7189-90 (stating that eliminating the three-tier structure "at this point in time would be unnecessarily disruptive in a number of States that currently have three-tier CAFO programs in place.").
[166] 40 C.F.R § 122.23(c). In making this designation, permitting authorities are directed to consider: (1) the size of the AFO and the amount of waste reaching waters of the U.S.; (2) the location of the AFO relative to jurisdictional waters; (3) the means of conveyance of animal wastes and process waste waters to waters of the U.S.; (4) the slope, vegetation, rainfall, and other factors affecting likelihood or frequency of discharge; and (5) other relevant factors. *Id.* § 122.23(c)(2).

a CAFO. Moreover, this term is so vague that it essentially precludes citizens from contesting the determination of the state agency.

While the regulations provide an open–ended list of criteria that permitting authorities may consider in making such a determination, the rules give no indication of how permitting authorities are to weigh these criteria. The complete lack of standards or accountability for state designation of Small CAFOs, in practice, renders this tier of the CAFO definition a nullity, despite the fact that even Small AFOs can cause large discharges and severe water quality impacts.[167] EPA should therefore revise the definition of "Small CAFO" to apply the current criteria for the Medium CAFO definition – if a Small AFO discharges from the production area, it should be defined as a CAFO. It simply defies logic to permit direct discharges from any size of AFO into jurisdictional waters without imposing basic NPDES permit requirements. Finally, EPA should expand its own authority to designate an AFO as a CAFO in other circumstances when the state permitting agency fails to act. This authority should not hinge on a finding that an AFO is contributing to a downstream water quality impairment.[168]

Overall, EPA's current CAFO regulations have failed to effectively bring discharging CAFOs and AFOs into the NPDES program, and EPA must establish presumptions that certain CAFOs discharge, close the agricultural stormwater loophole, affirm that integrators who qualify as operators must obtain permits, and update its CAFO definitions to reflect the fact that a functional program must better control pollution from Medium and Small AFOs. Any course of action short of adopting this set of revisions will allow the status quo of unregulated CAFO pollution to continue.

B. EPA Must Strengthen CAFO NPDES Permits to Adequately Protect Water Quality

Under EPA's current regulations and effluent guidelines, even the minority of CAFOs that have NPDES permits are inadequately regulated. The regulations applicable to all CAFOs purport to require CAFOs to maintain adequate waste storage and implement NMPs, and the effluent guidelines applicable to Large CAFOs further impose a zero discharge requirement on the production area under most circumstances and require various best management practices and minimization of runoff from land application areas. Yet the CAFO rules suffer from unclear language and fail to require the basic water quality monitoring required of virtually every other point source category, instead relying only on annual reports of waste applications. Such

[167] *See, e.g.*, Adam Rodewald, Green Bay Press-Gazette, Manure Spills Putting Water Supply at Risk (Feb. 8, 2015), http://www.greenbaypressgazette.com/story/news/investigations/2015/02/06/manure-spills-water-supply/22983669/; Bob Dohr, Green Bay Press-Gazette, One Million Gallons of Manure Dumped in Spencer Wetland (Aug. 13, 2014), http://www.greenbaypressgazette.com/story/news/local/2014/08/12/farm-cited-manure-discharge/13983497/ (discussing a 120-head Wisconsin dairy that spilled an estimated one million gallons of manure from a storage tank into a wetland and the Eau Pleine River between 2013 and 2014).
[168] 40 C.F.R. § 122.23(c)(1).

monitoring is essential, particularly given the other weaknesses in EPA's permit scheme. EPA's CAFO ELGs do not apply to Small or Medium CAFOs, leaving these permits' limits up to states. The ELGs also fail to prohibit certain practices that inherently pose threats to water quality from both the production and land application areas, and rely on state-based nutrient management requirements derived to maximize crop yield, rather than protect water quality. This approach addresses CAFO waste as though it is merely manure, and as a result EPA has also entirely overlooked numerous pollutants of concern.

To ensure that CAFO permits adequately protect water quality and provide necessary transparency and enforceability, EPA must adopt common-sense waste management and monitoring requirements, strengthen the basic requirements applicable to all CAFOs, regulate all important CAFO pollutants through the CAFO ELGs, and otherwise strengthen the CAFO ELGs to prohibit practices known to harm water quality.

a. EPA Must Strengthen and Clarify the Requirements Applicable to All CAFOs, 40 C.F.R. § 122.42(e)

While it is commendable that EPA has established industry-specific regulations for CAFO NPDES permits in addition to the ELGs, unlike many other regulated industries, the regulations lack clarity and accountability. The Large CAFO ELGs do not adequately make up for these shortcomings.

i. EPA Must Require Water Quality Monitoring in CAFO NPDES Permits

EPA has long failed to require CAFOs to meet one of the most basic requirements of NPDES permits—water quality monitoring capable of assuring compliance with permit terms. The CWA's permitting provisions require that NPDES permits contain conditions, including conditions on data collection and reporting, to "ensure compliance" with the Act.[169] The accompanying CWA regulations clearly require all NPDES permits to include certain monitoring and reporting requirements designed to "assure compliance with permit limitations . . . ."[170] These include, *inter alia*, "requirements to monitor" "[t]he mass (or other measurement specified in the permit) for each pollutant limited in the permit," "[t]he volume of effluent discharged from

[169] 33. U.S.C. § 1342. *See also NRDC v. EPA*, 808 F.3d 556, 580 (2d Cir. 2015) ("Under the CWA, NPDES permits must contain conditions that require both *monitoring* and *reporting of monitoring results* of TBELs and WQBELs to ensure compliance.").

[170] 40 C.F.R. § 122.41(i)(1). Moreover, because these monitoring requirements apply to all NPDES permits, EPA's rejection of groundwater and surface water monitoring requirements in determining BAT for the CAFO industry, and the *Waterkeeper* court's deference to EPA's rejection of groundwater monitoring, is irrelevant to this consideration. The question of surface water monitoring as part of BAT was not before the court, nor was the question of surface water monitoring as a general requirement of NPDES permits. *Waterkeeper Alliance*, 399 F.3d at 513-15.

each outfall," or "[o]ther measurements as appropriate."[171] Permit monitoring provisions must further specify the "type, intervals, and frequency [of sampling] sufficient to yield data which are representative of the monitored activity, including, when appropriate, continuous monitoring."[172] Permittees must report monitoring results "on a frequency dependent on the nature and effect of the discharge, but in no case less than once a year."[173] In light of these statutory and regulatory requirements, "[g]enerally, 'an NPDES permit is unlawful if a permittee is not required to effectively monitor its permit compliance.'"[174]

CAFOs are point sources subject to these permitting provisions, and persistent pollution from these sources has demonstrated that facility-level effluent monitoring on or adjacent to CAFO production and land application areas is necessary to meet the objectives of the CWA. Yet permitting agencies have overwhelmingly failed to incorporate any of these required monitoring provisions into CAFO NPDES permits. EPA must fill this regulatory gap by directly addressing monitoring in the CAFO regulations. To properly implement compliance monitoring, CAFO permits must require monitoring for, *inter alia*, pH, total nitrogen, ammonia nitrogen, nitrate, total phosphorus, specific conductance, biochemical oxygen demand, fecal coliform, temperature, and total suspended solids,[175] and must require such monitoring at points of discharge from the production and land application areas, as identified on a site-specific basis by a certified nutrient management planner. CAFO monitoring plans must be designed based on consistent EPA criteria for representative sampling and subject to public notice and comment prior to permit issuance.

EPA rejected water quality monitoring requirements in the 2003 CAFO Rule, citing "concerns regarding the difficulty of designing and implementing" an effective monitoring program, and "because the addition of in-stream monitoring does not by itself achieve any better controls on the discharges from CAFOs . . . ."[176] EPA did not revisit that decision in the 2008

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[171] 40 C.F.R. § 122.44(i).
[172] 40 C.F.R. §§ 122.48(b), 122.44(i)(1). *See also* 40 C.F.R. § 122.41(j)(1). Section 308 of the CWA provides further support for monitoring, stating that "whenever [it is] required to carry out the objective" of the CWA, a permitting agency "(A) shall require the owner or operator of any point source to . . . (iii) install, use, and maintain such monitoring equipment or methods . . . as may reasonably be require[d]." 33 U.S.C. § 1318(a)(1)(A)(iii).

[173] 40 C.F.R. § 122.44(i)(2). The regulations further set out required monitoring methodologies, 40 C.F.R. § 136, and state that all NPDES permits must specify "[r]equirements concerning the proper use, maintenance, and installation, when appropriate, of monitoring equipment or methods." 40 C.F.R. § 122.48(a).
[174] *NRDC v. EPA*, 808 F.3d at 583, quoting *NRDC v. Cty. of L.A.*, 725 F.3d 1194, 1207 (9th Cir. 2013).
[175] *See, e.g.*, Ca. Reg'l Water Quality Control Bd., North Coast Region, General NPDES Permit No. CAG011001, NPDES Permit for CAFOs, Attachment E – Monitoring and Reporting Program at E-4 [hereinafter CA CAFO Permit], http://www.waterboards.ca.gov/northcoast/water_issues/programs/dairies/pdf/120127/npdes/120127_12_0001_NPDES_CAFO.pdf. This California CAFO General Permit requires surface and groundwater monitoring for numerous pollutant parameters. EPA should also require monitoring for additional pollutants of concern added to the CAFO ELGs, as proposed *infra*.
[176] 2003 CAFO Rule, 68 Fed. Reg. at 7217.

CAFO Rule.[177] But while EPA may believe that CAFO monitoring is more difficult than with other point source industry sectors, there are no exemptions from these basic compliance monitoring requirements. Moreover, various states have demonstrated that such monitoring is in fact practicable and affordable. California, for example, issues CAFO permits with representative effluent monitoring requirements for numerous CAFO pollutants of concern at both production and land application area discharge points.[178] Maryland also has language in its CAFO General Permit authorizing the state to require operators to design a monitoring plan to sample various manure pollutants and pesticides that could be present at potential production and land application area discharge points, to "evaluate the effectiveness" of the facility's nutrient management plan and thereby assure compliance.[179] Contrary to EPA's 2003 findings, it is now practicable to design and implement such CAFO monitoring requirements.

Outside of the CAFO permitting context, other states have found it possible to derive monitoring methods for pollution runoff from agricultural operations, or to require operations to derive their own methods on a case-by-case basis. The emergence of pollution credit trading programs has created the incentive for such monitoring to verify agricultural credit generation where states do not merely rely on modeling, such as in Oregon, where the creation of credits must be accompanied by a monitoring plan, and Ohio, where soil and water conservation professionals must monitor water quality to assess the effectiveness of agricultural credit sellers' practices.[180] Evidently it is possible to develop representative monitoring of pollution from agricultural sources when those sources and permitting agencies have the incentive to do so; EPA cannot credibly claim that such monitoring is impracticable or ineffective while concurrently allowing states to use similar methods to verify credits and ostensibly demonstrate permit compliance in trading programs.

No existing CAFO requirements satisfy these monitoring requirements. The limited manure and soil nutrient sampling required under EPA's regulations is helpful in attempting to determine an agronomic rate for waste application, but does not provide any information relevant to the CWA's requirement that NPDES permits must assure compliance with water quality

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[177] No group challenged this deficiency of the 2003 and 2008 CAFO Rules, and no court has upheld the agency's decision to ignore these requirements.

[178] CA CAFO Permit at Attachment E.

[179] Md. Dep't of the Env't, General Discharge Permit for Animal Feeding Operations, Part V.A. (Dec. 1, 2014), http://www.mde.state.md.us/programs/Land/RecyclingandOperationsprogram/AFO/Documents/gd_permit%20signed.pdf.

[180] *See, e.g.,* Oregon Water Quality Trading Program Regulations, OAR 340-039-0025(5)(g), http://arcweb.sos.state.or.us/pages/rules/oars_300/oar_340/340_039.html; Ohio Water Quality Trading Regulations, OAC 3745-5-04(K), http://epa.ohio.gov/portals/35/rules/05-04.pdf. While these two programs are not specifically designed to assure compliance with effluent limitations and leave too much discretion to individual agricultural polluters to design monitoring plans, they demonstrate that such site-by-site agricultural monitoring requirements do not suffer from the "prohibitive[] expens[e]" or "severe technological limitations" necessary for EPA to lawfully omit them from CAFO permits. *See NRDC v. EPA*, 808 F.3d at 582.

standards[181] or EPA's CAFO ELG requirements to prevent production area discharges and minimize the potential for nutrient pollution from land application fields. EPA's regulations applicable to all NPDES permits speak for themselves, and must be given effect in permitting of CAFOs. In place of the 'honor system' currently in effect, EPA must require all permitted CAFOs to conduct periodic, representative water sampling and submit the results regularly via discharge monitoring reports—just like other industries are required to do. Absent such monitoring requirements, determining CAFO compliance with permit provisions becomes essentially impossible and CAFOs cannot reliably be held accountable for violations of permit terms.

ii. EPA Must Strengthen Annual Reporting Requirements

EPA should add to the CAFO annual reporting requirements, 40 C.F.R. § 122.42(e)(4). The annual report should of course include the results of the water quality monitoring discussed *supra*, though these results should also be submitted the permitting agency and EPA and made available to the public within 30 days of the monitoring event. The annual report should also include a summary of any discharges from land areas under the control of the CAFO; currently only production area discharges are subject to annual reporting requirements. In addition, the annual report should include not only the estimated amount of manure transferred to other persons, but also all of the manure transfer documentation that CAFOs are currently required only to keep on site pursuant to 40 C.F.R. § 122.42(e)(3). These common-sense additions to the existing annual report requirements will provide regulators and the public with far more of the information they need to assess a facility's compliance status without imposing significantly greater administrative burdens on permittees.

b. EPA Must Revise the Large CAFO Effluent Guidelines, 40 C.F.R. § 412

EPA's Large CAFO ELGs purport to prevent all production area discharges, absent a major storm event, and minimize the potential for nutrient runoff from land application.[182] Specifically, land application practices must be subject to best management practices (BMPs) specified in 40 C.F.R. § 412.4.[183] BMPs for land application include the requirement that a CAFO utilizing land application develop a nutrient management plan meeting nine minimum

[181] 40 C.F.R. § 122.4(d). For the same reason, EPA's 2003 rejection of monitoring in part because monitoring does not itself reduce CAFO pollution, 68 Fed. Reg. at 7217, is not a valid reason to omit monitoring requirements because as explained, that is not the purpose of monitoring requirements. Monitoring is required to demonstrate compliance, not to achieve it.
[182] 40 C.F.R. § 412.31(a) (explaining BPT for dairy cows and cattle other than veal calves); 412.32 (explaining BCT for the same); 412.33 (explaining BAT for the same); 412.43 (explaining BPT for swine, poultry, and veal calves); 412.44 (explaining BCT for the same); 412.45 (explaining BAT for the same).
[183] *See also* 40 C.F.R. §§ 412.31(b); 412.33(b); 412.43(b); 412.44(b); 412.45(b).

elements;[184] determine application rates for manure, litter, and other process wastewater that minimize phosphorous and nitrogen transport to surface waters; sample and analyze manure and soil; inspect land application equipment for leaks; and comply with setback requirements.[185]

But as evidenced by manure spills and widespread water contamination, these ELGs are failing to adequately control CAFO pollution. The regulations only require states to set BPJ limits for pollutants from Medium and Small CAFOs, ignore numerous pollutants of concern, leave various waste pathways unregulated, and fail to prohibit practices that are known to harm water quality and that prevent CAFOs from meeting narrative effluent limits. In short, they fall far short of representing the appropriate level of technology for reducing CAFO pollution.

i. The CAFO ELGs Should Apply to All CAFOs

In the 2001 CAFO rule preamble, EPA considered broadening the applicability of the CAFO ELGs beyond Large CAFOs to establish broader water quality protections and more uniform permit requirements, but its final 2003 rule maintained the status quo established in the 1970's.[186] EPA's rationale for leaving Small and Medium CAFO technology-based effluent limit determinations up to state permit writers was primarily out of a concern for flexibility and cost-effectiveness, as well as a finding that smaller facilities were more likely to have adequate land for manure disposal.[187] But the past decade has shown that the current approach is inadequate to protect water quality, and this is one aspect of the regulations where EPA could easily improve the quality and consistency of permits for a class of operations. If EPA applies the CAFO ELGs to all CAFOs, it will lessen the resource burden on state permit writers and improve water quality outcomes from this category of NPDES permits. Moreover, if EPA adopts certain rule changes discussed *supra*, particularly the revised Medium CAFO and agricultural stormwater definitions, far more facilities currently classified as non-CAFO AFOs will be subject to NPDES permitting requirements, increasing the cost benefits of uniform ELGs for state agencies and the

[184] NMP requirements are spelled out in 40 C.F.R.§ 122.42, which requires that NMPs: (1) ensure adequate storage of manure, litter, and process wastewater; (2) ensure proper management of mortalities; (3) ensure that clean water is diverted from the production area; (4) prevent direct contact of confined animals with waters of the U.S.; (5) ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water or treatment system; (6) identify appropriate site specific conservation practices to be implemented (BMPs); (7) identify protocols for testing of manure, litter, process wastewater, and soil; (8) establish protocols to land apply manure, litter, or process wastewater in accordance with site specific nutrient management practices; and (9) identify records that will be maintained to document implementation and management of these requirements. 40 C.F.R. § 122.42(e)(1)(i)-(ix).

[185] 40 C.F.R. § 412.4(c)(1)-(5). The regulations also provide two alternatives to compliance with setback requirements. CAFOs can instead implement vegetated buffers meeting certain standards, or demonstrate that alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent to, or better than, the otherwise required setback. 40 C.F.R. § 412.4(c)(5).

[186] 2003 CAFO Rule, 68 Fed. Reg. at 7208.

[187] *Id*.

regulatory certainty for operators.[188] At the very least, EPA should revisit its analysis of whether certain size classes of CAFOs have adequate land base for manure disposal, as this is a primary basis for EPA's differential treatment of these operations. The updated analysis should rely on current data and acknowledge the gaps in EPA's information about the CAFO universe, adopting conservative assumptions where critical information is unavailable.

ii. EPA Must Establish Application Disclosure requirements, BAT and NSPS Limits, and Monitoring Requirements for Additional CAFO Pollutants of Concern

EPA's long-standing approach to regulating CAFO discharges is reliant on the fundamental misconception that CAFO waste is comprised solely of manure. This approach has led EPA to disregard numerous pollutants of concern and instead simply regulate fecal coliform and certain constituents of CAFO waste that have agronomic value. This failure to establish BAT and NSPS limits for numerous pollutants that are not even currently disclosed in permit applications, in combination with the regulations' failure to require basic water quality monitoring, has led to a regulatory scheme in which CAFOs can use unknown combinations and quantities of metals, pharmaceuticals, cleaning products, and synthetic hormones, and then dispose of what ends up in the waste stream without demonstrated, effective controls. EPA must require CAFOs to disclose their use of these pollutants in permit applications, analyze the most effective means to prevent discharges of these pollutants, which are generally not agronomically useful and cannot be assumed to be utilized by crops, establish BAT and NSPS standards for CAFOs to control these pollutants, and incorporate these standards into the CAFO ELGs.

EPA's NPDES regulations require most applicants for NPDES permits to disclose pollutants of concern in their discharge in their permit application. For example, industrial facilities and large publicly owned treatment works must disclose any of a long list of hazardous substances if they will likely be present in their effluent, and provide monitoring data.[189] This is the only way for a permitting agency to ensure that it has established adequate limits to protect water quality, and a lack of such information hinders public participation in the permitting process. But inexplicably, EPA does not require CAFOs to disclose any pollutants beyond providing the quantity of "manure, litter, and wastewater" generated.[190] EPA must remedy this by establishing effluent limits on the full suite of CAFO pollutants of concern and incorporating application disclosure requirements into CAFO permit application Form 2B.

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[188] Even if EPA adopts the recommended changes to the CAFO definitions, which would re-define certain CAFOs as Large CAFOs, broadening the applicability of the ELGs to all CAFOs would benefit water quality and streamline permitting for state agencies—particularly if adopted in conjunction with the proposals, discussed *infra*, to strengthen the ELGs and make them more protective of water quality.
[189] 40 C.F.R. §§ 122.21(2)(i), (iv); EPA NPDES Forms 2A and 2C.
[190] EPA NPDES Form 2B.

Each of the constituents listed above meets the CWA definition of a "pollutant." Most of these substances are added to livestock feed, and EPA has established that the significant majority ends up in the animals' manure. EPA regulates the various heavy metals sometimes used by CAFOs as feed additives as priority pollutants, and has noted their harmful impacts on aquatic life, as well as crops and public health.[191] Pharmaceuticals and synthetic hormones added to livestock feed also plainly constitute pollutants. The CWA's broad pollutant definition includes all "biological materials," which clearly include biological pharmaceutical additives. And in the case of non-biological pharmaceutical and hormone agents, once they have fulfilled their purpose and been excreted in livestock waste, they are no longer serving a useful purpose and qualify as "chemical wastes."[192]

EPA acknowledges that its CAFO ELGs do not address all pollution that CAFOs discharge from the production area,[193] but it also fails to address other important pollutants discharged from both production and land application areas, and state permitting agencies are not acting to fill either of these gaps. Although permitting agencies are required to establish BPJ limits for pollutants that are not regulated under ELGs,[194] Petitioners are unaware of any state or EPA permits that address these pollutants, likely due both to the lack of CAFO monitoring requirements and the fact that the agricultural stormwater loophole enables states to simply assume without evidence that there are only minimal point source discharges of these constituents of CAFO waste. EPA and state agencies are not free to ignore these pollutants altogether, and the only reasonable way to ensure that permits adequately control all relevant pollutants is to establish BAT and NSPS standards for these pollutants and address them in the CAFO ELGs.

In addition to analyzing the availability of BMPs to reduce runoff from CAFO production and land application areas, the Agency has abundant recent evidence to inform an analysis of the costs of reducing or removing various feed additives from the waste stream altogether. Examples of tested pollution-reduction strategies include voluntary actions to remove arsenicals from poultry feed and certain companies' decisions to reduce use of medically important antibiotics, in both cases without any significant adverse economic consequences.[195] CAFO operators have the

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[191] *See* 40 C.F.R. § 423, App. A; 76 Fed. Reg. at 65434.
[192] 33 U.S.C. § 1362(6); *Nat'l Cotton Council*, 553 F.3d at 935-38.
[193] EPA has noted that the current CAFO ELGs do not address "plate chiller waste, filter backwash water, chemicals used in the production area (for disinfection) or pollutants that have fallen to the ground immediately downward from confinement building exhaust ducts and ventilation fans and are carried by precipitation-related or other runoff to waters of the US." Permit Writers' Manual at 4-18. This does not acknowledge metals, pharmaceuticals, or other pollutants of concern.
[194] *See* Hanlon BPJ Memo at Attachment A, pgs. 1-2 ("[A]n authorized state must include technology-based effluent limitations in its permits for pollutants not addressed by the effluent guidelines for that industry. 33 USC § 1314(b); 40 CFR § 122.44(a)(1), 123.25, 125.3. In the absence of an effluent guideline for those pollutants, the CWA requires permitting authorities to conduct the "BPJ" analysis discussed above on a case-by-case basis for those pollutants in each permit.").

[195] In fact, recent USDA research indicates that the economic impact on producers of banning all growth promoting antibiotics—not only those used in human medicine—would be minimal. *See, e.g.*, Stacy Sneeringer, James

ability to directly and significantly reduce the presence of metals and pharmaceuticals in their waste stream through modifying livestock feed inputs, and EPA cannot simply assume that the existing ELGs adequately address these pollutants. Some of these pollutants do not naturally break down or die like coliform bacteria, and may run off or move through soils differently than other pollutants, rendering different BMPs more effective at reducing their discharges and necessitating different BAT requirements.

Regarding metals, EPA's 2003 Rule estimated that the proposed regulations would only reduce Large and Medium CAFOs' metal discharges by 5%, and that assumed incorrectly that all Large CAFOs would obtain permits.[196] Given the low rates of permitting since, it follows that any reductions in metal pollution from the recent series of CAFO regulations have been negligible. EPA needs to address these pollutants directly by independently analyzing what technologies and practices are currently available to obtain results that are more protective of water quality. A useful analogy is sewage sludge, which shares certain characteristics with animal waste. EPA's sewage sludge application regulations impose metal concentration, cumulative loading, and annual loading limits. This is a stark example of EPA's inconsistent approaches to regulating human and animal wastes, and also provides a logical starting point in assessing BAT for CAFO applications of these pollutants.[197]

iii. The CAFO ELGs' NMP Requirements Must Prioritize Protecting Water Quality

Even in the absence of discharge monitoring requirements and the data they would provide, it is apparent that EPA's reliance on states to establish effective nutrient management requirements has failed to protect water quality. The CAFO regulations must provide a stronger backstop against weak state permitting provisions. Specifically, EPA must establish stronger federal requirements to minimize harmful runoff, rather than relying almost solely on NMPs and on state-promulgated technical standards.

MacDonald, et al., *Economics of Antibiotic Use in U.S. Livestock Production*, ERR-200, USDA Econ. Res. Serv. 55 (Nov. 2015), https://www.ers.usda.gov/webdocs/publications/err200/55529_err200.pdf?v=42401; Choices, Economics of Antibiotic Use in U.S. Swine and Poultry Production (2015), http://www.choicesmagazine.org/choices-magazine/theme-articles/theme-overview/economics-of-antibiotic-use-in-us-swine-and-poultry-production. Research has also indicated that "[s]ome antibiotics no longer work as growth promoters or yield a result so slight that the additional profit does not even cover the cost of the antibiotics, yielding a net loss." Food & Water Watch, *Antibiotic Resistance 101: How Antibiotic Misuse on Factory Farms Can Make You Sick* 13 (Mar. 2015), http://www.foodandwaterwatch.org/sites/default/files/Antibiotic%20Resistance%20101%20Report%20March%202015.pdf, citing Bonnie Marshall and Stuart Levy, *Food Animals and Antimicrobials: Impacts on Human Health*, 24 Clinical Microbiology Reviews 718, 723 (2011); S.S. Dritz et al., *Effects of Administration of Antimicrobials in Feed on Growth Rate and Feed Efficiency of Pigs in Multisite Production Systems*, 220 J. Am. Veterinary Med. Ass'n. 1690, 1690 (2002); J.P. Graham et al, *Growth Promoting Antibiotics in Food Animal Production: An Economic Analysis*, 121 Public Health Reports 79, 79 (2006).

[196] 2003 CAFO Rule, 68 Fed. Reg. at 7239.
[197] 40 C.F.R. § 503.13.

Research increasingly demonstrates that CAFO NMPs and other BMPs do not minimize pollution to the degree previously assumed. NMPs are designed to optimize crop yield, by specifying agronomically optimal nutrient goals, and therefore are not designed to minimize runoff to surface and ground water. Even when nutrient management planners have created site-specific nutrient application standards, inaccuracies in estimates of water delivery and utilization by crops and differential nutrient uptake rates by plants limit NMP effectiveness.[198] As a result, the NMP approach alone does not achieve the rates of pollution reduction required by the CWA.

Moreover, while EPA and states have identified certain nutrient management practices known to harm water quality (*see infra*, section B.b.iv), the federal regulations stop short of prohibiting these practices. These shortcomings weaken the efficacy of the CAFO regulatory program, and have resulted in a patchwork of state regulations pertaining to CAFOs with widely varying degrees of effectiveness. While some variation in land application restrictions may be appropriate due to varying climates, soils, crops, and other site–specific characteristics that will affect which practices will best protect water quality, EPA must reduce its reliance on state–based nutrient management planning. A stronger baseline of nationally–applicable standards is needed to make water quality protection, rather than crop yield, the primary consideration of CAFO nutrient management, and to ensure that states do not engage in a regulatory "race to the bottom."[199]

For CAFOs that land apply wastes, the ELGs require states to establish technical standards for nutrient management. Technical standards must address the form, source, amount, timing, and method of application of nutrients on each field, based on a field-specific assessment of the potential for nitrogen and phosphorous transport from the field to waterways.[200] These standards are supposed to be calculated to achieve realistic production goals while minimizing nitrogen and phosphorous movement to waters of the U.S.[201]

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[198] *See, e.g.*, EPA, *Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site: An Assessment of Nutrient Management Plans* 66 (Mar. 2011), http://nepis.epa.gov/Adobe/PDF/P100DOTV.pdf.

[199] *See, e.g.,* Stacy Sneeringer & Regina Hogle, *Variation in Environmental Regulations in California and Effects on Dairy Location*, 37 Agric. & Res. Econ. Rev. 133, 135 (2008) (surveying academic articles that have tested and supported the hypothesis that environmental regulations influence the location of dairies).

[200] 40 C.F.R. § 412.4(c)(2) (determination of application rates).

[201] *Id.*; *see also* Permit Writers' Manual at 6-12. EPA relies on the NRCS, a branch of USDA, to develop technical standards for nutrient management. *See* 2003 CAFO Rule, 68 Fed. Reg. at 7209 (allowing permitting authorities to rely on NRCS practice standards to meet required technical standards); 2008 CAFO Rule, 73 Fed. Reg. at 70430 (reiterating that permit applicants may rely on NRCS' technical guidance for CNMPs to fulfill NMP eligibility requirements).

Research has demonstrated, however, that "just having a NMP does not reduce excess nutrient application nor does it guarantee improvements in water quality."[202] The dual goals, expressed in EPA's regulations and state technical standards, of maximizing production and minimizing pollution are often incompatible, and when in doubt, state standards typically authorize operators to over–apply animal wastes and other supplements in order to ensure that crops have sufficient nutrients to ensure optimal growth.[203] As one researcher explained, "it cannot be assumed that there is a direct relationship between the soil test calibration for crop response to [nutrients] and surface runoff enrichment potential . . . . At what levels should recommendations for [nutrient] application change from being agronomic to environmentally based?"[204] Under the current regulations, states have too much discretion in balancing these competing interests.

Nutrient management requirements typically rely on the idea of a nutrient budget, limited either by nitrogen or phosphorous, in order to determine how much animal waste or other fertilizer can be applied to a crop.[205] NMPs should consider all nutrient input sources, and compare these to volatilization, mineralization, and plant uptake rates, as well as factors affecting the risk of loss, such as slope, in order to determine the amount of additional nutrients that can be added to a crop.[206] After taking all of these factors into account, "nutrient management planners [] assume that if waste is applied in accordance with an NMP, all CAFO contaminants will be taken up, inactivated, retained, or degraded in the root zone, so that surface and groundwater are inherently protected."[207] But while these calculations seek to consider relevant factors and involve some direct measurement of nutrient concentrations, they also rely on assumptions about the movement of water and physical and chemical interactions that may or may not reflect actual conditions.[208] As a result, these simplified models of nutrient uptake and transport ultimately fail to achieve environmentally optimal results.

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[202] R. Shepard, *Nutrient Management Planning: Is it the Answer to Better Management?*, 60 J. Soil and Water Conservation 171, 176 (2005).
[203] USDA, Nitrogen in Agricultural Systems: Implications for Conservation Policy 4, 46 (Sept. 2011), https://www.ers.usda.gov/webdocs/publications/err127/6767_err127.pdf?v=41056 (describing simultaneous environmental and economic optimization of nitrogen management as "a juggling act" and noting that reducing application rates may increase farmers' perceived risk of reduced yields); Robert Flynn, *Regulatory vs Agronomic Protection of Groundwater in New Mexico: A Case Study in Nutrient Management* 6 Western Nutrient Mgmt. Conference 165, 168 (2005) (noting that farmers "are not likely to allow crops to become deficient in nitrogen"); Andrew Sharpley, *Agricultural Phosphorous, Water Quality, and Poultry Production: Are They Compatible?* 78 Poultry Sci. 660, 668 (1999) (noting the importance of measuring the phosphorus content of both manure to be applied and that is already in the soil because "there is a tendency among farmers and their advisors to underestimate the fertilizer value of manure without these determinations.").
[204] Andrew Sharpley, *Agricultural Phosphorous, Water Quality, and Poultry Production: Are They Compatible?* at 668.
[205] EPA, *Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site: An Assessment of Nutrient Management Plans* at 5.
[206] *Id.*
[207] *Id.* at 7.
[208] *Id.*

Current nutrient management planning approaches also often allow over-application of phosphorus. Because most crops require more nitrogen than phosphorous, nitrogen-based approaches to manure application are more common than phosphorus-based.[209] This "presents a special problem because the N-to-P ratio in manures is lower than that needed by crops . . . [causing] excess P [to] build[] up to environmentally harmful levels in fields that received repeated applications."[210] EPA has come to similar conclusions when considering liquid dairy waste:

> "[A] potential problem arises when the relative content of nitrogen and phosphorous in lagoon water differs from that in the crop. In this case, NMPs that are designed to meet the nitrogen requirement for crops may result in the over-application of phosphorous."[211]

Other studies, including those looking at dry litter systems, echo this problem, finding that "[b]ecause most NMPs are based on plant N requirements, this invariably means that P is over–applied relative to needs."[212] Once excess phosphorous in soil reaches a particular saturation point, it begins to leach into surface and groundwater.[213] Some states do require that NMPs include phosphorus-based plans under certain circumstances.[214] Nonetheless, these approaches are highly variable, and recent studies demonstrate that phosphorous is often over-applied with respect to crop needs even in states with phosphorus-based plans. A 2014 report by the Environmental Integrity Project found, for example, that 75% of phosphorous from poultry operations on Maryland's Eastern Shore was applied in excess of crop needs.[215]

EPA's regulations should account for the modeling and design deficiencies that undermine the effectiveness of NMPs, rather than assuming that optimizing crop yield will also

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[209] University of Georgia Cooperative Extension, *Small Farm Nutrient Management Primer: For Un-permitted Animal Feeding Operations* 4-6 (Jan. 2006), http://extension.uga.edu/publications/files/pdf/B%201293_5.PDF; L.M. Risse, et al., *Land Application of Manure for Beneficial Reuse* at ii.
[210] L.M. Risse, et al., *Land Application of Manure for Beneficial Reuse* at ii.
[211] EPA, *Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site: An Assessment of Nutrient Management Plans* at 8. *See also* University of Georgia Cooperative Extension, *Small Farm Nutrient Management Primer: For Un-permitted Animal Feeding Operations* at 4-6; Risse, et al., *Land Application of Manure for Beneficial Reuse* at 18 ("Nutrients applied from animal manure should match the needs of the crop, but the ratios of N, P, K, and the various micro nutrients excreted by animals are generally different from crop requirements.").
[212] University of Kentucky Research Foundation, *Demonstration of Enhanced Technologies for Land Application of Animal Nutrient Sources in Sensitive Watersheds: Final Progress Report* 2 (2008), http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044927.pdf.
[213] Chesapeake Bay Foundation, *Manure's Impacts on Rivers, Streams, and the Chesapeake Bay* 8 (July 28, 2004), http://www.cbf.org/document.doc?id=137.
[214] *Id.* at 8-9 (noting that Virginia, Delaware, Pennsylvania, and Maryland all require that NMPs account for crop phosphorus needs to some extent).
[215] Environmental Integrity Project, *Manure Overload on Maryland's Eastern Shore* 8 (Dec. 8, 2014), http://dcpgonline.org/uploads/EIP_POULTRY-REPORT_-_Manure_Overload.pdf.

"minimize nitrogen and phosphorous movement to waters of the U.S."[216] At a minimum, EPA must expressly require the use of phosphorous-based plans, rather than nitrogen-based plans, where phosphorus is the limiting nutrient. However, even phosphorus-based plans fail to minimize the over–application of harmful manure constituents like *E. coli* and other pollutants, and EPA must commit to regularly strengthening CAFO nutrient management requirements as the science develops, including by analyzing the results of the requested land application monitoring data discussed *supra*. Put simply, the CWA mandates that EPA and states tip the scales in favor of water quality protection, not crop yield, requiring appropriate technology-based effluent limitations as mandated by the Act. The current NMP regulations fail to do so.

Stronger NMP regulations are also necessary to effectuate the Act's requirements that permits include stricter limits as needed to comply with water quality standards[217] and that permitting authorities may not issue a NPDES permit to a newly constructed or modified facility if discharges from that facility would cause or contribute to the violation of water quality standards.[218] Of course, the current permitting scheme discourages CAFO operators from obtaining permits in the first place, and as a result undermines the Act's mandate to protect water quality through more stringent permits when technology-based permits do not suffice. But even where CAFOs are required to obtain NPDES permits, the legal fiction that NMPs designed to maximize crop yield will also achieve minimal or zero discharge makes it unlikely that a permit writer will seek to establish more stringent requirements when a receiving water is impaired or the CAFO may cause or contribute to a violation of water quality standards.

Even in the case of land application, where EPA's ELGs merely require a few BMPs in addition to the NMP, there is nothing in EPA's rules to enable a permit writer to derive practices sufficiently protective to reduce loadings and ensure the discharge will not cause or contribute to water quality standards violations. Because many discharges under this scheme are assumed to be non-existent or not subject to regulation, and NMPs are already assumed to minimize the potential for runoff, there is no mechanism for permit writers to establish water quality-based permit limits where a receiving water is already impaired. Absent effective regulations that reflect the reality that NMPs are not zero discharge plans and that require discharging CAFOs to obtain permits in the first place, permitting authorities will continue failing to impose WQBELs to protect the uses of individual waterbodies.

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[216] *See* 40 C.F.R. 412.4(c)(2).
[217] *See* 33 U.S.C. § 1311(b)(1)(C) (NPDES permits must include "any more stringent limitations . . . necessary to meet water quality standards"); 40 C.F.R. § 122.44(d) (permitting authorities must include WQBELs for pollutants that "have the reasonable potential to cause, or contribute to an excursion above any State water quality standard").
[218] *See* 40 C.F.R. §122.4(i). *See also Friends of Pinto Creek v. EPA*, 504 F.3d 1007, 1014 (9th Cir. 2007).

iv. Technical Standards Must Prohibit Practices Known to Harm Water Quality

As written, EPA's ELGs for Large CAFOs allow CAFO operators to engage in several production and land application area practices known to cause discharges and harm water quality, undermining permits' narrative requirements to eliminate or minimize discharges, respectively. EPA's failure to promulgate CAFO technical standards that prohibit harmful practices is arbitrary and capricious, and contrary to EPA's obligations to develop guidelines sufficient to protect water quality and make progress towards the Act's goal of eliminating pollution.

The CAFO industry has grown and consolidated significantly since EPA conducted its BPT, BCT, BAT, and NSPS analyses for the CAFO ELGs, and its considerations of both the availability of better technologies and the industry's ability to afford certain practices has become outdated. EPA also knows far more now about the impacts of certain CAFO practices than it did in 2003, and should revisit the appropriateness of its current requirements and prohibitions. Moreover, EPA's prior analysis gave outsized consideration to the economic affordability factor; the mounting evidence that the existing ELGs cannot adequately control CAFO pollution, rendering EPA incapable of meeting its CWA obligations, dictates that the agency must reconsider its analysis with a greater focus on achieving acceptable water quality outcomes. Under such an updated and appropriately balanced analysis, the Petitioners believe that the proposed revisions are affordable for the industry as a whole and are appropriate for both new and existing CAFOs. Petitioners specifically request that EPA supplement the requirements of 40 C.F.R. § 412.4 (Best management practices for land application of manure, litter, and process wastewater) to prohibit the practices discussed below.

1. Manure Storage in Unlined and Inadequately Lined Lagoons and Impoundments

Studies have documented the fact that storage of manure in unlined lagoons and impoundments pollutes surface waters through hydrologic discharges,[219] and there is sufficient evidence to support a CAFO ELG provision that prohibits storage of manure and other animal wastes in lagoons without impermeable synthetic liners. While groundwater is not regulated as a

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[219] *See, e.g.*, S. Koike, et al., *Monitoring and Source Tracking of Tetracycline Resistance Genes in Lagoons and Groundwater Adjacent to Swine Production Facilities over a 3-Year Period*, 73 Applied Envtl. Microbiology 4813, 4822 (2007) (noting that animal waste seepage from unlined lagoons at two swine CAFOs was associated with the spread of antibiotic resistance genes in bacteria found in groundwater near the facilities); Shai Arnon, et al., *Transport of Testosterone and Estrogen from Dairy-Farm Waste Lagoons to Groundwater*, 42 Envtl. Sci. & Tech. 5521, 5525 (2008) (concluding that clay lining of lagoons "cannot efficiently protect the groundwater environment from waste lagoon leachates under long-term exposure," where a study demonstrated potential seepage of hormones and inorganic contaminants from CAFO waste lagoons to deep groundwater, even where thick layer of clay was present).

water of the U.S., pollution of groundwater often leads to pollution discharges into jurisdictional surface waters through hydrologic connections. As discussed *supra*, such hydrologic discharges of groundwater to jurisdictional waterways are so prevalent that EPA has previously proposed establishing a presumption that CAFO lagoon discharges to groundwater will have a hydrologic connection to surface waters.[220]

The current CAFO rules essentially ignore this discharge pathway, and put the burden on citizens to demonstrate that a CAFO waste structure will cause a jurisdictional discharge. In its Permit Writers' Manual, EPA does recommend that Large CAFOs near a waterbody listed "as impaired due to nutrients, dissolved oxygen or bacteria," or in areas where there is a "reasonable potential" that anticipated discharges will violate water quality standards, should use more protective practices like "installing an impermeable lining in a lagoon or storage pond."[221] This effectively presumes that such facilities will discharge via their lagoons in the absence of effective liners. However, the water pollution risks from unlined lagoons indicate that a mere recommendation is insufficient. EPA must prohibit this practice in order for permitted CAFOs to actually achieve the technology-based standards of zero production area discharges in most weather conditions.

Historically, CAFO operators have not been required to line waste storage impoundments because of the belief that the animal wastes themselves create a protective lining. A recent literature review of lagoon leaching studies demonstrates, however, that leaching rates are highly variable and dependent on site–specific factors such as soil type.[222] Moreover, even where lagoons are lined with soil containing at least 10% clay, "significant leaching can occur through shrink–swell fractures in lagoon sidewalls."[223] In contrast, "[p]roperly constructed and maintained, synthetic liner systems provide excellent protection from groundwater degradation."[224] In short, "synthetic liners can protect groundwater quality, while other liners require substantial post-construction monitoring."[225]

Given current research on the effectiveness of synthetic lagoon liners, and in keeping with the requirement that EPA develop standards which reflect best available technology economically achievable, EPA must directly address hydrologic discharges by imposing technical standards that require the use of the best available synthetic liners at all existing and new waste lagoons. NRCS has extensively analyzed the seepage rates of different liner materials

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[220] 2001 Proposed CAFO Rule, 66 Fed. Reg. at 3040. Although such a presumption of hydrologic connection is not necessary to impose this BMP requirement on permitted CAFOs, EPA should nonetheless revisit this analysis to provide further evidence in support of a more general presumption of discharge by CAFOs or categories of CAFOs.
[221] Permit Writers' Manual at 4-36.
[222] Thomas Harter, et al., *Assessing Potential Impacts of Livestock Management on Groundwater*, Nicholas Institute for Environmental Policy Solutions 6 (Mar. 2014), http://nicholasinstitute.duke.edu/sites/default/files/ni_r_14-03_sr2_final.pdf (noting studies had found high leaching rates where unlined lagoons were built on sandy or gravelly soils).
[223] *Id.*
[224] *Id.*
[225] *Id.*

and the other factors that affect manure storage system discharges to groundwater, as well as their relative costs, and EPA should use this information and other recent research in deriving its technology standards.[226]

2. Ventilation of Pollutants near Waters or Conduits to Waters of the U.S.

EPA should further amend the CAFO ELGs to address pollution discharges from livestock confinement ventilation systems near waterways, ditches, or other conduits that carry pollutants to waters of the U.S. Ventilated animal houses may release significant quantities of ammonia, feathers, dust, and other pollutants. Where houses are located near waterways, these pollutants can re–deposit directly to surface waters, and where CAFO facilities contain ditches, pipes, or other conduits to surface waters, they can carry ventilated pollutants directly to waterways. The current ELGs do not account for these pollution pathways, despite the fact that EPA has affirmed that discharges of CAFO ventilation system pollutants into jurisdictional waters, or conduits to such waters, constitute prohibited point source discharges.[227]

Ammonia gas that is intentionally vented out of livestock houses provides a concrete example of how significant this uncontrolled pollution pathway can be. According to the Chesapeake Bay TMDL, atmospheric sources of nitrogen contribute roughly one-third of the total nitrogen load to the Chesapeake Bay.[228] In 2010, EPA projected that between 2010 and 2020, roughly half of the atmospheric nitrogen depositing in the Chesapeake Bay watershed was ammonia.[229] In other words, roughly 17% of the enormous nitrogen load currently impairing the Chesapeake Bay comes from atmospheric ammonia. Much of this atmospheric ammonia comes from CAFOs: according to the most recent EPA National Emissions Inventory, 55% of national ammonia emissions come from livestock waste.[230] In areas where CAFOs are concentrated, this proportion is higher. In Maryland, for example, 74% of ammonia emissions come from livestock waste.[231] In short, the emissions of ammonia from CAFOs, including emissions from livestock

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[226] *See* NRCS, Agricultural Waste Management Field Handbook Chapter 10, Appendices 10D and 10E (Aug. 2009), http://www.wcc.nrcs.usda.gov/ftpref/wntsc/AWM/handbook/ch10.pdf; NRCS Conservation Practice Standard 521A, Pond Sealing or Lining—Flexible Membrane (Sept. 2011), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046899.pdf.

[227] *See Nat'l Pork Producers Council*, 635 F.3d at 754-56; *see also Rose Acre Farms, Inc. v. N.C. Dep't of Env't and Natural Res.*, No. 12-CVS-10, ¶¶ 54, 55 (Jan. 4, 2013) (finding that ammonia and other pollutants that reach jurisdictional waters after being expelled by CAFO ventilation fans are subject to NPDES permitting requirements, and are not exempt as agricultural stormwater).

[228] EPA, Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment 4-33 (Dec. 29, 2010), https://www.epa.gov/chesapeake-bay-tmdl/chesapeake-bay-tmdl-document.

[229] *Id.* at Appendix L, Table L3.

[230] EPA, 2011 National Emissions Inventory, https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data.

[231] *Id.*

confinement ventilation systems, are directly and substantially contributing to the ongoing impairment of the Chesapeake Bay. This is not a trivial pollution pathway.

The current Large CAFO ELGs ostensibly require existing CAFOs and new dairy and cattle CAFOs to meet a zero discharge standard for the production area, except in the case of a 25–year, 24–hour storm event, and require new hog and poultry CAFOs to achieve a zero discharge production area standard regardless of storm events.[232] However, many CAFOs fail to achieve these requirements in practice, due to the regulations'—and in turn, state permitting agencies'—failure to specifically address ventilation system pollution emissions that become discharges. EPA should require all CAFOs using ventilation systems to either prevent pollutant releases with biofilters or other existing technology, or to capture all ventilated pollution and divert it into the waste containment area to prevent any prohibited discharges of manure, litter, or process wastewater pollutants. To the extent that EPA finds that these technologies cannot eliminate all ventilation system discharges, which is particularly a concern for ammonia, such a finding would only bolster this Petition's argument that CAFOs do in fact discharge, and that a presumption of discharge is necessary to carry out the Act.

3. Application on Frozen, Saturated, or Snow-Covered Ground

EPA and other agencies recognize that spreading manure on frozen, snow–covered, or saturated ground results in high risk of runoff and pollutant transport. In the NPDES Permit Writers' Manual for CAFOs, EPA says that state programs "should either prohibit application of manure and process wastewater on snow, ice, and frozen ground, or include specific protocols that CAFO owners or operators . . . will use to conclude whether application to a frozen or snow–or ice–covered field (or a portion thereof) poses a reasonable risk of runoff."[233] Similarly, NRCS, EPA's primary resource for developing technical standards,[234] advises that "[n]utrients must not be surface–applied if nutrient losses offsite are likely" and warns against spreading on "frozen and/or snow–covered soils, and when the top 2 inches of soil are saturated from rainfall or snow melt."[235] But rather than prohibiting these dangerous practices, EPA merely "strongly encourages" states to adopt such prohibitions themselves.[236] This recommendation has proven inadequate.

The increased likelihood of runoff associated with application of manure to frozen, saturated, or snow–covered ground is widely recognized by agricultural experts, including

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[232] 40 C.F.R. § 412.
[233] Permit Writers' Manual at 6-15.
[234] USDA and EPA, *Unified National Strategy for Animal Feeding Operations* Sec. 3.2 (March 9, 1990), http://www.epa.gov/npdes/pubs/finafost.pdf.
[235] NRCS Conservation Practice Standard 590, Nutrient Management 3 (Oct. 2013), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1192371.pdf.
[236] Permit Writers' Manual at 6-16. *See also id*. at 5-30 (listing standards, including prohibiting application of manure to frozen or snow-covered ground, which permit authorities "may include" as technology-based standards).

agricultural extension program technical staff, state agencies, and EPA itself. Liquid or semi–liquid manure cannot easily permeate ground that is already saturated or that is frozen, and thus is much more likely to run off into nearby waterways, particularly when snow or frozen ground begins to melt.[237] Moreover, in areas where soils reach freezing temperatures, there are generally no winter crops available to uptake the nutrients in manure, meaning there is little to no agronomic benefit to winter applications and nutrients are susceptible to loss before any spring crop has been planted.[238] EPA's own peer–reviewed technical guidance similarly concludes that "[f]rom the dual perspectives of nutrient utilization and pollution prevention, [] winter is the least desirable time for land application."[239]

Other authorities, ranging from the state level to international, have also recognized the harms likely to result from land application in winter months and on frozen ground. The International Joint Commission, an international organization created by the Boundary Waters Treaty (ratified by the United States and Canada in 1909), recommends that to protect Lake Erie, all adjacent states should ban the spreading of manure on frozen or snow–covered ground because of the likelihood of those practices polluting surface waters.[240] The Iowa State University Extension acknowledges that "[b]roadcasting manure onto frozen, snow-covered, water-saturated soils increases the potential for nutrient losses with rainfall or snowmelt runoff to surface water systems."[241] Similarly, the Penn State Extension warns that "winter is not the best time to apply manure and should be our last choice,"[242] and the Ohio State University Extension advises that "[w]inter application should not be part of a manure management plan and it should only be viewed as a last resort."[243]

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[237] International Joint Commission, *A Balanced Diet for Lake Erie: Reducing Phosphorous Loadings and Harmful Algal Blooms* 75 (2014) [hereinafter 2014 IJC Report], http://www.ijc.org/files/publications/2014%20IJC%20LEEP%20REPORT.pdf.

[238] Ontario Ministry of Agriculture, Food, and Rural Affairs, *Winter Application of Manure and Other Agricultural Source Material*, OMAFRA Fact Sheet 10-073 (Sept. 2010), http://www.omafra.gov.on.ca/english/engineer/facts/10-073.htm#5. Similarly, in a PowerPoint presentation derived from a white paper prepared for EPA by contract company Tetra Tech, Tetra Tech noted that a "comprehensive literature review found no published research to support agronomic factors as a basis for recommending winter manure application." Tetra Tech, *Winter Manure Application and Water Quality: Overview of the Literature* 4 (Oct. 30, 2014), http://bloximages.chicago2.vip.townnews.com/auburnpub.com/content/tncms/assets/v3/editorial/f/ef/fef9f5a8-8a50-53b9-a377-eaf2a11a9362/5483213e3e237.pdf.pdf.

[239] Permit Writers' Manual at App. G-1-2, *Interim Final Technical Guidance for the Application of CAFO Manure on Land in the Winter* (noting that "[w]here there is a reasonable risk [of runoff from application on snow, ice, and frozen soil], EPA strongly prefers that technical standards prohibit application on the field or the pertinent portion thereof during times that the risk exists or may arise").

[240] 2014 IJC Report at 9.

[241] Iowa State Univ. Extension and Outreach, *Using Manure Nutrients for Crop Production* 6 (May 2016), http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1089&context=extension_pubs.

[242] Penn State Extension, *Winter Manure Application Considerations* (Jan. 2013), http://extension.psu.edu/plants/crops/news/2013/01/winter-manure-application-considerations.

[243] Amanda Meddles, Ohio State University Extension, *Properly Applying Manure on Frozen Ground*, Ohio's Country Journal (Jan. 24, 2012), http://ocj.com/2012/01/properly-applying-manure-on-frozen-ground/. *See also* Utah Farmstead Assessment for Ground Water and Surface Water Protection, *How to Manage Stored Manure and*

Despite the broad consensus on the dangers of winter application practices, however, many states with numerous CAFOs and severe winter conditions fail to prohibit such practices in their NPDES implementing regulations.[244] Absent a national prohibition on such irresponsible manure application practices, many operators will fail to maintain adequate storage to avoid winter application, will continue to land apply waste under high-risk conditions, and will continue to adversely impact surface water quality through preventable land application discharges. Moreover, climate change heightens the risk that applying waste under these circumstances poses to water quality. State regulators have understood for more than a decade that intermittent melting spells increase the risk of surface runoff.[245] In regions where the ground once predictably stayed frozen for the entire winter, but where such intermittent melting is now a more frequent occurrence, the relationship between season and runoff potential has changed. EPA should re–evaluate this relationship with recent data, because assumptions about winter runoff potential are likely no longer accurate.[246]

EPA must strengthen the CAFO ELGs to prohibit the spreading of manure on frozen, saturated, or snow–covered ground, or during periods of crop dormancy when such conditions are expected to occur before crop nutrient uptake occurs, because manure application under these conditions is known to lead to surface water discharges, and is therefore inconsistent with the requirement that land application be conducted in such a way that minimizes the risk of nutrient loss. In conjunction with this requirement, EPA must require adequate storage to ensure that operators may not simply dump excess stored manure on fields each spring, as that would also lead to unacceptable risk of pollution runoff. The technology to prevent these land application discharges is clearly available, and anything short of such a prohibition will continue to allow irresponsible manure disposal, rather than application calculated to best protect water quality, and fall short of what the CWA requires.

Protect Your Water 7 (Rev'd Mar. 2012), http://extension.usu.edu/files/publications/factsheet/WQFA-13.pdf (advising on proper manure handling and storage for water protection, and directing that "[m]anure should not be applied to frozen or snow covered ground unless all runoff can be controlled."); Ohio Dep't of Agric., Ohio Dep't of Natural Res., Ohio Envtl. Prot. Agency, Lake Erie Comm'n, *Ohio Lake Erie Phosphorus Task Force II Final Report* 51 (Nov. 2013), http://lakeerie.ohio.gov/portals/0/reports/task_force_report_october_2013.pdf.

[244] *See, e.g.,* Wis. Dep't of Natural Res., WPDES Permit No. WI-0063274-01: Large Dairy CAFO General Permit 3.7.4-3.7.7 (Apr. 4, 2011), http://dnr.wi.gov/topic/AgBusiness/documents/LargeDairyCAFOGP-WPDESPermit.pdf (allowing for liquid and solid manure application on frozen and snow-covered ground under various circumstances) [hereinafter Wis. CAFO Permit]; Ill. Envtl. Prot. Agency, *Considerations for Manure Application Setbacks* 2, http://www.epa.state.il.us/water/permits/cafo/documents/show/602 (providing that application to snow-covered soils is "not recommended" but may be permitted in order to address waste storage concerns); Sierra Club Michigan Chapter, *Why are CAFOs Bad?*, http://www.sierraclub.org/michigan/why-are-cafos-bad (noting that Michigan CAFOs may be permitted, either through their NMP or under an order from the state with specifications for winter application, to apply waste to snow or frozen ground).

[245] *See, e.g.*, Gregg Hoffmann, *Wintertime manure spreading under scrutiny*, WisBusiness (Apr. 7, 2005), http://www.wisbusiness.com/index.iml?Article=34685.

[246] 2014 IJC Report at 78.

4. Spray Irrigation of Manure

The CAFO ELGs should also expressly prohibit all methods of spray irrigation of manure, which threaten surface waters and present significant human health risks. Some of the unique water quality risks associated with spray irrigation relate to the fact that irrigation often takes place at night, center-pivot irrigation may occur without supervision, excessive irrigation can result in waste ponding, and dry weather discharges can occur via drift, surface runoff, and leaching.[247] Over-application via spray irrigation has been cited as a cause of water pollution in states where CAFOs use this application method.[248] Irrigation systems are also reliant on pipes and hoses to connect lagoons with sprayfields, and these can leak or break.[249]

Compared to other forms of irrigation, spray irrigation may also result in higher rates of evaporation and volatilization of a range of CAFO pollutants, including ammonia.[250] Indeed, several studies have found that where manure is not incorporated into soil, more than half of the manure ammonia is lost, likely due to volatilization.[251] This directly impacts water quality, because volatilized ammonia will re-deposit on land and water, where, as we have seen in the context of the Chesapeake Bay, it contributes to algae blooms and dead zones. In addition, spraying methods may result in liquid manure droplets drifting onto neighboring properties, roads, and other areas, where it can subsequently run off into waterways.[252] Spray irrigation is simply incompatible with the goal of agronomic use of manure nutrients, as well as with the CWA's requirements to limit and ultimately eliminate CAFO discharges to waters of the U.S.

Spray irrigation of waste also threatens public health, because it "create[s] a potentially hazardous situation as pathogens may become aerosolized and transported to downwind receptors [and] . . . could potentially be directly inhaled or ingested after they land on fomites, water sources, or food crops."[253] These bioaerosols can contain bacteria, viruses, parasites, fungi,

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[247] *See, e.g.*, Wis. Manure Irrigation Workgroup, *Considerations for the Use of Manure Irrigation Practices* 40-42 (Apr. 2016), https://fyi.uwex.edu/manureirrigation/files/2016/04/Manure-Irrigation-Workgroup-Report-2016.pdf.
[248] *See, e.g.*, Ron Seely, Wisconsin Watch, *Manure Spraying Under Scrutiny* (Apr. 27, 2014), http://wisconsinwatch.org/2014/04/manure-spraying-under-scrutiny/.
[249] NRDC, *Cesspools of Shame: How Factory Farm Lagoons and Sprayfields Threaten Environmental and Public Health* 29 (Jul. 2001) [hereinafter *Cesspools of Shame*], http://www.nrdc.org/water/pollution/cesspools/cesspools.pdf.
[250] *Id*. at 17; Iowa State Univ. Extension and Outreach, *Using Manure Nutrients for Crop Production* Table 2 (showing that spray irrigation has the highest volatilization rate of various application practices).
[251] *Cesspools of Shame* at 37.
[252] Penn State Extension, *Irrigation of Liquid Manures*, http://extension.psu.edu/plants/nutrient-management/educational/manure-storage-and-handling/irrigation-of-liquid-manures.
[253] R.S. Dungan, *Board-Invited Review: Fate and Transport of Bioaerosols Associated with Livestock Operations and Manures*, 88 J. Animal Sci. 3693, 3696, 3702 (2010), https://www.animalsciencepublications.org/publications/jas/pdfs/88/11/3693 (noting that spray irrigation methods contribute to the formation of bioaerosols at greater concentrations than found in background environments, and that there is increased potential for exposure to airborne pathogens and microbial by-products both on and off-site of CAFOs as a result of these practices).

and other microbes harmful to human health.[254] As the liquid manure is sprayed into the air, the risk of decreased droplet size and longer transport distances increases, as compared to other forms of manure application.[255] Because it poses threats to water quality as well as public health, EPA should prohibit spray irrigation methods of manure application in the CAFO ELGs.

5. Manure Application on Steep Slopes

Similarly, EPA cautions against, but fails to prohibit spreading of manure—even liquid manure—on steep slopes.[256] Steeply sloped areas often lack soil properties that foster normal plant growth, meaning that it is less likely that nutrients from manure will be fully assimilated by plants, and more likely that these excess nutrients will be transported to surface and ground waters.[257] In EPA's own literature review of academic research relating to livestock and poultry manure impacts, the Agency found land slope to be a key determinant of runoff and of the likelihood of pathogen transport.[258] Regulating this activity is clearly practicable, because several states do restrict the spreading, in winter or otherwise, of manure on sloped land above a certain grade.[259] Nonetheless, EPA and NRCS currently leave it up to the states to determine what grade is acceptable for manure spreading and what precautions, if any, CAFO owners and operators must take when spreading on sloped land.[260] This has resulted in a patchwork of state-based requirements,[261] indicating that a baseline of nationally applicable restrictions is necessary to protect water quality. For example, Illinois allows operators to apply manure to fields with slopes as high as 15%,[262] while Wisconsin does not impose any slope restrictions on manure spreading unless it takes place on frozen or snow-covered ground.[263]

EPA's failure to prohibit spreading on slopes that lead to discharges of nutrients and other pollutants renders permits incapable of achieving the narrative effluent limits in the CAFO ELGs, absent stronger state requirements. EPA has the technical expertise to determine, for various soil and manure types and percentages of solid content, the maximum slope grade

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[254] *See* Patricia D. Millner, *Bioaerosols Associated with Animal Production Operations*, 100 Bioresource Tech. 5379, 5379-80 (2009), https://pubag.nal.usda.gov/pubag/downloadPDF.xhtml?id=33386&content=PDF.
[255] Dungan, *Board-Invited Review: Fate and Transport of Bioaerosols Associated with Livestock Operations and Manures* at 3698-99.
[256] Permit Writers' Manual at 5-30.
[257] *Id.* at A-8.
[258] EPA Literature Review at 23, 25.
[259] State regulations vary widely with respect to restrictions related to land application on steep slopes. *See, e.g.*, Envtl. Law & Policy Ctr., *Cultivating Clean Water: State-Based Regulation of Agricultural Runoff Pollution* 47-51 (2010) [hereinafter *Cultivating Clean Water*], http://elpc.org/wp-content/uploads/2010/05/ELPC-Cultivating-Clean-Water-updated-May-5-2010.pdf.
[260] *See* NRCS Standard 590 at 3, which only mentions slope as a consideration factor when allowing nutrient application despite a likelihood of runoff, such as on frozen, snow-covered, or saturated soils.
[261] *See, e.g.*, *Cultivating Clean Water* at 47-51.
[262] Ill. Envtl. Prot. Agency, *Considerations for Manure Application* 2, http://www.epa.state.il.us/water/permits/cafo/documents/show/602.
[263] Wis. Admin. Code Ch. NR 243.14 (2015); Wis. CAFO Permit at Sec. 3.7.

consistent with the requirement to minimize nutrient loss and other discharges of pollutants. It should determine these and strengthen the ELGs to restrict land application accordingly.

6. Manure Storage in Exposed Stockpiles

Storage of manure in uncovered stockpiles also leads to preventable pollutant discharges to surface waters. EPA advises permit writers that "[i]deally, stockpiled manure and litter should be stored under cover on an impervious surface" to minimize pollutant runoff.[264] The EPA Office of Enforcement and Compliance Assurance also recognizes the dangers of this practice, warning that leaving manure in uncovered stockpiles is likely to result in pollutants escaping into the environment.[265] Manure stockpiles can contain vast quantities of waste and pollutants; a poultry litter stockpile generally ranges from 75 to 200 tons of waste, and precipitation events can carry pollutants from an uncovered pile to surface and ground water.[266]

As with the inherently risky practices discussed above, EPA has acknowledged the threat to water quality but has failed to impose appropriate and necessary permit restrictions. While EPA has properly defined stockpiles as part of the CAFO production area,[267] it continues to allow states to create loopholes from adequate regulation. For example, Delaware allows CAFOs to stockpile manure on application fields for up to 90 days, using the phrase "field staging" for the practice, and subsequently fails to impose a zero discharge requirement on the piles. This in effect improperly treats discharges from these piles as land application, rather than production area, discharges.[268]

All exposed stockpiles of litter are most likely to result in discharges of pollutants in the first few days after construction, when nutrients are at their highest levels.[269] As a result, even where stockpiles are considered part of the land application area, rather than the production area, they also fail to meet EPA's land application ELG requirement to "minimiz[e] nitrogen and phosphorus movement to surface waters."[270] Permitting the continued use of uncovered solid waste stockpiles, unless the CAFO operator demonstrates that all runoff and leaching from the piles will be diverted into a waste storage facility, simply fails to meet EPA's requirement to implement BMPs capable of "ensur[ing] appropriate agricultural utilization" of nutrients.[271] EPA must give effect to its zero discharge production area requirements for waste stockpiles by

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[264] Permit Writers' Manual at 5-39.
[265] EPA Office of Enforcement and Compliance Assurance, *EPA Targets Clean Water Act Violations at Livestock Feeding Operations*, 10 Enforcement Alert 1, EPA 325-F-09-001 (2009).

[266] Gregory D. Binford and George Malone, Evaluating BMPs for Temporary Stockpiling of Poultry Litter 4 (Dec. 22, 2008), http://mda.maryland.gov/SiteAssets/Pages/Manure/PL_Storage_Report_BINFORD_FINAL.PDF.
[267] 40 C.F.R. § 122.23(b)(8).
[268] Del. Nutrient Mgmt. Program, Del. Conservation Practice Standard: Temporary Field Staging (Jul. 2010), http://dda.delaware.gov/nutrients/downloads/Draft_TechStandards/Temp_Field_Storage.pdf.
[269] Gregory D. Binford and George Malone, Evaluating BMPs for Temporary Stockpiling of Poultry Litter at 12.
[270] 40 C.F.R. § 412.4(c)(2)(i).
[271] 40 C.F.R. § 122.42(e)(1)(viii).

imposing requirements to actually prevent them from discharging. Without a federal BMP specifically mandating stockpile pads and covers for all CAFOs subject to the ELGs, nutrient runoff from manure stockpiles will continue unabated.

v. State Permitting Programs Cannot Effectively Fill the Gaps Left by the Absence of Strong National Standards

Although EPA either discourages the use of these harmful practices or encourages states to prohibit the practice themselves, such suggestions are not adequate stand–ins for effective federal regulation. In a study examining state–based regulation of agricultural pollution, the Environmental Law and Policy Center examined regulatory programs in seven states—California, Delaware, Iowa, Kentucky, Maryland, Oregon, and Wisconsin—and noted that "[t]hus far, no state has demonstrated that measureable water quality improvements have resulted from its regulatory program."[272] State programs often lack adequate resources to fully implement CWA permitting programs for all sources.[273] Documenting violations of BMPs is costly and time consuming, and actions against individual producers often only address small amounts of pollution.[274] These deficiencies may lead state agencies to support interpretations of the CWA that minimize the need for regulatory oversight, rather than electing to go beyond federal requirements.[275] EPA itself has noted that states have not prioritized regulation of feedlot wastes, and that budgetary constraints make it unlikely that states will meet—much less exceed—program and permitting responsibilities under the current rules.[276]

The proliferation of "no more stringent than" laws in several states has erected an additional barrier to effective state regulation. Many states have adopted statutes or rules prohibiting administrative bodies from promulgating environmental protections more stringent than federal rules require. A study conducted by the Environmental Law Institute found that 13 states have enacted broad "no more stringent than" laws that prohibit the state from imposing

[272] *Cultivating Clean Water* at 11 (primarily examining nitrogen and phosphorous pollution caused by the application of animal waste and chemical fertilizers to land).
[273] Clifford Rechtschaffen, *Enforcing the Clean Water Act in the Twenty-First Century: Harnessing the Power of the Public Spotlight*, Center for Progressive Reform White Paper 7 (Oct. 2004); *Animal Waste and Water Quality* at 18 ("it is unclear how state agencies will find the resources needed to carry out their responsibilities under the revised rules without reducing resources for other important activities"); Terence J. Centner, *Regulating the Land Application of Manure from Animal Production Facilities in the USA*, 14 Water Policy 319, 329 (2012) (noting that "[s]tate regulatory agencies do not have the resources to penalize producers who fail to follow BMPs").
[274] Centner, *Regulating the land application of manure from animal production facilities in the USA* at 329.
[275] Terence J. Centner, *Challenging NPDES Permits Granted Without Public Participation*, 38 B.C. Envtl. Aff. L. Rev. 1, 10-11 (2011), http://lawdigitalcommons.bc.edu/ealr/vol38/iss1/2/.
[276] *Animal Waste and Water Quality* at 24; Jillian P. Fry, et al., *Investigating the Role of State Permitting and Agriculture Agencies in Addressing Public Health Concerns Related to Industrial Food Animal Production* at 4 (survey of state policies generated response from a state agency staff member indicating that compliance inspections are only initiated "on a complaint basis" because they "don't have staff or money").

more protective requirements than the minimum required by the CWA and federal regulations.[277] An additional 23 states have adopted laws that make it more difficult to establish state standards that surpass these minimum federal requirements.[278] Consequently, many states are unable to impose additional pollution control measures, even where local conditions may necessitate them to protect water quality. Iowa has even gone so far as to specifically prohibit the state from issuing CAFO NPDES regulations more stringent than required under federal law.[279] Even if EPA had intended that states would prohibit many harmful practices on their own, it is unreasonable to expect that this will happen given numerous state laws that prohibit adoption of more protective rules.

vi. EPA's Assumptions Regarding the Frequency of Storm Events Are No Longer Accurate

To meet its obligations under the CWA, EPA must review and update its process for designating precipitation events with a probable recurrence interval to reflect new weather patterns. Large CAFOs are required to maintain waste storage capacity to contain a 25–year, 24–hour storm event.[280] EPA determines the likelihood and magnitude of such events based on a 1961 National Weather Service rainfall atlas, known as Technical Paper No. 40 (TP40).[281] The Department of Commerce published TP40 in 1961 based on 100 years of rainfall data.[282] However, more recent research calls into question whether TP40 utilizes the best available techniques and data to determine the magnitude of 25–year, 24–hour storm events. Because certain design standards for CAFOs, such as standards for storage lagoons, are based on the anticipated frequency of major storm events, accurately predicting the likelihood and magnitude of such events is critical to preventing the need for manure application at high-risk times of year, as well as storage facility failures and overflows. A method that underestimates the likelihood or magnitude of precipitation events will mean that CAFO structures are designed to fail and reach capacity more frequently.

Due to changing weather patterns, precipitation events that were rare by 1961 standards may not be so infrequent today. Climate research has demonstrated that precipitation patterns are changing, and many places are experiencing a trend towards increased frequency of extreme

[277] Envtl. Law Inst., *State Constraints: State-Imposed Limitations on the Authority of Agencies to Regulate Waters Beyond the Scope of the Federal Clean Water Act* 1 (2013), http://www.eli.org/sites/default/files/eli-pubs/d23-04.pdf.
[278] *Id.*
[279] *Id.* at 93; Iowa Code 459.311(2).
[280] 40 C.F.R. § 412.2(i).
[281] *Id.*
[282] *See* Dep't of Commerce, Weather Bureau, *Technical Paper No. 40, Rainfall Frequency Atlas of the United States* (1961), http://www.nws.noaa.gov/oh/hdsc/PF_documents/TechnicalPaper_No40.pdf.

precipitation events.[283] The U.S. Global Change Research Program has observed an increase in very heavy precipitation events in every region of the country except Hawaii.[284] The Program found that "[t]here is a clear national trend toward a greater amount of precipitation being concentrated in very heavy events . . . ."[285] EPA has recognized this as well, stating "[t]he amount of rain falling in heavy precipitation events is likely to increase in most regions . . . ."[286] Larger and more frequent storm events mean that the current ELGs will likely be insufficient to prevent catastrophic failures, such as breached and overflowing waste lagoons.

Numerous studies indicate that newer, more accurate climate data are available to inform weather–based design standards.[287] For example, in 1992 the Midwestern Climate Center, part of the National Weather Service, in conjunction with the Illinois State Water Survey, released a Rainfall Frequency Atlas of the Midwest.[288] The study aimed to update TP40, which, even in 1992, was considered too old to be reliable.[289] New findings indicated that climate trends since TP40 changed precipitation patterns in the Midwest, and the study authors determined that TP40 did not provide sufficiently detailed spatial analysis for variations in rainfall amounts for given durations and recurrence intervals.[290]

The Southern Regional Climate Center at Louisiana State University created a Rainfall Frequency/Magnitude Atlas for the South–Central United States in 1997 for similar reasons.[291] The primary rationale for that analysis was that "[t]he rainfall frequency and magnitude patterns illustrated in TP40 need to be reexamined" in light of new data and global climate change. In addition, data limitations at the time of TP40's publication were thought to have resulted in an overgeneralized analysis of rainfall events. The authors cite specific findings that demonstrate TP40's inaccuracy, such as research indicating that "the 24-hour, 100-year value from TP40 was exceeded 3 times more often than expected in Michigan," and that both Wisconsin and Illinois had almost double the number of 100–year, 24–hour rain events that TP40 anticipates.[292] For 24–hour rainfall events, the study indicated storms may be three inches greater than TP40 predicts in

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[283] *See, e.g.* Jerry Melillo, et al., Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment*, U.S. Global Change Research Program 9 (Rev'd Oct. 2014), http://nca2014.globalchange.gov/downloads.
[284] *Id.*
[285] *Id.*
[286] EPA, Climate Change Science: Future of Climate Change, https://www.epa.gov/climate-change-science/future-climate-change (last accessed Jan. 13, 2017).
[287] NOAA, an agency within the Department of Commerce, also maintains more recent data sources about precipitation frequency by location. *See* Nat'l Oceanic and Atmospheric Admin., Precipitation Frequency Data Server, http://hdsc.nws.noaa.gov/hdsc/pfds/ (last accessed Jan. 13, 2017).
[288] Floyd A. Huff and James R. Angel, Ill. State Water Survey, Bulletin 71, *Rainfall Frequency Atlas of the Midwest* (1992), https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs141p2_024033.pdf.
[289] *Id.* at 1.
[290] *Id.*
[291] Gregory E. Faiers, et al., La. State Univ. S. Reg'l Climate Ctr., *Rainfall Frequency Magnitude/Atlas for the South-Central United States*, SRCC Technical Report 97-1 (1997), http://www.losc.lsu.edu/tech97_2.pdf.
[292] *Id.* at 1.

some regions.[293] EPA must revise its ELGs to require permitting agencies to use the most up-to-date rainfall data available, to ensure that design standards accurately reflect anticipated weather events.

III. CONCLUSION

Decades after passage of the CWA, CAFOs remain a significant—and substantially unregulated—source of water pollution throughout the United States. EPA's recent efforts at imposing a workable NPDES permitting scheme for the industry have failed on two major fronts: requiring permits of all CAFOs that discharge, and requiring adequate safeguards in the relatively small number of permits issued. Petitioners are aware of the unique challenges in regulating CAFO discharges. However, courts have repeatedly established that "this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all."[294] EPA has significant authority to revise its approach and strengthen its oversight of industrial livestock pollution, and Petitioners believe that EPA has an obligation pursuant to its CWA duties to do so without further delay.

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[293] *Id.* at 7.

[294] *NW Envtl. Advocates v. EPA*, 537 F.3d 1006, 1026 (9th Cir. 2008), quoting *NRDC v. Costle*, 568 F.2d 1369, 1380 (D.C. Cir. 1977); *see also Union Elec. Co. v. EPA*, 427 U.S. 246, 268-69 (1976) ("Allowing such [feasibility] claims to be raised . . . would frustrate congressional intent.").

EXHIBIT 2

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June 13, 2025

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Re: Detailed Study of Concentrated Animal Feeding Operations Point Source Category

Paul,

On November 26, 2024, via a Dropbox link provided by the agency, Food & Water Watch provided the Environmental Protection Agency (EPA or Agency) with numerous peer-reviewed scientific studies, water quality data, and other materials to inform the Agency's ongoing study of the Concentrated Animal Feeding Operations (CAFOs) point source category. Shortly thereafter, in December 2024, EPA released its Preliminary Effluent Guidelines Program Plan 16 which, among other things, set forth the Agency's intention to complete the CAFO study by late 2025. With this target in mind, Food & Water Watch hereby submits this memorandum describing how the materials we submitted, as well as additional forthcoming materials, should inform EPA's study.

The information submitted and cited throughout this memo demonstrates that EPA must update the CAFO effluent limitations guidelines (ELGs) to account for significant new technological advancements and environmental data. EPA's hands-off approach to CAFO regulation following the *Waterkeeper*[1] and *Pork Producers Council*[2] judicial decisions has left the nation's approximately 6,174 permitted CAFOs[3] to operate with outdated and substandard pollution control technologies and practices. Meanwhile, unchecked consolidation continues to radically transform the animal agriculture industry to the detriment of consumers, family farms, and the environment.[4] Despite rampant National Pollutant Discharge Elimination System (NPDES) permit evasion—an issue that we urge

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[1] *Waterkeeper Alliance v. EPA*, 399 F.3d 486 (2d Cir. 2005).
[2] *Nat'l Pork Prods. Council v. EPA*, 635 F. 3d 738 (5th Cir. 2011).
[3] 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 [hereinafter CAFO PERMITTING INVENTORY].
[4] FOOD & WATER WATCH, FACTORY FARM NATION 2024 EDITION, https://www.foodandwaterwatch.org/2024/09/21/factory-farm-nation-2024-edition/.

EPA to address[5]—strengthening the ELGs for those facilities that are permitted would result in major water quality improvements and go a long way toward ensuring polluters are held accountable for damage to our nation's waters.

This memo first briefly outlines evidence demonstrating the undeniable and adverse water quality impacts attributable to CAFOs and their contributions to harmful health outcomes, particularly in frontline communities. Next, we set forth the legal standards that must guide EPA's review and revisions to the CAFO ELGs as provided by the Clean Water Act (CWA) and relevant case law. We then describe how the existing regulatory scheme fails to control CAFO water pollution to such an extent that updating the ELGs is the only logical course of action. Finally, we provide EPA with evidence-backed recommendations for new regulations, including technologies and practices that must be considered as the bases for updated ELGs.

An update to the CAFO ELGs is long overdue. Upon conclusion of this detailed study, EPA will be more than justified in requiring CAFO operators to comply with standards rigorous enough to protect water quality for all communities.

[5] *See* FOOD & WATER WATCH ET AL., PETITION TO REVISE THE CLEAN WATER ACT REGULATIONS FOR CONCENTRATED ANIMAL FEEDING OPERATIONS 15–22 (2017), https://www.foodandwaterwatch.org/wp-content/uploads/2021/06/citizens_cafo_cwa_petition.pdf [hereinafter 2017 PETITION] (describing the under-permitting issue and proposing a regulatory solution).

Table of Contents

I. CAFOs Are Discharging Pollutants to Waters of the United States

CAFOs operating under the existing ELGs are contributing to the degradation of U.S. waters. CAFOs generate, handle, and dispose of numerous harmful pollutants. These pollutants threaten public health, wildlife, and water quality as they make their way into public and private waters both above and below ground.[6] CAFOs discharge pollutants to water through various pathways, including seepage through corrals, waste storage structures, and below land application areas; overflows from waste storage structures; air deposition of volatilized pollutants; and runoff from land application fields and production areas.[7] CAFOs and their pollution are often concentrated in certain regions and watersheds, disproportionately harming environmental justice communities.[8] Additional regulatory controls are plainly necessary to remedy environmental injustice, protect the public from future harms, and comply with the CWA.[9]

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[6] EPA, LITERATURE REVIEW OF CONTAMINANTS IN LIVESTOCK AND POULTRY MANURE AND IMPLICATIONS FOR WATER QUALITY 2 (July 2013) [hereinafter EPA LITERATURE REVIEW].

[7] SCOTT BRADFORD, U.S. ENV'T PROT. AGENCY, TRANSPORT AND FATE OF NUTRIENTS AND INDICATOR MICROORGANISMS AT A DAIRY LAGOON WATER APPLICATION SITE: AN ASSESSMENT OF NUTRIENT MANAGEMENT PLANS 66 (2011); Michael A. Mallin & & Lawrence B. Cahoon, *Industrialized Animal Production—A Major Source of Nutrient and Microbial Pollution to Aquatic Ecosystems*, 24 POPULATION AND ENV'T 369, 377 (2003); EPA, DRAFT INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2022 5–12, https://perma.cc/UX33-BZLQ (discussing deposition of volatilized nitrous oxide); *see also* THOMAS HARTER ET AL., NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS, ASSESSING POTENTIAL IMPACTS OF LIVESTOCK MANAGEMENT ON GROUNDWATER 4–7 (2014) (charting studies that documented leaching from CAFO corrals and feedlot surfaces, manure lagoons, and land application areas).

[8] *See generally* Linda Lobao & Curtis W. Stofferahn, *The Community Effects of Industrialized Farming: Social Science Research and Challenges to Corporate Farming Laws*, 25 AG. & HUMAN VALUES 219 (2007). Because industrial livestock operations necessarily entail large amounts of noxious waste and hazardous working conditions, the CAFO industry is concentrated in under-resourced areas with cheap labor and little political power to oppose them. Wendee Nicole, *CAFOs and Environmental Justice: The Case of North Carolina*, 121 ENV'T HEALTH PERSPECTIVES A183, A183 (2013). Due to institutional racism, the communities suffering the worst impacts from CAFOs are often disproportionately comprised of immigrant, Black, Hispanic, Indigenous, and low-income residents. Letter of Concern from Lilian S. Dorka, External Civil Right Compliance Office, EPA Office of General Counsel, to William G. Ross, N.C. Dep't Env't Quality (Jan. 12, 2007), https://www.epa.gov/sites/default/files/2018-05/documents/letter_of_concern_to_william_g_ross_nc_deq_re_admin_complaint_11r-14-r4_.pdf ("NC Title VI Letter"); Julia Kravchenko et al., *Mortality and Health Outcomes in North Carolina Communities Located in Close Proximity to Hog Concentrated Animal Feeding Operations*, 79 N.C. MED. J 278, 281 (2018); Julia Lenhardt & Yelena Ogneva-Himmelberger, *Environmental Injustice in the Spatial Distribution of Concentrated Animal Feeding Operations in Ohio*, 6 ENVT'L JUSTICE 133, 137 (2013); Sacoby M. Wilson et al., *Environmental Injustice and the Mississippi Hog Industry*, 110 ENV'T HEALTH PERSPECTIVES 195, 200 (2002); Phoebe Gittelson et al., *The False Promises of Biogas: Why Biogas Is an Environmental Justice Issue*, 15 ENV'T JUSTICE 352, 352–54 (2022); Ji-Young Son et al., *Disparities in Exposure to Concentrated Animal Feeding Operations (CAFOs) and Other Animal Feeding Operations Across Multiple States in USA*, J. EXPOSURE SCI. ENV'T EPIDEMIOLOGY 1, 5–7 (2025) (pagination in accordance with submitted copy).

[9] The CWA specifically authorizes EPA to consider relevant factors like public health and environmental justice when establishing ELGs. 33 U.S.C. § 1314(b)(1)(B), (b)(4)(B). EPA has considered environmental justice in establishing other ELGs. Further, EPA has already found that strengthening CAFO ELGs by "requiring specific mandatory BMPs that include treatment requirements as appropriate for both production areas and land application areas" could advance environmental justice. EPA, EPA LEGAL TOOLS TO ADVANCE ENVIRONMENTAL JUSTICE 75 (May 2022),

Nutrient pollution is one of the primary mechanisms by which CAFOs are contributing to widespread water quality issues and impairments.[10] Manure from the billions of animals currently confined in U.S. CAFOs is high in nitrogen and phosphorus. When an excess of these pollutants enter waterways via runoff, seepage, deposition, or leachate, the resulting eutrophication chokes surface waters and causes harmful algal blooms to proliferate, posing severe threats to aquatic ecosystems, drinking water sources, and recreation.[11] Eutrophication also increases methane emissions from water bodies, with the potential to significantly amplify climate impacts over the next century.[12] Even though EPA has not effectively monitored CAFO water pollution, waters in areas with dense concentrations of CAFOs have been found to contain higher nutrient pollution than areas with crop agriculture alone.[13]

Land application of CAFO waste is also a major contributor to the nitrate crises plaguing groundwater in rural communities across the country.[14] In fact, California's State Water Resources Control Board recently acknowledged that land application of dairy waste "is responsible for the vast

https://www.epa.gov/system/files/documents/2022-05/EJ%20Legal%20Tools%20May%202022%20FINAL.pdf [hereinafter EPA ENVIRONMENTAL JUSTICE REPORT].

[10] *See* GOV'T ACCOUNTABILITY OFFICE, CONCENTRATED ANIMAL FEEDING OPERATIONS: EPA NEEDS MORE INFORMATION AND A CLEARLY DEFINED STRATEGY TO PROTECT AIR AND WATER QUALITY FROM POLLUTANTS OF CONCERN 24–27 (2008) (describing several studies that found degradation caused by CAFO nutrient pollution).

[11] David Osterberg & David Wallinga, *Addressing Externalities from Swine Production to Reduce Public Health and Environmental Impacts*, 94 AM. J. OF PUB. HEALTH 1703, 1705 (2004); Julia Lenhardt & Yelena Ogneva-Himmelberger, *supra* n.8 at 134; Zach Raff & Andrew Meyer, *CAFOs and Surface Water Quality: Evidence from Wisconsin*, 104 AM. J. AGRIC. ECON. 161, 161, 163 (2022); Lorrayne Miralha et al., *The Spatial Organization of CAFOs and Its Relationship to Water Quality in the United States*, 613 J. OF HYDROLOGY 1, 1–2, 5, 7–9 (2022); Letter from Robert S. Lawrence, M.D., M.A.C.P., et al., to Illinois Department of Agriculture & Members of The Fulton County Board 4 (Mar. 2, 2017), https://www.sraproject.org/wp-content/uploads/2017/03/CLF-letter-for-Fulton-County-IL_two-swine-breeding-operations.pdf; *see generally* Apurva Lad et al., *As We Drink and Breathe: Adverse Health Effects of Microcystins and Other Harmful Algal Bloom Toxins in the Liver, Gut, Lungs, and Beyond*, 12 LIFE 1 (2022).

[12] Jake J. Beaulieu et al., *Eutrophication will increase methane emissions from lakes and impoundments during the 21st century*, 10 NATURE COMMC'NS 1, 1 (2019).

[13] STEPHEN J. KALKOFF, ET AL., U.S. GEOLOGICAL SURVEY, U.S. DEP'T. OF INTERIOR, WATER QUALITY IN THE EASTERN IOWA BASINS, IOWA AND MINNESOTA, 1996–98 13 (2000).

[14] MINNESOTA CENTER FOR ENVIRONMENTAL ADVOCACY ET AL., PETITION FOR EMERGENCY ACTION PURSUANT TO THE SAFE DRINKING WATER ACT, 42 U.S.C. § 300I, TO PROTECT THE CITIZENS OF THE KARST REGION OF MINNESOTA, 18-20 (2023); IOWA ENVIRONMENTAL COUNCIL ET AL., PETITION FOR EMERGENCY ACTION PURSUANT TO THE SAFE DRINKING WATER ACT, 42 U.S.C. § 300I, TO PROTECT THE CITIZENS OF THE KARST REGION OF IOWA, 21-26 (2024); MIDWEST ENVIRONMENTAL DEFENSE CENTER ET AL., PETITION FOR EMERGENCY ACTION PURSUANT TO THE SAFE DRINKING WATER ACT, 42 U.S.C. § 300I, TO PROTECT THE CITIZENS OF KEWAUNEE COUNTY, WISCONSIN (2014); FOOD & WATER WATCH ET AL., PETITION FOR EMERGENCY ACTION PURSUANT TO THE SAFE DRINKING WATER ACT § 1431, 42 U.S.C. § 300I, TO PROTECT CITIZENS OF THE LOWER UMATILLA BASIN IN OREGON, 15-20 (2020); CENTER FOR FOOD SAFETY ET AL., PETITION FOR EMERGENCY ACTION UNDER SECTION 1431 OF THE SAFE DRINKING WATER ACT TO PROTECT RESIDENTS OF THE LOWER YAKIMA VALLEY, WASHINGTON, 16-23 (2021) [hereinafter SDWA Petitions, collectively].

majority of dairies' nitrogen impacts to groundwater quality."[15] Ingesting water contaminated with nitrates is associated with dangerous health conditions like colorectal cancer, thyroid disease, birth defects, premature births, and methemoglobinemia (a potentially fatal condition commonly known as "blue baby syndrome").[16] EPA has received at least five petitions for emergency action under the Safe Drinking Water Act from citizens living in hotbeds of CAFO activity, detailing how high concentrations of industrial livestock facilities are driving pervasive high groundwater nitrate concentrations.[17] Water quality testing cited in these petitions and elsewhere reveals elevated nitrate levels in groundwater beneath and downstream from CAFOs that jeopardize the health of nearby residents.[18]

Seepage from liquid waste storage structures (often called "lagoons" or "ponds") is another notable source of nitrate pollution.[19] While some states have independently required that unlined lagoons meet minimum permeability standards like the 1×10^{-6} cm/s standard in Appendix 10D to the United States Department of Agriculture's (USDA) Agricultural Waste Management Field Handbook, even storage structures built to this standard are "designed to leak."[20] To this point, EPA recently had to file a second enforcement action against several dairy CAFOs in Washington's Lower Yakima Valley due to the CAFOs' failure to comply with a consent decree intended to remedy nitrate contamination leaching from their facilities.[21] Despite provisions in the Washington NPDES General Permits that require CAFO lagoons to meet the minimum permeability standards outlined in

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[15] STATE OF CALIFORNIA STATE WATER RESOURCES CONTROL BOARD, DRAFT ORDER 2024-00XX, IN THE MATTER OF REVIEW OF WASTE DISCHARGE REQUIREMENTS GENERAL ORDER NO 05-2013-0122 FOR MILK COW DAIRIES IN THE CENTRAL VALLEY REGION at 6 (Oct. 1, 2024) [hereinafter CA DAIRY ORDER].

[16] Mary H. Ward et al., *Drinking Water Nitrate and Human Health: An Updated Review*, 15 Int. J. Res. Public Health 1, 22 (2018) (pagination in accordance with submitted copy); JoAnn Burkholder, et al., *Impacts of Waste from Concentrated Animal Feeding Operations on Water Quality*, 115 ENV'T HEALTH PERSPECTIVES 308, 310 (2007); *see generally* Roberto Picetti et al., *Nitrate and Nitrite Contamination in Drinking Water and Cancer Risk: A Systematic Review with Meta-Analysis*, 210 ENV'T RSCH. 1 (July 2022) (metastudy of health risks associated with nitrate pollution) (pagination in accordance with submitted copy).

[17] *See* SDWA Petitions, *supra* n.14.

[18] *Id.*; *see also* DAVID J. ERICKSON, WATER & ENVIRONMENTAL TECHNOLOGIES, EXPERT OPINION ON THE IDAHO CAFO GENERAL PERMIT 7, Attachment 1 (Aug. 23, 2023), [hereinafter Erickson Report] (describing nitrate plumes encountered during CAFO investigations).

[19] MELANIE REDDING, WASH. STATE DEP'T OF ECOLOGY, MANURE & GROUNDWATER QUALITY: LITERATURE REVIEW 63 (June 2016), [hereinafter WA LITERATURE REVIEW].

[20] *Food & Water Watch v. EPA*, 20 F.4th 506, 509 (2021) (quoting *Cmty. Ass'n for Restoration of the Env't, Inc. v. Cow Palace, LLC*, 80 F. Supp. 3d 1180, 1223 (E.D. Wash. 2015)).

[21] U.S. Department of Justice, *Department of Justice and EPA File Complaint Against Lower Yakima Dairies for Failing to Control Nitrate Contamination in Drinking Water* (June 26, 2024), https://www.justice.gov/usao-edwa/pr/department-justice-and-epa-file-complaint-against-lower-yakima-valley-dairies-failing.

Appendix 10D,[22] EPA's allegations indicate the dairies' lagoons are still contributing to dangerously high nitrate levels in groundwater.[23]

CAFOs also degrade waters by emitting ammonia from ventilation systems that subsequently deposits on land and surface waters.[24] CAFOs emit ammonia at much higher rates than pasture-raised operations due to greater reliance on silage and manure storage as well as high pressure spray irrigation of wastes.[25] Volatilized ammonia can account for up to 70 percent of nitrogen excreted by confined livestock.[26] Modeling suggests that over 500 tons of ammonia from poultry CAFOs are deposited into the Chesapeake Bay every year in this manner.[27] The adverse impacts of air deposition from CAFOs in the Delmarva Peninsula has led Maryland's Department of Environment to include best management practices (BMPs) targeting air deposition of ammonia in the state's NPDES general permit for CAFOs.[28] EPA must follow suit and amend the CAFO ELGs to safeguard waters across the country from this currently overlooked water pollution pathway.

In addition to exacerbating nutrient pollution, CAFOs also contribute to the spread of dangerous pathogens.[29] CAFO waste that reaches surface waters or groundwater increases the risk of pathogen transmission to animals and humans in the surrounding environment.[30] Researchers have

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[22] *Wash. State Dairy Fed'n v. Dep't of Ecology*, 18 Wn. App. 2d 259, 271 (Wash. Ct. App. 2021); *Friends of Toppenish Creek v. Wash. Dep't of Ecology*, PCHB No. 23-002, Order on Summary Judgment 9–10 (Feb. 6, 2025).
[23] U.S. Dep't of Justice, *supra* n.23 at 21–31, 33–34.
[24] Jordan Baker et al., *Modeling and Measurements of Ammonia from Poultry Operations: Their Emissions, Transport, and Deposition in the Chesapeake Bay*, 706 SCI. TOTAL ENV'T 1, 28 (2020), https://www.sciencedirect.com/science/article/abs/pii/S0048969719352829?via%3Dihub (pagination in accordance with submitted copy); Burkholder, *supra* n.16 at 308–312.
[25] Alyssa M. Burns, et al., *Data Gap: Air Quality Networks Miss Air Pollution from Concentrated Animal Feeding Operations*, 57 ENV'T SCI. & TECH. 20718, 20720 (2023).
[26] Horacio A. Aguirre-Villegas & Rebecca A. Larson, *Evaluating Greenhouse Gas Emissions from Dairy Manure Management Practices Using Survey Data and Lifecycle Tools*, 143 J. CLEANER PRODUCTION 169, 169 (2017); *see also* EPA, DEVELOPMENT DOCUMENT FOR THE FINAL REVISIONS TO THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM REGULATION AND THE EFFLUENT GUIDELINES FOR CONCENTRATED ANIMAL FEEDING OPERATIONS 6-30 (Dec. 2002), [hereinafter 2003 TDD] (estimating that a quarter of total nitrogen deposition onto beef feedlot surfaces is lost to volatilization).
[27] *Id.*
[28] *See Md. Dep't of the Env't v. Assateague Coastal Trust*, 484 Md. 399, 484 (2023) (recognizing state and federal authority to regulate air deposition to surface waters through NPDES permits and citing evidence that air deposition of ammonia from CAFOs is a significant source of nitrogen to Maryland's waters); Baker, *supra* n.**Error! Bookmark not defined.** at 3.
[29] GOV'T ACCOUNTABILITY OFFICE, *supra* n.10 at 24–28 (describing studies establishing links between CAFOs and exposure to hazardous bacteria and bacterial components such as *E. coli*, *campylobacter*, and endotoxin); EPA LITERATURE REVIEW, *supra* n.6 at 58–63 (listing confirmed and suspected outbreaks associated with manure and describing contamination pathways).
[30] Lawrence, *supra* n.11 at 2–4; Letter from James D. Yager, Ph.D, et al., Johns Hopkins Center for a Livable Future, to Michael Rife et al., Montgomery Township Supervisors 2–3 (Jun. 1, 2017); Letter from Robert Martin et al., Johns

documented fecal bacteria from swine in surface waters downstream from CAFO hotspots at levels that exceed state and federal water quality standards.[31] Fecal material can also be dispersed through air. A recent study conducted by Johns Hopkins Bloomberg School of Public Health found that "fecal matter from swine CAFOs is contributing to the contamination of indoor and outdoor household surfaces of nearby community residents," with 44 percent of neighboring residences and 38 percent of CAFO worker residences testing positive for swine microbes.[32]

Further, CAFOs routinely administer antibiotics for non-therapeutic purposes, thereby contributing to the discharge and proliferation of pharmaceuticals and antibiotic-resistant bacteria that threaten aquatic life and human health.[33] Bacteria can survive in untreated farm animal waste for up to 12 months, while up to 75 percent of administered antibiotics are not metabolized by animals and so persist in waste and in soil after land application.[34] Even when waste is treated by anaerobic digesters, digestate can maintain favorable conditions for antibiotic-resistant genes to develop and spread to the bacteria in surrounding water, soil, and air.[35] Infections caused by antibiotic-resistant

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Hopkins Center for a Livable Future, to State of Hawai'i Department of Health and Office of Environmental Quality Control 2 (Feb. 5, 2018); 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. OF ENV'T QUALITY 1435, 1435 (2015); CARRIE HRIBAR, NAT'L ASSOC. OF LOC. BDS. OF HEALTH, UNDERSTANDING CONCENTRATED ANIMAL FEEDING OPERATIONS AND THEIR IMPACT ON COMMUNITIES, 10–11 (Mark Schultz, 2010); Burkholder, *supra* n.16 at 308; Tucker R. Burch et al., *Quantitative Microbial Risk Assessment for Contaminated Private Wells in the Fractured Dolomite Aquifer of Kewaunee County, Wisconsin*, 129 ENV'T HEALTH PERSPECTIVES 067003-1, 067003-1 (2021); *See* Timothy P. Neher et al., *Catchment-Scale Export of Antibiotic Resistance Genes and Bacteria from an Agricultural Watershed in Central Iowa*, 15 PLOS One 1, 12 (Jan. 2020) (field experiment in Iowa demonstrating elevated fecal bacteria and antibiotic resistance indicators in catchments downstream from CAFOs) (pagination in accordance with submitted copy); *see also* WORLD ANIMAL PROTECTION, SILENT SUPERBUG KILLERS IN A RIVER NEAR YOU: HOW FACTORY FARMS CONTAMINATE PUBLIC WATER COURSES ON THREE CONTINENTS 19 (2021); Martin, *supra* n.30.

[31] Christopher D. Heaney et al., *Source Tracking Swine Fecal Waste in Surface Water Proximal to Swine Concentrated Animal Feeding Operations*, 511 SCI. TOTAL ENV'T 1, 8 (2015) (pagination in accordance with submitted copy).

[32] Kathleen M. Kurowski et al., *Swine Production Intensity and Swine-Specific Fecal Contamination of Household Surfaces at Residences of Industrial Livestock Operation Workers and Community Residents, North Carolina, USA*, 985 SCI. TOTAL ENV'T 1, 7 (2025).

[33] EPA LITERATURE REVIEW, supra n.6 at 49–56; Martin, *supra* n.30; Yager, et al., *supra* n.30 at 2; S. Koike, et al., *Monitoring and Source Tracking of Tetracycline Resistance Genes in Lagoons and Groundwater Adjacent to Swine Production Facilities Over a 3-Year Period*, 73 APPLIED AND ENV'T MICROBIOLOGY 4813, 4822 (2007); Mao et al., *Distribution and Antibiotic Resistance Profiles of Salmonella enterica in Rural Areas of North Carolina After Hurricane Florence in 2018*, 5 GEOHEALTH 1, 12 (2020); Burkholder, *supra* n.16 at 309; *see generally* Randhir P. Deo, *Pharmaceuticals in the Surface Water of the USA: A Review*, 1 CURR. ENV'T HEALTH REPORT 113, 114 (2014) (identifying CAFOs as a source of pharmaceutical pollution in surface waters and calling for monitoring and increased source controls); Airu Huang et al., *A Review of Processes for Removing Antibiotics from Breeding Wastewater*, 18 INT'L J. ENV'T. RSCH. PUBLIC HEALTH 1, 2 (2021) ("With the development of the breeding industry and the widespread application of antibiotics, a large amount of wastewater containing antibiotics is produced. If this is discharged into the environment without effective treatment, it will cause serious pollution, altering the ecological balance and endangering human health.").

[34] WORLD ANIMAL PROTECTION, *supra* n.30; J.C. Chee-Sanford et al., *Occurrence and Diversity of Tetracycline Resistance Genes in Lagoons and Groundwater Underlying Two Swine Production Facilities*, 67 APPLIED ENV'T MICROBIOLOGY 1494, 1494 (2001).

[35] WORLD ANIMAL PROTECTION, *supra* n.30; Chee-Sanford, *supra* n.34 at 1501; Mao, *supra* n.33 at 12.

bacteria are more difficult and expensive to treat, and more likely to be fatal than non-resistant strains.[36] Residents unlucky enough to live near CAFOs are at heightened risk of contracting a waterborne illness generally[37] in addition to facing uniquely high risks from antibiotic-resistant bacteria.[38]

Hormones and other pharmaceuticals present in CAFO waste pose additional threats to humans and wildlife.[39] Heightened levels of hormones naturally present in animal waste as well as synthetic pharmaceutical-grade growth hormones commonly administered to livestock have consistently been found in surface waters, groundwater, and spring water surrounding CAFOs.[40] These hormones, especially synthetic hormones with longer half-lives,[41] alter the reproductive biology and development of aquatic species in waters near CAFOs. Changes observed include demasculinization and defeminization of fish, decreased fertility in female fish, and abnormal reproductive proteins in turtles.[42] Other veterinary pharmaceuticals can remain in manure and leachates even during prolonged storage, and have been documented in water resources surrounding CAFOs.[43] For instance, livestock fed ractopamine—a beta-agonist used to artificially hasten animal growth—excrete 95 percent of the administered dose within 3 days of consumption.[44] When waste containing ractopamine is discharged to waters, the pollution induces harmful behavioral changes and oxidative stress in fish.[45]

Exposure to these pharmaceuticals in drinking water raises risks stemming from "cumulative effects of long-term low-dose exposure," as well as unintentionally ingesting pharmaceuticals that are

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36 Martin, *supra* n.30.
37 Martin, *supra* n.30.
38 Lawrence, *supra* n.11; Yager, *supra* n.30; Martin, *supra* n.30; WORLD ANIMAL PROTECTION, *supra* n.30; Koike, *supra* n.33; Mao, *supra* n.33; Chee-Sanford, *supra* n.34; Xunde Li, *supra* n.30 at 1435, 1441, 1443, 1445; Burkholder, *supra* n.16 at 310.
39 EPA LITERATURE REVIEW, *supra* n.6 at 56–57; GOV'T ACCOUNTABILITY OFFICE, CONCENTRATED ANIMAL FEEDING OPERATIONS: EPA NEEDS MORE INFORMATION AND A CLEARLY DEFINED STRATEGY TO PROTECT AIR AND WATER QUALITY FROM POLLUTANTS OF CONCERN 24 (2008); HRIBAR, *supra* n.30 at 5; Edward F. Orlando, et al., *Endocrine-Disrupting Effects of Cattle Feedlot Effluent on an Aquatic Sentinel Species, the Fathead Minnow*, 112 ENV'T HEALTH PERSPECTIVES 353, 356–357 (2004); Burkholder, *supra* n.16 at 308; BRADFORD, *supra* n.7 at 1, 12, 66.
40 Orlando, et al., *supra* n.39 at 353–354; HRIBAR, *supra* n.30 at 5.
41 Orlando, et al., *supra* n.39 at 357.
42 *Id.* at 353, 356–357; HRIBAR, *supra* n.30 at 5.
43 Burkholder, *supra* n.16 at 308–9; S. Bartelt-Hunt et al., *Occurrence of Steroid Hormones and Antibiotics in Groundwater Impacted by Livestock Waste Control Facilities*, 123 J. CONTAM. HYDROL. 94 (April 2011).
44 Georges Bories et al., European Food & Safety Authority, *Scientific Opinion of the Panel on Additives and Products or Substances Used in Animal Feed: Safety Evaluation of Ractopamine*, 1041 THE EUROPEAN FOOD SAFETY AUTHORITY J. 1-52, 8-52 (2009).
45 *See generally* A. Sachett et al., *Ractopamine Hydrochloride Induces Behavioral Alterations and Oxidative Status Inbalance in Zebrafish*, 81 J. TOXICOLOGY & ENV'T HEALTH, Pt. A (Feb. 2018).

incompatible with an individual's prescribed medication.[46] These observations led researchers to the conclusion that "generally accepted livestock waste management practices do not adequately or effectively protect water resources from contamination with excessive nutrients, microbial pathogens, and pharmaceuticals present in the waste."[47]

Salts, heavy metals, semimetals, and other trace elements added to feed and eventually expelled by livestock also impact water quality.[48] CAFO waste is known to contain many of the same elements found in sewage sludge, including "arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc."[49] Following a 2009 petition for rulemaking that chronicled reports of residual arsenic in meat and poultry food products,[50] the Food and Drug Administration withdrew its approvals of feed additives with arsenic. However, other elements that are not agronomically useful or taken up by crops remain in feed and wastes, resulting in accumulation and metal-contaminated runoff.[51] In North Carolina, for example, excessive accumulations of zinc and copper in areas with high concentrations of industrial animal agriculture have degraded soil quality to toxic levels.[52] Excessive salt in CAFO waste also impacts soil quality and can actually restrict crop establishment and growth.[53] In this manner, allowing land application of CAFO waste that has not been treated or even tested for metals and other trace elements directly undermines plant growth and contributes to overapplication of manure, fertilizer, and soil amendments that further reduce water quality.

II. EPA Must Adhere to CWA Requirements When Evaluating the CAFO ELGs

In setting the CAFO ELGs, EPA must "identify, in terms of amounts and constituents and chemical, physical, and biological characteristics of pollutants, the degree of effluent reduction attainable through the application of [the applicable technological standard]."[54] Pollutant reductions mandated by the ELGs will vary based on whether the facility is new or existing. Because new sources

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[46] Burkholder, *supra* n.16 at 310.
[47] *Id.* at 308.
[48] *Id.*; BRADFORD, *supra* n.7 at 1, 12, 66; EPA LITERATURE REVIEW, *supra* n.6 at 43–47.
[49] National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 2978 (Jan. 12, 2001).; Burkholder, *supra* n.16 at 308.
[50] *See generally* CENTER FOR FOOD SAFETY & INSTITUTE FOR AGRICULTURE AND TRADE POLICY, CITIZEN PETITION TO THE FOOD AND DRUG ADMINISTRATION (Dec. 8, 2009), https://www.centerforfoodsafety.org/files/arsenic-petition-12-8-09-final_67875.pdf.
[51] 66 Fed. Reg. at 2978.
[52] Steph Kulesza et al., *Mitigating Zinc and Copper Toxicity in North Carolina Soils* (March 27, 2024), https://content.ces.ncsu.edu/mitigating-zinc-and-copper-toxicity-in-north-carolina-soils.
[53] BRADFORD, *supra* n.7 at 14–15.
[54] 33 U.S.C. §§ 1314(b)(1)(A), 1316(a)(1).

can install cutting edge pollution reduction technologies and practices without the added cost of retrofitting, the CWA imposes stricter limitations on those facilities. In this manner, the Act is "technology forcing."[55]

Under the Act, the relevant technological standards are: (1) best practicable technology currently available (BPT), (2) best available technology economically achievable (BAT), (3) best conventional pollutant control technology (BCT), and best available demonstrated control technology (BADT). In addition to establishing technological bases for effluent limitations, CWA Section 304 also authorizes EPA to promulgate rules establishing BMPs to control toxic and hazardous pollutants, runoff, spillage and leaks, sludge or waste disposal, and drainage from materials storage that may contribute significant amounts of pollutants to jurisdictional waterways.[56]

The BAT standard represents the CWA's current[57] level of pollution reduction stringency required to control the discharge of toxic and nonconventional pollutants (including nutrients) from existing sources.[58] In general, EPA must set BAT based upon the best available technology EPA determines to be economically achievable across the category or subcategory as a whole.[59] Availability for BAT purposes is not dependent on temporal availability of the requisite technology to any one plant.[60] Rather, "BAT limitations must be based on the performance of the best-performing plant in an industrial field."[61] Importantly, the "industrial field" is not limited to CAFOs. It also includes other point source categories employing pollution control practices that could be transferred to achieve

[55] *See NRDC v. EPA*, 822 F.2d 104, 123–24 (D.C. Cir. 1987) ("Thus, the most salient characteristic of this statutory scheme, articulated time and again by its architects and embedded in the statutory language, is that it is technology-forcing . . . . This policy is expressed as a statutory mandate, not simply as a goal."); *Sw. Elec. Power Co. v. U.S. EPA*, 920 F.3d 999, 1003, 1005 (5th Cir. 2019) (contrasting the technology-based ELG system with a system based on water quality and citing cases).
[56] 33 U.S.C. § 1314(e).
[57] Point sources were first required to achieve the level of pollution reduction attainable by technologies and practices determined to be BPT by 1989. Since 1989, BAT has replaced this lesser standard.
[58] *Id.* at §§ 1311(b)(2)(A), 1314(b)(2)(B).
[59] *Sw. Elec.*, 920 F.3d at 1006.
[60] *Chem. Mfrs. Ass'n v. EPA*, 870 F.2d 177, 243 (5th Cir. 1989); *see also NRDC v. EPA*, 808 F.3d 556, 576–77 (2d Cir. 2015) (emphasizing that lack of supply was not a legitimate reason to exempt a subcategory from installing BAT because "the purpose of BAT is to force technology to keep pace with need").
[61] *Sw. Elec.*, 920 F.3d at 1006, 1018; *Chem. Mfrs. I*, 870 F.2d at 226; *see also Kennecott v. EPA*, 780 F.2d 445, 448 (4th Cir. 1985) ("In setting BAT, EPA uses not the average plant, but the optimally operating plant, the pilot plant which acts as a beacon to show what is possible.")

similar effluent treatment in the CAFO context.[62] Thus EPA must consider transferrable technologies when updating the CAFO ELGs.

BAT must "represent a commitment of the maximum resources economically possible to the ultimate goal of eliminating all polluting discharges."[63] As such, courts have referred to this as the CWA's "gold standard" for controlling discharges from existing sources.[64] The factors that control EPA's designation of BAT are: (1) the age of equipment and facilities involved, (2) the processes employed, (3) the engineering aspects of the application of various types of control technologies, (4) process changes, (5) the cost of achieving such effluent reduction, (6) non-water quality impacts (including energy requirements), and (7) any other factors EPA deems appropriate.[65] The Supreme Court has stated that BAT must be set in a manner that reflects "reasonable further progress" beyond BPT toward the CWA's ultimate goal of eliminating pollutant discharges.[66] Setting BAT beyond previous ELG iterations is critical to achieving the CWA's mandate that pollution control requirements become more stringent over time.[67] For this reason, courts reviewing ELGs reject reliance on an expansive view of "other factors" to block adoption of stronger effluent limits.[68]

BCT represents the current level of stringency for controlling discharge of conventional pollutants from existing sources.[69] "BCT is not an additional level of control, but replaces BAT for conventional pollutants."[70] Per the CWA, EPA must choose BCT based on "consideration of the reasonableness of the relationship between the costs of attaining a reduction in effluents and effluent reduction benefits derived, and the comparison of the cost and level of reduction of such pollutants from the discharge from publicly owned treatment works to the cost and level of reduction of such pollutants from a class or category of industrial sources."[71] The two parts of the BCT cost assessment

[62] *Cal. & Haw. Sugar Co. v. EPA*, 553 F.2d 280, 287–88 (2d Cir. 1977); *see also NRDC*, 808 F.3d at 564, 572–573 ("EPA can mandate that BAT requires use of a technology that is not currently available within a particular industry when (1) the technology is available in another industry, (2) EPA finds that the technology is transferrable from that other industry, and (3) EPA can reasonably predict that such technology will adequately treat the effluent.").
[63] *NRDC v. EPA*, 863 F.2d 1420, 1426 (9th Cir. 1988).
[64] *Sw. Elec.*, 920 F.3d at 1003.
[65] 33 U.S.C. § 1314(b)(2)(B).
[66] *EPA v. Nat'l Crushed Stone*, 449 U.S. 64, 74 (1980) (quoting 33 U.S.C. § 1311(b)(2)(A)); *see also NRDC*, 808 F.3d at 576 ("[A]gain, the purpose of BAT is to force technology to keep pace with need.").
[67] *See NRDC*, 822 F.2d at 123–24 ("Thus, the most salient characteristic of this statutory scheme, articulated time and again by its architects and embedded in the statutory language, is that it is technology-forcing . . . . This policy is expressed as a statutory mandate, not simply as a goal.").
[68] *Sw. Elec.*, 920 F.3d at 1016–20.
[69] 33 U.S.C. §§ 1311(b)(2)(E), 1314(b)(4).
[70] *BP Exploration v. EPA*, 66 F.3d 784, 790 (6th Cir. 1995).
[71] 33 U.S.C. § 1314(b)(4)(B).

have come to be known as the "industry cost-effectiveness test" and the "POTW test."[72] Beyond these tests, the CWA further compels EPA to "take into account" the familiar BAT consideration factors: age, processes used, engineering factors, process changes, environmental impacts, and other factors as EPA deems appropriate.[73]

The last of the technological controls, BADT, must be set at the most stringent treatment level attainable by a CAFO.[74] As new sources are uniquely capable of installing the most effective and efficient production processes and wastewater treatment technologies up front, without the added costs of retrofitting, "EPA is statutorily required to give serious consideration to a standard permitting *no* discharge of pollutants."[75] However, as the name indicates, any zero-discharge standard for new sources must be demonstrably attainable, e.g. proven with monitoring data. A technology may qualify as "demonstrated" when even one facility employs that technology to achieve a greater degree of effluent reduction than it could achieve using a less effective technology or practice.[76]

In setting new source performance standards (NSPS), EPA must consider two factors: "the cost of achieving such effluent reduction, and any non-water quality environmental impact and energy requirements."[77] In determining whether the cost of a candidate BADT can be reasonably borne by a subcategory, the relevant consideration is the incremental cost of compliance relative to the cost of the new facility as a whole.[78] Accordingly, even technologies that may impose a reasonable measure of financial burden on CAFO owners are appropriate to use as a basis for NSPS.

Finally, EPA must consider additional BMPs to control CAFO pollutants. BMPs can serve as technology-derived standards in EPA's guidelines where numeric effluent limits are "infeasible."[79] EPA's authority to mandate the use of BMPs does not detract from its obligation to issue technology-based standards where feasible. Moreover, when resorting to BMPs in place of numeric technology-

[72] *Am. Paper Inst. v. EPA*, 660 F.2d 954, 960–61 (4th Cir. 1981).
[73] 33 U.S.C. § 1314(b)(4)(b).
[74] *Chem. Mfrs.*, 870 F.2d at 261 ("Congress also recognized that new sources are uniquely situated to push toward the outer envelope of pollution control technology in a way that will further progress toward the national goal of eliminating the discharge of all pollutants.").
[75] *NRDC*, 822 F.2d at 123 (citing 33 U.S.C. § 1316(b)(1)(B)).
[76] *Chem. Mfrs.*, 870 F.2d at 263–64 (citing *Am. Iron & Steel Inst. v. EPA*, 526 F.2d 1027, 1058 (1975)).
[77] 33 U.S.C. 1316(b)(1)(B). Though this test mirrors the BAT methodology, BADT must advance the CWA's goal of achieving further pollution reductions. *Chem. Mfrs.*, 870 F.2d at 263 (calling it "intuitive" that Congress would not create separate schemes for new and existing sources if it intended the standards to be identical).
[78] *Nat'l Wildlife v. EPA*, 286 F.3d 554, 571 (D.C. Cir. 2002).
[79] *NRDC v. Costle*, 568 F.2d 1369, 1380 (D.C. Cir. 1977); 40 C.F.R. § 122.44(k).

based standards, EPA must still demonstrate that the pollutant reductions required by the standard can be achieved by those BMPs.[80]

III. The Current CAFO ELGs Are Inadequate and a Failure to Revise Them Following the Detailed Study Would Be Arbitrary and Capricious

The current CAFO ELGs impose several BMP requirements on Large CAFOs confining poultry, swine, dairy and beef cattle.[81] To meet the production area prohibition against any discharge except some precipitation-induced overflows, EPA has established as BPT, BCT, BAT, and BADT requirements for CAFOs to design, construct, operate, and maintain the production area to contain CAFO waste and precipitation runoff from a 25-year, 24-hour rainfall event; conduct certain routine visual inspections of the production area; install depth markers in waste impoundment structures; handle animal mortalities to prevent discharges; and maintain relevant records.[82]

To meet the land application effluent limitation that requires CAFOs to minimize the transport of nutrients to surface waters, EPA has established as BPT, BCT, BAT, and BADT requirements for CAFOs to develop and implement a nutrient management plan (NMP) that includes application rates to achieve realistic crop production goals, infrequent manure and soil sampling provisions, inspection of land application equipment for leaks, minimum setback distances, and recordkeeping.[83]

A wealth of evidence demonstrates that these CAFO ELGs are not adequate to protect waters of the U.S. from pollutant discharges or achieve applicable effluent limits. As explained more fully below, not only do the current production area requirements fail to achieve the zero-discharge effluent limit, but the land application BMPs currently in place likewise fail to minimize nutrient transport to surface waters. Because EPA has a statutory obligation to ensure that the CAFO ELGs are actually achieving the effluent limits the Agency has set, it must update these deficient ELGs accordingly.

Not only have these deficient ELGs resulted in ineffective permits, they are also at the crux of the widespread failure to permit discharging CAFOs in the first place.[84] The current regulations' primary limitation on discharging CAFOs is a narrative standard requiring these operations to implement NMPs that will "minimize phosphorous and nitrogen transport" from land application

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[80] *Citizens Coal v. EPA*, 447 F.3d 879, 899–900 (6th Cir. 2006).
[81] *See* 40 C.F.R. §§ 412.30 and 412.40 (limiting ELG applicability to operations exceeding Large CAFO size thresholds). *See also id.* at § 122.23(b)(4).
[82] *See id.* at §§ 412.31(a), 412.32(a), 412.33(a), 412.35(a), 412.37(a)–(b), 412.43(a), 412.44(a), 412.45(a), 412.46(a).
[83] *See id.* at §§ 412.4, 412.31(b), 412.32(b), 412.33(b), 412.35(b), 412.37(c), 412.43(b), 412.44(b), 412.45(b), 412.46(b).
[84] Though EPA has estimated that 75 percent of CAFOs discharge and thus need NPDES permits, *see* Revised National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines for Concentrated Animal Feeding Operations in Response to the Waterkeeper Decision, 73 Fed. Reg. at 70418, 70469 (Nov. 20, 2008), less than 30 percent of CAFOs are currently permitted. *See* CAFO PERMITTING INVENTORY, *supra* n.3.

fields to surface waters.[85] Thus, the regulations effectively acknowledge that at absolute best, NMPs are only expected to *minimize* dry weather discharges from land applying CAFOs.[86] At the same time, the regulations allow CAFOs to implement the very same NMPs to escape permitting altogether, paradoxically assuming that an unpermitted CAFO with a NMP can somehow *eliminate* dry weather discharges such that they don't need a permit at all.[87] This circular logic and fundamental misunderstanding of what nutrient management planning is capable of has led to an under-permitting crisis. By EPA's own estimate, nearly 10,000 CAFOs discharge point source pollution yet unlawfully evade permitting.[88]

EPA must update the CAFO ELGs to ensure that all discharging CAFOs are subject to strong pollution control standards that protect water quality. The CAFO ELGs are critically flawed for numerous reasons, including: (1) NMPs—the primary BMP prescribed by EPA regulations—are not effective at even minimizing nutrient loss (much less eliminating it); (2) the ELGs ignore numerous other pollutants of concern; (3) the ELGs do not prohibit myriad practices known to harm water quality; (4) the ELGs entirely overlook subsurface discharges that reach jurisdictional waters; (5) the ELGs fail to address aerial deposition of pollutants to waterways; and (6) the ELGs are not based on representative effluent monitoring.

A. NMPs Are Not as Effective at "Minimizing" Nutrient Loss as Current Guidelines Assume

As EPA has already concluded, NMPs—the primary BMP required by current CAFO ELGs—are not sufficiently protective of water quality for the simple reason that they are not designed to minimize nutrient runoff to waterways (nor do they to any significant degree). Rather, the primary goal of nutrient management planning is to maximize crop yields. Even while acknowledging that NMP application rates are "agronomic rather than water-quality based,"[89] EPA has long relied on the faulty assumption that applying manure at recommended application rates will prevent excessive pollution runoff from CAFO land application fields.[90] Yet the Agency recently found the opposite to

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[85] 40 C.F.R. § 412.4(c)(2).
[86] *See id.* at § 122.23(e) ("EPA entirely exempts from regulation all precipitation-related discharges from CAFO fields covered by NMPs as "agricultural stormwater.").
[87] *Id.*
[88] EPA estimates there are approximately 21,179 CAFOs nationwide, 6,174 of which have NPDES permits. *See* CAFO PERMITTING INVENTORY, *supra* n.3. If 75 percent (15,884) of CAFOs discharge, an additional 9,710 unpermitted CAFOs should be covered under the NPDES program.
[89] EPA, Confined Animal Feeding Operations: An Overview of the NPDES CAFO Program Mostly by the Numbers 28 (June 2019) (EPA presentation on the CAFO industry and the NPDES regulatory program for CAFOs).
[90] National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs), 68 Fed. Reg. 7176, 7197 (Feb. 12, 2003) (finding that land application "in accordance with practices designed to ensure appropriate agricultural utilization of nutrients" will "minimize[] the potential for subsequent discharge of pollutants to waters of the United States").

be true, concluding that agronomic rates are in fact *not* achieving effluent limitations that require CAFOs to minimize transport of nutrients to surface waters. In 2021, EPA conceded that "[e]ven if CAFOs were to comply with their NMPs, *their standards are insufficient*. NMP standards are set by each state, and states typically rely on USDA standards, which focus on maximizing crop growth, *rather than on preventing excess nutrient runoff*."[91] In other words, the dual goals, expressed in EPA's regulations and state technical standards, of maximizing production and minimizing pollution are simply incompatible.[92]

State regulators have made similar findings. For instance, in reviewing its waste discharge requirements for dairy CAFOs, the California State Water Resources Control Board recently concluded that land application at agronomic rates "is responsible for the vast majority of dairies' nitrogen impacts to groundwater"—often a pollution pathway to hydrologically connected jurisdictional surface waters—"forc[ing] [the State] to take a hard look at what [it] now recognizes has been an inadequate approach for regulating dairy waste discharges."[93] The Board further determined that, going forward, more stringent regulation is necessary to account for the reality that existing land application practices are "primarily [] a method of disposing of dairy waste that has secondary benefits of fertilizing crops, rather than a method of crop fertilization that may have incidental impacts to groundwater."[94]

These federal and state findings are supported by substantial scientific evidence demonstrating that NMPs are an ineffective pollution control practice for several reasons. *First*, technical standards typically authorize the overapplication of animal wastes to ensure that crops have sufficient nutrients for optimal growth. This prioritization of crop growth over all else undermines the ability of NMPs to minimize nutrient runoff. *Second*, inherent complexities involved in designing and executing NMPs significantly limit their efficacy, even when operators comply with them. *Third*, NMP standards fail to

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[91] EPA, Confined Animal Feeding Operations: A Primer On The Federal Program 18 (Dec. 2021) (emphasis added) [hereinafter EPA CAFO Primer] (presentation on EPA regulation of CAFOs). Evidence also suggests that CAFOs are regularly out of compliance with their NMPs. *See, e.g.*, BEN CHUGG ET AL., STANFORD UNIV., DETECTING ENVIRONMENTAL VIOLATIONS WITH SATELLITE IMAGERY IN NEAR REAL TIME: LAND APPLICATION UNDER THE CLEAN WATER ACT (2022), https://dho.stanford.edu/wp-content/uploads/LandApp.pdf (finding substantial infractions of the prohibition on winter manure applications and repeated applications in excess of reporting); Environmental Integrity Project, *84% of MD Poultry Operations Failed Water Pollution Control Inspections from 2017-2020* (Oct. 28, 2021), https://environmentalintegrity.org/news/md-poultry-operations-fail-water-pollution-control-inspections/ ("[M]ore than half of the poultry farms for which records were available in 2019 reported to the state that they spread manure on their crops in amounts greater than allowed under their nutrient management plans.").

[92] 40 C.F.R. § 412.4(c)(1) (directing CAFOs to "achieve realistic production goals, while [also] minimizing nitrogen and phosphorous movement to surface waters,"); *see also* Andrew Sharpley, *Agricultural Phosphorous Water Quality and Poultry Production: Are They Compatible?*, 78 POULTRY SCI. 660, 668 (1999) ("It cannot be assumed that there is a direct relationship between soil test calibration for crop response to [nutrients] and surface runoff enrichment potential . . . .").

[93] CA DAIRY ORDER, *supra* n.15 at 6.

[94] *Id.* at 6.

distinguish between distinct forms of CAFO waste or provide for any heightened restrictions on anaerobically digested waste, which carries increased water quality risks.

Researchers have known for decades that "[e]ven under ideal conditions, with a well-planned system, there is still a significant risk of losses to the environment"[95] because land application of animal waste at so-called recommended rates frequently overloads fields with far more nutrients than plants can uptake or soil can retain, creating serious water pollution risks.[96] This is particularly the case for phosphorous. Because most crops require more nitrogen than phosphorous, nitrogen-based approaches to manure application are more common than phosphorous-based plans. This "presents a special problem because the N-to-P ratio in manures is lower than that needed by crops . . . [causing] excess P [to] build[] up to environmentally harmful levels in fields that received repeated applications."[97] This nutrient mismatch "invariably means [phosphorous] is overapplied relative to needs," and has led some researchers to conclude that nitrogen-based application rates "are much higher than agronomic requirements."[98]

For example, researchers analyzing recommended application rates for bermudagrass, a crop commonly grown on CAFO waste application fields, found that "[a]pplying poultry litter to meet the N requirements of bermudagrass resulted in 356 kg P/ha being applied that was not removed by the bermudagrass. Clearly this results in an accumulation of soil P and increase in P loss in surface runoff and subsurface flow occurs."[99] Land application of dairy and swine CAFO waste is no better.[100] Once excess phosphorous in soil reaches a particular saturation point, it begins to leach into surface and

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95 L.M. Risse, et al., *Land Application of Manure for Beneficial Reuse*, *in* NATIONAL CENTER FOR MANURE AND ANIMAL WASTE MGMT. WHITE PAPERS 17 (J.M. White et al., eds. 2001).

96 *See e.g.*, Kimberly A Rosov, et al., *Waste Nutrients from U.S. Animal Feeding Operations: Regulations are Inconsistent Across States and Inadequately Assess Nutrient Export Risk*, 269 J. ENV'T MGMT. l, 8 (2020) (finding "standing operating procedures for land application of swine wastes create significant potential for nutrient overloads of soils and potential export of excess nutrients from CAFOs to surrounding environment; Burkholder, *supra* n.16 at 308 (surveying literature that found high concentrations of nitrogen in surface waters adjacent to spray fields where animal waste was applied at recommended rates).

97 Risse, *supra* n.95 at ii.

98 UNIVERSITY OF KENTUCKY RESEARCH FOUNDATION, DEMONSTRATION OF ENHANCED TECHNOLOGIES FOR LAND APPLICATION OF ANIMAL NUTRIENT SOURCES IN SENSITIVE WATERSHEDS: FINAL PROGRESS REPORT 2 (2008); E. Osei et al., *Environmental Benefits and Economic Costs of Manure Incorporation on Dairy Waste Application Fields*, 68 J. ENV'T MGMT. 1, 6 (2003).

99 Sharpley, *supra* n.92 at 667.

100 BRADFORD, *supra* n.7 at 8 ("[A] potential problem arises when the relative content of nitrogen and phosphorous in lagoon water differs from that in the crop. In this case, NMPs that are designed to meet the nitrogen requirement for crops may result in the over-application of phosphorous."); Lawrence Cahoon & Scott H. Ensign, *Spatial and Temporal Variability in Excess Soil Phosphorus Levels in Eastern North Carolina*, 69 NUTRIENT CYCLING IN AGROECOSYS. 111, 112, 122–23 (2004); *see also* UNIV. OF GEORGIA COOP. EXTENSION, SMALL FARM NUTRIENT MANAGEMENT PRIMER: FOR UN-PERMITTED ANIMAL FEEDING OPERATIONS 4-6 (Thomas M. Bass & L. Mark Risse, eds. 2015); Risse, *supra* n.95 at 18 ("Nutrients applied from animal manure should match the needs of the crop, but the ratios of N, P, K and various micro nutrients excreted by animals are generally different from crop requirements.").

groundwater.[101] Some states do require NMPs to include phosphorus-based plans under certain circumstances.[102] However, these approaches remain highly variable, and studies demonstrate that phosphorous is nevertheless routinely overapplied even in states with phosphorous-based planning requirements.[103] Complicating matters further, recent studies show that applying waste at agronomic rates for phosphorous can cause excessive nitrogen releases to groundwater and surface water as well.[104] Because the current regulatory landscape explicitly allows CAFO operators to apply both nitrogen and phosphorous in excess of crop needs, downstream water quality impacts inevitably result.[105]

Difficulties inherent to accurately estimating water delivery and utilization by crops and differential nutrient uptake rates further undermine the effectiveness of nutrient planning. From the outset, EPA has acknowledged that "crafting proper waste application rates is a complicated task" requiring technical expertise in "soil science and soil fertility, nutrient application and management, crop production, soil and manure testing and results interpretation, fertilizer materials and their characteristics, BMPs for the management of nutrients and water, and applicable laws and regulations."[106]

Indeed, an EPA study "designed to test the assumption that a well-designed and executed NMP is protective" of waters identified myriad obstacles to developing effective NMPs.[107] For example, difficulties in accounting for the precise water demands of crops, other sources of plant available water beyond irrigation, and preferential flow paths in soil that allow CAFO wastewater to bypass the root zone all impede the ability of NMPs to minimize surface and groundwater

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[101] CHESAPEAKE BAY FOUNDATION, MANURE'S IMPACTS ON RIVERS, STREAMS, AND THE CHESAPEAKE BAY 8 (July 28, 2004).

[102] *Id.* at 8–9 (noting that Virginia, Delaware, Pennsylvania, and Maryland all require that NMPs account for crop phosphorous needs to some extent).

[103] ENVIRONMENTAL INTEGRITY PROJECT, MANURE OVERLOAD ON MARYLAND'S EASTERN SHORE 8 (Dec. 8, 2014), http://dcpgonline.org/uploads/EIP_POULTRY-REPORT_-_Manure_Overload.pdf (finding 75 percent of phosphorous from poultry operations on Maryland's Eastern Shore was applied in excess of crop needs despite the state's phosphorous-based planning requirements).

[104] Matthew T. Streeter, et al., *Effects of Cattle Manure and Soil Parent Material on Shallow Groundwater Quality*, 6 AGROSYS. GEOSCIS. & ENV'T 1, 6 (2023) (explaining "if cattle manure (and any other nutrient input) is applied at agronomic rates for [phosphorous] while not accounting for manure [nitrogen] in the total budget for that nutrient, the potential to degrade groundwater resources with No3-N is high.") (pagination in accordance with submitted copy); *cf.* Coleen N. Brown, et al., *Tracing Nutrient Pollution from Industrialized Animal Production in Large Coastal Watershed*, 192 ENV'T MONITORING ASSESSMENT 1, 15–16 (2020) (detecting CAFO-derived nutrients and high nitrate concentrations in surface waters many kilometers downstream from CAFOs).

[105] Burkholder, *supra* n.16 at 308 (2007) (surveying literature that found high concentrations of nitrogen in surface waters adjacent to spray fields where animal waste was applied at recommended rates); Chris Jones, et al., *Livestock manure driving stream nitrate*, 48 AMBIO 1143, 1151–52 (2019); Zihao Bian, *Production and Application of Manure Nitrogen and Phosphorus in the United States Since 1860*, 13 EARTH SYST. SCI. DATA 515, 515–16 (2021).

[106] *Waterkeeper Alliance*, 399 F.3d at 501 n.19 (quoting 68 Fed. Reg. at 7213).

[107] BRADFORD, *supra* n.7 at xi.

contamination.[108] Additionally, predicting accurate nutrient budgets is further complicated by the fact that other contaminants in CAFO waste actually restrict plant growth and hinder a crop's ability to uptake nutrients.[109] In light of these factors, the Agency found that only a highly conservative plan that treated wastewater prior to application to remove most of the suspended solid content and "depleted the soil organic reservoir . . . by applying only a fraction of" plant nutrient needs (neither of which are required by current CAFO ELGs) actually minimized pollution.[110] In contrast, a "more aggressive" plan—like those actually advised by USDA and state conservation standards—led to increased "leaching and contaminant migration."[111]

Finally, the failure of NMP standards to account for different, more water pollution-prone types of CAFO waste streams further underscores their inadequacy. In the decades since EPA updated the CAFO ELGs, CAFOs have increasingly implemented anaerobic digester systems to ostensibly limit the climate impact of their waste and capitalize on lucrative state and federal incentive programs.[112] Though USDA has readily acknowledged that the waste product resulting from the digestion process (digestate) alters a CAFO waste stream's chemistry in ways that directly bear on nutrient management, presenting additional and more serious risks to water quality than undigested manure,[113] neither EPA nor USDA standards for land application (upon which most state technical standards are based) establish digestate-specific requirements to mitigate its heightened risk.

As recognized by USDA's Natural Resource Conservation Service ("NRCS"), "[d]igestate has increased potential for some air and nutrient emissions compared to raw manure" because "[c]ompounds such as nitrogen, phosphorous, and other elements become more soluble due to anaerobic digestion and therefore have higher potential to move with water."[114] Recent studies confirm that digested CAFO waste behaves much differently on the landscape than undigested manure due to its altered chemical composition, increasing short-term nitrogen loss, and contributing to metals and antibiotic-resistant pathogen accumulation.[115]

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[108] *Id.* at 66.

[109] *Id.* at 67; Ishmail Sheriff *et al., Microplastics in Manure: Sources, Analytical Methods, Toxicodynamic, and Toxicokinetic Endpoints in Livestock and Poultry*, 12 ENV'T ADVANCES 1, 2 (2023) (pagination in accordance with submitted copy).

[110] BRADFORD, *supra* n.7 at 67.

[111] *Id.*

[112] *See infra* at Section IV.A.3.

[113] *See* USDA-NRCS, CONSERVATION PRACTICE STANDARD CODE 366, ANAEROBIC DIGESTER 8–9 (Aug. 2023), https://www.nrcs.usda.gov/sites/default/files/2023-08/366_NHCP_CPS_Anaerobic_Digester_2023.pdf (recommending that "additional equipment, processes and technologies may be necessary or useful to treat digestate to reduce emissions and the potential for groundwater and surface water contamination during digestate storage and land application based on its intended use.").

[114] *Id.*

[115] *See* Roger Nkoa, *Agricultural Benefits and Environmental Risks of Soil Fertilization with Anaerobic Digestates: A Review.* 34 AGRONOMY FOR SUSTAINABLE DEVELOPMENT 473, 482–84 (2014); Chengjun Pu, et al., *Impact of Direct Application of*

In sum, the Agency itself has acknowledged many times over that its previous assumptions about NMPs and their ability to simultaneously "achieve realistic production goals, while minimizing nitrogen and phosphorous movement to surface waters"[116] are unfounded. Maximizing agricultural production and minimizing pollution are fundamentally contradictory concepts that cannot be – and have not been – squared by EPA's ineffective nutrient management requirements. This critical flaw in the CAFO ELGs has far-reaching ramifications beyond even the universe of permitted CAFOs. Not only are these insufficient nutrient management practices required in CAFO permits, but EPA further compounds its error by allowing *unpermitted* CAFOs that follow these same faulty requirements to exempt their land application discharges from regulation as agricultural stormwater.[117]

The CWA requires EPA to "prescribe conditions for [NPDES] permits to *assure compliance* with" all applicable requirements, including effluent limitations.[118] In order to effectuate this mandate, EPA must align its CAFO ELGs with the scientific reality, stop pretending that NMPs accomplish pollution reduction to a degree that they do not, and promulgate revised technology-based requirements that are actually protective of water quality. Failure to do so despite the scientific evidence EPA has before it, and its own changed understanding of the problem, would be arbitrary and capricious.

B. The CAFO ELGs Ignore Pollutants of Concern

Pursuant to the CWA and EPA's implementing regulations, NPDES permits must establish technology-based effluent limitations for *all* pollutants present in a discharge.[119] However, the CAFO effluent guidelines fail to do so. Instead, EPA's long-standing approach to regulating CAFO discharges is reliant on the fundamental misconception that CAFO waste is comprised solely of manure, leading the Agency to regulate only certain pollutants that naturally occur in manure (i.e. fecal coliform and nutrients) and disregard numerous other contaminants in CAFO waste streams—including salts, heavy metals, pharmaceuticals, cleaning products, and synthetic hormones—all of which meet the CWA's broad definition of "pollutant."[120]

Biogas Slurry and Residue in Fields: In Situ Analysis of Antibiotic Resistance Genes from Pig Manure to Fields. 344 J. HAZARDOUS MATERIALS 441, 443, 446–47 (2018).

116 40 C.F.R. § 412.4(c)(1).

117 *Id.* at § 122.23(e).

118 33 U.S.C. § 1342(a)(2) (emphasis added).

119 *See* 40 C.F.R. § 125.3(a)(2) (requiring permits to contain technology-based limits for "conventional pollutants," "all toxic pollutants," and "all pollutants which are neither toxic or conventional pollutants."); *see also* 33 U.S.C. 1362(6) (broadly defining "pollutant" to include "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water").

120 EPA regulates the various heavy metals used by CAFOs as feed additives as priority pollutants in other contexts. *See* 400 C.F.R. § 423, App. A. Additionally, pharmaceuticals and synthetic hormones added to livestock feed and excreted in

As EPA has acknowledged, the current regulatory framework either entirely ignores certain pollutants found in CAFO waste,[121] or "implicitly assume[s]" that nutrient management requirements focused on the agronomically valuable constituents of animal manure may have some incidental impact on reducing other contaminants, even though they have no accepted agronomic use.[122] But the Agency has never "thoroughly tested these hypotheses,"[123] nor made an affirmative finding that current CAFO ELGs do in fact constitute the best pollution control technologies and BMPs for reducing other pollutants of concern. To the contrary, the little data EPA has gathered on this front suggest otherwise. For instance, when EPA promulgated its 2003 CAFO rule, which incorrectly assumed that all Large CAFOs would obtain NPDES permits, it estimated that the rule would only reduce metal pollution by five percent.[124] Given the exceedingly low rates of permitting since,[125] it follows that any reductions in metal pollution in the intervening decades have been negligible.

Moreover, courts have soundly rejected EPA's past attempts to shirk its CWA duty to under-regulate CAFO pollutants in this way, finding that EPA violates the statute when it fails to "impose ELGs specifically designed to reduce [certain pollutants of concern] in CAFO discharges" or otherwise make an "affirmative finding that [current ELGs] do *in fact* represent" the appropriate level of pollution control technology for reducing such pollutants.[126] EPA's continued failure to promulgate CAFO ELGs that address all pollutants of concern is thus unlawful.

C. The CAFO ELGs Allow Practices Known to Harm Water Quality

As written, EPA's ELGs for Large CAFOs allow CAFO operators to engage in several production and land application area practices known to cause discharges and harm water quality, undermining the permits' narrative requirements to eliminate or minimize discharges, respectively.[127] EPA's failure to promulgate CAFO technical standards that prohibit harmful practices is arbitrary,

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livestock waste are clearly "biological materials" and "chemical wastes." 33 U.S.C. § 1362(6); *see also Nat'l Cotton Council of Am. v. EPA*, 553 F.3d 927, 935–938 (6th Cir. 2009) (explicating the broad scope of the terms "biological materials" and "chemical wastes.").

121 For instance, EPA has noted that the current ELGs do not address "plate chiller waste, filter backwash water, chemicals used in the production area (for disinfection) or pollutants that have fallen to the ground immediately downward from confinement building exhaust ducts and ventilation fans and are carried by precipitation-related runoff to waters of the US." EPA, NPDES PERMIT WRITERS' MANUAL FOR CONCENTRATED ANIMAL FEEDING OPERATIONS 4-18 (Feb. 2012) [hereinafter CAFO NPDES PERMIT WRITERS' MANUAL].

122 BRADFORD, *supra* n.7 at 66 ("The current regulatory framework is based on nutrient management plans (NMPs) to ensure that lagoon water is applied to agricultural lands at agronomic rates to meet the nutrient demands of crops. Other lagoon water contaminants are implicitly assumed to be retained, inactivated, or degraded in the root zone. Additional studies are needed to thoroughly test these hypotheses.").

123 *Id.*

124 68 Fed. Reg. at 7239.

125 CAFO PERMITTING INVENTORY, *supra* n.3 (showing less than 30 percent of Large CAFOs have NPDES permits).

126 *See Waterkeeper Alliance*, 399 F.3d at 519 (the need to establish ELGs for other pollutants beyond pathogens was not before the court).

127 Small and Medium CAFOs are also permitted to engage in these practices, as the CAFO ELGs do not apply to these operations.

capricious, and contrary to EPA's obligations to develop guidelines sufficient to protect water quality and make progress towards the Act's goal of eliminating pollution.

EPA concedes that its current pollution control standards fail to effectively "limit the discharge of pollutants under certain circumstances."[128] Food & Water Watch alerted the Agency to those circumstances more than eight years ago in a Petition to revise CAFO CWA regulations, discussing at length numerous high-risk practices currently allowed by EPA's CAFO ELGs that are contributing to water quality degradation.[129] These practices include:

1) Manure storage in unlined and inadequately lined lagoons and impoundments;
2) Ventilation of pollutants near waters or conduits to waters of the U.S.;
3) Application of CAFO waste on frozen, saturated, or snow-covered ground;
4) Application of CAFO waste via spray irrigation equipment;
5) Application of CAFO waste on steep slopes;
6) Manure storage in exposed stockpiles; and
7) Lagoon design standards based on outdated weather and storm frequency data.

Though the Agency recognizes these practices to be high-risk, rather than prohibiting them by regulation, it instead has urged states to do so themselves, with little success.[130] For one thing, the Agency knows many state permitting agencies are themselves prohibited from exceeding EPA's minimum BMP requirements, including major livestock-producing states like Iowa, North Carolina, and Wisconsin.[131] A 2013 study conducted by the Environmental Law Institute found that a total of 13 states had enacted such "no more stringent than" laws, and an additional 23 states have adopted laws that make it more difficult to establish state standards that surpass these minimum federal requirements.[132]

Moreover, even when states have not expressly passed legislation to hamstring their permitting agencies from implementing more protective technical standards, the reality is state regulators often

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[128] EPA ENVIRONMENTAL JUSTICE REPORT, *supra* n.8 at 75.
[129] 2017 PETITION, *supra* n.5 at 46–55.
[130] *See* CAFO NPDES PERMIT WRITERS' MANUAL, *supra* n.121 at 4-36, 5-29–5-30, 6-15–6-16.
[131] *See e.g.*, Iowa Code § 459.311(2) ("any rules adopted pursuant to this [minimum requirements for manure control] subsection shall be no more stringent than requirements under the federal Water Pollution Control Act . . . ."); N.C. Gen. Stat. § 150B-19.3 ("An agency authorized to implement and enforce State and federal environmental laws may not adopt a rule for the protection of the environment or natural resources that imposes a more restrictive standard, limitation, or requirement than those imposed by federal law or rule"); Wis. Stat. § 283.11(2) ("all rules promulgated by the department under this chapter [pollution discharge elimination] . . . shall comply with and not exceed the requirements of the federal water pollution control act . . . .").
[132] ENV'T LAW INST., STATE CONSTRAINTS: STATE-IMPOSED LIMITATIONS ON THE AUTHORITY OF AGENCIES TO REGULATE WATERS BEYOND THE SCOPE OF THE FEDERAL CLEAN WATER ACT 1 (2013), https://www.eli.org/sites/default/files/eli-pubs/d23-04.pdf.

lack adequate resources to fully implement permitting programs.[133] Even EPA has noted that states have not prioritized regulation of feedlot wastes, and that budgetary constraints make it unlikely that states will meet—much less exceed—program and permitting responsibilities under the current rules.[134]

Faced with this lack of resources and in some cases limited permitting authority, most states default to the USDA technical standards outlined in NRCS Code 590, which EPA has already determined are insufficient.[135] Indeed, the Agency has found that "USDA's [NMP] guidance lacks many of the details EPA believes are necessary to ensure discharges of manure and other process wastewater are adequately controlled" because they contain "no avenue for ensuring that [C]AFOs implement any management practices or achieve a particular performance standard."[136] Despite EPA's finding that "consistency with NRCS Code 590 may not by itself ensure compliance with the regulatory requirements for technical standards of nutrient management"[137] it has allowed a patchwork of state technical standards that in many cases rely solely on NRCS Code 590 guidance to serve as the main vehicle for CAFO regulation, which in turn has allowed the harmful practices identified above to proliferate.

D. The CAFO ELGs Ignore Hydrologic Discharges

Another critical flaw in the current CAFO ELGs is that they fail to ensure CAFOs are not violating production area or land application effluent limitations due to discharges to jurisdictional surface waters via hydrologically connected groundwater. Under the CWA, a CAFO is liable for discharges of "pollutants that reach navigable waters after traveling through groundwater if [those] discharge[s] [are] the functional equivalent of a direct discharge from the point source into navigable waters."[138] Thus, if a CAFO has subsurface discharges into a jurisdictional water from its lagoons, it violates the zero-discharge effluent limitation for production areas.[139] Likewise, if CAFO waste applied

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133 EPA ENVIRONMENTAL JUSTICE REPORT, *supra* n.8 at75 (finding that "state permitting agencies lack the resources to regularly inspect [CAFO] facilities"); CLAUDIA COPELAND, CONGRESSIONAL RESEARCH SERVICE, ANIMAL WASTE AND WATER QUALITY: EPA REGULATION OF CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS) 18 (Feb. 16, 2010) ("[I]t is unclear how state agencies will find the resources needed to carry out their responsibilities under the revised rules without reducing resources for other important activities."); Terence J. Centner, *Regulating the Land Application of Manure from Animal Production Facilities in the USA*, 14 WATER POLICY 319, 329 (2012) (noting that "state regulatory agencies do not have the resources to penalize producers who fail to follow BMPs").

134 Copeland, *supra* n.133 at 24; Jillian P. Fry, et al., *Investigating the Role of State Permitting and Agriculture Agencies in Addressing Public Health Concerns Related to Industrial Food Animal Production*, 9 PLOS 1, 4 (2014) (discussing how state agencies "don't have staff or money" to effectively implement CAFO programs).

135 EPA CAFO Primer, *supra* n.91 at 8.

136 66 Fed. Reg. at 3033.

137 EPA, MANAGING MANURE NUTRIENTS AT CONCENTRATED ANIMAL FEEDING OPERATIONS 6-1 (Dec. 2004).

138 *Cnty. of Maui v. Hawaii Wildlife Fund*, 590 U.S. 165, 185 (2020).

139 40 C.F.R. § 412.31(a).

to fields excessively leaches into hydrologically connected groundwaters, the CAFO violates the minimize standard for land application areas.[140]

Over twenty years ago, EPA acknowledged groundwater contaminated by CAFO pollutants is a "significant transport mechanism" for surface water discharges due to the prevalence of hydrologic connections.[141] CAFO pollutants that seep into groundwater have been shown to migrate to surface waters. Investigations in Washington and California have shown nitrate pollution that seeps into groundwater from CAFOs can travel over two miles downgradient from the source.[142] In many scenarios, such seepage will clearly lead to hydrologic discharges that are functionally equivalent to direct discharges.

Nationally, 40 percent of average annual stream flow originates from groundwater,[143] and these connections are even more pervasive in certain regions where CAFOs are concentrated. For instance, in the Chesapeake Bay watershed, the U.S. Geological Survey estimates about half of the nitrogen loads from all sources to nontidal streams and rivers originate from groundwater.[144] Groundwater feeds half of all stream flow in North Carolina.[145] In Idaho's Magic Valley, where the majority of the state's dairy industry is located, agricultural irrigation is the largest contributor to recharging the Snake River Plain aquifer—an essential drinking water source.[146] As pollution from the CAFO industry seeps into groundwater, some of these contaminants are discharged directly into the Snake River at distinct points along its route.[147]

In Wisconsin, where groundwater is particularly vulnerable to contamination due to the region's karst geology,[148] CAFOs have contaminated ground and surface water to such an extent that regulators have created a factual presumption of discharge requiring all CAFOs that land apply waste

140 *Id.* at § 412.4(c)(1).
141 66 Fed. Reg. at 2980; EPA, RISK ASSESSMENT EVALUATION FOR CONCENTRATED ANIMAL FEEDING OPERATIONS 52–53 (May 2004) [hereinafter EPA RISK ASSESSMENT].
142 Erickson Report, *supra* n.18 at 7.
143 66 Fed. Reg. at 2980.
144 *Id.*
145 *See* NORTH CAROLINA DIVISION OF WATER RESOURCES, THE WATER CONNECTION: WATER RESOURCES, DROUGHT, AND THE HYDROLOGIC CYCLE IN NORTH CAROLINA 5 (Sep. 2009) (estimating most streams and rivers in the state receive approximately half their volume from groundwater).
146 UNIVERSITY OF IDAHO, EASTERN SNAKE RIVER PLAIN SURFACE AND GROUND WATER INTERACTION at 2–3, https://idwr.idaho.gov/wp-content/uploads/sites/2/legal/american-falls/AF-20020118-ESPA-Surface-Water-and-Groundwater-Interaction.pdf.
147 *Id.* at 3–5; *see also* IDAHO CONSERVATION LEAGUE, THE 2021 GROUNDWATER REPORT: GROUNDWATER QUALITY IN THE MAGIC VALLEY 3–7 (2021).
148 WISCONSIN DEP'T OF NATURAL RESOURCES, GROUNDWATER COLLABORATION WORKGROUP FINAL REPORT, 11 (June 2016), https://www.kewauneeco.org/i/f/files/Land%20%26%20Water%20Conservation/Groundwater%20Collaboration%20Workgroup%20Final%20Report.pdf.

to obtain NPDES permits and implement groundwater controls.[149] These same karst conditions are found throughout much of the Midwest where industrial agriculture is clustered, creating significant pollution problems in both ground and surface waters.[150]

Though EPA must "prescribe conditions for [NPDES] permits to *assure compliance* with" effluent limitations,[151] the CAFO ELGs fail to do so for the subsurface discharge pathway. For instance, the BMPs EPA prescribes for CAFO production areas all focus on waste *overflows*,[152] despite the well-established fact that lagoons can and do leak into groundwater. As EPA well knows, "[e]ven assuming [] lagoons were constructed pursuant to NRCS standards, these standards specifically allow for permeability, and thus, the lagoons are designed to leak."[153] NRCS guidance allows a seepage rate of 5,000 gallons per acre per day for compacted clay lined lagoons,[154] translating into an astronomical 1.825 *million* gallons per acre annually. Accordingly, EPA determined in 2001 that imposing groundwater-focused production area requirements on CAFOs would significantly reduce nitrogen loading to surface waters, with an estimated annual 3 million pounds reduction from the dairy and beef subcategories alone.[155] Yet the current CAFO ELGs are completely silent on this discharge pathway.

The same is true for the land application requirements EPA prescribes. Though it is well-documented that land application at agronomic rates "is responsible for the vast majority of [] nitrogen impacts to groundwater,"[156] and at the epicenter of many serious groundwater contamination crises across the country,[157] EPA's current CAFO ELGs entirely fail to address land application impacts to hydrologically connected groundwater.

For decades, EPA has relied on states to address the pervasive problem of subsurface CAFO discharges polluting jurisdictional waters, claiming that a national technology-based standard is

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[149] *See* Wis. Admin. Code § N.R. 243.11(3); Wisconsin NRCS Standard 590 (Dec 2015), https://datcp.wi.gov/Documents/NM590Standard2015.pdf.
[150] *See generally* SDWA Petitions, *supra* n.14.
[151] 33 U.S.C. § 1342(a)(2).
[152] 40 C.F.R. §§ 412.31(a), 412.37.
[153] *Food & Water Watch*, 20 F.4th at 509.
[154] NRCS, AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK, CHAPTER 10: AGRICULTURAL WASTE MANAGEMENT SYSTEM COMPONENT DESIGN, Appendix 10D (July 2024), https://directives.nrcs.usda.gov//sites/default/files2/1720533311/Chapter%2010%20-%20Agricultural%20Waste%20Management%20System%20Component%20Design.pdf.
[155] 66 Fed. Reg. at 3062.
[156] CA DAIRY ORDER, *supra* n.15 at 6.
[157] *See* Letter from Allamakee County Protectors – Education Campaign et al., to Bruno Pigott, EPA Office of Water (Oct. 29, 2024), https://www.foodandwaterwatch.org/wp-content/uploads/2024/10/EPA-Letter-Requesting-SDWA-Meeting-Oct-29-2024.pdf (summarizing the status of five emergency petitions pleading with EPA to address the severe nitrate contamination of groundwater and drinking water resources caused by CAFOs in Wisconsin, Oregon, Washington, Minnesota, and Iowa).

inappropriate given the "site-specific variables" that factor into such discharges.[158] But this hands-off approach has largely failed—particularly given the inability of many states to impose requirements more stringent than those established by EPA[159]—and has consequently created stark pollution disparities and an anti-regulatory race to the bottom further driving industry consolidation.

Moreover, EPA's position simply doesn't square with its broad authority and obligation to conduct site-specific analysis and create industry subcategories when necessary. EPA regularly makes estimates about difficult to discern site-specific factors when setting ELGs, and the Ninth Circuit has rejected the Agency's attempts to shirk site-specific analysis in the past.[160] If EPA finds that specific topographies or other geologic factors render certain regions fundamentally different and more vulnerable to surface water discharges via groundwater, the Agency is well within its authority to subcategorize the industry based on geographic location and impose targeted groundwater requirements where necessary.[161] EPA's decades-long failure to do so is arbitrary and capricious.

E. The CAFO ELGs Ignore Aerial Discharges

The CAFO ELGs also arbitrarily ignore discharges via aerial deposition of pollutants. As with hydrological discharges, EPA has long recognized that aerial deposition is a significant source of pollution to surface waters, that CAFOs discharge pollutants through aerial deposition, and that such discharges are subject to NPDES permitting requirements.[162] Practices that pose particularly high aerial discharge risks include storing CAFO waste in liquid form, operating industrial ventilation systems in confinement pens, and spraying liquid manure onto land application areas.[163] Despite acknowledging aerial deposition as an issue in past CAFO ELG rulemakings, EPA has yet to address this pathway through either technology-based effluent guidelines or BMPs. This oversight has had measurable consequences. Economic data from 2008 to 2012 show that even as gross economic

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158 68 Fed. Reg. at 7216.
159 *See supra* Section III.C.
160 *See Ass'n of Pac. Fisheries v. EPA*, 615 F.2d 794, 819–20 (9th Cir. 2007) (rejecting EPA's failure to consider full spectrum of costs when setting BAT where the Agency claimed certain costs were too site-specific to merit consideration).
161 *See Chem. Mfrs.*, 870 F.2d at 214–15 (finding EPA must create subcategories where a group of operations is "so fundamentally different from other plants on which the limitations are based that they cannot practicably achieve the effluent limitations achieved by the average of the best plants in the industry."); *Citizens Coal*, 447 F.3d at 904 (affirming subcategorization based on site-specific factors of geographic location).
162 66 Fed. Reg. at 2980 (acknowledging that "atmospheric deposition is the third leading cause of water quality impairment for estuaries, and the fifth leading cause of water quality impairment for lakes, ponds, and reservoirs," and identifying land application as a source of aerial deposition); *see also id.* at 3104 ("A fraction of the air emissions from AFOs [including those from manure management systems and animal housing] are subsequently redeposited on land or in surface waters."); 68 Fed. Reg. at 7236, 7240 (listing volatilization and subsequent redeposition along with direct discharge and leaching to groundwater as primary pathways by which CAFO pollutants reach surface waters); 2003 TDD, *supra* n.26 at 8-153–8-154 (similar); *see also Nat'l Pork Prods. Council*, 635 F.3d at 754–56 (describing EPA's position that aerial deposition of dust from poultry CAFO ventilation systems are discharges that must be permitted).
163 *Id.*; *see also* 2003 TDD, *supra* n.26 at 8-156 ("Field estimates of volatilization loss from surface-applied manure range from about 10 to 70 percent of NH3-N applied.").

damage from particulate matter in other sectors fell, damage caused by the livestock industry grew.[164] This is unacceptable, as EPA's role in establishing ELGs is to pursue the "ultimate goal of eliminating *all* pollutant discharges."[165] Given the wealth of evidence demonstrating that aerial depositions from CAFOs are causing surface water discharges and contributing to water quality impairments,[166] EPA must use this opportunity to regulate this significant pollution pathway.

The CWA grants EPA clear authorization to regulate air deposition to surface waters through the ELGs.[167] As the Supreme Court recently recognized, discharges that travel through media to reach navigable waters are discharges within the meaning of the CWA, so long as they "reach the same result [as a direct discharge] through roughly similar means."[168] The same reasoning applies to the discharge of gaseous ammonia, particulate matter, and other pollutants that reach surface waters through the air, particularly if the pollution reaches a nearby waterway relatively quickly.[169] In fact, treating aerially deposited discharges as non-jurisdictional would allow CAFOs to avoid regulation by simply spraying their waste into the air—a loophole the Supreme Court deemed impermissible in the groundwater context.[170] As the Sixth Circuit Court of Appeals held while determining pesticide applications were discernible, confined, and discrete conveyances within the meaning of the CWA's definition of point source, "there is no requirement that the discharged [pollutant] immediately cause harm to be considered coming from a point source."[171] Rather, when determining whether a discharge is subject to NPDES permitting requirements, "the relevant inquiry is whether—but for the point source—the pollutants would have been added to the receiving body of water."[172] Plainly, but for the CAFOs, aerial deposition of volatilized CAFO pollutants to surface waters would not be occurring. Moreover, given the significant amounts of pollution CAFOs aerially discharge to surface waters, failure to

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164 Peter Tschofen et al., *Fine Particulate Matter Damages and Value Added in the US Economy*, 116 PNAS 19857, 19858 (2019).
165 *NRDC*, 863 F.2d at 1426 (emphasis added).
166 *Supra* nn.25–**Error! Bookmark not defined.** and accompanying text.
167 *See* 33 U.S.C. §§ 1311(a), 1342(a)(1) (precluding the discharge of any pollutant to waters of the United States, except in compliance with a NPDES permit); *id.* § 1362(12) (defining "discharge of a pollutant" as "*any* addition of any pollutant to navigable waters from any point source) (emphasis added), 1362(14) (defining CAFOs as point sources without exception).
168 *Cnty. of Maui*, 590 U.S. at 183–84 (acknowledging jurisdiction over "functionally equivalent" discharges to surface water through groundwater).
169 *Id.* at 185 (explaining that time and distance are usually, but not always, the most important factors in determining whether a functionally equivalent discharge exists).
170 *Id.* at 178 ("If that is the correct interpretation of the statute, then why could not the pipe's owner, seeking to avoid the permit requirement, simply move the pipe back, perhaps only a few yards, so that the pollution must travel through at least some groundwater before reaching [a jurisdictional water]? We do not see how Congress could have intended to create such a large and obvious loophole.").
171 *Nat'l Cotton Council*, 553 F.3d at 939.
172 *Id.* at 940 (citing *S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians*, 541 US 95, 103 (2004))*; see also League of Wilderness Defs. / Blue Mountain Diversity Project v. Forsgren*, 309 F.3d 1181, 1183 (9th Cir. 2002) (finding aerial spraying of pollutants over forestland that then discharged to waterways required NPDES permit).

account for aerial deposition prevents EPA and other permitting authorities from attaining the Act's mandate to ensure permitted discharges do not cause or contribute to exceedances of water quality standards.[173]

Again, while site-specific factors like temperature, pH, humidity, precipitation, and distance to surface waters impact aerial deposition of CAFO pollutants, leaving regulation of these discharges completely up to the states has not been a successful strategy. Rather than filling the gap left by EPA, even states with the worst documented impacts from aerially deposited CAFO pollution refuse to include specific and legally binding requirements in NPDES permits to control aerial depositions.[174] To date, reviewing courts have largely deferred to agencies in these determinations.[175] And as detailed above, several states have statutory provisions that prohibit any regulation of CAFOs beyond what EPA includes in the federal regulations.[176] The remedy to uncontrolled aerial deposition of pollutants from CAFOs is obvious—EPA must impose specific and mandatory BMPs that are demonstrated to reduce aerial deposition.[177]

F. The CAFO ELGs Are Not Based on Representative Monitoring Data

A significant part of the challenge in establishing evidence-based CAFO ELGs is EPA's and other permitting authorities' failure to require collection and reporting of representative effluent monitoring data from CAFOs.[178] The CWA specifically mandates inclusion of monitoring requirements sufficient to produce representative data that demonstrate whether a CAFO is complying with the effluent limits in its NPDES permit.[179] The unwillingness to impose upon CAFOs the same monitoring requirements that all other point sources are required to undertake and report to permitting agencies in periodic discharge monitoring reports has left EPA and the public in the dark about the precise extent to which various CAFO practices are discharging pollutants to jurisdictional waters. Indeed, in announcing this very CAFO study, EPA acknowledged this dearth of monitoring, admitting that data on CAFOs are so "sparse" that the Agency "was only able to analyze monitoring data from sixteen reporting CAFOs" across the entire country—a paltry 0.2 percent of permitted

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[173] *See* 33 U.S.C. § 1342(a).
[174] *See e.g.*, *Assateague Coastal Trust*, 484 Md. at 442 (reprinting Maryland Department of Environment's response to comments requesting aerial deposition controls, in which the Department characterizes aerial discharges as an air quality issue and declining to include the remedial measures requested by commenters).
[175] *Id.* at 486 ("We see no reason to require the [Maryland Department of Environment] to precisely identify the BMPs that are required for ammonia emissions.").
[176] *See, e.g.*, Iowa Code § 459.311; Colo. Rev. Stat. § 25-8-504; Miss. Code Ann. § 49-17-34; § 75-5-203, MCA.
[177] *Citizens Coal*, 447 F.3d at 899.
[178] *See* 2017 PETITION, *supra* n.5 at 34–37.
[179] 33 U.S.C. §§ 1318(a), 1342(a)(2); 40 C.F.R. § 122.44(i).

CAFOs.[180] This black box in which CAFOs have been allowed to operate has led to chronic under-permitting, insufficiently protective ELGs and permits, and severe environmental consequences that threaten public health across the country.

Multiple adjudicatory bodies have now agreed that regulators' failure to include representative monitoring requirements in CAFO permits runs afoul of the CWA.[181] In particular, the Ninth Circuit Court of Appeals held that the Act "requires every NPDES permittee to monitor its discharges . . . in a manner sufficient to determine whether it is in compliance with the relevant NPDES permit."[182] The Court further held that EPA's 2020 NPDES general permit for CAFOs in Idaho violated the CWA because it did not include production area monitoring to ensure compliance with the permit's zero-discharge effluent limit and did not include land application area monitoring to ensure compliance with the permit's zero dry weather discharge effluent limit.[183] The Court also noted that "[e]ffective self-monitoring reveals permit violations, thereby promoting enforcement of the CWA."[184]

To remedy the legal and practical deficiencies created by inadequate monitoring, EPA must incorporate monitoring technologies and practices into the CAFO ELGs. "The NPDES program fundamentally relies on self-monitoring."[185] Continued exclusion of monitoring from EPA's CAFO regulations will not only hamstring enforcement efforts, but also keep EPA in the dark about opportunities to reduce and ultimately eliminate CAFO pollution through additional amendments to the ELGs. If CAFOs were required to submit representative discharge monitoring reports like other point source categories, EPA could identify the facilities achieving the best pollution reductions, making this entire detailed study process much more straightforward and enabling EPA to better comply with its mandatory duty to regularly review, and if necessary revise, the CAFO ELGs.[186] A

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[180] EPA, EFFLUENT GUIDELINES PROGRAM PLAN 15, App. A at A-2 (Jan. 2023); *see also* FOOD & WATER WATCH, COMMENTS OF FOOD & WATER WATCH ON PRELIMINARY EFFLUENT GUIDELINES PROGRAM PLAN 15 3–4 (Oct. 14, 2021) (casting doubt on the legitimacy and accuracy of what little CAFO monitoring data EPA has collected).
[181] *Food & Water Watch*, 20 F.4th at 517–18; *Wash. State Dairy Fed'n*, 18 Wn. App. 2d at 299–303; *Friends of Toppenish Creek*, Washington Pollution Control Hearing Board, PCHB No. 23-002. Other cases involving the same legal question are currently pending before state tribunals in Montana, Colorado, and Michigan. *Upper Missouri Waterkeeper v. Mont. Dep't of Env't Quality*, Case No. DV-16-2023-0001249; *Center for Biological Diversity v. Colorado Dep't of Public Health & Env't*, Case No. 2024-CV-30436; *In re Michigan Farm Bureau*, Dkt. No. 20-009773.
[182] *Food & Water Watch*, 20 F.4th at 516.
[183] *Id.* at 517–18.
[184] *Id.* at 516.
[185] *Id.* (quoting *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)).
[186] *See* 33 U.S.C. § 1314(b) (requiring EPA to conduct an annual review of ELGs and revise them as appropriate).

failure to impose mandatory representative monitoring of all known CAFO discharge points and reporting of monitoring data would be arbitrary and capricious.

IV. EPA Must Update the CAFO ELGs with New Technologies and Practices Available to Control CAFO Pollution

EPA must take action to correct the critical flaws in the CAFO ELGs identified above and strengthen the regulations consistent with its statutory duty.[187] Bringing the CAFO ELGs into compliance with the CWA will require the Agency to prohibit technologies and practices that exacerbate surface water pollution and to impose additional production area and land application requirements based on new and/or readily available technologies and practices.

A. The CAFO ELGs Must Mitigate the Water Quality Impacts of Outdated Technologies and Practices That Exacerbate CAFO Pollution

The CWA was designed to impose increasingly stringent pollutant reduction requirements on industrial point sources over time.[188] Certain pollutant control technologies and practices have been proven ineffective or discovered to have adverse impacts that outweigh any benefits. Thus, the only reasonable result of EPA's study of the CAFO category and its ELGs is to remove or substantially limit regulatory reliance on these outdated methods. EPA must therefore revise 40 C.F.R. § 412.4 to either prohibit outright or adopt more stringent waste management controls for spray irrigation, other high-risk land application practices, and anaerobic digesters. These technologies and practices are not acceptable BMPs, nor should they serve as the bases for any technology-based effluent limitation in the CAFO ELGs.

1. Center Pivots, Guns, and Other High-Pressure Broadcast Irrigation Technologies

Under the existing ELGs, CAFOs are permitted to land apply manure and other wastes using any equipment so long as they comply with setback, vegetated buffer, or compliance alternative requirements.[189] This flexibility has resulted in the proliferation of irrigation guns, center pivots, and other broadcast irrigation technologies that spray liquid waste onto land application fields.[190] These technologies are generally employed by and primarily benefit large CAFOs as opposed to smaller scale

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[187] *Id.*

[188] *Id.* (requiring EPA to review and appropriately revise ELGs annually); *see also id.* § 1311(b) (setting ultimate goal of eliminating all point source discharges).

[189] 40 C.F.R. § 412.4(c).

[190] WIS. MANURE IRRIGATION WORKGROUP, CONSIDERATIONS FOR THE USE OF MANURE IRRIGATION PRACTICES App'x B (Apr. 2016), https://fyi.uwex.edu/manureirrigation/files/2016/04/Manure-Irrigation-Workgroup-Report-2016.pdf; *see also* Katie M. Englin, *Efficient Irrigation Starts with the Flow Meter*, SEAMETRICS, https://www.seametrics.com/blog/efficient-irrigation-starts-with-the-flow-meter/ (visited June 12, 2025) ("Today over 70% of irrigation systems in the U.S. are pressurized.").

CAFO NPDES PERMIT WRITERS' MANUAL, *supra* n.121 at 6-48; HRIBAR, *supra* n.28 at 3; Michelle B. Nowlin, *Sustainable Production of Swine: Putting Lipstick on a Pig?*, 37 VT. LAW REV. 1079, 1087–88 (2013).

livestock operations that do not generate enough waste to necessitate long-term manure storage.[191] In addition to contributing to increased concentration and consolidation of the livestock industry, high-pressure spray irrigation methods have been proven to exacerbate water pollution. Moreover, spraying liquid manure causes pollutants in the waste to volatilize, leading to air pollution that adversely impacts the health and quality of life of communities living downwind from these facilities. To remedy these impacts, EPA must amend the CAFO ELGs to prohibit the use of irrigation guns and center pivots for land application of manure and other waste products.

Performance[192]

High-pressure spray equipment like irrigation guns and center pivots are not appropriate for land application of CAFO waste because of the likelihood of discharge to surface waters.[193] As EPA is aware, spray irrigation equipment is known to discharge directly into ditches and other drainage systems that abut land application fields.[194] Even when the expelled waste is aimed at a field rather than a waterway, spray technologies create volatilized pollutant particles that drift and discharge into surface waters.[195] Ultimately, high-pressure spray irrigation poses unnecessary discharge risks and contributes to elevated levels of nutrients and other pollutants in waterways near sprayfields.[196]

Existing BMPs in the CAFO ELGs are insufficient to prevent spray irrigation equipment from discharging to surface waters. The default setback for CAFOs spraying waste onto land application fields is 100 feet from "any down-gradient surface waters, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to surface waters."[197] However, the ELGs also permit CAFOs to spray waste within 35 feet of a surface water or conduit if they have installed a vegetated

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[191] Tucker R. Burch et al., *Quantitative Microbial Risk Assessment for Spray Irrigation of Dairy Manure Based on an Empirical Fate and Transport Model*, 125 ENV'T HEALTH PERSPECTIVES 067003-1, 067003-1 (2017) (pagination in accordance with submitted copy).

[192] This and subsequent evaluations of technology "performance" includes analysis of the following BAT factors: (1) the age of equipment and facilities involved, (2) the process employed, and (3) engineering aspects of the application of the application of various types of control technologies.

[193] *See* WIS. MANURE IRRIGATION WORKGROUP, *supra* n.190 at 3, 39–42 (discussing potential for surface water discharge); *Parris v. 3M Co.*, 595 F. Supp. 3d 1288, 1322 (N.D. Ga. 2022) (collecting cases in which "land application systems, spray head sprinklers, and trucks constitute point sources when used to spread treated wastewater and manure on land").

[194] *See* EPA, IMPLEMENTATION GUIDANCE ON CAFO REGULATIONS—CAFOS THAT DISCHARGE OR ARE PROPOSING TO DISCHARGE 9 (May 28, 2010), https://19january2021snapshot.epa.gov/sites/static/files/2015-08/documents/cafo_implementation_guidance.pdf (photograph of spray irrigation equipment causing dry weather discharge at CAFO); *see also Cmty. Ass'n for Restoration of the Env't v. Henry Bosma Dairy*, 65 F. Supp. 2d 1129, 1147 (E.D. Wash. 1999) (noting a "verified discharge of animal wastes from a spray gun").

[195] Burkholder, *supra* n.16 at 309; 2017 PETITION, *supra* n.5 at 52–53; Horacio A. Aguirre-Villegas & Rebecca A. Larson, *Evaluating Greenhouse Gas Emissions from Dairy Manure Management Practices Using Survey Data and Lifecycle Tools*, 143 J. CLEANER PRODUCTION 169, 169 (2017).

[196] Burkholder, *supra* n.16 at 308.

[197] 40 C.F.R. § 412.4(c)(5).

buffer.[198] Neither of these setbacks is sufficient to prevent volatized pollutants from discharging to surface waters or conduits when spray irrigation equipment is known to jettison these pollutants up to 10 kilometers away from the source.[199] While a vegetated buffer may mitigate against discharges from runoff or contaminated groundwater, they are plainly insufficient to prevent discharges from spray irrigation.

Non-Water Quality Impacts

Pollutants expelled by spray irrigation technologies include aerosolized bacterial and viral pathogens that create serious health risks when inhaled by neighboring residents or deposited on food crops.[200] Indeed, multiple studies have confirmed that communities situated near CAFOs suffer higher infection rates.[201] Farmworkers and CAFO employees bear the brunt of these unnecessary hazards,[202] all while safer and more precise land application methods are widely available and in use.[203] Irrigation guns and center pivots also allow CAFOs to land apply waste more frequently,[204] leading to cumulative exposure risks that are often not accounted for in the scientific literature.[205] CAFOs commonly employ these technologies at night, elevating the likelihood of pathogen transmission due to the lack of ultraviolet radiation from the sun.[206] Because sunlight helps to neutralize pathogens—including antibiotic-resistant bacteria[207]—EPA must prohibit the use of spray irrigation at night. This BMP

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198 *Id.*

199 *See* ROBERT L. KELLOGG ET AL., USDA, MANURE NUTRIENTS RELATIVE TO THE CAPACITY OF CROPLAND AND PASTURELAND TO ASSIMILATE NUTRIENTS: SPATIAL AND TEMPORAL TRENDS FOR THE UNITED STATES 69 (2000) ("Deposition (both wet and dry) of ammonia and ammonium has been shown in some studies to occur in close proximity to the source of emission, sometimes within 100 meters and often within 10,000 meters."); R.S. Dungan, *Fate and Transport of Bioaerosols Associated with Livestock Operations and Manures*, 88 J. ANIMAL SCI. 3693, 3699 (2010) (table of studies, including one showing elevated bacteria levels 200 meters downwind of a land application site); WISCONSIN MANURE IRRIGATION WORKGROUP, *supra* n.190 at C-14 (reprinting Mark A. Borchardt & Tucker R. Burch, *Airborne Pathogens from Dairy Manure Aerial Irrigation and the Human Health Risk*, which found risk of contracting *Salmonella* from aerosolized manure-borne pathogens exceeded EPA's drinking water risk threshold at distances below 1,000 feet).

200 Dungan, *supra* n.199 at 3693–96; Steve Wing et al., *Environmental Injustice in North Carolina's Hog Industry* 108 ENV'T HEALTH PERSPECTIVES 225, 225 (2000); Risse et al., *supra* n.95 at 298; Burkholder, *supra* n.16 at 309.

201 *See generally* Joan A. Casey et al., *Industrial Food Animal Production and Community Health*, 2 CURRENT ENV'T HEALTH REPORTS 259 (2015) (literature review concluding that communities living near industrial food animal production suffered heightened risk of respiratory illness, MRSA, Q fever, and adverse stress and mood conditions); Kravchenko, *supra* n.8 at 284 (describing a variety of adverse health impacts in communities near CAFOs even when controlling for confounding variables).

202 SARAH GOLDMAN ET AL., JOHNS HOPKINS CENTER FOR A LIVABLE FUTURE, ESSENTIAL AND IN CRISIS: A REVIEW OF THE PUBLIC HEALTH THREATS FACING FARMWORKERS IN THE US 44 (2021); Wing, *supra* n.200.

203 Dungan, *supra* n.199 at 3698 (acknowledging that tank spreading lowers pathogen transport risk); *see also infra* Section IV.B.4.d (waste incorporation).

204 Burch, *supra* n.191 at 087009-1.

205 WISCONSIN MANURE IRRIGATION WORKGROUP, *supra* n.190 at 53, C-14.

206 Andrew D. McEachran et al., *Antibiotics, Bacteria, and Antibiotic Resistance Genes from Cattle Feed Yards via Particulate Matter*, 122 ENV'T HEALTH PERSPECTIVES 337, 341 (April 2015); Risse, *supra* n.95 at 298.

207 Risse, *supra* n.95 at 298.

would also help improve permit enforcement, as unsupervised nighttime spray irrigation throws yet another wrench into the already exceedingly difficult process of evaluating NMP compliance.[208]

Crucially, health harms attributable to spray irrigation technologies include significant mental and physical health impacts from unbearable odor.[209] Residents who work and live near CAFOs report experiencing stenches so foul that they "interfere with daily activities, preventing neighbors from opening windows, drying clothes, gardening, and hosting family and friends."[210] State regulators recognize that pressurized spray irrigation in particular exacerbates odors, but have largely failed to adopt mandatory BMPs to alleviate burdens on surrounding communities.[211] If EPA does not prohibit the use of these technologies outright, it must at least consider BMPs to reduce adverse impacts including mandatory nozzle settings that ensure waste droplets meet minimum size thresholds, foregoing spray application when winds are above 5 mph, and limiting spray irrigation to the late morning and early afternoons to reduce odor and pathogen transmission.[212] However, as applied to the criteria for technology-based effluent limits, evidence of water quality harm and air quality related health hazards supports a full ban on pressurized spray application of CAFO waste.

2. Other High-Risk Land Application Practices

EPA and other agencies recognize that certain spreading practices, including spreading CAFO waste on steep slopes, bare soils, and frozen, snow-covered, or saturated ground, elevate the risk of runoff and pollutant transport. Nonetheless, EPA and NRCS currently leave it up to the states to determine what conditions are acceptable for manure spreading and what precautions, if any, CAFO owners and operators must take when spreading on sloped land or during winter months.[213] This has resulted in a patchwork of state-based requirements,[214] and many states with both numerous CAFOs

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208 *See infra* Section III.F (discussing barriers to NPDES permit enforcement).
209 Casey, *supra* n.201; NC Title VI Letter, *supra* n.8 at 4–7, Kaitlin Kelly-Reif & Steve Wing, *Urban-Rural Exploitation: An Underappreciated Dimension of Environmental Injustice*, 47 J. RURAL STUDIES 350, 355 (2016).
210 Title VI Letter, *supra* n.8 at 4–7; Kelly-Reif & Wing, *supra* n.209; WISCONSIN MANURE IRRIGATION WORKGROUP, *supra* n.199 at 35.
211 WISCONSIN MANURE IRRIGATION WORKGROUP, *supra* n.199 at 35, 37; Donald L. Pfost et al., *Odors from Livestock Operations: Causes and Possible Cures*, https://extension.missouri.edu/publications/g1884 (Nov. 2018) (noting that low-pressure, low trajectory irrigation reduces odor and merely recommending consideration of measures to reduce odors from center pivots); WILLIAM L. KRANZ ET AL., U. NEBRASKA-LINCOLN, APPLICATION OF LIQUID ANIMAL MANURES USING CENTER PIVOT IRRIGATION SYSTEMS 3 (2007).
212 WISCONSIN MANURE IRRIGATION WORKGROUP, *supra* n.190 at 37 (recommending droplet sizes greater than 150 micrograms to reduce odors), 36 (recommending avoiding application when air is warming or windy).
213 *See* USDA-NRCS, CONSERVATION PRACTICE STANDARD 590, NUTRIENT MANAGEMENT 4 (May 2019), https://www.nrcs.usda.gov/sites/default/files/2022-09/Nutrient_Management_590_NHCP_CPS_2017.pdf, which only mentions slope as a consideration factor when allowing nutrient application despite a likelihood of runoff, such as on frozen, snow-covered, or saturated soils.
214 *See, e.g.*, JESSICA DEXTER, ENV'T LAW & POLICY CTR., CULTIVATING CLEAN WATER: STATE-BASED REGULATION OF AGRICULTURAL RUNOFF POLLUTION 47-51 (2010), https://www.iaenvironment.org/webres/File/News%20%26%20Resources/Publications/Cultivating_Clean_Water_Report.pdf.

and high-risk conditions that wholly fail to prohibit such practices in their NPDES implementing regulations.[215] Absent a national prohibition on these reckless application practices, operators will continue to land apply waste under high-risk conditions, fail to maintain adequate storage to avoid winter application, and adversely impact surface water quality through preventable land application discharges.

EPA must strengthen the CAFO ELGs to prohibit the spreading of manure on steep slopes, frozen, saturated, or snow–covered ground, or during periods of crop dormancy when such conditions are expected to occur before crop nutrient uptake occurs, because manure application under these conditions is known to lead to surface water discharges, and is therefore inconsistent with the requirement that land application be conducted in such a way that minimizes the risk of nutrient loss. In conjunction with this requirement, EPA must require adequate storage to ensure that operators may not simply dump excess stored manure on fields each spring, as that would also lead to unacceptable risk of pollution runoff.

Performance

In the NPDES Permit Writers' Manual for CAFOs, EPA cautions against, but fails to prohibit spreading of manure—even liquid manure—on steep slopes.[216] Steeply sloped areas often lack soil properties that foster normal plant growth, meaning that it is less likely that nutrients from manure will be fully assimilated by plants, and more likely that these excess nutrients will be transported to surface and ground waters.[217] In EPA's own literature review of academic research relating to livestock and poultry manure impacts, the Agency found land slope to be a key determinant of runoff and of the likelihood of pathogen transport.[218]

In light of "considerable research [that] has demonstrated that runoff from manure application on frozen or snow-covered ground has a high risk of water quality impact,"[219] the Permit Writers' Manual also says that state programs "should either prohibit application of manure and process wastewater on snow, ice, and frozen ground, or include specific protocols that CAFO owners or operators . . . will use to conclude whether application to a frozen or snow–or ice–covered field (or a

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[215] *See, e.g.,* WIS. DEP'T OF NAT. RES., WPDES PERMIT NO. WI-0063274-01: LARGE DAIRY CAFO GENERAL PERMIT 3.7.4-3.7.7 (Apr. 4, 2011) (allowing for liquid and solid manure application on frozen and snow-covered ground under various circumstances); Ill. Admin. Code § 560.206 (noting that "[w]aste application on frozen or snow-covered land should be avoided," yet providing for legal application to frozen and snow-covered ground); Sierra Club Michigan Chapter, *Why are CAFOs Bad?*, http://www.sierraclub.org/michigan/why-are-cafos-bad (visited June 11, 2025) (noting that Michigan CAFOs may be permitted, either through their NMP or under an order from the state with specifications for winter application, to apply waste to snow or frozen ground).
[216] CAFO NPDES PERMIT WRITERS' MANUAL, *supra* n.121 at 5-30.
[217] *Id.* at A-8.
[218] EPA LITERATURE REVIEW, *supra* n.6 at 23, 25.
[219] CAFO NPDES PERMIT WRITERS' MANUAL, *supra* n.121 at G-14.

portion thereof) poses a reasonable risk of runoff,"[220] Similarly, NRCS, EPA's primary resource for developing technical standards,[221] advises that "[n]utrients must not be surface–applied if nutrient losses offsite are likely" and warns against spreading on "frozen and/or snow-covered soils, and when the top 2 inches of soil are saturated from rainfall or snow melt."[222] But rather than prohibiting these dangerous practices, EPA merely "strongly encourages" states to adopt such prohibitions themselves.[223] This recommendation has proven inadequate.

The increased likelihood of runoff associated with application of manure to frozen, saturated, or snow-covered ground is widely recognized by agricultural experts, including agricultural extension program technical staff, state agencies, and EPA itself. Liquid or semi–liquid manure cannot easily permeate ground that is already saturated or that is frozen, and thus is much more likely to run off into nearby waterways, particularly when snow or frozen ground begins to melt.[224] EPA has collected considerable research documenting "extremely high concentrations of nitrogen and phosphorous in runoff" due to winter application of waste. [225] Per this research, winter application of dairy manure can result in a 1,480 percent increase in soluble phosphorus concentrations found in nearby surface waters, and up to 576 percent increases in ammonia-nitrogen concentrations. [226] One study of Vermont streams and lakes concluded that 40 percent of studied waterbodies experienced significant water quality impairments from the addition of just two winter-spread fields in their watersheds.[227] A Wisconsin study similarly estimated that 25 percent of annual phosphorous loading was directly attributable to winter spreading of animal wastes.[228]

Moreover, in areas where soils reach freezing temperatures, there are generally no winter crops available to uptake the nutrients in manure, meaning there is little to no agronomic benefit to winter applications and nutrients are susceptible to loss before any spring crop has been planted.[229] Indeed,

[220] *Id.* at 6-15.
[221] USDA & EPA, UNIFIED NATIONAL STRATEGY FOR ANIMAL FEEDING OPERATIONS Sec. 3.2 (March 9, 1990), https://www3.epa.gov/npdes/pubs/finafost.pdf.
[222] NRCS STANDARD 590 at 4.
[223] CAFO NPDES PERMIT WRITERS' MANUAL, *supra* n.121 at 6-16; *see also id.* at 5-30 (listing standards, including prohibiting application of manure to frozen or snow-covered ground, which permit authorities "may include" as technology-based standards).
[224] INT'L JOINT COMM'N, A BALANCED DIET FOR LAKE ERIE: REDUCING PHOSPHOROUS LOADINGS AND HARMFUL ALGAL BLOOMS 75 (2014), https://ijc.org/sites/default/files/2014%20IJC%20LEEP%20REPORT.pdf; EPA RISK ASSESSMENT, *supra* n.141 at 23, 71.
[225] CAFO NPDES PERMIT WRITERS' MANUAL, *supra* n.121 at G-14. (citing research finding a 1,480 percent increase in soluble P concentrations and 576 percent increases in ammonia-nitrogen concentrations following winter application of dairy manure).
[226] *Id.* (citing 1990 and 1991 Clausen studies).
[227] *Id* (citing 1989 Clausen and Meals study).
[228] *Id.* (citing 1985 Moore and Madison study).
[229] B. HINDMARSH, ONTARIO MINISTRY OF AGRICULTURE, FOOD, AND RURAL AFFAIRS, WINTER APPLICATION OF MANURE AND OTHER AGRICULTURAL SOURCE MATERIAL 1 (Aug. 2021). Similarly, in a PowerPoint presentation

"the absence, or poor growth of crops (limiting uptake of manure nutrients and water), winter weather, and winter soil conditions generally exacerbate off-site losses of manure-derived pollutants."[230] EPA's own peer-reviewed technical guidance similarly concludes that "[f]rom the dual perspectives of nutrient utilization and pollution prevention, [] winter is the least desirable time for land application."[231] According to Michigan regulators, that is because "[b]ased on the frozen and/or snow-covered conditions, the minimal settling and breaking down of the waste during these conditions, and the inability to predict or control snowmelt and rainfall, *there are no practices* that can ensure the runoff from fields with surface-applied waste on frozen or snow-covered ground will not be polluted."[232]

Other authorities, ranging from the state level to international, have also recognized the harms likely to result from land application in winter months and on frozen ground. The International Joint Commission, an international organization created by the Boundary Waters Treaty (ratified by the United States and Canada in 1909), recommends that to protect Lake Erie, all adjacent states should ban the spreading of manure on frozen or snow-covered ground because of the likelihood of those practices polluting surface waters.[233] The Iowa State University Extension acknowledges that "[b]roadcasting manure onto frozen, snow-covered, water-saturated soils increases the potential for nutrient losses with rainfall or snowmelt runoff to surface water systems."[234] Similarly, the Penn State Extension warns that "[s]preading manure in the winter is discouraged because it is a high-risk time period for nutrient losses and contamination of surface water,"[235] and the Ohio State University

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derived from a white paper prepared for EPA by contract company Tetra Tech, Tetra Tech noted that a "comprehensive literature review found no published research to support agronomic factors as a basis for recommending winter manure application." TETRA TECH, *Winter Manure Application and Water Quality: Overview of the Literature* 4 (Oct. 30, 2014), http://bloximages.chicago2.vip.townnews.com/auburnpub.com/content/tncms/assets/v3/editorial/f/ef/fef9f5a8-8a50-53b9-a377-eaf2a11a9362/5483213e3e237.pdf.pdf.

[230] Jian Liu, et al., *A review of regulations and guidelines related to winter manure application*, 47 AMBIO 657, 657, 670 (Feb. 3, 2018).

[231] CAFO NPDES PERMIT WRITERS' MANUAL, *supra* n.121 at G-1–2 (noting that "[w]here there is a reasonable risk [of runoff from application on snow, ice, and frozen soil], EPA strongly prefers that technical standards prohibit application on the field or the pertinent portion thereof during times that the risk exists or may arise").

[232] MICHIGAN DEP'T ENV'T, GREAT LAKES, AND ENERGY, PERMIT NO. MIG010000 44 (March 27, 2020), https://www.michigan.gov/-/media/Project/Websites/egle/Documents/Programs/WRD/CAFO/MIG010000-General-Permit-2025.pdf.

[233] INT'L JOINT COMM'N, *supra* n.224 at 9.

[234] IOWA STATE UNIV. EXTENSION & OUTREACH, USING MANURE NUTRIENTS FOR CROP PRODUCTION 6 (May 2016), http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1089&context=extension_pubs.

[235] Charles White & Robert Meinen, PENN STATE EXTENSION, *The Do's and Don'ts of Winter Manure Spreading* (Dec. 13, 2022), https://extension.psu.edu/the-dos-and-donts-of-winter-manure-spreading.

Extension advises that "[w]inter application should not be part of a manure management plan and it should only be viewed as a last resort."[236]

Cost and Availability[237]

Regulating these spreading activities is clearly practicable, as evidenced by the fact that several states with numerous CAFOs do restrict the spreading of manure under high-risk conditions. For example, Maryland and Delaware have both implemented an outright ban on manure spreading during winter months, with additional restrictions in place outside the closed period for spreading on frozen, snow-covered or saturated fields.[238] Other States have limited application to sloped land in certain conditions.[239] Moreover, international examples of winter and high-risk spreading restrictions abound, including across European countries and certain Canadian and New Zealand provinces.[240]

Non-Water Quality Impacts

Beyond surface water degradation, these high-risk application practices also increase the risk of polluted runoff infiltrating wells and contaminating underground sources of drinking water. The Minnesota Department of Public Health has identified that applying waste to frozen ground heightens the risk of drinking water and public water supply contamination.[241] In Wisconsin, there have been documented instances of land application to snow-covered fields—performed in full compliance with state winter spreading regulations—that have poisoned nearby drinking water wells with astronomically high levels of *E. coli* and other dangerous pollutants and resulted in life-threatening illnesses.[242] Given the substantial and unwarranted risk these spreading practices pose to surface water,

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236 Amanda Meddles, OHIO STATE UNIV. EXTENSION, *Properly Applying Manure on Frozen Ground*, OHIO'S COUNTRY JOURNAL (Jan. 24, 2012), http://ocj.com/2012/01/properly-applying-manure-on-frozen-ground/; *see also* UTAH FARMSTEAD ASSESSMENT FOR GROUND WATER AND SURFACE WATER PROTECTION, HOW TO MANAGE STORED MANURE AND PROTECT YOUR WATER 7 (Mar. 2012), http://extension.usu.edu/files/publications/factsheet/WQFA-13.pdf (advising on proper manure handling and storage for water protection, and directing that "[m]anure should not be applied to frozen or snow-covered ground unless all runoff can be controlled."); OHIO DEP'T AGRIC. ET AL., OHIO LAKE ERIE PHOSPHORUS TASK FORCE II FINAL REPORT 51 (Nov. 2013), https://www.motherjones.com/wp-content/uploads/task_force_report_october_2013.pdf.

237 This and subsequent evaluations of technology "cost and availability" includes analysis of the following BAT factors: (1) the age of equipment and facilities involved, (4) process changes, and (5) the cost of achieving effluent reduction.

238 *See* MD. DEP'T AGRIC., NUTRIENT APPLICATION REQUIREMENTS, Ch. IV.C.2–3, E.3, F.2 (July 2024), https://mda.maryland.gov/resource_conservation/Documents/nm_manual/1-D1-1-1D1-6.pdf; 3 Del. Admin. Code 1201-6.2.

239 *See* Tenn. Comp. R. & Regs. 1200-4-5.14 app. A (prohibiting application to steep slopes); 327 Ind. Admin Code § 16-10-3(f)(1) (prohibiting application to frozen ground with slopes greater than 2 percent grade); 510 Ill. Admin. Code tit. 8 § 900.803(s) (prohibiting application to frozen or snow-covered land with slopes greater than 5 percent).

240 *See* Liu, *supra* n.230, at 660–662, 665 (discussing implementation of winter spreading ban throughout European Union, in Manitoba and Quebec, and Canterbury.)

241 MINN. DEP'T HEALTH, WELLHEAD PROTECTION ISSUES RELATED TO FEEDLOT OPERATIONS 2 (Sep. 11, 2012), https://www.health.state.mn.us/communities/environment/water/docs/swp/feedlot.pdf.

242 *See e.g.*, Jim Lundstrom, *Brown Water*, DOOR COUNTY PULSE (Sep. 17, 2014), https://doorcountypulse.com/brown-water/ (detailing how a CAFO operator's application of 18,000 gallons of waste to a field covered with 18 inches of

combined with their potentially severe public health consequences, EPA should prohibit land application under these high-risk circumstances.

3. Anaerobic Digesters

Anaerobic digesters are systems that produce "biogas" from feedstocks like plant materials and animal waste.[243] They accomplish this by containing feedstock in an oxygen-deprived environment, introducing and cultivating methanogenic bacteria, and collecting the resulting biogas emissions comprised of methane and other gases. In addition to biogas, operators must manage "digestate" or the remaining solid and liquid waste leftover after gas production.[244] Using anaerobic digesters to generate biogas from animal waste from CAFOs has become increasingly common over the past decade, thanks in large part to state and federal programs incentivizing biogas projects.[245] With the rising prevalence of anaerobic digesters on CAFOs and claims that digesters can reduce nutrient and pathogen runoff, this technology may seem like a viable candidate for inclusion in the ELGs as a basis for an effluent limitation on pathogens.[246] In reality, however, anaerobic digestion increases the risk that a CAFO will discharge pollution to waterways. Further, digesters are not affordable without uncertain government funding and cause adverse non-water quality impacts that outweigh any methane emission reduction benefits. While the immediate decommissioning of existing CAFO digesters may be beyond the scope of EPA's ELG revision, the ELGs should prohibit the construction and operation of new digesters and ensure facilities with existing digesters handle and dispose of digestate in a manner that reduces water quality risks.

Performance

Allowing the use of anaerobic digesters in the CAFO ELGs is not consistent with the CWA because digesters do not reduce water pollution. In fact, anaerobic digestion creates water pollution risks above and beyond those posed by CAFOs without anaerobic digesters. Digestate contains the

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snow, in compliance with state regulations, contaminated the residential drinking well of a nearby family with over 10,000 parts per mL of *E. coli* and 100,000 parts per ML of coliform); Declaration of Nancy Utesch, Dkt. No. 26.17, *Food & Water Watch v. EPA* (9th Cir. 23-2146), ¶ 10 (describing knowledge of same incident as "nearly killing [the family's] infant child who had to be treated in intensive care.").

243 EPA, *How Does Anaerobic Digestion Work?*, https://www.epa.gov/agstar/how-does-anaerobic-digestion-work (accessed March 28, 2025).

244 *Id.*

245 Credit for Production of Clean Hydrogen and Energy Credit, 90 Fed. Reg. 2224, 2289 (Jan. 10, 2025); *see also* EPA, Livestock Anaerobic Digester Database, https://www.epa.gov/agstar/livestock-anaerobic-digester-database (accessed March 28, 2025) (listing anaerobic digester projects by year and noting which received federal funding).

246 *See* EPA, *The Benefits of Anaerobic Digestion*, https://www.epa.gov/agstar/benefits-anaerobic-digestion (accessed April 25, 2025). Notably, EPA considered and rejected anaerobic digesters as a basis for large dairy and swine CAFO ELGs in 2002. 68 Fed. Reg. at 7216–17.

same pollutants of concern as undigested waste, including nutrients, salts, pesticides, pharmaceuticals, heavy metals like lead, copper, and mercury, and carcinogens like hexavalent chromium.[247] Most of these pollutants are not destroyed during digestion, but rather consolidated in the digestate as a portion of the feedstock is transformed into methane gas.[248] [249] Nutrients in digestate are particularly detrimental to water quality because anaerobic digestion increases the proportion of inorganic nitrogen and phosphorus in CAFO waste. Inorganic nutrients are more water soluble, elevating the likelihood that these pollutants will reach ground and surface waters when land applied or spilled during an accident.[250] Digestion also increases cumulative ammonia emissions by as much as 81 percent compared to storage and land application of undigested waste,[251] increasing risks associated with aerial pollution deposition.

The little evidence that does suggest anaerobic digestion can reduce CAFO water pollution is largely based on pathogen destruction data generated in laboratory settings. Studies of digesters operating in the field show they attain far lower and more variable pathogen reductions than digesters in laboratory settings.[252] For instance, one study of anaerobic digesters processing manure in Wisconsin found that pathogen deactivation rates were two times lower than the removal rates suggested in past literature.[253] To ensure a realistic analysis of possible amendments to the CAFO ELGs, EPA should assign more weight to research based on CAFOs operating under real-world conditions than it does to research conducted in a controlled laboratory setting.

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[247] Alberto Pivato et al., *Use of Digestate from a Decentralized On-Farm Biogas Plant as Fertilizer in Soils: An Ecotoxicolofical Study for Future Indicators in Risk and Life Cycle Assessment*, 49 WASTE MGMT. 1, 28 (2016) (pagination in accordance with copy submitted).
[248] *See* 68 Fed. Reg. at 7216–17 (explaining that digesters "would not necessarily lead to significant reductions for many of the pollutants discharged to surface waters from CAFOs"); 2003 TDD, *supra* n.26 at 8-69 ("The reductions of P, K, or other nonvolatile elements reported in the literature for covered lagoons are not really reductions at all. The material settles and accumulates in the lagoon, awaiting later management."). FRIENDS OF THE EARTH, A BROWN CLOUD OVER THE GOLDEN STATE: HOW DAIRY DIGESTERS ARE DRIVING CAFO EXPANSION AND ENVIRONMENTAL INJUSTICE IN CALIFORNIA 28 (2024), https://foe.org/wp-content/uploads/2024/10/BrownCloud-ENGLISH-Final-1.pdf; CARLIN MOLANDER & MOLLY ARMUS, MAKING A BAD SITUATION WORSE: MANURE DIGESTERS AT MEGA DAIRIES IN WISCONSIN 16 (2024), https://foe.org/wp-content/uploads/2024/06/WI-Case-Study_v2.pdf.
[249] The exception to this rule is active pathogens, which can be reduced under optimal conditions—but not eliminated—by digestion as discussed *infra* at nn.252–262 and accompanying text.
[250] NRCS STANDARD 366 at 8–9; FOOD & WATER WATCH, HARD TO DIGEST: GREENWASHING MANURE INTO RENEWABLE ENERGY 2 (Nov. 2016).
[251] Michael Holly et al., *Greenhouse Gas and Ammonia Emissions from Digested and Separated Dairy Manure During Storage and After Land Application*, 239 AG. ECOSYSTEMS, AND THE ENV'T 410, 413 (2017).
[252] *See* Tucker R. Burch et al., *Fate of Manure-Borne Pathogens during Anaerobic Digestion and Solids Separation*, 47 J. ENV'T QUALITY 336, 341 (2018), https://doi.org/10.2134/jeq2017.07.0285 ("In our own study, microbe inactivation was poor when initially compared with expectations from the literature.").
[253] *Id.*

EPA must also consider field data that show digesters create additional water pollution risks rather than improperly focusing on purported pathogen reduction benefits. Catastrophic spills, excessive land application, and even explosions[254] are issues at CAFOs that use anaerobic digesters to process their waste. In 2022, an on-farm digester built to receive waste from three dairies in northwest Iowa leaked approximately 376,000 gallons of manure into the surrounding environment, discharging bacteria and ammonia into a nearby creek.[255] Despite a 10,000 dollar fine, the digester operator was unable to prevent at least two additional discharges over the ensuing year.[256] The same year, a hog CAFO in North Carolina reported that its digester collapsed, spilling tens of thousands of gallons of manure, mortalities, and food waste onto surrounding fields and into neighboring wetlands.[257] In Minnesota, a digester owned by a major corporation in the biogas industry spilled untold quantities of waste after the facility's tank failed in March 2025.[258] A survey of large Wisconsin dairy CAFOs employing digesters also found that all five had experienced spills *and* been fined for improper land application of waste.[259] In Oregon, a Tillamook CAFO digester spilled an estimated 300,000 gallons of digestate, some of which discharged to a storm water pipe that emptied into a nearby creek.[260] Even CAFOs that land apply digested waste according to rates set forth in an NMP are likely contributing to water pollution because current NMP guidance (which does not even adequately prevent risks from ordinary manure) does not properly account for digestate's elevated soluble pollutant levels.[261]

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254 Steve Verberg, *Blast Destroys Roof of Troubled Biodigester Near Waunakee*, WISCONSIN STATE J. (August 6, 2014), https://agupdate.com/news/local/environment/blast-destroys-roof-of-troubled-biodigester-near-waunakee/article_56b6030d-5b7c-54a9-8f3e-2adb0a93b4ed.html.
255 Jared Strong, *Company Filled Massive Manure Container Despite Signs of a Leak, DNR says*, IOWA CAPITAL DISPATCH (July 6, 2022), https://iowacapitaldispatch.com/2022/07/06/company-filled-massive-manure-container-despite-signs-of-a-leak-dnr-says.
256 Erin Jordan, *'More Manure Means More Energy' Iowa Dairies with Biogas Digesters are Growing Their Herds, Which Concerns Water Quality Advocates*, The Gazette (Nov. 3, 2024), https://www.thegazette.com/agriculture/moremanure-means-more-energy-iowa-dairies-with-biogas-digesters-are-growing-their-herds-which-c/ (finding "manure leaking from a tile line" in April 2022 and "500 gallons of manure 'foam'" released into the environment in January 2023).
257 Will Atwater, *Wayne County Wetland Continues to Suffer: Farm with Massive Hog Waste Spill Nets New Violation Amid Bacteria Concerns*, NORTH CAROLINA NEWS (July 28, 2023), https://www.northcarolinahealthnews.org/2023/07/28/wayne-county/.
258 *LSP Demands Answers Surrounding Recent Manure Spill in Kandiyohi County* (March 7, 2025), https://landstewardshipproject.org/lsp-demands-answers-surrounding-recent-manure-spill-in-kandiyohi-county/.
259 *See* MOLANDER & ARMUS, *supra* n.248 at 6.
260 George Plaven, *Cleanup Underway After Manure Digester Spill Near Tillamook* (July 25, 2019), https://capitalpress.com/2019/07/25/cleanup-underway-after-manure-digester-spill-near-tillamook/
261 *See supra* Section III.A.

Digesters are also a false solution to water pollution because they incentivize CAFOs to grow their herds, leading to further concentration of pollutants in already overwhelmed watersheds.[262] Digester operations require large amounts of CAFO waste to function[263] and optimize biogas production infrastructure, incentivizing CAFOs to grow their herds to take advantage of economies of scale by maximizing biogas production.[264] USDA's most recent Census of Agriculture data show that herd size on California dairies with more than 2,500 milk cows increased by a whopping 26.8 percent over 5 years, boosting total milk cows in that size category from 808,503 in 2017 to approximately 1,025,716 in 2022.[265] Research investigating factory farm digesters in 8 states shows that "herd sizes at dairy CAFOs with digesters grew 3.7 percent year-over-year, which is *24 times* the growth rate for overall dairy herd sizes."[266] In some CAFO-intensive counties, herd sizes are growing even faster despite local opposition efforts.[267] The additional manure and other wastes from these operations pose water quality threats above and beyond business as usual, further exacerbating water quality risks.[268]

Finally, anaerobic digestion will not reduce water pollution from CAFOs because digestion incentivizes excessive, hazardous, and avoidable liquid manure storage at the expense of less harmful management strategies. When it comes to manure management, livestock operations have a variety of options for storage and treatment.[269] The rise in manure liquification, slurry storage in lagoons, land application of liquid waste, and the concomitant water quality impacts of these practices is a direct result of industry consolidation toward fewer and larger operations.[270] Digesters are only compatible with large-scale, centralized storage of liquid and slurry wastes, further entrenching livestock production in an overly consolidated system that inherently endangers water quality with the risk of

262 LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY ET AL., COMMENTS ON PROPOSED AMENDMENTS TO THE LOW CARBON FUEL STANDARD 2 (Feb. 20, 2023).
263 EPA only recommends anaerobic digestion for CAFOs with at least 500 cattle or 2,000 hogs. *Is Anaerobic Digestion Right for Your Farm?*, https://www.epa.gov/agstar/anaerobic-digestion-right-your-farm#q2 (visited April 7, 2025).
264 The U.S. Department of Treasury recently agreed that tax credits for biogas production from manure run the risk of incentivizing CAFOs to generate pollutants they would not otherwise produce. 90 Fed. Reg. at 2285. *See also* FOOD & WATER WATCH, THE BIG OIL AND BIG AG PONZI SCHEME: FACTORY FARM GAS 4–5 (Jan. 2024), https://www.foodandwaterwatch.org/wp-content/uploads/2024/01/RPT2_2401_GreenwashingBiogas-WEB3.pdf.
265 LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY, *supra* n.262 at 2.
266 CHLOË WATERMAN & MOLLY ARMUS, BIOGAS OR BULL****: THE DECEPTIVE PROMISE OF MANURE BIOGAS AS A METHANE SOLUTION 59 (2024), https://foe.org/wp-content/uploads/2024/03/Factory-Farm-Gas-Brief_final.pdf (emphasis added).
267 MOLANDER & ARMUS, *supra* n.248 at 17.
268 *Id.* at 25.
269 *See, e.g.*, *infra* Section IV.B.4.a (SLS), IV.B.3.a.iii (dry manure handling).
270 LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY, *supra* n.262 at 19–20.

catastrophic spills and mismanagement of huge quantities of waste. For all of these reasons, the use of digesters on CAFOs does not reduce—and likely increases—water pollution.

Cost and Availability

Digesters are prohibitively expensive for all but the largest CAFOs.[271] Not only are the digesters themselves expensive, operations looking to invest in digestion must also purchase, install, and maintain various pumps, tanks, pipes, monitors, and electrical equipment.[272] Total project costs to install a functional on-farm digester system vary widely, but average over 1 million dollars and can exceed 16 million dollars,[273] making the technology unaffordable for most facilities.[274] As the largest, wealthiest livestock operations scale up to take advantage of policies incentivizing digesters, smaller farms inevitably get pushed out, further exacerbating rampant consolidation within the industry.[275] This trend is already well underway in California, where the state's favorable treatment of biogas in its Low Carbon Fuel Standard (LCFS) program is transforming its animal agriculture sector to the detriment of smaller operations.[276] In this manner, incentivizing digesters poses an existential threat to family farms that raise livestock on the land instead of in confinement operations.

The costs of anaerobic digestion are so large that CAFOs could not install and operate these technologies without the constant stream of government support programs that are currently propping up the biogas industry.[277] These taxpayer-funded subsidies—which include government

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[271] Gittelson, *supra* n.8 at 358; Food & Water Watch, *supra* n.4 at 10; Hyunok Lee & Daniel A. Sumner, *Dependence on Policy Revenue Poses Risks for Investments in Dairy Digesters*, 72 CALIFORNIA AGRIC. 226, 231 (Dec. 2018); *see also* ASSEMBLY NO. 3 ON RES. & TRANSP., AGENDA 14–16 (Apr. 19, 2017), https://abgt.assembly.ca.gov/sites/abgt.assembly.ca.gov/files/April%2019%20-%20Toxics%20Recycling%20Ag.pdf (providing detailed digester cost analysis demonstrating how "costs skyrocket for small dairies" and further noting how cost contributes to a "high rate of project failure").

[272] Gittelson, *supra* n.8 at 358.

[273] *See* DAIRY DIGESTER RESEARCH AND DEVELOPMENT PROGRAM, CAL. DEP'T OF FOOD & AGRIC., REPORT OF FUNDED PROJECTS (2015–2022) 21–28, https://www.cdfa.ca.gov/oefi/ddrdp/docs/2022_DDRDP_Legislative_Report.pdf (listing total costs for 117 biogas projects, including one covered lagoon digester project that cost $16,642,393); *see also* 2002 CAFO ELG Cost Methodology at 5-119–5-125, A-105 (EPA's evaluation of the costs of anaerobic digester installation undertaken to inform the 2003 CAFO ELG rulemaking).

[274] EPA, *supra* n.263 (EPA only recommends digestion for CAFOs with a minimum of 500 cattle or 2,000 hogs); *see also* Gittelson, *supra* n.8 at 358; FOOD & WATER WATCH, *supra* n.264 at 9–10.

[275] For example, in Oregon, the number of cows at the state's mega-dairies increased by 60 percent from 2002 to 2022 while half of the state's small dairies disappeared. Juliet Grable, *Mega-Dairy CAFOs Tout Methane Digesters to Green Their Image*, SIERRA (Mar. 7, 2024), https://www.sierraclub.org/sierra/mega-dairy-cafos-tout-methane-digesters-green-their-image. *See also supra* nn.262–268 and accompanying text.

[276] LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY, *supra* n.262 at 8–10.

[277] Markus Lauer et al., *Making Money From Waste: The Economic Viability of Producing Biogas and Biomethane in the Idaho Dairy Industry*, 222 APPLIED ENERGY 621, 622 (2018); FOOD & WATER WATCH, *supra* n.264 at 3–4.

grants, tax incentives, and pollution trading schemes like California's LCFS[278]—make the production of biogas profitable. For example, analysis of one digester receiving LCFS credits showed that 93 percent of revenue was from state-issued energy credits, while only 7 percent—approximately a quarter of the digester's annual operating costs—was from selling biogas on the market.[279] Representatives from the biogas industry readily admit that government incentives and pollution credit markets are the drivers of digester profits and the reason the decades-old technology has only recently taken off.[280] While the entities trying to entice CAFOs into digester investment project profitability within a few years, "changes in state or federal policies on energy or environmental issues . . . could substantially alter economic calculations pertaining to digester investment."[281]

Indeed, influential policy shifts have already occurred, and more are on the horizon. Under the LCFS, pollution credit prices have fluctuated between 20 dollars and 200 dollars, due in part to changing federal attitudes on biofuels.[282] At present, the federal government seems poised to eliminate a critical revenue stream for digester projects alleging climate benefits.[283] Moreover, programs like the LCFS are mired in litigation and political controversy spearheaded by environmental justice advocates who argue California's methane accounting is a scam and view the program's incentives for factory farms as a direct threat to their communities.[284] If any one of these forces is successful in toppling extra-market supports for biogas, CAFO owners with new digesters could be left holding considerable loan obligations and stranded assets.[285] EPA must take the mercurial nature of these government

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[278] Gittelson, *supra* n.8 at 358 (listing examples of grants and cost-sharing agreements); FOOD & WATER WATCH, *supra* n.264 at 3–4; CHLOË WATERMAN & MOLLY ARMUS, *supra* n.266; Friends of the Earth, *supra* n.**Error! Bookmark not defined.** at. 35–40.
[279] Lee & Sumner, *supra* n.271 at 231–32.
[280] Kari Lydersen, *Biogas Expansion May Compound Worker Risks* (Nov. 16, 2022), https://www.canarymedia.com/articles/enn/biogas-expansion-may-compound-worker-risks.
[281] Lee & Sumner, *supra* n.271 at 233.
[282] *Id.*; see also FRANZISKA FÖRD, WHAT CAN CANADIANS LEARN FROM THE CALIFORNIA LCFS? (December 2024), https://www.naviusresearch.com/wp-content/uploads/2025/01/Blog-December-2024-California-price-trends.pdf.
[283] *See* Unleashing American Energy, Exec. Order No. 14154, 90 Fed. Reg. 8353 (2025) (pausing Inflation Reduction Act funding and revoking executive orders related to clean energy and climate); Karl Plume & Ed White, *North American Biofuels Sector Contracts Amid Trade and Policy Uncertainty* (March 20, 2025), https://www.reuters.com/business/energy/north-american-biofuels-sector-contracts-amid-trade-policy-uncertainty-2025-03-20.
[284] *See* FOOD & WATER WATCH, *Groups Sue CARB Over Environmental Impacts of Flagship Climate Program* (Dec. 19, 2024), https://www.foodandwaterwatch.org/2024/12/19/groups-sue-carb-over-environmental-impacts-of-flagship-climate-program/ (announcing litigation against the California Air Resources Board).
[285] *See* Ashita Gona & Mike Henchen, *US Can't Meet Climate Goals While Spending Billions on Gas Infrastructure* (Aug. 2, 2021), https://rmi.org/us-cant-meet-climate-goals-while-spending-billions-on-gas-infrastructure/.

supports into account when evaluating digester costs. In sum, digesters are not available or affordable to the industry, and the ELGs should prohibit CAFOs from installing them.

Non-Water Quality Impacts

Finally, in addition to the negative water quality impacts discussed above, any benefits that may be attainable through use of anaerobic digesters on CAFOs are outweighed by harmful non-water quality impacts. Proponents allege digesters are necessary to reduce greenhouse gas emissions from livestock operations, thereby reducing the livestock industry's climate footprint. But the greenhouse gas reduction capabilities of anaerobic digesters have been overstated. Moreover, any purported greenhouse gas emissions reductions occur at the expense of other considerations, including air quality, land use, water use, and worker safety.[286]

Processing manure in anaerobic digesters will not achieve the level of greenhouse gas reductions promised by digester proponents. Digesters that use internal combustion engines to generate electricity or power electrolysis emit large amounts of toxic nitrous oxide, a potent greenhouse gas that also contributes to the formation of particulate matter.[287] Beyond the digesters themselves, digestate also emits more nitrous oxide than undigested waste.[288] Further, as discussed above, incentives for biogas drive CAFOs to increase the number of animals in confinement to maximize profits from pollution credit trading schemes.[289] Needlessly increasing herd sizes will increase emissions from enteric fermentation, the primary source of methane emissions from the livestock industry.[290] Feeding larger herds also requires more crops, incentivizing conversion of the nation's remaining grasslands and wetlands to cropland, a land use change that eats away at carbon sinks and further undermines any methane reductions attributable to digesters.[291] Similarly, increased herd size can dramatically increase a CAFO's water use.[292]

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[286] Harish K. Jeswani et al., *Environmental Sustainability of Biofuels: A Review*, 476 PROCS. ROYAL SOC'Y A. 1, 1–2 (2020), https://doi.org/10.1098/rspa.2020.0351.
[287] LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY, *supra* n.262 at 3.
[288] Gittelson et al., *supra* n.8, at 356–57.
[289] 90 Fed. Reg. at 2285.
[290] FOOD & WATER WATCH, *supra* n.264 at 5 (estimating that 27 percent of the U.S.'s annual methane emissions come from enteric fermentation while only 9 percent come from manure management).
[291] *See generally* Seth A. Spawn et al., *Carbon Emissions from Cropland Expansion in the United States*, 14 ENV'T RSCH. LETTERS 1, 7–9 (2019) (discussing the role of land use change from grassland to cropland as a major source of greenhouse gas emissions).
[292] LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY, *supra* n.262 at 6–7.

Digesters also boost methane emissions from lagoon storage and land application of liquid waste as CAFOs grow their herds and transition away from other common manure management practices.[293] The conclusion that digesters reduce overall greenhouse gas emissions from CAFOs is derived from the assumption that uncovered lagoons are the baseline from which emission reduction benefits must be measured. This is a faulty premise because many facilities utilize—and EPA recognizes[294]—viable alternatives to lagoons that already achieve lower greenhouse gas emissions.[295] Research suggests that farms that transition from anaerobic digesters to other waste management methods, such as cleaner aerobic technologies, can reduce greenhouse gas emissions from manure management by 98.9 percent.[296] For example, as discussed below, separating CAFO waste into solids and liquids reduces organic pollutants in the liquid portion, reducing the risk of pollution impacts from land application of the liquids and allowing the solids to be composted for beneficial reuse.[297] However, CAFOs making money from generating and selling biogas have an incentive to retain volatile organics in slurries because the high organic content maximizes biogas output.[298] In fact, poultry CAFOs that primarily handle dry wastes are increasingly looking to liquify their litter just so they can generate biogas.[299] Such examples make clear that, while digesters may reduce methane emissions from storage on CAFOs already storing large amounts of liquid waste in uncovered lagoons,

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[293] *Id.* at 19–20 (explaining that methane emissions potential from liquid manure storage is higher than dry manure management systems).
[294] EPA, AGSTAR PROJECT DEVELOPMENT HANDBOOK: A HANDBOOK FOR DEVELOPING ANAEROBIC DIGESTION/BIOGAS SYSTEMS ON FARMS IN THE UNITED STATES 1-8–1-9 (3d ed.), https://www.epa.gov/sites/default/files/2014-12/documents/agstar-handbook.pdf.
[295] *See generally* USDA, PART 651 AGRICULTURAL WASTE MANAGEMENT FIELD HANDBOOK, CH. 9 AGRICULTURAL WASTE MANAGEMENT SYSTEMS (Dec. 2011), https://directives.nrcs.usda.gov/sites/default/files2/1712930953/17184.pdf; *see also infra* Sections IV.B.2.a (treatment), IV.B.3.a.iii (dry manure handling), and IV.B.4.a (SLS).
[296] MATIAS B. VANOTTI ET AL., U.S. DEP'T OF AGRIC., GREENHOUSE GAS EMISSION REDUCTIONS AND CARBON CREDITS FROM IMPLEMENTATION OF AEROBIC MANURE TREATMENT SYSTEMS IN SWINE FARMS (2006), https://www.ars.usda.gov/ARSUserFiles/60820000/Manuscripts/2006/Man720.pdf.
[297] *See* CAL. DEP'T FOOD & AGRIC., RECOMMENDATIONS FOR SHORT-LIVED CLIMATE POLLUTANTS: AN AGRICULTURAL WORKGROUP REPORT FOR THE CALIFORNIA AIR RESOURCES BOARD AND CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE 12–13 (June 2015), https://perma.cc/9CEA-U4NX ("[W]hen dry systems are used . . . emissions can be dramatically reduced – perhaps by more than 90 percent."); *see also infra* Section IV.B.4.a (SLS).
[298] *See* LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY, *supra* n.262 at 9 (discussing example of a dairy that shifted away from a system that produced less emissions after installing a digester).
[299] *See generally* UNIVERSITY OF MARYLAND, CASE STUDY: ANAEROBIC DIGESTION AND CAPTURE FROM POULTRY LITTER ON THE MARYLAND EASTERN SHORE, https://mda.maryland.gov/resource_conservation/counties/UMD%20Factsheet%20PFED%20Poultry%20Litter%20Digester.pdf (visited April 30, 2025).

such lagoons are neither the norm nor the baseline from which reasonable CAFO emission controls should be measured.[300]

Even assuming EPA is able to put safeguards in place to prevent digester incentives from increasing CAFO herd sizes or liquid waste storage, and assuming a baseline of liquid waste in uncovered lagoons, digesters increase emissions of non-greenhouse gas air pollutants such as ammonia.[301] Digestate also has higher potential to emit hydrogen sulfide and gaseous ammonia, dangerous air pollutants that contribute to respiratory illness and react with ozone to create nitrous oxide—yet another greenhouse gas.[302] EPA must consider these emissions risks, not just the claimed benefits from captured methane.

Producing and transporting biogas generated by anaerobic digesters also makes CAFOs reliant on pipelines and trucks, further harming local air quality and entrenching dangerous fossil fuel infrastructure in our agricultural system.[303] Transport trucks often run on diesel fuel, while gas pipelines notoriously leak tremendous amounts of methane, further negating any alleged greenhouse gas savings.[304] Reliable claims about emissions impacts attributable to anaerobic digestion must be based on analyses that quantify and include these emissions.

Finally, EPA should consider that digesters pose serious threats to worker safety. Between heavy machinery, toxic fumes, and pollutant-induced illnesses, CAFOs are already dangerous places to work.[305] Introducing digesters and additional liquid waste storage to supply those digesters is a recipe for disaster. Diagnostics and repairs to digester and lagoon infrastructure sometimes requires workers to submerge themselves into manure-filled cesspools—a situation that has already caused multiple deaths.[306] Additionally, the pressurized environment inside an anerobic digester creates

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300 LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY, *supra* n.262 at 18–20.
301 Holly, *supra* n.251 at 413 ("Digestion [] resulted in an 81% increase in cumulative emissions compared to [storage and land application of undigested waste] over the entire study period similar to previous studies."); MOLANDER & ARMUS, *supra* n.248 at 14.
302 Gittelson, *supra* n.8 at 356–57; Mallin & Cahoon, *supra* n.7 at 377–78 (explaining that digestion results in wastewater that increases emissions of volatilized ammonia when land-applied).
303 Evan Halper & Samuel Oakford, *California Draws Ire as Out-of-State Factory Farms Turn Pig Poop into Cash* (April 19, 2025), https://www.washingtonpost.com/business/2025/04/19/climate-factory-farms-carbon-credit-california/; Gittelson, *supra* n.8, at 355.
304 *Id;* MOLANDER & ARMUS, *supra* n.248; FOOD & WATER WATCH, *supra* n.264 at 5.
305 *See generally* F.M. Mitloehner & M.S. Calvo, *Worker Health and Safety in Concentrated Animal Feeding Operations*, 14 J. AGRICULTURAL SAFETY AND HEALTH 163, 178 (Mar. 2008); *see also* David I. Douphrate, *Work Related Injuries and Fatalities on Dairy Farm Operations – A Global Perspective*, 18 J. AGROMEDICINE 256, 259 (2013) (chronicling injuries and fatalities on dairy farms in the U.S.); Lisa Foust Prater, *Manure Pit Accidents More Deadly Than Not* (March 20, 2024), https://www.agriculture.com/manure-pit-accidents-are-more-deadly-than-not-7853529 (similar).
306 Lyderson, *supra* n.280.

explosion risks that generally do not exist at CAFOs without digesters.[307] To protect workers, nearby communities, and animals, EPA must ensure the CAFO ELGs do not inadvertently contribute to increased health and safety hazards.

In sum, anaerobic digesters threaten water quality, do not live up to their climate or pathogen reduction claims, incentivize CAFO expansion, and increase air pollution and safety risks. The ELGs should prohibit the installation and operation of new digesters on CAFOs and update the ELGs to regulate existing digesters and digestate management more stringently.

B. EPA Must Base the CAFO ELGs on Available Technologies and Practices that Reduce CAFO Pollution

As a first step toward updating the ELGs and regulating the CAFO industry in accordance with the CWA, EPA must consider how it currently regulates analogous point source categories to control similar waste streams. The CWA obligates EPA to consider whether pollution control practices used by these categories could be transferred to achieve similar effluent treatment in the CAFO context.[308] Here, EPA must consider practices used by sewage treatment plants as well as meat and poultry product (MPP) facilities.

Next, the Agency must consider various new, improved, and more readily available pollution reduction technologies and BMPs, many of which are already in use at CAFOs across the country. The weight of the evidence available to EPA leaves no doubt that NMPs have failed to achieve either zero discharge from production areas or minimized nutrient transport from land application areas to jurisdictional waters. Unsurprisingly, NMPs are also ineffective at preventing non-nutrient pollutants from entering waterways. Because storing and land applying waste in accordance with an NMP is not an effective approach, the time has come for EPA to consider an alternative tool for regulating CAFO management practices. As such, EPA must consider requiring CAFOs to develop and implement a planning document detailing the requirements and prohibitions applicable to a facility's production area and land application practices that improves on an NMP in four primary ways. First, the plan must include management practices designed to control the discharge of all pollutants of concern in

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[307] *See* FOOD & WATER WATCH, *supra* n.264 at 9 (describing study documenting explosions at biogas plants).

[308] *Cal. & Haw. Sugar*, 553 F.2d at 287–88 (affirming EPA's use of a technology transferred from another point source category's ELGs where the agency adequately justified transferability); *see also NRDC*, 808 F.3d at 564, 572–573 ("EPA can mandate that BAT requires use of a technology that is not currently available within a particular industry when (1) the technology is available in another industry, (2) EPA finds that the technology is transferrable from that other industry, and (3) EPA can reasonably predict that such technology will adequately treat the effluent.").

CAFO waste as opposed to nutrients alone (i.e., a pollutant management plan (PMP) rather than an NMP). Second, the plan must incorporate into existing production area requirements widely available technologies that come closer to achieving the zero-discharge effluent limit. Third, the plan's land application requirements must be tailored to achieve pollution reduction goals as opposed to maximizing crop yields.[309] Fourth, PMPs must require representative monitoring and reporting to ensure compliance with ELG requirements and inform future ELG revisions. As described below, the studies and other materials submitted by Food & Water Watch support the codification of the following technologies and practices into the ELGs.

1. BMPs and Treatment Systems Used to Regulate Similar Waste Streams

In setting the CAFO ELGs, EPA must consider its treatment of other point source categories with similar waste streams.[310] Two categories in particular produce similar waste streams with overlapping contaminants of concern: publicly owned treatment works that handle sewage and MPPs. Accordingly, EPA must consider the technologies and practices used as the basis for these ELGs when assessing whether and how to update the CAFO ELGs.

a. <u>Sewage Treatment Plants</u>

California regulators recently concluded that "[i]n many respects, the application of dairy waste to dairy cropland is more akin to the land application of waste produced by domestic sewage treatment plants than to the application of nitrogen fertilizer for the business enterprise of growing crops in traditional agricultural fields."[311] The same can be said of other land-applied CAFO wastes, particularly liquified wastes, because of the application method and because sewage and CAFO waste share many of the same pollutants of concern.[312] Due to these similarities, EPA has acknowledged that "[m]any municipal wastewater treatment techniques may be applied to CAFO wastewater."[313] Logically, then, EPA must consider whether CAFOs can use the same or similar technologies and BMPs used by sewage treatment plants to achieve similar pollution reductions.

[309] EPA should also consider prohibiting land application of untreated waste altogether to comply with the statutory requirement "to give serious consideration to a [NSPS] standard permitting *no* discharge of pollutants," since achieving zero discharge is not possible with land application of CAFO waste. *NRDC*, 822 F.2d at 123.
[310] *Cal. & Haw. Sugar*, 553 F.2d at 287–88; *NRDC*, 808 F.3d at 564, 572–573.
[311] CA DAIRY ORDER, *supra* n.15 at 53.
[312] Standards for the Use and Disposal of Sewage Sludge, 58 Fed. Reg. 9248, 9249 (Feb. 19, 1993) (listing "volatile organics, organic solids, nutrients, disease-causing pathogenic organisms (e.g. bacteria, viruses, and others), heavy metals and inorganic ions, and toxic organic chemicals from industrial wastes, household chemicals, and pesticides").
[313] BRADFORD, *supra* n.7 at 14; *see also* EPA LITERATURE REVIEW, *supra* n.6 at 66–69 (discussing applicability of techniques used at drinking water treatment plants to treat CAFO pollution).

Section 405 of the CWA prescribes specific processes EPA must follow in regulating the use and disposal of sewage sludge.[314] Specifically, Section 405 requires EPA to promulgate regulations that set forth BMPs "adequate to protect public health and the environment from any reasonably anticipated adverse effects" of toxic pollutants in sewage sludge.[315] While the requirements of Section 405 are separate from and in addition to EPA's obligation to establish ELGs under Section 304, Section 304 grants EPA discretion to impose similar BMPs for CAFO waste.[316] Moreover, EPA's insistence that BMPs are "particularly suited" to regulating land application of CAFO waste makes the sewage sludge regulations—and especially the regulations for land application of sewage sludge—uniquely relevant to the CAFO ELGs.[317]

EPA should consider imposing three key requirements from the sewage sludge land application regulations to CAFO land application activities. First, EPA should consider promulgating cumulative pollutant-specific limits for land application areas. Like the existing CAFO ELGs, the sewage sludge regulations permit application of sewage sludge to agricultural land so long as application does not exceed agronomic rates.[318] Unlike the CAFO regulations, however, EPA's sewage sludge regulations forbid land application in excess of cumulative pollutant limits established for arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc.[319] EPA deemed these limits necessary to protect human and environmental health from harm attributable to land application of sewage sludge. Given the similar risks presented by sewage sludge and CAFO waste, EPA must either regulate land application of these substances congruently or provide a non-arbitrary reason for treating them differently.

Second, EPA should consider requiring that land-applied CAFO waste not exceed pathogen levels designated to protect human health and the environment, just as it does for sewage sludge.[320] As exemplified by recent review of the impacts of livestock waste on *E. coli* contamination of leafy greens,[321] pathogens in CAFO waste threaten public health as well as the economic wellbeing of

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[314] 33 U.S.C. § 1345.
[315] *Id.* at § 1345(d)(2)(D).
[316] *Id.* at § 1345(e); *see also id.* § 1345(b) (authorizing EPA to consider non-water quality environmental impacts and any other factors the agency deems relevant when establishing ELGs).
[317] *See* 68 Fed. Reg. at 7227 (explaining EPA's position that numeric effluent limitations are infeasible for CAFOs).
[318] 40 C.F.R. § 503.14(d).
[319] *Id.* at § 503.12(b), (e), (g)–(j); *see also id.* § 503.13 (chart of cumulative limits).
[320] *Id.* at § 503.15(a) (citing 40 C.F.R. § 503.32(a).
[321] Stelio Viazis et al., *An Overview of Farm Investigation Findings Associated with Outbreaks of Shiga Toxin-Producing Escherichia Coli Infections Linked to Leafy Greens: 2009–2021*, 88 J. FOOD PROD. 1, 4–7 (2025) (pagination in accordance with submitted copy).

farmers. More than a decade ago, EPA even acknowledged the need to "[i]mplement control technologies for treatment of animal waste to reduce pathogen loads prior to land application or off-site transfer."[322] The Agency should therefore assess which pathogens commonly found in CAFO waste pose unacceptable risks, mandate testing of waste prior to land application, and prohibit land application of waste that exceeds pathogen limits sufficient to safeguard public health. At a minimum, CAFO waste should be subject to the same pathogen standards EPA requires for sewage sludge transferred to third parties for land application.[323] However, EPA should also consider new evidence suggesting these standards are out-of-date and insufficiently protective. For instance, some sewage sludge criteria give producers the option to choose between meeting a general fecal coliform standard or a standard based on specific pathogens like *Salmonella*.[324] Though EPA has previously used fecal coliform as an indicator for other harmful pathogens, "[t]ransport properties and the virulence of various pathogens vary to a wide degree, and may be poorly represented by the bacterial indicators *E. coli* and *enterococci*."[325] Where scientific evidence indicates updated pathogen standards are necessary, EPA should introduce revised standards as part of its revision to the CAFO ELGs.

Third, EPA should consider requiring CAFOs that land apply to comply with the same vector attraction reduction requirements that facilities land applying sewage sludge must meet.[326] Vector attraction reduction is necessary for CAFO waste just as it is for sewage sludge due to the tendency of animal waste to attract birds, insects, and other animals that may contribute to the spread of pathogens.[327] Requiring those land applying CAFO waste to manage vector attraction in the manner prescribed by the sewage sludge regulations would provide flexibility as those regulations offer a menu of pollution control options to choose from based on the understanding that cost-effectiveness of any given method will vary depending on site-specific characteristics of the facility. For instance, the regulatory menu specifies compliance pathways for waste treated aerobically or anaerobically.[328]

[322] EPA RISK ASSESSMENT, *supra* n.141 at 97.
[323] 40 C.F.R. § 503.32(a) (setting forth standards for Class A sewage sludge).
[324] *Id.* at § 503.32(a).
[325] DR. SHANE ROGERS & DR. JOHN HAINES, EPA, DETECTING AND MITIGATING THE ENVIRONMENTAL IMPACT OF FECAL PATHOGENS ORIGINATING FROM CONFINED ANIMAL FEEDING OPERATIONS: A REVIEW 53 (2005).
[326] 40 C.F.R. §§ 503.15(c), 503.33(a)(1) & (5).
[327] *See* 58 Fed. Reg. at 9254 (describing the need for vector control in the sewage sludge regulations); Casey, *supra* n.201 at 260 ("Studies have identified bacterial pathogens, such as antibiotic-resistant strains of *Staphylococcus* and *Enterococcus*, in and around [CAFOs], including colonizing animals and surfaces, in manure, and carried by flies and rats near operations.").
[328] 40 C.F.R. § 503.33(b).

Notably, the vector control regulations also endorse measures recommended by these comments, including solid liquid separation ("SLS"), injection, and incorporation.[329]

EPA should also consider using the maximum pollutant limits for land-applied sewage sludge to inform similar limits for land-applied CAFO waste. EPA acknowledges that CAFO waste contains many of the same pollutants that the Agency regulates in sewage sludge through enforceable concentration limits.[330] Land-applied waste threatens human health and the environment, regardless of whether it originates from humans or livestock. EPA must either evaluate and regulate these risks similarly[331] or provide a logical justification for treating like risks differently. And either way, the ELGs may not continue to ignore known pollutants of concern.

b. Meat and Poultry Products

The second regulated industry EPA must consider in developing the CAFO ELGs is the MPP category. As part of the ongoing process of updating the MPP ELGs, EPA has proposed specific effluent limits for nitrogen, phosphorus, and conventional pollutants[332]—primary pollutants of concern in CAFO waste.[333] As discussed below, several of the technologies and practices determined to be BAT for MPP facilities are already in use at CAFOs.[334] Given the similarities between the waste streams and the apparent availability of these technologies for use at CAFOs, any study of the CAFO ELGs that fails to consider technologies delineated as BAT, BCT, or NSPS for removing nutrients and conventional pollutants from MPP waste would be arbitrary and capricious.

EPA's proposed rule for the MPP regulations begins by discussing screens and dissolved air floatation as technologies widely used by MPP facilities to remove conventional pollutants.[335] As

[329] *Id.*
[330] *See* 68 Fed. Reg. at 7235–36 (discussing "arsenic, copper, selenium, zinc, cadmium, molybdenum, nickel, lead, iron, manganese, aluminum, and boron" as elements of environmental concern in manure, as well as pathogenic bacteria such as *Salmonella*, *E. coli*, *Cryptosporidium parvum*, and *Giardia* in CAFO waste); 40 C.F.R. §§ 503.13 (limits for arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc in land-applied sewage sludge), 503.32 (limits for fecal coliform and *Salmonella* in land-applied sewage sludge).
[331] *See* EPA, TECHNICAL SUPPORT DOCUMENT FOR LAND APPLICATION OF SEWAGE SLUDGE, VOLUME I 5-20–5-299 (Nov. 1992), https://19january2021snapshot.epa.gov/sites/static/files/2018-11/documents/tsd-land-application-volume1.pdf (evaluating pollutant pathways for land-applied sewage sludge).
[332] EPA, TECHNICAL DEVELOPMENT DOCUMENT FOR PROPOSED EFFLUENT LIMITATIONS GUIDELINES AND STANDARDS FOR THE MEAT AND POULTRY PRODUCTS POINT SOURCE CATEGORY 131 (Dec. 2023) [hereinafter MPP TDD].
[333] BRADFORD, *supra* n.7 at 3–4.
[334] *See infra* n.**Error! Bookmark not defined.** and accompanying text.
[335] Clean Water Act Effluent Limitations Guidelines and Standards for the Meat and Poultry Products Point Source Category, 89 Fed. Reg. at 4474, 4482 (Jan. 23, 2024); *see also* MPP TDD, *supra* n.332 at 61–63 (discussing various forms of SLS as "primary treatment" for MPP facilities).

discussed in Section IV.B.4.a, these SLS methods should be considered to treat conventional pollutants in CAFO waste as well.

All options EPA is considering for the final MPP regulations include biological treatment to achieve full denitrification. During full denitrification (also sometimes referred to as nitrification/denitrification), "[n]itrogen removal is carried out through a three-step biological process: (1) The conversion of ammonia from organic nitrogen by hydrolysis and microbial activities, called ammonification; (2) the aerobic conversion of ammonia to nitrate by reacting the ammonia with oxygen in a process called nitrification; and (3) the conversion of nitrate to nitrogen gas by reacting the nitrate with organic carbon under anoxic conditions in a process called denitrification."[336] Activated sludge can be added to the process to achieve up to "95 percent reductions in BOD, suspended solids, and reductions in ammonia nitrogen."[337] A variety of biological treatment systems are capable of achieving full denitrification, allowing operations to determine which system is most efficient and cost effective for their site-specific characteristics.[338] Several of these systems have been proven effective in treating swine wastewater for not only nutrients and conventional pollutants, but for antibiotics as well.[339] EPA should consider establishing effluent limits based on the removal capacity of biological treatment options, as the Agency has done for MPP waste.[340]

Each of EPA's three proposals for the MPP rules also includes chemical precipitation. Chemical precipitation is an advanced form of SLS during which chemicals that encourage coagulation and promote particle adhesion are added to wastewater to cause pollutants to settle to the bottom of a basin where the pollutant-laden sludge can be collected for further treatment.[341] "MPP facilities use

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[336] 89 Fed. Reg. at 4487.
[337] *Id.* at 4482–83.
[338] MPP TDD, *supra* n.332 at 63–68 (discussing various series of aerobic/anoxic tanks, sequencing batch reactors, moving bed biofilm reactors, and membrane bioreactors); *see also* M.B. Vanotti et al., *Removing and Recovering Nitrogen and Phosphorus from Animal Manure, in* 67 ANIMAL MANURE PRODUCTION, CHARACTERISTICS, ENVIRONMENTAL CONCERNS, AND MANAGEMENT 299 (H.M. Waldrip et al. eds. 2020) (discussing use of high-performance nitrifying sludge to improve pollution treatment efficiency in cold weather); Huang, *supra* n.33 at 3–5 (discussing various biological treatments—including biological aerated filters, sequencing batch reactors, and membrane bioreactors—and their capacities to remove commonly used antibiotics).
[339] Vanotti, *supra* n.338 at 299–307; *see also* David Townsend et al., *The Premium Standard Farms Nitrification and Denitrification Experience* (June 6, 2006), https://porkgateway.org/resource/the-premium-standard-farms-nitrification-and-denitrification-experience/ (describing an advanced nitrification and denitrification system consisting of multiple basins installed in a pig CAFO to treat waste from 52,800 animals).
[340] While many MPP facilities are discharge directly to waterways and do not claim their waste has any agronomically beneficial use, application of MPP nutrient controls to CAFOs is still warranted because both categories are responsible for widespread nutrient pollution.
[341] MPP TDD, *supra* n.332 at 68.

chemical precipitation for phosphorus removal through the addition of metal salts, most commonly alum or ferric chloride."[342] Chemical additives proven to remove phosphorus from CAFO wastewater include magnesium phosphate (struvite) in combination with ethylenediaminetetraacetic acid (70 to 80 percent effective at removing phosphorus from swine and dairy wastewater, 90 to 98 percent effective at removing phosphorus from poultry manure); lime (79.8 to 94.7 percent effective in removing phosphorus from pig waste); a combination of acid, hydrated lime, and organic polyelectrolytes (80 to 90 percent effective in removing phosphorus from poultry litter and swine waste); and metal salts like alum, aluminum chloride, ferric sulfate, and ferric chloride, alone or in combination with polymers (variety of phosphorus removal efficacies depending on the dose applied).[343]

Chemical additives can also assist in the removal of conventional pollutants like total suspended solids. Noting the potential transferability of chemical treatment to the CAFO category, EPA previously estimated the cost of using chemical treatment to remove 90 to 95 percent of total suspended solids from swine CAFO wastewater to be between 1.27 and 2.79 dollars per hog.[344] Plainly, chemical precipitation is worthy of full consideration in EPA's detailed study of the CAFO industry.

2. Controlling All Pollutants of Concern

Consistent with EPA's statutory obligation to create CAFO ELGs specifically designed to address all pollutants of concern present in the waste stream,[345] the PMP approach EPA should adopt must require practices and technologies to treat, remove, or prevent discharge of all such pollutants. Various treatment technologies are available for removing nutrients, pathogens, conventional pollutants, certain metals, pharmaceuticals, and microplastics from waste streams, which could be adopted at CAFOs. EPA must consider establishing effluent limitations based on the pollution reduction capabilities of these technologies. Additionally, EPA should consider addressing pollutants at the source by limiting or prohibiting the use of inputs like feed additives that end up in the waste stream.

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342 *Id.* at 68.
343 Vanotti, *supra* n.338, at 285–92; EPA LITERATURE REVIEW, *supra* n.6 at 67.
344 BRADFORD, *supra* n.7 at 14.
345 *Waterkeeper Alliance*, 399 F.3d at 519.

a. Terra Blue Treatment System for CAFOs Using Liquid Waste Management[346]

One of the most detailed studies to date examining systems to control water pollutants from CAFOs was completed after at least 46 lagoons on North Carolina hog CAFOs owned and operated by subsidiaries of Smithfield Foods, Inc. breached during Hurricane Floyd, causing widespread environmental harm that disproportionately impacted Black communities, low-income communities, and households that rely on groundwater for drinking.[347] Following the disaster, North Carolina's Attorney General negotiated a consent decree in which the corporate CAFO owners agreed to "commit $15 million for the development of Environmentally Superior Technologies[348] for the management of swine waste and to facilitate the development, testing, and evaluation of potential technologies on Company-owned Farms."[349] Although the vast majority of North Carolina's CAFOs are still operating without anything close to adequate pollution controls, the Environmentally Superior Technologies that emerged from the consent decree—a system known as Terra Blue[350] (formerly Super Soils)—could form the basis for effective and legally compliant CAFO ELGs. In particular, EPA should consider using Terra Blue's system of technologies as the basis for NSPS applicable to CAFOs that manage liquid waste, as the system has reliably achieved demonstrable reductions of multiple pollutants at the CAFOs where Terra Blue is in use.

346 Because Terra Blue was developed in North Carolina where hog CAFOs predominate, research on the system's efficacy was conducted using pig waste. However, due to similarities in waste streams and management issues, EPA should consider Terra Blue as a treatment option for other CAFOs such as dairies that also manage liquid waste.
347 Don Carrington*, Lawsuit Challenges A.G.'s Hog Waste 'Slush Fund'* (Oct. 27, 2016), https://www.carolinajournal.com/lawsuit-challenges-ags-slush-fund/; Steve Wing et al., *The Potential Impact of Flooding on Confined Animal Feeding Operations in Eastern North Carolina*, 110 ENV'T HEALTH PERSPECTIVES 387, 390–91 (2002).
348 North Carolina law defines "Environmentally Superior Technologies" as "any technology, or combination of technologies that (1) is permittable by the appropriate government authority; (2) is determined to be technically, operationally, and economically feasible and (3) meets the following environmental performance standards: 1. Eliminate the discharge of animal waste to surface and groundwater through direct discharge seepage or runoff; 2. Substantially eliminate atmospheric emissions of ammonia; 3. Substantially eliminate the emission of odor that is detectable beyond the boundaries of the farm; 4. Substantially eliminate the release of disease-transmitting vectors and airborne pathogens; and 5. Substantially eliminate nutrient and heavy metal contamination of soil and groundwater." M.B. VANOTTI ET AL., DEVELOPMENT OF ENVIRONMENTALLY SUPERIOR TECHNOLOGY IN NORTH CAROLINA: THE SUPER SOIL PROJECT 2 (2005), https://www.ars.usda.gov/ARSUserFiles/60820000/Manuscripts/2005/Man707.pdf.
349 Agreement between the Attorney General Of North Carolina; Smithfield Foods, Inc.; Brown's Of Carolina, Inc.; Carroll's Foods, Inc.; Murphy Farms, Inc.; Carroll's Foods Of Virginia, Inc.; And Quarter M Farms, Inc. 3, https://www.northcarolinahealthnews.org/wp-content/uploads/2022/12/3.-Smithfield-Agreement.pdf.
350 The system was formerly called "Super Soils." Viney P. Aneja et al., *From Pollution to Resource: Advancing Swine Waste Treatment in the USA*, 8 FRONTIERS SUSTAINABLE FOOD SYS. 1, 6 (2024), https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=7037&context=faculty_scholarship.

Performance

Terra Blue is a three-step system that processes liquid CAFO waste through (1) SLS enhanced by a polymer (polyacrylamide, or "PAM") to encourage flocculation; (2) biological treatment to enhance nitrification (the chemical process by which ammonia is transformed into nitrite and nitrate); and (3) alkali chemical precipitation to remove phosphorus and destroy pathogens.[351] A 4,400-animal swine CAFO in North Carolina that installed and operated the system for a full year shortly after the consent decree was reached was able to remove 97.6 percent of suspended solids, 99.7 percent of biological oxygen demand, 98.5 percent of total Kjeldahl nitrogen, 98.7 percent of ammonia, 95 percent of total phosphorus, 98.7 percent of copper, 99 percent of zinc.[352] Notably, a majority of suspended solids, zinc, copper, and phosphorus were removed during the polymer-assisted solids separation portion of the process.[353] The researchers working on the demonstration project concluded that "the technology was technically and operationally feasible," and met the technical performance standards that define an Environmentally Superior Technology.[354] Since these initial tests, additional data have been collected from other CAFOs that have installed versions of the Super Soils/Terra Blue system, verifying its capacity for significant pollution reductions that align with the CWA's ultimate goal of eliminating water pollution from CAFOs.[355]

Cost and Availability

At its inception, the system now known as Terra Blue was determined to be prohibitively costly.[356] However, over the past 25 years, researchers have developed second and third generations of the system to improve cost-effectiveness. Total capital costs of the second-generation system assessed for a 6,000-pig CAFO in North Carolina came to $556,000 for installation and $58,000 for annual operation and maintenance.[357] While these costs are significant, large operations (like those on which the Terra Blue system has been installed and tested so far) can likely recover these costs in the form of benefits resulting from improved pollution control. For instance, flushing confinement pits with recycled wastewater that has undergone ammonia removal has been shown to improve animal

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[351] *Id.*; Vanotti, *supra* n.348 at 4; *see also* Vanotti, *supra* n.338 at 281.
[352] Vanotti, *supra* n.348 at 4–5.
[353] *Id.* at 4; Vanotti, *supra* n.338 at 281–82.
[354] Vanotti, *supra* n.348 at 5.
[355] Aneja, *supra* n.350 at 9.
[356] Nicole, *supra* n.8 at A188.
[357] Aneja, *supra* n.350 at 8.

health and productivity, netting the studied CAFO economic benefits valued at $91,920 annually.[358] CAFOs can also compost the solid waste fraction after SLS to produce fertilizer that can be sold.[359] EPA must consider these and other benefits that offset installation and operational costs as part of its analysis.

Given its proven efficacy, the Terra Blue system would also result in huge savings for community members suffering from heightened healthcare costs, reduced property values, and lost recreational profits currently attributable to CAFOs. Requiring swine CAFOs to install, operate, and maintain the Terra Blue system would be a step toward more equitable allocation of the costs of industrial livestock production.

EPA must also consider the availability of state and federal funds to assist CAFOs with installation costs of innovative pollution treatment technologies like Terra Blue.[360]

Non-Water Quality Impacts

The Terra Blue system also redresses adverse non-water quality environmental impacts. Field studies of facilities employing the system have seen up to 100 percent removal of odorous compounds in liquid waste thanks in large part to denitrifying bacteria in the system's second step.[361] This means that Terra Blue has the capacity to significantly abate odor nuisances caused by swine CAFOs (and likely other CAFOs using liquid manure management) across the country.

Further, emissions reductions that would result from broad implementation of Terra Blue could significantly reduce the swine industry's climate footprint and local air quality impacts. Between reductions in ammonia (a precursor to nitrous oxide formation) and methane emissions, researchers estimate that facilities using Terra Blue can expect approximately 96.9 percent reductions in greenhouse gas emissions from manure management. These emissions reductions are critical to combatting the existential threats posed by climate change, as well as improving local air quality to benefit frontline communities.

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[358] *Id.* at 10–11.
[359] *Id.* at 6.
[360] *See id.* at 12 (mentioning the availability of funds through the Environmental Quality Incentives Program (EQIP) and Conservation Innovation Grants (CIG)). These longstanding federal support programs are stable funding sources, unlike the more volatile supports available for digesters. *See supra* Section IV.A.3.
[361] *Id.* at 9.

b. Other Available Treatment Options

EPA should also investigate other treatment options that may be effective in treating additional pollutants of concern, including pollutants like pharmaceuticals, PFAS, and microplastics that the current ELGs ignore. While we do not endeavor to provide a comprehensive list of all such treatment options, vermiculture and advanced oxidation processes are examples of technologies worthy of further analysis. These and other technologies and practices may be available to help CAFOs control discharges of emerging pollutants of concern. Without targeted treatment, CAFOs will continue to discharge these pollutants to waters, contributing to health and environmental harms.

Vermiculture, vermicomposting, and vermifiltration all refer to the use of earthworms to convert waste into compost. EPA briefly mentioned vermicomposting in the technical development document created to inform the 2003 CAFO ELGs. However, the Agency has not undertaken a full analysis of whether vermiculture may be an appropriate basis for the ELGs despite its acknowledgement that farm-scale systems for vermicomposting had been developed.[362] Since the 2003 rule, field studies have been conducted that indicate vermiculture can be effective in treating multiple CAFO pollutants of concern. One study of a vermifilter system installed on a 1500-head dairy CAFO in California found that the treatment reduced wastewater ammonia concentrations by 97 percent, total nitrogen by 84 percent, phosphorus by 84 percent, and total suspended solids by 95 percent.[363] The system was also effective in reducing salts, metals, and other trace elements in effluent.[364] Other studies have documented pathogen removal as well.[365]

Vermiculture systems can be scaled to meet the wastewater treatment needs of a variety of CAFO sizes, with some projects treating up to 750,000 gallons per day.[366] Vermiculture also has the potential to produce significant non-water quality benefits. Monitoring results show vermifilter systems can emit up to 99 percent less methane than a CAFO's lagoon system, while also cutting power usage.[367] Further, vermifilter systems produce compost instead of sludge, allowing CAFOs to offset installation and operating costs by eliminating the need for sludge management and creating a

[362] 2003 TDD, *supra* n.26 at 8-117–18.
[363] Sabina Dore et al., *A Vermifiltration System for Low Methane Emissions and High Nutrient Removal at a California Dairy*, 18 BIORESOURCE TECH. REPORTS 1, 7 (2022) (pagination in accordance with submitted copy).
[364] *Id.*
[365] *Id.* at 2.
[366] *See Projects*, https://biofiltro.com/projects/ (video testimonials by CAFOs that have installed biofiltro vermifilter systems of various specifications).
[367] Dore, *supra* n.363 at 2, 6.

separate compost revenue stream. California's State Water Resources Control Board recently acknowledged that expanded markets for vermicompost could make the technology cost-effective for more CAFOs going forward.[368] EPA's detailed study would benefit from additional analysis of vermiculture and similar emerging technologies to control the full suite of CAFO pollutants.

Advanced oxidation processes are other emerging treatment options that show promise at addressing a spectrum of CAFO pollutants, including pharmaceuticals. Although a growing body of evidence demonstrates that pharmaceuticals in CAFO waste threaten aquatic life and human health,[369] existing ELGs do not include treatment or practices that control these hazardous pollutants. Several studies now indicate that oxidization using hydroxyl radicals to decompose and mineralize organic pollutants can also substantially reduce the antibiotic content of CAFO waste.[370] Again, EPA briefly mentioned advanced oxidation processes during its rulemaking for the 2003 rule, but the Agency did not conduct a detailed assessment of the treatment options at that time.[371] Since 2003, further research on additional advanced oxidation processes has been published, indicating emerging methods like Fenton's process may be capable of achieving high antibiotic removal rates cost effectively while also removing heavy metals, fecal coliform, and phosphorus.[372] In light of this new information, we ask EPA to revisit advanced oxidation processes as a basis for ELGs targeting pharmaceuticals and other CAFO pollutants.

In surveying other emerging technologies, EPA should pay special attention to options capable of controlling emerging pollutants of concern, including PFAS and microplastics. Like humans, livestock are exposed to carcinogenic PFAS, commonly known as "forever chemicals," in their feed and drinking water.[373] PFAS ingested by livestock in CAFOs either accumulate within the animals or are excreted in their waste.[374] Thus, significant amounts of PFAS may be building up on land application areas, running off into waters, and contaminating soil and groundwater beneath land application areas, waste storage areas, and mortality management areas. EPA recognizes these risks

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368 CA DAIRY ORDER, *supra* n.15 at 57.
369 *Supra* nn.33–47 and accompanying text.
370 Huang, *supra* n.33 at 5–8; Eva Domingues et al., *Advanced Oxidation Processes Perspective Regarding Swine Wastewater Treatment*, 776 SCI. TOTAL ENV'T 1, 4–14 (2021).
371 *See* 2003 TDD, *supra* n.26 at 8-117 (briefly discussing disinfection via ozonation and UV radiation).
372 *See* Domingues, *supra* n.370 at 12 (summarizing studies evaluating pollution removal capacities of advanced oxidation processes); Huang, *supra* n.33**Error! Bookmark not defined.** at (similar).
373 Clare Death et al., *Per- and Polyfluoroalkyl Substances (PFAS) in Livestock and Game Species: A Review*, 774 Sci. Total Env't 1, 3–4 (2021); *see also* Jared Jaborek & Jeannine Schweihofer, *How will PFAS impact the Michigan cattle industry?*, MICH. STATE U. (Oct. 14, 2022), https://www.canr.msu.edu/news/how-will-pfas-impact-the-michigan-cattle-industry.
374 Death, *supra* n.373 at 3–8.

and has acknowledged its authority to address them through the CWA.[375] We therefore request that EPA assess pollution control options for PFAS in its detailed study.

Similarly, EPA should consider options for controlling microplastic pollution from CAFOs. As EPA is aware, "microplastics are harmful and pervasive emerging contaminants" that pose myriad threats to human health when ingested through drinking water.[376] Like PFAS, microplastics ingested by livestock accumulate in animal tissues and are excreted in waste. Emerging research indicates that "animal manure is a source of microplastics entering the environment owing to its wide use as fertilizer on farmlands."[377] Accordingly, EPA must consider practices and technologies to control microplastics from CAFOs as part of its detailed study.

c. Restrictions on Feed Additives

EPA should also consider implementing feed restrictions to minimize or eliminate the presence of pollutants in excreted waste, particularly where treatment cannot adequately remove certain heavy metals or pharmaceuticals from the waste stream or reduce nutrients and pathogens to the extent necessary to meet pollution reduction goals. EPA has already considered requiring CAFOs to adopt certain dietary restrictions and feeding strategies in the context of reducing nutrient pollution,[378] and has imposed similar "stock limitations" on other point source categories that restrict the pollutant content of process inputs.[379] In the decades following EPA's 2002 evaluation of such limitations for CAFOs, new studies have emerged demonstrating how feed restrictions can be an effective pollution reduction tool.

For instance, researchers have found that "limiting the use and types of antibiotics, particularly 'critically important antimicrobials,' in animal production is the most direct route of controlling agricultural antibiotic release into the environment."[380] The European Union has adopted maximum

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[375] EPA, PFAS STRATEGIC ROADMAP: EPA'S COMMITMENTS TO ACTION 2021-2024 16, https://www.epa.gov/system/files/documents/2021-10/pfas-roadmap_final-508.pdf.
[376] FOOD & WATER WATCH ET AL., PETITION TO INCLUDE MICROPLASTICS ON THE SIXTH UNREGULATED CONTAMINANT MONITORING RULE UNDER THE SAFE DRINKING WATER ACT 1 (2024), https://www.foodandwaterwatch.org/wp-content/uploads/2024/11/Microplastics-Petition-to-EPA.pdf.
[377] Sheriff, *supra* n.109 at 13.
[378] *See e.g.*, 2003 TDD, *supra* n.26 at 4-28–4-31, 4-44 (considering dietary restrictions for swine and poultry as a nutrient pollution reduction practice).
[379] *See e.g.*, Effluent Limitations Guidelines and New Source Performance Standards for the Oil and Gas Extraction Point Source Category, 66 Fed. Reg. 6850, 6864 (Jan. 22, 2001) (establishing BAT and NSPS imposing "stock limitations" on PAH content, sediment toxicity, and biodegradation of the synthetic materials which form the base fluid of synthetic-based drilling fluids (SBFs), or product substitution in the alternative, in addition to setting discharge limitations in a two part approach to controlling SBF-cuttings discharges).
[380] Amy Pruden et al., *Management Options for Reducing the Release of Antibiotics and Antibiotic Resistance Genes to the Environment*, 121 ENV'T HEALTH PERSPECTIVES878–885, 879 (2013).

limits on heavy metals in animal feed additives, which has proven to be an effective strategy for reducing the overall spread of heavy metals and resulting environmental pollution.[381]

Feed restrictions can also demonstrably reduce nutrient and pathogen presence in CAFO waste. One study found that eliminating wet distillers grains with solubles from cattle finishing diets can reduce *E. coli* levels in excreted waste by nearly 40 percent.[382] Formulating diets to ensure optimal levels of protein reduces nitrogen excretion by as much as 62 percent depending on animal type, not only limiting the amount of nitrogen eventually land applied to fields, but also reducing ammonia emissions and the deposition of nitrogen to surface waters.[383] EPA must consider setting these types of common sense feeding requirements to effect pollution reduction for the full spectrum of CAFO pollutants.

3. Updating Production Area Requirements

EPA must revise production area requirements to cover all discharge pathways and ensure that CAFOs are in fact achieving the zero-discharge effluent limitation. In addition to existing requirements geared towards preventing waste overflow, the regulations must incorporate technologies and practices that will prevent discharges to surface water via groundwater and air pathways. This can be achieved through stronger requirements for liquid manure storage systems that include impermeable liners and adequate leak detection technologies to control seepage, lagoon covers, proper containment of solid wastes, and ventilation system filtration to limit air pollutants from depositing to surface waters.

a. Liquid Manure Storage Requirements

Uncovered and unlined anaerobic lagoons pollute waterways, emit significant air pollution, and create unbearable burdens on communities near CAFOs. Numerous examples demonstrate that storing and treating CAFO waste in these structures—even those that comply with NRCS practice standards—has not prevented the discharge of pollutants to jurisdictional waters.[384] Moreover, lagoon specifications allowed under the current ELGs beleaguer neighboring communities with severe non-

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381 M. Hejna et al., *Review: Nutritional Ecology of Heavy Metals*, 12 ANIMAL 2156, 2157 (2018).
382 J.E. Wells et. al., *Impact of Reducing the Level of Wet Distillers Grains Fed to Cattle Prior to Harvest on Prevalence and Levels of Escherichia coli 0157:H7 in Feces and on Hides*, 74 J. FOOD PROT., 1611, 1613 (May 2011).
383 C.A. Rotz, *Management to Reduce Nitrogen Losses in Animal Production*, 82 J. ANIM. SCI., E119, E122 (2004); *see also* Adeline Bouguoin et al., *Nitrogen excretion from beef cattle fed a wide range of diets compiled in an intercontinental dataset: a meta-analysis*, 100 J. ANIM. SCI. 1, 10–11 (2022); F.M. Mitloehner & M.S. Calvo, *supra* n.305 at 178.
384 STEPHEN R. HUTCHINS ET AL., EPA, CASE STUDIES ON THE IMPACT OF CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS) ON GROUND WATER QUALITY 15, 26, 38, (Sept. 2012); Harter, *supra* n.7 at 5–6 (noting that "significant leaching can occur through sink-swell fractures in [] sidewalls" of lagoons designed to NRCS guidelines).

water quality impacts, primarily in the form of noxious odors.[385] To better control pollution discharges from liquid manure storage structures, EPA must consider requiring composite synthetic liner systems and lagoon covers. Alternatively, EPA could require or incentivize the dry handling of manure in place of liquid handling systems.

i. *Require Liners for Subsurface Lagoons*

Unlike other point source categories that use liquid waste storage structures, the CAFO ELGs do not provide detailed lagoon liner specifications.[386] EPA previously stated that accumulation of solids and compacted soil at the bottom of lagoons would adequately mitigate the risk of pollutants seeping into groundwater and being transported to surface waters and drinking water sources. However, recent research indicates this assumption is incorrect.[387] Multiple studies have confirmed that, as a result of natural wear and tear as well as improper lagoon upkeep, pollutants such as ammonia-N and antibiotic-resistant bacteria seep from unlined lagoons into groundwater where they are then transported downstream.[388] Nitrate plumes underlying CAFOs have been observed to travel through groundwater to nearby surface waters, threatening water quality.[389] According to recent Supreme Court precedent, EPA has a legal duty to regulate these hydrologic discharges.[390] Scientific evidence and information from state permitting authorities now suggest that composite liners with double synthetic layers and leak detection are BAT for liquid manure storage structures. Imposing a requirement that CAFOs install liners that conform to this design standard would correct the ELGs' failure to address subsurface discharges, ensuring the ELGs are based on technology that is actually capable of meeting the zero-discharge from production areas standard.[391]

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385 Aneja, *supra* n.350 at 2 (describing odorous compounds emitted by lagoons); *supra* nn.209–211 and accompanying text (describing impacts on communities).
386 *Compare, e.g.*, 40 C.F.R. § 257.70 (design criteria for coal combustion residual landfill liners) *with* 40 C.F.R. § 122.42(e) (requiring only "proper operation and maintenance of the storage facilities").
387 *See* Noah Rudko et al., *Development of a Point-Source Model to Improve Simulations of Manure Lagoon Interactions with the Environment*, 325 J. ENV'T MGMT. 1, 2 (2023) (sealing likely not adequate to prevent groundwater contamination in "lagoons constructed on sandy soils with high permeability or with shallow groundwater tables"), 9 ("The effects of manure sealing that might reduce leakage rates as earthen structures age are offset by processes such as freezing and thawing cycles, or wetting and drying.") (pagination in accordance with submitted copy).
388 Chee-Sanford, *supra* n.34 at 1499 (detecting tetracycline-resistant bacteria from lagoons at swine CAFOs in groundwater); S. Koike et al., *supra* n.33 at 4822 ("[A]nimal waste seeping from unlined lagoons at two swine confinement facilities had an impact on the dissemination of tetracycline resistance genes in groundwater near the facilities."); Rudko et al., *supra* n.387, at 5 ("The groundwater monitoring wells downgradient of the lagoon had elevated concentrations of each of the sampled water quality parameters, indicating that the lagoon was the only factor driving elevated ammonia-N concentrations in the downgradient wells.").
389 Erickson Report, *supra* n.18 at 1–2, 7.
390 *Cnty. of Maui*, 590 U.S. at 186.
391 *Nat'l Crushed Stone*, 449 U.S. at 74 (quoting 33 U.S.C. 1311(b)(2)(A)). As explained in Section III.D, the current ELGs are not actually designed to achieve the zero-discharge production area effluent limit because EPA has ignored hydrological discharges. Thus, additional progress toward that goal is still necessary.

Performance

The best performing subsurface waste storage structure liners include three key elements: (1) synthetic liner(s) (sometimes referred to as geomembranes or geotextiles); (2) a composite design; and (3) built-in leak detection.[392] Synthetic liners are generally made of plastics like high-density polyethylene, polyvinyl chloride, or low linear density polyethylene processed to certain specifications.[393] "Composite liner" is an umbrella term that refers to layers of various materials designed to slow the movement of pollutants to the subsurface outside the liner. Composite liner designs—and the efficacy of those designs in controlling CAFO pollution—vary widely.

Liquid waste storage structures with at least one synthetic liner layer outperform lagoons that rely solely on compacted soil and manure sealing (i.e. "earthen-lined" lagoons).[394] Synthetic liners are particularly effective in vulnerable areas with permeable (non-clay) soils, high water tables, karst topography, shallow aquifers, high hydrological connectivity, or nearby drinking water wells.[395] Composite liners provide even more protection. A study that examined the efficacy of various landfill liners in controlling seepage of many of the same pollutants of concern in CAFO waste found that "composite liners are substantially better than single liners in terms of controlling leakage."[396] However, simple composite designs limited to a single geomembrane over soil attenuation layer are less reliable in the CAFO context. While these designs may suffice to control groundwater pollution from landfills, they "should not be used as primary (single) liners in lagoons" where frequent filling and emptying disrupt tensile stress on the geomembrane.[397] A study conducted by the Minnesota Pollution Control Agency shows that adding a clay layer and ballasting the geomembrane (i.e. using a weight such as a layer of soil to hold the liner in place) can improve the performance of a composite design with a single synthetic layer, helping to reduce the nitrogen content of downgradient groundwater by 55 percent and measurably decrease phosphorus and organic carbon as well.[398] However, states like Washington still recommend groundwater monitoring at facilities that rely on a composite design with only a single synthetic liner due to the elevated leakage potential.[399]

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[392] R.K. Rowe, *Long-term Performance of Containment Barrier Systems*, 55 GEOTECHNIQUE 631, 652 (2005) ("[A]ll of the leakages reported for composite liners are small and, correspondingly, the contaminant transport by advection will be very small.").
[393] MINN. POLLUTION CONTROL AGENCY, LIQUID MANURE STORAGE AREA HANDBOOK App'x F (Feb. 2017).
[394] *See* WA LITERATURE REVIEW, *supra* n.19 at 27, 28, 67 (June 2016), (collecting studies).
[395] *See also* MINN. POLLUTION CONTROL AGENCY, *supra* n.393 at 7–13 (discussing locational risks that merit additional precautions).
[396] *Rowe, supra* n.392 at 672.
[397] WASH. STATE DEP'T OF ECOLOGY, LAGOON AND LINER DESIGN GUIDELINES T7-9 (April 2023) [hereinafter WA LAGOON DESIGN GUIDELINES].
[398] WA LITERATURE REVIEW, *supra* n.19 at 67; *see also* Rowe, *supra* n.392 at 651 (recording average and peak flows through composite geomembrane/geosynthetic clay liners and composite geomembrane/composite clay liners).
[399] WA LAGOON DESIGN GUIDELINES, *supra* n.397 at T7-12.

Double synthetic lined lagoons are currently the most effective practice advised for use at CAFOs.[400] Double lined lagoons are composed of two geomembranes and often include leak detection and collection systems between the synthetic layers.[401] This is the design EPA imposed on a Yakima Valley dairy subjected to an enforcement action after Agency officials noted the facility's leaky lagoons were contributing to widespread groundwater pollution that endangered nearby communities.[402] Double liners are also currently in use at MPP facility evaporation ponds to control chlorides—a pollutant also of concern in CAFO waste.[403] EPA's understanding that composite liners with double synthetic layers are available to reduce pollution discharges from individual CAFOs and MPP facilities should also guide the Agency in its revision of the CAFO ELGs.

Merely recommending (or even requiring) that CAFO operators meet a specified lagoon permeability standard has not adequately protected groundwater because wear, tear, and improper installation or upkeep are often not apparent to the naked eye.[404] To overcome this challenge, engineers recommend that liquid manure storage structures include leak detection devices, particularly where representative groundwater monitoring is not occurring.[405] Leak detection allows CAFO operators to take immediate remedial action that can prevent discharges entirely. Without leak detection or groundwater quality monitoring, enforcing a lagoon permeability standard is impossible, illegally undermining one of the pillars of the CWA.[406] Simply requiring double-lined synthetic composite liners with leak detection mechanisms would facilitate straightforward enforcement and provide a better safeguard against pollution that threatens drinking water and surface waters.

Cost and Availability

Lagoon liner costs vary according to design.[407] While more protective designs like double synthetic liners are generally more expensive to install, their current use at CAFOs, including in

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400 *Id.* at T7-10, T7-12–T7-13.
401 *Id.*
402 Letter from Eric Winiecki, EPA Region 10, to David Erickson (March 29, 2017), at 4; *see also* WESTERN ENVIRONMENTAL LAW CENTER, *WA Industrial Dairy Installs Court-Ordered Manure Lagoon Liners to Protect Groundwater* (Dec. 12, 2016), https://westernlaw.org/wa-industrial-dairy-installs-court-ordered-manure-lagoon-liners-protect-groundwater-news-rel/ (opining that, with the installation of the new lagoon design, "Cow Palace has set the standard that the rest of the CAFO industry must now follow in order to protect people's health.").
403 EPA, Response to FOIA 2025-EPA-04763 at 10.
404 *See infra* nn.20–23 and accompanying text; *see also* WA LITERATURE REVIEW, *supra* n.19 at 69 (". . . it has been determined that design permeability data do not adequately predict actual seepage rates."); Erickson Report, *supra* n.18 at 5.
405 Erickson Report, *supra* n.18 at 5, 9.
406 *See* 33 U.S.C. § 1251(e) ("Public participation in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan, or program established [under the CWA] shall be provided for, encouraged, and assisted by [EPA].").
407 Dairyland Initiative, University of Wisconsin, *Manure Management*, https://thedairylandinitiative.vetmed.wisc.edu/home/housing-module/adult-cow-housing/manure-management/ (accessed April 24, 2025).

response to enforcement actions, demonstrates that they are available and affordable. Moreover, allowing CAFOs to cut costs by relying on compacted soil-lined lagoons and manure sealing falls short of BAT and burdens the public with the costs of dealing with excessive pollution. EPA has broad authority to consider these relevant costs when evaluating additional ELGs to control production area pollution.[408]

The costs for CAFOs to install commonsense pollution controls like synthetic liners, clay attenuation layers, and leak detection are justified because the alternative is saddling the public—and particularly frontline, rural communities—with higher healthcare, home maintenance, and utility bills. For instance, while retrofitting lagoons with double synthetic liners on a large CAFO can cost upwards of a million dollars,[409] reducing nitrate levels in drinking water wells impacted by CAFOs to below the Safe Drinking Water Act threshold can cost up to one million dollars *per well*.[410] Similarly, the Northeast Wisconsin Karst Task Force recounts "millions of dollars spent helping municipalities, farmers, and rural homeowners address [pervasive nitrate and bacteria contamination issues]," without any meaningful progress toward reducing the number of contaminated wells or the severity of the contamination.[411]

Municipal ratepayers also pay for externalities created by CAFOs. In Des Moines where factory farms and row crop agriculture are responsible for a whopping 65 percent of nitrogen loading to the two rivers that source the city's drinking water, ratepayers have been forced to cover the costs of a 4 million dollar reverse osmosis treatment system.[412] The need for advanced treatment has caused water bills to double over the past decade, and rates are expected to continue to increase up to 10 percent each year.[413] Further, upfront costs for sturdier liners and leak detection systems are offset by lower repair costs in the long run and lower likelihood that a CAFO will be saddled with litigation and remediation costs from an enforcement action.[414]

To reduce costs without sacrificing water quality, EPA could even permit CAFOs to make "alternate liner demonstrations," as the Agency does for coal ash impoundments. Such a provision

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[408] 33 U.S.C. § 1314(b)(2)(B) (authorizing EPA to consider the cost of effluent reductions, non-water quality impacts, and any other factors EPA deems appropriate); *see also Weyerhaeuser v. Costle*, 590 F.2d 1011, 1045 (D.C. Cir. 1978) (affirming EPA's discretion in deciding "how to account for the consideration factors, and how much weight to give each factor).
[409] *See* EPA, Public Comments on Proposed Modification of NPDES Permit # IDG010000 (compiled Nov. 13, 2024), at 4 (comment from industry group estimating that installation of a double synthetic lagoon liner costs $4 per square foot, or approximately $1.7 million for a 2,400-cow dairy).
[410] Minnesota Center for Environmental Advocacy et al., *supra* n.14 at 18.
[411] Midwest Environmental Defense Center et al., *supra* n.14 at 26.
[412] Kat Ruane et al., *The Devastating Toll of Factory Farm Pollution in Iowa* (Jan. 29, 2025), https://www.foodandwaterwatch.org/2025/01/29/iowa-factory-farm-water-pollution/.
[413] *Id.*
[414] WA LAGOON DESIGN GUIDELINES, *supra* n.397 at T7-14.

would exempt liquid manure storage structures from synthetic liner requirements if the CAFO could demonstrate through hydrogeologic and monitoring data that the "effective hydraulic conductivity of the engineered liner and/or naturally occurring soil is so low that, even if leachate migrates from the unit, the volume of leachate that can be released to the underlying aquifer over the active life of the impoundment is so small that these releases will not result in adverse effects at any point in the future."[415] Of course, such demonstrations would need to consider the cumulative impacts of all waste impoundments in the relevant watershed. If EPA chooses to regulate the storage of polluting materials on CAFOs differently than it regulates the storage of polluting materials in other point source categories, it must provide a rational explanation for doing so.

ii. *Require Covers for Liquid Manure Storage Structures*

Allowing CAFOs to store waste in uncovered lagoons is an outdated practice that is not representative of the best performing facilities in the industry. Uncovered lagoons are more susceptible to overflows and contribute to excessive amounts of land-applied waste that increase the risk of pollution discharge. Moreover, lagoon covers have the capacity to reduce emissions of odors and airborne pollutants, particularly ammonia that can aerially deposit on surrounding land and surface waters. EPA must consider requiring CAFOs that store liquid waste to do so in affordable covered structures that also minimize adverse non-water quality impacts.

Performance

Despite BMPs in the existing ELGs that require CAFOs to maintain minimum capacity necessary to contain precipitation from 25-year, 24-hour rainfall events,[416] uncovered lagoons continue to overflow due to human error and severe storms.[417] Lagoon covers can prevent rainfall from overwhelming storage capacity and causing catastrophic overflows that contaminate waterways.[418] This feature is increasingly important for pollution control as rainfall events become heavier and more unpredictable due to anthropogenic climate change. As EPA is aware, covers are already in use at many CAFOs. A 2001 consent decree reached in a CAFO enforcement case, in which EPA was a party, required permeable covers on all anaerobic lagoons to reduce odors as well as ammonia and

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415 EPA, Hazardous and Solid Waste Management System: Disposal of CCR, 85 Fed. Reg. 72,506, 72,408 (Nov. 12, 2020).

416 As discussed in Food & Water Watch's 2017 Petition, this standard is itself outdated, as it relies on weather data from 1961. *See* 40 C.F.R. § 412.2(i); 2017 PETITION, *supra* n.5 at 56–58.

417 *See, e.g.*, Greg Stanley, *Seventeen Manure Pits Reportedly Overflow at Large Feedlots in Southern Minnesota* (June 26, 2024), https://www.startribune.com/manure-pits-reportedly-overflow-at-16-large-feedlots-in-southern-minnesota/600376074 (quoting Minnesota feedlot operator who stated "we get 100-year floods every other year it seems"); Kendra Pierre-Louis, *Lagoons of Pig Waste Are Overflowing After Florence*, https://www.nytimes.com/2018/09/19/climate/florence-hog-farms.html (Sept. 19, 2018); *see also* Rudko, *supra* n.387 at 5–6 (finding the primary causes of lagoon overflows at Washington dairies are mismanagement and extreme rainfall).

418 2003 TDD, *supra* n.26 at 4-21.

hydrogen sulfide emissions.[419] Because lagoon covers help to control ammonia emissions, they are likely to assist in reducing aerial deposition of ammonia into waterways. Gas permeable liners can even be paired with subsequent acid stripping to convert ammonia into nonvolatile ammonium ions that can be made into fertilizer.[420]

Cost and Availability

As indicated by their prevalence on existing CAFOs, lagoon covers are affordable. Covers are widely available for less than 16 dollars per yard and, depending on the material, can last for up to 20 years.[421] Given the variety of options at different price points, most facilities should have no trouble finding a cover that fits the engineering specifications, processes, and site-specific considerations of their individual operations.

In assessing the cost of a cover requirement, EPA must also consider that covering lagoons may reduce disposal costs for CAFO operators by decreasing the overall volume of liquid waste.[422] In EPA's 2002 CAFO rulemaking, the Agency recognized that lagoons at swine facilities fill to capacity within just a few years of beginning operation due in part to precipitation.[423] This has led to the need for increased lagoon construction, created incentives to overapply waste when lagoons are full, and contributed to lagoon failures that cause catastrophic waste spills. Thus, requiring CAFOs to install lagoon covers could have the added benefits of slowing the need for additional lagoon construction and decreasing the frequency of land application by allowing CAFOs to more efficiently store waste. By giving CAFO operators more certainty about the volume of waste in their lagoons, lagoon covers would also help address inadequate maintenance of treatment volume, a factor that EPA previously identified as "the single most common reason for the failure of lagoon systems.[424]

EPA's cost analysis of a BMP mandating lagoon covers must also include costs currently externalized onto neighboring residents, including in the form of healthcare bills. Odorous irritants, particulate matter, and pathogens from inadequately contained CAFO waste contribute to disproportionate rates of respiratory illness and antibiotic-resistant infections in nearby

[419] Consent Decree Between United States of America and Citizens Legal Environmental Action Network, Inc. and Premium Standard Farms, Inc. and Continental Grain Company, Inc. at App'x A, Citizens Legal Action Network, Inc. v. Continental Grain Company, Inc., No. 98-6099-CV-W-6.
[420] Vanotti, *supra* n.338 at 295.
[421] University of Minnesota Extension, *Covers for Manure Storage* (2024), https://extension.umn.edu/manure-management/covers-manure-storage (citing Rose M. Steinglein et al., Covers for Mitigating Odor and Gas Emissions in Animal Agriculture: An Overview (2011)).
[422] 2003 TDD, *supra* n.26 at 4-21.
[423] *Id.* at 4-18.
[424] *Id.* at 4-21.; *see also id.* at 4-82 (describing anaerobic lagoons' "sensitivity to sudden changes in temperature and loading rates).

communities.[425] In this manner, overly lenient ELGs unfairly foist the costs of irresponsible CAFO operation onto vulnerable populations.[426]

Non-Water Quality Impacts

EPA has recognized that covers also help control odors and volatilized pollutants.[427] While the scope of emission reductions depends on the material used, covers can reduce odor emission by 40 to 99 percent.[428] Covers are also effective at reducing gaseous pollutants like ammonia, hydrogen sulfide, and methane.[429] According to the University of Colorado, manure slurry stored in covered lagoons can retain 3.5 times more nitrogen than slurries stored in open lagoons where nitrogen freely volatilizes.[430] Monitoring from two swine facilities in Utah using Bio-Cap™ Multi-layer covers showed evaporation rates were 45 percent less for covered lagoons than uncovered lagoons, evincing a decrease in overall pollutant volatilization.[431] Monitoring data provided by the manufacturer that compared uncovered lagoons to lagoons capped with Bio-Cap™ Multi-layer covers showed the covered facilities reduced odors by 83.7 percent, hydrogen sulfide emissions by 94.7 percent, and ammonia emissions by 65.78 percent.[432] The manufacturer claims a Colorado swine facility that installed the cover technology in 1999 achieved similar results.[433]

Controls for odor and other air pollutants from CAFOs are desperately needed to mitigate harmful impacts to nearby residents who experience disproportionately high rates of respiratory illness, high blood pressure, and psychological distress.[434] Moreover, lagoon covers provide more reliable methane emissions reductions compared to manure crusts, helping to mitigate the livestock industry's contribution to climate change.[435]

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425 Casey, *supra* n.201 at 259–60, 265.
426 *Id.*; *see also* Kelly-Reif & Wing, *supra* n.209 at 2, 5 ("The costs of the injuries, illnesses, and deaths caused by dangerous CAFO work are not borne by the pork industry. Rather, occupational injuries and accidents are primarily paid for by workers, their families, and taxpayers.").
427 2003 TDD, *supra* n.26 at 4-18.
428 University of Minnesota Extension, *supra* n.421.
429 *Id.*
430 S.G. Lupis et al., *Best Management Practices for Reducing Ammonia Emissions: Lagoon Covers*, U. COLO. (Dec. 2012), https://extension.colostate.edu/topic-areas/agriculture/best-management-practices-for-reducing-ammonia-emissions-lagoon-covers-1-631b/.
431 BEI AG ENVIRONMENTAL SOLUTIONS, UTAH BIO-CAP ML FINAL REPORT 5 (Jan. 21, 2003), https://epiair.com/wp-content/uploads/2012/01/Case-Study-BioCap-ML-Final-Report-1-21-03.pdf.
432 *Id.*
433 EMISSION SOLUTIONS, INC. & BAUMGARTNER ENVIRONICS, INC., EMISSION TESTS OF THE BIOCAP™ BIOCOVER INSTALLED ON A COLORADO SWINE LAGOON 2, https://epiair.com/wp-content/uploads/2012/04/COReport.pdf.
434 Casey et al., *supra* n.201 at 262–265; Kelly-Reif & Wing, *supra* n.209 at 5); Steve Wing, *Air Pollution from Industrial Swine Operations and Blood Pressure of Neighboring Residents*, 121 ENV'T HEALTH PERSPECTIVES 92, 94–95 (2013).
435 Jonah M. Greene et al., *National Greenhouse Gas Emission Reduction Potential from Adopting Anaerobic Digestion on Large-Scale Dairy Farms in the United States*, 58 ENV'T SCI. & TECH. 12409, 12412– 13 (2024) (explaining that the assumption that natural crusts will reduce lagoon methane emissions by up to 40 percent is rarely justified).

iii. *Require or Incentivize Dry Manure Handling*

In addition to considering technologies that can mitigate the substantial water quality impacts of liquid manure handling systems, EPA should alternatively consider NSPS and/or BAT requirements that prohibit new CAFOs from using liquid manure handling and transition existing CAFO operators away from liquid manure handling. As EPA has long found, "[r]educed water use or handling of wastes in a dry or drier form lowers the risk of pollutants entering surface waters."[436] Therefore, surface quality benefits can be achieved by requiring new operations to employ dry scrape systems for the removal of manure from livestock housing structures, and requiring or incentivizing existing operations to retrofit wet flush systems with a dry scrape system.

Performance

According to the Agency, "[r]eplacing a flush system with a dry scrape system," or for that matter, requiring dry scrape systems from the outset, "dramatically reduces the amount of water used in manure handling and also reduces the tonnage of manure by decreasing dilution with water."[437] Not only does this technology eliminate reliance on large lagoon systems in favor of storage options like prefabricated or formed storage tanks, "from which contaminants are less likely to seep,"[438] but compared with a wet flush system, the resulting manure product is more readily transported to areas where there is an increase in available land base where fertilizer is actually needed.[439] In other words, a CAFO operator using a dry scrape system would be less likely to overapply waste to cropland immediately surrounding the production area due to the practical difficulty and high cost associated with hauling the waste elsewhere.

Cost and Availability

Though EPA previously found the use of dry scrape systems to be uncommon outside of poultry operations when it last reviewed the technology in 2002,[440] the Agency soon thereafter reported otherwise. Since at least 2003, EPA acknowledged dry scrape systems as the primary manure removal practice for beef cattle raised on open lots, and the typical method of manure removal for dry lot dairy operations.[441] The Agency has also noted the impracticality of flush systems in colder climates where flush water is more likely to freeze.[442] Moreover, CAFOs have continued to adopt the practice in the intervening decades. For instance, California dairy operations have increasingly

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436 2003 TDD, *supra* n.26 at 8-1.
437 *Id.* at 8-16.
438 *Id.*
439 *Id.* at 8-17.
440 *Id.*
441 EPA, *NPDES Permit Writers' Guidance Manual and Example NPDES Permit For Concentrated Animal Feeding Operations*, App. B at B-11, B-12, B-14 (Dec. 31, 2003), https://www3.epa.gov/npdes/pubs/cafo_permit_guidance_entirepub.pdf.
442 *Id.*

completed flush-to-scrape conversions in recent years, aided in part by state incentive programs for alternative manure management systems.[443] California regulators have found scrape system retrofits to be a relatively "low cost option" as compared with liquid waste management systems involving lagoons and anaerobic digestion,[444] with costs presumably reducing further for new construction.

Non-Water Quality Impacts

Beyond the clear water quality benefits of dry manure handling systems, they also provide other important non-water quality benefits, particularly as it relates to water conservation and the reduction of climate-altering methane emissions. Because wet manure handling creates the anaerobic conditions that lead to methane production, dry manure handling that pairs scrape systems with other practices like composting or solar drying of waste have been shown to substantially reduce greenhouse gas emissions. For instance, California researchers have concluded that converting one 4,250-head dairy to primarily dry handling practices will result in emissions reductions of up to 17,174 $MTCO_2e$ per year,[445] the equivalent climate impact of 1,932,486 gallons of gasoline consumed.[446]

b. Solid Waste Storage Requirements

In addition to manure, CAFOs also store large amounts of other solid wastes, including silage, compost,[447] and mortalities. When stockpiled, these organic wastes release significant amounts of nitrate through ammonia volatilization and pollutant-laden leachate that can infiltrate groundwater or contaminate stormwater runoff.[448] Controlling leachate is critical, as researchers estimate the liquid can be "40 times stronger than dairy parlor wastewater and up to 200 times stronger than raw sewage."[449]

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443 *See* CAL. DEPT. OF FOOD AND AGRIC., ALTERNATIVE MANURE MANAGEMENT PROGRAM – INCENTIVE PROJECT-LEVEL DATA (Jan. 8, 2025), https://www.cdfa.ca.gov/oefi/AMMP/docs/AMMP_Project_Level_Data.pdf (documenting 17 flush-to-scrape conversions at Dairy CAFOs since 2018).

444 CALIFORNIA AIR RES. BOARD, SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY 122 (Mar. 14, 2017); *see also id.* at 123 (estimating capital costs of flush-to-scrape conversion at a 2,000-milking cow dairy to be $1.6 million over a ten-year period, and continued operating and maintenance costs over same time frame to be $0.4 million).

445 CALIFORNIA DAIRY RESEARCH FOUNDATION, Small Dairy Climate Change Research: An Economic Evaluation Of Strategies For Methane Emission Reduction Effectiveness And Appropriateness In Small And Large California Diaries 35 (Mar. 31, 2020), https://www.cdfa.ca.gov/oefi/research/docs/CDFA_SmallDairyResearch_FINAL_Report.pdf.

446 *See* EPA, *Greenhouse Gas Equivalencies Calculator* (Nov. 2024), https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results.

447 While "composting is a well-suited technology for on-farm management of agricultural residues, [] it is not an environmentally sustainable technology for treating manure alone. Certain chemical and physical characteristics of animal manures are not adequate for composting and could limit the efficiency of the process . . . ." Vanotti, *supra* n.338 at 283.

448 *See* M.M. Gebrehanna et al., *Silage Effluent Management: An Overview*, 143 SOIL, WATER, & CLIMATE 113, 113 (Oct. 2014) ("Silage effluent is a potent wastewater that can be produced when ensiling crops that have a high moisture content. Silage effluent can cause fish-kills and eutrophication."); Vanotti, *supra* n.338 at 283.

449 JOSEPH P. HARNER, KANSAS ST. UNIV., SILAGE LEACHATE: A PROBLEM WITH POTENTIAL BENEFITS (May 2006), https://bookstore.ksre.ksu.edu/download/silage-leachate-a-problem-with-potential-benefits_MF2728; *see also* Dr. Rebecca Larson, U. WISC., *Silage Runoff Characterization* 6 (Apr. 3, 2013), https://www.slideshare.net/slideshow/silage-runoff-characterization-mah/19908018 (chart comparing concentrations of pollutants typical of silage leachate to pollutant concentrations of residential wastewater).

Because leachate contains such high nutrient concentrations, even seemingly negligible amounts can signify major nutrient losses that reduce the nutritional value of feed and contribute to water quality impairments.[450] In fact, "silage bunkers [are] one of the highest concentrated runoff nutrient loss areas on a farm in terms of loading per unit area."[451] Leachate from compost, which often includes mortalities on CAFOs, contains similar pollutants of concern as well as elevated pathogen risks.[452]

Existing guidelines require that production areas be "designed, constructed, operated, and maintained to contain all manure, litter, and process wastewater."[453] Regulations also require CAFO operators to divert clean water and properly manage mortalities.[454] In practice, these vague mandates have not resulted in production area practices that prevent the discharge of leachate or runoff. Many states allow "temporary" uncovered solids stockpiling on bare ground despite the fact that leachate release generally peaks within a few days.[455] To stem the flow of production area pollution, EPA must consider requiring liners and covers for all waste stockpiles.

Performance

The most effective methods for controlling leachate pollution generally consist of a liner and leachate collection system paired with covers and stormwater diversions to prevent contaminated runoff. Pollution reduction rates attributable to such a system depend on the material being stored and the composition of the liner. Silage leachate, for example, is extremely corrosive and can damage both concrete and steel.[456] Thus, while merely prohibiting the practice of stockpiling on bare ground would be an improvement to the ELGs, EPA should also consider establishing minimum standards for liner composition.

In the United Kingdom, farmers are required to seal baled silage in an impermeable membrane such as high-density plastic.[457] Bagging silage is an effective method of preventing leachate from reaching waters because it prevents both rainwater contamination and seepage into groundwater. In

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450 PETER WRIGHT ET AL., EFFECTIVENESS OF SILAGE LEACHATE TREATMENT WITH VEGETATIVE FILTER AREAS (Aug. 2004), https://socwisconsin.org/wp-content/uploads/2016/05/Wrightetal_2004_SilageLeachateTrtmtVTA.pdf (noting that leachate losses from silo storage can equate to 15 percent of total feed nutrients or 7 pounds of phosphorus per cow per year).
451 Michael A. Holly et al., *Silage Storage Runoff Characterization: Annual Nutrient Loading Rate and First Flush Analysis of Bunker Silos*, 264 AG. ECOSYSTEMS & ENV'T 85, 90 (2018).
452 BRADLEY A. CLEARY, ASSESSMENT OF THE TRANSPORT OF BURIED LIVESTOCK LEACHATE THROUGH A SYNTHETIC CLAY LINER 35 (July 2009), https://central.bac-lac.gc.ca/.item?id=MR55444&op=pdf&app=Library&is_thesis=1&oclc_number=745898967.
453 40 C.F.R. § 412.31(a)(1)(i).
454 *Id.* § 122.42(e)(1).
455 *See* WRIGHT, *supra* n.450 at 2 ("The amount of juice from silage peaks quickly after harvest and then decreases to a trickle over time.").
456 Harner, *supra* n.449; Gebrehanna, *supra* n.448 at 114.
457 DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, *Storing Silage, Slurry, and Agricultural Fuel Oil* (Oct. 12, 2023), https://www.gov.uk/guidance/storing-silage-slurry-and-agricultural-fuel-oil.

this manner, bagging silage allows farmers to collect the low flow, high pollutant concentration leachate and divert it to further treatment before it enters the environment.[458] Similar "ag-bag" services are available in the U.S. and serve the dual purpose of reducing leaching to groundwater and reducing runoff caused by precipitation comingling with the stockpile.[459] EPA should therefore consider BMPs requiring that silage be bagged in a low permeability geomembrane.

Research also indicates geosynthetic clay liners can reduce permeability to protect groundwater quality and prevent leachate transport to surface waters. Field testing conducted in Canada shows the addition of a geosynthetic clay liner reduced hydraulic conductivity in a mortality pile by three orders of magnitude as compared to a soil liner alone.[460] Modeling conducted pursuant to the same study indicated that using a geosynthetic clay liner "could reduce the maximum contaminate concentration at the top of the aquifer by 38 percent for sandy soils and by 32 percent for clayey soils."[461]

While site-specific considerations may impact the specifications for storage areas, EPA must set baseline requirements and can distinguish between regional differences in the generally applicable ELGs. For instance, EPA can require locations that experience freezing temperatures have concrete barriers with air content and water/cement ratios sufficient to withstand freeze and thaw cycles without cracking, consistent with industry best practices outlined in American Concrete Institute guidance.[462] National standards establishing more specific regulatory minimums are necessary because, contrary to the expectation set forth in past rulemakings,[463] states have largely failed to promulgate additional regulations necessary to account for site-specific conditions. To prevent patchwork regulatory coverage that does not adequately protect national water quality, EPA should consider a BMP that uniformly requires solid waste storage area liners.

Cost and Availability

In evaluating affordability, EPA must consider that minimizing effluent loss from silage storage by adequately drying material prior to storage maximizes the value of the feed, partially offsetting costs associated with drying and installing concrete barriers.[464] According to one

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[458] *See* Wright, supra n.450 at 12–13 (describing variable efficacy in vegetated buffers intended to treat leachate).
[459] *See e.g.*, Ag-bag, https://ag-bag.com/ (visited June 9, 2025).
[460] CLEARY, *supra* n.452 at 48. Laboratory modeling confirmed the benefits of a geosynthetic liner. *Id.* at 74.
[461] *Id.* at 94.
[462] *See generally* AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE (ACI 318-19) (2022), available at https://www.concrete.org/store/productdetail.aspx?ItemID=318U19&Language=English&Units=US_Units.
[463] *See, e.g.*, 68 Fed. Reg. at 7211 (anticipating that states would establish site-specific land application limits sufficient to prevent excessive phosphorus application).
[464] *See* Gebrehanna et al., *supra* n.448 at 113 ("Effluent release during silage making represents a loss of silage dry matter (DM), and a reduction in the value of the silage as feed.").

manufacturer, bagged silage can greatly reduce loss of matter, allowing operators to feed more cows with the same amount of feed at a reduced fermentation time.[465]

c. Outlet Filters for CAFOs with Ventilation Systems

As described in Sections I and III.E, air deposition is a significant source of jurisdictional water pollution from CAFOs. Pollutants of concern for this pathway include ammonia, pathogens, dust, and particulate matter.[466] While liquid manure storage structures are a major source of ammonia emissions from CAFOs, confinement pens where animals are held also contribute ammonia to surface waters, as do other parts of the CAFO where deposited nitrogen is then prone to wash into waters as runoff. Both courts and EPA have previously acknowledged EPA's authority to regulate water pollution transmitted through aerial pathways.[467] Further, ammonia deposition from a CAFO into surface waters constitutes a jurisdictional discharge from that CAFO if it is the functional equivalent of a direct discharge.[468] Accordingly, EPA must consider technologies and BMPs to control pollutants from these pathways. To combat nitrogen pollution from ammonia deposition, as well as the deposition of pathogens, dust, and other particulate matter, commenters urge EPA to consider requiring the use of filters and scrubbers in confinement ventilation systems.

Performance

A variety of filters and scrubbers are available and effective in reducing ammonia emissions and other air pollutants from CAFO housing. Much like the composite liners recommended for use with liquid manure storage structures, the most effective air deposition reduction systems have multiple components designed to provide extra layers of protection. Filters and scrubbers use physical, biological, and chemical processes to trap or neutralize pollutants.[469] Removal efficiencies depend on the type of filter used, but data are available for a variety of designs and pollutants at various livestock confinements.[470] Notably, ventilation outlets with acid scrubbers can remove up to 99 percent of ammonia before air leaves a CAFO, while biofilters can remove up to 67 percent of ammonia while

465 AgBag, https://www.agbag.co.uk/ (visited June 9, 2025).
466 Li Guo, *Mitigation Strategies of Air Pollutants for Mechanical Ventilated Livestock and Poultry Housing – A Review*, 13 ATMOSPHERE 1, 9 (2022).
467 *See Nat'l Pork Prods. Council*, 635 F.3d at 754–56 (describing EPA's position that aerial deposition of dust from poultry CAFO ventilation systems are discharges that must be permitted); *Nat'l Cotton Council*, 553 F3d at 940 (recognizing that pesticides sprayed from point sources that deposit in waterways are jurisdictional discharges under the CWA).
468 *Cnty. of Maui v. Hawaii Wildlife Fund*, 590 U.S. at 185.
469 Guo, *supra* n.466 at 9–11.
470 *Id.* at 12–13 (providing ammonia, particulate matter, and bacteria removal efficiencies for various filter types at swine and poultry CAFOs); *see also* Vanotti, *supra* n.338 at 293 (listing studies).

also providing significant odor mitigation.[471] Multistage scrubbers, such as those that use a combination of water, acid, and a biofilter, have been shown to achieve 90 percent reductions in particulate matter while also significantly cutting emissions of airborne bacteria.[472] Filters with gas permeable membranes or electrostatic spinning technologies have also been proven effective in removing particulate matter, bacteria, and viruses.[473] EPA can and should use these removal efficiencies and available data on per-animal emissions to set specific emission reduction standards for air-deposited water pollutants like ammonia.[474]

Cost and Availability

The availability of outlet filters to control air deposition of pollutants from CAFOs is supported by their widespread use in other countries. In the Netherlands, for instance, pig and poultry operations have been employing acid scrubbers and trickling biofilters to address soil acidification and eutrophication for decades.[475] The rollout of these technologies for animal feeding operations has been so successful that they are now considered commercially available, "off-the-shelf techniques."[476]

Site-specific considerations such as facility design, climate, and top pollutants of concern will impact which filtration system makes sense for a given facility.[477] However, the availability of multiple, tailorable filter options ensures that the majority of CAFOs with housing ventilation systems could find workable options to significantly reduce air-deposited water pollutants such as ammonia, particulate matter, and pathogens.

Costs of installing outlet filters in CAFOs vary widely depending on whether the operation is new or existing, the size of the confinement, and the configuration of the filter or scrubbing system. Estimated investment and operational costs are available, though likely out of date.[478] EPA should

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[471] Guo, supra n.466 at 12; *see also* R. W. Melse & N.W.M. Ogink, *Air Scrubbing Techniques for Ammonia and Odor Reduction at Livestock Operations: Review of On-Farm Research in the Netherlands*, 48 TRANSACTIONS AM. SOC'Y AG. ENG'RS 2303, 2306, 2308 (2005), https://edepot.wur.nl/31455 (noting that scrubbers are capable of attaining up to 99 percent ammonia removal and describing a long term farm study that showed an average of 90 percent removal).
[472] Guo, *supra* n.466 at 13–14.
[473] *Id.* at 15–16.
[474] Melse & Ogink, *supra* n.471 at 2304.
[475] *Id.* at 2303.
[476] *Id.* at 2303.
[477] Guo, *supra* n.466 at 16.
[478] Roland W. Melse et al., *Multi-Pollutant Scrubbers for Removal of Ammonia, Odor, and Particulate Matter from Animal House Exhaust Air* (2008), https://lpelc.org/multi-pollutant-scrubbers-for-removal-of-ammonia-odor-and-particulate-matter-from-animal-house-exhaust-air/.

update these cost estimates, require filtration systems at new sources, and evaluate the feasibility of retrofitting existing sources.

Non-Water Quality Impacts

Installing filters and scrubbers in CAFO ventilation systems will provide important environmental benefits in addition to improving water quality. Most obviously, filters installed to reduce aerial deposition of pollution will also reduce air pollution. Filters that reduce ammonia and particulate matter emissions are especially beneficial as exposure to high levels of these pollutants is associated with adverse cardiac, respiratory, and mental health outcomes.[479] In fact, a recent study of a spatially explicit pollution inventory estimated that fine particulate matter ($PM_{2.5}$) from animal-based food production in the United States is responsible for at least 12,700 premature deaths every year, and that this is largely driven by ammonia.[480] Many filters that target odorous ammonia and particulate matter also reduce emissions of hydrogen sulfide, an odorous and toxic gas that is responsible for many human and animal deaths in livestock facilities.[481] Due in part to this ability to trap hydrogen sulfide, many filters are effective in reducing odor impacts on surrounding communities.[482]

Using ventilation filters to reduce the dispersal of particulate matter can also reduce the spread of pathogens and antibiotic-resistant genes. Clouds of particulate matter generated by CAFOs across the country are vectors for pathogenic microorganisms, including antibiotic-resistant bacteria.[483] Antibiotic and antiviral drugs themselves may also be distributed as particulate matter, unintentionally exposing the non-livestock animals (including humans) to drugs intended for livestock alone.[484] Filters and scrubbers installed at ventilation outlets in animal housing have the capacity to capture and neutralize pathogens and antibiotic-resistant genes that could otherwise wreak havoc on other animal feeding operations, wildlife populations, and even global human health.[485]

When evaluating the non-water quality impacts of including ventilation outlet filters and scrubbers in the ELGs, EPA should also consider the costs that are currently being borne by

479 Mitloehner & Calvo, *supra* n.305 at 174–75; Casey, *supra* n.201 at 263, 264; Tschofen, *supra* n.164 at 19857.
480 Nina G. G. Domingo et al., *Air Quality-Related Health Damages of Food*, 118 PNAS 1, 1–2 (2021) (pagination in accordance with submitted copy).
481 Guo, *supra* n.466 at 12–13; Ji-Qin Ni et al., *Emission Factors and Characteristics of Ammonia, Hydrogen Sulfide, Carbon Dioxide, and Particulate Matter at Two High-Rise Layer Hen Houses*, 154 ATMOSPHERE 260, 261 (2017).
482 Melse & Ogink, *supra* n.471 at 2310–11.
483 McEachran, *supra* n.206 at 337–38, 340–41.
484 *Id.* at 340–42.
485 Guo, *supra* n.466 at 9.

communities forced to endure poor air and water quality attributable to existing CAFOs. Economic data from 2008 to 2012 show that even as gross economic damage from particulate matter in other sectors fell, damage caused by the livestock industry grew.[486] Homes lose value when CAFOs move within their vicinity and rural economies wither as residents are forced out to avoid odors and pests.[487] A variety of studies have determined the public is willing to pay for reduced environmental hazards associated with CAFOs, including improved recreation, property values, health impacts, drinking water, and climate outcomes.[488] Requiring even a subset of CAFOs, such as those with jurisdictional discharges based on the *Maui* factors,[489] to install and operate ventilation outlet filters or scrubbers would benefit CAFO workers and frontline communities, helping to alleviate the environmental injustices currently perpetrated by CAFOs against their neighbors, including noxious odors, pests, and the resulting reduced property values.[490]

4. Tailoring Land Application Requirements for Pollution Reduction

As EPA well knows, current land application requirements have utterly failed to "minimize" transport of nutrients to surface waters, much less other pollutants of concern. Significant revisions to the CAFO ELGs are necessary to ensure that CAFO land application practices reflect BAT. Not only must EPA consider technologies capable of reducing the nutrient content of waste prior to application so that land application areas have a chance of assimilating the amount of nutrients applied, but the Agency must heed its own findings that the agronomic approach to land application does not adequately reduce excess nutrient runoff, and align application rates, technologies, and practices with pollution reduction goals instead of maximum crop yields.

a. <u>Solid Liquid Separation</u>

EPA must consider requiring CAFOs that generate waste in slurry form to employ SLS. SLS is an affordable and, when paired with additional practices, effective pollution control technology that is already widely used in diverse CAFO settings.

486 Tschofen, *supra* n.164 at 19858.
487 *See generally* DR. WILLIAM J. WEIDA, COLORADO COLLEGE, A SUMMARY OF THE REGIONAL ECONOMIC EFFECTS OF CAFOS (July 21, 2001).
488 Gemma Del Rossi et al., *The Economics of Nutrient Pollution from Agriculture*, 15 ANN. REV. RES. ECON. 105, 117–118 (2023).
489 *Cnty. of Maui*, 590 U.S. at 184–85.
490 *See generally* WEIDA, *supra* n.487.

Performance

There are a variety of SLS methods, each of which has benefits and drawbacks that may make one system better suited for a particular CAFO.[491] This variety of options makes SLS a flexible requirement. Overall, SLS reduces the organic load in CAFO wastewater, thereby decreasing nutrient and pathogen concentrations in liquid containment structures and land-applied liquid waste and reducing water quality risks.[492] The solids can then be composted either on or offsite to create valuable fertilizer without the heightened leaching risks associated with higher inorganic nutrient concentrations.[493] Meanwhile, SLS improves the liquid fraction's nutrient ratio, total suspended solids concentration, and pathogen content for plant growth compared to unseparated slurry.[494] SLS is also a critical first step to many more advanced pollutant treatment methods.[495]

With the understanding that a portion of land-applied waste will be discharged to waters, EPA should consider imposing maximum pollutant concentrations for land-applied waste based on demonstrated reductions attained by SLS. For many SLS methods, estimated dry matter, total nitrogen, total phosphorus, volatile solids, and pathogen indicators removal efficiencies have already been documented.[496] EPA must also consider establishing differentiated minimum removal requirements based on CAFO size, as larger CAFOs will be able to—and should be required to—attain greater overall pollutant reductions and achieve greater cost efficiency by investing in more advanced SLS methods like centrifuges with polymer additives or dissolved air floatation tanks.[497] As the 2017 rulemaking petition described, establishing ELGs for additional CAFO size categories is

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491 *See*, *e.g.*, Vanotti, *supra* n.338 at 280 (comparing a screw press separator to a rotating drum screen separator).
492 BRADFORD, *supra* n.7 at 13.
493 *Id.*; Vanotti, *supra* n.338 at 277; *see also* M. Hjorth et al., *Solid-liquid Separation of Animal Slurry in Theory and Practice: A Review*, 30 AGRONOMY SUSTAINABLE DEVEL. 153, 155 (2010) (contrasting manure management in Asia with management in North America); MINN. POLLUTION CONTROL AGENCY, RESPONSE TO COMMENTS ON THE GENERAL NPDES AND SDS FEEDLOT PERMITS 7–9 (2025), https://www.pca.state.mn.us/sites/default/files/wq-f3-64.pdf.
494 *Id.*
495 *See* Vanotti, *supra* n.338 at 289 (describing use of calcium hydroxide to remove and recover phosphorus from liquid wastewater after SLS), 300 (describing biological nitrification/denitrification process for separated waste).
496 *See* Giorgia Cocolo, Assessment of Different Solid-Liquid Separation Techniques for Livestock Slurry 12–20, 36, 49–50, 62 (2013) (PhD thesis, Scuola di Dottorato), https://air.unimi.it/retrieve/dfa8b990-f12e-748b-e053-3a05fe0a3a96/phd_unimi_R09277.pdf; Vanotti, *supra* n.338 at 279–82; Hjorth, *supra* n.493 at 160–176; Rotz, *supra* n.383 at E128 (estimating 25 percent N reduction in liquid portion); Liang Wang, *Nutrient Reduction of Dairy Manure through Solid-Liquid Separation with Flocculation and Subsequent Microalgal Treatment*, 190 APPLIED BIOCHEM. & BIOTECH. 1425, 1429–36 (2020); BRADFORD, *supra* n.7 at 43 (estimating that the combination of inclined screen separator, sedimentation tank, and sand filter removed over 90 percent of pathogen indicator microorganisms); Greene, *supra* n.435 at 12415 (estimating 15 percent N removal and up to 30 percent removal of volatile solids attributable to SLS); Lide Chen & Hernan Tejeda, *Estimating the Efficiency and Cost of an On-Farm Centrifuge Separator* (Dec. 2020), https://www.uidaho.edu/extension/publications/bul/bul991#Study (providing tons of nutrients removed by screen separators on their own and in combination with centrifuge separators).
497 Notably, EPA's recent proposal to update the MPP regulations begins by describing screens, dissolved air floatation, and chemical additives as technologies used by MPP facilities to remove conventional pollutants. 89 Fed. Reg. at 4482.

necessary to account for the tendency of CAFOs to cluster just beneath the Large CAFO threshold to avoid regulation.[498]

Cost and Availability

Many CAFOs already employ some form of SLS to help mitigate water and air pollution.[499] In fact, SLS was already considered a common practice when EPA studied the CAFO category ELGs in 2002.[500] Since then, SLS has only increased in popularity. For instance, a 2024 survey of Wisconsin dairies found that 80 percent employed some sort of SLS.[501] Driven by the "need to improve animal manure management systems to protect water and air quality and comply with [] regulations," advances in SLS over the past two decades have resulted in numerous SLS technologies that can be tailored to work for CAFOs with a variety of characteristics. Consequently, many researchers and regulators have recognized the benefits of SLS already in use on CAFOs.[502] In fact, an EPA study on NMP implementation determined an SLS system consisting of an inclined screen, sedimentation tank, and sand filtration was "necessary for efficient management of the NMP."[503] Similarly, the USDA's NRCS concluded that SLS is often "a necessary component to achieve manure treatment goals for a farm."[504]

One of the primary benefits of SLS is the flexibility attributable to the diversity of available SLS technologies and methods. For instance, CAFOs may employ mechanical separation methods such as filtration screens, and presses, or harness natural forces through the use of centrifuges, settling basins, or Dorr separators.[505] SLS can also be accomplished or assisted by chemical means through the addition of coagulants and flocculants.[506] This diversity increases opportunities for treatment at all kinds of CAFO facilities, but also means there are a range of pollution reduction capabilities, costs,

[498] *See* 2017 PETITION, *supra* n.5 at 31–32 (requesting that EPA shrink or eliminate the Medium CAFO category).
[499] Rotz, *supra* n.383 at E128 ("Some type of liquid and solid separation is often used to reduce the solids content of manure entering the lagoon.").
[500] 2003 TDD, *supra* n.26 at 4-82 ("One common practice for the treatment of waste at dairies is solids separation."), 8-17–23 (describing prevalence of gravity and mechanical separation at dairy and hog CAFOs).
[501] RUTHIE LAZENBY, UCLA, MITIGATING EMISSIONS FROM CALIFORNIA'S DAIRIES 8 (Jan. 2024).
[502] *See, e.g.*, NY STATE DEP'T OF AGRIC. & MARKETS, RFP0326 - REQUEST FOR PROPOSALS, CAFO ENHANCED NUTRIENT AND METHANE MANAGEMENT PROGRAM 5 (2024), https://agriculture.ny.gov/system/files/documents/2024/06/requestforproposals_rfp0326_cafo_enmp.pdf (listing SLS among a menu of BMPs that control nutrient and greenhouse gas pollution); Yijia Zhang et al., *Solid-Liquid Separation and its Environmental Impact on Manure Treatment in Scaled Pig Farms—Evidence Based on Lifecycle Assessment*, 13 Agric. 1, 16 (2023) (pagination in accordance with submitted copy); WISCONSIN MANURE IRRIGATION WORKGROUP, *supra* n.199 at 14.
[503] BRADFORD, *supra* n.7 at 40.
[504] USDA-NRCS, ENVIRONMENTAL ENGINEERING NATIONAL ENGINEERING HANDBOOK, PT. 637, CH. 4, SOLID-LIQUID SEPARATION ALTERNATIVES FOR MANURE TREATMENT AND HANDLING 4-145 (2019).
[505] Cocolo, *supra* n.496 at 13–22.
[506] *Id.*

and benefits associated with SLS implementation on CAFOs.[507] USDA's Economic Research Service has noted that many simple mechanical SLS technologies are "generally affordable at approximately $40,000 for a 120-head dairy farm."[508] According to a study of a 4,000-cow dairy CAFO in Idaho, the combined capital and operation costs of a centrifuge system for a large CAFO are approximately $90,100,[509] indicating significant savings are attainable through economies of scale. The study also noted that large facilities already using inclined screen separators can save on operating costs by incorporating a centrifuge into their SLS system.[510]

In addition to the cost per unit of pollutant removed, EPA's affordability analyses should also consider financial benefits that will flow to CAFOs employing SLS. For example, lower solids content in wastewater reduces equipment maintenance and buildout costs by preventing clogged irrigation systems and limiting the need for additional liquid storage structure capacity; recycled solids can replace bedding, cutting down on operational costs; and composted solids can be sold as fertilizer, adding another source of income to CAFO revenue streams.[511] The already widespread use of this technology further underscores its availability and affordability to the industry.

Non-Water Quality Impacts

In addition to helping CAFOs achieve water pollution reductions, SLS has many non-water quality benefits that EPA must consider. For instance, removing volatile solids prior to long-term liquid waste storage reduces greenhouse gas emissions.[512] In fact, a 2017 study of dairy CAFOs concluded that SLS reduced methane emissions by 46 percent and overall greenhouse gas emissions by 44 percent, indicating it was more effective than anaerobic digestion in combatting emissions from manure storage.[513] Relatedly, solids suspended in liquid waste are a primary source of odors that plague residents near CAFO lagoons.[514] Removal of these solids can help reduce odors.[515] Finally, CAFOs that rely on flushing systems to remove manure from production areas can reuse SLS liquids, reducing dewatering of aquifers and waterways.[516]

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507 Vanotti, *supra* n.338**Error! Bookmark not defined.** at 277; USDA-NRCS, *supra* n.504 at 4-145–4-14; TENG LIM ET AL., USDA-ERS, INCREASING THE VALUE OF ANIMAL MANURE FOR FARMERS 40–43, 64–65 (March 2023).
508 Lim, *supra* n.507 at 40.
509 *See* Chen & Tejeda, *supra* n.496 ($48,151.91 in capital costs + $41,949 in operating costs).
510 *Id.*
511 Lazenby, supra n.501 at 10; USDA-NRCS, *supra* n.504 at 4-30, 4-98; LIM, *supra* n.507 at 40, 71 (March 2023).
512 Lazenby, supra n.501 at 10.
513 Holly, *supra* n.251 at 416.
514 USDA-NRCS, *supra* n.504 at 4-22.
515 *Id.* at 4-45, 4-129, 4-133; Hjorth, *supra* n.493 at 154, 165; IOWA STATE U. EXTENSION, *Solids Separation*, https://www.extension.iastate.edu/ampat/solids-separation (visited March 3, 2025).
516 *See* Vanotti, *supra* n.338351 at 277 (describing availability of separated liquids for water reuse).

Given the promising implementation of SLS technologies by CAFOs and the abundance of information on the efficacy of those technologies in removing pollutants, EPA must consider requiring SLS as a BMP and/or designating SLS as BAT.

b. Abandoning the Agronomic Approach to Application Rates

Maximizing crop yields is outside the scope of EPA's authority under the CWA and is therefore not an appropriate goal for the CAFO guidelines. As such, the Agency must re-orient its view of land application as a pollutant disposal practice to be closely regulated and monitored, rather than a crop production tool limited only by optimal yield recommendations. Waste application can only function as a nutrient pollution prevention practice when such application is limited to the land's assimilative capacity under real world conditions—not ideal crop production conditions.[517] Thus, application standards must be set based on their ability to achieve environmental—and not agricultural—targets, considering not only the assimilative capacity of available cropland, but also all discharge pathways and known water quality risks.

Several examples of developing and implementing this kind of nutrient planning within the United States and abroad can serve as instructive models to guide CAFO ELG updates. For instance, the California State Water Resources Control Board is currently updating its land application requirements for dairy CAFOs to shift away from an agronomic approach in favor of application rates that more directly relate to groundwater protection outcomes.[518] The State is developing a groundwater loading limit expressed as the maximum annual pounds of nitrogen allowed to leach below the root zone per acre per acre foot of water, calculated to ensure groundwater does not exceed maximum contaminant levels.[519] Regulators will then derive a multi-year land application rate formula that determines how much nitrogen can be applied to dairy cropland consistent with the groundwater loading limit.[520] EPA could take a similar approach to setting application rates for achieving surface water quality protection.

Alternatively, EPA could consider adopting protective application rates like those used throughout the European Union to reduce manure nutrient losses to surface waters for the past three decades. The EU's Nitrate Directive sets a 170 kg/ha (151.67 lbs/acre) annual farm-level limit on N application from manure while giving member states the flexibility to set more specific soil and crop

[517] *See* Kellogg, *supra* n.199 at 1 ("When manure application rates exceed the capacity of the land to assimilate nutrients, repeated applications can lead to a buildup of nutrients in the soil. This increases the potential for nutrients to move from the field through leaching and runoff to pollute ground and surface water."); Qiuchun Yang et al., *Spatiotemporal Patterns of Livestock Manure Nutrient Production in the Conterminous United States from 1930 to 2012*, 541 SCI. TOTAL ENV'T 1592, 1597–98 (2016) (using assimilative capacity of land as a benchmark for assessing negative environmental impacts).
[518] *See* CA DAIRY ORDER, *supra* n.15 at 54.
[519] *Id.* at 55.
[520] *Id.*

rates consistent with this limit.[521] A Dutch law implementing this directive known as the Manure and Fertilisers Act set initial soil and crop specific standards for N and P, and then periodically lowers those rates to meet environmental targets.[522]

EPA could also consider creating a nationally applicable tool to ensure PMPs include land application requirements that will achieve water quality protection. For example, New Zealand has created a computer software model called Overseer to estimate nutrient use and losses within a farm system, a tool that has undergone rigorous scientific review and redevelopment in recent years, and which is used by regulators to set allowable "Nitrogen Loss Limits" for livestock operations.[523]

c. Flow Meters in Land Application Equipment

While replacing NMPs with PMPs as described above is crucial, the change is unlikely to significantly reduce pollution from land application of CAFO waste unless EPA simultaneously addresses plan noncompliance. Monitoring results prove not only that NMPs are inadequate, but that many CAFOs are land applying waste at rates and under conditions that violate those NMPs.[524] To ensure permitted CAFOs land apply waste at rates calculated to reduce discharges of all pollutants, EPA must mandate the use of flow meters for any CAFO that land applies liquid waste.

Performance

Flow meters are devices that measure the amount of liquid that passes through a piece of irrigation equipment.[525] Flow meters provide precise data about how much liquid has been applied to a particular field and the rate at which application occurred.[526] Many modern flow meters also include automated leak detection.[527] Flow meters are flexible tools that are compatible with many types of irrigation equipment, including those commonly used by CAFOs.[528] By requiring CAFOs to submit

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521 European Union, Council Directive of 12 December 1991 Concerning The Protection Of Waters Against Pollution Caused By Nitrates From Agricultural Sources 1 (1991), https://eur-lex.europa.eu/eli/dir/1991/676/oj/eng.

522 *See* Hans J.M. Van Grinsven et al., *Evaluation of the Dutch Implementation of the Nitrates Directive, the Water Framework Directive and the National Emission Ceilings Directive*, 78 WAGENINGEN J. LIFE SCI. 69, 72–74 (2016).

523 NEW ZEALAND MINISTRY FOR PRIMARY INDUS., *Overseer: A Nutrient Management Tool For Farmers And Growers* (visited April 8, 2025), https://www.mpi.govt.nz/agriculture/farm-management-the-environment-and-land-use/overseer-a-nutrient-management-tool-for-farmers-and-growers; ENV'T CANTERBURY REG'L COUNCIL, *Using Overseer* (visited Apr. 8, 2025), https://www.ecan.govt.nz/your-region/farmers-hub/farming-plans-and-consenting/overseer/.

524 CA DAIRY ORDER, *supra* n.15 at 60; BRADFORD, *supra* n.7 at 8.

525 MCCROMETER, *Flow Meters for Agricultural Applications: An Overview* (June 25, 2020), https://blog.mccrometer.com/flow-meters-for-agriculture-applications-an-overview/.

526 Englin, *supra* n.190.

527 *Id.*

528 *Id.* (mentioning center pivot, drip, and sprinkler irrigation and concluding that "[n]o matter your method of irrigation, an efficient irrigation system should include a working flow meter"); MCCROMETER, *supra* n.525 (discussing flow meters for use with dairy lagoons); UTAH ST. UNIV., *Accurate Irrigation Water Flow Measurement in Pipes*, https://extension.usu.edu/irrigation/research/accurate-irrigation-water-flow-pipes (listing various types of flow meters and assessing pros and cons of each).

regular flow metering reports that include the time and date of readings and waste nutrient concentration data, EPA would gain valuable insight about whether facilities are complying with their NMPs/PMPs by land applying in accordance with specified rates, avoiding application during wet weather, and more.[529] This information is essential to identify and remedy NPDES permit noncompliance that is contributing to widespread water quality problems.[530]

Cost and Availability

Flow meters are available and cost effective.[531] Some states and localities already have laws that require the use of flow meters, including for entities who appropriate water from surface sources and groundwater aquifers.[532] Flow metering is so prevalent in agriculture that NRCS includes them in its Conservation Practice Standard for Irrigation Water Management.[533] Indeed, the Central Valley Dairy Representative Monitoring Program, a non-profit group of dairy owners and operators, reported in 2019 that flow meters were "at hand" and "could be implemented in relatively short order" in California at a cost of $300 to $1,000 per dairy.[534] Flow meters will also save CAFOs money that they otherwise would have spent on water and electricity bills.[535]

Non-Water Quality Impacts

The primary non-water quality impact that would result from a BMP mandating the use of flow metering at CAFOs is water conservation. Industrial animal agriculture uses huge quantities of water.[536] Flow meters allow irrigators to limit liquid application to only what is necessary for plant growth, maximizing efficiency in one aspect of CAFO water use. With rising instances of severe

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[529] Some flow meters even come with built-in datalogging that includes weather data at the time of application, eliminating the need for EPA, state regulators, and the public to chase down weather reports. UTAH ST. UNIV., *supra* n.528.
[530] National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operation (CAFO) Reporting Rule, 76 Fed. Reg. 65,432 (Oct. 21, 2011).
[531] *See* UTAH ST. UNIV., *supra* n.528 (Table 5, providing an overview of flow meter equipment costs).
[532] *See, e.g.*, Minn. Stat. § 103G.281(2); 23 Cal. Code Reg. § 993(b)(4) (requiring submission of telemetered data to a public website).
[533] USDA-NRCS, CONSERVATION PRACTICE STANDARD 449, IRRIGATION WATER MANAGEMENT (Jan. 2024), https://www.nrcs.usda.gov/sites/default/files/2024-09/449_NHCP_CPS_Irrigation_Water_Management_2023.pdf.
[534] CENTRAL VALLEY DAIRY REPRESENTATIVE MONITORING PROGRAM, SUMMARY REPRESENTATIVE MONITORING REPORT v (April 1, 2019), https://leadershipcounsel.org/wp-content/uploads/2019/10/Dairy-report.pdf.
[535] MCCROMETER, *supra* n.525 (discussing the use of flow meters for expense management).
[536] *See* Dara Meredith Fedrow, Water Use in Confined Animal Feeding Operations (CAFOs) in Minnesota: Who's Keeping Track? 44 (Graduate thesis, 2019), https://scholarworks.umt.edu/cgi/viewcontent.cgi?article=12430&context=etd (estimating that large hog and dairy CAFOs in Minnesota alone used 4.2 billion gallons of water in 2017).

drought and rampant aquifer depletion in farm country,[537] water conservation is an enormous benefit that EPA must consider in evaluating whether to include a flow metering BMP in the CAFO ELGs.

d. Manure Incorporation

Manure incorporation is a land application practice commonly used by CAFOs and farms that land apply CAFO waste.[538] During incorporation, CAFO waste is mixed into the top layer of soil by tilling or aerating[539] the soil directly after application. Incorporation of liquid wastes can also be achieved by injecting waste deeper into the soil using a shallow disc injector, spoke wheel injector, chisel injector or other injection technology.[540] Many states already require some level of incorporation because mixing waste into the soil immediately after application reduces the likelihood that pollutants will pool and run off into ditches, tile drains, or nearby surface waters.[541] There is also evidence indicating that incorporation may reduce odor and air pollution.[542] Given the prevalence of incorporation and injection in the industry already, EPA should consider including this available practice as a BMP for all CAFOs that land apply waste.

Performance

Numerous studies show that incorporating manure likely helps to conserve nutrients in soil and reduce nutrient runoff. During EPA's consideration of the CAFO ELGs in 2002, the Agency recognized that incorporation and injection can reduce erosion and runoff, keeping nutrients and

537 *See* U.S. GLOBAL CHANGE RES. PROGRAM, IMPACTS, RISKS AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II, CH. 10 AGRICULTURE AND RUAL COMMUNITIES (2018), https://nca2018.globalchange.gov/chapter/10/ (predicting agricultural production in the U.S. will decline in response to increasing drought conditions and extreme heat); *see generally* Taro Mieno et al., *Aquifer Depletion Exacerbates Agricultural Drought Losses in the US High Plains*, 2 NATURE WATER 1 (2024) (pagination in accordance with submitted copy).

538 According to USDA, surface application with incorporation is the second most common land application method after application without incorporation, and was used on 5.5 million acres of cropland from 2013 through 2019. Nigel Key & Laura Dodson, *Farmers Spread Most Manure through Surface Applications* (July 3, 2023), https://ers.usda.gov/data-products/charts-of-note/chart-detail?chartId=106802; *see also* MARCEL AILLERY ET AL., USDA-ERS, MANAGING MANURE TO IMPROVE AIR AND WATER QUALITY 12 (2005), https://ers.usda.gov/sites/default/files/_laserfiche/publications/46336/29004_err9.pdf (estimating approximately 40 percent of cropland in the Chesapeake Bay watershed benefitted from manure incorporation).

539 *See* CORNELL U. COOPERATIVE EXT., SUBSURFACE (TILE) DRAINAGE BEST MANAGEMENT PRACTICES (2011), http://nmsp.cals.cornell.edu/publications/factsheets/factsheet58.pdf (calling aerators a promising approach for shallow incorporation that minimizes soil disturbance).

540 CORNELL U. COOP. EXTENSION, LIQUID MANURE INJECTION (2015) http://nmsp.cals.cornell.edu/publications/factsheets/factsheet87.pdf.

541 John E. Gilley & L. Mark Risse, *Runoff and Soil Loss as Affected by the Application of Manure*, 43 BIO. SYS. ENG'G 1583, 1587 (2000); *see e.g.*, Minn. R. § 7020.2225 (requiring injection or incorporation within 24 hours and prior to rainfall in sensitive areas); Wis. Admin. Code § 243.14 (mandating injection or incorporation in surface water quality management areas); 510 ILCS § 77/20 (requiring injection or incorporation for land application in a 10-year floodplain); *see also* E. Osei, *supra* n.98 at 5 (discussing prevalence of incorporation among Texas dairies that also employ SLS).

542 CORNELL U. COOP. EXTENSION, *supra* n.540.

other pollutants on land application sites.[543] Since then, additional research has quantified nutrient and hormone discharge reductions attributable to incorporation.

Incorporation has proven particularly effective at reducing off-field transport of phosphorus. Practices that reduce phosphorus pollution should be a priority for the CAFO ELGs as existing regulations allow CAFOs to use nitrogen-based application rates that result in excess phosphorus on fields.[544] For instance, modeling based on dairy CAFOs in Texas indicated that incorporation of land-applied waste could achieve up to 45 percent reductions in soluble phosphorus losses to edge-of-field runoff.[545] Field studies confirm the phosphorus reduction potential of incorporation as a BMP. In a study of swine manure applied to Iowa cropland, total phosphorus concentrations in runoff from unincorporated fields were more than two times higher than concentrations in runoff from fields that incorporated manure after application.[546]

Incorporation can also significantly reduce nitrogen pollution. Mixing promotes conversion of organic nitrogen to plant-available inorganic nitrogen, increasing the percentage of nitrogen that is taken up by crops and reducing the nitrogen content of runoff.[547] According to a 2005 literature review conducted by USDA, incorporation significantly reduces nitrogen losses from land application fields for hog, dairy, poultry, and beef operations.[548] Part of this reduction in nitrogen water pollution is due to incorporation's ability to control nitrogen volatilization.[549] As discussed in Sections I and III.E, deposition of aerosolized pollutants—and particularly ammonia—is a major pathway by which CAFOs discharge pollutants to surface waters. Because incorporation has been shown to dramatically

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543 2003 TDD, *supra* n.26 at 8-179.
544 *See supra* Section III.A.
545 Osei, *supra* n.98 at 1.
546 Brett L. Allen et al., *Effect of Liquid Swine Manure Rate, Incorporation, and Timing of Rainfall on Phosphorus Loss with Surface Runoff*, 37 J. ENV'T QUALITY 125, 135–36 (2008).
547 U. MINN., *Manure Application Methods and Nitrogen Losses*, https://extension.umn.edu/manure-management/manure-application-methods-and-nitrogen-losses. Of course, this assumption will not hold if EPA does not enforce against manure applications to unplanted fields. *See* MARCEL AILLERY ET AL., *supra* n.538 at 4, 7 (warning of the need to account for increased soil retention of nitrogen when injecting manure).
548 MARCEL AILLERY ET AL., *supra* n.538 at 12.
549 CORNELL U. COOP. EXTENSION, *supra* n.540 ("Liquid manure injection in the spring or into a growing crop reduces N volatilization loss, resulting in much greater retention of plant-available N."); Gabriella Burkett et al., *Influence of Manure Injection Versus Surface Application on Corn for Silage and Winter Rye Yield, Quality, Phosphorus Balance and Soil Test Phosphorus*, 16 J. AG. & FOOD RES. 1, 1 (2024) ("[S]urface application of manure often results in loss of ammonium-N (NH_4-N) fraction through ammonia volatilization.") (pagination in accordance with submitted copy).

reduce ammonia emissions,[550] CAFOs that incorporate their manure can be expected to contribute far less ammonia to waters.

Incorporation has also been shown to reduce hormone transport to surface waters and overall runoff volume, indicating incorporation may be effective in reducing the off-field movement of other CAFO pollutants.[551] Cumulatively, these results suggest that EPA should consider amending the ELGs to require incorporation or injection of land-applied CAFO waste as soon as possible after application, but at least within 24 hours.

Replacing broadcast spray irrigation with injection of liquid waste may produce even greater pollution reductions than incorporation of solid waste.[552] One study examining land application activities in the Mid-Atlantic region found that replacing broadcast irrigation with low-disturbance injection reduced total nitrogen in the watershed by 19 percent and total phosphorus by 44 percent.[553] Similarly, experiments conducted in Pennsylvania showed phosphorus lost to runoff was reduced by 68 percent on fields that injected dairy waste in place of broadcast irrigation.[554]

Cost and Availability

As indicated by the widespread use of incorporation and injection at existing land application sites,[555] these practices are available and affordable. While initial investments in tank and injector technologies can be expensive, many states offer grants to help cover the costs of incorporation

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550 MARCEL AILLERY ET AL., *supra* n.538 at 54 (estimating that injecting manure resulted in just 12 percent of ammonia emissions attributable to surface application); Holly, *supra* n.513 at 414 ("There is abundant literature on reductions of NH_3 when manure is rapidly incorporated (40–90%)."); UNION OF CONCERNED SCIENTISTS, CAFOS UNCOVERED: THE UNTOLD COSTS OF CONFINED ANIMAL FEEDING OPERATIONS 59 (2008) (estimating that injection can reduce ammonia emissions by 50 to 100 percent depending on the method used).

551 Odette Mina et al., *Estrogen Transport in Surface Runoff from Agricultural Fields Treated with Two Application Methods of Dairy Manure*, 45 J. ENV'T. QUALITY 2007, 2013 (2016) (finding shallow disc injection reduced estrogen transport to runoff by two orders of magnitude compared to broadcast irrigation); MINNESOTA POLLUTION CONTROL AGENCY, RUNOFF REDUCTIONS WITH INCORPORATED MANURE 2 (May 2018), https://www.pca.state.mn.us/sites/default/files/wq-f1-08.pdf.

552 *See* I.J. ROSS ET AL., U. KENTUCKY WATER RES. RSCH. INST., EFFECTS OF SOIL INJECTION OF LIQUID DAIRY MANURE ON THE QUALITY OF SURFACE RUNOFF 63 (1978) ("Injection of the manure into the soil essentially eliminated any pollutant yield in the runoff from the test plots as compared to surface application.").

553 Arghajeet Saha et al., *Water Quality Benefits of Weather-Based Manure Application Timing and Manure Placement Strategies*, 333 J. ENV'T. MGMT. 1, 2 (2023) (pagination in accordance with submitted copy).

554 Emad Jahanzad et al., *Varying Influent of Dairy Manure Injection on Phosphorus Loss in Runoff over Four Years*, 48 J. ENV'T. QUALITY 450, 450, 454 (2019).

555 *See infra* n.541 and accompanying text; *see also* Aguirre-Villegas, *supra* n.26 at 174, fig.4 (conveying survey results showing prevalence of injection on Wisconsin livestock operations).

equipment.[556] And many CAFOs already own or have access to incorporation tools or have equipment that is compatible with low-cost incorporation accessories. Even for CAFOs that must purchase, maintain, and operate an additional piece of machinery, incorporation is likely to pay for itself over time as incorporation reduces the need for additional applications of nitrogen fertilizer.[557] Research conducted on a dairy in Illinois concluded that switching from surface application to injection saved the operator 150 dollars per hectare, more than enough to cover the additional cost of injection.[558] Modeling based on Texas dairies indicates that "the cost of incorporating solid manure on waste application fields is small for all dairy sizes," amounting to just 3 percent of net returns at most.[559]

Non-Water Quality Impacts

Requiring incorporation of land-applied CAFO waste is likely to result in beneficial non-water quality impacts as well. As discussed, incorporation can reduce air emissions from CAFOs, alleviating health impacts and improving quality of life for farm workers and surrounding communities. Reductions in ammonia emissions are likely to improve respiratory health and pulmonary function.[560] Assuming manure is applied at appropriate rates, incorporation can also be effective in reducing odors.[561] Further, some injection methods are compatible with no-till strategies intended to bolster soil health and promote long-term sustainability of farmland.[562] These benefits would help to offset the already minimal costs of mandating incorporation as a BMP and help ensure CAFOs are not unfairly offloading externalities onto nearby communities.

5. Monitoring

All NPDES permits must include representative monitoring and reporting provisions sufficient to ensure compliance with the permit's effluent limits.[563] "Effective self-monitoring reveals

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[556] *See, e.g.*, NY DEP'T OF AGRIC. & MARKETS, CAFO ENHANCED NUTRIENT AND METHANE MANAGEMENT PROGRAM (ENMP) PROJECT DESCRIPTIONS (2025) (describing state funds awarded to CAFOs for upgrades, including injection systems, to mitigate environmental impacts), https://agriculture.ny.gov/system/files/documents/2025/02/round1awarddescriptions_cafo_enmp.pdf.
[557] Osei, *supra* n.98 at 9.
[558] Gabriella Burkett et al., *supra* n.549 at 9.
[559] Osei, *supra* n.98 at 9.
[560] Mitloehner & Carvo, *supra* n.305 at 171, 174.
[561] CORNELL U. COOP. EXTENSION, *supra* n.539; MARCEL AILLERY ET AL., *supra* n.538 at 7.
[562] CORNELL U. COOP. EXTENSION, *supra* n.539; 2003 TDD, *supra* n.26 at 8-179.
[563] 33 U.S.C. § 1318(a)(2)(A)(iii); 40 C.F.R. §§ 122.44(i)(1), 122.41(j)(1), 122.48(b); *see also Food & Water Watch,* 20 F.4th at 518; *Wash. State Dairy Fed.*, 18 Wn. App. 2d at 300–03; *see also NRDC*, 808 F.3d at 580–84; *NRDC v. Cnty. of Los Angeles*, 725 F.3d 1194, 1203–10 (9th Cir. 2013).

permit violations, thereby promoting enforcement of the [law]."[564] Accordingly, EPA's NPDES permit writers' manual makes clear that "[m]onitoring is performed to determine compliance with effluent limitations established in NPDES permits."[565] Once collected, monitoring data must be reported to the permitting entity, making the information publicly available via a records request or government website.[566] 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 exceedances of water quality standards. Mere assumptions that implementing technologies and practices will result in permit compliance are impermissible under the CWA.[567] Nevertheless, the CAFO ELGs do not include specific requirements instructing permittees on how to conduct representative monitoring to determine compliance. EPA should correct this deficiency by incorporating specific monitoring requirements for production areas and land application areas into the CAFO ELGs.

a. Production Areas

As discussed in Sections I and III.D, the current ELGs do not prevent seepage and leachate from lagoons and solid storage areas from infiltrating groundwater, where pollutants may then discharge to surface waters or drinking water sources. Following the Ninth Circuit's opinion on this issue in *Food & Water Watch v. EPA*, EPA revised the NPDES General Permit for CAFOs in Idaho to include a provision requiring that permittees develop a subsurface discharge monitoring plan as part of their NMP.[568] Alternatively, permittees will be excused from the subsurface discharge monitoring plan requirement if (1) they submit documentation from a professional engineer or similarly qualified expert certifying none of the facility's lagoons has any subsurface connection to any water of the U.S., or (2) the CAFO has documentation that each lagoon is constructed of concrete,

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[564] *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 (1988), *and reinstated and amended by* 853 F.2d 667 (9th Cir. 1988)).
[565] CAFO NPDES Permit Writers' Manual, *supra* n.121 at 5-1, 8-2; *see also Food & Water Watch*, 20 F.4th at 516 (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].").
[566] 33 U.S.C. § 1318(b).
[567] *NRDC,* 808 F.3d at 565, 583 (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.").
[568] EPA, PERMIT NO. IDG010000 11–12 (2024).

steel, or has a double synthetic liner with leak detection.[569] In revising the ELGs, EPA must consider including and expanding this requirement to cover solid storage areas such as compost and mortality piles and leachate lagoons in addition to manure storage structures.

CAFOs have many options for subsurface discharge monitoring that could be included as examples of how to develop a satisfactory subsurface discharge monitoring plan. One option is to require a series of groundwater monitoring wells. Monitoring wells are frequently used in other NPDES permits for other categories. Siting one well up-gradient from the production area and other wells down-gradient from the production allows CAFOs, regulatory authorities, and the public to compare data and determine whether the production area is contributing to elevated pollutant levels down-gradient. Another option is to require regular monitoring using lysimeters or interstitial devices.[570] Regardless of the method chosen, monitoring requirements must be accompanied by clear standards for controlling placement of monitoring devices (considering proximity to potential contamination sources and the hydrogeological characteristics of the site), frequency of testing, and stringent reporting requirements, including reporting results through Discharge Monitoring Reports (DMRs) and notices of non-compliance.

b. Land Application Areas

EPA must also consider options to ensure CAFOs monitor discharges from land application areas. In the Idaho permit, EPA required "visual inspection of the downgradient edge of the field and any other potential discharge locations (e.g., tile drains, ditches, or other conveyances) must be conducted during the land application event and after the land application event to check for field runoff and discharges."[571] While this is a step in the right direction that should be incorporated into the ELGs to ensure uniform requirements for CAFOs across the country, flow metering requirements discussed above must also be included to ensure NMP compliance.[572] Additionally, EPA must make clear that the results of visual inspections and flow metering data must be regularly submitted to regulatory authorities as part of a CAFO's discharge monitoring reports.

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[569] *Id.*
[570] EPA, *Release Detection for Underground Storage Tanks (USTs) – Interstitial Method* (April 22, 2025), https://www.epa.gov/ust/release-detection-underground-storage-tanks-usts-interstitial-method.
[571] EPA, PERMIT NO. IDG010000 10.
[572] *See supra* Section IV.B.4.c.

Further, EPA must require monitoring to detect subsurface discharges from land application areas. Even assuming EPA does not correct the agricultural stormwater loophole,[573] EPA's regulations require that a CAFO's NMP "ensure appropriate agricultural utilization of the nutrients in [land-applied] manure, litter, or process wastewater."[574] Nutrients from land-applied waste that seep below a crop's root zone cannot be appropriately utilized,[575] indicating the CAFO applying the waste is either not following its NMP—a permit violation meriting enforcement action—or that the CAFO must revise its NMP (such as by lowering application rates or specifying operational practices to avoid cracks or other preferential flow paths) in order to comply with federal law. Under the existing regulatory regime, permitting authorities have no way of knowing whether subsurface land application area discharges are occurring. Thus, this regulatory structure does not "assure compliance with permit limitations," as required by law.[576] To correct this deficiency, EPA should consider requiring CAFOs to conduct representative subsurface monitoring of land application areas using readily available soil moisture probes or lysimeters installed to measure moisture below crop roots.[577] Monitoring and reporting soil moisture below the root zone would help safeguard water quality by providing regulatory agencies and the public with data necessary for EPA to effectively review and revise the ELGs going forward, as well as to facilitate enforcement against CAFOs that over- or mis-apply waste.

V. Conclusion

The evidence is clear: EPA's existing regulatory regime has utterly failed to control water pollution from CAFOs. This decades long failure has led to devastating impacts for frontline communities, agricultural workers, and the environment. But even as EPA has allowed CAFO pollution discharges to proliferate, technologies and practices capable of controlling those discharges have emerged. With information and data supporting the efficacy of these methods now squarely before the Agency, EPA must act. It is time for EPA's regulation of the CAFO industry to finally catch up to its statutory obligations under the CWA.

As demonstrated by many of the studies described in this memo and provided to the Agency, many CAFOs are already achieving pollutant reductions using widely available technologies. EPA

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573 *See* 2017 PETITION, *supra*
n.5 at 22–25 (describing how the agriculture stormwater exemption has severely undercut EPA's ability to adequately regulate CAFOs).

574 40 C.F.R. § 122.42(e)(1)(viii).

575 As discussed elsewhere in this memo, CAFO waste contains numerous pollutants that provide no benefit to crops at any application rate. Waste must be treated to reduce or remove these pollutants prior to land application.

576 *Id.* §§ 122.44(i)(1), 122.41(j)(1).

577 Erickson Report, *supra* n.18 at 10–11.

must use this information to create ELGs that prohibit practices known to cause discharges and control all pollutants and pathways of concern. Further, EPA must maximize pollution controls by subcategorizing the CAFO industry such that facilities generating and handling the largest amounts of dangerous waste and those sited in geographically vulnerable locations are subjected to the most stringent controls. Anything less is contrary to the CWA and undermines EPA's mission to protect human health and the environment.

Respectfully submitted,

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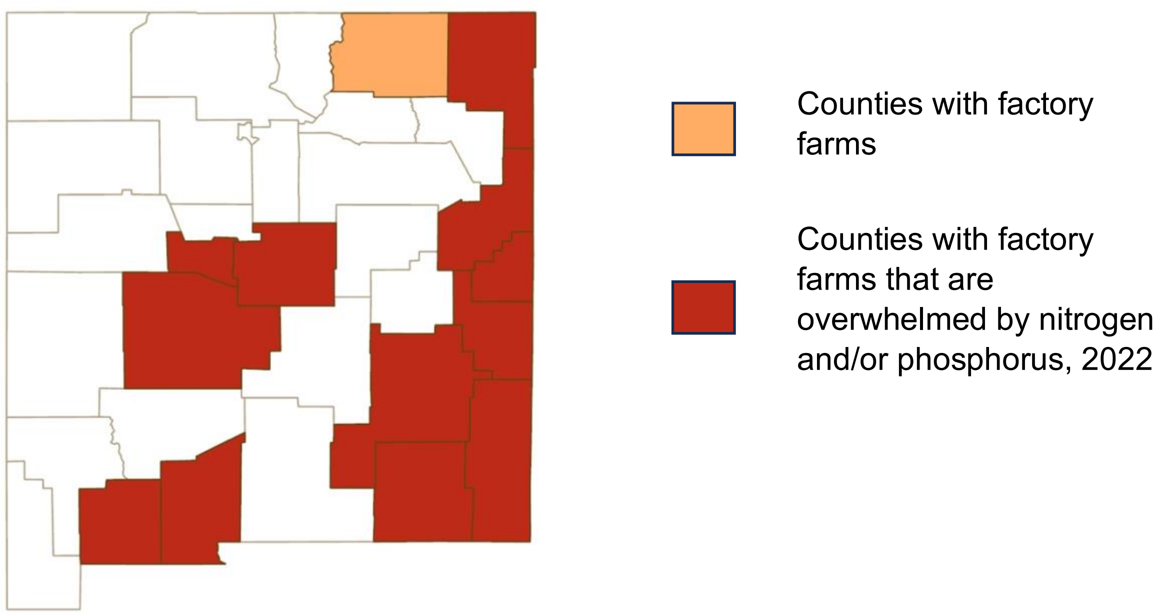
EXHIBIT 2

Factory Farm Manure Is Overwhelming New Mexico

Food & Water Watch (FWW) calculated county-level nitrogen and phosphorus excreted in manure from livestock on factory farms in 2022, across New Mexico's counties. In total, 12 out of 13 New Mexico counties with factory farms are overwhelmed by nitrogen and/or phosphorus from factory farm manure, lacking available cropland to absorb it all, even in an extremely unrealistic spreading scenario where factory farms have access to every available acre of cropland for nutrient application (see Fig. 1). These data suggest that New Mexico cannot possibly recycle manure nutrients, even under ideal spreading scenarios.

Fig. 1: New Mexico Is Overwhelmed by Factory Farm Nitrogen and/or Phosphorus, 2022



These Data Underestimate the Magnitude of the Problem

These calculations reflect the total assimilative capacity of cropland in a county, given current rates of synthetic nitrogen and phosphate application, and assuming that factory farms have access to the vast majority of crop acreage for manure disposal. They reflect hypothetical conditions, where each pound of nutrient generated on factory farms is deposited on cropland exactly where needed within the same year and at agronomic rates. In practice, obviously factory farms do not have access to every field capable of absorbing nutrients, much less at the exact time they are needed for crop growth.

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In fact, the U.S. Department of Agriculture (USDA) found that in 2012, most medium and large potential concentrated animal feeding operations (CAFOs) lack sufficient land to assimilate all nitrogen and phosphorus produced in their animal manure.[1] And even manure spread at rates and intervals based on crop needs can and does still reach waterways, including through rainfall events, soil percolation into groundwater, and volatilization and deposition, causing significant human and ecological harm.[2]

A 2024 FWW analysis using Agricultural Census data estimated that in 2022, New Mexico's beef and dairy factory farms produced 12.5 billion pounds of manure — over four times as much manure as the state's human population. Moreover, the average factory dairy farm in New Mexico confined 3,600 cows — 21 percent more than in 2017.[3] Expanding operations compounds the problems associated with manure disposal. Stockpiling manure, risky liquid manure managing methods, and poor land application rates such as spreading manure above crop nutrient requirements, spreading on environmentally vulnerable locations, spreading at a non-optimal time, and spreading too much at a time, all increase the chances that manure nutrients (and other pollutants) will reach waterways.[4] This risk is exacerbated in counties with extreme factory farm density.

Finally, these calculations do not consider manure nutrients from smaller operations, including smaller AFOs and pasture-based systems. Therefore, these figures are likely a gross underestimate of counties overwhelmed by nitrogen and/or phosphorus and are therefore significantly contributing to factory farm water pollution.

Factory Farm Data and Definitions

FWW modeled its methodology from a 2014 U.S. Department of Agriculture (USDA) report,[5] with modifications due to data availability and differing assumptions. We compiled year-end inventory data from the 2022 USDA Census of Agriculture to estimate the total number of livestock on factory farms in each New Mexico county.

We classified operations as "factory farms" if they fell into the following Census categories: 500 or more beef cattle on feed, and 500 or more milk cows.

The USDA withholds inventory figures for some counties if few operations exist (in order to protect their identifies).[6] In these instances, we used state-level data to calculate the average inventories per factory farm. We then applied the state average to each operation with withheld data.

USDA 2014 employed a calculation that used year-end inventories as well as county-level sales data, to extrapolate the total number of animals on each farm in the given year. However, county-level sales by operation size are not published in the Census for most livestock types; therefore, we used year-end inventories (as described above) as the next best proxy.

Our inclusion of only medium- and large-scale livestock operations deviates from USDA 2014's approach, which looked at animal operations of all sizes. However, smaller operations are more likely than larger ones to raise animals on pasture, where manure may be deposited in fields and therefore is less available for collection and spreading. This obviously reduces our manure production figures compared to USDA 2014's model. However, we also exclude pastureland in our analysis of county land available for manure nutrient assimilation (see below), where a sizable portion of this manure is likely to be deposited and assimilated.

Manure and Nutrient Production

USDA 2014 used different metrics for animal unit conversions, as well as livestock manure and nutrient production, depending on the Census years considered, reflecting evolving average weights in farmed animals. For both dairy cows and beef cattle, we used the variables that USDA 2014 applied to the 2002 and 2007 Census years.

We used these animal unit conversions, manure production variables, and estimates on nutrients per ton of weight wet, to calculate the total pounds of nutrients excreted in manure per animal per year (see Fig. 3). We applied these figures to our calculated livestock inventories for each county, totaling them across both dairy and beef categories, to achieve an estimate of total nitrogen and phosphorus production for the largest livestock operations for the entire county.

USDA 2014 adds a factor to account for "recoverable" manure — that which is collected from confinements and available to spread on land. It assumes that larger farms will have more efficient manure management and therefore a larger portion of its livestock manure as excreted will be recoverable. However, as the purpose of our analysis is to estimate the total nutrient load of a county, we did not apply these recoverability factors. Manure runoff can occur from many areas at a CAFO,[7] and manure that is not recovered still has to go somewhere, suggesting that manure that is unable to be collected for land spreading still enters the environment (such as when rain events wash manure from walkways and outdoor confinements into nearby fields and waterways).

Fig. 3: Pounds of elemental phosphorus and nitrogen, per animal per year, as excreted in manure

Livestock Type	Nitrogen	Phosphorus
Beef Cattle	127.09	15.49
Dairy Cows	359.99	5.32

Similarly, USDA 2014 adds an additional factor for nutrient recoverability, to account for nutrients in recoverable manure that are lost "during collection, transfer, storage, and treatment."[8] This includes "incidental" losses from manure handling and transfer, as well as volatilization of nitrogen. We exclude these recoverability factors as well, since nutrients in manure that do not reach the field for spreading still exist within the surrounding environment and contribute to total nutrient load. For instance, much of the ammonia (NH_3) emitted to the atmosphere from factory farms returns as dry and wet deposition, and studies show that the rate of deposition decreases exponentially within a kilometer of the source.[9] Thus, our analysis assumes that volatilized nitrogen will deposit in the county in which it was emitted.

Assimilative Capacity of Cropland and Pasture

USDA 2014 considered the assimilative capacity of 21 different crops, including four types of hay crop. Each crop has specific coefficients for elemental nitrogen and phosphorus assimilation, reflecting the amount of nutrients taken up by the plants and removed at harvest. These variables are based on total production (bushels/tons/bales per acre). We omitted rice, sugarbeets, and tobacco as New Mexico had no reported acreage of these crops, as well as three types of hay and grass silage not available in the 2022 Census (see Fig. 4).

Fig. 4: Pounds of elemental nitrogen and phosphorus taken up by crops and removed at harvest, per yield unit

Crop	Per-acre yield unit	Nitrogen	Phosphorus
Corn for grain	Bushels	0.84	0.18
Corn for silage	Tons	8.43	1.6
Soybeans	Bushels	3.6	0.31
Sorghum for grain	Bushels	0.84	0.18
Sorghum for silage	Tons	9	1.57
Cotton (lint and seed)	500-pound bales	12.31	2.42
Barley	Bushels	0.94	0.18
Winter wheat	Bushels	1.1	0.22
Durum wheat	Bushels	1.5	0.22
Other spring wheat	Bushels	1.5	0.22
Oats	Bushels	0.7	0.15
Rye for grain	Bushels	1.2	0.18
Peanuts for nuts	Pounds	0.04	0.003
Alfalfa hay	Tons	52.31	5.45

We compiled county-level data on crop acreage and production from the 2022 Census. Similar to livestock inventories, the Census withholds acreage and production totals for counties with few reporting farms. We followed the same methods in these instances, subtracting the acreage/production from counties that reported from the state totals, and dividing these figures by the total number of operations in counties that did not disclose, to arrive at an estimate of acres per operation in counties with undisclosed data. We then multiplied this figure by the total number of operations in each county with undisclosed data. USDA 2014 employs an “efficiency factor” for nitrogen and phosphorus spreading on cropland, reflecting the fact that a portion of nutrients spread “would be lost from the farm field with wind and water and would thus not be available for crop yield.” This is 1.2 for nitrogen on farms with good nutrient management practices (representing 83 percent efficiency in nitrogen uptake and removal), and 1.05 for phosphorus (representing 95 percent efficiency). However, our analysis is not interested in total manure needed to maintain crop production, but instead the total nutrient burden of a county. Excess nutrients that are lost to wind and water will add to the nutrient burden of the environment and therefore should be included when estimating a county's total nutrient load.

USDA 2014 also included two additional land categories: cropland used as pasture and pasture/range land, with accompanying assumptions as to the availability of land for manure transfer and spreading. However, we omitted both categories. These lands are used for grazing, most likely by the operations whose herd sizes are below those categories we considered in our study. Operations with grazing herds are unlikely to be open to receiving additional manure loads above what their grazing cattle already deposit.

Availability of Crop Acreage for Manure Spreading

USDA 2014 assumes that not all crop acreage would be available for manure spreading, due to environmental constraints like application limits from past manure or synthetic phosphorus applications, and limits to spreading on highly erodible land. USDA 2014 assumed that 20 percent of acreage on factory farms would not be available due to such limitations, based on information from agronomists working with farmers on manure management. It assumed that half of cropland on neighboring farms would not be available, due to similar constraints as well as an unwillingness to accept manure.

USDA 2014 accessed individual Census survey responses to calculate the available cropland on factory farms; any manure nutrients that exceeded the land's assimilative capacity were assumed to be made available off farm. However, the Agricultural Census does not publish this level of detail, so we were unable to make assumptions pertaining to on- and off-farm manure spreading. Instead, we used USDA's 2014 20 percent figure as a conservative estimate of total cropland unavailable due to environmental constraints and the unwillingness of neighboring farms to accept manure.

Certainly, the aforementioned environmental constraints do not prevent overspreading manure in many real-world scenarios — just as the assimilative limits of specific cropland will not prevent overspreading in many cases. Yet adjusting for these constraints can help paint a picture of total assimilative capacity in a county, under the extremely unrealistic scenario where manure is always spread at the agronomically optimal time, and at agronomically optimal rates. Our 20 percent assumption is certainly a gross underestimate of all cropland in a county unavailable for manure spreading. However, it avoids the problem of double-counting unavailable acreage, given our addition of synthetic fertilizer application used on cropland to our assimilative calculations (see next section). For example, assuming half of non-AFO cropland is unavailable for spreading, while also accounting for total synthetic fertilizer application (which would include these unavailable acres) would result in double-counting.

Synthetic Nutrient Inputs

USDA 2014 considers the ability of available crop and pastureland to absorb nutrients, without accounting for synthetic inputs already being applied to cropland. For our analysis, we included nitrogen and phosphate fertilizer application data when available. USDA's Agricultural Chemical Use Program provides periodic surveys of fertilizer application on selected crops in survey regions, gathering data directly from farmers such as percentage of crop treated, number and rate of applications, and total amount applied. We used the most recent surveys available (see Fig. 5). These covered all of the crops in our New Mexico analysis except for rye and alfalfa, which represent 0.11 percent and 32.3 percent of total cropland acreage we considered for assimilative capacity, respectively.

Fig. 5: Survey availability for fertilizer data in USDA's Agricultural Chemical Use Program

Crop	Survey Year	Crop	Survey Year
Corn (grain & silage)	2021	Winter wheat	2024
Soybeans	2023	Durum wheat	2024
Sorghum (grain & silage)	2024	Other spring wheat	2024
Cotton	2021	Oats	2023
Barley	2023	Peanuts	2023

The fertilizer data are in pounds of active ingredient. Phosphate is the compound P_2O_5, which can be converted to elemental phosphorus by dividing it by 2.3.[10] Fertilizer data are available for select states; when New Mexico was not included, we used the regional averages. For each crop with available data, we applied the total percent of cropland treated with the fertilizer in question to the total crop acreage reported by the Census, and multiplied that figure by the average application per acre. This provided a figure for total nitrogen and phosphorus applied on cropland in each New Mexico county, although it is certainly an underestimate given the gaps in data on fertilizer use.

Assimilation and Overwhelming of Nutrients

We totaled the nitrogen and phosphorus produced by factory farmed livestock in each county and added the estimated fertilizer application data. We subtracted these totals from the estimated assimilative capacity of the county's acreage of cropland considered. Counties with positive figures for either nitrogen or phosphorus were overwhelmed by manure nutrients in 2022. (A county, for instance, overwhelmed by phosphorus but not nitrogen would be considered overwhelmed by manure, as additional manure applications would only add to the phosphorus overload.) These counties face substantial risks of soil and water contamination, even when employing best practices for manure handling.

To emphasize, this reflects a hypothetical situation where all available nutrients end up precisely where they can best be utilized at the optimal time for crop uptake. In practice, manure may be spread on fields above their assimilative capacities; in other instances, manure and its nutrients may runoff from confinement operations and fields due to poor application timing or during weather events. Therefore, our analysis cannot determine how many farms are discharging pollutants due to land application of manure, nor where runoff occurs during manure storage and transfer. It is therefore likely a gross underestimate of the severity of the problem in New Mexico counties overwhelmed by manure nutrients.

Additional Figures

Fig. 6: Nearly All New Mexico Counties with Factory Farms Are Overwhelmed by Nitrogen and/or Phosphorus

County	% of Total N Assimilative Capacity*	% of Total P Assimilative Capacity*	Beef Cattle on Factory Farms	Dairy Cows on Factory Farms
Chaves	184.1%	240.8%	4,221	60,550
Colfax	-23.8%	-10.9%	5,550	0
Curry	421.6%	409.5%	8,442	70,210
Doña Ana	127.1%	205.6%	0	16,150
Eddy	-5.5%	42.6%	0	8,400
Lea	492.2%	574.9%	0	35,140
Luna	173.1%	234.0%	4,221	8,320
Quay	56.6%	37.5%	4,221	0
Roosevelt	493.2%	540.1%	4,221	66,515
Socorro	189.8%	266.5%	0	7,391
Torrance	127.8%	153.8%	0	3,695
Union	49.3%	5.0%	8,442	0
Valencia	89.7%	154.6%	4,221	3,695

**Total excess nutrients (from factory farm manure and/or synthetic inputs) as a percentage of county cropland's maximum ability to assimilate them, in 2022.*

Fig. 7: New Mexico Counties Overwhelmed by Factory Farm Manure Nitrogen, 2022

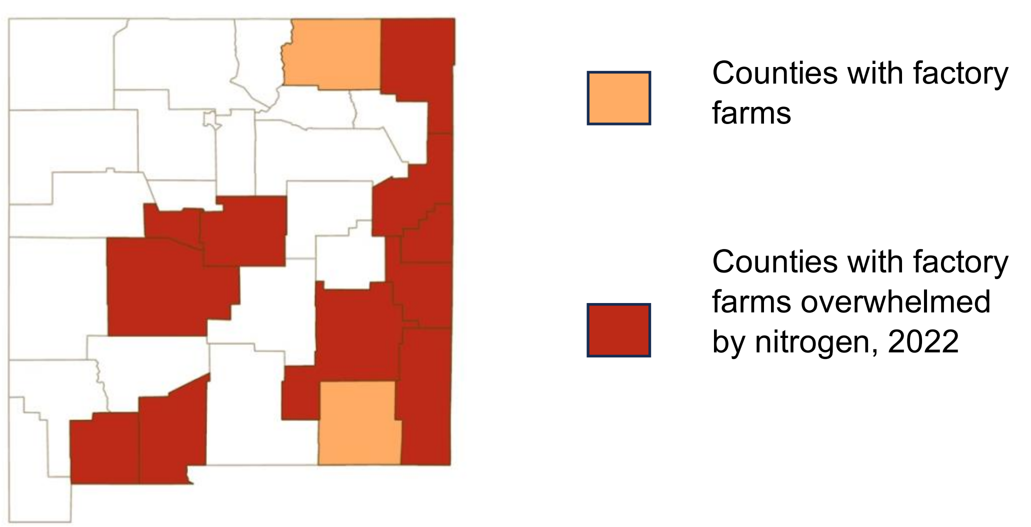
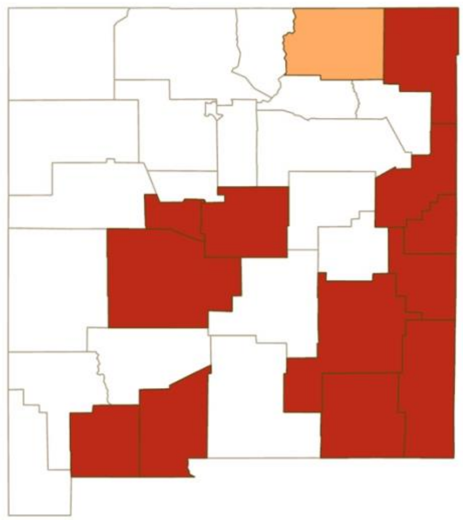


Fig. 8: U.S. Counties Overwhelmed by Factory Farm Manure Phosphorus, 2022



Counties with factory farms

Counties with factory farms overwhelmed by phosphorus, 2022

Endnotes

1 Gollehon, Noel R. et al. U.S. Department of Agriculture (USDA). Natural Resources Conservation Service (NRCS). "Estimates of Recoverable and Non-Recoverable Manure Nutrients Based on the Census of Agriculture—2012 Results." June 2016 at 18.

2 U.S. Environmental Protection Agency (EPA). Office of Research and Development. "Risk Assessment Evaluation for Concentrated Animal Feeding Operations." EPA/600/R-04/042. May 2004 at 24 to 25; Gollehon, Noel R. et. al (2016) at i.

3 For methodology, see Food & Water Watch. "Factory Farm Nation: 2024 Edition." September 2024.

4 U.S. Environmental Protection Agency (EPA). Office of Research and Development. "Risk Assessment Evaluation for Concentrated Animal Feeding Operations." EPA/600/R-04/042. May 2004 at 58 to 59.

5 Kellogg, Robert L. et al. USDA NRCS. "Estimates of Recoverable and Non-Recoverable Manure Nutrients Based on the Census of Agriculture." September 2014.

6 See U.S. Department of Agriculture. National Agricultural Statistics Service. "2017 Census of Agriculture: U.S. Summary and State Data." AC-17-A-51. April 2019 at ix.

7 EPA (2004) at 49.

8 Kellogg et al. (2014) at 42.

9 Shen, Jianlin et al. "Ammonia deposition in the neighbourhood of an intensive cattle feedlot in Victoria, Australia." *Scientific Reports*. September 2016 at 1 to 5.

10 Mullins, Gregory. "Phosphorus, Agriculture & the Environment." Virginia Cooperative Extension. Publication No. 424-029. 2009 at 8.