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Please see the attached comments on behalf of Minnesota Center for Environmental Advocacy, CURE, W. J. McCabe Chapter of the Izaak Walton League of America, and Clean Water Action.

December 12, 2024
Commissioner Katrina Kessler
Minnesota Pollution Control Agency
520 Lafayette Road N
Saint Paul, MN, 55101

VIA SmartComment

RE: *Request for Comment on the Minnesota Pollution Control Agency's Proposed PFAS in Biosolids Strategy*

Dear Commissioner Kessler,

The undersigned organizations write to applaud the Minnesota Pollution Control Agency's ("MPCA") Proposed PFAS Strategy for Land Application of Biosolids (the "Strategy"). The Strategy describes an important step towards understanding how the long-standing practice of land applying biosolids from wastewater treatment facilities ("WWTFs") may be contributing to PFAS contamination at agricultural fields, reclamation sites, and Minnesota's broader environment. Once MPCA implements the Strategy, producers and all other Minnesotans can have greater confidence that each land-application event will not pose a substantial PFAS risk to the environment and public health.

MPCA can make some targeted changes and additions to greatly improve the Strategy. The following proposed improvements are aimed at gathering additional, critical information so the WWTF and producer can make more informed decisions about whether biosolids are fit to be land-applied. First, MPCA should lower the response thresholds and representative sampling frequency to ensure fidelity with current science and so sampling accurately reflects the PFAS concentrations in the biosolids that are to be land-applied. Second, MPCA should make explicit that sampling will collect data on all 40 PFAS analytes detectable under Method 1633, and that the data MPCA collects will be publicly available upon request. Third, MPCA should require infrequent total organic fluorine testing to more broadly assess PFAS concentrations in every WWTF that land applies biosolids. Finally, MPCA should modify the Strategy to include investigations for sensitive areas and to update the biosolids manual to account for PFAS-specific risks.

I. MPCA Should Modify the Response Thresholds to Ensure the Most Current and Protective Standards for Classifying Industrially Impacted Biosolids are in Effect

The Strategy "is similar to those implemented in other states and particularly based on the Industrial Pretreatment Initiative and the studies of 42 municipal WWTFs completed by the state of Michigan," and the subsequent success of Michigan's program

in reducing PFAS contamination in WWTF effluent.[1] However, the Strategy adopts the out-of-date, discontinued 125 µg/kg of PFOA or PFOS threshold for classifying industrially impacted biosolids. The Michigan Department of Environment, Great Lakes, and Energy used this threshold when its PFAS biosolids program was updated in 2022; the Michigan environmental agency, however, revised this threshold downward in 2024 to 100 µg/kg of PFOS or PFOA.[2] Michigan has revised its threshold for classifying biosolids as industrially impacted when the scientific literature and ongoing data collection from WWTFs compels a response.[3]

Minnesota should not be left behind. Michigan lowered their industrially impacted threshold after reviewing updated science and new data on PFAS concentrations in biosolids. That Michigan was compelled to lower its industrially impacted threshold by 20% is firm evidence that Minnesota should follow suit. MPCA should modify the Strategy to adopt the most current and protective threshold for industrially impacted biosolids of 100 µg/kg. Prohibiting land application of biosolids with PFAS concentrations greater than 100 µg/kg tracks with the best available policy and science and harmonizes our regulation with Michigan's, which has been in effect since 2021. Minnesota is committed to remaining a leader in responding to the PFAS crisis. Lowering the response thresholds upholds this promise.

II. MPCA Should Tweak and Clarify the Strategy's Representative Sampling Protocols

MPCA can greatly improve the Strategy by revising the representative sample collection frequency and clarifying its scope. As drafted, the Strategy treats all WWTFs the same, regardless of their size or how frequently its biosolids are land-applied. This approach fails to recognize that each WWTF has a unique land-application program with varying numbers of spreading events each year. To truly ensure biosolids are suitable to be applied, MPCA should tweak the Strategy to require a subset of WWTFs to collect more frequent representative samples for analysis. MPCA should also clarify that each representative sample will be analyzed to the full extent of Method 1633, and that the concentrations of the 40 identifiable PFAS will be considered by the agency to be public data. Given that the Strategy's tiered response approach only uses PFOA and PFOS as

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[1] Minn. Pollution Control Agency, *Minnesota Biosolids PFAS Strategy for Land Application of Biosolids* 2 (2024), *available at* https://www.pca.state.mn.us/sites/default/files/wq-wwprm2-113b.pdf.

[2] Mich. Dep't of Envt, Great Lakes, & Energy, *Michigan Biosolids PFAS-Related Information and Links*, https://www.michigan.gov/egle/about/organization/water-resources/biosolids/pfas-related.

[3] Mich. Dep't of Envt, Great Lakes, & Energy, *Land Applications of Biosolids Containing PFAS: Interim Strategy* 6 (2022), *available at* https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Programs/WRD/Biosolids/PFAS-Biosolids-Interim-Strategy-2022.pdf.

constituents that merit responses, it is unclear whether MPCA will be collecting additional data beyond that for PFOA and PFOS. MPCA should clarify that it is indeed collecting this data, and that the data is available upon request.

A. MPCA Should Modify the Strategy to Require More Frequent Representative Sample Collection and Analysis

The Strategy currently adopts a one-size-fits-all approach for representative sample collection: Each WWTF is required to grab one representative sample each year it plans on land-applying biosolids, prior to application. This approach is shortsighted. As MPCA knows, each WWTF with a land-application program operates differently; some facilities may apply once a year, if that, while other facilities land-apply their biosolids multiple times a year. For example, the recent annual cropping reports prepared by the WWTP serving the St. Cloud area reveal that the facility spread biosolids four or five times a calendar year (November 2020, March 2021, April 2021, October 2021, November 2021). And, thanks to data recently published by the WLSSD facility in Duluth, the agency has confirmation that the concentrations of PFAS in biosolids vary significantly throughout the year.[4] As the WLSSD data reveals, PFOS concentrations over a four-month period changed over 36%, while PFOA concentrations over the same period more than doubled.[5] This data undermines the Strategy's notion that a once-a-year sampling for certain facilities can be "representative." It cannot.

To ensure that PFAS concentrations in biosolids set for land application are below the response thresholds, MPCA should modify the Strategy to require more frequent representative sample collection for certain WWTFs. One way to do this is to tie sampling frequency to whether the WWTF operates under a major or minor permit. Minor permittees, operating with an average wet weather design flow of less than 1 million gallons per day, could continue with annual sampling, as these facilities are less likely to have multiple spreading events throughout the year.[6] Major permittees, however, given their size, are more likely to have multiple spreading events during a calendar year. To ensure the representative sample accurately depicts the PFAS concentrations in the biosolids that are to be land applied, major facilities should be required to perform more frequent testing, such as quarterly. One other way is for MPCA to simply modify the Strategy to require sampling prior to every land application event. While more costly to the WWTF, this level of testing frequency provides the most clarity about the PFAS

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[4] W. Lake Superior Sanitary Dist., *"Forever Chemicals": Per- and Polyfluoroalkyl Substances (PFAS)*, https://wlssd.com/education/pollution-prevention/per-and-polyfluoralkyl-substances-pfas/.

[5] While one of the data points for the PFOA concentrations is <2 ppb, blurring the precision in this assertion, given testing thresholds, it is fair to assume that the concentration in this constituent for this sample is close to 2 ppb.

[6] During a presentation about the Strategy, MPCA staff explained that many smaller WWTPs spread biosolids less than once per year. Given this, annual testing

constituents in the biosolids and ensures the highest confidence that the PFAS concentrations in the biosolids are trace enough where they pose little or no risk. In the eyes of the undersigned, this is money well spent.

MPCA understands the need to collect high-quality representative samples. Currently, the sampling frequency for parameters traditionally of concern for biosolids increases depending on the annual tonnage applied. Under existing rules, small WWTFs may only have to test once per year while large facilities may test up to a dozen times.[7] Additional sampling may be required if sampling returns show metal rates greater than 50% of the ceiling concentration.[8] This dynamic sampling program makes sense given the unique composition of biosolids, which changes depending on the makeup of the influent the WWTF receives. MPCA should adopt a similar approach in the final Strategy; modifying the Strategy to better ensure the accuracy of the representative sample is vital to protecting producers, the broader public, and the environment from further harm from PFAS.

B. MPCA Should Make Explicit that Representative Samples will be Tested for the Complete Suite of PFAS Identifiable Under Method 1633 and that Sampling Data will be Publicly Available

MPCA should be explicit that representative sampling will assess concentrations of the 40 PFAS detectable by Method 1633, and that sampling data will be publicly available. As drafted, it is unclear whether MPCA will be collecting data on PFAS concentrations for analytes other than PFOS and PFOA, as those two analytes are the only PFAS that may trigger response actions. While the undersigned agree with MPCA's current decision to focus the Strategy on PFOS and PFOA, MPCA should clarify that representative sampling will assess the concentrations of all 40 PFAS analytes detectable under Method 1633.[9]

Collecting this broader data is extremely important for multiple reasons. Regulatory pressure has shifted PFAS production away from the long-chain legacy PFAS like PFOS and PFOA to new, shorter-chain alternatives. While short-chain PFAS are presently understood to be less toxic to human health than long-chain PFAS, short-chain PFAS are similarly persistent and bioaccumulative, the two characteristics that make PFAS so problematic.[10] As use of these newer chemicals rises, it is likely that concentrations of these types of PFAS will increase in biosolids, which is concerning

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[7] Minn. Pollution Control Agency, *Land Application of Biosolids a Manual for Minnesota*, 82 (2014), *available at* https://www.pca.state.mn.us/sites/default/files/wq-bios2-00.pdf.

[8] *Id.*

[9] Minn. Pollution Control Agency, *PFAS Monitoring Plan: Initial Findings & Next Steps* 8 (2024). Moreover, since the Strategy envisions using Method 1633 already, there are no economic or administrative barriers for collecting this information.

[10] Fan Li et al., *Short-Chain Per- and Polyfluoroalkyl Substances in Aquatic Systems: Occurrence, Impacts, & Treatment* 15 Chem. Eng'g J. 122506 (2020)

because these PFAS are more readily taken up and accumulated by plants.[11] The science may not be clear enough today for MPCA to set response thresholds for non-PFOS and PFOA analytes, but given the regulatory trendlines over the last few decades for PFAS generally, it is reasonable to anticipate response triggers for PFAS other than PFOS and PFOA in the near future.[12] Given this looming horizon, MPCA must be sure to collect as much data now to inform future regulatory decisions about PFAS.[13]

Making this data publicly available will also provide needed transparency. Producers are rightfully concerned about negative consequences that may follow if high levels of PFAS are found in their soils. By making available the complete breadth of PFAS data under Method 1633, producers will be able to make more informed decisions about whether they apply biosolids on their fields. Certain producers may not wish to apply biosolids with high levels of non-PFOS and PFOA PFAS given that future regulations may make that decision unwise. Neighbors living near fields receiving land-applied biosolids have every right to know the full swath of information about PFAS levels in the biosolids. By having access to this data, neighbors will also be able to make more informed decisions about drinking water monitoring and safety, for example. Finally, ensuring broad accessibility of this data protects the public. Data transparency is vital to advancing regulation and identifying strategies for Minnesota to respond to future threats. As MPCA recognizes, robust data is critical for gaining knowledge about where and how PFAS are entering Minnesota's environment.[14] MPCA must clarify that this data will be publicly available.

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[11] A 2013 study reported BAF/BCFs up to 203 for PFBA and up to 34.5 for PFHxA in strawberries; up to 122 for PFHpA, 316 for PFBS, 46.2 for PFHxS, and 6.57 for PFHpS in lettuce; and up to 5.6 for PFHxS in tomatoes (as cited in ITRC, 2023, section 5.6 and table 5.2). Andrea C. Blaine et al., *Uptake of Perfluoroalkyl Acids into Edible Crops via Land Applied Biosolids: Field and Greenhouse Studies* 24 Envtl. Sci. Tech. (2014).

[12] Table 1 in the *PFAS Monitoring Plan* succinctly illustrates just how swiftly and severely Minnesota has regulated six PFAS in the past two decades. While PFOA and PFOS are the most striking - between 2002 and 2024, the Health Based Value for both chemicals dropped from 7 parts per billion to well smaller than 1 part per quadrillion - concentrations deemed safe for three of the other four listed PFAS dropped significantly as well.

[13] Like the Environmental Protection Agency ("EPA") did with the Hazard Index for regulating PFAS under the Safe Drinking Water Act, MPCA may be wise to follow a similar approach to set up a response action plan for a cocktail of PFAS rather than one analyte.

[14] MPCA documents are littered with references of how data collection will inform future response efforts. *See, e.g.*, *PFAS Strategy*, *supra* note 1, at 2 (referencing influent and biosolid data collection and stating "[t]his data will inform and further prioritize source identification and reduction work"); *PFAS Monitoring Plan*, *supra* note 9, at 20 ("The MPCA committed to using the data collected through the [Municipal Wastewater]

C. MPCA Should Require Periodic Total Organic Fluorine ("TOF") Testing to Assess Broader PFAS Concerns

Considering the amount of information MPCA will collect under the Strategy, the agency should use this opportunity to require WWTFs perform TOF testing of biosolids at least once per permit cycle. This low-cost test will allow MPCA and the public to better understand the possible amount of non-target PFAS in a biosolids sample. An infrequent TOF test will help MPCA better understand what WWTFs may have broader PFAS concerns that require further, more rigorous investigation for source identification assessments and pretreatment options. Data from TOF testing should be made publicly available.[15]

1. TOF Testing Provides a Broader Perspective of the PFAS Burden in a Representative Sample

TOF testing is a useful tool in conjunction with Method 1633 to better gauge the accuracy of prior test results,[16] and to develop a broader understanding of the overall PFAS burden for a particular sample of biosolids. As MPCA knows, Method 1633 only detects a fraction of the total PFAS in a particular sample. While the scientific community is developing information about the relative toxicity of short-chain PFAS, these chemicals possess the same hallmarks that make PFOA and PFOS uniquely problematic: persistence and bioaccumulation. While TOF testing lacks the precision of Method 1633, such general information will help verify and strengthen testing protocols, and this data will potentially help MPCA set response thresholds for specific PFAS discovered through additional, chemical-specific testing.[17]

Program Plan to inform development of a regulatory framework for addressing PFAS in municipal wastewater in Minnesota.").

[15] While biosolids data is only one part of the PFAS puzzle, MPCA should consider publishing the data it collects in a centralized location similar to the EPA PFAS analytic tools webpage which provides a clearinghouse for such data for researchers and the public. *See* EPA, *PFAS Analytic Tools*, https://echo.epa.gov/trends/pfas-tools. Regularly publishing the data in an easy-to-access database will save MPCA time by preventing the need for frequent Data Practices Act requests for this information.

[16] Eurofins, *EnviroNote News, Total Organofluorine Analysis & PFAS Investigations* (Oct. 2018), *available at* https://cdnmedia.eurofins.com/apac/media/601777/environote-1080-tof.pdf (quoting 2018 PFAS National Environmental Management Plan, stating that TOF "Can be used in conjunction with a US EPA method . . . to understand the total presence of organic fluorine in a sample and compare this to the organic fluorine equivalent detected by the US EPA method").

[17] *See* Eurofins, *PFAS Testing Brochure* 3, *available at* https://sustainabilityservices.eurofins.com/wp-content/uploads/2022/10/Eurofins-PFAS-Testing-ESS003.pdf ("As PFAS

Requiring each WWTF to perform TOF testing once per permit cycle would give MPCA a consistent data set of all the organic fluorine in biosolids used in Minnesota, and to see how this data changes over time. This information would help MPCA decide when further investigation is needed due to organic fluorine spikes in particular locations that might have disproportionate negative impacts to a watershed or agricultural community.

2. TOF Testing can Show Whether Certain Samples may be at Risk for Higher PFOA/S Later

Infrequent TOF testing now will help MPCA make more informed decisions later. As described, the Strategy ties responses to concentrations of PFOS and PFOA only. Over time, however, many of the more than 14,000 known PFAS chemicals can degrade to become PFOA or PFOS, the PFAS with the most established and known toxicity.[18] Experts have referred to these non-target PFAS as "PFAS dark matter," which break down into target PFAS and contribute to overall toxicity risk beyond chemicals picked up by more specific testing.[19] Without this information on the presence of such "PFAS dark matter," it is not possible for MPCA or permittees to assess risk or how much remedial effort would be required to assure the biosolids do not contain toxic amounts of non-target PFAS.[20] Investing in TOF testing now will better inform MPCA's future PFAS regulatory and remediation efforts.

3. TOF Testing is Available Now for Biosolids

One leading lab asserts that TOF testing can be used for any liquid or solid media, including biosolids: "Eurofins has invested in automated combustion ion chromatography instrumentation to allow this analysis to be conducted for AFFF concentrates, water and solid samples such as soil, biosolids, granulated and powdered activated carbon as well as wipes or filter samples."[21] That same lab offers PFAS testing, including TOF testing, for "Tissue, biosolids and blood/serum" at this time.[22]

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chemicals contain organic fluorine, if the detected level of TOF is greater than the regulated limit of PFAS in your matrix, further analysis such as targeted PAS testing, can be used to determine which PFAS is present to help you cleanse your supply chain.").

[18] Terry Obal et al., *Total Organic Fluorine (TOF) By Combustion Ion Chromatography: A New Tool for Monitoring PFAS Impacts* 6, *available at* https://esaa.org/wp-content/uploads/2021/10/RT21-Obal.pdf.

[19] *Id.*

[20] *Id.*

[21] Eurofins, *EnviroNote News, Total Organofluorine Analysis & PFAS Investigations*, https://cdnmedia.eurofins.com/apac/media/601777/environote-1080-tof.pdf.

[22] Eurofins, *PFAS testing (Per- and Polyfluoroalkyl Substances)*, https://sustainability services. eurofins.com/services/pfas-testing-per-and-polyfluoroalkyl-substances/.

Commenters believe that the cost of TOF testing is less than a thousand dollars and uses proven technology that has been in use for some time.[23] While the Eurofins lab pricing sheets do not appear to be available online, it is our understanding that each TOF test costs approximately $350, with two testing results needed for a valid test. TOF testing is a cost-effective tool that can be put to immediate use to gather information that will inform future MPCA decisions concerning PFAS. MPCA should revise the Strategy to require each WWTF to perform TOF testing at least once every permit cycle. And MPCA should clarify that information gathered under this protocol is available upon request.

III. MPCA should Modify the Strategy to Include Investigations for Sensitive Areas

The Strategy is an important step for Minnesota to improve data collection on PFAS in biosolids intended for land application and to take a risk management approach based on tiered concentration levels of PFOS and PFOA. However, the Strategy lacks any consideration for how to assess PFAS risks in and near sensitive areas of the state that have historically received biosolids. Moreover, the Strategy does not contemplate any current monitoring of fields receiving land-applied biosolids that are located in or near areas with sensitive soils/hydrogeology. While the Strategy is correct to require that any further land-applied biosolids have low amounts of certain PFAS, MPCA must also include in the Strategy a plan for investigating whether past and present land-application events in sensitive parts of the state may have created PFAS hotspots that threaten human health and Minnesota's natural resources.

Unfortunately, there are rife examples in states like Maine, Michigan, and Texas of PFAS contamination in soils, groundwater, crops and livestock traced to biosolids land application events. These stories are shocking: farmers' livelihoods have been destroyed by the discovery of extensive PFAS contamination on their farms originating from a practice long-considered safe. To begin doing the hard work of evaluating where previous decades of land-application events may have contributed to current PFAS risks, MPCA should add a section of the Strategy to describe how it will evaluate what parts of the state should be sampled for PFAS contamination linked to historical or current land-application events. Commenters propose that MPCA use the initial year of data collection under the proposed Strategy to develop criteria for sensitive site investigations that would begin in 2026. These sensitive areas include parts of the state with sensitive soils/hydrogeology, and fields located near surface water and drinking water supplies. Commenters also propose that MPCA start a monitoring program now when Tier-3 biosolids are spread near sensitive soils or hydrology.

[23] Presentations on TOF testing available online describe other testing methods as "high cost" compared with TOF. *See Total Organic Fluorine (TOF) By Combustion Ion Chromatography, supra* note 18.

A. MPCA Should Add a Section to the Strategy to Establish a Protocol to Conduct Shallow Soil / Groundwater Investigations

MPCA should use data gathered in the first year of the Strategy to develop criteria to determine when soil and/or shallow groundwater investigations need to occur in sensitive areas that are at higher risk of PFAS contamination from current and legacy biosolids land application events.

There are several different approaches MPCA could take to establish these criteria. The first approach would be to define areas with vulnerable soils / hydrogeology where biosolids land application sites must be monitored for their impacts on soils / shallow groundwater. There are already effective tools to determine vulnerable soils / hydrogeology in Minnesota, such as the DNR Pollution Sensitivity of Near-Surface Materials map, which "estimates the time required for water to travel from the land surface; through unsaturated sediment, and finally to the water table" where the water table is assumed to be at a 10' depth.[24] DNR developed these detailed and extensive maps in response to a mandate in the Groundwater Protection Act to craft specific criteria to identify sensitive groundwater areas.[25] DNR has determined five relative classes of geologic sensitivity based on time of travel ranges, from High, where contaminants may reach the groundwater within hours to a week, to Ultra Low, where travel time is more than a year. DNR has also outlined special conditions, such as areas of karst terrain, where the method to determine transmission time could not be used but where there is a direct and rapid exchange between surface water and groundwater and a significantly increased groundwater contamination risk from surface pollutants.[26] It would be simple for MPCA to develop criteria for investigating sensitive soils and shallow groundwater using this readily available information.

A second available tool to define areas with vulnerable soils / hydrogeology is the Vulnerable Groundwater Area map created by MDA for the Groundwater Protection Rule.[27] Here, vulnerable areas are defined as coarse textured soils and shallow bedrock based on the United States Department of Agriculture's National Resource Conservation Service soils maps, and karst geology based on DNR Pollution Sensitivity of Near-Surface

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[24] Minn. Geospatial Commons, *Pollution Sensitivity of Near-Surface Materials*, https://gisdata.mn.gov/dataset/geos-hydrogeology-atlas-hg02; Minn. Dep't of Nat. Res., *Groundwater Pollution Sensitivity*, https://www.dnr.state.mn.us/waters/groundwater_section/mapping/sensitivity.html.

[25] Minn. Stat. § 103H.101 Subp. 1.

[26] Roberta Adams, Minn. Dep't of Nat. Res., *Water-Table Elevation and Depth to Water Table*, *available at* https://files.dnr.state.mn.us/waters/groundwater_section/mapping/mha/hg03_report.pdf.

[27] Minn. Dep't of Agric., *Vulnerable Groundwater Area Map*, https://www.mda.state.mn.us/chemicals/fertilizers/nutrient-mgmt/nitrogenplan/mitigation/wrpr/wrprpart1/vulnerableareamap.

Materials map.[28] This approach aligns with MPCA's Biosolids Manual, which categorizes soils based on the federal classifications of coarse texture, medium texture, and fine texture. The MDA Vulnerable Groundwater Area map and the DNR Pollution Sensitivity of Near-Surface Materials map largely parallel each other in the sensitive areas they depict. While these approaches based on highly sensitive or vulnerable groundwater areas are both compatible with MPCA's Biosolids Manual, which already has some restrictions for biosolids application to highly permeable soils to control for nitrogen loss, they also go beyond those restrictions in recognition of the distinct human health risks that PFAS poses to groundwater resources. More on this below.

Another approach that MPCA could take to establish criteria for soil / shallow groundwater investigations would be to calculate the maximum cumulative application rate (PFAS mass per unit mass of soil) that could be applied to the land surface in a single event or accumulated over multiple application events and remain protective of groundwater resources. A group of scientists attempted to do this in a 2022 study in central Illinois that used the preliminary remediation goal ("PRG") that EPA set in 2019 for groundwater contamination by PFAS: 70 ng/L for PFOA and PFOS.[29] The study then used a HYDRUS model for unsaturated water flow and PFAS transport to determine the maximum cumulative rate of biosolids that could be applied to the land surface and not exceed that 70 ng/L threshold in receptors (water supply wells) at different distances from the application site. EPA has since rescinded the 70 ng/L limit for PFOS and PFOA from 2019 for a more site-specific approach, but EPA does still have regional screening levels for PFOS, PFOA, PFNA, GenX, PFHxS, PFBS, PFHxA, and PFBA concentrations in soils.[30] In addition, MPCA listed screening levels for PFOS, PFHxS, PFOA, PFBA and PFBS concentrations in soils in Minnesota's PFAS Blueprint.[31] By using the methodology depicted in the study above, MPCA could use state or federal thresholds for PFOS and PFOA in soil and groundwater resources to determine the maximum cumulative biosolids application rate that, if exceeded, should trigger soil/shallow groundwater investigations statewide.

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[28] Minn. Geospatial Info. Office, *Digital Soil Mapping in Minnesota*, https://www.mngeo.state.mn.us/chouse/soil.html; *Pollution Sensitivity of Near-Surface Materials*, *supra* note 24.

[29] Jeff A.K. Silva et al., *Simulated Leaching of PFAS from Land-Applied Municipal Biosolids at Agricultural Sites* 251 J. Contaminant Hydrology 104089 (2022).

[30] EPA, *Interim Recommendations for Addressing Groundwater Contaminated with PFOA and PFOS*, https://www.epa.gov/pfas/interim-recommendations-addressing-groundwater-contaminated-pfoa-and-pfos.

[31] *Minn.'s PFAS Blueprint* 180-82 (2021), https://www.pca.state.mn.us/sites/default/files/p-gen1-22.pdf.

B. MPCA Should Add a Section to the Strategy to Establish a Protocol to Conduct Future Surface Water Investigations

MPCA should also develop criteria for future investigations of surface waters near land-application sites for the presence of PFAS. Mounting evidence shows that biosolids are a significant source of PFAS loading into aquatic environments. Last year, Minnesota Center for Environmental Advocacy published a report linking PFAS in surface waters to biosolids applied on nearby fields.[32] Water quality sampling revealed high levels of PFOA and PFOS in the Clearwater River, and the report explains that fields near surface waters that received biosolids "are significant sources of PFAS to watersheds in Minnesota."[33] The takeaway for MPCA is that sites receiving biosolids pose risks to nearby waters. To control these risks, MPCA should use the first year to gather data that will inform criteria for performing monitoring and sampling for surface waters near land application sites that would begin in 2026. Such criteria could include distance between a field receiving biosolids and a surface water; the number of fields receiving biosolids in a particular watershed; or the tonnage of biosolids applied in a particular watershed. Expanding the agency's PFAS monitoring to surface waters near land-application sites will help MPCA enact more precise regulations to target the key pathways these chemicals use to enter the environment.

C. MPCA Should Include Monitoring Provisions when Biosolids with PFAS Concentrations in Tier 3 are Applied on Fields with Close Proximity to Sensitive Soils / Hydrology

As drafted, the Strategy does not include any soil or groundwater monitoring when biosolids with Tier 3 concentrations of PFAS are land applied. The way MPCA intends to mitigate the risks of Tier 3 biosolids is to limit the tonnage of biosolids that may be applied in a single event. Although this approach may be reasonable for certain sites, it fails to ensure that parts of Minnesota with sensitive soils and hydrogeology are not impacted by PFAS in Tier 3 biosolids. This is especially important because while the proposed Strategy does limit the rate of land applied biosolids to 1.5 dry tons per acre under Tier 3, it does not appear to limit the frequency of applications, which would more sufficiently address the long-term potential for PFAS to leach into soils and shallow groundwater over time. To address this, the undersigned recommend that in areas of High and Moderate Near-Surface Pollution Sensitivity as defined by DNR, where contaminants may reach the groundwater within hours to a month, as well as in areas of karst, MPCA monitor biosolids land application sites that fall within Tier 3 of the proposed Strategy for soil/shallow groundwater contamination in the first year of the proposed Strategy.

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[32] Minn. Ctr. for Envtl. Advocacy, *Forever Chemicals in our Wastewater* (Nov. 2023).
[33] *Id.* at 19.

It would be straightforward for MPCA to determine areas where near-surface pollution sensitivity and biosolids land application sites overlap. DNR's Pollution Sensitivity of Near-Surface Materials map, MDA's Vulnerable Groundwater Area map, and MPCA's biosolids land application map are all digitally available through the Minnesota Geospatial Commons. Furthermore, data collection in these sensitive areas would help MPCA determine cumulative application rates that pose the greatest risk for soil / shallow groundwater contamination. MPCA could then use the exceedance of these cumulative application rates, which it will begin to collect for Tier 2 and 3 biosolids under the proposed Strategy, as a threshold for future investigations statewide. Such an approach would provide more confidence over time that sites that accept moderate levels of PFAS biosolids do not pose a risk to groundwater resources.

Other states are already doing something similar. The 2020 amendments to Vermont's Solid Waste Rules require soil and groundwater to be tested for PFAS at all certified land application sites for Class B biosolids and stabilized septage, at minimum, annually. The rules also require crops grown on certified land application sites to be tested for PFAS at the end of each five-year permit cycle. This change to the Solid Waste Rules came after a 2019 study of PFAS occurrence in shallow soils across the state where PFAS were detected in every sample, and PFOS was the dominant compound detected.[34] MPCA should modify the proposed Strategy and follow a similar approach to the one currently in use in Vermont, but with an initial focus on sensitive groundwater areas as identified by DNR. Doing so will give increased assurance to producers and the public that PFAS in biosolids are not endangering natural resources and human health.

IV. MPCA Should Evaluate Whether the Site Restrictions in the Biosolids Manual are Sufficiently Protective for PFAS

Finally, MPCA should start evaluating whether PFAS-specific criteria are needed when considering the suitability of a field to receive biosolids. Minnesota law presently restricts where biosolids can be spread for a number of reasons, such as proximity to drinking water sources and surface waters. But these general setbacks were developed to control the risks associated with non-PFAS concerns in biosolids, such as heavy metals and fecal coliform.[35] Unfortunately, PFAS do not act like traditional contaminants found in biosolids. And the chemicals' unique fate and transport mechanisms and persistence necessitates a panoply of regulations specifically targeted to mitigate and manage the dangers posed by PFAS.

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[34] Wenyu Zhu et al., *PFAS Background in Vermont Shallow Soils* (2019), *available at* https://anrweb.vt.gov/PubDocs/DEC/PFOA/Soil-Background/PFAS-Background-Vermont-Shallow-Soils-03-24-19.pdf.

[35] Commenters are aware of the setback requirements for wetlands and surface waters in Minn. R. Ch. 7401. However, given the unique characteristics of PFAS - including fate and transport, persistence, and the acute risk to human health - the standard setbacks developed years ago do not respond to the urgency of the problem.

To aid the Strategy's goal to limit the PFAS risks associated with spreading biosolids, MPCA should use the opportunity presented by the Strategy to prepare a workplan for how the agency will use the incoming data to update the biosolids manual to account for PFAS risks. One idea the agency could consider is restricting spreading events during periods of high wind. The biosolids manual and Minnesota law do not appear to cite high winds as a reason biosolids cannot be applied. Perhaps this lack of restriction is because the traditional contaminants found in biosolids are not transported by wind. But PFAS are.[36] There is also a growing body of science showing that PFAS from biosolids are taken up by plant matter and, if those plants are consumed as feed, animal products such as eggs and milk will have elevated levels of PFAS.[37] Given these concerns, MPCA may want to prohibit land application events during periods of high wind or restrict PFAS from being applied on fields used for certain agricultural purposes, such as growing forage crops. As these examples illustrate, augmenting the default rules in the biosolids manual to account for PFAS-specific risks is a critical piece in MPCA's broader biosolids PFAS-management. MPCA should use the framework and momentum of the Strategy to update the biosolids manual to restrict land application due to PFAS-specific concerns.

V. Conclusion

The Strategy is a much-needed step towards limiting PFAS contamination in Minnesota's environment, and the undersigned greatly appreciate MPCA taking action in this space. Minnesota must continue to use all available tools to blunt the present and current impacts of PFAS on the environment and public health. By adopting the above suggestions, MPCA can make the Strategy stronger and provide enhanced assurance to everyone that biosolids leaving the WWTF are suitable for land-application.

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[36] *See* Tim Schroeder, David Bond, & Janey Foley, *PFAS Soil and Groundwater Contamination* via *Industrial Airborne Emissios and Land Deposition in SW Vermont and Eastern New York State, USA*, 23 Envtl Sc. Processes & Impacts 291-301 (2021) (documenting multi-mile PFAS transport via wind); *see also* Petition from N.C., N.J., & N.M to U.S. Envtl Pro. Agency to Add PFAS Compounds to the List of Clean Air Act Hazardous Air Pollutants, https://www.deq.nc.gov/air-quality/pfas-hap-petition/open?utm_medium=email&utm_source=govdelivery (identifying multiple instances were PFAS were transported long distances by the wind).

[37] Jiuyi Li, Jing Sun, & Pengyang Li, *Exposure Routes, Bioaccumulation and Toxic Effects of Per- and Polyfluoroalkyl Substances (PFASs) on Plants: A Critical Review*, 158 Envt. Int. 106891 (2022); Clare Death et al., *Per- and polyfluoroalkyl substances (PFAS) in Livestock and Game Species: A Review*, 774 Sci. Total Envt. 144795 (2021).

Respectfully submitted,

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