ENVIRONMENTAL LAW & POLICY CENTER

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By Email

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Attn: TMDL Program
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RE: Comments on Ohio's Maumee Watershed Nutrient TMDL

Dear Ms. Kavalec:

The Environmental Law & Policy Center (ELPC) submits the following comments on Ohio EPA's Draft Maumee River Watershed Total Maximum Daily Load (TMDL).[1] ELPC is the Midwest's leading environmental advocacy organization. For more than 25 years, ELPC has been working to protect the environment and public health in the region, with a particular commitment to defending the Great Lakes.

The problem is clear: every summer (and increasingly, every fall) western Lake Erie is covered with hazardous cyanobacteria or blue-green algae blooms, imperiling drinking water, harming local economies, preventing outdoor recreation, and otherwise depriving Ohioans of their right to use and enjoy the state's greatest natural resource. The solution is also clear: reduce phosphorus, particularly dissolved reactive phosphorus (DRP), pollution into western Lake Erie by 40% from 2008 levels, around 90% of which pollution comes from agriculture.

The State of Ohio has spent nearly twenty years and vast sums of public money trying to achieve those reductions with virtually nothing to show for it. The Clean Water Act's remedy for an impaired water like Lake Erie is a TMDL, but for years, Ohio refused to prepare one, changing course only after ELPC and the Lucas County Board of Commissioners successfully sued U.S. EPA in federal court. The Draft TMDL is the Agency's final installment in a series of presentations and documents outlining its approach to preparing a Maumee Watershed Nutrient TMDL. At every turn, a broad range of commenters, including U.S. EPA, local governments, advocacy organizations like ELPC, and scientists (especially Dr. Jeffrey Reutter, who led the team that developed the underlying pollution targets), have asked Ohio EPA to fulfill its legal obligations

[1] In support of Comments 2 and 3, we attach Exhibit 1, a letter from soil scientist Dr. Julie Weatherington-Rice—who has studied the movement of contaminants in soil in Northwest Ohio for four decades—and environmental engineer Dr. Kerry Zwierschke.

and design the TMDL to succeed in cleaning up Lake Erie. These commenters have identified specific, serious defects in Ohio's approach and explained how they should be remedied.

But Ohio has not budged in the face of this feedback. The final Draft TMDL doubles down on key failures commenters have identified, including by refusing to set a target for the pollutant driving the algal bloom crisis (DRP), failing to seriously address pollution from industrial livestock operations (including by assigning CAFOs wasteload allocations), and providing no meaningful implementation plan, let alone one capable of giving "reasonable assurances" of remediating Lake Erie. Indeed, the TMDL does not even commit to hitting phosphorus targets by any given date, and gives itself a nine-year runway to simply "implement[] the practices that are expected to meet phosphorus reduction goals." TMDL at 129.[2] Instead, the TMDL just proposes to keep doing the same things that have already failed, focused on voluntary measures and incentive payments to producers.

We describe these shortcomings in the following eight comments:

(1) By failing to allocate DRP loads, the TMDL violates core legal requirements and ensures Lake Erie will not be remediated.

(2) The TMDL wrongly fails to assign wasteload allocations to CAFOs that are discharging phosphorus pollution.

(3) The TMDL wrongly fails to assign wasteload allocations to tile outlets on any fields that receive application of liquid livestock waste.

(4) The TMDL fails to apportion the Load Allocation between land use types or sub-watersheds and fails to account for anticipated increased loadings.

(5) The TMDL's 3% explicit "Margin of Safety" is orders of magnitude below what is required.

(6) The TMDL substantially understates the amount of DRP attributable to manure and other AFO waste.

[2] "Documenting improvements in water quality is important because demonstrated success, or effectiveness, is often tied to funding; further, a lack of demonstrated success can undermine the scientific credibility and hard work of the many stakeholders involved in TMDL development and implementation." The Cadmus Group, Inc. for USEPA Region 10, Recommendations for Developing TMDL Effectiveness Monitoring Plans, July 27, 2011, available at https://www.epa.gov/tmdl/tmdl-effectiveness-monitoring-data-and-plans. (Ex. 2) Note that if documents cited in these comments are included in Appendix 3 to the TMDL or available online, we are not attaching them as exhibits. Materials that are not listed in Appendix 3 or available online will be attached.

(7) The TMDL does not comply with Ohio law requiring that it establish specific implementation actions, schedules and monitoring in order to effectuate the TMDL.

(8) The TMDL fails to include reasonable assurances that nonpoint source DRP reductions will be achieved.

We ask the Agency to please remedy these defects in its Final TMDL. But if the Agency intends to stand firm and not meaningfully change the TMDL, we urge you to promptly submit it to U.S. EPA so as not to further delay the process any longer. We appreciate your thorough and thoughtful consideration of our comments and are willing to meet to discuss them at your convenience.

Comment 1: By failing to allocate DRP loads, the TMDL violates core legal requirements and ensures Lake Erie will not be remediated.

The Clean Water Act requires TMDLs to "be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." 33 U.S.C. 1313(d)(1)(C). "TMDLs shall be established for all pollutants preventing or expected to prevent attainment of water quality standards." 40 C.F.R. § 130.7(c)(1)(ii). Similarly, Ohio regulations require a TMDL to contain "[a]n estimate of the total amount of pollutants that may be added to the water of the state while still allowing the water of the state to achieve and maintain applicable water quality standards." Ohio Adm.Code 3745-2-12(a)(ii). By setting and allocating loads only for total phosphorus and not for dissolved reactive phosphorus (DRP), the TMDL violates these requirements and ensures that Lake Erie will not be cleaned up. In the words of Dr. Jeffrey Reutter, Retired Director of Ohio Sea Grant who co-led the task team that set the phosphorus reduction targets pursuant to Annex 4 of the Great Lakes Water Quality Agreement: If it does not include a DRP target, "this TMDL is doomed to failure, and we should not even waste the money to do it." Comments of J. Reutter, submitted March 6, 2023.

A. The TMDL recognizes that DRP is the primary driver of algal blooms in western Lake Erie but sets only a TP target.

Throughout the TMDL, Ohio EPA correctly concludes that DRP is driving the algal bloom crisis in western Lake Erie. DRP is phosphorus that is not attached to a particle and thus 100% bio-available for uptake by the cyanobacteria that form the algal blooms. TMDL at A1-2.[3] For example, the TMDL states:

- "These findings keep the emphasis on the DRP as the main driver of Western Basin of Lake Erie HABs." TMDL at 67.

[3] S*ee also* David B. Baker et al. (2019). Needed: Early-Term Adjustments for Lake Erie Phosphorus Target Loads to Address Western Basin Cyanobacterial Blooms, *Journal of Great Lakes Research*, 45 (2) 203–211. (Ex. 3).

- Studies from the time of Lake Erie's re-eutrophication "examined correlations between tributary nutrient loads and phytoplankton biomass. They found that increased DRP from nonpoint sources had the strongest correlation to increasing prevalence of HABs. . . . Studies since (e.g., Rowland et al., 2021) have definitively confirmed increases in DRP during this time, especially as delivered by the Maumee River system. And subsequent Lake Erie summer HABs have indeed grown with the 2011 record bloom being surpassed in 2015." TMDL at A1-1.

- "It is this elevated DRP export that the Maumee Watershed Nutrient TMDL project intends to remediate." TMDL at 23.

- "Reducing the DRP portion of total phosphorus as much as possible is an explicit goal of implementation for this TMDL." TMDL at 115.

While Ohio EPA correctly recognizes that DRP is causing the "problem," it is inconsistent with the Agency's proposed "solution": setting allocations based entirely on total phosphorus (TP). As we explained extensively in our comments to the draft Loading Analysis Plan and Preliminary Modeling Results, and reiterate here, TP is a not a proxy for DRP. DRP allocations are essential to the Maumee River watershed TMDL's success and to its legal sufficiency.

B. Cleaning up Lake Erie requires achieving both the DRP and TP Annex 4 targets.

Setting (or achieving) TP load allocations alone will not achieve the necessary DRP load reductions. DRP makes up only about 20% of the TP load; particulate phosphorus (PP) is the rest.[4] DRP is 100% bioavailable, and PP is 25–50% bioavailable.[5] This means that "various combinations of DRP and PP [loads] can reach the 40% reduction in TP but have vastly different effects on the total bioavailable phosphorus."[6] In addition, as the TMDL recognizes, practices that reduce particulate phosphorus losses—especially no-till—do not reduce DRP losses and may even make them worse. TMDL at 44.

Past trends bear this out. As the TMDL acknowledges at pages 22 to 23 and in Figure 8, TP concentrations and loading have slowly decreased since the early 1990s. However, DRP concentrations and loads increased from the 1990s through around 2006 and have not declined since. TMDL at 22. This demonstrates empirically that decreases in TP do not necessarily equate to similar decreases (or any decreases at all) in DRP. And, because the increase in bioavailable

[4] *Id.* at 206.
[5] Annex 4 Objectives and Targets Task Team Final Report to the Nutrients Annex Subcommittee, May 11, 2015, at 2, available at https://binational.net/wp-content/uploads/2015/06/nutrients-TT-report-en-sm.pdf. (Ex. 4).
[6] *Id.*

DRP corresponds to the period of Lake Erie's re-eutrophication, the focus should be on reducing DRP concentrations and loads. [7]

The Annex 4 Task Team understood the importance of bioavailability when it set both TP and DRP targets. The Team recommended that the spring load from the Maumee River be no greater than 860 metric tons TP and 186 metric tons DRP.[8] Of the two parameters, the Annex 4 Task Team recognized that DRP was the most important target for reduction, but that both targets were necessary to achieve its goal of mild algal blooms 90% of the time.[9] Task Team co-lead Dr. Reutter reiterates this in his comments on the TMDL submitted March 6, 2023, emphasizing that reducing DRP by at least 40% is essential to meeting water quality goals.

C. By failing to set DRP load targets, the TMDL will result in a violation of applicable water quality standards.

As noted earlier, the Clean Water Act requires TMDLs to be "established at a level necessary to implement applicable water quality standards." 33 U.S.C. 1313(d)(1)(C).[10] If the TMDL is *not* set at this level, U.S. EPA cannot approve it.[11] Ohio's water quality standards dictate that all surface waters be: "[f]ree from substances entering the waters as result of human activity in concentrations that are toxic or harmful to human, animal or aquatic life or are rapidly lethal in the mixing zone." and "[f]ree from nutrients entering the water as a result of human activity in concentrations that create nuisance growths of aquatic weeds and algae."[12] At present, western Lake Erie is not attaining these standards due to DRP pollution. TMDLL at 12.[13] By targeting only TP and not DRP, the TMDL cannot and will not remediate those impairments, violating the core legal requirement to be "established at a level necessary to implement the applicable water quality standards." 33 U.S.C. 1313(d)(1)(C).

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[7] Baker, D.B., Confesor, R., Ewing, D.E., Johnson, L.T., Kramer, J.W., Merryfield, B.J. (2014). Phosphorus loading to Lake Erie from the Maumee, Sandusky and Cuyahoga rivers: The importance of bioavailability, *Journal of Great Lakes Research*, 40 (3) 502-17. (Ex. 5).

[8] Annex 4 Objectives and Targets Task Team Final Report to the Nutrients Annex Subcommittee, May 11, 2015, at 2, available at https://binational.net/wp-content/uploads/2015/06/nutrients-TT-report-en-sm.pdf. (Ex.4).

[9] *Id.*

[10] Federal regulations and state law contain the same requirement. See 40 CFR 130.7(c)(1); R.C. 6111.561(B).

[11] "No TMDL will be approved if it will result in a violation of water quality standards." USEPA, Guidance for Water Quality-based Decisions: The TMDL Process, April 1991, at 32, available at https://www.epa.gov/sites/production/files/2018-10/documents/guidance-water-tmdl-process.pdf. (Ex. 6)

[12] Ohio Adm.Code 3745-1-04(D) & (E).

[13] The recreation and public drinking water supply uses of the western Lake Erie basin are impaired due to harmful algal blooms, which produce toxins such as microcystin. The western Lake Erie shoreline and islands shoreline assessment units are impaired for aquatic life use due to nutrients. *See* Final Loading and Analysis Plan, Ohio EPA, 2022, at 16. (Ex. 7).

D. Setting DRP allocations is required for successful and accountable implementation planning.

Setting DRP allocations is also a prerequisite to implementation. The TMDL itself recognizes that "[r]educing the DRP portion of total phosphorus as much as possible is an explicit goal of the implementation plan for this TMDL" (TMDL at 115), but then fails to set numerical DRP allocations to ensure accountability in meeting that goal. Under Ohio law, the TMDL implementation plan must establish *specific actions, schedules and monitoring* proposed to effectuate the TMDL.[14] Underlying this accountability framework is the understanding that TMDLs operate like a pollution "budget"—they are intended to quantify the amount of pollution a water body can receive and still meet water quality standards. And, if you are on a budget, you have to know how much is in your account before you can plan your spending or track your progress. This is particularly true because practices that reduce losses of attached P (and thus TP)—particularly, no till—do not reduce DRP losses and can actually make them worse.

E. Ohio EPA cannot blame its failure to allocate DRP on its choice of model.

Ohio EPA claims that it cannot use its preferred modeling method, the mass balance method, to allocate DRP loads. TMDL at 17. But in the Final Loading and Analysis Plan for the TMDL last year, that agency recognized that it could have reasonably arrived at the opposite conclusion:

> Most of the phosphorus exported from the Maumee watershed network occurs during high flow periods. Baker et al., 2014a calculated 76 and 86 percent of the DRP and particulate phosphorus, respectively, is exported at high stream flows (i.e., during the 20 percent of the time with the highest flows). Therefore, it could be argued that during high flows DRP could be treated as a conservative parameter and conservative mass balance means of accounting for the parameter in this TMDL may be acceptable.[15]

Ohio EPA ultimately rejected this "acceptable" approach because of supposed uncertainty about how "in-stream processes"—particularly the degree to which DRP is adsorbed to sediment as it moves through the watershed—affects the DRP loads and levels. TMDL at 65. But whatever level of uncertainty in-stream processes create, it does not come close to the uncertainty (or the legal inadequacy) created by ignoring DRP completely and allocating only the TP load. Irrespective of any in-stream processes, reducing DRP loads by 40% would at least come close to achieving water quality standards while reducing only TP loads by 40% would certainly not.

In any event, in-stream processes do not appear to be substantially impacting the DRP loads driving the algal blooms. First, as noted in the above quote, in-stream processes are less relevant to DRP loads during high-flow events, which provide the vast majority of phosphorus export. See also TMDL at 65 (instream processes may not be "of prime concern for this project" because of how

[14] Ohio Adm.Code 3745-2-12(A)(2)(a)(iv)(f)(emphasis added). *See also infra* Comment 7.
[15] Ohio EPA, Final Loading and Analysis Plan, 2022, at 3128 – 29.

much phosphorus loading occurs during high flow periods). Second, sediment loads have been declining (in large part due to adoption of conservation tillage), and the less in-stream sediment there is to adsorb DRP, the more conservative DRP becomes as a parameter. See TMDL at 40. Moreover, in-stream processes also affect the amount of TP; every time soil particles with attached phosphorus settle into a stream bed the amount of TP is reduced but the Agency has no hesitancy about using the mass balance method to set TP loads.

Finally, both DRP and TP are extensively monitored across the watershed.[16] As noted in the TMDL at page 21, "[w]ith this wealth of sampling data, relatively straightforward analytical methods are carried out to calculate daily loads and [flow-weighted mean concentrations]." We are simply asking the Agency to use this wealth of data for DRP as well as TP because doing so is necessary for the TMDL to comply with the Clean Water Act and have any hope of remediating Lake Erie.

Comment 2: The TMDL wrongly fails to assign wasteload allocations to CAFOs that are discharging phosphorus pollution.

A "wasteload allocation" (WLA) is "the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution."[17] Regulations require TMDLs to include "the sum of the individual WLAs for point sources."[18] WLAs must then be "incorporate[ed] into [those point sources'] NPDES permits."[19] Such incorporation is a primary mechanism for ensuring that TMDL targets are met.[20]

The TMDL recognizes that CAFOs are "defined as point sources" in the Clean Water Act. TMDL at xxi, 107, 113. [21] The TMDL nevertheless fails to assign CAFOs wasteload allocations. *Id.* The TMDL's rationale is that CAFOs supposedly are not discharging pollutants other than in the form of "agricultural stormwater runoff," which is an exception to the definition of "point source" in the Clean Water Act. *Id.*

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[16] *See* Ohio Lake Erie Commission, *Expanded Lake Erie Tributary Monitoring*, November 2020, at 14, https://lakeerie.ohio.gov/static/Water_Monitoring_Summary/Expanded_load_monitoring_report_2020_FINAL.pdf. (Ex. 8).

[17] 40 C.F.R. 130.2(h); Ohio Adm.Code 3745-33-01(W)(1) (same).

[18] 40 C.F.R. 1302.2(i).

[19] 40 C.F.R. 130.7(a).

[20] *See* U.S. EPA Guidelines for Reviewing TMDL's under Existing Regulations issued in 1992 (May 20, 2002) ("EPA TMDL Guidelines") (Ex. 9).

[21] A CAFO is an "animal feeding operation" or AFO – meaning a facility where animals are "stabled or confined and fed or maintained" for at least 45 days per year on land where crops are not grown – that either: (a) has at least 750 dairy cows, 2500 hogs or the equivalent of other animal types ("Large CAFO"); or (b) meets the legal definition of "Medium CAFO" (discussed in sub-part E of this Comment 2) or is "designated" as a CAFO by U.S. EPA or Ohio EPA because of its particular characteristics. Ohio Adm.Code 903.01(C), (F), (M), (Q); 40 C.F.R. 122.23(b)(1), (2), (4), (6), (9).

This position is incorrect as a matter of fact and law.[22] As shown below, CAFOs that apply liquid waste to tile-drained fields—which include all or nearly all dairy and hog CAFOs—are, in fact, discharging to waters of the state and those discharges do not qualify as "agricultural stormwater runoff." Indeed, some CAFOs have been caught directly discharging, in some cases repeatedly, and Ohio EPA has not assigned them wasteload allocations in the TMDL. This comment applies not only to "Large CAFOs," which currently operate under permits from the Ohio Department of Agriculture, but also to "Medium CAFOs," which the State of Ohio does not regulate or even track.

A. CAFOs that spread liquid waste on tile-drained fields are discharging.

"Discharge of a pollutant or pollutants" means "any addition of any pollutant to waters of the state from a point source."[23] "Point source" is defined to include, *inter alia*, a "concentrated animal feeding operation."[24] CAFO "discharge" may come from the facility's production area or from fields that receive applications of CAFO waste. "The discharge of manure to waters of the state from a facility as a result of application of that manure by the facility to land application areas is a discharge from that facility subject to NPDES requirements except where it is an agricultural stormwater discharge."[25] "Agricultural stormwater discharge" is defined as:

> runoff generated by precipitation that drains over terrain used for agriculture as defined in section 1.61 of the Revised Code that conveys manure to waters of the state, provided that the manure has been applied in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of nutrients in manure in compliance with the best management practices set forth in Chapter 901:10-2 of the Administrative Code.[26]

Land application of manure and other liquid CAFO waste (urine, sileage leachate, milkhouse waste, wash water, etc.) to tile-drained fields in the Maumee River watershed inevitably causes a "discharge" under this definition (and, as explained in the next section of this comment, is not subject to the agricultural stormwater runoff exemption). The attached letter (Exhibit 1) from soil scientist Dr. Julie Weatherington-Rice—who has studied the movement of contaminants in soil in Northwest Ohio for four decades—and environmental engineer Dr. Kerry Zwierschke explains how such discharges occur, providing extensive scientific support:

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[22] This position is also contrary to U.S. EPA's direct request that "OEPA characterize existing phosphorus loads from this point source sector, and establish allowable loads for all 76 identified CAFOs, including related production and land application areas, in the wasteload allocation portion of the forthcoming TMDL." Comments of U.S. EPA to PMR at 4, dated Aug. 17, 2022.
[23] Ohio Adm.Code 3745-33-01(D)(2).
[24] *Id.* at 3745-33-01(P)(2).
[25] *Id.* at 901:10-2-14.
[26] *Id.* at 901:10-1-01.

- The watershed was formerly a swamp. The land became arable only after people started installing subsurface drainage systems in the 19th century. These systems now pervade agricultural fields across the watershed.

- Subsurface drainage systems draw moisture from the top layers of the soil down into plastic (formerly clay) pipes, which empty into roadside ditches or streams (ultimately flowing into the Maumee River).[27]

- The predominant soil types in the watershed feature extensive fractures (e.g., cracks, earthwork burrows, root holes) that create preferential flow paths from the top layers of the soil down to the tile lines and below.

- Liquid CAFO waste—including dissolved nutrients and contaminants like DRP—applied to tile-drained fields behaves exactly like water; some portion of it immediately begins to flow down through the preferential flow paths in the soil into the subsurface drainage system, and ultimately into surface waters.[28]

The TMDL acknowledges the underlying scientific dynamic. It states that soils in the Maumee watershed have "poor soil structure," "large deep fissures and cracks," and "compaction problems," which means they are not readily "infiltrated" by "surface water and dissolved nutrients"; instead, those substances "travel through fissures, cracks, and macropores (preferential flow), and they flow out through subsurface drains or tiles." TMDL at 6. The TMDL nonetheless discounts DRP loss through subsurface drainage because "current nutrient management standards" and state law and regulations supposedly include "requirements aimed to reduce the risk of these discharge events." TMDL at 33. The TMDL identifies these supposed "requirements" as "tillage

[27] All of these waters – including the ditches that connect to natural surface or underground waters – are "waters of the state." See R.C. 6111.01(H) ("[W]aters of the state" means "all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and other bodies or accumulations of water, surface and underground, natural or artificial, regardless of the depth of the strata in which underground water is located, that are situated wholly or partly within, or border upon, this state, or are within its jurisdiction, except those private waters that do not combine or effect a junction with natural surface or underground waters.").

[28] Ohio's Nutrient Management Standard (Code 590)—modeled on the standard set by the U.S. Department of Agriculture's Natural Resources Conservation Service—also recognizes the problem:

> When applied to fields with subsurface drains, the liquid [manure] can follow soil macropores directly to the tile drains creating a surface water pollution hazard from direct tile discharge. A field is considered subsurface drained if 1/3 or more of the field is subsurface drained; however, ***even a field with one subsurface drainage line may present a risk of manure/wastewater movement to subsurface drains and cause a direct discharge***.

Natural Resource Conservation Service, Conservation Practice Standard, Nutrient Management, Code 590 (Ohio Code 590 (2020), p.6 (emphasis added) (Ex. 10).

to disrupt macropores, blocking tile lines to prevent discharge, limiting the volume of liquid waste that can be applied, prohibitions for snow covered/frozen ground, restrictions on soil water content, and more." TMDL at 33.

But just because these practices "aim to reduce the risk" of discharges through tiles does not mean they actually do so, and the TMDL cites no evidence indicating that they reliably have that effect. And as Dr. Weatherington-Rice and Dr. Zwiershke explain, these practices are not remotely sufficient to stop discharges from applying liquid waste on tiled fields. Tillage is only marginally and occasionally helpful. It is also not required. Ohio Department of Agriculture regulations do not include any incorporation requirements except for when land is frozen or snow-covered, or when phosphorus applications are being made at extremely high rates (between 250-500 pounds per acre).[29] See Ohio Adm.Code 901:10-2-14(E)(3) and (G). Tile blockers or plugs are not required and only delay the inevitable, since the drainage systems have to empty eventually to keep operating (plugs also frequently fail or "blow out" with strong rains).

Limits on waste volume are excessively generous and do not prevent discharges because some portion of virtually any liquid waste application will find its way to preferential flow paths. As noted by Dr. Weatherington-Rice and Dr. Zwiershke, Ohio Adm.Code 901:10-2-14 (Appendix B) erroneously assumes that dryer soil can safely tolerate liquid manure applications. In fact, fractures and macropores described in Exhibit 1 are fully present on dry soil in this watershed and they convey liquid manure directly into the tile lines, even at specified application rates. Exhibit 11, an ODA Pollution Compliant Intake Form regarding a CAFF called MVP Dairy, illustrates this point. The CAFF applied liquid waste below the maximum rate in Appendix B but still caused a discharge of "discolored" liquid at a tile outlet that killed fish.

The remaining practices highlighted in the TMDL do not address the problem either. Restrictions on applying waste to frozen/snow-covered ground are, by definition, inapplicable when ground is *not* frozen or snow-covered (which is when applications should occur anyway). And "best management practices" like buffer strips, setbacks, and cover crops, do not address the problem at all, while no-till and injection can make it even worse. Ex. 1.[30]

The failure of currently required practices to stop DRP loss through the tiles shows up in the data. Kevin King of USDA's Agricultural Research Service has been studying 40 paired fields on 20

[29] Ohio's Nutrient Management Standard (Code 590) includes some additional recommendations about incorporation for liquid manure applications on tiled fields, but they only come into play if the field has no growing crop, or it involves a "no till field where tillage is not an option." Natural Resource Conservation Service, Conservation Practice Standard, Nutrient Management, Code 590 (Ohio Code 590 (2020), p. 6-7 (Ex. 10). Moreover, Code 590 is not mandatory and is unenforceable against any facilities who decide not follows these recommendations.

[30] Dr. Deanna Osmond of North Carolina State University Extension made the same point at the 2021 *Understanding Algal Blooms: State of the Science Virtual Conference*, stating "if you've got a surface practice it's not going to be effective" at preventing phosphorus loss when DRP is flowing straight into the tiles. Presentation can be viewed https://www.youtube.com/watch?v=Exc9zfVYjRY from 2:24 to 2:58.

farms in Northwest Ohio, gathering 200 + site-years of data (surface and subsurface). His team reported that 73 ± 26% of total DRP load from studied fields was from tile drainage, meaning that DRP loss from tiles ranged from 47% up to 99% of all DRP loss to surface waters.[31] These levels of DRP loss are particularly dangerous because even "agronomically insignificant losses can be environmentally significant."[32] And of course, if required management practices were somehow sufficient to eliminate or even seriously curb DRP losses through the tiles, we would not continue to see elevated DRP levels in the most CAFO-heavy areas of the watershed.

Changing weather patterns will make controlling DRP losses through tile drains even more difficult and make continued application of liquid CAFO waste even more dangerous. The TMDL cites Williams and King (2020) addressing "implications of changing hydrology on phosphorus export in the Maumee watershed." TMDL at 50. That study notes that even though some conservation practices may have increase infiltration and water holding capacity in the watershed:

> ***increased rainfall occurring via more extreme events (in relatively shorter periods of time) overwhelms the overall watershed water storage capacity***. The authors say this can directly increase DRP concentrations due to increased time with wet conditions. Therefore, many activities intended to address water management, especially subsurface tiling, play a role in facilitating increased DRP export.

TMDL at 50 (emphasis added).

The Williams and King study further rebuts the TMDL's assumption that current CAFO management practices reliably, let alone *always*, prevent discharges following application of liquid waste to tiled fields. That assumption becomes even less defensible given the continually increasing number of CAFOs and AFOs using liquid waste systems in the watershed. See TMDL App'x 3 at A3-6.

B. CAFO discharges resulting from application of liquid waste to tile-drained fields do not qualify as "agricultural stormwater runoff."

The TMDL repeatedly states that to the extent CAFOs discharge any pollutants, those discharges qualify as "agricultural stormwater," which means that the CAFOs do not require wasteload allocations (or NPDES permits). TMDL at 107, 113. That is incorrect for three independent reasons. **First**, the agricultural stormwater exemption applies only to "runoff generated by precipitation that ***drains over*** terrain used for agriculture."[33] The discharges that result from application of liquid waste to tiled fields, however, are not "generated by precipitation that drains over" agricultural terrain during rain events; they result from pollutants flowing directly down

[31] King, *Instrumentation, Measurement and Findings from the USDA-ARS Edge-of-Field Research Network* slide 7 (Ex. 12).
[32] Kleinman, *Tile drained fields receiving manure; dealing with phosphorus losses*, slide 2 (Ex. 13).
[33] Ohio Adm.Code 901:10-1-01(emphasis added).

through the soil even during dry weather into tile lines, which then inevitably—and by design—empty into waters of the state.

The "drains over" language limits the agricultural stormwater runoff exemption to pollutants in overland sheet flow that is driven directly off of fields by rain, which is commonly understood as "runoff." Because the risk of such runoff cannot be eliminated but only mitigated, the exemption provides a safe harbor for operators who adequately mitigate by following proper site-specific nutrient management practices. It does not make sense to extend that safe harbor to CAFOs that spread liquid waste on tiled fields because it is entirely predictable that at least some of that waste will end up in surface waters. Discharges under these circumstances are not accidental or unforeseeable; they also do not result from the vagaries of the weather and are not "generated by precipitation." Rather, such discharges are the inevitable result of human-made drainage systems doing precisely what they are designed to do – pulling liquid from the top portions of the soil and delivering it to the waters of the state.

Second, the agricultural stormwater exemption applies only if nutrients are "applied in accordance with site specific nutrient management practices that ***ensure*** appropriate agricultural utilization of nutrients."[34] By definition, however, nutrients in liquid waste that flow rapidly into the tile lines are not subject to ***any—***let alone "appropriate" —"agricultural utilization." And as explained above, standard "nutrient management practices" like buffers, setbacks, injection, or no-till do not curb the flow of nutrients into the tiles (indeed, the latter two practices can make the problem worse). Consequently, if a field is significantly tiled, following "site specific" practices that "ensure appropriate agricultural utilization of nutrients" would necessarily require not applying liquid waste onto it.

Third, many if not most CAFOs cannot satisfy the "site specific nutrient management practices" requirement because they spread waste on fields that are already overloaded with phosphorus. According to the Tri-State Fertilizer Recommendations, there is "no agronomic reason to apply fertilizer" when soil test phosphorus (STP) levels exceed crop "maintenance limits," which for corn and soybeans is 40 ppm on the Mehlich-3 scale (equivalent to 29.6 or 30 ppm on the Bray-P1 scale).[35] But ODA regulations do not prohibit CAFOs from applying waste above the phosphorus maintenance limit. It is true that *manufactured* phosphorus cannot be applied above Bray1 40 ppm, but phosphorus from manure is not similarly restricted. *See* Appendix E Table 2 to Ohio Adm.Code 901:10-2-14. Indeed, ODA regulations expressly provide "recommended" application rates for STP ranges above 40 ppm—all the way up to 150 ppm. *See id*. Only once soil test phosphorus levels hit 150 ppm are CAFOs no longer allowed to apply additional non-synthetic phosphorus. *Id.* As a result, CAFOs routinely apply waste beyond maintenance limits, as is

[34] Ohio Adm.Code 901:10-1-01(emphasis added).
[35] OSU Extension, et al., *Tri-State Fertilizer Recommendations for Corn, Soy, Wheat & Alfalfa* (2020) at pp. 25, 27-28 (https://www.canr.msu.edu/soilfertility/Files/Main-page/FINAL%20PRINT.pdf) (Ex. 14).

illustrated by the Manure Management Plans in multiple recently approved ODA Permits.[36] This practice in unsurprising given how just much waste CAFOs concentrate and how expensive that waste is to transport.

A 2015 decision by the Ohio Court of Appeals supports our position and demonstrates that the agricultural stormwater exemption should be narrowly construed to serve its purpose. In *State v. Brennco, Inc.*, No. 1-14-24, 2015 WL 509665 (Ohio Ct. App. Feb. 9, 2015) (attached as Ex. 15), the Court of Appeals held the exemption did not cover a discharge through a tile outlet following livestock waste application, even though the operator claimed that prior precipitation contributed to the waste leaving the field surface:

> We think the real issue is not whether the discharges occurred during rainfall or were mixed with rain water run-off, but rather, whether the discharges were the result of precipitation. Of course, all discharges eventually mix with precipitation run-off in ditches or streams or navigable waters so the fact that the discharge might have been mixed with run-off cannot be determinative.

Id. at *8.

In sum, CAFOs that apply liquid waste to tile-drained fields are point sources discharging to waters of the state and those discharges are not subject to the agricultural stormwater runoff exemption. Such CAFOs require wasteload allocations in the TMDL.

C. "Medium CAFOs" that apply liquid waste to tiled fields (which are currently unregulated) also require wasteload allocations.

This comment applies to all Large CAFOs (which are permitted as "Concentrated Animal Feeding Facilities" (CAFFs) by the Ohio Department of Agriculture) to the extent they apply liquid waste to tile-drained fields. It also applies to at least a substantial portion of all medium-sized AFOs (200-699 mature dairy cows or 750-2,499 swine weighing more than 55 lbs) engaging in that waste disposal practice.[37]

A medium-sized AFO is considered a point source that needs a NPDES permit and a wasteload allocation in a TMDL if it meets the definition of "Medium CAFO."[38] That definition is met if a medium-sized AFO "[d]ischarges pollutants into waters of the United States through a ditch

[36] See Ex. 16 at PDF 180-200; 200-76 (Draft Permit for NASA Farms, LLC); Ex. 17 at PDF 156-159; 160-186 (Draft Permit for Zeedyk Swine Farm); Ex. 18 at PDF 170-185; 221-318 (Draft Permit for Continental Dairy).
[37] See Ohio Adm.Code 903.01(Q) (animal unit numbers for "medium concentrated animal feeding operation"); 40 C.F.R. 122.23(b)(6) (same).
[38] See 40 C.F.R. 122.23(a) & (d)(1); Ohio Adm.Code 3745-33-02(A).

constructed by humans, a flushing system constructed by humans, or another similar device constructed by humans."[39]

Because the Ohio Department of Agriculture requires Permits to Install/Operate only for Large CAFOs/CAFFs, we have no official count of how many medium-sized AFOs exist in the watershed. At present, they are completely unregulated. A 2022 analysis by the Environmental Working Group, however, indicates there are more than 2200 of them in the Western Lake Erie Basin. *See* Ex. 19.

We do know, however, that at least some—and potentially a substantial portion—of those medium-sized AFOs meet the definition of "Medium CAFO." For the reasons explained above, when medium-sized AFOs apply liquid waste to fields with subsurface tile drainage, at least some of that waste will flow directly into the tile lines and not constitute "agricultural stormwater runoff." Those tile lines inevitably discharge into ditches (which flow into streams or rivers) or streams or rivers themselves, many, if not most, of which would qualify as "waters of the United States."[40] The subsurface drainage systems and any ditches into which they drain are unquestionably "constructed by humans" or "man-made." Consequently, medium-sized AFOs in the Maumee River watershed that spread liquid manure and other waste on tile-drained fields meet the definition of "Medium CAFO." Just like Large CAFOs that engage in that waste disposal practice, such facilities are point sources that require wasteload allocations in the TMDL.

D. The TMDL also wrongly fails to assign wasteload allocations to CAFOs that the State of Ohio has caught discharging.

As explained in Comment 3, the TMDL wrongly fails to assign WLAs to CAFOs that are discharging by applying liquid waste to tiled fields. Regardless of whether they require WLAs for that reason, at least the following eleven CAFOs/CAFFs have been caught discharging by the State of Ohio, sometimes more than once.

Name of Facility	**Date of Discharge/Pollution to Waters of the State**
1. Continental Dairy	10/9/2020
Continental Dairy	8/3/2021
Continental Dairy	8/5/2021
2. Gina Dairy	10/15/2021
3. Jeff & Alan Ricker Swine	11/8/2019
4. MVP Dairy	9/12/2019
MVP Dairy	1/3/2022
5. Rose Grove Farm	11/29/2017

[39] Ohio Adm.Code 903.01(Q). See also 40 C.F.R 122.23(6)(i)(A) ("Medium CAFO" is an AFO of requisite size where "[p]ollutants are discharged into waters of the United States through a man-made ditch, flushing system, or other similar man-made device.").

[40] The definition of "waters of the United States" is currently before the Supreme Court in Sackett v. United States Environmental Protection Agency, 8 F.4th 1075 (9th Cir. 2021), *cert. granted* Jan. 24, 2022.

6. Spitnale Pigs	3/6/2019
Spitnale Pigs	7/20/2020
7. Sun Mountain Dairy	2/7/2019
Sun Mountain Dairy	8/2/2019
8. Van Erk Dairy	5/27/2018
Van Erk Dairy	7/25/2019
Van Erk Dairy	7/24/2020
9. Van Ham Dairy	5/1/2017
10. VanderMade Dairy	3/27/2018
11. Pine Valley	9/7/2021

See also Ex. 20 (supporting data on discharges). Based on these discharges alone, the above CAFFs are discharging point sources that must be given WLAs in the TMDL. The same is true for any facilities listed in Ohio EPA's spills database that, which as of the date of these comments, reflected 295 recorded spills attributed to manure.[41] As discussed in **Comment 6**, there is every reason to assume this is only a small fraction of the actual discharges and spills that are taking place. Yet the TMDL fails to assign wasteload allocations to even these CAFOs.

Comment 3: The TMDL wrongly fails to assign wasteload allocations to tile outlets on any fields that receive application of liquid livestock waste.

The Clean Water Act defines "point source" as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged."[42] As explained in the prior comment, the express inclusion of "concentrated animal feeding operation" means that CAFOs applying liquid waste to tile-drained fields are "point sources" that require wasteload allocations in the TMDL. But the same underlying facts—that at least some portion of liquid manure and other livestock waste flows directly into the tiles, which discharge them to waters of the state—means that tile outlets on fields receiving liquid waste applications themselves are point sources. Indeed, they are a perfect example of a "discernible, confined and discrete conveyance . . . from which pollutants may be discharged."

The *Brennco* case cited earlier makes this point clear. The "point source" in that case was not the hog facility itself (which may or may not have qualified as a CAFO) but rather the travelling gun applicator used to spread the waste and the tile outlet from which it was discharged, which was the State of Ohio's position: "The State maintains that the traveling gun applicator and the field tile, which directly conveyed the manure into Pigeon Run, constitute a point source."[43] Consistent with this position, Ohio EPA should ensure that the Final TMDL recognizes tile outlets on all fields in

[41] https://data-oepa.opendata.arcgis.com/maps/5684b8ecaf014901be58e8fca593050c (click on "Filter Data," select "RECOVPRODUCTTYPE," and select "Manure").
[42] 33 U.S.C. 1362(14).
[43] *Brennco*, 2015 WL 509665, at *6 (Ex. 15).

the watershed that receive liquid manure and other liquid livestock stock waste as "point sources" and assign them wasteload allocations.

Comment 4: The TMDL fails to apportion the Load Allocation between land use types or sub-watersheds and fails to account for anticipated increased loadings.

The TMDL lumps together load allocations for all nonpoint sources except home sewage treatment systems (HSTS) into a single "nonpoint source landscape load." TMDL at 108. This "nonpoint source landscape load allocation is not itemized by land use or any other means. Just one total allocation value is provided." TMDL at 108. The TMDL then applies that load allocation across the entire watershed as one total nonpoint source load without any variation by sub-watershed or land use type.

As the TMDL recognizes, however, agriculture land use type contributes at least 85% of total phosphorus load. TMDL at 72. Because they are the most heavily agricultural, the southern parts of the watershed contribute greater amounts of total phosphorus and DRP relative to the northern parts. See TMDL at 76-85. As the TMDL explains, this disparity exists in both modeled outcomes and in data from water quality monitoring stations. Monitoring data show southern areas of the watershed contributing greater TP and DRP loads and southern monitoring sites having higher flow-weighted mean concentrations of both pollutants. TMDL 79-85. Not surprisingly, the southern areas of the watershed also include the greatest numbers and concentrations of CAFOs. *See* Ex. 19.[44]

Given these disparities, achieving water quality standards will necessarily require greater reductions from the southern sub-watersheds than the from the northern ones. The TMDL should thus apportion the load allocation by sub-watershed and assign a greater share of the allocation to the sub-watersheds contributing more to the load (particularly, the Auglaize and the St. Mary's). That is especially true given that the geographical disparities are likely to grow as AFOs (including CAFOs) continue to proliferate in the southern sub-watersheds. *See* Ex. 19; *see also* Ohio Adm.Code 3745-2-12(C)(1)(b) (requiring Ohio EPA to set load allocations based on "[i]ncreases in pollutant loadings that are reasonably anticipated to occur"). Apportioning the Load Allocation by sub-watershed is also necessary for effective implementation planning; otherwise, resources and pollution reduction efforts cannot be effectively defined and prioritized. It is also only fair. When the TMDL "lump[s] all agricultural fields in the watershed together," it is effectively "shielding the bad actors and not recognizing the many good actors that are out there." Comments of J. Reutter, submitted March 6, 2023.

The Agency's excuses for using a single nonpoint source "landscape" load allocation are illogical and circular. The Agency says a combined nonpoint source load allocation is necessitated by the "nature" of its overall calculation of the nonpoint source load, which appears to be: Ohio TP load

[44] Environmental Working Group: "In the Western Lake Erie Basin, newly identified animal feeding operation hot spots produce excess manure, threatening waterways and human health" (July 28, 2022), also available at: https://www.ewg.org/research/ewg-analysis-western-lake-erie-basin-newly-identified-animal-feeding-operation-hot-spots.

target at Waterville – existing point source loads – HSTS load = nonpoint source landscape load. TMDL at 108. But there is nothing inherent in this calculation that prevents the Agency from providing additional definition within the nonpoint source landscape load, especially given that the differences in northern and southern loads is clear in measured stream data.

Ohio EPA also claims that a single "landscape" nonpoint source load allocation is necessary because of "how nonpoint source implementation actions are proposed to be carried out." TMDL at 108. This excuse shows that the Agency is looking at this issue backwards. Source contributions drive load allocations which drive implementation actions—not the other way around. That logical flow is reflected in Ohio Adm.Code 3745-2-12, which recognizes that setting load allocations for nonpoint sources begins with an assessment of existing loads and a "reasonable" expectation of whether those loads will go up, down, or stay the same.

In short, the TMDL's use of a single nonpoint source "landscape" load for the entire watershed is a mistake that conflicts with Ohio regulations and precludes TMDL implementation and achievement of water quality standards. The final TMDL should divide the load allocation by sub-watershed.

Comment 5: The TMDL's 3% explicit "Margin of Safety" is orders of magnitude below what is required.

The Clean Water Act requires a TMDL to incorporate a margin of safety "to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality."[45] Ohio EPA claims the TMDL includes a significant "implicit" margin of safety because it uses certain assumptions and methods that supposedly "conservative," including the mass balance method, which is based on actual data. TMDL at 110-11. The TMDL also adds an "explicit" margin of safety equal to 3% of the total loading capacity, which the Agency says is sufficient to "account[] for the unknown factors in both calculating baseline conditions and uncertainty in the relationship between sources receiving a load allocation and a wasteload allocation." TMDL at 112.

In fact, the 3% margin of safety is nowhere near sufficient to fulfill its statutory purpose. The primary reason for that failure stems from Comment 1 above: the TMDL's "load and wasteload allocations" are set only for total phosphorus but "water quality" is driven by DRP, which makes up only around 20% of total phosphorus and is much harder to reduce. That means there is a substantial "lack of knowledge concerning the relationship between" the TMDL's load and wasteload allocations and "water quality." A 40% reduction in total phosphorus could easily fail to result in *any* reduction in DRP and reducing DRP by 40% could require total phosphorus reductions of well over 80%. For this reason alone, if Ohio EPA insists on setting a TMDL only for total phosphorus, the margin of safety would have to be at least 40% (40% TP reduction in

[45] U.S. EPA TMDL Guidelines at 4. See also 33 U.S.C 1313(d)(1)(C) (margin of safety must "take into account any lack of knowledge concerning the relationship between effluent limitations and water quality"); 40 C.F.R. 130.7(c)(1) (same).

TMDL + 40% margin of safety = 80% total reduction). We again direct the Agency to Dr. Reutter's comments, which make a similar point.

The TP/DRP discrepancy is not the only source of uncertainty "concerning the relationship between load and wasteload allocations and water quality."[46] Others include:

- the lack of wasteload allocations for discharging CAFOs and tile outlets (Comments 2-3), which are instead wrongly included in the undifferentiated landscape load allocation;

- the failure to apportion the load allocation based on sub-watershed pollution levels (Comment 4);

- the substantial increases in rainfall, and animal numbers in the watershed since 2015 when the Annex 4 targets were established, which mean that the 40% TP and DRP reduction targets are likely too low to achieve Annex 4 water quality goals;[47] and

- the lack of numeric nutrient water quality standards in Ohio.

For all of these reasons, the TMDL's 3% explicit margin of safety is not remotely adequate to account for "lack of knowledge concerning the relationship between effluence limitations and water quality" as required by the Clean Water Act.

Comment 6: The TMDL substantially understates the amount of DRP attributable to manure and other AFO waste.

As shown in Comment 2, the TMDL wrongly denies that CAFOs are discharging non-agricultural stormwater in the watershed through subsurface tile drainage and accordingly refuses to assign them wasteload allocations. The TMDL otherwise takes every opportunity to downplay the contribution of manure and other AFO waste to DRP loads. It even refers to "fertilizers, both commercial and manure" (TMDL at 32), as if manure is always applied solely for fertilization purposes and never as a form of waste disposal.

The TMDL recognizes that direct manure discharges (including from land application areas) "do occur" but then, without explanation or scientific support, dismisses them as "irregular and infrequent" and a "small contribution to the overall load when compared to other sources." TMDL at 32-33. The TMDL appears to base this conclusion on the assumption that because direct discharges are illegal, they do not occur—or if they do, they are always caught and remedied. TMDL at 32 (describing remediation requirements). This assumption defies common sense. First, discharges are often not immediately apparent. Liquid waste that flows into tile lines does not

[46] *Id.*

[47] Dr. Reutter noted that due to climate change and increased precipitation, "the Task Team's 40% phosphorus reduction target is too low to produce HABs like those of 2004 and 2012, or smaller, 9 years out of 10." Comments of J. Reutter, submitted March 6, 2023.

typically flow out of tile outlets at or around the time of application; it can remain in the tile systems until it is flushed out by rain or snowmelt. And discoloration is not an accurate reflection of water quality; water that is laden with *E. coli*, DRP and other pollutants can look crystal clear.

Second, as the Agency acknowledges elsewhere in the TMDL, illegal discharge investigations are primarily complaint-driven (TMDL at 32); therefore, there is no reason to believe the majority of discharges are caught. Speeding is illegal; and a very small proportion of speeders are caught. But that does not mean that drivers do not speed, or that speeding is not a widespread problem. It just means that most speeders do not get caught. The same is true here, especially given CAFOs' ability to obscure what happens to their waste. The most obvious way CAFOs do that is by transferring their waste to unregulated third parties through a practice called "distribution and utilization" or D&U, which is now used for an estimated 78% of waste produced in the watershed.[48]

Moreover, unlike other point sources, who must publicly submit discharge monitoring reports, CAFOs do not have to regularly monitor their discharges. They also enjoy broad data secrecy protections, including in the legislation known as HB 7 (which the TMDL cites as an effort to help Lake Erie). That legislation purports to exempt "data or records of a person's agricultural operations or water quality improvement practice" from the Public Records Act. ORC 940.37(A). Ohio EPA has no idea how much CAFO waste is being directly discharged into waters of the state and no basis to assume that number is zero (or anything close to it).

Data from just over the border in south-central Michigan bear this out. A group called Environmentally Concerned Citizens of South Central Michigan (ECCSCM) has recorded more than *4,700* environmental violations by just 12 CAFOs between 2001-20021—and this number includes only violations formally documented by federal or state agencies.[49] ECCSCM also conducted water testing in the Raisin River and Bean Creek watersheds—both of which feed into Lake Erie—for *E. coli*, and DNA analysis for different genera of cyanobacteria, cyanotoxins, and source species DNA from Bacteroides. Of all sites tested, 85% of samples exceeded Michigan's "total body contact" maximum of 300 mg/mL for *E. coli*. Animal and cyanobacteria DNA were found in a majority of the samples as well.[50]

As we explained in our PMR and LAP comments (as well as in a letter dated May 9, 2022), the TMDL's insistence that manure discharges are a relatively minor concern is also belied by broader observed trends, none of which the TMDL seriously reckons with:

- The increase of DRP loads into the Maumee River coincided with the shift to concentrated livestock operations using liquid waste systems which, as explained in the letter from Dr.

[48] Kast, J., et al. (2019) *Manure Management at Ohio Confined Feeding Facilities in the Maumee River Watershed"* J. of Great Lakes Research, 45 (6) at 1162-1170 (Dec. 2019).
[49] https://nocafos.org/violations.
[50] https://nocafos.org/water-sampling-data.

Weatherington-Rice and Dr. Zwierschke, rapidly transports DRP into subsurface drainage systems and ultimately into surface waters.[51]

- Commercial fertilizer and manure involve opposite economic incentives. The former is an expense that users have no incentive to waste and the latter is a waste product that producers must fully dispose of in order to keep raising new animals. Liquid waste is also particularly expensive to transport, with transport costs exceeding fertilizer value at distances beyond 5 miles. *See* Ex. 19. And while commercial fertilizer use continues to decline (TMDL at 34), animal unit and manure numbers continue to increase.

- Despite spending more than ten years and untold sums of public money encouraging manure management practices that the TMDL insists are keeping nutrients on the field, DRP loads have not declined.

Our PMR comments also explain that the Agency is unduly relying on a single, flawed study by Kast et al (2021) to minimize manure loads and we incorporate those comments here by reference. Below, we highlight three additional means by which the TMDL is understating the role of manure and other AFO waste in fueling Lake Erie's impairment: (a) the TMDL distorts the role of "legacy" phosphorus from crop fields; (b) Appendix 3 rests on several key, false assumptions; and (c) numerous other studies and data points confirm the important role of manure in driving DRP loads.

A. The TMDL inflates and distorts the role of "legacy" phosphorus.

The TMDL repeatedly touts the importance phosphorus that is already or currently in soils, which it refers to as "legacy" phosphorus, in driving DRP loads and Lake Erie's impairment. See TMDL at 32-33; 42-45. The TMDL tries to create the impression that "legacy" phosphorus just happens to be there in the soil, as if it were from some earlier civilization, bedeviling current efforts to reduce loads from current agricultural producers and requiring some special, as of yet unknown, methods to remediate.

But the TMDL never defines "legacy" phosphorus and acknowledges the term could encompass nutrient from applications as recent as the last 30 days. TMDL at 42. In reality, then, today's "legacy" phosphorus is just last month's (or last season's, or maybe last year's) over-application of phosphorus. While we can certainly learn more about how to prevent losses of phosphorus after it is applied, there is no solution to the supposed "legacy" phosphorus problem that does not begin with ceasing applications beyond immediate agronomic needs *now*. As U.S. EPA noted in its comments to the PMR, "controlling legacy phosphorus will rely not only on controlling soil runoff,

[51] As noted in our PMR comments, the USDA Agricultural Research Service recognized liquid manure and tile drainage as plausible reasons for the increase in DRP and resulting harmful algal blooms in "far-field." *See, e.g.*, Smith, D., King, K. & Williams, M., *What is causing the harmful algal blooms in Lake Erie?* Journal of Soil and Water Conservation (March/April 2015), Vol. 70 No. 2, at 28A. Fertilizer timing is also on USDA's list: post-harvest fertilizer application, which is typical for manure, can substantially increase the risk of phosphorus loss. *Id.*

but also 'turning off the tap' by reducing fertilizer use/reducing activities which add more phosphorus to the soil." Comments of U.S. EPA to PMR at 4, dated Aug. 17, 2022.

The experience from 2019 makes this clear. According to Guo et al. (2021), a 62% reduction in applied phosphorus in 2019 due to an uncommonly wet spring led to a 26% reduction in DRP at the outlet of the Maumee River watershed.[52] This is a far greater reduction than we've seen from any suite of BMPs or related initiative, such as H2Ohio, and unlike rain or other climate conditions, it is something we can control. As Dr. Reutter noted, "2019 shows us that reducing the application of fertilizer and manure will produce significant and immediate results . . . ." Comments of J. Reutter, submitted March 6, 2023. The TMDL's repeated touting of "legacy" phosphorus as the real culprit behind the Lake Erie's re-eutrophication, as if it required some yet unknown solution, is just a shell game.

B. Appendix 3 contains many flawed assumptions that should be corrected.

The TMDL cites Appendix 3 to argue that manure supplies approximately 23% of crop phosphorus need in the watershed. But even if that number were accurate, it gives us only a theoretically maximum nutrient value of manure *if it were applied under perfectly agronomic conditions*; it says nothing about what portion of DRP *losses or loads* are caused by manure. Given the dynamics of applying liquid waste to tiled fields explained by Dr. Weatherington-Rice and Dr. Zwiershcke, as well as the other factors described earlier in this comment, there is ample reason to believe manure has been a driving force in rising DRP loads since the early 2000s.

Appendix 3 also contains numerous flawed assumptions, all of which artificially lower the estimate manure share of crop phosphorus needs:

- Appendix 3 uses the 2017 Census of Agriculture to calculate number of animal units in the Maumee River watershed without an upward adjustment to reflect the continued growth trajectory. Those census numbers are now six years old and cannot be reliably used. Better data is available in some instances (e.g., annual NASS survey efforts and current CAFF permits) and where it is not, the TMDL should apply an assumed increase that reflects past growth rates.

- Appendix 3 assumes that manure phosphorus is never applied above agronomic rates and instead applied only where needed in the watershed, regardless of how far it may have to travel from the generating facility. This assumption conflicts with the basic reality that liquid manure is expensive to transport and is allowed to be applied when STP levels are more than three times "maintenance limit" in the Tri-State Fertilization Recommendations. See Comment 2(B).

[52] *See* Guo, T., Johnson, L.T., LaBarge, G.A., Penn, C.J., Stumpf, R.P., Baker, D.B., and Shao, G. (2020). Less Agricultural Phosphorus Applied in 2019 Led to Less Dissolved Phosphorus Transported to Lake Erie. *Environmental Science & Technology*, 55 (1), 283-291. DOI: 10.1021/acs.est.0c03495

- Relatedly, Appendix 3 does not take account of soil test phosphorus levels and instead assumes that crops receive 100% of their phosphorus need from new inputs every year.

- Appendix 3 understates the amount of P in manure across the watershed by averaging the P content numbers from permitted CAFFs. Permitted CAFFs, however, house only around 1/3 of animals in the watershed, and they are the only facilities required to test manure P levels; they also often add phytase to feed in order to reduce those levels. As shown in Table a.3.4, Ruddy et al (2006) show that typical manure P levels are much higher than those used in permitted CAFFs (nearly 60% higher for hogs) and those Ruddy numbers roughly match the average levels in the Grand Lake St. Mary's watershed, where all facilities (not just the largest that may spend money on phytase) must test manure P levels.

C. Substantial additional evidence demonstrates the role of manure and other AFO waste in driving DRP increases.

The relationship between water pollution and industrial livestock operations is well documented. Voluminous evidence links CAFO/AFO waste with water pollution, including:

- Exhibit 21, a map of Michigan CAFO locations and cyanobacteria blooms, which shows that watersheds with higher densities of CAFOs also have higher densities of confirmed HABs.[53]

- Exhibit 22, a map showing Michigan CAFO locations and nutrient impairments, which similarly illustrates the connections between CAFOs and water pollution. Nearly all impaired waters (and TMDL areas) and impaired waterways are located near CAFOs.[54]

- Exhibit 23, a map showing Michigan CAFO locations and *E. coli* TMDLs, which vividly demonstrates the connection between CAFO locations and E. coli pollution. Nearly all of the CAFOs are within or very close to a TMDL watershed.[55]

[53] While it may first appear that the CAFO-heavy thumb area has relatively few blooms, that area also has very few inland lakes on which blooms can form; Saginaw Bay, however, into which much of that region drains, has suffered numerous blooms.

[54] While there are also numerous CAFOs in areas without TMDLs or impairments, that does not indicate an absence of impairments because EGLE has not had the resources to assess most waterbodies.

[55] While there are a handful of CAFOs in areas without an *E. coli* TMDL, EGLE has not had the resources to assess most waterbodies. Indeed, because so many waterways exceed *E. coli* water quality standards, Michigan has prepared a statewide *E. coli* TMDL, which was approved by U.S. EPA in 2019. This allows EGLE to add additional waterbodies to the TMDL as they are discovered, which happens on a regular basis. According to recent EGLE estimates,

- The petition attached as Exhibit 24, which collects extensive evidence linking CAFOs to a variety of negative environmental and human health outcomes, including the U.S. Fish and Wildlife Services' observation that "CAFO wastes contain nutrients, pharmaceuticals, and hormones, and cause eutrophication of waterways, toxic blooms of algae and dinoflagellates and endocrine disruption in downstream wildlife." Ex. X at 14-15.

- The National Association of Local Boards of Health compiled scientific data documenting how CAFOs and AFOs lead to surface and groundwater pollution, as well as negative human health outcomes, noting that "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." Ex. 25 at 4.

- Exhibit 26 describes a Wayne State University study of treated home tap water in Adrian, Michigan, which is in a CAFO-heavy watershed that feeds into Lake Erie. The study identified the presence of Microcystis aeruginosa (harmful algae), a species of cyanobacteria, and two algal toxins it can produce, microcystin and anatoxin-a.

In addition to the sources we have cited elsewhere in these Comments, as well as in our PMR comments, numerous other scientific and governmental studies draw a clear link between industrial livestock animal agriculture and nutrient pollution. *See, e.g.* Ex. 27 (Kleinman, et al., *Phosphorus Fate, Management and Modeling in Artificially Drained Systems*, J. Env. Quality (March 2015)); Ex. 28 (Wang et al., *Solid Cattle Manure Less Prone to Phosphorus Loss in Tile Drainage Water*, J. Env. Quality (Jan. 2018)); Ex. 29 (Michigan Department of Environment, Great Lakes, and Energy Water Resources Division, *Staff Report: Algal Toxin Monitoring in Michigan Inland Lacks: 2016-2019 Results*); Ex. 30 (US Department of Agriculture, *The Transformation of U.S. Livestock Agriculture: Scale, Efficiency, and Risks* (January 2009)); Ex. 31 (A Watershed Moment); Ex. 32 (Hoorman, et al., (2006), *Subsurface Drainage and Liquid Manure*, J. Soil and Water Conservation, 61 (3).

Comment 7: The TMDL does not comply with Ohio law requiring that it establish specific implementation actions, schedules and monitoring to effectuate the TMDL.

Under Ohio law, the TMDL must include a "[p]reliminary TMDL implementation plan establishing specific actions, schedules and monitoring proposed to effectuate a TMDL."[56] The final implementation plan must also include "reasonable assurances that water quality standards

"approximately 50 percent of the rivers and streams in Michigan exceed the [water quality standards] for *E. coli*." EGLE, Michigan's *E. coli* Pollution and Solution Mapper <https://egle.maps.arcgis.com/apps/MapSeries/index.html?appid=2a060da30e254512922208616 32b2c99> [Click "Introduction"] (accessed on March 7, 2023).

[56] Ohio Adm.Code 3745-2-12(A)(2)(a)(iv)(f).

will be attained in a reasonable period of time."[57] Fundamentally, the implementation plan must provide an actionable—and detailed—roadmap for Ohio EPA to achieve preliminary, interim and final target loads for phosphorus in a reasonable amount of time.

The TMDL section titled "implementation plan" (TMDL at 119-46) does not remotely satisfy those requirements. Despite the fact that TP and DRP loads are regularly monitored in waterways around the basin, the TMDL does not contain any interim target loads for either pollutant, even at the final pour point at Waterville. The absence of such targets will make it impossible to track progress toward TMDL goals and to know if implementation plan is succeeding or needs to be changed.

In fact, the TMDL does not even set a date for achieving TMDL goals. Figure 53 indicates that date is 2032, but as the TMDL states, the "milestone" in 2032 is not for actually achieving the target TP load but only for "implementing the practices that are expected to meet phosphorus reduction goals." TMDL at 129. The TMDL also does not even acknowledge that the State of Ohio will fail to meet reduction targets by 2025, as it agreed to do pursuant to Annex 4. The TMDL's failure to set either a final target date for achieving TMDL goals or any interim target loads doom the implementation plan to failure.

Making matters worse, the "implementation plan" is nothing but a laundry list of past and ongoing pollution efforts, most of which have been tried for years without meaningful results. The efforts include the Domestic Action Plan process pursuant to Annex 4 (begun in 2015), H2Ohio (begun in 2020 and now transitioning away from the Maumee watershed), and nine-element watershed improvement plans (available under Section 319 of the Clean Water Act since 1987). The "implementation plan" contains no discussion of what will be done differently within these programs to make them more effective or of how Ohio EPA will improve coordination and accountability in administering them. The implementation plan also does not identify any new initiatives to reduce DRP loads, even though many would be within Ohio EPA's (or ODA's) existing legal authority (e.g. requiring CAFOs to get NPDES permits as described in Comment 2; improving compliance monitoring for existing CAFF permits, expanding the "watershed in distress" designation to require more widespread nutrient management planning (see Ohio Adm.Code 901:13-1-20)).

The "implementation plan" emphasizes how long nutrient reduction efforts have been occurring. See TMDL at 123 (showing activity starting in 2004). But Ohio EPA never acknowledges, let alone reckons with, the obvious implication of these programs' heritage: they are not working. That failure is especially stark in light of what happened in 2019, when, as discussed above, a 62% reduction in applied phosphorus likely led to a 26% reduction in DRP loads at the Waterville pour

[57] Ohio Adm.Code 3745-2-12(E)(3). As discussed in comment 5 below, U.S. EPA guidance also requires TMDLs to include implementation plans and "reasonable assurances" that nonpoint source reductions will be achieved.

point.[58] Real pollution reductions are possible, but only if the State of Ohio is willing to require them. The TMDL's "implementation plan" is just a promise of more of the same, a permission slip to spend another ten years doing exactly the same ineffective things we have been doing for the last twenty.

If, as we hope, Ohio EPA decides to prepare a proper implementation plan for the Final TMDL, we direct the Agency to our comments on the PMR, which outlined key implementation plan guidelines and incorporate by reference in these comments.[59]

Comment 8: The TMDL fails to include reasonable assurances that nonpoint source DRP reductions will be achieved.

TMDLs must include an implementation plan that provides "reasonable assurances that nonpoint source reduction will in fact be achieved." [60] Otherwise, "the entire load reduction must be assigned to point sources."[61] U.S. EPA requires reasonable assurances to ensure that the waste load and load allocations established in the TMDL are not based on overly generous assumptions regarding the amount of non-point source pollution reduction that will occur.[62] This requirement is particularly important here because what the TMDL deems "nonpoint" pollution is the overwhelming driver of Lake Erie's impairment.[63]

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[58] *See* Guo, T., Johnson, L.T., LaBarge, G.A., Penn, C.J., Stumpf, R.P., Baker, D.B., and Shao, G. Less Agricultural Phosphorus Applied in 2019 Led to Less Dissolved Phosphorus Transported to Lake Erie. (2020). *Environmental Science & Technology*, 55 (1), 283-291. DOI: 10.1021/acs.est.0c03495. (Ex. 33).

[59] We would add one point to that list based on an observation in Dr. Weatherington-Rice and Dr. Zwiershke's letter: reducing broadcast application of soluble commercial fertilizer, which is far more likely to get into tile lines than older methods of application.

[60] U.S. EPA, *Guidance for the Implementation of Water Quality-Based Decisions: The TMDL Process*, at 15, EPA 440/4-91-001 (Apr. 1991) https://nepis.epa.gov/Exe/ZyPDF.cgi/00001KIO.PDF?Dockey=00001KIO.PDF; R.C. 6111.562(B)(5). *See also* 33 U.S.C. § 1313(d)(1)(C); U.S. EPA, *Protocol For Developing Nutrient TMDLs* at 9-2, EPA 841-B-99-007 (Nov. 1999), https://nepis.epa.gov/Exe/ZyPDF.cgi/20004PB2.PDF?Dockey=20004PB2.PDF; U.S. EPA, Supplemental Information for TMDL Reasonable Assurance Reviews (Feb. 15, 2012, https://www.epa.gov/sites/default/files/2020-07/documents/supplemental_information_for_tmdl_reasonable_assurance_reviews_feb_2012.pdf. (Ex. 34).

[61] *Id.*

[62] *Am. Farm Bureau Fed'n v. U.S. E.P.A.*, 984 F. Supp. 2d 289, 297 (M.D. Pa. 2013), aff'd, 792 F.3d 281 (3d Cir. 2015).

[63] Consistent with Comments 2 and 3 above, a great deal of what the TMDL deems "nonpoint" pollution sources (CAFOs that apply liquid waste to tiled fields and tile drain outlets on fields receiving liquid livestock waste) are, in fact, "point sources" that require wasteload allocations. Even excluding those sources, the TMDL will still require substantial nonpoint source reductions.

Section 8 of the TMDL purports to provide the required "reasonable assurances." But like the "implementation plan" in section 7, section 8 simply walks through the "long history" of efforts to "manag[e] phosphorus in the Maumee watershed" (TMDL at 148) without recognizing or dealing with the fact that those efforts have failed. Section 8 does not explain why we should expect those efforts to suddenly start working, or provide any benchmarks for evaluating when and how such a reversal might occur. And section 8 does not attempt to apply the lessons of 2019, which, as just discussed, showed that substantial and immediate reductions in DRP loads are possible through source control and reduction.

The supposed "success stories" in section 8 only underscore that relying on the same actions we've been taking for the last two decades cannot provide any assurances, let alone "reasonable assurances," of achieving necessary reductions. For instance, the "H2Ohio Success Stories" highlight an *individual farmer* who used state funds to buy injection equipment (which, as discussed in Comment 2, is not even an effective practice on tiled fields) and boast of enrolling roughly 1 million acres in certain BMPs, which, even if effective, would be a drop in the bucket in this 522-million-acre watershed. A recent report by the Ohio Environmental Council and Alliance for the Great Lakes underscores just how costly and widespread BMP adoption would have to be in order to achieve even the total phosphorus reduction target. Michigan and Ohio would need to increase spending on conservation by $40-65 million and $170-250 million annually, respectively, over and above current investments (such at H2Ohio). *See* Ex. 35. Michigan and Ohio would also need to implement and maintain 2-4 in-field BMPs on virtually *every* agricultural acre, but even that would be insufficient; adoption of structural, semi-permanent conservation practices such as constructed wetlands and two-stage ditches would also need to increase significantly. *Id.*

In short, if the measures described in section 8 had any potential to provide "reasonable assurances" of achieving the TMDL's nonpoint source reduction goals, progress would already be visible, and the agency would have provided interim reduction targets to ensure it continues. The only "reasonable assurance" provided by section 8 is that Lake Erie will remain impaired by cyanobacteria blooms.

Conclusion

As the TMDL recognizes, the State of Ohio has spent nearly twenty years and untold millions trying to stop the algae blooms that plague western Lake Erie every summer (and, increasingly, fall). These efforts have not worked. This TMDL gives Ohio an opportunity to get things right, but only if the State follows applicable law and regulations and uses its authority to control pollution. Unfortunately, the Draft TMDL squanders this opportunity, failing to fulfill a host of basic legal requirements, including to set necessary pollution targets, assign wasteload and load allocations, impose an appropriate margin of safety, or provide an implementation plan that gives "reasonable assurances" of pollution reductions.

The Final TMDL is not due to be submitted to U.S. EPA until June 30, 2023. That gives Ohio one last chance to fix the problems identified in these comments, and which ELPC and so many other commenters have been making since the beginning of this process. We hope Ohio uses these next

several months to do that. But if Ohio intends to stand firm and not meaningfully change the TMDL, we urge you to promptly submit it to U.S. EPA.

Thank you again for the opportunity to submit these comments. We will make ourselves available to discuss any issues they raise at your convenience.

Sincerely,

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