



ENVIRONMENTAL LAW & POLICY CENTER

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By E-mail

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**RE: Comments on Ohio's Maumee Watershed Nutrient TMDL
Preliminary Modeling Results and Draft Implementation Plan**

Dear Ms. Kavalec:

The Environmental Law & Policy Center (ELPC) submits the following comments on the Preliminary Modeling Results and Draft Implementation Plan for Ohio EPA's proposed Maumee River Watershed Total Maximum Daily Load (TMDL). 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 the Great Lakes.

We appreciate Ohio EPA's decision to prepare a TMDL for the Maumee River Watershed, as well as the opportunity to comment on the Preliminary Modeling Results and Draft Implementation Plan. In offering these comments, we recognize that preparing the Maumee River Watershed TMDL is a challenging and resource-intensive task. Ohio EPA staff has assuredly spent countless hours preparing this and other documents, hosting webinars and stakeholder meetings, fielding calls from interested parties, and keeping abreast of the current research. However, it is also an opportunity for the Agency to set nutrient reduction targets *and* to articulate a detailed and comprehensive plan to achieve those targets. To make Ohio EPA and the stakeholders' significant investments into this process worthwhile, the TMDL must be designed to succeed.¹ Right now, it is not.

¹ "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>. Note that if documents cited in these comments are included in Appendix 3 to the PMR or available online, we are not attaching them as exhibits. Materials that are not listed in Appendix 3 or available online will be attached.

As explained in detail below, we are concerned that, unless addressed, major flaws in both the Preliminary Modeling Results and Draft Implementation Plan (PMR) will render the TMDL ineffective in controlling the harmful algal blooms that proliferate each year in Lake Erie:

- (1) The PMR fails to allocate DRP loads, which undermines the success and legal sufficiency of this TMDL.**
- (2) The PMR does not define source contributions or set load allocations.**
- (3) The PMR substantially understates the amount of DRP attributable to manure and other AFO waste.**
- (4) The PMR’s 3% “Margin of Safety” is arbitrary, unsupported, and well below what is required.**
- (5) The PMR fails to include an allowance for future growth in livestock numbers.**
- (6) The PMR does not comply with Ohio law requiring that it establish specific implementation actions, schedules and monitoring in order to effectuate the TMDL.**
- (7) The PMR fails to provide “reasonable assurances” that nonpoint source reductions will be achieved.**
- (8) The PMR fails to identify and/or provide underlying data and information sources, which undermines full stakeholder participation in the TMDL process.**

We appreciate your thorough and thoughtful consideration of our comments, and look forward to your response as well as the final modeling results.

Comment 1: The PMR fails to allocate DRP loads, which undermines the success and legal sufficiency of this TMDL.

- A. The PMR recognizes that DRP is the primary driver of algal blooms in western Lake Erie but proposes to set only a TP target.**

Throughout the PMR, Ohio EPA correctly concludes that dissolved reactive phosphorus 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.² For example, the PMR states:

² See 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. (**Attachment A**).

- “This project focuses on reducing the most bioavailable portion of total phosphorus, characterized by the parameter dissolved reactive phosphorus (DRP).” (PMR at 2)
- “It is this elevated DRP export that the Maumee Watershed Nutrient TMDL project intends to remediate.” (PMR at 7)
- “These findings keep the emphasis on the DRP as the main driver of western Lake Erie HABs.” (PMR at 47)
- “Reducing the DRP portion of total phosphorus as much as possible is an explicit goal of the implementation plan for this TMDL.” (PMR at 90)
- “The TMDL and implementation will focus on the Annex 4 load reductions for total phosphorus (TP) and dissolved reactive phosphorus (DRP).” (PMR Appx. 2 at 1)

While we are encouraged by Ohio EPA’s recognition 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 reiterate here, TP is a poor proxy for DRP. DRP allocations are essential to the Maumee River watershed TMDL’s success and to its legal sufficiency.

B. The TMDL’s success in cleaning up western Lake Erie depends on achieving both Annex 4 phosphorus load targets.

Setting 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.³ DRP is 100% bioavailable, and PP is 25 – 50% bioavailable.⁴ 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.”⁵

Past trends bear this out. As the PMR acknowledges at pages 6 to 7 and in Figure 5, 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. (PMR at 7). 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

³ *Id.* at 206.

⁴ 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>.

⁵ *Id.*

DRP corresponds to the period of Lake Erie’s re-eutrophication, the focus should be on reducing
DRP concentrations and loads.⁶

The Great Lakes Water Quality Agreement Annex 4: Nutrients (Annex 4) Task Team understood the importance of bioavailability when it set both TP and DRP targets. The Annex 4 Task Team recommended that the spring load from the Maumee River be no greater than 860 metric tons TP and 186 metric tons DRP.⁷ 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.⁸ If Ohio EPA fails to set numeric load allocations based on the Annex 4 Task Team’s recommended reductions of TP *and* DRP, it will not meet the Annex 4 goal and the TMDL will fail.

C. Failing to set DRP load targets will result in a violation of applicable water quality standards.

Federal and state law require Ohio EPA to set the TMDL at a level necessary to meet water quality standards.⁹ If the TMDL is *not* set at this level, U.S. EPA cannot approve it.¹⁰ 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.”¹¹ At present, western Lake Erie is not attaining these standards. DRP-driven harmful algal blooms proliferate each year, impairing the use of the Lake for recreation, drinking water, and aquatic life beneficial uses. (PMR at 4).¹²

Ohio EPA recognizes that achieving *both* the TP and DRP load targets prescribed by the Annex 4 Task Team will be required to meet water quality standards. “Because the Annex 4 objectives will address all three impaired beneficial uses, the Annex 4 *targets* will be used to create one set of phosphorus allocations.” (PMR at 4) (emphasis added). However, the PMR does not actually use both targets. It only allocates TP loads, which, for the reasons discussed above, will not result in the required DRP load reductions. By failing to set a numeric DRP target and to allocate DRP

⁶ 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.

⁷ 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>.

⁸ *Id.*

⁹ 40 CFR 130.7(c)(1); R.C. 6111.561(B).

¹⁰ “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>.

¹¹ Ohio Adm.Code 3745-1-04(D) & (E).

¹² 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.

loads to sources, Ohio EPA concedes that this TMDL will violate Ohio’s water quality standards, Ohio Adm.Code 3745-1-04(D) and (E), and result in an ineffective—and legally deficient—TMDL.

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

Setting DRP allocations is also a prerequisite to implementation. The PMR 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” (PMR at 90), 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.¹³ 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, as discussed in more detail below, practices that reduce losses of attached P (and thus TP)—particularly, no till—do not reduce DRP losses and can actually make them worse. In sum, numerical DRP allocations will be essential to successful implementation planning.

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 in this PMR.¹⁴ Contrary to this claim, Ohio EPA also recognizes 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 uncertainty regarding how much DRP is adsorbed to sediment as it moves through the watershed. Especially given the critical importance of setting DRP allocations to this TMDL, this excuse fails.

First, in-stream processes affect *both* components of TP: particulate phosphorus and DRP. As the Agency notes, the differences between the modeled TP loads and the observed TP loads at the various monitoring stations identified in Table 28 were likely the result of particulate phosphorus settling out or other instream processes. (PMR at 95). But, contrary to the logic used to reject DRP modeling, in-stream cycling of TP has not deterred Ohio EPA from using TP in its mass

¹³ Ohio Adm.Code 3745-2-12(A)(2)(a)(iv)(f)(emphasis added).

¹⁴ Ohio EPA, Final Loading and Analysis Plan, 2022, at 31.

¹⁵ *Id.* at 28 – 29.

balance model. In fact, as the PMR points out at page 45, since most of the phosphorus loading occurs during high flow periods, in-stream processes may not be “of prime concern for this project.”

Second, if more in-stream sediment reduces DRP export, and Ohio continues to focus on reducing sedimentation by promoting practices such as no-till, then DRP is likely to continue its current elevated trend without significant intervention. Put differently, the less in-stream sediment there is to adsorb DRP, the more conservative DRP becomes as a parameter. For the TMDL, this means that allocating DRP to sources and focusing on targeted implementation measures is even more important. Relatedly, to the extent in-stream adsorption is happening, it only deepens the need to reduce DRP losses from crop fields and increases the amount of such reductions that will be required to remediate Lake Erie.

Third, both DRP and TP are extensively monitored and tracked across the watershed.¹⁶ As noted in the PMR at page 5, “[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.

In conclusion, if this TMDL is to have any hope of success in achieving water quality standards in western Lake Erie, it must set allocations based on TP *and* DRP. We appreciate Ohio EPA’s statement that “[t]here is an expectation that these methods, and subsequent results, will be altered after careful consideration by stakeholders and further discussions with Ohio EPA.” (PMR at 80). We urge Ohio EPA to act consistently with this expectation and revise its analytical model to allocate DRP as well as TP loads in the final modeling results.

Comment 2: The PMR does not define source contributions or set load allocations.

The core function of any TMDL is to inventory pollution sources in the watershed and to allocate pollution reductions among those sources based, at least in part, on their contributions. Ohio EPA committed, in its Response to Comments on the Draft Loading and Analysis Plan to include “a detailed source assessment utilizing the most relevant resources (SWAT modeling, edge of field monitoring, etc.)” and distribute reductions across various sources.¹⁷ The PMR does not honor these commitments.

Rather than define source contributions from diverse categories of nonpoint sources, the Agency merely summarizes research on the subject. While we can appreciate that Ohio EPA is using a “weight of evidence approach” instead of using one study to assess source contributions (PMR at 69), it must actually weigh the evidence, use the data, and define source contributions accordingly. This TMDL is ultimately an Ohio EPA document, and must contain Ohio EPA’s determinations. The source assessment cannot be the “backbone” of this TMDL (PMR at 70) if it merely reports

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.

¹⁷ Ohio EPA, Maumee Watershed Nutrient TMDL Project Loading Analysis Plan Response to Comments, January 2022, at 49, available at https://epa.ohio.gov/static/Portals/35/tmdl/LAPs/MaumeeWatershedNutrientTMDL_LAP_RtoC.pdf.

on the state of the research without including the necessary analysis. We urge Ohio EPA to perform a complete assessment of existing loads from nonpoint sources.¹⁸

More fatal, the PMR also fails to assign load *allocations* to any particular nonpoint source, or even any specific category of nonpoint sources, except for discharging home sewage treatment systems (HSTS). (PMR at 87). Rather, “the nonpoint source landscape load allocation is not itemized by land use or any other means. Just one total allocation value is provided.” (PMR at 87). This approach sets the TMDL on course to fail and violates applicable law.

Ohio Administrative Code 3745-2-12 requires Ohio EPA to set load allocations based on at least the following information:

- (a) Existing pollutant loadings if changes in loadings are not reasonably anticipated to occur.
- (b) Increases in pollutant loadings that are reasonably anticipated to occur.
- (c) Anticipated decreases in pollutant loadings if such decreased loadings are technically feasible and are reasonably anticipated to occur within a reasonable time period as a result of implementation of best management practices or other load reduction measures.¹⁹

This section further provides that if Ohio EPA sets nonpoint source load allocations based on anticipated reductions in existing loads, it must also collect and analyze monitoring data “in order to validate the TMDL’s assumptions, to verify anticipated load reductions, to evaluate the effectiveness of controls being used to implement the TMDL implementation plan and to revise the point source allocations and load allocations as necessary to ensure that water quality standards will be achieved within the time period established by the TMDL.”²⁰

Setting one cumulative nonpoint source load directly conflicts with these requirements. The PMR recognizes that each nonpoint source category—including non-permitted stormwater, manure/AFO waste²¹, and commercial fertilizer—contributes different phosphorus loads to the Lake. It also recognizes that these sources are on different trajectories. Loads from some sources, particularly manure/AFO waste, are increasing²² while others, like commercial fertilizer, are declining. (PMR at 19). These trends dictate whether Ohio EPA should follow approach (a), (b) or (c) above in setting load allocations for each phosphorus source and preclude use of a single combined “landscape” load.

¹⁸ Section 3.3 of the PMR is titled “Methods to Assess Existing Loads” but does not appear to use these methods to assess loads here, or elsewhere in the PMR.

¹⁹ Ohio Adm.Code 3745-2-12(C)(1)(emphasis added).

²⁰ Ohio Adm.Code 3745-2-12(C)(2).

²¹ While manure is the primary component of waste from confined livestock operations, that waste also includes urine, milkhouse or other confinement area waste, and silage leachate, all of which are high in nutrients. We use the term AFO to refer to Animal Feeding Operations as defined in the Clean Water Act and Ohio Administrative Code, which definition also includes Concentrated Animal Feeding Operations or CAFOs. *See* Ohio Adm.Code 903.01(C), (F), (M), (Q); 40 C.F.R. 122.23(b)(1), (2), (4), (6), (9).

²² See https://www.ewg.org/interactive-maps/2019_maumee/ (finding that between 2005 and 2018, the number of confined animal facilities in the Maumee River watershed increased by 42%; the number of animals more than doubled; and the amount of manure produced and applied to farmland swelled from 3.9 million tons to 5.5 million tons each year).

Additionally, using one load allocation for disparate nonpoint sources will prevent achievement of necessary reductions. An implementation strategy designed to reduce phosphorus contributions from soil sources is different from one designed to address nonpermitted stormwater sources. Similarly, an implementation strategy designed to reduce the overapplication of AFO waste is different from one designed to reduce the overuse of commercial fertilizer. A correct diagnosis is required before the right medicine can be prescribed.

Specific load allocations are also required for accountability and milestone setting. Without target load allocations (for both TP and, more importantly, DRP) for each known nonpoint source or at least each source category, the Agency will be unable to assess whether implementation strategies are working, and to what degree. For all of these reasons, we urge Ohio EPA to set itemized nonpoint source load allocations for known categories of nonpoint sources.

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 its overall calculation of the nonpoint source load, which appears to be: Ohio TP load target at Waterville – existing point source loads – HSTS load = nonpoint source landscape load. (PMR at 78). But there is nothing inherent in this calculation that prevents the Agency from providing additional definition within the nonpoint source landscape load, and calculating load allocations starting with existing source contributions. Ohio EPA also chose this calculation method, so even if it did preclude a load allocation that complied with Ohio Adm.Code 3745-2-12 and/or assured necessary reductions, the solution would be to change the calculation, not violate the law and prepare an inadequate TMDL.

Ohio EPA also claims that a single "landscape" nonpoint source load allocation is necessary because of the "manner in which nonpoint source implementation actions are proposed to be carried out." (PMR at 87). 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 heart of any TMDL is the quantification of existing loads from point and nonpoint sources and the allocation of reductions to those sources necessary to remediate the impairment. The PMR fails to do either of those things and must be corrected.

Comment 3: The PMR substantially understates the amount of DRP attributable to manure and other AFO waste.

A. The 2021 Kast et al. study underestimates the role of manure/AFO waste.

On May 9, 2022, ELPC sent Ohio EPA a letter in response to public webinars previewing the PMR release because we feared that the PMR would underestimate the role of manure in contributing to the DRP loads in the Lake.²³ The PMR release confirmed this fear. We incorporate the full text and attachments of our May 9th letter in this comment, and summarize the main points as follows:

²³ ELPC Letter to Ohio EPA, May 9, 2022 (**Attachment B**).

- Ohio EPA has not adequately considered that the increase of DRP loads into the Maumee River coincided with the shift to concentrated livestock operations using liquid waste systems.
- Ohio EPA has not recognized that there are opposite economic incentives to land apply commercial fertilizer vs. AFO waste. Commercial fertilizer is too expensive to waste whereas AFO waste is applied at disposal rates.
- Ohio EPA has given too much weight to a flawed study by Kast, et al. (2021), which used a SWAT model with various incorrect assumptions to underestimate the contribution of manure (and other AFO waste) to DRP loads into the Lake.

Unfortunately, rather than correct course in the PMR, the Agency has doubled down on the Kast et al. 2021 paper to support its theory that manure is not a major contributor of DRP to the Lake. (See PMR at 9). This remains deeply problematic.

As our letter explains, the Kast model considered only springtime manure/AFO waste applications even though, as the Agency has recognized, “peak manure application times” are late summer and fall. The Kast model thus ignores the bulk of AFO waste applications. Kast’s apparent reason for doing this is that spring DRP loads tend to drive summer HABs, but at least to a substantial degree, later summer and fall waste applications are part of spring loads. Because late summer and fall are relatively dry and there is relatively little crop growing in fall and winter to take up nutrients, significant portions of DRP from such waste applications will not enter Lake Erie until later, including with the snowmelt-driven March and April runoff. Late summer and fall waste applications may also become soil or “legacy” sources of phosphorus, terms that Ohio EPA should define with far more precision given their importance to the PMR’s analysis. See PMR at 25 (“legacy” sources of phosphorus “likely play an important role in export from fields”). By excluding late summer and fall waste applications, Kast’s model fails to provide a remotely accurate picture of manure’s contribution to DRP loads into Lake Erie.

The Kast model also assumed manure is applied far less frequently on the same fields than it typically is, and that it is rarely applied in excess of agronomic need, as if AFO waste were perfectly distributed to fields where it is needed and no hotspots or critical source areas existed. As our letter explains, these assumptions are incorrect, which the PMR itself implicitly recognizes in its discussion of manure hotspots surrounding AFOs. (See PMR at 16). The 2021 Kast paper also recognizes that AFO waste is typically applied within 1.8 miles of facilities where it is generated and a 2019 paper by Kast, et al. recognized that widespread use of distribution and utilization agreements (D&U) creates large knowledge gaps as to where, exactly, AFO waste is applied. It is unreasonable for Ohio EPA to place any particular emphasis on Kast’s conclusions regarding the relative contribution of manure to Lake Erie phosphorus loads.

Recent research by Meyer, Raff and Porter provides additional evidence linking AFO expansion to downstream DRP concentration increases using an empirical, data-driven approach.²⁴ Unlike a

²⁴ Meyer, A., Raff, Z, and Porter, S. (July 13, 2022). Remotely Sensed Imagery Reveals Animal Feeding Operations Increase Downstream Dissolved Reactive Phosphorus (prepublication) (**Attachment C**).

model-based study (like 2021 Kast et al.), which is only as good as the assumptions that drive it, using real data minimizes risk of miscalculating the contribution of manure to the DRP problem. Meyer, Raff and Porter concluded that the addition of just *one* AFO producing an average amount of manure increased downstream DRP levels by over 15%.²⁵ This tells us that a significant amount of manure is getting into the water from an average facility. Given that some areas of the Maumee River watershed have *many* such facilities²⁶ --and Ohio is continuing to allow new and expanded facilities without any limitations-- there is no basis for Ohio EPA to conclude that manure discharges are “a negligible proportion of the Maumee’s overall seasonal far-field phosphorus load.” (PMR at 16).

B. The PMR unreasonably downplays direct discharges of manure through tile lines.

We are pleased that the PMR recognizes that application of liquid AFO waste can follow preferential flow paths into subsurface tile drainage systems, which ultimately drain into surface waters. (PMR at 16). Drainage tile systems, like those that predominate the Maumee River Watershed, “can quickly transfer excess nutrients directly from farm fields to nearby streams.”²⁷ Liquid AFO waste, which contains very little solids content, behaves like water in its flow patterns.²⁸ Ohio’s current Nutrient Management Standard (Code 590)—prepared by the U.S. Department of Agriculture’s Natural Resources Conservation Service—also recognizes the problem, stating that “. . . even a field with *one* subsurface drainage line may present a risk of manure/wastewater movement to subsurface drains and cause a direct discharge.”²⁹ As the PMR acknowledges, the Maumee River watershed is extensively tiled. (PMR at 21). No-till can make this problem even worse.³⁰

²⁵ *Id.* at p. 19.

²⁶ <https://www.ewg.org/interactive-maps/2022-afos-in-western-lake-erie-basin/map/>

²⁷ Meyer, A., Raff, Z, and Porter, S. (July 13, 2022). Remotely Sensed Imagery Reveals Animal Feeding Operations Increase Downstream Dissolved Reactive Phosphorus (prepublication) at 7 (**Attachment C**); *see also* Williamson, T.N. et al (Jan. 2019). Delineation of tile-drain networks using thermal and multispectral imagery—Implications for water quantity and quality differences from paired edge-of-field sites, *Journal of Soil and Water Conservation*, 74 (1) 1-11 available at <https://www.jswnonline.org/content/jswn/74/1/1.full.pdf>.

²⁸ Green, David. *Frank Gibbs: Liquid Manure is Too Wet*, State Line Observer (2006). *See also* Shipitalo, et al *Potential of Earthworm Burrows to Transmit Injected Animal Wastes to Tile Drains*, *Soil Sci. Soc. Am. J.* 64:2103–2109 (2000). These two documents are attached as Exhibits A and B, respectively, to our March 2, 2022 letter which is attached to these comments (along with its attachments) as Attachment C and D respectively within **Attachment D**, ELPC’s Letter on March 2, 2022.

²⁹ Natural Resource Conservation Service, Conservation Practice Standard, Nutrient Management, Code 590 (Ohio Code 590 (2020), at 6 (emphasis added).

³⁰ Smith, D.R., et al. (2015). Phosphorus losses from monitored fields with conservation practices in the Lake Erie Basin, USA. *AMBIO*, 44(Supplement 2), 319-331, doi:10.1007/s13280-014-0624-6. *See also* Hoorman, J.J. et al (Nov. 2004). “Liquid Animal Manure Application on Drained Cropland: Preferential Flow Issues and Concerns Workshop Summary”, at p. 4, available at https://www.academia.edu/37500316/LIQUID_Animal_Manure_Application_on_Drained_Cropland_Preferential_Flow_Issues_and_Concerns_Workshop_Summary (recommending that systematically-tiled fields receiving liquid manure should be tilled prior to liquid manure application and cautioning against injection of liquid manure on no-till fields).

But while recognizing that manure discharges through tile lines occur, the PMR inexplicably—and without explanation or scientific support—immediately dismisses them as a “small contribution to the overall load when compared to other sources.” (PMR at 16 – 17). The PMR 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). (PMR at 16). This assumption defies common sense. First, liquid waste that flows into tile lines does not 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. Second, as the Agency acknowledges elsewhere in the PMR, illegal discharge investigations are primarily complaint-driven (PMR at 13); 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. The same is true here. Ohio EPA simply lacks the foundation to conclude that manure discharges are only a localized “near-field” problem. (PMR at 16).

In fact, the USDA Agricultural Research Service has recognized these factors (liquid manure and tile drainage) as plausible reasons for the increase in DRP and resulting harmful algal blooms in “far-field”—i.e., Lake Erie.³¹ Fertilizer timing is also on USDA’s list: post-harvest fertilizer application, which is typical for manure (PMR at 12), can substantially increase the risk of phosphorus loss.³²

The fact that manure “is at times directly discharged into streams” as the PMR recognizes at page 16, is not just a water quality problem; it also poses a major legal problem in the context of this TMDL. As ELPC wrote in its March 2, 2022 letter to Ohio EPA, which we incorporate fully into this comment, large CAFOs and medium AFOs that land apply liquid manure on tile fields *are* discharging, and therefore need discharge (NPDES) permits from Ohio EPA.³³ Without NPDES permits, this TMDL will continue, erroneously, to treat these significant sources of phosphorus in the watershed as part of the nonpoint source gross load allocation rather than as point-sources with individual waste load allocations. Categorization matters in a TMDL. If CAFOs were correctly categorized as point sources, Ohio EPA could tighten their permit limits to minimize phosphorus pollution. As it stands now, all phosphorus reductions from CAFOs in this TMDL are strictly voluntary. We ask that Ohio EPA implement the investigation that we requested in our March 2, 2022 letter, pursuant to R.C. 6111.05, and ensure that CAFOs are properly permitted through Ohio EPA’s delegated NPDES authority.

C. The PMR fails to adequately account for increasing livestock numbers and concentrations in the watershed.

The PMR recognizes that commercial fertilizer use has declined in the Maumee River watershed and that the number of confined animals (and therefore, the total amount of manure) has increased substantially. But the PMR tries to minimize this increase by noting that the number of animals in the watershed had previously declined. (*See* PMR at 14). The problem with this is simple. The number of animal units in the watershed is just one part of the puzzle. The *concentration* of animal

³¹ Smith, D., King, K. & Williams, M. (2015). What is causing the harmful algal blooms in Lake Erie? *Journal of Soil and Water Conservation*, 70 (2) at 28A.

³² *Id.*

³³ ELPC Letter to Ohio EPA, March 2, 2022 (**Attachment D**).

units also plays an important role in determining the effect of manure on nutrient delivery to surface water, as does the form in which their waste is stored and land-applied. Kellogg et al. have studied this:

These changes in animal agriculture have resulted in increased problems associated with the utilization and disposal of animal waste. As livestock production has become more spatially concentrated, the amount of manure nutrients relative to the assimilative capacity of the land available on farms for application has grown, especially in high production areas. Consequently, off-farm export requirements are increasing. In some counties, the production or recoverable manure nutrients exceeds the assimilative capacity of all cropland and pastureland available for manure application in the county.³⁴

Concentrating large numbers of livestock in certain areas of the watershed inevitably leads to manure hot spots, particularly when manure and other waste are kept in liquid form, which is far more expensive to transport. AFOs have no incentive to ship manure to nutrient-deficient fields outside the close proximity of the facility and instead have every incentive to apply their manure and other waste to nearby fields regardless of agronomic need. Simply counting the animals in the Maumee River watershed, estimating how much manure they produce, and theoretically “distributing it” across the entire landmass results in a clear understatement of the impact of manure on water quality.

Relatedly, the PMR argues that increasing manure production is somehow related to, or offsetting, commercial fertilizer use. (*See* PMR at 15).³⁵ But the PMR does not cite any evidence to establish such a causal link and there is no reason to assume it exists. First, as Ohio EPA acknowledged in its March 1, 2022 webinar, much of the decline in commercial fertilizer usage has resulted from improved precision agriculture techniques, which allow farmers to save money by carefully targeting applications. The purported link between rising manure production and reduced commercial fertilizer use also disregards the incentives and logistical issues noted in the preceding paragraph; there is no reason to assume that increased manure generation in one part of the watershed will always be put to maximum agronomic uses in other parts of the watershed. We ask Ohio EPA to account for growing numbers—and concentrations—of livestock in the Maumee River watershed in its final existing loads analysis and in setting future load allocations for manure in accordance with Ohio Adm.Code 3745-2-12(C)(1)(b).

D. Appendix 1 contains many flawed assumptions that should be corrected.

³⁴ Kellogg, R.I., Lander, C.H., Moffitt, D.C., Gollehon, N. (2000). Manure nutrients relative to the capacity of cropland and pastureland to assimilate nutrients: spatial and temporal trends in the United States, *Proc. Water Environ. Fed.* (16), 18-57. (**Attachment E**) *See also* Ohio EPA, Ohio Phosphorus Task Force Final Report (April 2010) at 39-40 (explaining that adoption of AFO model entailed shift to liquid or slurry manure systems for dairy and hog operations).

³⁵ The PMR takes a statement made in EWG’s 2019 report out of context in making this argument. This report, and EWG’s 2022 analysis of AFO distribution in the Western Lake Erie Basin, do not conclude that manure is a 1:1 replacement for commercial fertilizer. Both of these projects focus on the location and concentration of livestock facilities using aerial imagery. Indeed the 2022 report is clear that high concentrations of AFOs can lead to manure hotspots. *See* <https://www.ewg.org/research/ewg-analysis-western-lake-erie-basin-newly-identified-animal-feeding-operation-hot-spots>.

Appendix 1 and the associated text of the PMR, pages 14 through 19, attempts to calculate how much manure is generated in the Maumee River watershed and extrapolate that to how much manure is satisfying the theoretical crop “need” for phosphorus. However, we believe the following inaccurate assumptions are driving the Agency’s inaccurate conclusions regarding the contribution of manure to the DRP loads in the Maumee River watershed:

- Appendix 1 uses the 2017 Census of Agriculture to calculate number of animal units in the Maumee River watershed without an upward adjustment to reflect the upward growth trajectory. Better data is available in some instances (e.g., annual NASS survey efforts and current CAFF permits). And, where better data is not available, the PMR should apply an assumed increase that reflects past growth rates.
- Appendix 1 prorates livestock populations, cropland acres, and crop distribution based on the percentage of a county’s land base within the Maumee River watershed for 9 of the 17 counties identified. Data exists—USDA’s geospatial cropland data layer and annual USDA agricultural statistics survey data—to more accurately inform these estimates.
- Appendix 1 assumes even distribution of manure (and crop uptake of nutrients derived from manure) through the watershed. As discussed previously in these comments, and shown in the EWG 2022 maps, manure is not uniformly applied throughout the Maumee River watershed, but generally within a few miles of the AFO that generated it.
- Appendix 1 uses a 50:50 split of corn and soybean for all agricultural acres in the watershed. Choosing not to include acres of other crops grown, when this data exists, leads to unnecessary inaccuracy.

We agree with the Alliance of the Great Lakes and the Ohio Environmental Council that opportunities exist within the PMR to use refined, data-driven approaches to determine livestock and crop distribution and we also encourage Ohio EPA to make these refinements in the final TMDL. We similarly echo their comment that Appendix 1 should be revised to include greater detail and transparency surrounding the calculations for animal units, manure generation and resulting phosphorus generation. Finally, we ask the Agency to clarify all source data, assumptions, and math that informed the conclusions within Appendix 1. Without this data, it is difficult to verify its accuracy.

Comment 4: The PMR’s 3% “Margin of Safety” is arbitrary, unsupported, and well below what is required.

The Clean Water Act requires that a TMDL incorporate 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 131(d)(1)(C). Without any explanation or support, the PMR states that this

TMDL will use a Margin of Safety of 3%. (PMR at 88-89). This figure is far too low given numerous factors creating uncertainty about the effluent limitations needed to protect water quality, including, but not limited to: (a) uncertainty about the volumes and location of manure and other AFO waste applications, particularly given the widespread use of D&U and the vast number of unpermitted and unregulated livestock facilities, about which no Ohio agency has any meaningful information; (b) uncertainty about the effectiveness of BMPs and other pollution reduction measures; (c) uncertainty about in-stream processes affecting phosphorus, including any phosphorus loading due to streambank erosion; (d) uncertainty about and unpredictability of weather patterns, especially heavy rains that drive much DRP loading (apart from the fact that, due to climate change, heavy rains will continue to worsen); and (e) uncertainty regarding the continued growth of concentrated livestock facilities, which the State of Ohio continues to allow without any limits.

Given these factors, a 3% margin of safety is indefensible. It is also far below the figure used in other TMDLs, including those identified in comments filed by Alliance for the Great Lakes and Ohio Environmental Council. *See also NRDC v. Muszynski*, 268 F.3d 91, 101-03 (2d Cir. 2001) (approving 10% margin of safety for phosphorus TMDL). Given the uncertainties identified in the prior paragraph – which will exist even if Ohio EPA corrected the other problems outlined in these comments – the margin of safety must be *at least* be 10% and be calculated using some rational and supported process.

Comment 5: The PMR fails to include an allowance for future growth in livestock numbers.

U.S. EPA Guidance requires load allocations to include “load allocations, which identify the portion of the loading capacity attributed to existing *and future* nonpoint sources.”³⁶ Ohio Administrative Code 3745-2-12, discussed in comment 2 above, also requires that load allocations reflect “increases in pollutant loadings that are reasonably anticipated to occur.” The PMR, however, does not include any future growth estimates for livestock numbers or facilities in its load allocation, despite clear evidence that such growth is happening now and will continue to happen so long as Ohio does not impose a moratorium on new AFOs (or even CAFOs) in the watershed. In response to questions, Ohio EPA staff suggested that future growth allowances are required only for point sources, but that position conflicts with the U.S. EPA Guidance quoted above, as well as the Ohio Administrative Code 3745-2-12. Moreover, as explained in comment 3 above, CAFOs that apply liquid waste on tiled fields should be permitted as point sources, and any future growth in their discharges should be considered in that regard as well.

Comment 6: The PMR does not comply with Ohio law requiring that it establish specific implementation actions, schedules and monitoring in order to effectuate the TMDL.

Under Ohio law, the PMR must include a “[p]reliminary TMDL implementation plan establishing specific actions, schedules and monitoring proposed to effectuate a TMDL.”³⁷ The final

³⁶ U.S. EPA, Guidelines for Reviewing TMDLs under Existing Regulations issued in 1992 (May 20, 2002), available at https://www.epa.gov/sites/default/files/2015-10/documents/2002_06_04_tmdl_guidance_final52002.pdf.

³⁷ Ohio Adm.Code 3745-2-12(A)(2)(a)(iv)(f).

implementation plan must also include “reasonable assurances that water quality standards will be attained in a reasonable period of time.”³⁸ 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 draft implementation plan in the PMR lacks such a roadmap, and thus fails to comply with Ohio law.

At minimum, the implementation plan must identify a schedule for achieving TP and DRP load reductions from all sources, and link that schedule to specific programs and detailed actions that Ohio EPA will take. These actions could include: adopting new rules under Ohio EPA’s statutory authority to protect water quality; enforcing compliance with existing rules and permits; securing additional resources for cost-share programs; and issuing NPDES permits with stringent effluent limits to discharging CAFOs.³⁹ To the extent that Ohio EPA requires additional primary data to target implementation measures in an effective and efficient way, Ohio EPA should identify those data gaps and articulate a concrete plan to fill them, with appropriate funding and staffing considerations, and associated timelines to provide accountability to the process.

Although the PMR purports to include a “Draft Implementation Plan,” that portion of the document includes none of the items discussed in the preceding two paragraphs. Instead, with the exception of a “bubble permit” concept for existing point sources, it provides little beyond a generic overview of “adaptive management.” While we appreciate that an adaptive management framework may be useful, it is not a substitute for an implementation plan—it is a tool by which Ohio EPA can modify the plan in response to new facts and research. Without “actions, schedules and monitoring” that address manure and other agricultural sources, which, we know are the largest sources of DRP fueling the algae bloom crisis, there is no foundation for the adaptive management process.

As it stands, the draft implementation plan within the PMR contains little specificity and no accountability framework, and appears to rely almost exclusively on the actions of other parties to achieve nonpoint source reductions. Figure 46, for example, purports to describe milestones under consideration but lacks a schedule for meeting them in the associated text. (PMR at 99). The PMR also fails to set interim actions that Ohio EPA plans to take in order to achieve these milestones. In some cases, these milestones (e.g., “Increase cropland acres with approved Voluntary Nutrient Management Plans” or “Expand controlled drainage on suitable acres”) require extensive coordination with other state agencies and depend on non-guaranteed funding sources like H2Ohio. It is therefore unclear how Ohio EPA intends to overcome barriers to achieving those milestones, or on what timeline it proposes to do it. And of course, this all assumes that the actions subject to these milestones will actually improve water quality, which we have little reason to believe will be the case based on past performance.

We urge Ohio EPA to develop a real implementation plan with specific and meaningful actions, schedules and monitoring, and to release that plan with the final modeling results. In doing so, we ask Ohio EPA to follow these general principles:

A. Source control is essential, especially in light of climate change.

³⁸ 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.

³⁹ See ELPC’s letter to Ohio EPA (March 2, 2022) (**Attachment D**).

Without reducing the amount of fertilizer applied on a yearly basis we can expect decades more of harmful algal blooms at severe levels. For example, one model suggests that under high spring precipitation and high spring streamflow conditions, Annex 4 DRP load targets can be met in about 25 years if neither commercial fertilizer nor manure is applied, *or* 45-50 years if commercial fertilizer is excluded, but manure is still applied. (PMR Appx. 2 at 9). One implication of this study is that failing to address soil sources of phosphorus is fatal to achieving Annex 4 DRP targets in a reasonable amount of time. (PMR Appx. 2 at 9). However, this modeling effort also demonstrates that failing to control another significant source of DRP—i.e., manure—can result in 20+ additional years of severe harmful algal blooms in western Lake Erie.

The 2021 Guo et al. paper confirms the importance of source control. In this study, the authors found that in 2019, a 62% reduction in applied phosphorus likely led to a 26% reduction in DRP at the outlet of the Maumee River watershed.⁴⁰ In sum, the paper shows that applying less manure and commercial fertilizer will produce immediate reductions in flow weighted mean concentrations of DRP. Ohio EPA should therefore prioritize source control in its implementation plan.

B. Soil phosphorus “hotspots” must be addressed.

The PMR (page 12) recognizes that “Manure applications *should* follow Ohio USDA Natural Resources Conservation Service (NRCS) Nutrient Management Practice Standard (Code 590)” however, but fails to reckon with the reality that often they do not. In fact, “[l]ivestock producers tend to apply manure at high rates and have little incentive to apply manure correctly.”⁴¹ A USDA Agricultural Research Service article authored by Doug Smith and Kevin King (cited in the PMR at 9) similarly recognizes that manure has been applied at disposal—rather than agronomic—rates, in areas of the Western Lake Erie Basin with high concentrations of AFOs, leading to a “chronic source of P to receiving waters.”⁴² Fields that receive both manure and commercial fertilizer can also lead to excess nutrient loss.⁴³

Indeed, later in the PMR (page 16), the Agency correctly states that manure application near CAFOs/CAFFs may lead to critical source areas risking greater phosphorus export. We would point out that this is not limited to areas around CAFOs/CAFFs, the largest of industrial livestock operations, but also should include the small and medium sized facilities (AFOs), which form

⁴⁰ 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

⁴¹ Hoorman, J.J. et al. (November 2004). Liquid Animal Manure Application on Drained Cropland: Preferential Flow Issues and Concerns Workshop Summary, at 6, available at https://www.academia.edu/37500316/LIQUID_Animal_Manure_Application_on_Drained_Cropland_Preferential_Flow_Issues_and_Concerns_Workshop_Summary.

⁴² Smith, Douglas & King, Kevin & Williams, Mark. (2015). What is causing the harmful algal blooms in Lake Erie? *Journal of Soil and Water Conservation*, 70 (2) at 28A.

⁴³ Long, C.M., Logsdon Muenich, R., Kalcic, M.M., Scavia, D. (2018). Use of manure nutrients from concentrated animal feeding operations, *Journal of Great Lakes Research*, 44 (2), 245-252, ISSN 0380-1330, <https://doi.org/10.1016/j.jglr.2018.01.006>.

about 93% of the total number of livestock facilities in the Ohio portion of the Maumee River watershed, according to new research by the Environmental Working Group.⁴⁴ Ohio EPA should use EWG's findings to target implementation measures near likely soil phosphorus hotspots.

C. Ohio EPA should step up enforcement of its water pollution control laws.

In our March 2, 2022 letter, which we discuss previously in these comments, we asked Ohio EPA to investigate manure discharges from existing AFOs for violations of Ohio's water pollution control laws.⁴⁵ Revised Code 6111.05 grants Ohio EPA broad authority to investigate or inquire into any alleged act of pollution to waters of the state upon complaint or on its own initiative. This investigation can occur on private or public property and can include discharge sampling. We reiterate this request in the context of the TMDL implementation plan. Ohio EPA should begin investigation of AFO pollution under R.C. 6111.05 to identify facilities that pose the greatest threat to water quality and should be prioritized for NPDES permitting. As we explain in the letter and in comment 3 above, AFOs that apply liquid waste to tiled fields are discharging to waters of the state and must be required to obtain NPDES permits, and this permitting should be a critical component of the TMDL implementation plan.

Independently of this request, we also urge Ohio EPA to increase enforcement efforts against violators of Ohio's water pollution control laws, R.C. Chapter 6111, in the Maumee River watershed. At minimum, this stepped-up enforcement plan should include pursuing penalties of up to \$10,000 per day against all persons who discharge manure or other AFO-wastes into "waters of the state."⁴⁶ Ohio EPA retains this authority under R.C. Chapter 6111, whether or not the Ohio Department of Agriculture or the Ohio Department of Natural Resources are pursuing parallel enforcement actions under their statutes, and should use it to drive pollution reductions.

D. Targeted BMPs are required for efficient DRP reductions.

We are encouraged that Ohio EPA recognizes the importance of best management practice (BMP) targeting—i.e., putting the right BMP in the right location⁴⁷—to reduce phosphorus levels from the heavily polluting agricultural sector. (PMR at 26, 90, 105, Appx. 2). As TetraTech notes in Appendix 2, ". . . ensemble and individual SWAT modeling efforts indicate that targeting BMPs to source areas with high phosphorus load delivery to streams yields greater reductions than randomly distributing BMPs." (PMR Appx. 2 at 7).

Targeting BMPs appropriately is especially important to achieving the Annex 4 DRP target (PMR Appx. 2 at 21), which is prerequisite to delisting western Lake Erie. Many conservation practices

⁴⁴ <https://www.ewg.org/research/ewg-analysis-western-lake-erie-basin-newly-identified-animal-feeding-operation-hot-spots>

⁴⁵ ELPC Letter to Ohio EPA, March 2, 2022 (**Attachment D**).

⁴⁶ See R.C. 6111.04 (prohibiting discharges into waters of the state); R.C. 6111.07 (providing for injunctive relief for violations of water pollution control laws); R.C. 6111.09 (providing for civil penalties for violations of water pollution control laws). See also *State v. Brennco, Inc.*, 3rd Dist. Allen, No. 1-14-24, 2015-Ohio-467, ¶ 19.

⁴⁷ This recognition is not aligned with Ohio Department of Agriculture's administration of H2Ohio funding, which currently prioritizes number of acres enrolled in seven defined practices which are not uniformly useful in keeping phosphorus (especially DRP) out of surface water.

such as no-till, buffer strips, and cover crops, are better suited to control soil losses and particulate phosphorus loss, rather than reducing DRP loss.⁴⁸ However, despite the importance of BMP targeting to this TMDL's success, TetraTech also notes that "Ohio EPA did not identify BMP-targeting as one of the topics to be addressed in this review." (PMR Appx. 2 at 7). We urge Ohio EPA to correct this omission and contract with TetraTech to perform a comprehensive review of the BMP-targeting literature to arrive at recommendations for BMPs that are the most effective in reducing DRP in systemically tiled areas. This effort should include BMPs that are not currently being promoted in Ohio, including increasing the solid content of AFO waste before land application

Further we urge Ohio EPA to look to what other states are doing to effectively target BMPs to reduce DRP loss. The Environmental Working Group is currently working collaboratively with the Michigan Department of Environment, Great Lakes, and Energy and the Michigan Department of Agriculture and Rural Development to identify targeted locations for certain conservation practices within the River Raisin watershed.⁴⁹ This initiative arose after Michigan concluded that the only way to achieve its nonpoint source nutrient reduction goals for the Western Basin is through targeted BMP implementation.⁵⁰ Within each priority HUC-12 watershed, Michigan's NPS Agricultural Inventory Process uses modeling, desktop analysis, and a windshield inventory to collect field-level data to locate and prioritize sites that have the greatest potential to impact water quality.⁵¹ The results of the Inventory Process inform stakeholders' implementation decisions. Michigan has also committed to tracking implementation in a database to evaluate the efficacy of these measures.⁵²

A similar effort—focusing on data collection and analysis to inform precision implementation of BMPs—is needed in Ohio. Ohio EPA should allocate existing funding through sources such as H2Ohio, or seek additional funding, to replicate the Michigan NPS Agricultural Inventory Process for the critical source areas for DRP in the Ohio portion of the Maumee River watershed. This data-led implementation strategy stands in stark contrast to Ohio's current focus on enrolling acres into certain practices, regardless of their likely impact on downstream water quality.

E. Ohio EPA should measure progress in water quality improvements, not by program participation.

This TMDL has one goal: to reduce the severity of harmful algal blooms in western Lake Erie to the point where recreation, drinking water, and aquatic life uses are restored. To achieve this goal,

⁴⁸ 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

⁴⁹ EWG, *2022 CAFO Report*, available at <https://www.ewg.org/research/ewg-analysis-western-lake-erie-basin-newly-identified-animal-feeding-operation-hot-spots>.

⁵⁰ Michigan Department of Environment, Great Lakes and Energy, *Report on the Status of Implementation Plan for the Western Lake Erie Basin Collaborative Agreement Report for Fiscal Year 2021*, available at <https://www.michigan.gov/egle/-/media/Project/Websites/egle/Documents/Reports/Boilerplate/report-fy-2021-Western-lake.pdf?rev=7376035c6b0546f3a5935880c384b346&hash=ADF9EFBF7C83D8602599C31ADA68D988>.

⁵¹ *Id.*

⁵² *Id.*

the PMR’s stated focus is to align springtime phosphorus loads to the Annex 4 targets. In short, the TMDL’s success is dependent on improvements in water quality driven by phosphorus load reductions. However, the Agency appears poised to measure progress towards that goal by quantifying participation in voluntary programs, rather than by measuring actual results.

The PMR at page 99 suggests that for some general milestones under consideration, like “increasing the cropland acres with approved voluntary nutrient management plans,” progress may be measured by “quantifying implementation measure [sic] *or* improvements in water quality.” But progress in reducing the severity of HABs in western Lake Erie cannot be defined by anything other than measurable water quality improvements—i.e., phosphorus load reductions.⁵³ Research has shown, for example, that “just having a [nutrient management plan] NMP does not reduce excess nutrient application nor does it guarantee improvements in water quality.”⁵⁴ The same is true for other voluntary H2Ohio practices, such as enrolling acres in no-till or cover crops, practices that, when combined with liquid manure application and tilled fields, may actually increase DRP downstream.⁵⁵

Recent lessons from the Chesapeake Bay Program reinforce the need for this TMDL to focus on measuring success by water quality outcomes vs. the number of BMPs adopted or acres enrolled in BMP or related programs. For over 30 years, federal and state governments have funded conventional technical and financial cost share programs to encourage BMP implementation. These programs have not produced the desired water quality outcomes, despite this significant investment.⁵⁶ This indicates that incentive systems need to be aligned with water quality goals.⁵⁷ Rewarding producers for quantifiable nutrient reductions or observable water quality outcomes—pay for performance—would better align with the ultimate goal of this TMDL and provide a framework for assessing progress.

We urge Ohio EPA to commit to measuring progress towards the TMDL goal of delisting western Lake Erie as impaired under the only metric that counts: TP/DRP load reductions and their associated water quality improvements.

F. Ohio EPA must take the primary role in facilitating implementation planning and coordinating the Agencies’ actions.

⁵³ See The Cadmus Group, Inc. for U.S. EPA Region 10, *Recommendations for TMDL Effectiveness Monitoring Plans*, at p. 7, available at https://www.epa.gov/sites/default/files/2015-07/documents/recommendations_for_tmdl_effectiveness_monitoring_final_7-27-11.pdf. (“Ultimately, effectiveness will be determined by compliance with water quality standards and attainment of designated uses. This is the overriding goal that all implementation and monitoring activities should be designed to achieve. If an activity does not help to achieve this goal, its status as a program priority should be reevaluated.”)

⁵⁴ Shepard, R. (2005). Nutrient Management Planning: Is it the Answer to Better Management? *J. Soil and Water Conservation*, 60 (4), 171-176. **(Attachment F)**

⁵⁵ Ni, X., Yuan, Y., Liu, W. (2020). Impact factors and mechanisms of dissolved reactive phosphorus (DRP) losses from agricultural fields: A review and synthesis study in the Lake Erie basin. *J. of Science of the Total Environment*, 714 (“Both conservation tillage and no-till demonstrated significant potentials to increase DRP subsurface losses compared to conventional tillage ($p < 0.01$).”). **(Attachment G)**

⁵⁶ Stephenson, K., L. Shabman, J. Shortle, and Z. Easton (2022). Confronting our Agricultural Nonpoint Source Control Policy Problem. *JAWRA Journal of the American Water Resources Association*, 1–6, 3. <https://doi.org/10.1111/1752-1688.13010> **(Attachment H)**.

⁵⁷ *Id.* at 5.

We recognize that many stakeholders are, and will continue to be, involved in nutrient reduction efforts in the Maumee River watershed. We also wholeheartedly agree that implementation of the TMDL will “require coordination among many partners, including all levels of government, nonprofit organizations, and individual landowners.” (PMR at 100). However, as the delegated authority to administer the Clean Water Act section 303(d), the “buck stops with” Ohio EPA. Ohio EPA must take on the challenge of leading the necessary coordination efforts.

Based on the PMR and prior releases during the TMDL process, Ohio EPA appears reluctant to take the primary role in facilitating TMDL implementation planning. This lack of direction has led to a scattershot approach to implementation that must be corrected for a successful TMDL. Actions that Ohio EPA should consider in developing a more coordinated approach to implementation include:

- Allocating additional technical staff and resources to coordinate ongoing TMDL implementation efforts in the Maumee River watershed;
- Establishing a Maumee River watershed TMDL implementation work group that includes key representatives from Ohio EPA and other state agencies, local governments, environmental advocates, research institutions, the agricultural community, and utility ratepayers, to meet regularly and to evaluate progress towards implementation goals and facilitate adaptive management in a transparent and inclusive forum;
- Leading H2Ohio resource planning to focus on funding alternative BMPs in certain hotspot areas, such as adding solids content to liquid manure prior to spreading on tile-drained fields; and
- Leveraging inter-agency relationships to ensure that Section 319 Nine-Element plans and other watershed planning efforts led by Ohio Department of Agriculture under House Bill 7 are consistent with, and further the goals of, the Maumee River watershed TMDL.

If executed correctly, this TMDL will serve as the roadmap for state agencies, agricultural groups, environmental organizations, researchers, and other stakeholders to improve the water quality of western Lake Erie and the Maumee River watershed. We ask that Ohio EPA articulate (with specificity) how it plans to lead this important effort in its final modeling results.

G. Ohio EPA should plan and implement finer scale monitoring efforts.

USEPA guidance on TMDL development recognizes that “monitoring is a crucial element of water quality-based decision making” because it “provides data for an independent evaluation of whether the TMDL and control actions based on the TMDL protect or improve the environment.”⁵⁸

⁵⁸ USEPA, *Guidance for Water Quality-based Decisions: The TMDL Process*, April 1991, at page 16, available at <https://www.epa.gov/sites/production/files/2018-10/documents/guidance-water-tmdl-process.pdf>.

USEPA encourages states to use innovative monitoring programs to establish adequate monitoring coverage and to make sure that monitoring programs are in place to evaluate nonpoint source control measures.⁵⁹ Monitoring is also a required element for TMDL implementation planning under Ohio law.⁶⁰ For load allocations set below existing loads, Ohio EPA must collect and analyze monitoring data “in order to validate the TMDL’s assumptions, to verify anticipated load reductions, to evaluate the effectiveness of controls being used to implement the TMDL implementation plan and to revise the point source allocations and load allocations as necessary to ensure that water quality standards will be achieved within the time period established by the TMDL.”⁶¹

Ohio EPA has stated that it will use the Heidelberg and USGS water quality monitoring networks at the sub-watershed pour points to evaluate the TMDL’s progress. (PMR at 71). In addition to this broader monitoring effort, Ohio EPA should also develop a plan to collect water quality data at multiple sites in smaller tributaries downstream of critical source areas and in the public right-of-way near known phosphorus sources, such as AFOs. Such a distributed sampling plan would provide Ohio EPA greater insight into the effectiveness of individual BMPs or other nonpoint source controls and allow for more informed adaptive management.⁶² To the extent that any the 10,000+ samples Ohio EPA has already collected in the Maumee River watershed (PMR at 59) can be used to set baseline conditions, Ohio EPA should leverage that dataset in this effort.

Comment 7: The PMR 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.”⁶³ Otherwise, “the entire load reduction must be assigned to point sources.”⁶⁴ 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.⁶⁵ This requirement is particularly important here because, as the PMR recognizes the reality that “a great deal of nonpoint source reductions are required.” (PMR at 90). But TetraTech’s evaluation of the various

⁵⁹ *Id.* at p. 16.

⁶⁰ Ohio Adm.Code 3745-2-12(A)(2)(a)(iv)(f).

⁶¹ Ohio Adm.Code 3745-2-12(C)(2).

⁶² See The Cadmus Group, Inc. for U.S. EPA Region 10, *Technical Guidance for Designing a TMDL Effectiveness Monitoring Plan*, December 2011, at p. 5, available at https://www.epa.gov/sites/default/files/2015-07/documents/techguide_design_tmdl_effective_monitorp_123011-2.pdf.

⁶³ 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.

⁶⁴ *Id.*

⁶⁵ *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).

SWAT model runs in the Maumee River watershed showed little confidence that TP and DRP targets will be met even with widespread adoption of agricultural practices. (PMR Appx. 2 at 20). This does not support a business-as-usual approach to nonpoint source control.

Prior webinars have previewed that Ohio EPA intends to rely on Governor DeWine’s H2Ohio program to provide “reasonable assurances” for nonpoint source reductions in this TMDL. However, Ohio has not established a dedicated source of funding for H2Ohio; it depends on annual appropriations and is therefore always subject to the winds of politics. Even current levels of funding are insufficient to finance necessary nutrient reduction efforts and there is no guarantee that funding will continue, let alone increase, into the indefinite future. Additionally, Ohio EPA cannot control the spending of the Ohio Department of Agriculture within the H2Ohio program. Without Ohio EPA input on how, where, and on what the H2Ohio money is spent within the agriculture sector, it is unreasonable to believe any assurance that the necessary nonpoint reductions of DRP will occur. We also cannot assume the all-voluntary H2Ohio programs alone will result in meaningful water quality improvements, let alone enough improvements to meet TMDL goals and remediate Lake Erie.⁶⁶

Failure to properly reduce nonpoint source contributions has real consequences on public ratepayers. A 2022 report by the Alliance for the Great Lakes found that harmful algal bloom-related monitoring and treatment *currently* costs Ohio residents using Lake Erie as their water source an average of \$10.48 per person every year.⁶⁷ The annual per capita cost for a Toledo resident is even higher at \$18.76.⁶⁸ If “a great deal of nonpoint source reductions” do not occur, the burden of meeting the TMDL targets will fall on the wastewater treatment plants and other point sources of phosphorus, landing ultimately on downstream ratepayers, a substantial portion of whom are members of environmental justice communities, particularly in the City of Toledo.⁶⁹

Despite its fundamental importance to the success of the TMDL and to its legal sufficiency,⁷⁰ the PMR merely contains a placeholder for reasonable assurances, stating that this section will be provided with the draft of the final TMDL at the end of the year. (PMR at 115). Coupled with the lack of any specific implementation plan to control nonpoint sources of phosphorus, we can only conclude that the Agency does not have such a plan, and that reasonable assurances are an

⁶⁶ U.S. EPA disapproved the Lake Champlain TMDL for this reason, finding that: “Its weakness (in the reasonable assurance context) is that nearly all of the recommendations are just that – recommendations. Nearly all elements of the plan depend on both additional funding and entities’ willingness to participate or cooperate voluntarily with the intent of the program.” U.S. EPA, Correspondence Re: Lake Champlain Phosphorus TMDL Disapproval, January 24, 2011, available at <https://www.epa.gov/sites/production/files/2015-09/documents/2002-lake-champlain-tmdl-disapproval-decision.pdf>.

⁶⁷ Alliance for the Great Lakes, Western Lake Erie Basin Drinking Water Systems: Harmful Algal Bloom Cost of Intervention, May 2022, available at <https://greatlakes.org/wp-content/uploads/2022/05/FINAL-COI-Report-051622.pdf>.

⁶⁸ *Id.*

⁶⁹ See U.S. Census Bureau, Quick Facts Toledo city, Ohio, July 2021, available at <https://www.census.gov/quickfacts/toledocityohio>.

⁷⁰ U.S. EPA has developed a supplemental information sheet for use in evaluating reasonable assurance demonstrations, which should be used to strengthen Ohio EPA’s “reasonable assurances” demonstration in this TMDL. U.S. EPA, Supplemental Information for Reviewing Reasonable Assurance in TMDLs, February 15, 2012, available at https://www.epa.gov/sites/default/files/2020-07/documents/supplemental_information_for_tmdl_reasonable_assurance_reviews_feb_2012.pdf

afterthought of this TMDL process. We ask that Ohio EPA release a draft of the reasonable assurances section *prior* to the release of the draft TMDL for stakeholder review and input.

Comment 8: The PMR fails to identify and/or provide underlying data and information sources, which undermines full stakeholder participation in the TMDL process.

A. Ohio EPA should provide early access research to stakeholders.

The PMR references several resources that are not available to the public but apparently informed Ohio EPA’s decision making. As many of these resources are unfinished research projects, it is clear that the Agency must have access to the researchers’ preliminary conclusions. There are two issues with including these projects in the PMR in any capacity other than in the adaptive management discussion.

First, it is inappropriate to rely upon unfinished research to stall current action under this TMDL. USEPA guidance is clear that “[I]ack of information about certain types of pollution problems (for example, those associated with nonpoint sources or with certain toxic pollutants) should not be used as a reason to delay implementation of water quality-based controls.”⁷¹ Here, for example, the ongoing research cited at pages 45 through 47 of the PMR appears to have influenced Ohio EPA’s decision to omit DRP allocations in this TMDL. While we can appreciate that ongoing research describing in-stream phosphorus cycling and BMP effectiveness may inform future modifications to TMDL modeling and implementation planning, there is a large body of complete and published research, as well as a wealth of primary data, that can be used—right now—to set measurable TP and DRP targets and to describe the specific actions Ohio EPA will take to meet them.

Second, relying upon unpublished research without providing the underlying information in the record does not facilitate informed comment by stakeholders, who may not have similar access to the materials. We request that Ohio EPA provide these resources in an Appendix, in their entirety and in whatever format the Agency received the information.⁷² If, for example, Ohio EPA staff obtained preliminary study conclusions via email correspondence, that email correspondence should be provided to stakeholders. We have identified the following references to sources that should be part of this resource Appendix:

- “In 2021, ODA inventoried livestock in the Maumee watershed in Ohio and evaluated population trends for recent years. Details of this analysis are included in Appendix 1.” (PMR at 14)
- “A recent fertilizer study by the ODA shows a decreasing trend in nitrogen and phosphorus fertilizer sales in the Maumee River basin since 2008.” (PMR at 17)

⁷¹ USEPA, *Guidance for Water Quality-based Decisions: The TMDL Process*, April 1991, at page 2, available at <https://www.epa.gov/sites/production/files/2018-10/documents/guidance-water-tmdl-process.pdf>.

⁷² See Ohio Adm.Code 3745-2-12(F) (stating that all public records created in the development of the TMDL “shall be made available upon request” in accordance with Ohio’s public records statute, Ohio Rev.Code 149.43).

- “A current SWAT modeling project examining H2Ohio practices will continue improving model performance.” (PMR at 21)
- “The King et al. (in preparation) study explains that the implications of the stream-water suspended sediment adsorbing DRP means the process can potentially be providing an environmental service.” (PMR at 45)
- “A project being led by Dr. James Hood at OSU (HABRI, 2019), will evaluate when and where rivers within the Maumee watershed are sources or sinks of phosphorus.” (PMR at 46)
- “Another project out of Dr. Hood’s lab (HABRI, 2020/2021) includes an evaluation of the sources and chemistry of sediment moving through the Maumee stream network.” (PMR at 46)
- “A large, paired watershed study currently occurring within the Maumee watershed (ARS, 2019) will provide additional insight into nexus agricultural BMPs, nutrient and sediment runoff, and instream processes.” (PMR at 46)
- “USGS is undertaking a study to examine most of the factors outlined in the two Hood studies noted above in Wisconsin’s Fox River that feeds the Green Bay of Lake Michigan (Kreiling, 2021).” (PMR at 47)
- “NRCS and ARS are just starting a multiphase CEAP project examining various aspects of legacy phosphorus (NRCS, 2021).” (PMR at 47)
- “Dr. James Larson with USGS is researching how nutrients (N, P and C) are transformed in the Maumee River mouth in Toledo.” (PMR at 47)
- “This work continues as a state priority and a current project is funded by Ohio through the Harmful Algal Bloom Research Initiative (HABRI) and via H2Ohio to use a SWAT model of the Maumee River watershed to evaluate the impact of ongoing implementation, including specific actions and scenarios based on H2Ohio programs.” (PMR at 105)

In sum, we ask that Ohio EPA use ongoing research to inform adaptive management rather than to stall current action. And, to the extent that the Agency received advance access to ongoing research, that it provide that research in an appendix to the final modeling results.

B. Ohio EPA should “show its work” and provide missing source attributions, underlying data, assumptions, and math.

The PMR also contains many figures, equations, and charts that are missing the underlying sources of information, data, assumptions and math. These include:

- Figures that are missing sources, data, assumptions, and/or math: 12, 13, 14, 33, 34, 35, 36, 37, 38, 39, A1.1, A1.2
- Tables that are missing sources, data, assumptions, and/or math: A1.3
- Equations that do not appear to have been performed, or which are divorced from the results, appear on pages: 72, 73, 75, 79

We urge Ohio EPA to exercise complete transparency here as well. With respect to figures and tables not attributable to a previously published source, we ask the Agency to include the missing source, data, assumptions, and math in the Appendix of sources previously discussed. With respect to the equations, we ask that the Agency “show its math” within the document itself and to clarify how, if at all, the outputs of these equations fit into the modeling results. This will help enable understanding and eliminate confusion.

C. Ohio EPA should make clear if and how it is using prior work and external research projects in its decision making.

A large portion of the draft PMR summarizes the various research projects and studies that have occurred, are occurring, or will occur, that may affect the Maumee River watershed TMDL. Despite this thorough digest, it remains unclear if or how Ohio EPA used the research to analyze existing loads, set load allocations, or define specific implementation actions. It is also unclear whether Ohio EPA considers all research projects cited within the PMR to be of equal value, or if not, how much weight the Agency has assigned to any particular research project, study or paper in the TMDL process.

For example, Section 2.3 of the PMR should contain the Agency’s determination of where critical source areas (or hotspots) for phosphorus export exist within the watershed. But this section fails to articulate any definitive conclusions. Instead, it reads as a list of prior efforts to define critical source areas, without regard to how they are informing *this* TMDL. We are asking for additional clarity here, and throughout the PMR where research is cited without analytical discussion.

Additionally, Ohio EPA should clarify throughout the PMR how much of its analysis is new—i.e., done for the purpose of preparing this TMDL—or adapted from prior work such as the 2020 Domestic Action Plan or the 2020 Nutrient Mass Balance. In so asking, we recognize that Ohio EPA is not starting from scratch. We understand that the Agency’s prior efforts provide a base of understanding for this TMDL process. However, understanding the difference between new and prior work is essential for stakeholders to understand which decisions Ohio EPA has already made, and which may yet change.

Conclusion

As this summer is already showing, the Lake Erie algae bloom crisis is unacceptable and unsustainable and will not resolve itself absent strong, unprecedented action to reduce phosphorus—especially DRP—loads from the Maumee River watershed. The TMDL is the tool for defining and taking that action, but if the defects in the PMR outlined above are not corrected,

the TMDL will fail and Ohioans' greatest natural resource will continue be impaired, threatening access to safe drinking water, limiting outdoor recreation, harming tourism, and inflicting worsening economic damage on a major swathe of the state.

We urge Ohio EPA to change course and prepare a TMDL that complies with all applicable legal requirements and puts the state on a path to successfully remediating Lake Erie for current and future generations. 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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