# “THE RIVER DOESN’T CATCH ON FIRE ANYMORE,” COMMENTS ON THE OHIO EPA MAUMEE RIVER WATERSHED DRAFT TMDL

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Acknowledgment of advice and assistance from Dr. Daniel Winarski and Donna.

With encouragement from Alison, Ken and Bonnie, Bill, Ann, my friends in Toledo, especially Mary Yacklin (Woodward classmate of ’66) who in 2006 asked me if I could ‘look into’ why her favorite place, the “Maumee Bay and Lake Erie has green scum on the water.”

Remembering Ira Whitman, Bill Ruckelshaus, and Milt Feldstein who set me on the journey.

For all of my friends in Toledo.

Onward Rocinante.

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# Introduction

The Total Maximum Daily Load (TMDL) must include a full and meaningful public participation that includes a review of the Ohio EPA proposals for clean water. The TMDL for the Maumee River watershed is near to being completed and the plan is open for public comment.

The attached detailed comments are my review of the TMDL, demonstrating whether the work performed by the Ohio EPA will comply with all applicable requirements. The TMDL is a planning tool, its purpose is to provide a roadmap which Ohio will use to meet water quality standards for the Maumee River watershed. While the TMDL is part of the solution, it does not contain any regulations or actions which, by themselves, will reduce discharges. It is critical that the TMDL be an effective plan if the goal of clean water will have a chance of success.

The formation of hazardous algae blooms in the Maumee River watershed is a serious and complex problem that will be difficult to solve, and the solution set will take years to implement. Any successful plan to improve water quality will require difficult and possibly unpopular legislative and regulatory decisions. The time for solutions which show minor water improvement and make people feel good are long gone.

If the TMDL produces a good plan, the clean water goal will be attained. If the TMDL doesn't produce a good plan, the problem will become worse. As the problem worsens, unhealthful water will be the norm and more draconian solutions will be needed later.

My work will show where the Ohio TMDL plan does or does not comply with the numerous federal and state planning requirements.

The attached comments will allow the Ohio EPA the opportunity to develop corrective actions in the final TMDL. If the deficiencies remain in the final plan there will be ample cause for the rejection of the TMDL.

A long time ago the Ohio EPA developed a plan to stop the river from burning. Now is the time for them to develop another successful clean water plan.

I grew up in Toledo, and like you, I want a clean Maumee Bay and Lake Erie. But first we need to have a detailed and realistic TMDL that will show how we can have clean water.

Peter Hess

# Summary of Comments

## How the Comments were Formulated

The preparation of the Maumee River watershed TMDL has been a long process. The journey commenced with the first segment generated by the Ohio EPA, the Loading Analysis, and then the Preliminary Modeling Report. The final segment incorporates the work performed by the staff of the Ohio EPA with assistance from the Ohio Department of Agriculture (ODA).

As a person who has guided staff for four decades in preparing numerous attainment plans, the development of implementation plans, and the associated rules to meet environmental standards, I must attest that it is a difficult task. Unfortunately, the staff of the Ohio EPA needed to rely on work performed when the Ohio Domestic Action Plan was developed, due to time constraints of meeting a court ordered deadline. This is unfortunate, because the Ohio EPA needed to rely upon, what I call stale data, to develop this TMDL. I hoped that the Ohio EPA would have more time to initiate ampler focused studies to obtain better quality data for this TMDL, but it wasn't to be. In the long run, maybe it is better to push onto the next step; but that was not my decision.

The quality of the inputs to any plan is critical to the quality of the plan, any plan, whether it be water quality, air quality, or a life plan. Early in the development process I was encouraging the Ohio EPA to incorporate into the modeling analytical tools, the most data intensive set as possible. Unfortunately, the Ohio EPA, to meet deadlines, was required to fall back to use a degree of modeling which, in my opinion, is an order of magnitude less sophisticated than what I think is necessary. But they did not have a choice in the matter due to court ordered deadlines. There were no other options.

Presently, it is the time to move on, to complete the TMDL, submit the document to the US EPA, to correct deficiencies, and to hopefully receive approval.

At the present is the time to analyze and comment on the work done by the Ohio EPA and the ODA. Yes, comments, very detailed comments have been submitted to the Ohio EPA on the numerous segments of the TMDL such as the PMR and the loading analysis. I provided extremely detailed comments and analysis to make my point to the Ohio EPA. I am well aware of the term 'agency discretion' and how the implementing agency typically has the option of deciding upon what they feel should be in the attainment plan, unless other recourse is taken through another venue, such as a call for judicial review. I take no offense to the staff of the Ohio EPA deciding that their path was better suited to their implementation plans, rather than alternative proposals. The staff of the Ohio EPA has been extremely polite and courteous to me. I hope that my comments, then and now are sufficiently focused on the final goal of clean water, and that they provide some type of assistance to them.

My goal, as I told to the leaders and staff of the Ohio EPA division of surface water, was to ensure that the process of developing the TMDL was incorporating the best available science and that the guidelines were followed with both rigor and precision. I am a proponent of the use of best available predictive models, those being used in the determination of the proper attainment path. I know from past experience, the greater the use of an expansive data set for spatial and temporal inputs, the greater the probability to conduct a more thorough analysis, and in turn, develop a better plan.

The use of the expansive spatial and temporal spectrum was impossible to use in the creation of this TMDL, which is disappointing to me. I also suggested the use of a consulting firm to perform the modeling, develop attainment scenarios, and other labor-intensive tasks in order to free up the intellectual time of the Ohio EPA staff to evaluate the decisions, which I know is the critical step in the process. I have used many excellent consulting firms in the preparation of attainment plans which covered a greater geographic area than the Maumee River watershed. Time apparently did not allow this to happen.

The comments on the TMDL are in two parts, a summary of comments which is a short thumbnail sketch, and the detailed comments, supported by exhaustive material. The detailed comments are more important than the summary because the summary cannot cover the intricacies' contained in the detailed comments. I tried to keep the summary to less than a page in length while the detailed comments is 100 pages in length.

As a student of the development of the Clean Air Act (Act) (having testified before the US Senate on June 3, 1981, on offsets, banking, and NSR; and being involved in the creation of the bubble permit and the defense of the same in 467US847 on June 24, 1984) and Clean Water Act (CWA) I incorporate the principle set forth in the Act to judge the appropriateness, and the viability of this attainment plan. Congress desired that each state formulate their own plan to meet the desires of what their people would accept for mitigation(with the incorporation of basic tenants set forth by Congress and contained in the Act). Congress wisely followed this path because they did not want to be blamed for demanding a control strategy what may be called a draconian action, which may be acceptable by one state, that would not be acceptably received in another state (a wise decision). This let each state to 'pick their own cure' theory has debatably worked with stakeholder, oversight, and judicial prodding.

Another test I applied is pertaining to the process used by the agency that is developing the plan. Has the agency identified the contributors of the cause of the nonattainment problem? If so, has the agency taken action to mitigate the causes of nonattainment? This is the commonsense test.

The next step I applied is to ascertain the viability of the success of the path that is chosen to reach attainment. In other words, will it work? This is the viability test.

The always astute legislature of Ohio promulgated considerable guidance on the preparation and required contents of the TMDL. Guidance was also established in the Ohio Administrative Code. These legislative and administrative proclamations, although complex, establishes the rules and bounds (guardrails), on the path that the Ohio EPA and the ODA must follow for the development of the TMDL.

Lastly, and most importantly, I look at whether the guidelines and requirements published by the oversite agency, the US EPA are met. For the TMDL this is the May 20, 2002, document titled

*Guidelines for Reviewing TMDL's under Existing Regulations issued in 1992,* taking into account applicable judicial review.

There are many positive attributes in this TMDL. For example, the initiation of the development for HUC-12 sub watershed basin TMDL's is a positive action, which will hopefully identify legacy phosphorous and CSA's. Adaptive management, which is embraced in the TMDL, is a 'must have' in the modern planning world. However, the incorporation of findings from adaptive planning must have a vehicle to force the new findings into the decision-making arena. For the last decade, I have watched the Ohio administration 'kick the can' of providing clean water down the proverbial alley.

The following comments, some of which are pointed, are my opinion of where the TMDL has deviated from what I, in my review, is a better path to clean water. I tried to provide ample explanation and cause for my positions, contained in the body of this document. These are my positions and the reasons for these positions.

For your convenience, the recommendation based upon the comments can be found encapsulated in a text box at the end of each of the nine summary items on pages 7-20. More detailed recommendations, encapsulated in a text box highlighted red and yellow, are at the conclusion of each comment section on pages 23-128.

## Summary of the Comments

1. The TMDL fails to identify, evaluate, categorize, and quantify the potential TP and DRP discharges from the 73 ODA DLEP CAFF's. This is a correctable deficiency.

The TMDL has a serious deficiency because it does not demonstrate reasonable assurance that the Load Allocation (LA) from non-point sources will occur. The deficiency is due to failure to identify, evaluate, categorize, and quantify the TP and DRP mitigation opportunities from the discharges produced by the 73 ODA DLEP CAFF's[1]. Without addressing and lowering the potential TP and DRP discharges from the largest source category, the TMDL targets will, as documented later, be impossible to attain. Without a reasonable assurance that the LA from non-point sources will occur, the US EPA will more likely be unable to approve the Ohio TMDL.

1 The ODA DLEP CAFF's are the 73 large Combined Animal Feeding Facilities (CAFF), or Combined Animal Feeding Operations (CAFO) permitted by the Ohio Department of Agriculture (ODA) Department of Livestock Environmental Permits (DLEP) under their permit-to-install and permit-to-operate program. There are 73 CAFF's or CAFO's in the Maumee river watershed according to the 8/17/2022 US EPA comment letter on the Ohio EPA preliminary modeling report (PMR) issued The ODA is insisting these CAFF's and their associated land application of manure-based fertilizer does not discharge to surface waters of the state of Ohio or the surface waters of the US (a disputed claim). If the CAFF's discharge to the above waters, they are compelled to apply for coverage under a National Pollutant Discharge Elimination System (NPDES) Permit. The Ohio EPA is the permitting agency for the NPDES permits, not the ODA. The 7/29/2002 MOA between the ODA and Ohio EPA transferred the permitting authority from Ohio EPA to ODA, this MOA will be discussed later. The US EPA recently rejected the ODA's request to receive NPDES permitting authority.

The failure of the TMDL to initially address the discharges associated with the operation of the 73 ODA DLEP CAFF's and all other permitted animal feeding operations (AFO's) is very surprising. This lack of attention to the TP and DRP discharges caused by 73 ODA DLEP CAFF's is more than an oversight, it is a structural defect in the TMDL, that has been highlighted in detailed in the body of the comments and by the US EPA. Additionally, the TMDL should identify, evaluate, and quantify the DRP and TP potential discharges from all (large, medium, small AFO's (which fall under the category of having non-compliance, plus standard compliance, and designated concentrated animal feeding operations (CAFO's)).

A first-time ever documentation that I constructed of the discharge comparisons demonstrating the significance of the CAFF's is contained in *Comment 1. ODA DLEP CAFF's* clearly demonstrates the TP and DRP discharge potential from the 73 ODA DLEP CAFF's (and associated land application operations). They produce 58% of the total phosphorous (TP) produced by all animal feeding operations in the Maumee River watershed. There is an extremely high concentration of the high potential TP and DRP generation CAFF's in the Upper Maumee, Auglaize, and the St. Mary's watersheds which may lead to legacy concentrations of phosphorous. Only 73 CAFF's produce 290 million gallons of manure wastewater which is laden with dissolved reactive phosphorous (DRP), this amount of manure wastewater totals to be 69% of that produced in the Maumee River watershed from animal feeding operations every year.

The tables I constructed in *Comment 1. ODA DLEP CAFF's* delineate the amount of TP produced from each of the 73 ODA DLEP CAFF's, and also makes the comparison of the TP generating potential between the total TP produced in the basin from animal feeding operations. Unfortunately, as shown in the comparison of the TP discharges, there is clear demonstration in the TMDL of a lack of a thorough evaluation of this source category. An evaluation, similar to my evaluation must be in the TMDL to close eliminate reasons for US EPA to reject its approval.

The lack of identifying the land application areas in the TMDL, associated with the 73 ODA DLEP CAFF's, and conducting a thorough engineering evaluation (in accordance with judicial review) as stated in *Comment 2: Land Application*, needs correction. An evaluation of all permitted CAFF's CAFO's, and AFO's of whether they discharge to the waters of Ohio is another deficiency, which if unfilled, begs for the rejection of the TMDL by the US EPA.

In straightforward terms, the 73 ODA DLEP CAFF's are the largest group of TP producers in the non-point source category of the TMDL. The potential discharges by these CAFF's or through their associated land application areas deserves a thorough review in the TMDL (as suggested in the detailed comments 1 & 2 and inferred by the US EPA).

To reiterate the above, the first step in preparing an attainment plan (including a TMDL) is to review the discharges from the largest of the source categories in order to ascertain whether they ripe for mitigation. These potential dischargers are the 73 ODA DLEP CAFF's. Such an evaluation was not conducted in the TMDL which must be corrected.

There is critical need to review the appropriateness of the 'ODA policy-based conclusion' that the 73 ODA DLEP CAFF's do not discharge into the waters of the state of Ohio. The ODA conclusion may be in error because many technical studies show that they discharge as defined by state law and code under certain circumstances. The statements included in the draft TMDL infers that there is a discharge from the cojoined land application areas (see *Comment 2: Land Application*).

An evaluation of the discharges from the 73 ODA DLEP CAFF's (and other permitted operations) will be an indispensable step in the identification of additional mitigation of legacy phosphorous in critical source areas (CSA), as well as legacy phosphorous areas.

There are activities available to rectify this deficiency in order to move the needle to approvability for this TMDL. These proposed actions are not draconian steps and have been applied in other arenas of environmental control.

CAFF's have the right to apply manure onto lands for crop production. The right to apply manure is tempered when the application of manure in excess to what is assimilated in crop production and is discharged by ground tiles. Studies show that when too much manure is applied, the unassimilated excess may be discharged to the waterway of the state of Ohio.

Some of these corrective actions are as follows and are also detailed in *Comment 1. ODA DLEP CAFF's* & *Comment 2: Land Application*.

1. Conduct a thorough evaluation (*as detailed in Comment 1. ODA DLEP CAFF's* & *Comment 2: Land Application* ) in order to ascertain the discharge status of the 73 ODA DLEP CAFF's with their associated land application, and whether the CAFF's are subject to NPDES permits and additional requirements.
2. Establish a non-point TP load allocation for the 73 ODA DLEP CAFF's in the TMDL.
3. Establish a no net increase, declining bubble permit for the 73 ODA DLEP CAFF's. Such action should include a declining discharge cap, an allowance for TP discharge trading within the bubble (similar to what is proposed for the Waste Load Allocation (WLA)) for point sources in this TMDL. The discharge TP cap under the bubble would decline to a goal of 40% from a baseline (possibly 2008) or appropriate, on an incremental basis. The threshold of the CAFF and AFO applicability, trading provisions from within and from without the bubble, of real, enforceable, permanent, and quantifiable reductions of discharges would be determined through appropriate rulemaking. This is a concept similar to the US EPA bubble rule, emission trading program, and emission offset program for areas which do not attain environmental standards.
4. Due to their familiarity with the abatement strategy, and its technical nature, there should be consideration that the Ohio EPA be assigned to be the lead agency for the program with assistance by the ODA.
5. The 73 ODA DLEP CAFF's produce every year about 3,500 MT out 5,300 MT TP animal waste generated, the grouped allocation target is 547.0 MT/Season out of the LA of 555.9 MT/Season. Consideration should be given for a regulation requiring the use of "P waste reduction technology" on the largest of the CAFF's, especially for liquid waste management. The State of Ohio may consider constructing and operating publicly owned "P nutrient reduction treatment plants".

6. Consider requiring "nutrient reduction technology" for some CAFF's.

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| The 73 ODA DLEP CAFF's produce every year about 3,500 MT out 5,300 MT TP animal waste generated, the 'grouped landscape' load allocation target is 547.0 MT/Season. The calculated current animal waste loading is between 2,000 and 2,500 MT TP/Season. Consideration should be given to a regulation for the use of "P waste reduction technology" on the largest of the CAFF's, focused upon liquid waste management. The State of Ohio may consider constructing and operating publicly owned "P nutrient reduction treatment plants." |

2. <u>The criteria the ODA and Ohio EPA uses to evaluate if the 73 ODA DLEP CAFF's and their associated land application areas discharge into the waters of the state of Ohio, and waters of the US has possible deficiencies. This a correctable deficiency in the TMDL.</u>

The TMDL has a serious deficiency because it has not demonstrated reasonable assurance that the Load Allocation (LA) from non-point sources will occur due to failure to properly evaluate, the permit status and requirements for the 73 ODA DLEP CAFF's. Without a reasonable assurance that the LA from non-point sources will occur, the US EPA is unable to approve the TMDL.

The deficiency is a lack of showing in the TMDL, goes part and parcel with a failure to evaluate, categorize, identify, and quantify the mitigation opportunities from the discharges from the 73 ODA DLEP CAFF's and their associated land application areas.

The inability of using a commonsense approach, coupled with applicable judicial decisions, along with Ohio law in applying the permit requirements of the CWA does not provide reasonable assurance that the load allocation from non-point sources will occur. For the purpose of brevity and realizing this is a summary, the details pertaining to the matter is found in the <u>*Comment 2: Land Application*</u>.

Unfortunately, the TMDL lacks any statement pertaining to the determination that the 73 ODA DLEP CAFF's, CAFO's, or other AFO's are not discharging into the waterways of the state of Ohio or the waterways of the US (other than they are designated to not to do so). Any evaluation needs to take into account all forms of manure waste, solid, sludge, and liquid. Such a basic determination would be part of an approvable TMDL, contained in the body of the document or contained in an Appendix. The glaring statement contained in the TMDL that the ODA only considers design of the CAFF in determining applicability to federal and state requirements is very disturbing.

The TMDL asserts that land application occurs once every six years, which is contrary to the land application of liquid and sludge through the use of drag lines and contrivances owned, controlled, and operated through the CAFO, CAFF and possible the AFO production areas on a more frequent timeframe. The *Comment 2: Land Application* provides details pertaining to, and a discussion of the rationale for the evaluation of potential discharges.

The use of a functional equivalency discharge evaluation as stated by a Supreme Court brief, coupled with the evaluation of ownership and control, in concert with the linkage between the CAFF production area and land application area, the use of scientific studies pertaining to the transport of phosphorous through tiled fields, with the assimilation of fertilizer by crops is critically needed for all of the 73 ODA DLEP CAFF's and all AFO's in the Maumee River watershed to ensure the Ohio agencies are actually enforcing the requirements of the Clean Water Act and Ohio's CRC and OAC. Without this evaluation and documentation there is no real reasonable assurances of the LA will occur.

The TMDL assumes there are no "legal" discharges from CAFF's and land application when the facts show otherwise. The agencies should reviewt the law in conjunction with science and the fact that phosphorous discharges by CAFF's and application occurs. CAFF's have the right to apply manure onto lands for crop production. The right to apply manure is tempered when the application of manure in excess to what is assimilated in crop production, and is then discharged by ground tiles, or the application of manure is applied in a manner where it is discharged to the waterways of the state of Ohio.

3. <u>There is a failure to provide an evaluation of the TMDL targets assigned for the downstream of the Waterville water monitoring station. This is a deficiency in establishing TMDL targets, which are more likely set at an improper level. The lack of a water quality monitoring station at or near to the mouth of Lake Erie and the Maumee Bay is a deficiency because there is no ability to verify the attainment of the TMDL target for downstream of the Waterville monitoring station. These two deficiencies are correctable.</u>

The TMDL targets proposed for the region downstream of the Waterville monitoring station have not been properly evaluated and documented, thereby they are more likely set an improper level, which is a deficiency that must be corrected. The TMDL target for downstream of Waterville does not take into account actions documented in earlier studies and the impact on water quality obtained by ORC § 6111.32 pertaining to the prohibition of the release of dredging spoils into western Lake Erie watershed. The contents contained in *Comment 3: Downstream Target TMDL* discuss the details of the dredging requirements and the studies relied upon to make the assertion that actions downstream of the Waterville station, and close to or at the mouth of the Maumee Bay and Lake Erie will have a significant impact upon water quality and the ability meet the CWA goals for the impaired area. This deficiency can be remedied by including in, and possibly revising the TMDL target for the Maumee River at mouth/Maumee Bay 41.6937,-83.4682 by an evaluation of the impact of ORC § 6111.32.

The TMDL contains no sound rational for avoiding the installation of a water quality monitoring station to affirm that the TMDL targets are met. If the TMDL is approved without a requirement for a monitoring station at or near to the mouth of the Maumee River, there is absolutely no ability to directly measure attainment of the clean water goals, which is a deficiency in the TMDL. The commitment to select and install a water monitoring station at the region of the mouth of the Maumee River/Maumee Bay is the remedy to correct this deficiency. The people need to be assured that the TMDL targets are being met or will be met by way of measurement not calculation and assumption. Yes, a monitoring station will be expensive, but the burden of HAB's also bears a cost.

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| Establishing a water monitoring station at the mouth of the Maumee River and the Bay is required to 'demonstrate,' rather than to 'calculate' the TMDL targets are attained. The positive effect of eliminating phosphorous laden dredging silt from being dumped into Lake Erie should be included as an effective mitigation strategy in the TMDL. |

4. <u>The lack of a 'Watershed Implementation Plan' between Ohio, Indiana, and Michigan affirming the commitment to attain the TMDL targets, and the lack of targets for interstate transport, and the lack of monitoring for the meeting of the targets is a deficiency in the TMDL. The US EPA may wish to replace this intrastate TMDL with a federally constructed interstate TMDL (modeled after the Chesapeake Bay TMDL). It may be difficult for the framers of this TMDL to correct this deficiency without the assistance of the US EPA.</u>

The Maumee River watershed TMDL is deficient by definition because it is an intrastate solution for an interstate problem. There are Band-Aids which will cover up the problem, but a real solution is for the construction of an interstate TMDL which contains all portions of the Ohio, Indiana, and Michigan Maumee River watershed. As much as a Band-Aid is a cure for a heart attack, a 'Watershed Implementation Plan' between the three states may be one path to follow. The TMDL does not include a written agreement, which is a deficiency which is noted in <u>*Comment 4: Interstate v. Interstate Transport*</u>.

The TMDL does not include monitoring or targets for the transport between the three states. The success of the TMDL relies upon all three states doing their part, and there are no assurances provided in the TMDL that this will happen.

There are no targets in the TMDL which a stakeholder, or the US EPA is able to measure whether one or more of the three partners are meeting their obligations for remediation, which is a major deficiency. This scenario is discussed in detail in <u>*Comment 4: Interstate v. Interstate Transport*</u>.

There are no monitoring provisions in the TMDL to measure the interstate transport or the effects of remediation.

There is no mention in the TMDL about using the multistate Chesapeake TMDL as a guide for framing the Maumee River watershed TMDL. This lack of federal coordination of interstate transport which impacts international treaties is concerning to stakeholders.

Unfortunately, there are no comparisons contain in the TMDL of, or discussion of the basic mitigation strategies between the three states. You would expect the degree of uniformity between the contiguous states, pertaining to permit applicability, thresholds, the treatment of CAFF's, and mitigation to be forefront in the TMDL. There is interstate transport of waste manure between states with no requirements discussed in the TMDL.

Lastly, a comparison of the requirements in the Maumee River water shed TMDL to the Chesapeake Bay watershed TMDL would be useful for stakeholders in order to make a comparison of respective mitigation. Such a comparison would be a helpful tool to the US EPA in order to compare programs and judge the Ohio TMDL submittal to the approved Chesapeake Bay TMDL.

The preferred path to correct this deficiency is for the construction of a federal TMDL in conjunction with, or instead of the intrastate Ohio TMDL. As an option, the commitment to the framing of a 'Watershed Implementation Plan' with TMDL targets and measurement for assurance of attainment may be the next best path to correct the deficiency.

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| The boundary condition allocation loads from Indiana and Michigan (25% of the total) have no assurances of being met. Change the TMDL from an intrastate to an interstate program or establish an effective "Watershed Implementation Plan." |

5. <u>Without annual targets and allocations, the critical conditions and legacy phosphorus will not be addressed, which is a lack of the demonstration of reasonable assurance the LA will be met, which is a deficiency in the TMDL. This deficiency can be corrected.</u>

Annual TMDL targets and allocations in concert to the proposed seasonal targets and allocations are needed to demonstrate reasonable assurance that the LA is met through the ability to address legacy phosphorous and critical conditions caused by the buildup in the 137-mile Maumee River and tributaries of the watershed.

The TMDL and the evaluation in *Comment 5: Critical Conditions* clearly shows the impact plus importance of legacy phosphorous and critical source areas in solving the water quality challenges. The lack of annual targets will make the attainment of the water quality goals difficult, or impossible to attain, necessitating a future revision of the TMDL for the inability to meet the seasonal targets. The concentration of CAFF's within certain watersheds is a clear demonstration of CSA's and legacy areas.

The review of the history of the Maumee River watershed shows the timing of the runoffs being unpredictable. The uncertainty of future climate change makes a case for the need for annual targets in conjunction with the spring targets.

This deficiency can be corrected by the addition of annual TMDL targets and appropriate allocations.

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| The reduction of legacy phosphorous, which has built up due to overapplication, will take a long time to be dissipated. Maybe up to a dozen years. Starting to identify and then to eliminate over-application areas of phosphorous is a logical first step in the right direction. In the meantime, annual TMDL targets and allocations are appropriate. |

6. The quantity of phosphorous needed to be removed from the Maumee River watershed to meet the GLWQA goal, as portrayed in Figure 6.2, is a mischaracterization of facts. The quantity of phosphorous, needed to be removed to meet TMDL targets, could be two or three times higher than those illustrated in Figure 6.2. A more realistic portrayal of the degree of work, needed to meet the clean water standards, should be added to the TMDL because Figure 6.2 provides no semblance to reality.

The quantity of phosphorous reductions to meet the TMDL target, as shown in Figure 6.2, is based upon a baseline starting point of loading as it was in 2008. Those days of a low phosphorous baseline are long gone. The evaluation contained in *Comment 6: Model Verification* shows the recent massive increase of phosphorous generated from animals, which also increased the phosphorous loading in the Maumee River watershed. Things have changed since 2008, and Figure 6.2 doesn't show that.

If the latest year of available loading data is used for the baseline (2019), the approximate calculated phosphorous reductions needed to meet the TMDL target would be 2,500 metric tons a year, rather than what is illustrated in Figure 6.2, approximately 442 metric tons of phosphorous from the Ohio portion of the Maumee watershed when using a 2008 baseline.

Figure 6.2 should be replaced by a true-to-life portrayal of the phosphorous reductions needed for attainment, from a more realistic baseline, in order to show to the stakeholders and policymakers the true task before them.

The details of *Comment 4: Interstate v. Interstate Transport* also shows the problems with insufficient non-point source inventory data sets, used to verify the comprehensive water quality monitoring, and used to develop allocations for the TMDL. The problems with the model verification may necessitate the increase of the Margin of Safety in the TMDL.

In conjunction with the lack of a defined reduction of TP as discussed above, a comparison of the results of the modeling to the amount of phosphorous measured in the Maumee River and other tributaries shows the model underestimates the quantity of phosphorous in the water by 20%. This underestimation occurs for the watersheds south of the Maumee River. This is a problem that will eventually show the reductions needed to reach the clean water goals is underestimated by 20%, for the watersheds south of the Maumee River, so it will take longer and more reductions than predicted in this TMDL.

The days of simplistic actions and easy fixes are long past, due the decades of inaction. The TMDL target is not as close as shown.

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| The estimated reductions of phosphorous needed to reach the clean water target is way too low. The target of 914.4 MT/Season may be two, three times, or further away than alluded to in the draft TMDL, which uses a 2008 baseline. The underestimate is in part due to not including the growth of animal feeding operations. |

7. There is a pressing need to establish an allowance for growth for the non-point source category of animal feeding operations in order to reflect the anticipated increases of phosphorous. Any commensurate decreases in phosphorus use from synthetic fertilizer can be used as a mitigation factor for the growth in manure-based fertilizer in the TMDL. The averaging of the synthetic and manure-based fertilizers in order to avoid establishing an allowance for growth is an error and mischaracterizes the accuracy and credibility of the TMDL. The absence of an allowance for growth is a deficiency in the TMDL and is counter to the OAC.

The Maumee River TMDL in Appendix 3 includes information pertaining to the growth in the non-point source category of animal feeding operations. There is an assertion that the decrease of synthetic fertilizer offsets the growth of manure-based fertilizer. If so, that offset is an assumed mitigation to growth and should not be used to avoid calculating the allowance for growth, and for its inclusion in the load allocation.

As discussed in *Comment 7:Allowance for Growth*, the structure of the OAC for creating a TMDL has a provision for the Director of the Ohio EPA to calculate an allowance for growth within the same section included for the creation of a margin for safety. A Margin of Safety has been constructed, but no allowance for growth has been constructed. The Director of the Ohio EPA may wish to exercise regulatory discretion and not calculate an allowance for growth from the animal feeding non-point sector. If so, she must articulate and justify her decision for not complying with the provisions of AOC § 3745-2-12 (A)(2)(iv)(d). It may be a better use of resources to calculate an allowance for growth and apply a justifiable mitigation assumption, that can be monitored, than developing and defending her avoidance of state regulations and the common sense showing of the very visible growth of the animal feeding source category.

The deficiency can also be removed by following the recommendation in summary and evaluation contained in *Comment 1. ODA DLEP CAFF's* of creating a CAFF and AFO bubble cap, with a no net increase permit system, and having the allowance for growth be included within the cap. Such as system is similar to what the Ohio EPA is proposing for point sources withing the WLA in the TMDL.

As seen in Item 6, there has been a massive growth of animal units since 2008, which must be factored into an allowance for growth, used to determine the reductions needed to attain the clean water goals. There has been an unmitigated growth of non-point source TP and DRP since 2008. To use the statement, that manure-based CAFF land applications regulations 'are not allowed to release phosphorous into the waterways of Ohio' is an unacceptable reason for not including an allowance for growth in the TMDL.

8. The conclusion that there is no critical source areas and legacy areas because there is sufficient acreage for land application in the watershed ignores the realities and cost effectiveness of manure waste disposal.

As written by the ODA, the conclusion contained in Appendix 3 is that there is sufficient cropland in the Maumee River watershed to completely assimilate all of the manure produced in the watershed every year. That may be generally correct, but the assumption that manure will be transported from every animal feeding operation to every acre of cropland in the basin does not make sense.

The case the ODA apparently is trying point out is the ample amount of acreage for land application. That is not the point, as shown in *Comment 8: Land Application Cost Evaluation*.

It is a well-known fact that the manure produced by the AFO production area is distributed to the land application in the most economical method available. The hauling of manure by truck, especially sludge and liquid manure is very expensive. The sludge and liquid manure are transported for land application to acreage as close as possible to the AFO production area. The transport of the sludge and liquid manure, in order to be as economical as possible, is frequently accomplished by way of a drag line.

CAFF's make money from the product they raise. Studies detail the amount of money made by the product versus the sale of the manure products. Manure is a waste product.

CAFF's are not in the business of producing manure fertilizer, they produce animal products, money is made by animal production not by the sale of waste manure.

All of the manure produced in the Maumee River watershed must be disposed, none of it can be retained. The waste will be disposed in a manner most economical to the animal producer, whether the liquid and sludge be distributed by drag lines nearby (within 2-miles) to the land application sites. Or, if it be solid manure or dry fowl manure, it may be transported longer distances. (Various parts of this information comes by a family member drove a manure transport truck, and the family farm was asked to receive waste manure due to excesses at an AFO).

The ODA characterization is counter to the fact there are high phosphorous legacy acreage.

It is an erroneous assumption that manure will be uniformly transported from all CAFF's to the 2.3 million acres of cropland in the watershed. To reduce the transport costs, the liquid and sludge manure is deposited as close as possible to the production areas. Repeated application of manure near to CAFF's creates a legacy buildup of phosphorous, that washes away during wet seasons. The use of synthetic fertilizer is not dropping as fast as the increase of manure-based fertilizer growth, and in some counties, it is increasing.

9. <u>There is insufficient information contained in the TMDL to demonstrate that there are reasonable assurances that the non-point source measures will achieve expected load reductions in order for the TMDL to be approvable. The deficiency of an insufficient showing of reasonable assurance will lead to disapproval of the TMDL unless corrected.</u>

The information contained in the TMDL, and supporting documents, shows the TMDL targets, and their load allocations will never be met using the current strategies. The Federal guidelines require a showing to provide a reasonable assurance that the load reductions will be met. The avoidance to mitigate the phosphorous loads from the largest non-point source categories in the LA as a logical first step to bring clean water to the Maumee River watershed.

The first goal of the TMDL is to develop a plan that will be successful, the second goal is to assure all parties, that the plan will work.

The reluctance for the ODA to include in the TMDL any statistics of where the $H_2O$ plan is being successfully implemented, such as locations (needed to evaluate legacy and CSA's) the corresponding acreage does not build confidence in the TMDL and retards the scientific evaluation of programs.

In other words, the task of demonstrating reasonable assurance will be the greatest hurdle to obtaining TMDL approval from the US EPA. The information contained in *Comment 9: Reasonable Assurance* is a serious detriment to obtain US EPA approval of the TMDL, to ever be granted. Therefore, the TMDL needs to be amended to meet the US EPA requirements.

The statements of "are never met" when referring to the ability of the TMDL to reach the targets using the $H_2$Ohio strategies, cannot give the US EPA, the stakeholders, or the people demanding clean water any confidence in the contents of the plan.

A demonstration of reasonable assurance may be possible if the TMDL includes a structured mitigation plan for large CAFF (their associated land application) in conjunction with the $H_2$Ohio BMP actions. This direction is suggested because the 73 ODA DLEP CAFF's, by themselves, produce 58% of the TP generated by all AFO's in the Maumee River watershed. Reducing the potential phosphorous discharge from the category will show a major step forward.

Unfortunately, there is an apparent trend in the TMDL package where various reports and evaluations have been deleted as material relied upon in making the attainment determination, or as some would say, the 'official record.' An explanation of the rational for the culling of the supporting scientific material. We need to have an open mind to formulate the best possible TMDL.

Most certainly, the deficiency of an inadequate demonstration of reasonable assurance must be addressed in order for the US EPA to approve the TMDL.

Voluntary BMP's, $H_2$Ohio programs, and Nutrient Management Plans (NMP), coupled with crop assimilation will not be sufficient to reach the TMDL LA allocation target. The amount of phosphorous from the non-point sector that needs to be reduced is greatly underestimated in the draft TMDL. A current day estimate of the amount of phosphorous needed to meet the TMDL allocation is between 2,000 and 2,500 MT/Season. The TMDL's 458 MT/Season TP reductions from non-point sources (based on 2008 loading) does not account for the increased numbers of animals and loading. The use of "P nutrient reduction technology" is needed because, without it, there is no realistic path to clean water.

# **COMMENTS ON THE OHIO EPA RIVER WATERSHED DRAFT TMDL**

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# COMMENT 1: ODA DLEP CAFF's

**The 73 ODA DLEP CAFF's itemized in Appendix 3, Table A3.2 constitute approximately 58% of the animal feeding operation TP produced in the Maumee Watershed and must be evaluated as a major source category in the TMDL.**

An assessment of manure loading into the WLEB basin from the 73 ODA DLEP CAFFs provides awareness to these operations contribution to the amount of the total basin phosphorous loading. The permitted facilities in this source category offer the greatest discrete phosphorous generation potential of any point source and area source in the Maumee watershed.

The map included in the draft TMDL shows seven (7) watersheds in the Maumee River basin.

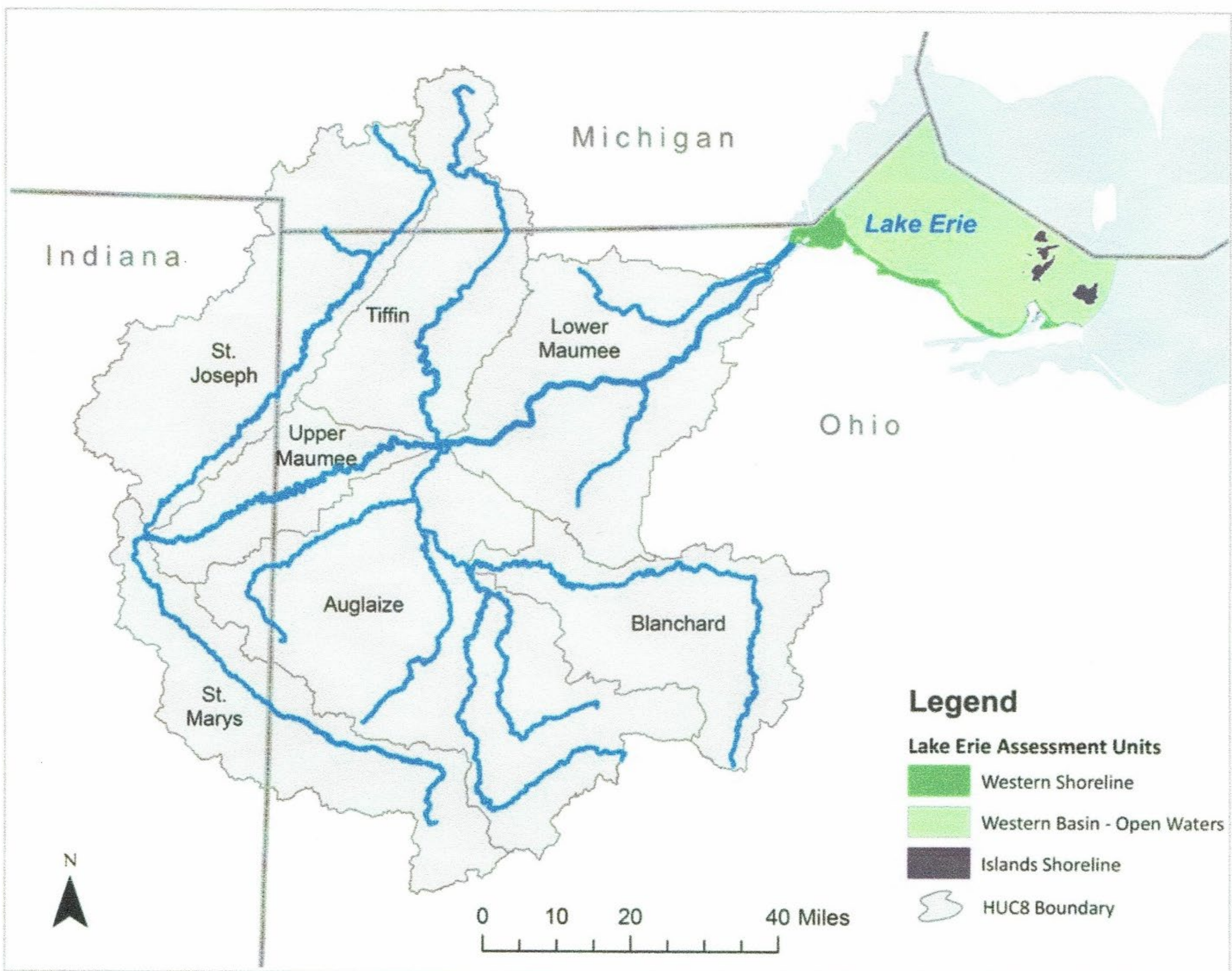


Figure 1.1. Map of the Maumee Basin

The watersheds normally considered to be in the Maumee Basin are:

| Watershed | HUC 8 |
|---|---|
| St. Joseph | 04100003 |
| St. Marys | 04100004 |
| Upper Maumee | 04100005 |
| Tiffin | 04100006 |
| Auglaize | 04100007 |
| Blanchard | 04100008 |
| Lower Maumee | 04100009 |

Figure 1.2. List of sub watersheds in the Maumee River Watershed

Based upon the August 17, 2022, comment letter from the US EPA, they appear to consider the Cedar-Portage (which carries a HUC 8 designation of 04100010) watershed to be in the Maumee watershed. For purposes of using US EPA standards, the Cedar-Portage data will be included in the assessment, although there is not a significant TP loading from the watershed. For the comparison of apples to apples, the information from the Cedar-Portage watershed can effortlessly be subtracted from the information shown below.

Determining the quantity of total phosphorous (TP) generated by the 73 ODA DLEP CAFF's provides; A) insight on the significance of animal feeding operations on the total loading, B) insight on where the loading occurs, and C) what type of animal feeding operation creates the most phosphorus loading.

The request of the US EPA articulated in the comments on the PMR, the 73 ODA DLEP CAFF's (animal feeding operations) were encompassed into the draft TMDL, found in Appendix 3 titled "Methods For Manure, Fertilizer, and Crop Removal" as seen in Table A3.2. As deliberated below, the origin of the information contained in Table A3.2 is based upon permit application submittals, therefore the information may not be an exact representation of actual discharges.

Yet again, because the numbers are not exact, the assessment of the findings in Table A3.2 is intended to provide a comparative analysis of the phosphorous loading from the 73 ODA DLEP CAFF's operating within the Maumee watershed. Please remember the Cedar-Portage watershed is separate from the Maumee watershed.

## A. FINDINGS

The verdict from a review of the attached Tables1.1-1.4 and Figures 1.A-1.C, titled "73 ODA DLEP Permitted CAFF's by Facility, Watershed, Animal Species, Animal Count-Metric US Tons Excreted per year-Million Gallons Generated per year-Metric Tons Released to the Waters of Ohio" are as follows.

The following findings are based upon the analysis of the information provided in the draft TMDL. In order to arrive at a greater level of confidence, additional information from the Ohio EPA and ODA will need to be obtained. The author requested the Ohio agencies prepare the statistics using the aforementioned data on December 20, 2022, unfortunately, to date that work has not been done.

1. The TP Produced by the ODA DLEP CAFF's is Significant to the Basin Loading.

   The 73 ODA DLEP CAFF's have the potential to produce 58% of the TP produced by the entire animal feeding operations located in the Maumee River watershed during 2017. (3,053 metric tons per year of TP from the ODA DLEP CAFF's out of the 5,300 metric tons per year of TP produced by the entirety of the watersheds animal feeding operations (AFO"s) (Table A3.5 of the draft TMDL))

**Quantity and Percentage of TP Produced in the Maumee River Watershed from the 73 ODA DLEP CAFF's Compared to all Maumee River watershed AFO's**

| Metric Tons TP Produced by ODA DLEP CAFF's in the Maumee Watershed | Metric Tons TP Produced by all AFO's in the Maumee Watershed in 2017 | Percent Produced by ODA DLEP CAFF's |
|---|---|---|
| 3053 | 5300 | 58% |

Table 1.1. Calculated quantity and percentage of TP produced in the Maumee Watershed from the 73 ODA DLEP CAFF's compared to all Maumee River Watershed AFO's

2. The ODA DLEP CAFF TP Production is Concentrated in particular Watersheds.

   The three watersheds which generates the greatest quantity of TP from manure produced by the 73 ODA DLEP CAFF's (2,320 MT) happen to be the Upper Maumee, Auglaize, and St. Marys watersheds. The 52 ODA DLEP CAFF's in the Upper Maumee, Auglaize, and St. Marys watersheds produce 76% of the TP generated by the 73 ODA DLEP CAFF's in the Maumee River watershed. The Upper Maumee, Auglaize, and St. Marys ODA DLEP CAFF's produce 44% of the TP generated by all animal feeding operations (AFO's) in the Maumee River watershed (Number of AFO's is unknown).

| Quantity and Percentage of TP Produced by Watershed from the 73 ODA DLEP CAFF's Compared to the AFO TP Generated in the Maumee River Watershed during 2017 | | | |
|---|---|---|---|
| **Watershed Name** | **Metric Tons of TP from ODA DLEP CAFF's** | **Percent TP by watershed from ODA DLEP CAFF's** | **Percent TP by ODA DLEP CAFF's vs. 2017 all AFO's in Maumee Watershed** |
| Upper Maumee | 881 | 29% | 17% |
| Auglaize | 743 | 24% | 14% |
| St. Marys | 696 | 23% | 13% |
| Lower Maumee | 243 | 8% | 5% |
| Cedar-Portage | 161 | 5% | 3% |
| Tiffin | 150 | 5% | 3% |
| St. Joseph | 108 | 4% | 2% |
| Blanchard | 71 | 2% | 1% |

Table 1.2. Calculated quantity and percentage of TP produced by watershed from the 73 ODA DLEP CAFF's compared to the TP generated by all AFO's in the Maumee River Watershed during 2017

3. TP Production by Species is Concentrated in particular Watersheds.

As expected, the poultry animal feeding operation sector produces the highest amount of TP produced by the 73 ODA DLEP permitted animal feeding operations. Surprisingly, the 73 ODA DLEP CAFF's generate 97% of the dairy produced TP, 80% of the poultry produced TP, and 40% of the swine produced TP compared to the Maumee River watershed.

**Quantity and Percentage of TP Produced by Animal Type from the 73 ODA DLEP CAFF's Compared to the TP Generated in the Maumee River Watershed during 2017**

| Animal Species | Metric Tons TP produced by the ODA DLEP CAFF's | Metric Tons TP produced in 2017 by AFO's in the Maumee Watershed | Percent TP Produced by ODA DLEP CAFF's vs. AFO's in the Maumee Watershed in 2017 |
|---|---|---|---|
| Dairy Cows | 1041 | 1069 | 97% |
| Poultry | 1575 | 1981 | 80% |
| Swine | 438 | 1096 | 40% |

Table 1.3. Calculation of quantity and percentage of TP produced by animal species from the 73 ODA DLEP CAFF's compared to the TP generated in the Maumee River Watershed during 2017

4. Wastewater Manure Production is Dominated by particular Watersheds.

   The volume of liquid manure produced by the 73 ODA DLEP CAFF's is computed to be 69% (289 million gallons a year) of the liquid manure generated in the Maumee River watershed (421 million gallons per year) by animal feeding operations. Liquid manure includes the manure excreted by animals as well as the process water generated during the animal production operation. It is assumed all of the liquid manure in the Maumee River watershed is pumped by drag line to or delivered by truck to land application for distribution and utilization owned, operated, or controlled (or not) by persons other than the owners and operators of the animal feeding operation. Poultry operations are assumed to not generate or produce liquid manure. Whether or not the ownership is precise, it bears no matter to the statistics since all of the manure is distributed and utilized.

   The consequence of the review of the millions of gallons of liquid manure generated, is to establish a correlation between the gallons of manure produced and DRP. Included in the draft TMDL in Section 4, *Phosphorous in the Maumee Watershed,* there is a detailed discussion of the relative algae generation by TP and DRP. The deduction of the discussion is that DRP provides a more readily available and soluble form of phosphorus than TP to form HAB's. As also argued, the lack of availability of DRP data at monitoring stations, especially at pour points. This makes for a scarcity of dependable data to produce a precise mass balance model to calculate TMDL targets. The mixing of phosphorus in water will create a dissolved phosphorous solution. Intermingling of TP and water in lagoons provides for the formation of DRP. Phosphorous sludge amalgamated with water is another vehicle for creating DRP (refer to the COMMENT 2, Land Application *asserting CAFF's that are co-joined operationally with land applications are required to have permits that facilitates discharges into the waters of the state of Ohio, a dissertation on NPDES applicability, and a treatise of permit requirements for Ohio CAFF's)*.

5. Tables A.1-A.3 can be improved by correlating the TP and DRP produced with the land application acreage associated with each of the 73 ODA DLEP CAFF's. The addition of the land application acreage will allow a cursory determination of whether there is overapplication due to too much manure and not enough land for distribution.

   Another column in the Tables A.1-A.3 would be beneficial to the analysis of the 73 ODA DLEP CAFF's. The addition of information of each of the CAFF's land application practices and whether overapplication is designed into their operation.

Is land application data and BMP use for the 73 ODA DLEP CAFF's trade secret?
Why isn't more information released by ODA pertaining to the DLEP CAFF's?
Discharge information cannot be trade secret as defined by OAC Rule 3745-49-02 (T)(3) and 3745-49-03 *Trade Secrets.*

**Quantity of Wastewater (Million gallons per Year) and Percentage of Wastewater Produced by Watershed from the 73 ODA DLEP CAFF's Compared to the AFO Wastewater Produced in the Maumee River Watershed during 2017**

| Watershed Name | Dairy MM Gal/Yr. | Swine MM Gal/Yr. | Watershed Total MM Gal/Yr. | Percent of 73 facilities | Percent of Watershed |
|---|---|---|---|---|---|
| **Maumee Watershed** | 224 | 65.9 | 290 | - | 69% |
| Auglaize | 88.5 | 38.0 | 127 | 44% | 30% |
| St. Marys | 28.9 | 4.92 | 33.8 | 12% | 8% |
| Cedar-Portage | 30.7 | 2.20 | 32.9 | 11% | 7% |
| Upper Maumee | 26.9 | 3.37 | 30.3 | 10% | 7% |
| Tiffin | 18.4 | 8.74 | 27.1 | 9% | 6% |
| St Joseph | 17.1 | 4.58 | 21.7 | 7% | 5% |
| Blanchard | 13.5 | 1.05 | 14.5 | 5% | 3% |
| Lower Maumee | 0 | 3.00 | 3.00 | 1% | <1% |

Table 1.4 Calculated and percentage quantity of wastewater produced by ODA DLEP CAFF's compared to the wastewater produced in the Maumee River Watershed during 2017

**Methodology used in constructing Tables 1.A through 1.C**

The 73 ODA DLEP CAFF statistics contained in the draft TMDL, Appendix 3, Table A.3.2 is the fundamental information used for constructing the evaluation. The amount of manure phosphorus generated was calculated by using the information contained in draft TMDL, Appendix 3, Table A.3.3, using the ODA average. The volume of manure produced by swine was estimated to be 250 gallons/unit/year based upon a review of data contain in recent Ohio ODA and Ohio EPA permit applications. The average volume of gallons produced by a dairy cow was obtained from *Sizing Manure Storage, Typical Nutrient Characteristics, Lesson 21, Charles Fulhage and John Hoehne, University of Missouri, 2001.* For the most part, I attempted to preserve using three significant figures when calculating or stating the results. Watershed information is delineated in the rows and species are color coordinated for convenience of review, with apologies to those who have a color deficiency.

**The material contained in Figures 1.A, 1.B, and 1.C shows that the 73 ODA DLEP CAFF's produce a substantial quantity of TP in the Maumee watershed and this information should be systematically reviewed and updated to evaluate the numerous options for mitigation of discharges to the waters of the state of Ohio. The statistics should also be used in updates and revisions of the TMDL.**

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**Table 1. A**
**73 ODA DLEP Permitted CAFF's**
**By Facility, Watershed, Animal Species, Animal Count**
**Metric & US Tons TP Excreted Per Year**
**Million Gallons Manure Generated Per Year**

| Facility Name | Watershed | Animal Species | Animal Count | MT P Excreted/yr | US Ton/yr Excreted | Manure Generated MM Gal/Yr |
|---|---|---|---|---|---|---|
| Bridgewater Dairy, LLC | 4100003 | Dairy | 3,900 | 82.7 | 84.6 | 17.1 |
| Del-Rod Farms, LLC | 4100003 | Swine>55 lbs | 5,000 | 6.85 | 7.01 | 1.250 |
| Grand Republic | 4100003 | Swine>55 lbs | 7,350 | 10.1 | 10.3 | 1.838 |
| Heritage Family Farms, LLC | 4100003 | Swine>55 lbs | 6,000 | 8.22 | 8.41 | 1.5 |
| Bowersock Pork | 4100004 | Swine>55 lbs | 4,800 | 6.58 | 6.89 | 1.200 |
| Heartland Dairy Holdings | 4100004 | Dairy | 2,100 | 44.5 | 45.6 | 9.20 |
| KFS Farms, LLC | 4100004 | Swine>55 lbs | 7,680 | 10.5 | 17.6 | 1.920 |
| Liberty Egg Farms, LLC | 4100004 | Chickens-Layers | 207,360 | 37.3 | 38.2 | |
| Luginbill Swine Farm | 4100004 | Swine>55 lbs | 7,200 | 9.86 | 10.1 | 1.800 |
| MVP Dairy | 4100004 | Dairy | 4,500 | 95.4 | 97.6 | 19.7 |
| **Pine Valley Ranch (#2)** | 4100004 | Chickens-Layers | 2,264,000 | 408 | 417 | |
| R & S Farms Ag, LLC | 4100004 | Chickens-Layers | 105,000 | 18.9 | 19.3 | |
| Wilker Eggs & Grain Farm | 4100004 | Chickens-Layers | 317,151 | 57.1 | 58.4 | |
| Wilker Family Farms | 4100004 | Chickens-Pullets | 210,000 | 8.40 | 8.59 | |
| Flat Land Dairy | 4100005 | Dairy | 3,144 | 66.7 | 68.2 | 13.8 |
| Fox Tail | 4100005 | Swine>55 lbs | 3,675 | 4.31 | 4.41 | 0.919 |
| Hicksville Farm | 4100005 | Beef | 3,020 | 24.7 | 25.3 | 0.008 |
| **Hillandale Farms (#1)** | 4100005 | Chickens-Layers | 4,011,864 | 722 | 739 | |
| Vissers Dairy | 4100005 | Dairy | 1,600 | 33.9 | 34.7 | 7.01 |
| West Side Dairy | 4100005 | Dairy | 1,400 | 29.7 | 30.4 | 6.13 |
| Bernath Farms 1 and 2 | 4100005 | Swine>55 lbs | 5,000 | 6.85 | 7.01 | 1.25 |
| Brown Swine Farm | 4100005 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| Crites Farms | 4100006 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| De Vries Dairy Ltd.North | 4100006 | Dairy | 2,400 | 50.9 | 52.1 | 10.5 |
| Goebel Pork, LLC | 4100006 | Swine>55 lbs | 4,550 | 6.23 | 6.38 | 1.14 |
| Nofziger Livestock | 4100006 | Swine>55 lbs | 10,000 | 13.7 | 14.0 | 2.50 |
| PGC Chesterfield Hogs | 4100006 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| Planson Pork | 4100006 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| VanderMade Dairy LLC | 4100006 | Dairy | 1,800 | 38.2 | 43.0 | 7.88 |

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**Table 1. B**
**73 ODA DLEP Permitted CAFF's**
**By Facility, Watershed, Animal Species, Animal Count**
**Metric & US Tons TP Excreted Per Year**
**Million Gallons Manure Generated Per Year**

| Facility Name | Watershed | Animal Species | Animal Count | MT P Excreted/yr | US Ton/yr Excreted | Manure Generated MM Gal/Yr |
|---|---|---|---|---|---|---|
| Zeedyk Swine Farm | 4100006 | Swine>55 lbs | 6,000 | 8.22 | 8.41 | 1.5 |
| Bob Sinn Swine | 4100007 | Swine>55 lbs | 9,600 | 13.2 | 13.5 | 2.40 |
| Bruce Rosswurm Swinefarm | 4100007 | Swine>55 lbs | 9,600 | 13.2 | 13.5 | 2.40 |
| Canal Farm | 4100007 | Swine>55 lbs | 3,582 | 4.91 | 5.02 | 0.90 |
| Convoy Dairy LLC | 4100007 | Dairy | 2,033 | 43.1 | 46.2 | 8.90 |
| Creek View Farm | 4100007 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| Deer View Farm | 4100007 | Swine>55 lbs | 3,500 | 4.80 | 4.91 | 0.88 |
| Feather Ridge Farm | 4100007 | Chickens-Layers | 183,288 | 33.0 | 33.8 | |
| Gina Dairy Farm | 4100007 | Dairy | 1,300 | 27.6 | 29.9 | 5.69 |
| Happy Yoks LLC | 4100007 | Chickens-Layers | 404,616 | 72.8 | 74.5 | |
| Harting Livestock LLC | 4100007 | Swine>55 lbs | 14,000 | 19.2 | 27.7 | 3.50 |
| Hefner's Dola Swine Farm | 4100007 | Swine>55 bs | 4,200 | 5.75 | 5.89 | 1.05 |
| Hillside Acres | 4100007 | Swine>55 lbs | 13,600 | 18.6 | 19.1 | 3.40 |
| Jeff & Ann Ricker Swine | 4100007 | Swine>55 lbs | 4,900 | 6.71 | 23.4 | 1.23 |
| Lamar Swine Farms LLC | 4100007 | Swine>55 lbs | 9,600 | 13.2 | 13.5 | 2.40 |
| Miller City Farms LLC | 4100007 | Dairy | 1,250 | 26.5 | 27.5 | 5.48 |
| Oak Forrest | 4100007 | Turkey | 74,000 | 0.56 | 0.58 | 0.139 |
| **Paulding Dairy (#4)** | 4100007 | Dairy | 5,501 | 117 | 119 | 24.1 |
| Pesserfall Farms LLC | 4100007 | Swine>55 lbs | 5,200 | 7.12 | 7.29 | 1.30 |
| Profit Family Pork | 4100007 | Swine>55 lbs | 9,600 | 13.2 | 13.5 | 2.40 |
| Riverbend Sow Complex | 4100007 | Swine>55 lbs | 3,500 | 4.80 | 4.91 | 0.88 |
| RMK Farming LLC | 4100007 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| Rose Grove Farm | 4100007 | Swine>55 lbs | 3,611 | 4.95 | 5.06 | 0.90 |
| Schweinefarmen LLC | 4100007 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| Sugar Lane Dairy LLC | 4100007 | Dairy | 3,820 | 81.0 | 82.9 | 16.7 |
| Sun Mountain Dairy | 4100007 | Dairy | 3,200 | 67.9 | 75.5 | 14.0 |
| The Brick Farm Swine LLC | 4100007 | Swine>55 lbs | 6,000 | 8.22 | 8.41 | 1.50 |
| Tim Sinn Family Hog Farm | 4100007 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| Triple R Farms Inc. | 4100007 | Swine>55 lbs | 7,200 | 9.86 | 10.1 | 1.80 |

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**Table 1. C**
**73 ODA DLEP Permitted CAFF's**
**By Facility, Watershed, Animal Species, Animal Count**
**Metric & US Tons TP Excreted Per Year**
**Million Gallons Manure Generated Per Year**
**&**
**Summary by Watershed**

| Facility Name | Watershed | Animal Species | Animal Count | MT P Excreted/yr | US Ton/yr Excreted | Manure Generated MM Gal/Yr |
|---|---|---|---|---|---|---|
| Triple V Pork LLC | 4100007 | Swine>55 lbs | 5,450 | 7.47 | 7.64 | 1.36 |
| Van Erk Dairy | 4100007 | Dairy | 2,000 | 42.4 | 43.4 | 8.76 |
| Vandenhengel Pork LLC | 4100007 | Swine>55 lbs | 7,350 | 10.1 | 10.3 | 1.84 |
| White Oak Farm | 4100007 | Swine>55 lbs | 2,776 | 3.80 | 3.89 | 0.69 |
| Wildcat Dairy | 4100007 | Dairy | 1,102 | 23.4 | 23.9 | 4.83 |
| Willow Tree Swine LLC | 4100007 | Swine>55 lbs | 9,600 | 13.2 | 13.5 | 2.40 |
| Continental Dairy LLC | 4100008 | Dairy | 2,250 | 47.7 | 48.8 | 9.86 |
| Highship Pork | 4100008 | Swine>55 lbs | 4,200 | 5.75 | 5.89 | 1.05 |
| Vrieco Farms Ldt | 4100008 | Dairy | 825 | 17.5 | 17.9 | 3.61 |
| Fenstermaker Farms Inc | 4100009 | Swine>55 lbs | 6,780 | 9.29 | 12.9 | 1.70 |
| **Hertzeld Poultry Farms (#3)** | 4100009 | Chickens-Layers | 1,256,191 | 226 | 231 | |
| KMLS Farms LLC | 4100009 | Swine>55 lbs | 5,234 | 7.17 | 7.62 | 1.31 |
| **BB Land LLC (#5)** | 4100010 | Dairy | 5,000 | 106 | 108 | 21.9 |
| Boyer Farms | 4100010 | Swine>55 lbs | 4,800 | 6.58 | 6.73 | 1.20 |
| Reyskens Dairy LLC | 4100010 | Dairy | 2,000 | 42.4 | 43.4 | 8.76 |
| Roger & Lori Rader Farms | 4100010 | Swine>55 lbs | 4,000 | 5.48 | 5.61 | 1.00 |
| | | | | | | |
| **TOTAL** | | | | **2,964** | **3081** | 271.6 |
| | | | | | | |
| **Watershed Total** | **Watershed** | | | **MT Watershed/Yr** | **UST Watersehd/Yr** | **MM gal/Yr** |
| Sum watershed 04100003 | St. Joseph | | | 69 | 71 | 13.7 |
| Sum watershed 04100004 | St. Marys | | | 716 | 733 | 38.1 |
| Sum watershed 04100005 | Upper Maumee | | | 824 | 843 | 27.3 |
| Sum watershed 04100006 | Tiffin | | | 150 | 154 | 17.8 |
| Sum watershed 04100007 | Auglaize | | | 730 | 747 | 124.3 |
| Sum watershed 04100008 | Blanchard | | | 71.0 | 72.6 | 14.52 |
| Sum watershed 04100009 | Lower Maumee | | | 243 | 248 | 3.004 |
| Sum watershed 04100010 | Cedar-Portage | | | 161 | 164 | 32.9 |

## B. DISCUSSION OF FINDINGS

The material shown in the above tables 1.A, 1.B, and 1.C pertaining to the quantity of TP and the volume of manure generated by the 73 ODA DLEP CAFF's in conjunction with the venue of CAFF's primarily within three watershed confirms the correlation in the draft TMDL pertaining to the location of TP and DRP hotspots, high TP landscape yield, conceivable location to land application sites within the HUC-8 watershed, the formation of CSA's, legacy TP and DRP regions due to high levels of annual rainfall delineated in the draft TMDL.

The findings will review the correlation between the 73 ODA DLEP CAFF's location and the:

1. *The areas of highest TP yield by HUC-8 watershed during the spring 2008 base condition.*
2. *The setting of HRU's chosen to receive manure applications with the Maumee River watershed.*
3. *The conceivable "Hotspots" also called "Critical Source Areas" of nutrient export to the Maumee River Watershed (WEB) identified by evaluating multiple predictive models.*
4. *The setting of potential legacy TP and DRP areas produced by increased rainfall.*

The ODA DLEP CAFF's located in the Upper Maumee, Auglaize, and the St. Mary watersheds are the utmost producers of TP and possibly DRP of the ODA DLEP CAFF's and when summed, the 73 CAFF's comprise a noteworthy portion of the TP and DRP generated by all AFO's located in the Maumee River watershed.

An assessment of Tables 1.1-1.4 alongside tables 1.A, 1.B, and 1C include the watersheds where the greatest amount of TP and gallons of manure are produced from the ODA DLEP CAFF's. The location of the 73 ODA DLEP CAFF's is listed by watershed.

| Watershed | HUC 8 |
|---|---|
| St. Joseph | 04100003 |
| St. Marys | 04100004 |
| Upper Maumee | 04100005 |
| Tiffin | 04100006 |
| Auglaize | 04100007 |
| Blanchard | 04100008 |
| Lower Maumee | 04100009 |

Figure 1.3 Sub watersheds in the Maumee River Watershed

The watershed 04100010 which is the Cedar-Portage region is listed in the tables but is not included in the discussion of the findings included in the draft TMDL (because the US EPA and the Ohio EPA are apparently in discussion on the matter of applicability), other than in Appendix 3. The matter of the loading from the Cedar-Portage watershed will be sorted out later.

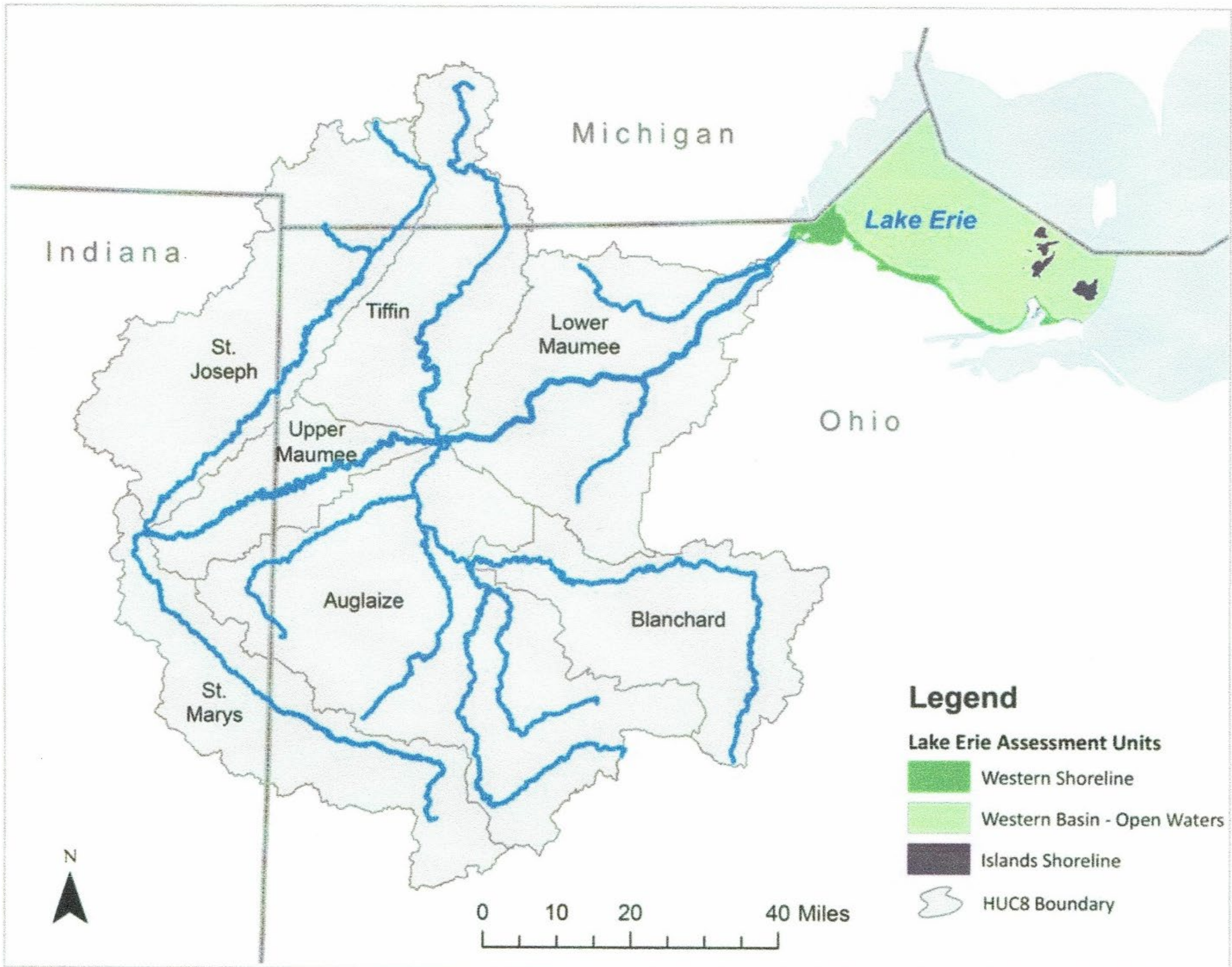


Figure 1.4. Maumee Basin and the location of the seven watersheds where ODA DLEP CAFF's are located

1. ***Assessment of the location of the largest ODA DLEP CAFF Concentration and the areas of highest TP yield by HUC-8 watershed for the spring 2008 base condition. (Figure 1.5).***

The information contained in the draft TMDL in §4.1.1.2 relating to critical source areas (CSA's) being in the three watersheds is validated. Figure 1.5 (Figure 30 in the draft TMDL) shows the relationship between the CSA's and the watersheds where there is a high concentration of ODA DLEP CAFF's

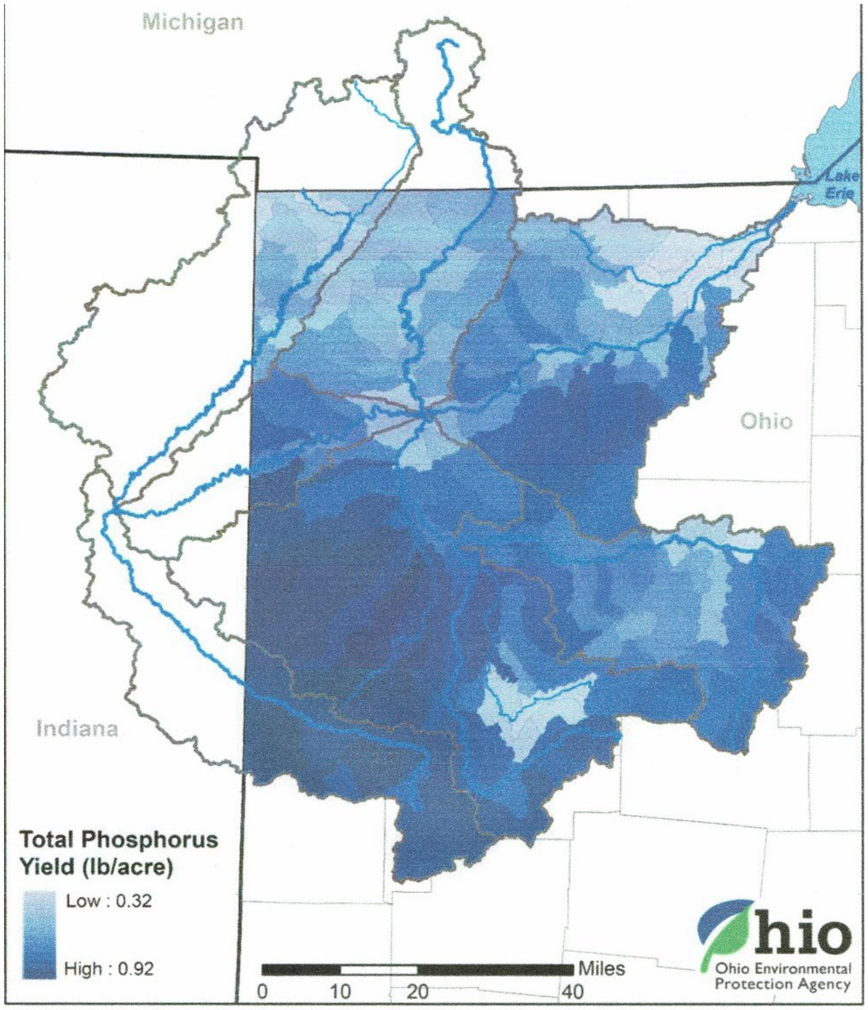


*Figure 30. Total phosphorus yield from the landscape by HUC-12 in the Maumee watershed for the spring 2008 base condition from the Ohio DAP 2020 (OLEC, 2020a).*

Figure 1.5 Total phosphorous yield from the landscape by HUC-12, spring 2008. Ohio DAP 2020.

The darker the blue shown in Figure 1.5 (Figure 30 in the draft TMDL), the higher the TP yield from landscape in the watershed. Note the darkest blue areas appears in the St. Marys, Auglaize, and Upper Maumee watersheds where there is a high TP loading. Note the lighter blue areas of the St. Joseph and Tiffin watersheds where there is lower TP loading. The St Marys watershed flows into Indiana where it meets with the Upper Maumee River. This discharge is a longer journey than the drainage from the Upper Maumee River watershed and the Auglaize watershed into the Maumee River and to the Waterville monitoring station, which will be discussed later.

2. ***<u>Assessment of the location of the largest ODA DLEP CAFF Concentration and locations of Hydraulic Response Units (HRU's) indicated to receive manure applications within the Maumee River watershed. (Figure 1.6).</u>***

Observing where manure from CAFF's is employed when distributed by drag lines (typically within 2-miles from the CAFF production area) is important. The Figure 1.6 (Figure 18 in the draft TMDL) depicts those areas where the solid manure is deposited once every six years. (versus liquid and sludge manure which are distributed to land application on a more frequent basis, which may be more than once a year).


*Figure 18. Locations of hydrologic response units (HRUs) chosen to receive manure applications within the watershed. Approximately 18 percent of the agricultural cropland was selected to receive manure applications at least once every six years (Kast et al., 2021: Supplemental Material).*

Figure 1.6 Location of HRUs chosen to receive manure applications

The purple-colored areas of Figure 1.6 show the unabridged Maumee River watershed without the demarcation of state lines, and the setting of areas (in purple) where there is a possibility of land application phosphorous manure. The heavily purple area shown in the St. Mary watershed and the Auglaize watershed is apparent, with concentrated areas also in the Upper Maumee watershed. The dearth of knowledge of the location of the 73 ODA DLEP CAFF's hampers the ability to implement a better connection between the location of and the distribution of land application areas of manure with the production areas. Even so, the knowledge of the watershed where the greatest concentration of land application is located, is all that is available on the relationship between the two variables of production location and land application location. The important characteristic is how well Figure 1.6 correlates with Figure 1.5. It is stated, Ohio EPA intends to research this phenomenon later.

3. ***<u>Assessment of the location of the highest concentration of ODA DLEP CAFF's and the potential "Hotspots" also called "Critical Source Areas" of nutrient export to the Western Lake Erie Basin identified by comparing multiple predictive models. (Figure 1.7).</u>***

As expressed in the draft TMDL, numerous predictive models such as SWAT, were used in earlier evaluations to distinguish "hotspots" where there may ban accumulation of TP and DRP within various watersheds. Figure 1.7 (Figure 29 in the draft TMDL) is an appraisal of that work. As in the earlier figures, the entire Maumee basin is depicted in Figure 1.7. This figures depicts the loading from inside the Indiana and Michigan state boundaries as well as that generated in Ohio.

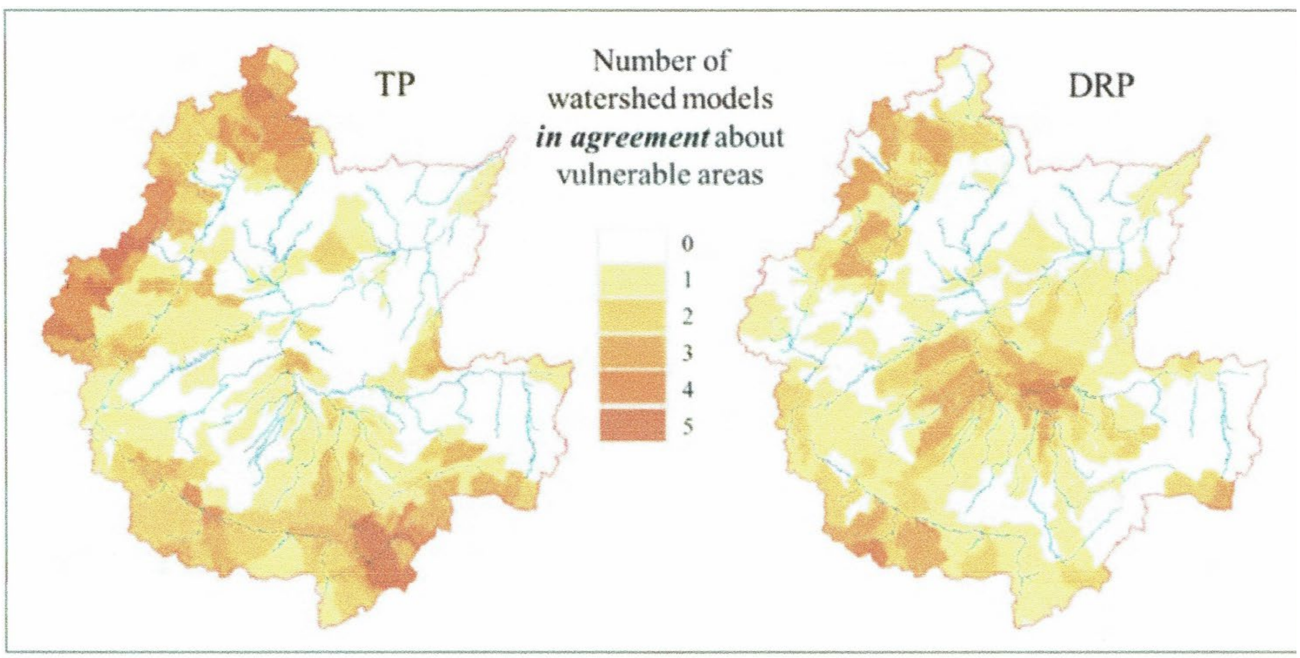


*Figure 29. Potential "hotspots" of nutrient export to WLEB in the Maumee watershed identified by comparing multiple models. Scale is 0–5 based on models in agreement. There were six models used in the total phosphorus map; however, all six models did not agree on any area. Only five models are used in the DRP map (Scavia et al., 2016).*

Figure 1.7 Potential hotspot of nutrient export

Predictive modeling is an indispensable tool used in the development and the evaluation of the TMDL targets. Figure 1.7 is a comparison of model results in order to identify "hotspots" which are identified as Critical Source Areas (CSA's). This is a very important step and the federal guidelines for the approval a TMDL require this step. The Ohio EPA and I agree about the importance of accurate modeling.

It is important to note the figure on the left is for concentration of TP and the one on the right is for DRP. This distinction is important because as mentioned earlier, DRP is more associated with the land application of liquid manure. This land application of liquid manure is more likely, due to physical and chemical speciation to be interconnected to the formation of DRP and HAB's. TP is more likely related to solids and as stated earlier, total phosphorous. The identification of CSA's is important because it shows the implementing agencies where they should concentrate their resources to mitigate the TP and DRP. Myriad studies show drainage tiles dissipate liquid DRP to waterways.

In Figure 1.7 the darker shaded areas are evident in the St Mary watershed, the Auglaize watershed, and the upper Maumee watershed south of the Maumee River. Again, there is a relationship between the location of the concentration of the 73 ODA DLEP CAFF's and the models that predict a higher DRP concentration in those area. Also, note the similarities between Figures 1.5, 1.6, and 1.7.

Section 4.2.1 of the draft TMDL states several of the reasons for the creation of CSA's. One reason is **"high livestock density"** and as stated on page 71 of the draft TMDL**,**

> **" Two HUC-12s were identified as being top priorities due to high livestock density. One of these two HUC-12s is south of the mainstem Maumee River."**

The section also details the causes of CSA's as "Soils in hydrologic group D", "High Sloped Lands", and "Various Hotspot Characteristics."

There is a powerful correlation between the concentration of ODA DLEP CAFF's and the CSA "hotspots." Note various areas are closer to Waterville and Lake Erie than others.

4. ***Assessment of the ODA DLEP CAFF's and the position of potential legacy TP and DRP areas created by increased rainfall.***

Hydrology plays an important role in the distribution of DRP and TP within the watershed. The DRP produced at the 73 ODA DLEP CAFF's and other AFO's is delivered by dragline and truck to land application areas, to be applied in a manner which is sometimes in excess to the amount which may be assimilated by crops persists in the land application areas. Rainfall, or an excess amount of liquid pushes the DRP into waterways which lead to the waters of the state of Ohio. Also, rainfall is the medium for conveying the excess DRP applied during land application to the waters of the state of Ohio. Additionally, the DRP is adsorbed in the sediment of the waterways of the state during its journey from the field to Lake Erie. Increased flow within the waterway due to increased rainfall encourages the DRP to migrate from the sediment to the water while in transit and/or for the sediment to migrate down to Lake Erie. This sediment migration is one of the motivations for the dredging of the Maumee Bay ship channel. Moreover, the reason for the Maumee River to have the nickname "muddy water."

The term for the excess DRP which resides in land application areas is frequently called legacy DRP and legacy TP. The controlling word being "legacy," because the DRP resides in the land application area on occasion for more than one year. There have been occasions during high rainfall seasons where the measurement of TP at pour points are exceedingly high without a large quantity of fertilizer or manure-based nutrients being applied to the land, such as 2017, which is caused by rainfall. Studies show the high HAB levels during that year were caused by 'legacy' phosphorous.

Obviously, the reason for many of the high phosphorous reading is because "legacy" phosphorous is being washed from the land into the waterways of the state of Ohio.

Of course, there must be a source of the legacy phosphorous to be washed into the waterway. That phosphorous comes from manure-based land application from AFO's and from synthetic fertilizer. Namely, excess application of the phosphorous constituents.

The strong correlation between rainfall and DRP loading, Section 4.1.1.7 of the draft TMDL discusses the correlation in depth. The areas within the watershed where there are increases in rainfall corresponds to the areas of high ODA DLEP CAFF's, the possible generator of legacy phosphorous. Figure 1.8 (Figure 20 in the draft TMDL) shows that correlation.

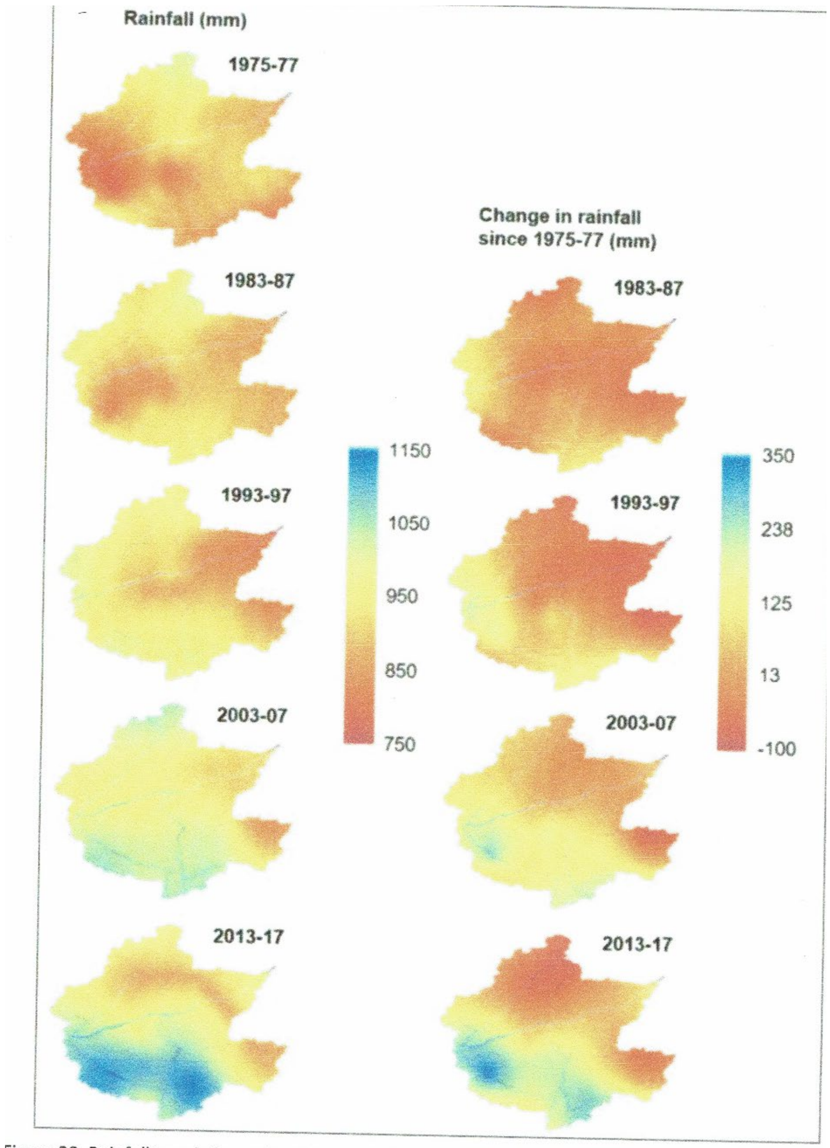


*Figure 20. Rainfall trends for various time periods between 1975 and 2017. The right maps show the calculated differences from the 1975–1977 period (Williams and King, 2020).*

Figure 1.8 Rainfall Trends in the Maumee Watershed 1975-2017

As it can be seen in Figure 1.8 and reviewed in the draft TMDL §4.1.1.7, "*Changes in watershed hydrology changes in precipitation amount, timing and intensity present a complicating challenge to nonpoint source control of phosphorus*." The timing and the location of the increased precipitation is exceedingly important because of the location of the high concentration of the 73 ODA DLEP CAFF's, which are in the same watersheds. "An ARS study by Williams and King (2020) examined hydrologic changes in the Maumee watershed. Twenty-three daily rainfall and 12 streamflow gages in and near the watershed were examined from 1975 through 2017. An overall increase in rainfall of 11–13 percent (Figure 20) and streamflow of 19–32 percent were documented for the Maumee watershed. Heavy and very-heavy rainfall events brought the majority of these increases, more often 49 in the spring. The study noted that the greatest increases in rainfall were observed in the southern half of the Maumee."

The consequence of precipitation has an effect not only on direct discharges, but studies also show the increased rainfall has an influence of increasing legacy and CSA TP and DRP discharges.

As shown later in the draft TMDL, there is a tendency in the Maumee watershed where the largest TP and DRP loads coincide with the highest rainfall due to the increased streamflow. As stated in the same section, “Hydrology directly plays a role in all nonpoint sources discussed in this section as well as permitted stormwater sources, described below. Increased rainfall in the Maumee watershed has, and most likely will continue to, exacerbate controlling these sources.”

You are encouraged to review the area, and the watersheds, which the data reveals will have the greatest TP and DRP impact due to precipitation. The correlations showed by the earlier review corresponds with rainfall and of course the discharge of DRP and TP close to, or downstream of the 73 ODA DLEP CAFF’s in the watersheds of the Upper Maumee, Auglaize, and St. Marys. This conclusion is confirmed in the draft TMDL.

***Exemption from permit requirements under ORC § 307.204(B)(2) for major CAFF’s which increase their design capacity by less than 10% may underestimate discharge projections.***

The concern of a deficiency caused by an exemption from permit requirements, for the construction or expansion of major CAFF’s that are less than 10%, creates a loophole from the environmental review. Any of the 73 ODA DLEP CAFF’s could increase the permitted animal limits without review. If so, the TP and manure generation estimates will be lower than stated. For example, the calculated percentage of TP generated by the 73 ODA DLEP CAFF’s would rise from 58% to 68%, a significant increase in the non-point inventory without review by Ohio EPA and ODA.

This legislative exemption may be contrary to the US EPA federal permitting requirements.

Found in Section 307.204(B)(2) of the ORC *Procedure concerning construction or expansion of concentrated animal feeding facility*, provides written notice must be provided when there is, “… increase (of) the design capacity of an existing major concentrated animal feeding facility by ten percent or more in excess of the design capacity set forth in the current permit…”.

The cumulative impact of increases of the animal capacities of CAFF’s is currently unknown due the lack of information. Information which does not need to be reported or obtain environmental review.

This exemption from review and permits promotes what people call, the “one under” CAFF’s which allow them to climb over that hurdle to be “10% greater CAFF’s.”

## C. Summary of Findings and Recommendations

The Ohio EPA and the ODA are encouraged to comprehensively examine and evaluate the impact of the 73 ODA LEP CAFF’s and their influence on the TP and DRP loading. A more detailed assessment than what I provided is encouraged. The scrutiny of the contribution of TP and DRP by the 73 ODA LEP CAFF's is warranted in the TMDL, or that the US EPA may perform in their evaluation, in the case there is a federally generated TMDL. The evaluation proposed in *COMMENT 2: Land Application* may lead to the reassignment of the loading by the 73 ODA DLEP CAFF/CAFO livestock and corresponding land applications controlled by the same owners/operators to a separate LA source category.

I. The 73 ODA LEP CAFF's are a substantial source of nonpoint TP in the Maumee River watershed.
II. The 73 ODA LEP CAFF's generate a greater amount of TP than all of the many smaller sized AFO's.
III. The 73 ODA LEP CAFF's are a significant source for creating liquid manure in the Maumee River watershed which readily becomes a source of DRP.
IV. The three watersheds where the 73 ODA DLEP CAFF's reside and that generate the greatest portion of the TP are the St. Marys, Upper Maumee, and the Auglaize.
V. The location of the 73 ODA DLEP CAFF's which generate the lion's share of the TP are in watersheds where the draft TMDL shows,
    a. The greatest amount of loading of TP (Figure 1.5).
    b. A large concentration of HRU's which receive manure applications (Figure 1.6).
    c. The areas where potential "hotspots," "CSA's, "legacy TP and DRP areas" are identified by predictive models (Figure 1.7).
    d. The areas where data validates there has been increased precipitation which has caused an increase of the generation of TP and DRP (Figure 1.8).
VI. The 73 ODA DLEP CAFF's may be subject to NPDES permit requirements and should be evaluated for applicability to the federal permit requirements as suggested in *COMMENT 2: Land Application*.
VII. The TMDL has a duty to identify the CAFO's, CAFF's or animal feeding operations that hold a NPDES permit, and which are permitted as CAFF's.
VIII. The documentation of the amount and location of land controlled by, used by, owned by each of the 73 ODA DLEP CAFF's would be beneficial in the review of whether they are subject to NPDES permitting requirements, and whether they discharge into the waters of the state of Ohio.
IX. The 73 ODA DLEP CAFF's with its respective land application discharges could be combined into one subsegment of the Load Allocation (LA) into what is called a bubble permit. The Ohio EPA can establish a bubble TP LA as a subset of the non-point source LA. The total discharge for the bubbled CAFF's will be no more than a baseline amount and gradually decrease until it reaches a prescribed amount (40% below baseline or determined by regulation). The CAFF's are able to trade TP discharges between themselves and offset any new and modified

CAFF's must fit under the TP bubble allowance, or a growth allowance should be established. Real, enforceable, and quantifiable reductions from outside the bubble can be allowed of offset growth from within the bubble. This concept is similar to and should be designed to comply with the US EPA bubble rule, emission offset rule, and emission trading rule. As the program matures, the applicability of the program could expand to smaller CAFF's/AFO's. Programs such as these are used for areas that do not meet environmental standards. Sister agencies to the Ohio EPA have applied similar program and a common air regulation strategy. The program allows for the applicable CAFF's to determine the most effective strategy to lower the TP and DRP discharges. The program more likely will need to be run by the Ohio EPA rather than the ODA requiring, legislative action. If applicable, public involvement, such as creating watershed treatment and storage facilities will require state involvement.

**It is recommended the TMDL be amended to include a separate load allocation for the 73 ODA LEP CAFF's for DRP and TP land applications discharges under a review recommended in COMMENT 2. Establish the 73 ODA DLEP CAFF's into a separate category with allocations within the LA and establish a phosphorous bubble program run by the Ohio EPA to lower TP and DRP discharges.**

**The 73 ODA DLEP CAFF's produce every year about 3,500 MT out 5,300 MT TP animal waste generated. Consideration should be given to a regulation for the use of "P waste reduction technology" on the largest of the CAFF's, especially for liquid waste management. The State of Ohio may consider constructing and operating publicly owned "P nutrient reduction treatment plants".**

# COMMENT 2: LAND APPLICATION

**This is an examination of whether CAFF's that are cojoined operationally with land applications are required to have permits that enable discharges into the waters of the state of Ohio, a dialogue of NPDES applicability, and a dissertation of permit requirements for Ohio CAFF's.**

CAFF's have the right to apply manure onto lands for crop production. The right to apply manure is tempered by when the application of manure in excess to what is assimilated in crop production and is discharged by ground tiles, or the application of manure is applied in a manner where it provides no assistance to crop growth. Studies show when too much manure is applied, the unassimilated excess will be discharged to the waterway of the state of Ohio.

The following is a dissertation on the points made in the draft TMDL pertaining to CAFF TP and DRP discharges into the waters of the state of Ohio and waters of the US.

I encourage a considerate deliberation of the issues.

Please excuse my attempt to be a neophyte barrister and an inept agent of the law. I am but a simple and relatively aged engineer by training with many decades working within the borders of laws and regulations. Any rational person must assume that laws are written to make sense and the people who writes the law, do so for the good of all.

For the ease of analysis and to understand the sometimes-unconnected sequence of themes, the analysis is organized by the following four topics.

A. The applicability of discharge limitations for a CAFF is dependent on whether it discharges to the waterway of Ohio, not whether the CAFF is 'designed' not to discharge.
B. The applicability of discharge limitations for land application of manure is dependent on whether there is a discharge that is not caused by stormwater. Land applications create the discharge without consequences to the producer of the manure.
C. The transport of manure from the production area of the CAFF to the land application area is a discharged controlled by the CAFF, even if the land application area is not owned by the owners of the CAFF.
D. The use of the 'functional equivalency test' is an excellent tool to determine whether a CAFF production area, or a land application area associated with the CAFF or unassociated to the CAFF, discharges into the waters of Ohio or the waters of the US.

A. The applicability of limitations for a CAFF is dependent on whether it discharges to the waterway of Ohio, not whether the CAFF is 'designed' not to discharge.

One principal issue revolves around "actual discharge" and "designed not to discharge" as it relates to the 73 ODA DLEP CAFF's and all animal feeding operations, whether permitted or not.

The question is not whether a discharge of pollutants into the waters of the state of Ohio from a CAFF and land applications are allowed or not allowed. The question is whether, if they discharge, are they properly permitted.

The first step to make a determination is to evaluate whether there are CAFFs and land application pollutant discharges into the waters of the state of Ohio (and waters of the US). The second step is to determine whether these discharges are properly and correctly permitted by the agencies of the state of Ohio under the statues of Ohio and the US EPA. As seen below, the 73 ODA DLEP CAFF's may be subject to the NPDES permit requirements.

The draft TMDL maintains the large, permitted animal feeding operations known as CAFFs are designed to have zero discharges from the production areas into the waters of the state of Ohio. This statement solicits attention.

The TMDL stresses the word <u>design</u> and confines the statement to <u>production area</u>.

This is seen in the TMDL *Section 4.1.1.1(page 28), Row crop fertilizer sources: commercial and manure fertilizer use.*

> "DLEP is charged with regulating the construction and operation of Ohio's largest livestock and poultry facilities using science-based guidelines that protect the environment while allowing the facility to be productive. DLEP rules regulate how Ohio's largest livestock and poultry farms manage manure, wastewater, and nutrients, as well as control flies, rodents, and other pests. <u>Permitted facilities, known as Concentrated Animal Feeding Facilities (CAFFs),</u> <u>**are designed**</u> <u>to have zero discharge of pollutants into the waters of the state from the</u> <u>**production area**</u> <u>(emphasis added).</u>"

This statement brings up questions, and it demands a clarification of the TMDL.

Later in the draft TMDL in §5.6, *Allowance for future growth* on page 113, pronounced the same issue pertaining to permits for CAFO/CAFFs.

> "This TMDL provides no wasteload allocations to CAFO/CAFF livestock operations**.** <u>**No livestock operations in the watershed are currently discharging non-agricultural**</u>

> **stormwater under NPDES permits**. In most circumstances, they are prohibited from discharges that would receive a wasteload allocation, and industry trends do not indicate interest in using the Alternative Management Standards that could allow some load to be authorized with a wasteload allocation. Because of these factors, no CAFO/CAFF operations are expected to need a wasteload allocation in the future.
>
> **Livestock operations contribute to the nonpoint source phosphorus load via agricultural stormwater from the land application of manure**. This project does not divide nonpoint sources but instead groups them into a single load allocation. The cumulative load of all contributing nonpoint sources must meet the TMDL's load allocation. If new land uses (such as new or expanding livestock facilities) start operating in the watershed, they are expected to attain the same level of phosphorus control as the existing land use. Because of this construct, reserving AFG for nonpoint sources is not necessary." (emphasis added)

The relevant point is the determination of whether the CAFO/CAFF is discharging during other than times of stormwater. How is the determination of no discharges achieved? The explanation may be partly found by going back to §4.1.1.1 of the draft TMDL on page 28.

> "The ODA Division of Livestock Environmental Permitting (DLEP) has regulatory authority over Ohio's largest livestock and poultry operations, specifically the animal feeding facilities that are required to have a permit under ORC Chapter 903.
>
> DLEP is charged with regulating the construction and operation of Ohio's largest livestock and poultry facilities using science-based guidelines that protect the environment while allowing the facility to be productive. DLEP rules regulate how Ohio's largest livestock and poultry farms manage manure, wastewater, and nutrients, as well as control flies, rodents, and other pests. Permitted facilities, known as Concentrated Animal Feeding Facilities (CAFFs), are **designed** to have zero discharge of pollutants into the waters of the state from the **production area**." (emphasis added)

A straightforward reading is that a CAFF production area may have discharges into the waters of the state of Ohio, but it wasn't designed to do that. Add to this, the fact that 'land application area' is separate from the 'production area.'

This portion of the TMDL brings the reader back to the **design** of the CAFO/CAFF and what engineering evaluation supports that statement. There is no mention of the science of making the findings, that there are many factors which contribute to the discharge of pollutants into the waters of the state of Ohio, outside of the stormwater discharge exemption.

Turning to the land application area and a possible discharge, page 32 in §4.1.1.1, there are additional points of clarification which recognize the discharge of commercial and manure fertilizer which constitutes a discharge into (in this case of TP and DRP) into waters of the state of Ohio. The important point of the following statement is that there is no denial that land application areas do discharge. The following states the inconsequential Ohio remedy for the discharges.

> "Fertilizer, both commercial and manure, is at times lost from farms and fields in a way that is inconsistent with the definition of agricultural stormwater. **These discharges are unacceptable according to federal and state regulations** (see ORC Section 6111.04 and OAC 901:13-1, OAC 901:5, and OAC 901:10-1-10). When livestock operations are found to have a discharge of manure or other waste products, they are required to eliminate the discharge. They also may be required to pay a penalty and to obtain a permit from Ohio EPA and/or ODA to ensure that future discharges do not occur. When direct discharge events do occur, management actions are required to eliminate the source and mitigate the impact. Mitigation often results in much of the discharged material being removed from the surface water body. Overall, these discharges represent a small proportion of manure or commercial fertilizer applied in the watershed. For example, ODA DLEP has responded to five or fewer substantiated spills in each of the last five years (2017–2021). The ODA DLEP oversees manure application completed by CAFO/CAFF operations and certified

Actual discharges not designed discharges determines whether a CAFF is subject to permit requirements.
*-National Pork Producers Council v. EPA*

> livestock managers, representing a substantial amount of manure applied in the watershed." (emphasis added)

We are staring at what should be a bright line test that is defined by science. The decisions of the 2008 - *National Pork Producers Council v. EPA 635 F. 3d 738, 749-51 (5th Cir. 2011*) read in context with the 2020 decision *County of Maui, Hawaii v. Hawaii Wildlife Fund, et al. 140 S. Ct. 1462* of whether the CAFO/CAFF is discharging, which the ODA is turning the assessment of whether there is a discharge, into a blurred line.

If the CAFF discharges from the production area it is a discharge, whether or not the discharge was an intended discharge.

B. The applicability of discharge limitations for land application of manure is dependent on if there is a discharge that is not caused by stormwater.

The draft TMDL addresses the science of discharges from land applications. It is assumed some of the land applications and the production areas are by definition part of the same CAFF.

> **"Fertilizer, both commercial and manure, is at times lost from farms and fields in a way that is inconsistent with the definition of agricultural stormwater. These discharges are unacceptable according to federal and state regulations (see ORC Section 6111.04 and OAC 901:13-1, OAC 901:5, and OAC 901:10-1-10).** When

livestock operations are found to have a discharge of manure or other waste products, they are required to eliminate the discharge. They also may be required to pay a penalty and to obtain a permit from Ohio EPA and/or ODA to ensure that future discharges do not occur. When direct discharge events do occur, management actions are required to eliminate the source and mitigate the impact. Mitigation often results in much of the discharged material being removed from the surface water body. Overall, these discharges represent a small proportion of manure or commercial fertilizer applied in the watershed. For example, ODA DLEP has responded to five or fewer substantiated spills in each of the last five years (2017–2021). The ODA DLEP oversees manure application completed by CAFO/CAFF operations and certified livestock managers, representing a substantial amount of manure applied in the watershed.

Like all nonpoint source pollutants, fertilizer phosphorus loss from fields is driven by water movement. Large, infrequent precipitation events are known to drive most of the phosphorus exported from the Maumee watershed. Baker et al. (2014a) calculated 76 percent 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). These high-precipitation, high-stream-flow events can overwhelm measures taken to avoid fertilizer phosphorus loss and make them less effective. Phosphorus from fertilizer is washed off fields and delivered to streams via runoff and subsurface tile drainage. Phosphorus can be attached to the soil, or other particles, in the particulate form or in the dissolved form most often monitored as DRP (Christianson et al., 2016). Phosphorus stored in soils that is naturally 33 occurring and/or from prior crop fertilization (often referred to as legacy or soil phosphorus) is discussed in Section 4.1.1.2 below.

Manure overapplication near livestock operations may lead to phosphorus accumulation in soil, leading to greater export risk (see the discussion on agricultural soil and legacy phosphorus sources in Section 4.1.1.2). Studies have shown manure overapplication can occur due to applications on soils with already-elevated available phosphorus and by overestimating crop yield/nutrient removal (Long et al., 2018). Kast et al. (2019) did not find evidence that this was widespread in fields under control by CAFOs/CAFFs in the Maumee watershed. These samples come from fields that use 66 percent of CAFO/CAFF swine and 37 percent of CAFO/CAFF cattle manure. CAFO/CAFF operations do not report soil test phosphorus data to Ohio state agencies for fields not under their control (including manure transferred from CAFO/CAFFs through distribution and utilization and smaller facilities).

Another process affecting nutrient movement from fertilizer applications is preferential flow, where soil cracks, earthworm burrows, and other soil fissures can lead to rapid transport to tile drains. This pathway exists for all applied nutrients. Incidences of manure discharges are more prevalent with liquid waste from swine and dairy operations (Hoorman and Shipitalo, 2006). Current nutrient management standards, state law, and state administrative codes have incorporated requirements aimed to reduce the risk of these discharge events. These requirements include many recommendations by Hoorman and Shipitalo (2006) and other studies. Practices exist to prevent the movement of manure or commercial fertilizer to tile lines, and include tillage 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.
>
> <u>Consequently, when discharges of fertilizer—manure or commercial—are not consistent with the definition of agricultural stormwater,</u> parties are often liable for civil penalties and damages. As discussed above, these discharges do sometimes occur and certainly cause local disturbances. However, these discharges are irregular and infrequent. They deliver a relatively small amount of the overall load compared to other sources."

The point made above is discharges occur, sometimes infrequently and sometimes frequently. The test is not the frequency or whether the discharges were not designed to take place, the point is that <u>discharges outside of the stormwater exemption occur</u>. Studies declare they do!

The regulatory agencies (Ohio EPA and ODA) recognize the illegal discharges,

> "**Consequently, when discharges of fertilizer—manure or commercial—are not consistent with the definition of agricultural stormwater,** …"

However, the regulatory discretion applied by either the ODA, or the Ohio EPA appears to prevent the identification of the challenge. The challenge is that regulatory discretion cannot be utilized as a tool to counter the intent and purpose of a regulation. Looking a tad deeper into the absence of permit enforcement by the ODA and the Ohio EPA, we see sundry examples of ignoring or twisting the discretionary enforcement authority to fit the interpretation of a constrained CAFF discharge applicability. It appears the regulatory discretion runs against the sharp meaning of the regulation.

| |
|---|
| It appears ODA is using 'not designed to discharge' as a pass from applying discharge limitations to 'actual discharges.' Admitting that discharges do occur. |

The discharges during land application occurs more frequently than stated in the TMDL, which infers manure is spread at land applications sites about 'once every six years.'

The TMDL needs to address the discharge of liquid and liquid sludge manure from lagoons at the CAFF production area onto land application areas.

Liquids penetrate the soil much easier than the solids. The hydraulic pressure forces the liquids quickly down to the tiled areas to be discharged, without the assistance of a storm.

The implied statement that CAFF production operations do not discharge DPR into the waters of the state and therefore do not qualify to meet restrictions through the state and possibly the federal permit process requires an in-depth evaluation. It is not whether the production operations do not discharge, it is whether the CAFF as defined in § 903.01 does or does not discharge into the waters of the state of Ohio. If the Ohio agencies do not exclude by definition the discharges of process wastewater and process generated wastewater from the determination of a discharge, through the applicability tests for Ohio CAFF permit requirements and limitations by § 903.01, it is contrary to sound clean water logic to narrowly limit the source of the discharge.

Specifically, CAFF operation process water, including fresh water used for flushing manure, sprinklers or foggers used for cooling, wasted drinking water, and water used in washing down rooms or cleaning milking equipment, and if applicable, open lot runoff due to rainfall, rainfall falling into a sludge or solids accumulation in the manure storage facility which comes into contact with and mixes with manure, sludge or solids accumulation which is directed to an earthen lagoon, slurry storage tank, or manure storage facility becomes contaminated with and contains DRP. As stated earlier, § 903.01 (Y) in the definition of a pollutant does not exclude the discharges generated from the above regulation because these operations are included in the definition of CAFF § 903.01 (F).

There is no difference, by statute, between pollution from manure, process and production wastewater generated by CAFF facilities. The process water generated in a CAFF becomes contaminated by solid or liquid manure during the inevitable mixing of the process water and the manure in the *slurry or liquid manure storage and handling systems.* DRP or nutrients in slurry manure are less concentrated due to higher water content (90% to 95% moisture content with a high content of water) than solid manure, also DRP and nutrients in lagoons are dilute and are usually handled by irrigation rather than handling systems. Liquid or lagoon systems have solids concentrations less than 5% with stratification of the nutrients unless agitated.

It is not that the DRP or TP content is lower in slurry or liquid manure systems. The test is that the process water is contaminated with DRP. It is also factual that mixing of the process water and manure occurs, which makes a release of the process water contaminated with DRP. The quantity (lbs./1000 gallons, ppm) of nutrients (Total Kjeldahl N, Ammonia N, $P_2O_5$, $K_2O$) is dependent upon numerous factors such as retention time, mixing, agitation, stratification, settling, climatic effects, rainfall, drain down, aerobic, and anaerobic conditions, and proportions of process water and manure in the storage operations.

All such contaminated process water is impounded in a lagoon, liquid manure or slurry storage facility, or other containment system must undergo pump down of volume before a liquid (containing DRP) overflow occurs. A 20% to 30% of the volume being pumped depending upon many factors including freeboard of total volume. That said, 5% to 10% of excreted phosphorous may be pumped from unagitated swine lagoons, higher concentrations if the lagoons are agitated.

It is clear that the process water mixed with the sludge and liquid contains nutrients for they are transported for land application, or they are a waste product that is destined for disposal.

The contaminated process water that contains DRP that is used for land application is frequently transported by way of drag lines or other conveyances. Manure sediment is a solid slurry and is removed from the lagoon about once every six to seven years and typically trucked for land application.

The DRP contaminated process water is conveyed from the manure storage facility, lagoon, or sludge tank by a "*discernable, confined, and discrete conveyance… from which pollutants* by a drag line that originates at the permitted facility and terminates at the land application site.

The DRP contaminated process water *actually discharges* into the waters of the U.S. and the state of Ohio through a *functional equivalent of a direct discharge.* The case for satisfying the functional equivalent test as described in *County of Maui, Hawaii v. Hawaii Wildlife Fund, et al.* The DRP contaminated process water is generated at a permitted source and is discharged through groundwater transport into the waters of the U.S. and the waters of the State of Ohio.

The draft TMDL (and supporting appendices and documents such as the PMR and Loading Analysis) under review provides numerous instances detailing the relationship between the land application of DRP contaminants through the widespread use of drainage tiles in most agricultural lands in the WLEB, the impact of the accumulation and then the release of DRP and TP from the agricultural fields into the waters of the U.S. and the waters of the State of Ohio.

Clearly, the 2012 EPA final rule is in response to the 2008 case- *National Pork Producers Council v. EPA* requires an owner or operator of an AFO (CAFO/CAFF) that actually discharges into the waters of the U.S. and the broader Ohio requirements specify a permit from the 73 ODA DLEP CAFF's (and possibly other similar sources) with an Ohio Department of Agriculture/Ohio EPA permit because of the triggering of a *functional equivalent discharge* of the DRP contaminated process wastewater. This test is answered in the draft TMDL on page 32.

Prior to a storm, especially a significant rain event the lagoon liquid (which is dissolved phosphorous liquid) needs to be partially drained to maintain the freeboard safety so there will not be an overflow (which is a violation). Therefore, the drag lines will transmit the liquid from the production areas to the land application areas preceding the storm. Of course, the storm will assist the transport of the phosphorous to the land application area tile drains and facilitate a discharge to the waters of the state of Ohio.

The storms <u>assist</u> but do <u>not cause</u> the discharge event.

Look beyond the discharge from the land application area and to the CAFF that is supplying the manure-based nutrient to the land application area. The greatest volume of pollutant discharges from a CAFF is the liquid contained in the lagoon and liquid manure storage facilities. In the WLEB, where there is heavy rainfall, the liquid manure storage facilities must have sufficient capacity of holding the liquid manure and the direct rainfall resulting from a 25-year, 24-hour storm. In order to have sufficient freeboard to protect the integrity of the storage facility, there must be routine discharges to land application. The liquid discharges are typically accomplished by the use of drag lines to the land application areas contiguous or very close to the production area. Figure 2.1 shows a typical lagoon cross section with the various constituents.

> Water used in cleaning animal production facilities is a volume component in manure storage facilities. Examples include fresh water (not recycled) used for flushing, water used to clean milking systems and cow utter preparation, and water used to wash down confinement rooms in swine operations. The amount of water used for a given activity or operation is usually

specific to that operation and management scheme, and thus must be determined specifically in each case.

**Typical water usage rates for cleaning milking center facilities and swine production areas.**

| Production Area | Typical Water Use |
|---|---|
| Milking center | 8-12 gallons/cow/day |
| Swine breeding operation | 0.1 gallons/head/day |
| Swine farrowing | 1.0 gallons/crate/day |
| Swine nursery | 0.05 gallons/head/day |
| Swine grow/finish | 0.1 gallons/head/day |

Table 2.1 Water use by Dairy Operation

**Lot runoff**

Contaminated runoff from open lots and production area is usually directed into manure storage facilities so it can be ultimately used for land application.

**Rainfall-evaporation**

Manure storage facilities exposed to rainfall, whether structured or earthen, should be designed to hold rainwater that falls on the surface.

**Pumpdown Volume for Slurry and Liquid**

Manure storage facilities that contain slurry or liquid manure are usually designed on the basis of a storage period at the end of which all or a portion of the slurry is pumped from a facility. In the case of lagoons, which are designed with a permanent treatment volume, only that portion corresponding to the selected storage period is pumped down from the lagoon. This pumped down volume will include some of the following components.

1. Manure volume for the selected storage period
2. Washwater and other wastewater for the selected storage period
3. Lot runoff for the selected storage period
4. Rainfall-evaporation for the selected storage period

A manure storage facility should always be pumped before overflow occurs regardless of the design period.

**Liquid waste is typically the greatest component in a lagoon and this liquid must be drained regularly.**

As mentioned earlier, the manure storage facility should always be pumped before overflow occurs. The operator should always have the means and flexibility to manage storage periods that might be shorter than the design storage period.

Therefore, the owner and operator of the CAFF is highly dependent upon the owner and operator of the land application field if they are not under the same control. In fact, one could reasonably assume the when the owner and operator of the CAFF calls upon the land application owner and operator to receive liquids and/or sludge due to a declining lagoon freeboard, that request is not declined, even if the land is saturated.

The following figures 2.1 (B-7a and 7b) illustrates the liquid and solid proportions in a lagoon. Note the volume of the lagoon dedicated to sludge versus liquid. The deposition of liquid manure waste onto land application areas due to preventing a lagoon overflow has not been reviewed in the TMDL, and it would be improved if a discussion is included.

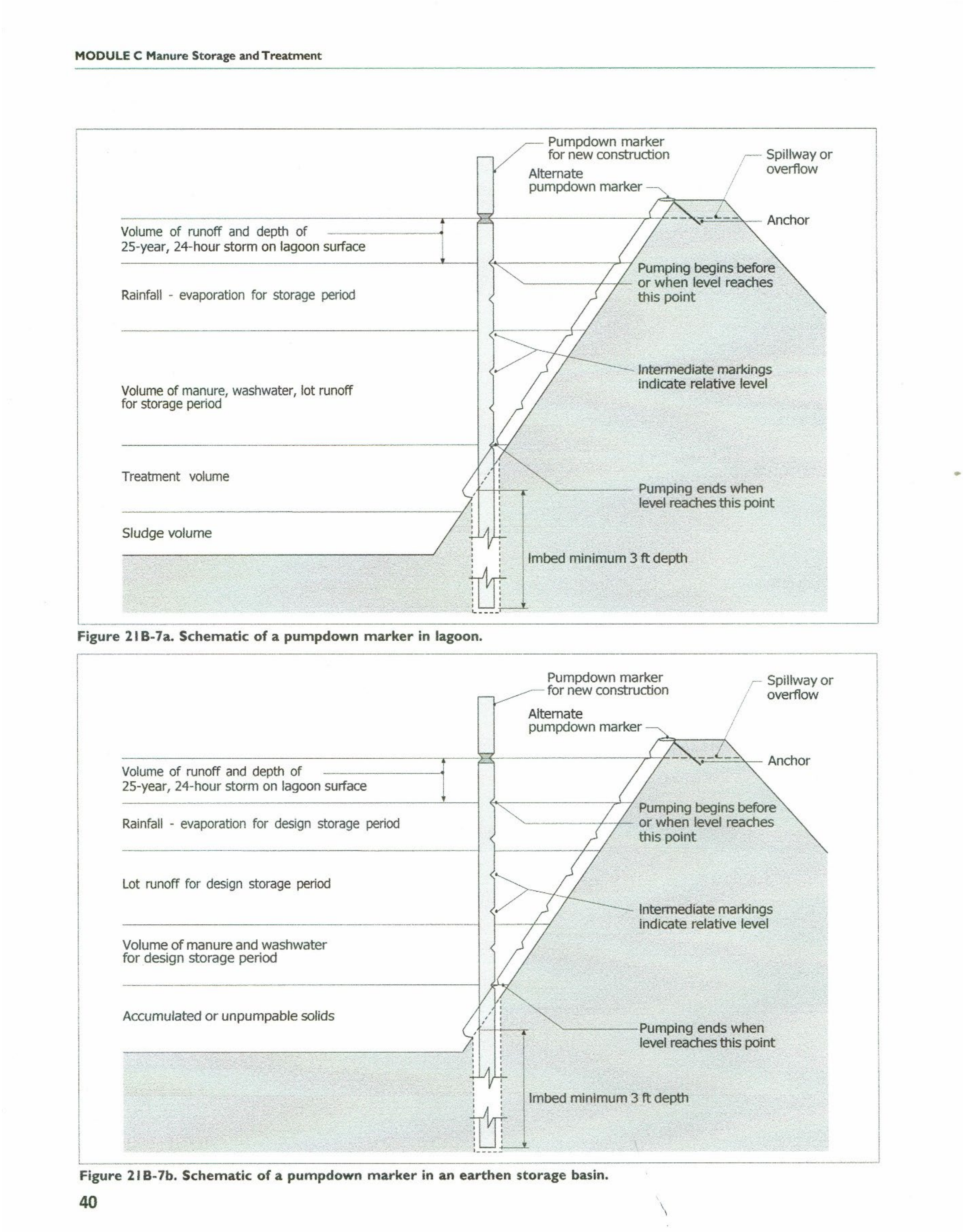


Figure 2.1 Cross Section of an animal waste liquid lagoon. From Lesson 21, Sizing Manure

Storage, Typical Nutrient Characteristics, Charles Fulhage and John Hoehne, University of Missouri. Midwest Plan Service, Iowa State University, Ames, Iowa 50011-3080, 2001

**It would be well served to apply the equivalent discharge evaluation to the 73 ODA DLEP CAFF's to ascertain whether they do or do not discharge into the waters of the state of Ohio.**

C. The transport of manure from the production area of the CAFF to the land application area is a discharged controlled by the CAFF, even if the land application area is not owned by the owners of the CAFF.

There is a connection between the CAFF that sends the manure and the land application area.

The evaluation of a connection between the CAFF and the land application area needs to be done, looking at federal and Ohio requirements. Federal requirements, or the applicability of a NPDES permit for a CAFO are found in 40 CFR §122.23. Federal requirements are the baseline for the program.

The determination of whether there is a discharge from the land application site into the waters of the U.S. or the waters of the state of Ohio appears to be influenced less by who owns the ***discrete conveyance*** **and** ***who turns on the valve*** **(**which releases the DRP contaminated wastewater onto the land application property) than **who owns and operates the land** where the discharge occurs. The question of whether land application sites which discharge pollutants into the waters of the state of Ohio or into waters of the U.S. is in compliance with the precise permit requirements or requirements of site-specific *nutrient management plans* is covered under 40 CFR §122.23(E) which has numerous off-ramps for exemption from permits for CAFO's.

The federal definition of ***land application area*** may be found in 40 CFR §122.23(b)(3) which states "land under the <u>control</u> of an AFO owner or operator, whether it or owned, rented, or leased, to which manure, litter or process wastewater from the production area is or may be applied (emphasis added)." As stated in the above. The discharge of pollutants from the production area of a CAFF by the use of a drag line to contiguous or nearby land application areas is commonplace. It is not unusual to have the land surrounding the CAFF production facility to be the land application area.

Sometimes the CAFF production facility and the land application area is separated by a county road. Some of the land application sites receiving pollutants from CAFF production facilities were once under the same ownership as the CAFF. However, the method or control of the discharge has little to do with the trigger of whether the CAFO is required to have a NPDES permit.

The decision revolves on whether the discharge requires an NPDES permit only if such discharge comes from lands under the control and is not an agricultural stormwater discharge.

Here are a few examples of whether the permit exemption applies to a CAFO. If the owner and operator is the same and the CAFO and application area is the same property, a NPDES permit <u>is</u> required. If the owner and operator is the same and the CAFO and the land application is on the adjacent properties, a NPDES permit <u>is</u> required for the CAFO. If the owner and operator is the same as the CAFO and the land application is on properties miles away, a NPDES permit <u>is</u> required for the CAFO. If the owner and operator is not the same and the CAFO and the land application is on the adjacent properties, a NPDES permit for the CAFO <u>is not</u> required. If the owner and operator is not the same and the CAFO and the land application is on properties miles away, a NPDES permit for the CAFO <u>is not</u> required.

*Is it true that all of the 73 ODA DLEP CAFF's and the land application areas are not under the ownership? Were these areas once under the same ownership and in order to escape regulatory requirements the land application areas were assigned a separate ownership? If there is separate ownership, how does the land application area and the production area under the same control effect the permit requirements?*

The Ohio requirements for the discharge from land applications appear to differ from the federal requirements. Like the federal requirements, a discharge of pollutants into the waterways of the state of Ohio without a permit is not allowed. The Ohio provisions in §903.01 contains definitions that parallels the federal CAFO thresholds for the many different sized concentrated animal feeding facilities CAFF.

Also, the discharge of pollutants from land application areas from precipitation related events (agricultural stormwater) are exempt in most cases. However, there is an instance where a discharge from the CAFF warrants a review.

Reviewing ORC §903.01 *Concentrated animal feeding facility definitions*, §§(Q) " 'Medium concentrated animal feeding operation' means an animal feeding facility that satisfies both of the following." The first (1) test is in regard to the number of animals specified in numerous categories. The second test (2) is in regard to a discharge, it states,

> "(2) The facility does one of the following:
> (a) Discharges pollutants into the waters of the United States through a ditch constructed by humans, a flushing system constructed by humans, <u>or another similar device constructed by humans</u>:

(b) Discharges pollutants directly into the waters of the United States that originate outside of and that pass over, across, or through the facility or otherwise come into direct contact with the animals at the facility."

The provisions of §903.01(Q)(2) may be applicable to an animal feeding operation when there is a discharge into the waters of the state of Ohio without a permit (§6111.04) when the pollutants are conveyed by way of a drag line (which is of course a device constructed by humans).

Looking at the Federal side of the equation. The EPA CAFO regulation in 40 CFR 122.23 states the discharge from land application requires an NPDES permit if the discharge to the waters of the U.S. is "…from land areas under its control" which is the CAFO production area and does not constitute an "agricultural stormwater discharge." 40 CFR 122.23 (e). The pertinent point is control. The TMDL lacks information and a discussion about the "…under the control of…" provisions and the "… no discharge…" statements.

Also, the discharge from the drag line is under the control of the owner and operator of the CAFF if,

1. The drag line to the land application area is under the same ownership and operation as the CAFF.
2. The pumps which convey the manure material to the land application area which is transported by way of the drag line is under the ownership, operation, and control as the CAFF.
3. The manure discharge through the drag line to the land application area is directed (including turning the pump on and off and determining the quantity of manure being pumped through the drag line) by the owners and operators of the CAFF.
4. The drag line to the land application area conveys manure to a 'Baker Tank' that is located on the property of the land application site, or another site not on the property that is the manure production site. The Baker Tank acts to serves an intermediate storage vessel from which the liquid, sludge, or solid manure is distributed at the convenience of the owner or operator of the land application site onto the fields. This is especially true if the drag line is owned or operated by the producer of the manure and if the Baker Tank is leased to the owner and operator of the production area. Or if the transfer of material from the production area to the Baker Tank or any similar storage container that is under the control (whether leased or not) of the owner and operator of the production site.
5. There is a contract or agreement between the owners of the production and the land application areas for the purchase of feed for animals by the production area.

It is important to note that §6111.04 (F)(3) provides limited exemptions from the '…no discharge into the waters of the state of Ohio without a permit…' requirement for "activities regulated by Chapter 307, or 939. Of the Revised Code."

The Federal provisions for a CAFO is not a prohibition from a discharge, it is the establishment of specific requirements for the discharge. The requirements for the discharge are not onerous and are common sense business practices such as following a site-specific nutrient management plan, recordkeeping, and if the solid, sludge, or liquid manure is sold or transferred to a third party, again there are applicable requirements.

The requirements for a discharge by the producer through land under his control differ from the requirements of manure transfer to a person who handles distribution and utilization. As EPA states in the comment letter, all of the discharges can be categorized in the load allocation, even though they may be part of a NPDES permit. However, the coverage under the LA rather than WLA in the TMDL does not preclude the separation of the permit CAFF's and CAFO's from other non-point sources in the LA. The requirements of the creation of a TMDL in an impaired waterway under §303 (d) of the CWA is separate from the regulation of animal feeding operations in 40 CFR 122. There is latitude for the grouping of similar sources together in the TMDL planning document. And if it is beneficial, the discharges can be bubbled, and have similar requirements.

**The TMDL should be able to answer whether the 73 ODA DLEP CAFF's own, operate, or control the drag lines, baker tanks, trucks which transmit material from the production site to the land application site.**

The provisions of ORC § 939.8 titled "Application of manure in the western basin" appears to be appropriate to land application for the area covered by this draft TMDL. It is clear that ORC § 939.8 (A) and (B) set operating requirements for the surface application of manure. Of course, these requirements were established to prevent the discharges into the waterway of the state of Ohio without a permit.

This section provides operating standards of what must be done, but it does not provide an exemption from the provision that the discharges into the waterway of the state of Ohio are prohibited without a permit. In fact, ORC §939.8(D) states the restrictions contained in ORC Chapter 903 are not affected by the provision of ORC §939.

The provision of ORC §903 is the one mentioned below (and discussed earlier).

> §903.01(Q)(2)
> "The facility does one of the following:
> (a) Discharges pollutants into the waters of the United States through a ditch constructed by humans, a flushing system constructed by humans, or another similar device constructed by humans:
> (b) Discharges pollutants directly into the waters of the United States that originate outside of and that pass over, across, or through the facility or otherwise come into direct contact with the animals at the facility."

Therefore, under the above circumstances, and using and **equivalent discharge evaluation**, are there animal feeding operations which are required to obtain Ohio CAFF permits to allow a discharge into the waters of the state of Ohio?

**It would be well served to determine which of the 73 ODA DLEP CAFF's use a "*discernable, confined, and discrete conveyance… from which pollutants are transmitted to a land application site* by a drag line that originates at the permitted facility and terminates at the land application site**

In the instances where the DRP contaminated process water is conveyed from the manure storage facility, lagoon, or sludge tank by a "*discernable, confined, and discrete conveyance… from which pollutants by a* drag line that is owned by, and originates at the permitted facility, and terminates at the land application site is a knowledgeable, planned action by the generator of the DRP contaminated wastewater.

The discharge to the land application site, which is "*under the control of the owner or operator, whether it is owned, rented, or leased, to which the manure, litter or process wastewater from the production area is or may be applied"* is required to be under the provisions of a NPDES permit. While the discharge of the contaminated water on property possibly not in the permitted facilities direct ownership, the discharge is in the control of the permitted facility.

D. The use of the 'functional equivalency test' is an excellent tool to determine whether a CAFF production area, or a land application area associated with the CAFF or unassociated to the CAFF, discharges into the waters of Ohio or the waters of the US.

I have an apprehension about the statement in the draft TMDL on page 28, Section 4.1.1.1 includes only "**production areas**" as defined in ORC §903.01 (BB) (1-4) not the definition of a "**CAFF**" as defined in ORC §903.01 (F) (1-3). It appears the use of production area is an intentional narrowing of the definition in order to exclude the contiguous **land application areas** where *discernable, confined, and discrete conveyances* such as drag lines under the control of the owner or operator of the CAFF conducts a *functional equivalent discharge* to the waters of the state of Ohio and the waters of the U.S. One must question whether the statement contained in Section 4.1.1.1 of the draft TMDL would be true if the phrase "production areas" was substituted by the word "CAFF." More likely it would not be true because it is questionable whether all CAFF's in the WLEB would pass a functional equivalent discharge evaluation. This is especially true for the approximately 73 ODA DLEP CAFF's listed in Table A3.2 Appendix 3.

The functional equivalency test must be conducted for each of the 73 ODA DLEP CAFF's.

An examination of the opinion of the court in *County of Maui, Hawaii v. Hawaii Wildlife Fund, et al. (April 23,2020)* is appropriate. As Justice Breyer mentioned. "Suppose, for example, that a sewage treatment plant discharges polluted water into the ground where it mixes with groundwater, which, in turn, flows it a navigable river… Must the plant's owner seek an EPA permit before emitting the pollutant? We conclude that the statuary provisions at issue require a permit if the addition of the pollutants through groundwater is the functional equivalent of a direct discharge from the point source into navigable waters."

First, the discharge of a "pollutant" in the example is not of a discharge of manure, which some say is totally but questionably exempt from regulation (except for excrement of the same). So, the example is of process water and production water that is contaminated by nutrients (Total Kjeldahl N, Ammonia N, $P_2O_5$, $K_2O$) through the industrial animal production process. However, another reading of the regulations of Ohio would apply that any pollutant as defined in ORC § 903.01 (Y) such as manure would also be applicable to the similar restrictions. As shown, the contaminated production and process water easily fits the description of a pollutant. Also, the conveyance of sludge from the manure treatment and storage facility at a production area also meets the definition of pollutant. Both discharges would be of DRP.

Second, the "point source" in the example is any "discernable, confined, and discrete conveyance, including for example, any 'container,'" "pipe, ditch, channel, tunnel, conduit," which is the drag line from the lagoon, waste process area, manure storage and processing area in the CAFF production area to the land application site. The definition in §502(14) could also apply the transport of solid manure, sludge and liquid manure in a 'container' not just using a drag line for sludge and liquids, would meet the definition.

Now, applying the appropriate provisions of the CWA and Ohio statute states with certain exceptions " 'the discharge of any pollutant by any person'" without an appropriate permit " 'shall be unlawful.'" §301 and the appropriate Ohio provisions " 'No person shall cause pollution… of any waters of the state.'" Read in conjunction with 'this section shall not apply if the persons causing pollution'…if the person causing pollution'… 'holds a valid, unexpired permit, or renewal of a permit, <u>governing the causing or placement.</u>' "(emphasis added) ORC §6111.04.

Moving onto the 'means of delivery test' which is called the *functional equivalency discharge evaluation* which must be undertaken to demonstrate whether and how the pollutant after it leaves the "point source" and then travels through groundwater reaches the waters of the US and the water of the state of Ohio. As stated in the discussion of *functional equivalency discharge* *evaluation* in the *County of Maui, Hawaii v. Hawaii Wildlife Fund, et al.* opinion of the court, the factors to be considered are numerous. The *functional equivalency discharge evaluation* for the case of land application discharges is the matter of stormwater discharges versus discharges by way of the predominant use of drainage tiles and over application of manure-based materials (solid, sludge, and liquid) which has been documented along with the transport through tiled land which will move the matter to a permitted discharge.

> "consider, for example, just some of the factors that may prove relevant (depending upon the circumstances of a particular case): (1) transit time, (2) distance traveled, (3) the nature of the material through which the pollutants travels, (4) the extent to which the pollutant is diluted or chemically changed as it travels, (5) the amount of pollutant entering navigable waters relative to the amount of the pollutant that leaves the point source, (6) the manner by or area in which the pollutant enters the navigable waters, (7) the degree to which the pollutant (at that point) has maintained its specific identity. Time and distance will be the most important factors in most cases."

Yes, time and distance must factor into the equation. In most cases the distance is relatively short. The distance is from the field to the drainage ditch adjacent to the county road. Time depends upon the transfer mechanisms such as application methods, tiles, hydrology, time of year the manure is applied to the land application area. Another important group of factors are the type of crop which determines the uptake of nutrients by the crops, cover crops, and other planting factors, Also the concentration of the material applied to the land application area. Lastly, the discharge is dependent upon the legacy of prior nutrient applications to the land application area.

The technical information in the draft TMDL demonstrates that the discharge of manure by way of land application does not take dozens and hundreds of years for the pollutants to reach waters of the state of Ohio. The prevalent use of drainage tiles in the WLEB provides a direct hydrological connection to surface water. As stated in *Bethlehem Steel Corp., 2 E. A. D. 715, 718 (EAB 1989)* the Acts permitting applies to injection wells "that inject into ground water with a physically and temporally direct hydrologic connection to surface water."

Reviewing the *functional equivalency discharge evaluation* design and applicability that is thoroughly discussed in the opinion of the court penned by Justice Breyer. The scientific evaluation, done on a case-by-case basis will need to rely upon the expertise of well-trained scientists and engineers within a regulatory agency to accurately make the determination and to accurately determine what amount a discharge will be allowed in and as the appropriate permit condition in conjunction with a possible incremental compliance plan. The evaluation will need to blend together the engineering techniques, possible soil water analysis, modeling (using SWAT ensembles or other predictive Lagrangian models) for source operations (of which there are many), coupled with loading analysis (LA) to reach the desired loading TMDL targets for the WLEB. This functional equivalency discharge evaluation may require a review of the permit authority within the Ohio Department of Agriculture (ODA) and the Ohio Environmental Protection Agency (Ohio EPA), and another revision of 7/29/02 MOU.

The Ohio agencies have discretion, granted through the legislature, of determining the thresholds for any level of control. The statute and regulatory history allow an area impacted by excess pollution the discretion to develop the type of and degree of controls that are needed to meet the environmental standards. This interpretation does not mean that all releases to groundwater need to be treated equally as seen in ORC §903.01. Of course, there are many options and degrees of permitting (tools in the toolbox) as well as control afforded to the Ohio agencies in the crafting of a workable and logical regulatory scheme. However, the current Ohio approach of "none' and "not all" control of pollutant discharges from CAFF operations is worthy of review by the US EPA to ascertain whether the intent of CWA §303(d) is met.

CAFF's have the right to apply manure onto lands for crop production. The right to apply manure is tempered when the application of manure in excess to what is assimilated in crop production is discharged by ground tiles. Studies show when too much manure is applied, the unassimilated excess may be discharged to the waterway of the state of Ohio.

It is a thin curtain to stand behind the EPA "Interpretive Statement" pertaining to the CWA's structure and history, " a release of pollutants to groundwater is not subject to" the Act's permitting requirements even if the pollutants impair the waters of the state of Ohio.

Lastly, the appropriate provisions covered by federal and Ohio statute provide for the regulation of the discharges by permit condition. The practice of control of pollutants by permit is a basic tenement of the Clean Water Act.

The permit application requirements for the installation of an animal feeding operation appears to be lightweight. The requirements in Section 903.02 of the ORC, Title 9 contains a self-policing, affidavit-based demonstration to the reviewing authority that all is well. Instead of a review of whether there is sufficient amount of land to prevent over-application of manure there is a requirement for support from county commissioners (who will be glad to have another taxpayer).

| |
|---|
| The Ohio CAFF permit requirements may not provide a sufficient degree of scientific review, such as a functional equivalency test, to assure the new or modified operation does not cause a discharge into he waters of the state of Ohio. |

To conclude the discussion on whether the CAFF's, their associated or unassociated land applications discharge into the waters of the state of Ohio is, they more likely do than they do not.

The question now turns to **Reasonable Assurance,** one of the 13 pillars to gain US EPA approvability of the TMDL**.** Do the actions of the ODA and Ohio EPA provide reasonable assurance that the laws and the administrative codes of the state of Ohio will be fairly and adequately be interpretated?

If there is not an adequate demonstration of regulatory authority to control the source operation the US EPA must determine the state of Ohio has not met one of the main showings for the approval of a TMDL.

Table 2.2 shows the agency responsibility for NPDES, CAFO, CAFF, and AFO permitting in Ohio where the responsibilities are divided between the Ohio EPA and the ODA. The inclusion into the TMDL of the number of facilities in each category within Table 2.2 would allow the ability to focus attention on the facilities that have the greatest potential to cause the most pollution. While determining whether they are properly permitted.

## Confined Animal Feeding Operations (CAFOs)

| Type of Operation | Permits Required | Agency |
|---|---|---|
| Large CAFO/CAFF | NPDES* | Ohio EPA |
| | Permit-to-Install (PTI) Permit-to-Operate (PTO) | ODA |
| Medium AFO, discharges to surface water | NPDES | Ohio EPA |
| Medium or small AFO, history of non-compliance with ODA-DSWC's rules and standards | PTO, PTI (if facility modification is required) | ODA |
| Small AFO adding significant pollutants to surface water (Designated CAFO) | NPDES | Ohio EPA |
| If one or more acres will be disturbed during construction of a livestock operation | NPDES Construction Stormwater General Permit | Ohio EPA |

(table adapted from Ohio Livestock Coalition's Guidelines for Livestock Operations)
*Large CAFOs that do not discharge to surface waters are not compelled to apply for coverage under an NPDES permit

Maumee Watershed Nutrient TMDL Project

Table 2.2 Oversight Authority for AFO permitting, Ohio EPA 12/2022 Webinar

**It is questionable whether the ODA and the Ohio provides that the law and codes of Ohio, as applied, are sufficient to demonstrate reasonable assurance to the US EPA. The Ohio questionable permitting of CAFF's may tip the balance against approval. It is time to amend the permit process.**

Is it possible that existing and new Ohio industries will stop the discharge of pollutants directly into the waters of the state of Ohio and start to discharge pollutants into the ground where it mixes with groundwater, which, in turn, flows into waters of the state of Ohio in order to avoid regulatory control? Why wouldn't the owner of a facility simply move the discharge pipe to another location, perhaps only a few yards so the pollution must travel through some ground surfaces to reach the waters of the state of Ohio?

> Could the Bay View STP near to my old home on south 109th street in Point Place divert their outflow from the Maumee River to the low ground in Detwiller Golf course (the distance of a good poke by a driver) which discharges into Cullen Bay and be exempt from Ohio permits under the ODA interpretation? Would there be a permit exemption for the STP if rice is grown on the golf course, and it is nurtured by the STP nutrient rich discharge. Would an exemption be applicable for the water hazards of the golf course or in Cullen Bay and if the sewage treatment plant accepted manure from animal feeding operations? I hope not.
>
> Could the current refinery off of Woodville Road, appropriately named the Toledo Refinery Company (across the street from my grandparents' house at 1902 Woodville Road) divert its wastewater discharge into a cropland in Oregon Township and not be subject to permits? Could its water discharge be exempt from permits if a fertilizer by-products plant that uses sulfur, phosphorous, nitrogen, and potassium from the refining process if the discharge is onto cropland in the Oregon Township? Would there be a be an exemption from Ohio permits if the refinery wastewater is mixed with animal feeding operation manure in the storage lagoons, or from the by-products plant, and is discharged into cropland, even if the croplands drain into the Maumee Bay? I hope not.
>
> Could the General Motors Central Foundry in Defiance discharge its wastewater into a nearby crop field and be exempt from Ohio permits? Would it be exempt from permits if the wastewater in the storage lagoons is mixed with manure from nearby CAFF's? I hope not.

Is the intent of the Federal CWA, Ohio Administration, and the Ohio legislature to create back-door exemptions from permit requirements? I think it is not the intent.

Appropriate next steps

1. The first appropriate step is to apply the *actual discharge* versus the *design discharge* provisions when evaluating the applicable provisions of the Ohio Revised Code. Such as §6111.04. and all appropriate provisions of Ohio State Law to the 73 CAFF's and all AFO's.
2. Another appropriate step is to have the enabling agencies perform an engineering evaluation of the design *and operation* of all new and modified CAFF facilities to determine whether are operating in compliance with all provisions of the Ohio Revised Code, such as §6111.04. and all appropriate provisions of Ohio State Law. Do not rely upon notarized compliance affidavits from the new source operator.
3. Apply the *functional equivalent discharge test* to the CAFF operations covered by §903.01 of the Ohio Revised Code. At the minimum the *functional equivalent discharge test* should be conducted on the 73 facilities listed in Table A3.2

Appendix 3. Where it is determined there is a functional equivalent discharge to the waterway of the State of Ohio,

a) inform the US EPA of the possible violation of the CWA,
b) prepare an appropriate State permit to limit the phosphorus discharged in the land application to not exceed 40 ppm P, or lower if applicable,
c) require the preparation of a Nutrient Management Plan for the facility to be submitted to the Administrators of the Ohio Department of Agriculture and the Ohio EPA for review and approval. The plan shall, prior to action by the approving agencies, be noticed and be available for public review and comment for a period of less than 90 days. All plans shall be subject to appeal through the appropriate Ohio adjudication process.
d) establish a permit program as mentioned in Comment 1.

**The TMDL assumes there are no "legal" discharges from CAFF's and land application when the facts show otherwise. The agencies should look at the law in conjunction with science and the fact that phosphorous discharges by CAFF's and application occurs. CAFF's have the right to apply manure onto lands for crop production. The right to apply manure is tempered when the application of manure in excess to what is assimilated in crop production, and is then discharged by ground tiles, or the application of manure is applied in a manner where it is discharged to the waterways of the state of Ohio.**

# COMMENT 3: DOWNSTREAM TMDL TARGET

**There is a lack of a meaningful evaluation, and documentation of WLA and LA TMDL targets downstream of Waterville monitoring station, which calls into question the TMDL targets in Table 6, especially the 54.4 MT portion downstream of Waterville. Monitoring close to the mouth of the Maumee Bay to verify attainment is essential.**

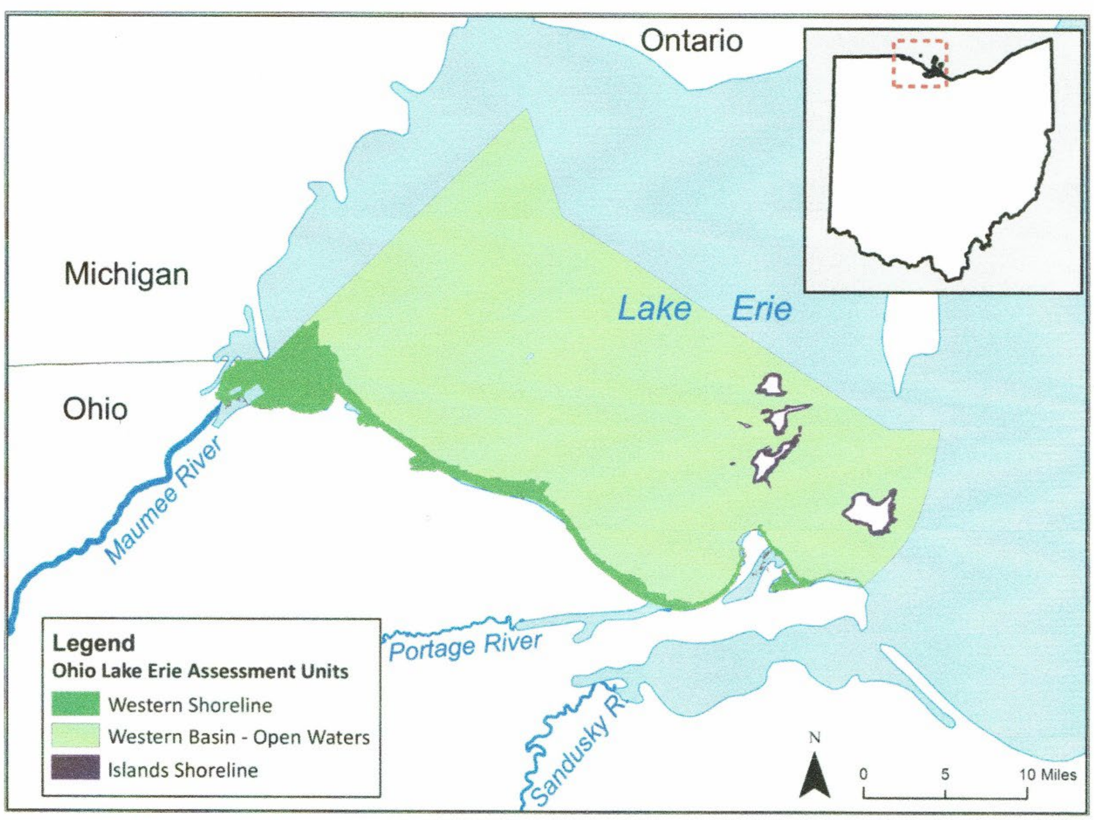

*Figure 4. Map of Ohio's Western Basin of Lake Erie assessment units.*

Figure 3.1.Ohio Lake Erie Assessment Area

The downstream of Waterville TMDL targets (shaded green) proposed in Table 3.1 (Table 6 of the draft TMDL, page 15) necessitates further evaluation by the Ohio EPA prior to action by the US EPA of the planning document.

**<u>Maumee watershed nutrient TMDL targets</u>**

| Location | Total Phosphorous spring (March-July) target (in MT) |
|---|---|
| Maumee River at Waterville Ohio, 41.4998,-83.7140 | 860.0* |
| Maumee River at mouth/Maumee Bay 41.6937,-83.4682 | 914.4 |

Note: * To be met nine out of 10 years to account for interannual flow variability for the March–July period in extreme years

Table 3.1. Nutrient TMDL Targets

The draft TMDL missed the opportunity to include a major action which will possibly have a significant impact upon the reduction of phosphorous on the 'downriver of Waterville' region of the watershed. This lack of the quantification of the impact of the actions mentioned below should be rectified in the final TMDL.

The establishment of downstream targets below Waterville using the sited methods (2020 Domestic Action Plan (DAP)) is inadequate to quantify a value of the accuracy of three significant figures. It is strongly recommended the final TMDL target be thoroughly and significantly reviewed, recalculated, and possibly enhanced. The draft TMDL target and justification for the referenced source categories does not provide a reviewer an adequate degree of confidence that the WLA and LA assumptions 'downstream of Waterville' are correct. I heartily concur with the US EPA comment of establishing monitoring downstream of Waterville in or near the mouth of the Maumee Bay. The establishment of a TP and flow monitoring site downstream of Waterville is the only practical path which provides assurance to, and positively measure attainment and progress of reaching the Maumee River Watershed TP TMDL targets.

Any TMDL target must have corresponding monitoring to ensure attainment, therefore the need for downstream of Waterville monitoring to ensure the TMDL targets are met. Without monitoring downstream of Waterville, all stakeholders will be blind to knowing that TMDL targets are being met which reflects upon reasonable assurance of the TMDL.

The necessity of establishing a monitoring station or expanding the monitoring network downstream of the Waterville station is imperative to assuring the TMDL targets are met.

The earlier 2012 work, Toledo Harbor Sediment Use Plan prepared for the Toledo Harbor Dredge Task Force Great Lakes Restoration Initiative Project. USEPA Grant # GL-E00523 Prepared for: Ohio Lake Erie Commission 111 Shoreline Drive, Sandusky, Ohio 44870, and the Toledo-Lucas County Port Authority One Maritime Plaza Toledo Ohio 43604, Prepared by: Hull & Associates, Inc. 3401 Glendale Avenue Suite 300 Toledo Ohio 43614. December 2012. (THSMUP) evaluates and ranks, by using a scientific criterion, the possible options for contaminated (phosphate and other matter) dredging spoils. The THSMUP report, though not mentioned in the DAP, provides a detailed analysis of the options of final and short-term disposition of contaminated dredging material and is worth review and of mention. This information should be used, in conjunction with the available data to build a proper level of loading for the 'downstream of Waterville' watershed.

**The pertinent point for your consideration is the quantity of projected phosphorus loading that will be removed from the Western Lake Erie area by the prohibition (ORC § 6111.32) of Open Water Disposal, as stated below is a significant occurrence and relevant to the establishment of the TMDL targets.**

> "The Ohio Phosphorus Task Force was convened in 2007 to identify various phosphorus sources and impacts to Lake Erie and to recommend management strategies. The Ohio Phosphorus Task Force estimated 1,096 metric tons (Ohio EPA, 2010) while recent USACE (U.S. Army Corp of Engineers) communication estimated 913 metric tons of total phosphorus added as a result of open-lake placement." Of course, this phosphorous has be removed.
>
> "However, bioavailability associated with phosphorus release is unknown but is a function of many factors which influence the forms and availability of phosphorus including competing constituents (e.g., iron, aluminum), wind conditions, wave action, and temperature. As part of this effort, open-lake placement of dredged material was identified as a potential contributor and it was suggested that discontinuing open lake placement could improve net phosphorus removal in Lake Erie (Ohio EPA, 2010). The Ohio Phosphorus Task Force also identified a lack of data related to open-lake placement of dredged material and its effect on phosphorus bioavailability. USACE will complete additional testing to evaluate these potential impacts in 2013 as required by the 2012 Ohio EPA-issued Section 401 Water Quality Certification (WQC). As required by the Section 401 WQC, the USACE must prepare a sampling plan and protocols for approval by Ohio EPA to conduct phosphorus monitoring during the 2012 dredging season."

**This is a clear point that should be considered, 'the implementation of the provisions of ORC 6111.32 will be beneficial to reducing a significant quantity of an estimated 913 metric tons per year of phosphorus per year into the western Lake Erie watershed.'**

The DAP would benefit by a review and a discussion of how and where the discharge of phosphorous from dredging spoils causes various impacts upon the degradation of water quality and algae blooms (location of blooms versus discharges) as mentioned above and in the THSMUP. Of course, discharge of phosphorous from dredging spoils in the 'sensitive area of western Lake Erie' (near to the epicenter of the formation of blooms) continue to cause and contribute to the loading in the lake. It would be beneficial to explore the mechanisms associated with that loading of phosphorous.

The following are two examples, with three citations, demonstrating the need for a more detailed review, the draft TMDL does not analyze or even discuss the impact of the diminution of the release of dredging waste to the waterway. As mentioned on Page A1-6 in Appendix 1 of the draft TMDL, the role of sediment on the release and retention of DRP and TP from dredging sediment is an important cog in the determination of a practical solution set for the TMDL and is ripe for review in the western basin shoreline (HUC 12 041202000201) and western basin open water (HUC 12 041202000301). As mentioned in the paper Matisoff G., Kaltenberg E., et al, Journal of Great Lakes Research, Volume 42, Issue 4, August 2016, Pages 775-788, *Internal loading of phosphorous in western Lake Erie* "The implication is that this internal diffusive recycling of P is unlikely to trigger cyanobacterial blooms by itself but is sufficiently large to cause blooms when combined with external loads"(emphasis added). To reinforce the aforementioned Matisoff paper, the works by Riza M., Ehsan M., et al, Case Studies in Chemical and Environmental Engineering 7 (2023) 100297, *Control of eutrophication in aquatic ecosystems by sustainable dredging: Effectiveness, environmental impacts, and implications* "Sediment dredging has a major impact on internal nutrient loading, which, when combined with external nutrient loading, causes algal bloom. Dredging is able to alter the physicochemical and biological environment of the newly formed sediment-water interface. Thus, significant changes in nutrient concentrations alter the cyanobacterial community that causes blooms.(emphasis added)."

An effective TP and DRP control strategy, yet to be deployed, may be the control of liquid (DRP) waste (a point source which discharges into the waters of the state of Ohio) or the prohibition of the dumping of ship channel dredging spoils into the land area contiguous to the Maumee Bay. The dredging and proper disposal of sediment requires inclusion into the final TMDL for downstream of the Waterville monitoring site. The quantification of the reduction of the drop in TP and DRP from the 2008 baseline should be accounted for in this document.

I call to your attention the paper which concludes sediment dredging is an effective method to reduce internal phosphorus (P) loading of eutrophic lakes by Wen S., Zhong, J., Li, X., et al, Journal of Hazardous Materials, Vol 394, 15 July 2020,122548. *Does external phosphorous loading diminish the effect of sediment dredging on internal phosphorous loading? An in-situ simulation study.*

The review of the reintroduction of DRP into the waterway through the dredging disposal process in conjunction with the removal of P laden sediment needs to be a factor in the final TMDL limits. Because "the sediment contributes 3.0-6.3 μg P/L as a background internal contribution that represents 20-42% of the IJC Target Concentration of 15 μg P/L for the western basin"(Emphasis added) this begs a thorough review at the timing of dredging, the method of dredging, and land disposal of dredged material as a possible P control strategy.

Most assuredly, the downstream of Waterville TMDL targets proposed in Table 3.1 (Table 6 of the draft of the TMDL) necessitates further evaluation by the Ohio EPA prior to action by the US EPA of this planning document.

The discussion of the work needed to establish the downstream TP and monitoring site stated in the draft TMDL is small when compared to the burden of the people of the Maumee River basin, the people of Toledo, the people who will be spending resources on compliance. Knowing of the cost, an automated monitoring station located possibly at the Toledo water intake crib, Coast Guard station upriver of Cullen Park, the ship docks at Presque Isle, the buoy by Grassy Island (for non-winter measurement), the harbor light if that isn't too far away, using solar power for collection and serviced by somebody at the University of Toledo. These are examples that show a monitoring station is feasible and but one of the costs associated with the attainment of clean water goals.

Without proper monitoring downstream of the Waterville station the question posed by the 08/17/2022 US EPA pertaining to assurance of progress, attainment, and maintenance of the CWA WQS and the TMDL targets remains valid.

The public deserves the right to know the status of the clean water.

**Amend the draft TMDL in accordance with §3745-2-12(B)(8)(b) of the OAC to incorporate the contribution of or the removal of DRP and TP to the downstream of Waterville station due to the provisions of §6111.32 of the ORC. Include provision for monitoring downstream of Waterville to ensure stakeholders of progress and attainment of TMDL targets.**

**Establishing a water monitoring station at the mouth of the Maumee River and the Bay is required to 'demonstrate,' rather than to 'calculate' the TMDL targets are attained. The positive effect of eliminating phosphorous laden dredging silt from being dumped into Lake Erie should be included as an effective mitigation strategy in the TMDL.**

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## COMMENT 4 : INTERSTATE v. INTRASTATE TRANSPORT

**There is no explanation why the TMDL should not be focused upon interstate rather than intrastate pollutants which degrade international waterways as well as waters of the US. There is an absence of sub-basin TMDL targets which are linked to the achieving reasonable assurance of the WLEB TMDL targets. There is a lack of sub-basin targets and monitoring for TP discharges from Ohio into Indiana, from Michigan and Indiana into Ohio. The interstate transport must be addressed to establish a workable solution, such as what was done for the Chesapeake Bay TMDL.**

Why the Maumee River basin TMDL now under review is not under the development and issuance by the US EPA, incorporating only actions by the state of Ohio rather than Ohio-Indiana-Michigan, when the impaired waterway is international waters, and there is interstate transport of the contaminants, begs explanation.

This Maumee River Basin TMDL should be developed by the US EPA and must include the contributions by Indiana and Michigan. The US EPA appears to be abrogating its responsibility to address interstate transport to waters of the US and international waters by allowing this TMDL focus on intrastate issues.

The TMDL as structured is inadequate.

This comment should not be confused with the thought of amending this far field TMDL to be a near field TMDL. The TMDL under consideration can be improved by the inclusion of a limited number of sub-basin TMDL targets. It would be beneficial for the Ohio EPA to establish a nutrient reduction target for specific priority watersheds to be used in assessing nutrient reduction progress toward the Annex 4 targets. Please review the absence of phosphorus load targets for the HUC-8 subwatersheds 04100003-04100009 whose portions reside in Ohio is a correctable oversight, and if possible HUC12 subwatersheds. The inclusion of only one TMDL target site (Waterville) for approximately 6,600 square miles of watershed is insufficient to establish meaningful targets for adaptive planning and measuring reasonable further progress.

It is recommended that TMDL targets be established for some of the aforementioned subwatersheds. As shown in Figure 8A.4 on Page A1-12 in Appendix 1, the Ohio nutrient monitoring network has sufficient robustness to accommodate the additional TMDL targets. The reliability of the data from the sub-basin sites has been proven to meet the modeling guidelines as stated in the *Final Preliminary Modeling Report*. The establishment of sub-basin TMDL targets will be of great importance in determining the effectiveness of the BMP program within Ohio. The establishment of sub-basin TMDL targets will also be a demonstrative showing of the effectiveness of the water quality reduction partnership between Ohio and the contiguous States of Michigan and Indiana.

The draft Maumee River TMDL as currently written, and under review is one that focuses upon intrastate transport with little mention of interstate transport of pollutants. The TMDL does not explain or discuss the details surrounding any commitments of reductions due the interstate transport of TP and DRP which impairs the waterway of the United States.

Is it not the duty of the US EPA to assist in the mitigation of interstate transport? The US EPA, or the Ohio EPA should explain why the TMDL should be an intrastate TMDL rather than an interstate TMDL which causes degradation of international waters.

As seen in Figure 4.1 (Figure ES1from the draft TMDL), titled “Allocations to meet the TMDL in the Maumee watershed to address western basin of Lake Erie Impairment”, the boundary conditions for the transport of TP from Michigan to Ohio is set forth as 180.7 metric tons during the spring season and 1,180.9 kilograms TP per day. Likewise, the boundary conditions for the transport of TP from Indiana to Ohio are set forth as 48.0 metric tons during the spring season and 313.6 kilograms per day.

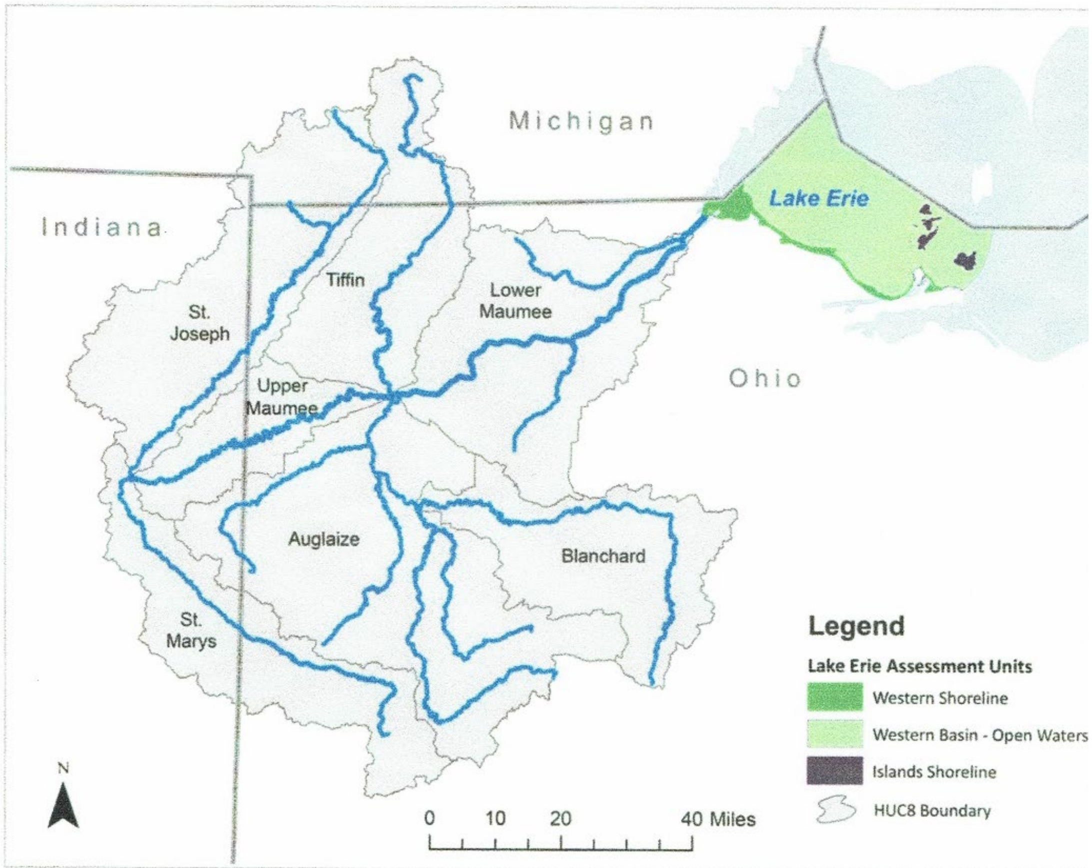


*Figure ES-1. Map of Ohio's western Lake Erie assessment units and the Maumee Watershed.*

Figure 4.1 Watershed Map

Table ES1. Allocations to meet the TMDL for the Maumee watershed to address western basin of Lake Erie impairments.

| Allocation type | Spring season total phosphorus (metric tons) | Daily total phosphorus (kilograms) |
|---|---|---|
| Boundary condition: Michigan | 180.7 | 1,180.9 |
| Boundary condition: Indiana | 48.0 | 313.6 |
| Wasteload allocation | 109.3 | 714.6 |
| Load allocation | 555.9 | 3,633.2 |
| Explicit margin of safety (3%) | 20.6 | 134.5 |
| TOTAL | 914.4 | 5,976.8 |

Table 4.1. TMDL Allocations

The embodiment of the Michigan and Indiana boundary conditions would be a wise addition to the TMDL targets. The establishment of the interstate transport which is part of the cause of the

Lake Erie impairment has value to the Ohio actions, Indiana, and Michigan actions, and to the oversight by the US EPA and the public in ascertaining whether progress is being met towards the goals of the TMDL.

According to Table 30 of the draft TMDL the monitoring station gage on the St. Joseph River near Newville (04178000) drains 610 square miles of acreage. The monitoring gage on the St. Marys River at Wilshire (04181049) drains 386 square miles of acreage. The respective average spring TP load (MT) 2017-2021 are 98.3 and 149.2. which is significant TP transport from Ohio to Indiana.

As seen in Figure 4.2 (Figure 28 from the draft TMDL) there is TP transport into Ohio, which influence the loading on the boundary conditions.

a) Michigan into the West Branch of the St. Josephs River watershed HUC8 (04100003) into the St. Josephs River.
b) Michigan into the East Branch of the St Josephs River watershed HUC8 (04100003) into the St. Josephs River.
c) Michigan into the Bean Creek into the Tiffin River watershed HUC 8 (04100006).
d) Indiana into the Flatrock Creek into the Auglaize River watershed HUC 8 (04100007).
e) Indiana into the Upper Maumee River watershed HUC 8 (04100005).

As stated in *§5.3.7 Out-of-state boundary condition and resulting targets*, the allocations for Indiana and Michigan assume the same reduction rate as in the reductions for Ohio (39.2 percent) from the 2008 baseline. The assignment of phosphorus load and load reduction was based upon (possibly erroneous data due to the impact of point source contributions) upon the quantity of land mass in the watersheds.

> "The baseline conditions of phosphorus load were calculated for the entire watershed draining to the Maumee River, including the areas within Michigan and Indiana. However, the allocations calculated in this TMDL are only for the load delivered from within Ohio's borders. This includes reductions for streams that flow into Indiana. All streams that flow into Ohio from Indiana and Michigan are assumed to be at a boundary condition that meets the same reduction rate of 39.2 percent from the 2008 baseline condition. The baseline conditions assessment described above found that 75 percent of the existing total phosphorus load delivered to the Maumee watershed is from Ohio. Note that Ohio makes up 73.3 percent of the area in the watershed, which is very close to the load proportion. Applying the 39.2 percent reduction to the baseline loads determined from outside of Ohio results in an out-of-state boundary condition target load of 228.7 MT of total phosphorus. Of that boundary condition, 79 percent, or 180.7 MT, of total phosphorus per spring season is assigned to Indiana. Michigan is assigned 21 percent of the boundary condition, with 48.0 MT of total phosphorus. Considering only the part of the total watershed target that Ohio is responsible for, the 914.4 MT complete watershed total phosphorus target becomes 685.8 MT. This is the value that the Ohio allocations will sum to in this TMDL."

The above stated target allocation methodology begs the question on why the portion of the Maumee River watershed that is in Michigan and Indiana is not ‘formally’ in the TMDL with targets, load allocations and waste load allocations. The question to the US EPA is whether they should develop a federal TMDL which encompasses the three states or have a joint powers agreement such as Chesapeake Bay TMDL.  I am sure the plaintiffs of the action which stimulated the development of this TMDL thought long and hard about the forcing the hand of Ohio versus the three states together.

One possible example for the Ohio EPA to follow is how the Chesapeake Bay TMDL was developed and the targets were developed for portions of  seven states.

Echoing the concerns of the US EPA in regard to the boundary conditions, how was the boundary condition divided between Indiana and Michigan? The setting of these conditions bears evaluation, in how they were established, how they will be measured, how they will be enforced, and what happens of the boundary conditions are not met. Are the timeframes contained in the draft TMDL applicable to the contiguous jurisdictions?

What is recourse of stakeholders if Indiana and Michigan do not meet the targets in the boundary condition? What is the vehicle a party must use to effectuate said reductions? Will the state of Ohio protect the integrity of their TMDL targets by legal means, if such a path is available?

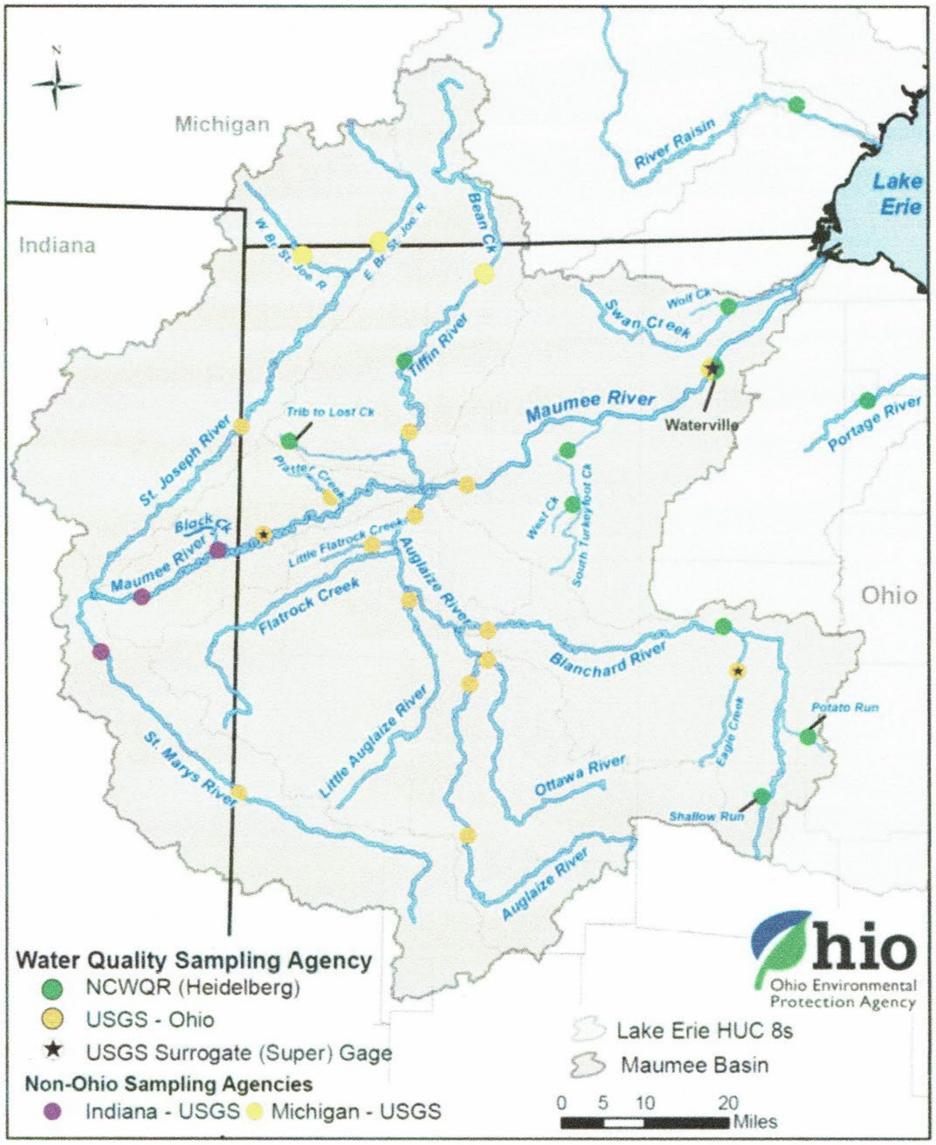


*Figure 28. Network of continuous water quality monitoring stations throughout the Maumee watershed at USGS streamflow gages. The various water quality sampling agencies are noted.*

Figure 4.2. Water Sampling Locations

Also, the TP produced in Ohio and transported to Indiana should bear scrutiny and be in part memorialized as a TMDL target. The loading from the St. Marys watershed and the St. Joseph watershed will influence the loading from Indiana into the Upper Maumee watershed.

The loading from the Indiana portion of the Upper Maumee River bears significant concern due to the quantity of TP produced in the Indiana portion of the watershed as well as the potential and undocumented transport from Ohio through Indiana and back into the Ohio Maumee River watershed HUC 8 (04100005). This is shown in the draft TMDL Figure 30. *Total phosphorus yield from the landscape by HUC-12 in the Maumee watershed for the spring 2008 base condition from the Ohio DAP 2020 (OLEC, 2020a).*

As seen in Figure 4.2 (copied from the draft TMDL) there is TP transport:

a) From the St. Marys River HUC 8 watershed (04100004) to Indiana (produces approximately 13% of the TP in the WLEB watershed).
b) From the St. Josephs River HUC 8 watershed (04100003) to Indiana.

The loading from the St. Marys watershed HUC 8 (04100004) in Ohio into the Indiana bears significant concern due to the quantity of TP produced in the watershed as shown in the draft TMDL Figure 30. *Total phosphorus yield from the landscape by HUC-12 in the Maumee watershed for the spring 2008 base condition from the Ohio DAP 2020 (OLEC, 2020a).*

The success of the TMDL includes too much reliance upon Michigan and Indiana for reductions without assurances. There is no provision in the TMDL for the failure to meet the boundary condition or ability to seek redress by stakeholders. There are no provisions for monitoring.

I see the potential for a squabble if the state of Indiana misses the boundary target for discharge into Ohio and they claim the cause for the excess is due to the discharge from Ohio into Indiana by way of wither the St. Mary or the St. Joseph Rivers.

To add another layer of complexity to the equation is the possibility of the same excess discharge from Indiana into Ohio by way of the upper Maumee River beyond the boundary condition, and where the good state of Indiana blames Ohio excess contaminants from the St. Joseph River, and Ohio points the finger upstream to Michigan for their discharges into the St. Joseph River which flow through Ohio into Indiana, and the discharges flows through Indiana into Ohio, eventually into Lake Erie. Complicated? This issue must be clarified in the TMDL and only the US EPA has the correct solution, which is a Federal Maumee River watershed TMDL.

The US EPA in the comment #29 penned on 08/17/2022 to the Ohio EPA on the PMR, sounded concern about the determination of the boundary conditions and the potential actions by Michigan and Indiana.

The development of a "Watershed Implementation Plan Agreement" as used in the Chesapeake Bay TMDL is recommended for this TMDL.

The US EPA may wish to step in an to solve the problem by initiating a three state Federally constructed TMDL.

**Evaluate amending the draft TMDL by establishing targets for the St. Marys watershed to be measured at the St. Marys monitoring station, for the St. Josephs watershed to be measured at the St Josephs monitoring station and include targets and measurement to ensure the states of Michigan and Indiana are meeting the allocation used to establish that the TMDL target will be met (reasonable assurance).**

**The boundary condition allocation loads from Indiana and Michigan (25% of the total) have no assurances of being met. Change the TMDL from an intrastate to an interstate program or establish an effective "Watershed Implementation Plan."**

# COMMENT 5: CRITICAL CONDITIONS

**The importance of Seasonality, Critical Conditions, Legacy Phosphorous demands the need for an annual TMDL target in addition to the proposed spring season TP target.**

The draft TMDL in §5.7.2 *Critical conditions*, makes the assertion that the location and the timing of the discharge of TP or DRP into the waters of the state of Ohio, the application of TP or DRP during the means of land application bears no relevance to the formation of HAB's in the far field. Therefore, there is no reason to consider the impacts from specific 'geographic zones' in the development of the TMDL targets and the institution of voluntary or mandatory mitigation measures.

The discussion of the impact of legacy phosphorous in the watershed from the point of discharge through what may be a 135- mile journey down the Maumee River to Lake Erie, being adsorbed and discharged by wetlands, stream restoration, flood plain restoration, river sediment, and of course stored in the land application areas before being discharged through drainage tiles, raises the adequacy of only the March 1 through July 31 TMDL targets.

The variations of climatic effects that Ohio, and the rest of the world are experiencing pertaining to the lack of, and then plentiful rainfall which accelerates and then retards discharges from land application areas into the water of the state of Ohio, creates a problem that has not been addressed by the TMDL.

The lack of differentiation between a land application discharge occurring a day earlier than the measurement of compliance of the TMDL target, questions whether the a 'springtime only' TMDL target is appropriate. Will this 'springtime only' target be a vehicle for noncompliance with the TMDL targets by amending the manure land application cycles?

The variables in conditions and loopholes from attaining clean water will be ameliorated by establishing annual TMDL targets which will be in effect and compliment the proposed March 1 through July 31 TMDL targets and allocations.

**<u>Maumee watershed nutrient TMDL targets</u>**

| Location | Total Phosphorous spring (March-July) target (in MT) |
|---|---|
| Maumee River at Waterville Ohio, 41.4998,-83.7140 | 860.0* |
| Maumee River at mouth/Maumee Bay 41.6937,-83.4682 | 914.4 |

Note: * To be met nine out of 10 years to account for interannual flow variability for the March–July period in extreme years

Table 5.1. Nutrient TMDL Targets (Draft TMDL, page 15)

**<u>Allocations to meet the TMDL for the Maumee watershed to address western basin of Lake Erie impairments.</u>**

| Allocation type | Spring season total phosphorus (metric tons) | Daily total phosphorus (kilograms) |
|---|---|---|
| Boundary condition: Michigan | 180.7 | 1,180.9 |
| Boundary condition: Indiana | 48.0 | 313.6 |
| Wasteload allocation | 109.3 | 714.6 |
| Load allocation | 555.9 | 3,633.2 |
| Explicit margin of safety (3%) | 20.6 | 134.5 |
| TOTAL | 914.4 | 5,976.8 |

Table 5.2. TMDL Allocations

The application of TP or DRP to croplands, and the discharge of TP and DRP by any means does bear relevance to the formation of HAB's in the far field. Therefore, there is reason to consider the impacts from specific 'geographic zones' in the develop of the TMDL targets and the institution of voluntary or mandatory mitigation measures.

A review of the watershed makes a person beg to differ which may need evaluation and rectification in the final TMDL.

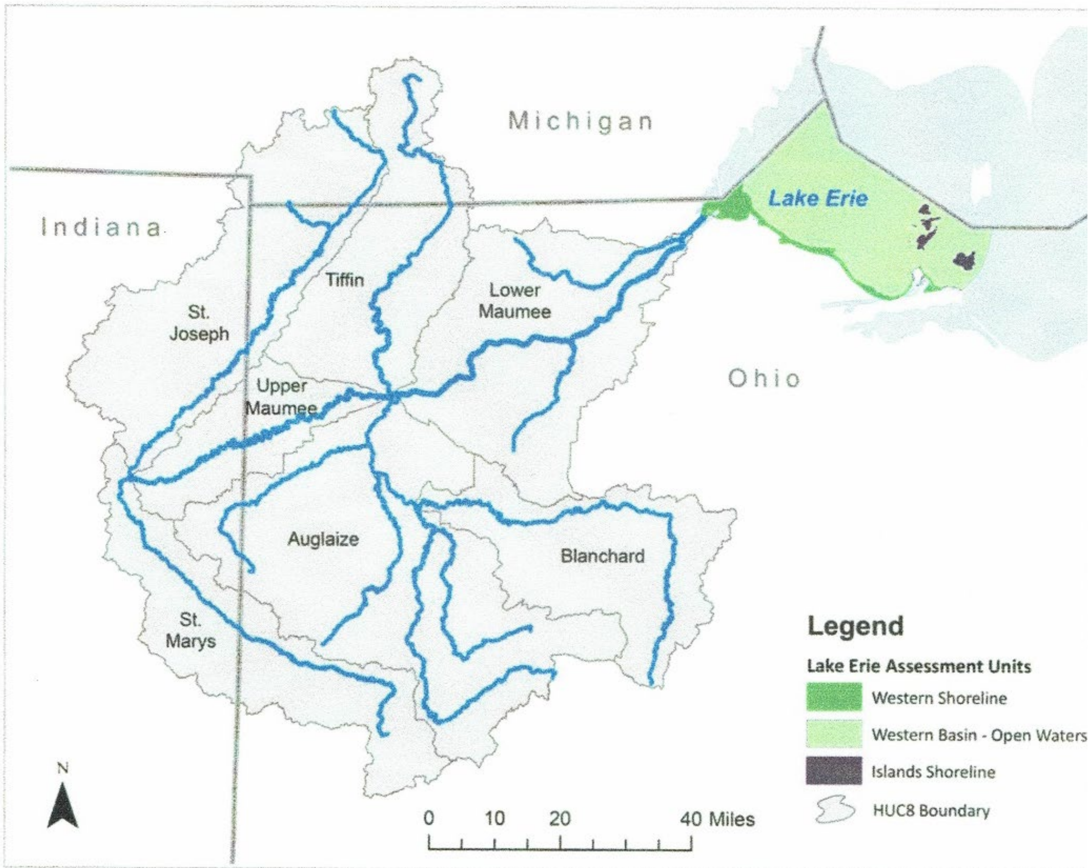


*Figure ES-1. Map of Ohio's western Lake Erie assessment units and the Maumee Watershed.*

Figure 5.1. Watershed Map

Contrary to the high-lighted statement contained in §5.7.2 in the draft TMDL, regarding the location of critical conditions, (see below) there are facts in the same document which tells a different story.

> *"5.7.2 Critical conditions*
>
> *Ohio EPA considers this a "far-field" TMDL because the pollutants of concern are causing impairment to waters "far" downstream from their source. Phosphorus delivered by the stream network that makes up the Maumee watershed is the cause of the HAB impairments in the Western Basin of Lake Erie.*
>
> *Impairments to designated uses within the Maumee watershed stream network are considered "near-field." This project does not address near-field impairments due to phosphorus pollution. Near-field impairments are addressed by near-field TMDLs. Where no existing TMDL addresses a near-field impairment, a future TMDL is still required. For a list of areas with existing near-field phosphorus TMDLs in the Maumee watershed, see Appendix 5.*
>
> *The timing of phosphorus delivery within the targeted "spring" period is not relevant. Nor is the geographic zone from which phosphorus reduction occurs. It makes no*

> *difference if the targeted amount of phosphorus reduction occurs from a very small area (within the Maumee watershed) during a very short period of time (within the spring period) or if it is completely spread out in space and time. Therefore, critical conditions of this TMDL are any combination of environmental factors that results in meeting the phosphorus-reduction targets.*
>
> *While this far-field approach provides some flexibility in implementing pollution controls, the reality is that a substantial reduction from nonpoint sources is required. For success, certain recommended implementation actions, such as agricultural nutrient management planning, will need to cover a significant amount of additional acreage throughout the watershed. Additional, more-targeted improvements to nutrient-reduction practices are also needed where critical sources areas are identified. The reasonable assurances section (Section 8) discusses this further."*

The temporal and spatial analysis of the transport and reactions of TP and DRP to the target levels, which are related to HAB formation is important to the generation of HABs due to legacy retainment of phosphorous, transport of phosphorous through waterways to Lake Erie, and the creation of ill-timed land application of manure-based or synthetic fertilizer. It is important in the evaluation to maintain that scientific link when reviewing or developing policy.

The US EPA brought the matter of temporal critical conditions to the attention of the Ohio EPA in the 08/17/2022 question 33, 26, 24, 13, 3. With the question of how the tap of phosphorous can be turned off and the impact of changing climate.

One important factor to consider is how the Maumee River floods during the melt, whether the melt occurs during the March1 through July 31 timeframe or not. Many of us have seen the extent of the flooding due to ice buildup and a massive melt off. I remember the false springs of February where the melt off commences. The accumulation of phosphorous in the lower Maumee watershed, up from the ice dam, normally upstream of Waterville is typical. When the ice dam lets loose, the water floods the lower Perrysburg area, removing cemetery head markers, ruining the park trails all due to the water surge. This surge carries downstream the remnants of previous years phosphorous, whether it be dissolved or adsorbed in sediment. This is called the 'lag time' between delivery of TP and the fueling of algae later in the year.

Yes, the bloom will not start until the weather warms, which is typically after March 1$^{st}$, but the loading for the bloom may arrive earlier. It would be prudent to err on the side of caution, especially with so low of a margin of safety of 3%.

Legacy phosphorous will more likely be reduced if there are annual limits because they will eliminate any incentive for application outside of the 'spring season' as a disposal mechanism to empty the lagoons at CAFF production facilities prior to the early rains. Everyone agrees with the EPA comment that a strong emphasis should be made in reducing or eliminating legacy phosphorous which will lessen the WLA and LA burdens. The annual loads are the best action available to lessen legacy phosphorous because as it currently stands, as demonstrated in the evaluation of the CAFF's in the Auglaize, Lower Maumee, St. Marys watersheds, the concentration of larger AFO's create an overabundance of the manure-based fertilizer which unfortunately is treated as a waste product if the nutrient concentration is unattractive.

In regard to the temporal aspects of the issue.

- ✓ It is correct to assert that seasonal discharges into the waterways of the state of Ohio are not applicable to this far field TMDL. As seen in the map of the watershed, the target area is huge. The waterways originate in contiguous states, such as Michigan. The St. Marys waterway originates in Ohio and winds its way to the Upper Maumee to eventually discharge in Lake Erie. Other discharges have a shorter route.
- ✓ It is correct to apply a yearly limit control strategy because in some waterways the time necessary it takes from discharge to Lake Erie varies due to discharge point and final destination. Of course, the flow of the watercourse will impact this point.
- ✓ However, a close eye will need to be on the changing weather patterns to ensure that the current target timeframes, which are currently appropriate, are relevant in the future. Of course, the ultraviolet light intensity, one of the drivers for the creation of the algae bloom, along with temperature, and water depth needs research.
- ✓ It is correctly stated in the yellow highlighted area of §5.7.2, that the temporal aspects of certain nonpoint discharges are delayed, and that realistic factors must be built into any mitigation program. Not to be dismissed are the programs instituted by ODNR which will have an impact upon the timing and quantity of the formation of HAB's due to phosphorous.
- ✓ Lastly, on the discussion temporal impacts, the adsorption, and the release of DRP through sediment has a major impact on the timing of the HAB. A mole of DRP released at the upper St. Marys watershed may or may not take a lazy or an accelerated journey to Lake Erie. The HAB's formed in one year may be due to the discharges from prior years, as discussed in the section pertaining to legacy phosphorous. There are many variables in each of the seven watershed which affect the temporal aspects of discharges. Currently, I know of no temporal scientific studies being done in the Maumee River watershed.
- ✓ All of the points raised above can be addressed by the institution of annual loads which maintains limits throughout the year.

A research project pertaining to the release of inert radionuclide particles from various locations in the seven watersheds to discover the temporal information of TP and DRP discharges may be worth a review as part of adaptive management in order to improve future amendments of the TMDL .

In regard to the spatial aspects of the issue.

- ✓ The temporal impacts of a phosphorus release merit a different conclusion, in some respects, than the spatial review.
- ✓ A closer review of validity the statement "*It makes no difference if the targeted amount of phosphorus reduction occurs from a very small area (within the Maumee watershed) during a very short period of time (within the spring period) or if it is completely spread*

*out in space and time*." Unlike the fact that the portion of the TP and DRP which is not mitigated or unless it is used in the formation of HAB's before reaching Lake Erie, it matters where the TP and the DRP is discharged into the waters of the state of Ohio, in the timing and the yield of HAB per unit of pollutant (potency).

- ✓ Discharges in the lower Maumee and some other watercourses) during periods of higher flows has a higher probability of having no diminution of yield due to manmade watercourse source sinks and other actions. These actions are found in Figure 50 on page 121 of the draft TMDL and amounts to an approximate 92 metric tons of reductions. Examples listed of these actions are increase wetland area, stream restoration, and floodplain restoration (all good projects).
- ✓ Coupled with the above point, the discharge of a liquid medium that has a higher DRP percentage rather than solid manure will affect the phosphorous yield. Therefore, the evaluation of where (and when) the discharges from the 73 ODA DLEP CAFF's occur is warranted.
- ✓ The effect of the type and location of the discharge is common sense data which will improve the validity of the TMDL, and one would say, necessary for ***demonstrating reasonable assurance***.
- ✓ One could say that the discharges closer to the mouth of the Maumee Bay, which are the lowest fruit on the limb, should be picked off the 'tree of implementation' first.

The evaluation of the location of the discharges closest to Lake Erie and the largest in the aggregate, especially the 73 ODA DLEP CAFF's, and those which create the greatest quantity of liquid manure, would be time well spent in improving the reasonable assurance of the TMDL. The continued collection of information will improve the accuracy of any near-field TMDL while provided data input for the use of SWAT ensemble predictive models.

**It is recommended that annual TMDL targets and allocations be established. Amend the draft TMDL by evaluating the impact of the 73 ODA DLEP CAFF's whose direct or indirect land application is nearest to the Waterville monitoring station. Determine whether the 73 ODA DLEP CAFF's are in compliance with federal and state regulations.**

**The reduction of legacy phosphorous, which has built up due to overapplication, will take a long time to be dissipated. Maybe up to a dozen years. Starting to identify and then to eliminate over-application areas of phosphorous is a logical first step in the right direction.**

# COMMENT 6: MODEL VERIFICATION

**Evaluate and amend the TMDL to take into account the TP baseline is a possible 20% further away than stated due to an absence of an adequate model verification, underestimation of nonpoint source contributions. There isn't a CAFF growth allowance plan. There isn't a quantification of the implementation of BMPs. There isn't a correct estimate of reductions necessary from the current baseline and implementation target. These deficiencies impact the reasonable assurance of the TMDL.**

The hardship of demonstrating reasonable assurance in the TMDL is called into question by the conspicuous absence of information. The absence of information leads to a dearth of the ability to precisely demonstrate the Ohio EPA TMDL will attain the requirements of § 303 (d) of the CWA. The consequences of this dilemma should not fall onto the shoulders of the Ohio EPA staff, they have prepared a draft TMDL with limited information and even less regulatory authority

You cannot prepare a route to where you wish to go without knowing where you currently are.

Unfortunately, while the draft TMDL properly delineates the desired target, it does not provide sufficient information on where the plan is starting from. The accuracy of the computation of the starting point is called into question, and at the best, there is an inadequate or no presentation of the effectiveness of the selected strategies. The agency has elected to not factor into the TMDL the demonstrated growth of the largest source category and has neglected to propose any action to tamper that growth. A comprehensive synopsis of the holes in the TMDL.

To be more specific, the following points are a sketch of the issues which will be discussed later in greater detail.

A. The inability to verify the model has the consequence that the estimates of the reduction of TP to be possibly 20 % lower than necessary to reach the Waterville target goals. The model verification, done on various watersheds shows up to a 38% underestimation (at the Wilshire monitoring station of the St. Marys River).

B. The current TP and DRP loadings are greatly higher than the year 2008 baseline, from which a 40% reduction is the target. Absolutely, the starting point for reductions is not 1128 MT phosphorous a year, it is more than double that number, the loading is closer to 2,000 MT phosphorous a year.
C. The draft TMDL would greatly benefit from the inclusion of a growth allowance for specific segments of the TP inventory. The establishment of a growth allowance for CAFF's (currently absent) would provide a parameter for measuring progress and possibly allow the establishment of a new source review or bubble program.
D. The draft TMDL provides no quantification of results, detailed evaluation of the mitigation effects of the measures contained in the BMP, NMP, $H_2$Ohio programs, either by facility, strategy, and by sub-watershed.

Items A through D will be reviewed individually.

A. <u>MODEL VERIFICATION</u>

The modeling of the target conditions, the proposed allocations and the verification of the model are basic requirements of the TMDL. The draft TMDL provides two figures which show a graphical representation of the model verification results. Similar comments have been provided during the PMR stage of the TMDL. It is recognized that there has been improvement. <u>The issue is whether the amended modeling output is sufficient to provide reasonable assurance.</u>

Figure 6.1 (Figure 46 from the draft TMDL) shows a comparison between the observed TP loading (solid bullet) and the Mass Balance Modeling (diamond) with an alternative modeling endeavor 'Drainage Area Ratio Method' (triangle).

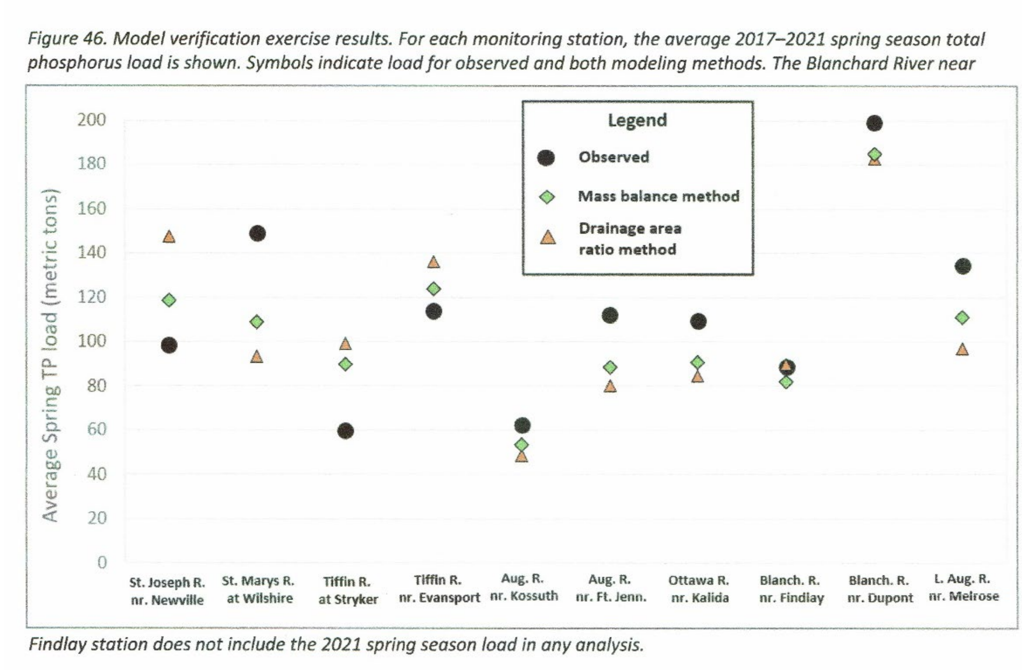


Figure 6.1. Model Exercise Results

Please note the observed readings (shown as solid dots), from certain monitoring stations are greater than the calculated readings ( diamonds and triangles) used in the development of the draft TMDL targets.

The use of a lower TP allocation may underestimate the amount of TP reductions that are necessary to reach the TMDL target. The observed TP readings differ from the calculated modeled estimates range between 38% and 8% with the modeled estimate being lower. As shown in Table 6.1, there is a difference between the verification of the model when applied to the watersheds north and south of the Maumee River. The model predicted higher than observed readings for stations north of the Maumee River where it was the opposite for those south of the river. When averaging the errors, the sum of all was in the ‘acceptable’ range (questionable term to use) for verification (This averaging is unacceptable when the greatest amount of phosphorous is generated south of the Maumee River).

The monitoring stations which are south of the Maumee River shows the greatest disparity between observed TP readings and the modeled readings, also when the stream watershed flows are low. This information of when the modeling and measurements do not coincide are very important and should be used in future analysis. An explanation of the cause of the deviation can be obtained by the review of *COMMENT 1 ODA DLAP CAFF’s* of this submittal. The greatest difference between the observed and modeled readings are in the watersheds south of the Maumee River where the largest of the 73 ODA DLEP CAFF’s reside. More detail on the same is below in Table 6.1 (Table 30 from the draft TMDL). Most assuredly, the lack of data does not reside in the stream side monitoring, which is one of the most complete data sets available to the regulatory community.

*Table 30. Model verification results. Modeled loads using the mass balance and drainage area ratio methods compared to observed spring loads with summary statics. All load results are shown in metric tons, averaged for the 2017–2021 spring seasons (except where footnoted).*

| Monitoring station gage | Drainage area (mi²) | Average spring TP load (MT) 2017–2021 | | |
|---|---|---|---|---|
| | | Observed | Mass balance method | Drainage area weighted method |
| 04178000 St. Joseph R. near Newville | 610 | 98.3 | 118.5 | 147.5 |
| 04181049 St. Marys R. at Wilshire | 386 | 149.2 | 108.7 | 93.3 |
| 04185000 Tiffin R. at Stryker | 410 | 59.9 | 89.9 | 99.1 |
| 04185318 Tiffin R. near Evansport | 563 | 113.7 | 123.9 | 136.1 |
| 04185935 Auglaize R. near Kossuth | 201 | 62.5 | 53.3 | 48.6 |
| 04186500 Auglaize R. near Ft. Jennings | 332 | 112.1 | 88.7 | 80.3 |
| 04188100 Ottawa R. near Kalida | 350 | 119.5 | 90.6 | 84.6 |
| 04189000 Blanchard R. near Findlay* | 346 | 89.0 | 82.0 | 90.1 |
| 04190000 Blanchard R. near Dupont | 756 | 199.1 | 185.0 | 182.8 |
| 04191058 L. Auglaize R. near Melrose | 401 | 134.4 | 110.9 | 96.9 |

*Note:*
* The 2021 observed spring season load was not available for this station at the time of this analysis. Therefore, for appropriate comparison, 2021 is also not included in the two modeled averages for this station.

Table 6.1. Model Verification Results

The draft TMDL discusses the model verification very thoroughly. The Ohio EPA could do only so much with the data they had available. I am surprised, based upon the information available, they were able to get within an accuracy of 20%. The lack of data is not due to the stream monitoring. The lack of data is due to what type of data is collected and what data is available from the ODA. More accurate spatial, temporal, quantitative speciated data is needed to develop a more accurate assessment of the path to meet the TMDL target. Either that data is not being collected or for some reason, it was not used in this TMDL.

Part of the explanation and the cure or mitigation for the deviation can be found in the discussion of the Margin of Safety (MOS) on page 110 in §5.5 of the draft TMDL. The Ohio EPA has astutely used, for which they should be commended, the MOS as a partial remedy for the burden caused by the lack of data to run a more data intensive predictive model on a subwatershed basis.

> “ The mass balance modeling employed for this TMDL is not amenable to formal uncertainty analysis for the majority of the watershed upstream of the monitoring pour point. However, the model verification results, as presented in Section 6.2 below, demonstrates that the error in calculating the unmonitored load downstream of the pour point could be as great as 19.2 percent for that area. Section 6.2 explains when that error is applied to the load allocation downstream of the pour point, it could underestimate the load by 3.4 MT of total phosphorus for the spring loading season. To account for the much less quantifiable uncertainties spelled out in this section, more than 3.4 MT must be reserved. The 3.4 MT is the maximum error resulting from a very small portion, less than 5 percent, of the watershed. The remainder of the watershed represents a much

> larger load, but the error is mitigated by the implicit considerations discussed above (though this mitigation is not quantifiable). Considering these factors and using 3.4 MT as an anchor point, a reasonable value was determined to be greater than five times this amount of load and less than 10 times. The load that results from an explicit MOS of 3 percent, or 20.6 MT, meets these criteria. An overall explicit MOS of 3 percent accounts for the unknown factors in both calculating baseline conditions and uncertainty in the relationship between sources receiving a load allocation and a wasteload allocation. This load is reserved as a proportion of the total loading capacity. Therefore, it reduces the loading capacity available for allocations. Unless an approved TMDL is officially reevaluated, the load reserved for MOS will remain unallocated in perpetuity."

Stepping back and looking at the problem from a stratospheric viewpoint. The Maumee River watershed is comprised of distinct watersheds, some have similar characteristics, and some have voluminous differences. Differences like TP loading due to the number of large CAFF's (see *COMMENT 1: 73 ODA DLEP CAFF's)* producing the greatest amount of TP and DRP in the watershed. Correlate the information contained in *COMMENT 1: 73 ODA DLEP CAFF's* with the watersheds where the model underperforms and notice similarities. This analysis demonstrates that a much greater degree of accurate spatial, temporal, quantitatively speciated data is needed to develop a more accurate assessment of any path to meet the TMDL target.

**The Maumee Bay WLEB is comprised of separate watershed which have dissimilar attributes, such as loading, hydrology, rainfall, and drainage location to the Waterville gage station. These seven watersheds must be analyzed separately and modeled properly. Valid data is necessary to provide accurate spatial, temporal, quantitative speciated data is needed to develop a more accurate assessment of the path that has a reasonable assurance of meeting the TMDL target.**

Yes, there are guidelines for model approvability. Using the guideline for the entire basin rather than applying the guideline to the separate watersheds, as discussed in the above paragraph, is a route that I wish the Ohio EPA to take. The use of better modeling will, in the future, help create a better work product.

The justification for using a basin averaging mechanism rather than a watershed evaluation is as follows and is on page 118 of the draft TMDL.

> "As explained throughout Section 4.3, watershed size generally predicts the magnitude of load delivered, with larger watershed areas producing more load. Two pairs of the stations included in this verification, the Tiffin and Blanchard Rivers stations, are "nested" sites. In each of these pairs, one station is upstream

of the other. Therefore, the greater load at the downstream station in each of these nested pairs is expected.

Moriasi et al. (2015) recommend a variety of performance measures when evaluating water quality models. These recommendations are intended to be used when comparing process-based models (such as SWAT and Hydrologic Simulation Program – FORTRAN [HSPF]). However, grouping the results of the 10 stations modeled for the two types of modeling employed in this verification allows for some of these statistical tests to be carried out.

The dimensionless Nash Sutcliffe efficiency (NSE) test determines the relative magnitude of the modeled to observed variance. This essentially provides a rating of the noise compared to information of the fit. Moriasi et al. (2015) suggest an NSE greater than 0.65 indicates a "very good" fit for phosphorus modeling. When examining the grouped averages of the two types of modeling to the observed loads, the mass balance method has an NSE of 0.96; the NSE for the drainage area ratio method is similar at 0.91.

The percent bias (PBIAS) test examines the average tendency of simulated data and provides a statistic for the overall estimation of bias. Values greater than zero suggest an overall underestimate, whereas values less than zero indicate an overestimate. The average of the 10 stations' observed load is compared to both modeling methods results' average load. This analysis finds a PBIAS of 6.8 percent for the mass balance method and 6.1 percent for the drainage area ratio method. It indicates a slight underestimation in both methods (mass balance method underestimates slightly more than the drainage area ratio method). However, both results are considered a "good" fit for nutrient modeling by Moriasi et al. (2015).

The standard regression analysis again averages the observed or predicted (modeled) loads for each station and provides several summary statistics that can be used to compare the performance of modeling methods. The coefficient of determination (R2) is considered a benchmark performance evaluation. The closer this R2 value is to one, the better the fit of the modeled dataset to the observations. Moriasi et al. (2015) recommend using such scatter plot analysis when the datasets do not contain extremely high values that may skew such assessments. To best quantify this fit, the regression's gradient, or slope, along with its y-intercept, are recommended to also be presented with R2. A slope of 1.0 and a y-intercept of 0 are optimal.
Summary statistics from the regression analysis show different performance for the two modeling approaches. The R2 for the mass balance method is 0.72 with a slope of 0.72 and y-intercept of 24 MT. Compared to the drainage area ratio method's R2 of 0.40 with a slope of 0.59 and y-intercept of 39, the mass balance method has a higher (better) R2, closer slope to 1.0, and closer y-intercept to 0. These metrics provide evidence that the mass balance method results in a tighter (better) relationship with the observed loads compared to the drainage area ratio.

> This analysis is quite evident when graphically observing these two regressions results in Figure 43."

The discussion continues onto page 119. I thank the Ohio EPA for considering my thoughts, and the incorporation of the analytical recommendations (submitted in the PMR comment period) from my colleagues'.

> "The verification also helps quantify some of the uncertainty in the mass balance method. The standard error for each monitoring station is the percent difference of the average modeled/predicted load compared to the average observed load. Some stations have a positive average standard error, indicating a model overestimation, and some have a negative average standard error. The average of the absolute value of all 10 stations' average standard error is 19.2 percent. This can be considered the mass balance method's model verification overall standard error. The TMDL's load allocation (prior to reserving a MOS) for the area downstream of the Waterville monitoring station is 17.8 MT of total phosphorus. Applying the 19.2 percent verification standard error to this 17.8 MT results in 3.4 MT of load that could be considered required to be reserved as a MOS accounting for modeling uncertainty. The reason this only applies to the area downstream of the Waterville monitoring station is because the load calculated for the area upstream of Waterville is based directly on observations. The explicit MOS reserved in this TMDL is greater than 3.4 MT, however, due to additional reasons further explained in Section 5.6."

However, there is much work to do to establish an accurate estimate of the needed reductions. Unfortunately, the timelines dictated by the court and the practicality of the time that is needed to accomplish the task, especially if data needs to be gathered, is outside any possible extension.

As a stopgap option I recommend increasing (doubling) the Margin of Safety to compensate for the lack of modeling inputs. Then when a new modeling, with correct inputs, becomes available, adjust the Margin of Safety as part of adaptive planning and management.

B. <u>Allocations and Estimated TP Reductions Necessary to Reach the TMDL Target</u>.

The draft TMDL on Page 121 contains an illustration which may be confused with estimates of TP reductions that will be necessary to reach the TMDL targets. This is shown in Figure 6.2.

As seen, this figure estimates a reduction of approximately 5 metric tons of phosphorous will need to occur from Point Source Reductions, approximately 92 metric tons of phosphorous will need to occur by Enhanced Nonpoint Source Sinks, and approximately 366 metric tons of phosphorous reductions will need to occur from Nonpoint Source Management (all reductions are from a 2008 baseline).

| Figure 6.2 sends the message that the TMDL target is much closer than it is. |
|---|

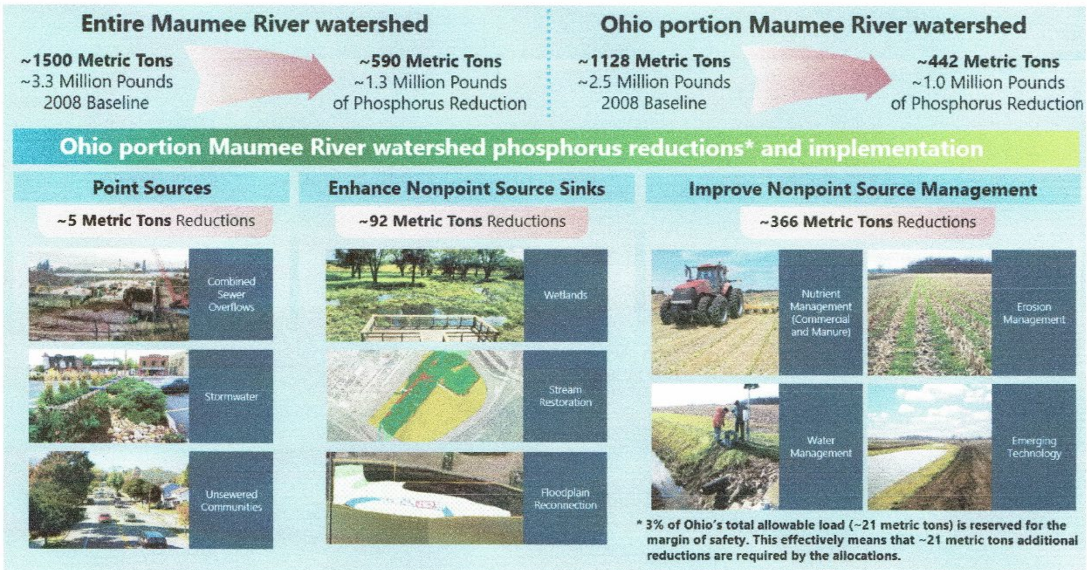


*Figure 50. Implementation of the TMDL is accomplished by managing all reduction opportunities in the watershed, both by reducing sources and enhancing existing sinks.*

Figure 6.2. Phosphorous Reductions in Ohio.

The estimates in Figure 6.2 must be used for only illustrative purposes and not be taken as absolute numbers. This assertion is correct for many reasons. I would like to provide a better estimate, but I do not have the data to calculate a more accurate estimate than below. So, the following is the best I can do with the data that I have. I encourage the Ohio EPA and ODA to calculate the quantity of reductions that will be necessary to reach the target TMDL allocations from a current year baseline.

The first and most obvious reason is the TMDL has not established a starting point of what the current baseline of TP and DRP loading is, or what it will be in a year or two.  The baseline is not 2008.

As mentioned earlier, the model validation generally demonstrates a greater than measured loading of TP from watersheds above the Maumee River and it predicts a lower TP in the watersheds south of the Maumee River. Coupling the location of the largest AFO's, the 73 ODA DLEP CAFF's location with the subsequent land application, generally around a three-mile radius of the production operation, with the deviance due to the modeling generates a possible overestimate of TP loading north of the Maumee River and an underestimate of TP loading south of the Maumee River.

A greater concern with the illustrative Figure 6.2 is the suggested amount of TP reductions is from what must be from an unknown 'current' or 'future' baseline. In order to calculate the quantity of TP reductions, a baseline (*Point A*) must be established which is the current or anticipated starting point, and a final, or attainment level of TP (*Point B*) must be established.

The establishment of the quantity of basin wide TP reductions needed to reach an attainment level of TP, is "*Point A* minus *Point B*."

The end point, which is the desired quantity of TP and DRP at the Waterville monitoring station is a known amount. This known value is *Point B*, (the quantity of TP established as *Point B* is under question as discussed in COMMENT 3) and the Waterville station quantity of TP is established by the Annex 4 agreement.

Figure 6.3 (also found on page 25 of the draft TMDL in figure 9) shows the total phosphorous spring season loads for the Maumee River. The loads vary due to many reasons, such as precipitation, current and past years synthetic fertilizer and manure-based fertilizer application, new and modified CAFF's added to the watershed. A review of Figure 6.3 shows that establishing the starting point (*Point A*) is not simple because of the changes in the amount of loading and hydrological conditions. It is difficult, but sharp minds are able to overcome challenging situations.

The baseline loading year may be when there are high flows or may be a year when there are low flows in the Maumee River watershed. A predictive model could be used to normalize the flows, generate a typical flow based upon 40-years of water movement. As an option to a predictive model, an error band analysis can be established. No matter which tool is used, the evaluation needs more work. A range of predicted estimated reduction targets is the path I would follow with the ranges dependent upon a categorization of the amount of rainfall. This would create a "wet-year, dry-year, and a "average-year" target using a histogram to look at attainment of target probabilities. Incorporating all of the variables associated with the calculation, numerous scenarios can be constructed.

A solution set could be created for each scenario and the impact of enhanced non-point sinks, detection and the mitigation of legacy areas which have a greater impact during wet years could be a constant in the definition of the equation to solve the problem.

A three-scenario target determination with appropriate probability sets is needed in this TMDL. The public will be well served by showing numerous paths to attainment, rather than one simplistic, and erroneous path.

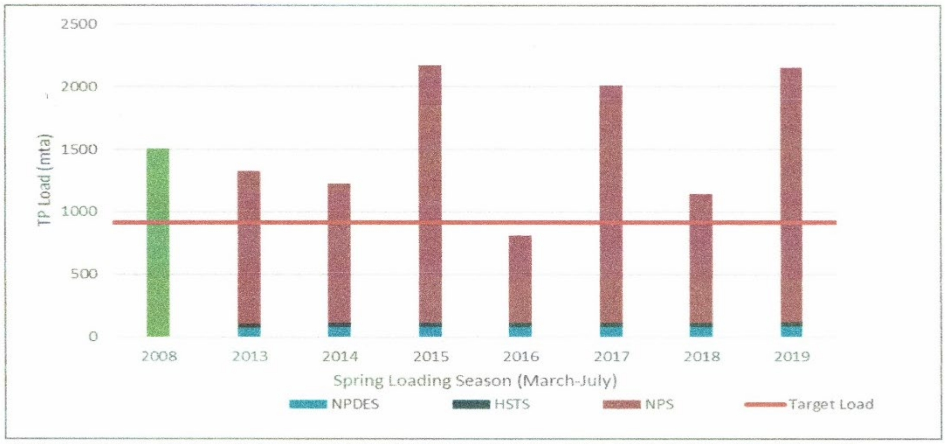


*Figure 9. Maumee River total phosphorus loads for spring seasons in 2013–2019, broken out by Ohio EPA Nutrient Mass Balance major source categories. Note that the NPDES load in this work only includes the non-stormwater individual permitted load. For comparison with the Annex 4 reduction targets baseline, the 2008 spring season total load is also shown. (Ohio EPA, 2020b, Appendix A)*

Figure 6.3 TP Spring loads.

C. <u>What are the reductions needed to reach the TMDL target of 40% reduction from the current not the 2008 baseline?</u>

The amount of the phosphorous reduction needed to attain the TMDL allocations and targets reflects upon the actual probability of attaining the non-point loading allocations and the ability to meeting the Reasonable Assurance standards for approval of the TMDL.

It is possible to use the highest TP loading in recent years, shown in Figure 6.3 which is approximately 2,100 metric tons TP generated during 2019 spring season as a baseline for '*Point A*.' However, using the highest demonstrated loading year as an option fails to incorporate the growth of animals and their discharge into the Maumee River watershed. Therefore, using this 'highest value' method does not take into account the growth from nonpoint sources such as the number of or the increase in size of CAFF's.

When incorporating animal growth into calculation of the reductions necessary to reach the clean water goals, a person needs to be realistic, there is a commensurate increase in phosphorous loading from the additional animals through land application. As shown earlier, the Ohio ODA and the Ohio EPA assume that because the discharge of animal manure into the waterways of the state of Ohio is prohibited, it does not occur.

In this calculation I will not test the common sense of the reader to assert such an erroneous hypothesis. This analogy is like saying that because something is illegal, it should not be included in real world analysis. I will not speak to the calculation of murder rates or train wrecks and excluding or not counting activities which are illegal, assuming that the illegal activities do not happen, or that there are laws making them illegal and enforcement is perfect.

I will incorporate into the analysis, real world assumptions, crop assimilation and the beneficial reduction of phosphorous due to Ohio mitigation strategies such as nutrient management plans (NMP), best modern practices (BMP), and $H_2$Ohio (even though the funding is being diluted in the upcoming budget year, I will assume it retains the same level of effectiveness).

**The estimated reductions of phosphorus needed to reach the TMDL may be two to three times larger than the target of 914.4 metric tons phosphorous per shown in the draft TMDL. This is due to unmitigated growth since 2008.**

Unfortunately, working with the absence of data, one way to calculate the level of reductions from today's loading is to sum the estimated annual increase of non-point loading from animal feeding operations every year, generated from the information (contained in Table A3-5 of the draft TMDL) with the 2,100 MT TP estimated seasonal loading in 2019.

The data used in the evaluation will be what is in the TMDL, augmented with real world assumptions. I encourage the ODA and the Ohio EPA to develop better scenarios to show the good people of Ohio how close or how far away the clean water target may be, and what the viable mitigation strategies could be.

Figure 7.2 (shown in Table A3-5 of the draft TMDL) shows the increase of TP from an increase of animal count from a calculated 3,700 MT TP/Yr. in 2007 to 5,300 MT TP/Yr. in 2017 which is approximately a 160 MT TP increase per year. I would like to develop an analysis which includes liquid and sludge manure based upon the wastewater created, alas, that data is not available to me. The increase of loading from 2017 to 2022, which I will call the present, is not known, therefore assume the continuation of the same rate of increase 160 MT TP/Yr. from 2008 to 2022. All of the additional phosphorous is assumed to be applied to crops. However, the additional calculation of phosphorous due to animal growth requires an adjustment based upon crop assimilation and by the effect of nutrient management plans (NMP), best modern practices (BMP), and $H_2$Ohio (even though the funding is being diluted in the upcoming budget year, I will assume it retains the same level of effectiveness). A phosphorous crop assimilation reduction factor of 30% is used and a very generous 40% reduction due to the Ohio EPA and ODA mitigation programs. Therefore, this evaluation assumes only 30% of the new growth phosphorous is available to be directed to the waterways of the state of Ohio. Please remember the discharge of manure-based nutrients such as TP and DRP is not illegal due to the stormwater exemption contained in Ohio law. The calculation is about obtaining the amount of phosphorous, not distinguishing between the division between a legal and illegal discharge.

Determine the amount of yearly TP generated by the additional growth of animal units, assuming the crop assimilation factor of 30% plus 40% effectiveness of Ohio EPA mitigation, which totals a 70% reduction. Therefore, the amount of TP potential generated by the addition of new animals, only 30% of the TP makes it to the watershed. This is (160 MT TP/Yr. from animal growth) X (30% not assimilated and reduced by increased mitigation) = 48 MT TP/Yr. every year from 2008 to 2022 (15 years). The cumulative yearly increase is calculated to be (48 MT TP/Yr.) X (15 years) = 720 MT TP added to the baseline, as mitigated growth.

Unfortunately, the only TP loads available are found in Figure 6.3 (Figure 9 of the draft TMDL) which shows the spring season loading rather than the yearly loading. The information contained in Figure 6.3 is for seasonal load, 2019. These are spring loads and annual total loads; I am reluctant to prorate seasonal loads into yearly loads without the information on flows on the Maumee River. The seasonal loading is for the spring part, not for a whole year, which makes the calculation of the possible quantity of reductions of TP to be on the low side (this apricot to peach comparison can be solved by the ODA and Ohio EPA staff, which has more data than I do). Any prorating assistance from seasonal to annual loading is welcome.

The calculation of the future year (2022) baseline to analyze the quantity of reductions necessary to attain the clean water goals is complicated, and is explained as follows.

Allocations to meet the TMDL for the Maumee watershed to address western basin of Lake Erie impairments.

| Allocation type | Spring season total phosphorus (metric tons) | Daily total phosphorus (kilograms) |
|---|---|---|
| Boundary condition: Michigan | 180.7 | 1,180.9 |
| Boundary condition: Indiana | 48.0 | 313.6 |
| Wasteload allocation | 109.3 | 714.6 |
| Load allocation | 555.9 | 3,633.2 |
| Explicit margin of safety (3%) | 20.6 | 134.5 |
| TOTAL | 914.4 | 5,976.8 |

Table 6.2. TMDL Allocations

The allocations for the boundary condition from Michigan (180.7 MT TP during the Spring Season) and the boundary condition from Indiana (48.0 MT TP during the Spring Season) is loading that will be excluded from the calculation because it does not occur in Ohio (although both Michigan and Indiana will have animal count growth in their states which will increase the loading in Ohio, which has not been addressed, see *Comment 4:Intrastate v. Interstate Transport*).

The Margin of Safety, an amount which the Ohio EPA has determined to be 3% of the loading (20.6 MT/Season) will also be excluded from the calculation because it is, like its name, a factor of safety required due to the uncertainty of the input to the calculation.

The load allocation of 555.9 MT TP during the Spring Season is comprised of two general areas, on-site home sewage treatment systems with a load allocation (8.8 MT TP during the Spring Season) and grouped landscape non-point source load (547.0 MT TP during the Spring Season) from Table 28 *Load allocation breakdown* on page 116 of the draft TMDL. The growth from new and modified animal units is within the 547 MT TP/Season, a number which we will use.

Assumed within the 547 MT TP/Season are the manure-based nutrients and the synthetic based nutrients (fertilizers). The TMDL asserts the manure-based nutrients are replacing the use of synthetic nutrients. Although the data supplied in the PMR shows that may be true for some counties, the data shows it is not a correct assumption for other counties. This breakdown of fertilizer use will have a place in the evaluation, but there is insufficient information to include the breakdown in this calculation. The important point to note is that both types of fertilizer are susceptible to loss from the fields. Most importantly is the point that the strategy of 'improved non-point source management' in Figure 6.2. *Phosphorous Reductions in Ohio* applies to both manure-based and synthetic fertilizer application.

The calculation of projected TP reductions as stated in Figure 6.2 in order to establish a nonpoint source baseline in 2008 is the next step.

Looking at the Ohio portion of the loading, not the entire watershed loading, the Ohio EPA estimates the reductions from 'enhanced non-point source sinks' of an approximate 92 MT TP/Yr. These source sinks primarily apply to non-point source discharge mitigation. The sinks are in the upriver areas and adsorb the phosphorous while slowing down the water flow. Examples of sinks are wetlands, stream restoration, and floodplain reconstruction. Another strategy for reduction for non-point sources contained in Figure 6.2 is an approximate 366 MT/Yr. of TP due to 'improved non-point source management. The examples of the non-point source management are nutrient management (commercial and manure), erosion management, water management, and emerging technology.

Combining the two categories of reductions, the management, and the sinks (366 MT TP/Yr. + 93 MT TP/Yr.) the non-point source reduction total is 459 MT TP/yr.

Establishing the non-point TP during the 2008 baseline year in Figure 6.2 is the next step. Knowing the amount of TP for the future case, the allocation of 547 MT TP/Season that is derived from Table 6.2, which is the goal of the amount of TP in the future, added to the anticipated reductions 457 MT TP/Yr. provides the starting point of non-point source TP in the baseline case, (547 MT TP/Season + 458 MT TP/Season = 1005 MT TP/Yr. which is the non-point MT TP during the 2008 baseline year of Figure 6.2.

Calculation of the 2022 non-point source baseline is accomplished by adding the recently established baseline of 1005 MT TP/Yr. with the projected growth of TP generated by additional animal sources from 2008 through 2022.

Baseline for which the TP reductions should be calculated is (1005 MT TP/Yr. + 720 MT TP/Yr.) = 1725 MT TP/Yr.

The 1725 MT TP/yr. baseline leaves a potential reduction from 'non-point sources management improvements' to reach the TMDL target allocation to be 1,178 MT (1725 MT TP/Yr.) – (547 MT TP/Yr. goal = 1,178 MT TP/yr.) , not 366 MT TP/Yr.

This 1,178 MT TP/Yr. estimated reduction necessary to reach the clean water goals is three times greater than the estimate in Figure 6.2. I wish to again state the uncertainty of the estimate. However, a current day estimate is better than relying upon a 15-year-old estimate of reductions necessary to meet clean water goals.

The assumed degree of the reduction of TP from the current year baseline is greatly dependent upon the assumptions, such as the assimilation rate and the effectiveness of the as nutrient management plans (NMP), best modern practices (BMP), and $H_2$Ohio (even though the funding is being diluted in the upcoming budget year). Assuming the reduction of the effectiveness of the programs during startup and the diminution of the effectiveness due to the proposed decrease of state of Ohio funding moves the clean water targets further away from attainment.

The starting point for reductions is calculated by adding,

| Category | MT TP/Yr. |
|---|---|
| Non-point (LA) | 1725 |
| HSTS | 8 |
| Point (WLA) | 109 |
| Reductions from WLA | 5 |
| Margin of Safety | 21 |
| Total | 1868 |

Table 6.3 Estimated 2022 baseline of MT TP/Yr.

However, what is the quantity of TP in the TMDL which can be called *Point A*?

**About 1,868 MT TP/Yr. not 1,128 MT TP/Yr. appears to be a more realistic estimate of a baseline to calculate the reductions needed to meet the TMDL targets. The lower estimate was based on 2008 activity.**

**You cannot formulate a plan to reach a goal until you know where you are starting from. The TMDL should have defined realistic starting point of TP and DRP emissions.**

**The estimated TP reductions needed to reach the targets may be twice than assumed.**

**For clarity purposes the estimates of potential TP target reductions from the source categories in Figure 6.2 should be used for illustrative purposes and not be taken as absolute number, or be recalculated to reflect current year estimates.**

**Accurate reduction targets are the Reasonable Assurance that the nonpoint source load allocations will be achieved, and water quality standards will be attained.**

**The estimated reductions of phosphorous needed to reach the clean water target is way too low.**

**The TMDL LA target of 555.9 MT TP/Season may be two, three times, or further away than alluded to in the draft TMDL, which uses a 2008 baseline.**

**The underestimate is in part due to not including the growth**

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# COMMENT 7: ALLOWANCE FOR GROWTH

**Include a growth allowance for TP produced by animal feeding operations. Accounting for the massive growth from this nonpoint source category is necessary from the TMDL. Minimizing or accounting for growth while reducing existing discharges is a cornerstone of attainment planning.**

To accurately forecast the amount of TP and DRP reductions necessary to reach the TMDL targets, there are countless variables that need to be accurately calculated. The baseline TP and DRP load fluctuates due to many of these variables. The lack, in the TMDL, of an allowance for future growth (AFG) is also a concern voiced by the US EPA in their comment #31 dated 08/17/2022. The comment by US EPA is not an endorsement of the omission, rather it is a directed action to the Ohio EPA with specific points to be taken. The draft TMDL contains no detailed response to the US EPA comment for revising the PMR and include assigning an allowance for growth to the CAFF's which will be permitted under the ODA DLEP CAFF program.

As suggested later and included in *COMMENT 1: ODA DLEP CAFF's* the establishment of a regulatory program which incorporates the 73 ODA DLEP CAFF's which caps the source categories and reduces the amount of discharge through an offset permit program is an option available to the Ohio EPA to rectify the allowance of growth deficiency called out by the US EPA.

The US EPA also requested an allowance for growth be established for medium sized and smaller AFO's which is a wise action and can be incorporated into the TMDL.

However, the baseline, or starting point of determining the amount of TP and DRP reductions is yet to be mentioned in the TMDL (a deficiency). The quantity of increases from new and modified source operations, whether they are point sources or nonpoint sources, must be factored into the baseline emissions to calculate the quantity of emission reductions. Regrettably, the non-point growth allowance for animal operations is absent from the TMDL, but the growth is brazenly shown in Appendix 3.

Without a proper calculation of baseline pollutants, the determination of whether the TMDL complies with the **reasonable assurance** test is impossible.

The TMDL does not include a projection of pollutant growth called a growth allowance, from the nonpoint sector, especially from AFO's. The need for a growth allowance has been discussed in the draft TMDL.

A nonpoint source growth allowance is not mandated by federal TMDL guidelines.

A nonpoint growth allowance, even if it is not mandated by the US EPA, is essential. Also, including a growth allowance for the amount of TP and DRP generated by AFO's is not against federal TMDL guidelines.

**A nonpoint source growth allowance although not required in this TMDL by federal guidelines is needed and may be required by Ohio Administrative Code.**

Without a non-point source growth allowance in the TMDL displaying the projected TP generated by new and modified AFO's, there will not be a proper reduction target, or a point A.

This is a major deficiency in the TMDL.

There is a voluminous amount of data to support the conclusion for the need for a growth allowance. First, review the growth of TP and DRP due to new and modified AFO's such as CAFF's. A review of Figure 13, page 30 of the draft TMDL demonstrates the continued growth of the nonpoint source category of animal units, which translates to increased TP and DAP loading to the basin. This is shown in Figure 7.1.

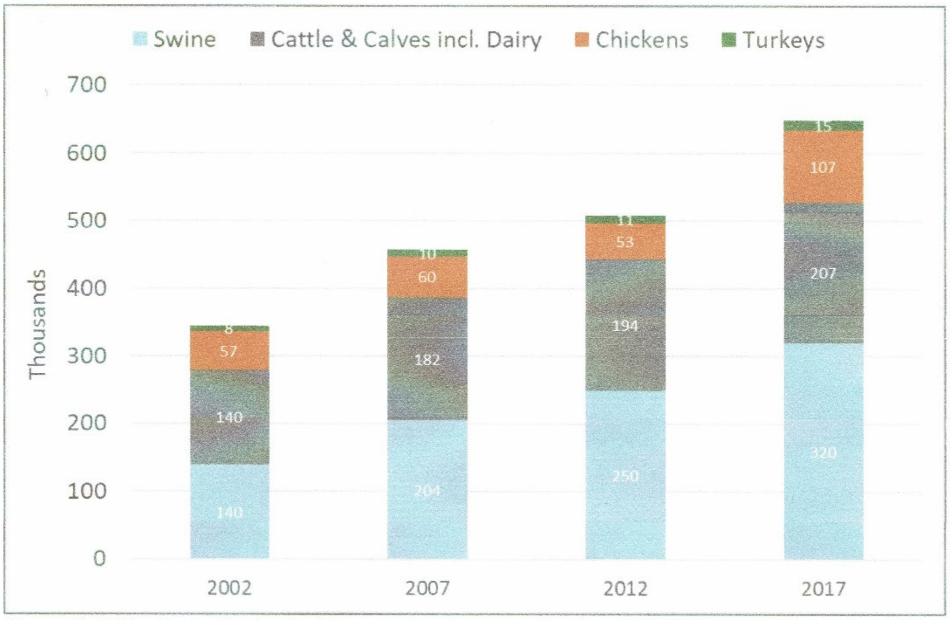


*Figure 13. ODA estimate of animal unit capacity based on a combination of USDA's Census of Agriculture and ODA DLEP numbers.*

Figure 7.1. Estimate of Animal Units

Take this nearly doubling of animal count found in the draft TMDL and translate that number of animal specific units during that same time frame, which can be found on page A3-6, Table A3.3 of Appendix 3 of the draft TMDL, as calculated by ODA is shown in Figure 7.2.

*Table A3.3. Estimate of animal units in the Maumee watershed in Ohio 2002-2017, using a combination of Census of Agriculture and ODA DLEP permitting data.*

| Type | Population | | | | Animal Unit Factor | Animal Units - Rounded | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2007 | 2012 | 2017 | | 2002 | 2007 | 2012 | 2017 |
| Milk Cows | 1,748 | 46,917 | 41,360 | 50,428 | 1000/700 | 45,000 | 67,000 | 59,000 | 72,000 |
| Cattle - Non-Milk Cows | 93,937 | 116,808 | 136,115 | 136,326 | 1000/1000 | 94,000 | 117,000 | 136,000 | 136,000 |
| Swine | 343,616 | 511,073 | 624,004 | 801,232 | 1000/2500 | 137,000 | 204,000 | 250,000 | 320,000 |
| Turkeys | 459,391 | 532,019 | 606,203 | 811,309 | 1000/55,000 | 8,000 | 10,000 | 11,000 | 15,000 |
| Chicken Pullets | 626,671 | 793,607 | 680,464 | 1,125,498 | 1000/125,000 | 5,000 | 6,000 | 5,000 | 9,000 |
| Chicken Layers | 4,078,097 | 4,160,386 | 3,700,194 | 8,749,470 | 1000/82,000 | 50,000 | 51,000 | 45,000 | 107,000 |
| | | | | | Total animal units: | 339,000 | 455,000 | 506,000 | 659,000 |

Table 7.1. Enhanced Estimate of Animal Units

Using the animal specific counts and animal specific emission factors, which is similar to the exercise in *COMMENT 1: ODA DLEP CAFF's* , the increase in the TP generated in the Maumee Watershed can be calculated as done by the ODA. This amount of metric tons of TP can be found on page A-3-8 in Table A3.5 Appendix 3 of the draft TMDL as shown in this document as Figure 7.3.

A cursory review of Figure 7.3 shows the massive increase of TP and DRP due to new and modified AFO's, more likely CAFF's and demonstrates the need for a non-point source growth allowance in this TMDL.

*Table A3.5. ODA calculated metric tons of phosphrous produced in Ohio's portion of the Maumee watershed by livestock species in 2002, 2007, 2012, and 2017.*

| Type | Population | | | | Estimated P in Manure in MT P/animal/year | Metric Tons P Generated per Year | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2002 | 2007 | 2012 | 2017 | | 2002 | 2007 | 2012 | 2017 |
| Milk Cows | 31,748 | 46,917 | 41,360 | 50,428 | 0.02121 | 673 | 995 | 877 | 1,069 |
| Cattle - Non-Milk Cows | 93,937 | 116,808 | 136,115 | 136,326 | 0.00819 | 769 | 957 | 1,115 | 1,117 |
| Hogs | 343,616 | 511,073 | 624,004 | 801,232 | 0.00137 | 470 | 699 | 853 | 1,096 |
| Turkeys | 459,391 | 532,019 | 606,203 | 811,309 | 0.00045 | 207 | 240 | 273 | 365 |
| Chicken Pullets | 626,671 | 793,607 | 680,464 | 1,125,498 | 0.00004 | 24 | 30 | 26 | 42 |
| Chicken Layers | 4,078,097 | 4,160,386 | 3,700,194 | 8,749,470 | 0.00018 | 733 | 748 | 666 | 1,574 |
| | | | | | **Total** | 2,900 | 3,700 | 3,800 | 5,300 |

Table 7.2. TP Loading Estimate from all AFOs

Is there growth from non-point sources such as animal feeding operations in the Maumee River watershed?

Look at Table 7.3. Yes, the increase has been 2,400 MT TP.

The quantity of TP with a commensurate increase in DRP from 2002 to 2017.

**Increase of TP generated by animal units in the Maumee Watershed 2002-2017**

| Year | 2002 | 2007 | 2012 | 2017 | Increase between 2002-2017 Metric tons TP and percentage |
|---|---|---|---|---|---|
| **Metric tons per year** | **2,900** | **3,700** | **3,800** | **5,300** | ***2,400 metric tons and 182%*** |

Table 7.3. Projected TP Growth

***<u>Exemption from permit requirements under ORC § 307.204(B)(2) for major CAFF's which increase their design capacity by less than 10% will underestimate TP discharge projections and are not covered by the allowance for growth.</u>***

The deficiency caused by the need for an allowance for growth is amplified by the exemption, from permit requirements, for the construction or expansion of major CAFF's which are less than 10% greater than the permitted levels. This creates a loophole for the expansion from the environmental review. Any of the 73 ODA DLEP CAFF's could increase the permitted animal limits without review. If so, the TP and manure generation estimates will be lower than stated. For example, the calculated percentage of TP generated by the 73 ODA DLEP CAFF's would rise from 58% to 68%, a significant increase in the non-point inventory without review.

This legislative exemption may be contrary to the US EPA federal permitting requirements.

Found in Section 307.204(B)(2) of the ORC *Procedure concerning construction or expansion of concentrated animal feeding facility*, provides written notice must be provided when there is, "… increase (of) the design capacity of an existing major concentrated animal feeding facility by ten percent or more in excess of the design capacity set forth in the current permit…". Therefore if the increase in animal count is less than 10%, no notice need to be provided to the ODA and the Ohio EPA. This exemption is more likely a loophole from the Ohio and federal CWA regulations.

The cumulative impact of increases of the animal capacities of CAFF's is currently unknown due the lack of information. Information which does not need to be reported or obtain environmental review.

This exemption from review and permits promotes what people call, the "one under" CAFF's which allow them to climb over that hurdle to be "10% greater CAFF's."

The information shown in Table 7.3 clearly demonstrates the need for a growth allowance for specific non-point sources such as ODA DLEP CAFF's.

**The most basic strategy for the construction of environmental policy and law is to minimize the increase of pollutants from new and modified operations while focusing the reduction upon the existing sources of pollution.**

**This TMDL does not follow this basic strategy.**

A. <u>Seven reasons for establishing an allowance for growth.</u>

1. As shown in *<u>COMMENT 1: ODA DLEP CAFF's</u>*, Table 1.1, the ODA DLEP CAFF's contribute 58% of the yearly TP produced in the Maumee River Watershed generated by all animal feeding operations. A 182% increase of TP from these operations in 15 years is a huge increase.
2. Nonpoint sources contribute the majority of TP and DRP produced in the Maumee Watershed.
3. The draft TMDL does not contain an estimate of the increase of TP from nonpoint sources, AFO's, and CAFF's whether permitted by the ODA DLEP or not.

4. The draft TMDL does not contain a growth allowance for the ODA DLEP CAFF's, or nonpoint sources.
5. Section 307.204(B)(2) of the ORC *Procedure concerning construction or expansion of concentrated animal feeding facility is a loophole for unpermitted CAFF growth.*
6. What will be the increase of TP generated by CAFF's and AFO's from 2017 to 2023, when the increase from 2002 to 2017 is 2,400 metric ton or a 182% increase? What will be the increase of TP in the next twenty years? Will the growth within the source category overwhelm the control projected in the $H_2$Ohio BMP program?
7. The Director of the Ohio EPA has the discretion to construct and include the TMDL an allowance for growth of ODA DLEP CAFF's.

The amount of manure based TP and DRP distributed by way of land application is solely dependent upon the quantity of manure-based fertilized produced within the Maumee River Watershed.

Every AFO and CAFF must use land application as a disposal mechanism for the solid, liquid, or sludge manure generated by way of the animal feeding stage of the production operation.

Every ounce of manure produced must be disposed by land application.

As mentioned in *COMMENT 2: Land Application*, the TMDL fails to specify, for the 73 ODA DLEP CAFF's or other similar large permitted AFO, NPDES or otherwise, the location of where the land application of the manure is occurring. As mentioned in the draft TMDL, the land application typically occurs within three miles from the production area. The question then morphs down to whether the land application is under the control and ownership of the owner of the production area, excluding the caveats mentioned in *COMMENT 2: Land Application*.

The OAC appears to require the establishment of an allowance for growth for nonpoint sources.

B. The Director has the discretion under Ohio Administrative Code/Attainment and Protection of Surface Water Quality Standards (WQS) § 3745-2-12 (A)(2) (iv)(d) to require the inclusion of growth allowances without specifying they be from the nonpoint or point source category.

A review of pertinent parts of the OAC pertaining to Total Maximum Daily Loads is warranted to determine whether the allowance for growth is allowed under Ohio provisions for preparing a TMDL, and whether it is logical to create a growth allowance for nonpoint source categories.

The applicable provisions (Chapter 3745-2-12) of the Ohio OAC are as follows.

Ohio Administrative Code

Chapter 3745-2 | Attainment and Protection of Surface Water Quality Standards (WQS)

***Effective:*** *February 15, 2019*
"(A) Administrative procedures.

(1) At a minimum, total maximum daily loads (TMDLs) shall be established in accordance with the listing and priority setting process established in Section 303(d) of the act and 40 C.F.R. 130.7.

(2) The director shall do the following for stakeholder involvement during TMDL development in accordance with section 6111.562 of the Revised Code:

(a) Provide notice of and opportunity for input during the development of a TMDL at each of the following stages:

(i) The project assessment study plan, including portions of the plan that seek to determine the causes and sources of impairments or threats.

(ii) The biological and water quality study report or an equivalent report.

(iii) The loading analysis plan, including, but not limited to, the proposed modeling approach and the water quality restoration targets, goals or criteria.

(iv) The preliminary modeling results including the following:

(a) Any management choices.

(b) Load allocations (LAs) for nonpoint sources of pollutants.

(c) Wasteload allocations (WLAs) for point sources of pollutants.

(d) Allowances for margin of safety and future growth.

(e) Permit limits necessary to achieve the WLAs.

(f) Preliminary TMDL implementation plan establishing specific actions, schedules and monitoring proposed to effectuate a TMDL."

***The justification for allowing the establishment of a growth allowance for the nonpoint source category or a subset of the nonpoint source category such as AFO's, or CAFF's which are permitted under the ODA DLEP provisions are as follows.***

1. The controlling part of the OAC is § 3745-12-12 (A)(2)(iv)(d).

"(iv) The preliminary modeling results including the following:

(d) Allowances for the margin of safety and future growth." (emphasis added)

2. The OAC in the section establishes in (A)(1) the at the minimum the TMDL's shall be established in accordance with the provisions of the code of Federal Regulations, which is the CWA §303(d). *With the inclusion of* at the minimum *there is no specific provision that prohibits the state of Ohio cannot be more stringent than federal regulations.*

   "(1) At a minimum, total maximum daily loads (TMDLs) shall be established in accordance with the listing and priority setting process established in Section 303(d) of the act and 40 C.F.R. 130.7." (emphasis added)

3. The OAC in the next section, establishes in (A)(2) the numerous "stages" of the TMDL (subsections 2 (a)(i)- (iv), and sets the noticing and input requirements for the same. Subsection 2(a)(iv) specifies the what the provisions should be in the PMR and the allowance for notice and public input.

   "(iv) The preliminary modeling results including the following:"

4. The OAC then sets forth the items to be in the PMR, which is part of the TMDL, that is in (d) and are the two requirements put into the same line of the OAC. *The allowance for a margin of safety is a separate and distinct step and item from an allowance for future growth. This distinction is important because of the common reading that the allowance for a margin of safety is applicable to the entire body of the PMR and subsequently the TMDL. The applicability of both requirements, allowances for a margin of safety and future growth are joined together by their inclusion in the same sentence. The sentence structure of the provisions which refers to "allowances" and then referring to the two allowances which are applicable is a clear reading of the provisions of the requirement. Likewise, the allowance for future growth should also apply to the same set of information, the entire body of the PMR (and TMDL) which are the point source WLA and the area source LA. The allowance for a margin of safety most certainly applies to the entire PMR, as should the allowance for a growth.*

   "(d) Allowances for margin of safety and future growth." (emphasis added).

5. Therefore, based upon the structure of Ohio TMDL Administrative Code, it is difficult to justify applying an allowance for a growth to only the waste load allocation (WLA) and not the load allocation (LA).

6. To support this position one only needs to look at a TMDL and a PMR, where there are only area sources with no point sources in the subject impacted region. In many locations, especially rural Ohio, this is a reality when the contours of a watersheds are the boundary for the TMDL. *In the case where there are no point sources within the confines of the boundary of a TMDL, and there are only nonpoint sources which comprise the loading, the position taken by the Ohio agencies would be there is no need for an allowance for future growth.*

7. The final supporting claim to this reading of the OAC is to look at the TMDL currently under development, specifically where the majority, if not almost the entirety of the TP

and DRP loading is due to nonpoint sources, as shown in Figure 6.3 of this paper and Figure 9 on page 24 of the draft TMDL. *Certainly, the lack of a growth allowance for nonpoint sources, especially the source category which generates the majority of the phosphorous which is the subject of the TMDL should be reviewed as consistent with Ohio's TMDL provisions and regulatory sense.*

C. <u>Three options for consideration to remove the deficiency.</u>

1. One option to <u>not</u> creating a growth allowance for ODA DLEP CAFF's is to prohibit the permitting of that category of large AFO's under the impaired waterway interpretation powers.

2. Another option to <u>not</u> creating a growth allowance is including the ODA DLEP CAFF's discharges into an area source category, bubbling the discharges (yet to be established) and capping those discharges, where any new ODA DLEP CAFF must offset the increases from the new and modified operation by commensurate reduction of TP discharges.

3. The final option is capping the production of TP using an appropriate discharge emission factor based upon a discharge rate and that all TP, and DRP solids, sludge, and liquids will be distributed from the production area to land application area used in conjunction with the TP and DRP permitting, offset and trading program. This permit, offset, and trading program will like the GHG, criteria air permit, bubble program foster the use of innovative TP and DRP abatement programs which are used in other areas.

- It is good regulatory policy to separate the largest CAFF's from the medium and smaller sized AFO's with the attention being directed to the largest contributors.

**An allowance for growth for the production of TP from CAFF's must be included in the TMDL because the source category constitutes a significant part of the area source inventory, and it is increasing. It is required by the OAC. If this is no growth allowance, the Director of the Ohio EPA should explain the rationale for excluding the CAFF growth allowance from the TMDL and how doing so will not inhibit the TMDL from meeting the Reasonable Assurance test.**

**As seen in Item 6, there has been a massive growth of animal units since 2008, which must be factored into an allowance for growth, used to determine the reductions needed to attain the clean water goals. There has been an unmitigated growth of non-point source TP and DRP since 2008. To use the statement, that manure-based CAFF land applications regulations 'are not allowed to release phosphorous into the waterways of Ohio' is an unacceptable reason for not including an allowance for growth in the TMDL.**

# COMMENT 8: LAND APPLICATION COST EVALUATION

**This analysis, especially the conclusion contained in the Draft TMDL, Appendix 3, Section A3.4, page A3-9 should be revised to make an accurate comparison of the availability of watershed land for manure-based land application. The entire Maumee River Watershed is not available for land application. The ODA comparison is between 'apples and oranges.'**

The egregious reference in the draft TMDL, Appendix 3, Section A3.4, page A3-9 gives the idea that all of the Maumee River watershed agricultural land is open for TP and DRP land application. This postulation is grossly in error and should be altered or removed.

Of course, not all of the 2.3 million acres of cropland is available for practical TP and DRP manure-based land application. The argument, that there is sufficient cropland available in the Maumee River watershed to assimilate the total amount of solid, sludge, and liquid manure produced by the AFO's is lost by a weak comparison.

First, I will make the showing of the misstatement in *Section A3.4. Estimate of crop removal/fertilizer need.*

This evaluation needs to be done, but it needs to be done on a CAFF and AFO basis, not done by a gross 2.3 million acre watershed evaluation.

The ODA (as the primary regulatory body) may wish to evaluate whether the land application is within the acceptable assimilative boundaries for all CAFF's and AFO's (two miles for liquid and sludge, lager radius for dry fowl manure).

There is no reason that the ODA should not evaluate the 73 ODA DLEP CAFF's to compare the MT of TP produced and the acres of land application used for the each CAFF. The ODA has stated that the land application sites are covered under trade secret protection of OAC 3745-49-01, 3745-49-02 and 3745-49-04 to 3745-49-14. This is an incorrect assumption. I draw your attention to the definition of trade secret in the Administrative procedure -definitions contained in OAC Rule 3745-49-02 (T)(3) Trade secret, where trade secret protection is not afforded to the "discharge or emission data." Especially when the discharges are ***illegal.***

As stated on Page 32 of the draft TMDL under the subsection titled *Fertilizer contribution to phosphorous pollution,* it is succinctly stated land application does create a discharge. This section of the draft TMDL calls the discharges by another term, which are in fact **federally illegal and illegal in the state of Ohio**, by using a gentler term of unacceptable.

> "**Fertilizer, both commercial and manure, is at times lost from farms and fields in a way that is inconsistent with the definition of agricultural stormwater. These discharges are unacceptable according to federal and state regulations (see ORC Section 6111.04 and OAC 901:13-1, OAC 901:5, and OAC 901:10-1-10)** ***(emphasis added).*** When livestock operations are found to have a discharge of manure or other waste products, they are required to eliminate the discharge. They also may be required to pay a penalty and to obtain a permit from Ohio EPA and/or ODA to ensure that future discharges do not occur. When direct discharge events do occur, management actions are required to eliminate the source and mitigate the impact. Mitigation often results in much of the discharged material being removed from the surface water body. Overall, these discharges represent a small proportion of manure or commercial fertilizer applied in the watershed. For example, ODA DLEP has responded to five or fewer substantiated spills in each of the last five years (2017–2021). The ODA DLEP oversees manure application completed by CAFO/CAFF operations and certified livestock managers, representing a substantial amount of manure applied in the watershed.
>
> Like all nonpoint source pollutants, fertilizer phosphorus loss from fields is driven by water movement. Large, infrequent precipitation events are known to drive most of the phosphorus exported from the Maumee watershed. Baker et al. (2014a) calculated 76 percent 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). These highprecipitation, high-stream-flow events can overwhelm measures taken to avoid fertilizer phosphorus loss and make them less effective. Phosphorus from fertilizer is washed off fields and delivered to streams via runoff and subsurface tile drainage. Phosphorus can be attached to the soil, or other particles, in the particulate form or in the dissolved form most often monitored as DRP (Christianson et al., 2016). Phosphorus stored in soils that is naturally 33 occurring and/or from prior crop fertilization (often referred to as legacy or soil phosphorus) is discussed in Section 4.1.1.2 below.
>
> Manure overapplication near livestock operations may lead to phosphorus accumulation in soil, leading to greater export risk (see the discussion on agricultural soil and legacy phosphorus sources in Section 4.1.1.2) (emphasis added). Studies have shown manure overapplication can occur due to applications on soils with already-elevated available phosphorus and by overestimating crop yield/nutrient removal (Long et al., 2018). Kast et al. (2019) did not find evidence that this was widespread in fields under control by CAFOs/CAFFs in the Maumee watershed. These samples come from fields that use 66 percent of CAFO/CAFF swine and 37 percent of CAFO/CAFF cattle manure. CAFO/CAFF operations do not report soil test phosphorus data to Ohio state agencies for fields not under their control (including manure transferred from CAFO/CAFFs through distribution and utilization and smaller facilities).

> Another process affecting nutrient movement from fertilizer applications is preferential flow, where soil cracks, earthworm burrows, and other soil fissures can lead to rapid transport to tile drains. This pathway exists for all applied nutrients. Incidences of manure discharges are more prevalent with liquid waste from swine and dairy operations (Hoorman and Shipitalo, 2006). Current nutrient management standards, state law, and state administrative codes have incorporated requirements aimed to reduce the risk of these discharge events. These requirements include many recommendations by Hoorman and Shipitalo (2006) and other studies. Practices exist to prevent the movement of manure or commercial fertilizer to tile lines, and include tillage 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."

Although the arithmetic in Section A3.4 is correct, the issue is whether there is sufficient land that is <u>economically available</u> to the CAFF production area and whether there is over <u>application</u> stimulated by the need of savings. There are countless factors in presenting an accurate presentation of whether the land application of manure is taken up by crops.

> "A3.4 Estimate of crop removal/fertilizer need Annual crop removal of phosphorus from the Maumee can also be estimated using the crop removal rates found in the most recent Tri-State Recommendations (Culman et al., 2020) multiplied by an assumed crop yield. For this estimate, it was assumed that the average yields were 180 bushel an acre for corn and 50 bushels an acre for soybeans. It is assumed that the 2.3 million acres of cropland in the Maumee watershed in Ohio were planted in an even 50/50 split of corn and soybeans (although cropping pattens do vary from year to year). Under these assumptions, crop removal is in approximately 23,500 metric tons of phosphorus per year.
>
> <u>Manure's contribution to crop need Combining the estimates of crop removal and manure phosphorus produces results in the final estimate that approximately 23 percent of the crop need is supplied by manure phosphorus in the Maumee watershed in Ohio. (emphasis added)</u>
>
> (5,300 metric tons manure produced per year) / (23,469 metric tons P removed per year) = 22.6%
>
> Conservative assumptions are noted throughout this appendix that mention a likely overestimate of the amount of manure produced in the Maumee watershed."

The ODA analogy appears to mean that manure-based fertilizer will be transported long distances without consideration of the cost of transport. That the CAFF's located in the watershed which produce the greatest amount of TP and DRP, or the manure brokers will transport the product throughout the Maumee River watershed without a consideration of cost.

Although the dry manure generated in foul production has a lower transportation cost, the assumption that all of the 5,024 square miles of the Maumee River watershed will be used as a land application area is a difficult concept to swallow.

The missing point from the analysis, that is discussed in many of the papers cited and discussed in *COMMENT 2: Land Application*, is the land application locations are typically within a few files radius of the production areas in order to have the cost of the transport of the liquid, sludge, or solid manure exceed the cost of the sales of the same.

As stated in the peer reviewed papers (Long et.al., 2008, Kast et. al., 2019, Hess 2022*). There is a degree of overapplication of manure in land application. Also, the amount of manure produced questions its use as a waste product in some instances when the cost of transport exceeds the cost of transportation to land application fields (Hess 2022) and stated below in his paper.

> "The overapplication of nutrients, whether it be manure-based or synthetic, causes runoff of the nutrient or the establishment of legacy nutrient concentrations in the cropland is a topic of thorough review. Scientific information by Long et al., J. Great Lakes Res (2018) addresses the question in a succinct manner. The above cited evaluation took place from data from permitted CAFO's in southeastern Michigan that has a modest CAFO permit system. "The manure produced in a CAFO's can be used to fertilize cropland, but there may be agronomical, logistical, and economic constraints on these large operations because there may not be enough nearby cropland in need of nutrients to receive all of the manure. In these cases, manure may be applied far from the CAFO barns or transferred to another operation, (both of which are expensive), stored on site, or potentially over applied to nearby cropland. Nutrients applied above crop requirements can accumulate in the soil (especially P), denitrify (in the case of N), or wash off fields and then contaminate surface water. Studies have suggested that the amount of land needed to use CAFO manure nutrients is often underestimated (Kellogg et al., 2000; Jackson et al., 2000, Gollehon et al., 2001, Ribaudo et al., 2003), so there is an opportunity to spread manure on more land, and potentially reduce inorganic fertilizer applications." and "CAFO's applied excess manure nutrients to cropland by applying to fields with soil phosphorus test levels > 50 PPM (42% of all cases), applying to soybeans (7% of all cases), over estimating crop yields in calculating plant nutrient requirements (67% of all cases), and applying beyond what is allowed by state permits (26% of all cases)." The following explains why, "Recommended application rates for both N and P2O5 are based on crop yield goals. A higher yield goal allows for a higher nutrient application rate, and CAFO operators set their own yield goals. We found that the stated yield goals were higher than actual yields 67% of the time."
>
> Summarizing the Long and associated studies, "These findings are relevant to the HAB and hypoxia issues in Lake Erie, which are driven by excess nutrients and can be used to better inform science, modeling, and policy in the region." And later, "Because more manure is generally produced by a CAFO then can easily be used, it is often treated as a waste rather than a valuable replacement for inorganic fertilizer (Hoag and Roka, 1995; Fleming et al., 1998).

The most succinct statement is from Ribaudo et al. (2003), " Animal feeding operations in 2 to 5 percent of U.S. counties produce more manure nutrients than can be absorbed by all of those counties' cropland and pasture."

The amount of manure-based nutrient produced must balance with the manure-based nutrient needed by a crop. In the paper by Fleming et al. 1998 the calculation of the balance is as follows. "A finishing hog produces 1.2 gallons of raw manure a day on average while on feed. Assuming 20 percent water wastage in the finishing building and that hog is on feed 114 days, each hog produces 164 gallons of slurry manure. At the end of storage (one year), each gallon of swine slurry manure will contain on average 0.05 pounds N, 0.035 pounds P, and 0.025 pounds of K. With a lagoon treatment system, the daily production of 1.2 gallons of raw manure is diluted with approximately 12 gallons of water. Of this quantity, 4.1 gallons daily or 467.4 gallons yearly are eventually delivered to a field per finished hog. A gallon of manure water delivered to a field after a year of storage will contain an average 0.004 pounds N, 0.003 pounds P, and 0.004 pounds of K. Crop rotation determines the quantity of a nutrient required by a crop. Continuous corn (120 bushels per acre yield) utilizes 144 pounds N, 45 pounds P, and 36 pounds K. Corn planted after soybeans requires less nutrients. Whereas soybeans planted after a soybean crop requires no N, 32 pounds of P, and 60 pounds of K."

Fleming et al., in the aforementioned 1998 paper provides information of the economics of hog and manure value in Iowa. "The sale of manure nutrients can be beneficial to a swine producer. Note, however, that while a finished hog may earn $3.37 or less for its manure nutrients, it earns $115 or more as a consumer product. Hence, it is the market value of the hog that will drive swine production decisions, not the value of manure nutrients that a hog produces. This finding supports the conclusions drawn by Roka and Hoag (1994) that, while the value of manure nutrients is nonzero, this value is insignificant compared to the value of primary product, pork. In this situation, a swine producer will minimize the cost of manure storage and delivery and simply accept what value there is in the manure nutrients generated." Certainly, the information from this paper shows the hog is 34 times more valuable than the hog manure.

The determination of the use manure-based nutrients within the WLEB is another question mark due to the lack of records. Of course, the first utilization of the manure-based nutrient would be on or extremely near to the CAFO operation. The second utilization is the manure sold as a commodity to nearby cropland to make the transportation cost effective. Chicken litter sold as a commodity can be transported greater than 20 plus miles. The transport of manure to locations is one of the highest costs for a CAFO. These studies by Teye confirms the manure distribution occurs in proximity to the manure production sites, the 31 Ohio permitted swine and dairy operations studied in the WLEB: 331 farm crop sites growing corn (St. Joseph, Auglaize, Upper and Lower Maumee sub-basins), received dairy manure from dairy CAFOs, 242 farm crop sites (Auglaize sub-basin) growing soybean received dairy manure from dairy CAFOs, 47 farm crop sites growing corn (Auglaize sub-basin) received swine manure from CAFOs, and 41 farm crop sites growing soybean (Upper Maumee, Auglaize, St. Marys sub-basin) received swine manure from CAFO's.

Typically, crop producers that are not CAFO's, that have manure-based nutrient transported to their fields, if the fields are smaller sized, are not subject to any nutrient management regulations. The distribution of manure-based nutrients in regard to the applicability of oversight is articulated by Kast, et al. (2015) in the number of animals and subsequent manure subject to oversight, " approximately 71% of swine, 76% of cattle, and 15% of poultry within the Maumee River watershed and proportional volumes of manure were housed in and generated on non-permitted operations." The lack of knowledge where the unpermitted animal feeding operations is one part of the problem, the other is the transfer of manure-based nutrients to other locations. Again, the above-cited Kast paper mentions that based upon the 41 permitted CAFO's (out of 775 facilities estimated by EWG) the transfer of manure-based nutrients is significant, "A majority of cattle CAFO's (78%) and half of the swine CAFO's (50%) planned to transfer some of their manure with 7% of cattle CAFO's planning to transfer all of their manure and 50% of swine CAFO's planning on transferring none of their manure. All five poultry CAFO's planned to transfer 100% of their manure nutrients."[i] These two statements indicate the volume of off-site manure transfer plus the knowledge gap indicated later by Kast, et al. "A critical knowledge gap for manure management in Ohio is the management that is distributed offsite through Distribution and Utilization (D&U)."

The above census of the distribution of CAFO manure does not show or show that there is an unfulfilled need for manure nutrients. If there is demand for CAFO manure nutrient, the cost of transporting the manure from the point of generation to the farmland is the limiting factor for use at locations more than 12-miles as an average distance. The unasked question is whether the manure-based nutrients are being used on fields that are croplands. Referring to the 4R pillars of the ODA Nutrient Management Plan (NMP) and Best Modern Practices (BMP) voluntary control measures, there are no mandates that manure-based nutrients be used on land that will be growing crops for that or any season. Is the deposit of manure-based nutrients on land that cannot add to the sustainability circle an example of waste disposal? The question can be answered by gathering additional information on the spatial and temporal use of nutrient-based manure. In that same vein of thinking, depositing manure-based nutrients onto cover crops, or land that does not provide animal or human feed is outside of the bounds of the definition of sustainable use.

To add another degree of complication into the equation, the soil has the ability to trap and hold both dissolved and total phosphorous, called legacy P and DRP. This legacy phosphorous soil is like a saturated sponge, saturated with P and DRP. As stated by Jarvie et al., J. Environ. Qual., "Cumulative daily load time series show that the early 2000s marked a step-change increase in riverine soluble reactive phosphorus (SRP) loads entering the Western Lake Erie Basin from three major tributaries: the Maumee, Sandusky, and Raisin Rivers. These elevated SRP loads have been sustained over the last 12 yr. Empirical regression models were used to estimate the contributions from, (i) increased runoff from changing weather and precipitation patterns and (ii) increased SRP delivery (the combined effects of increased source availability and/or increased transport efficiency of labile phosphorus [P] fractions). Approximately 65% of the SRP load

> increase after 2002 was attributable to increased SRP delivery, with higher runoff volumes accounting for the remaining 35%. Increased SRP delivery occurred concomitantly with declining watershed P budgets. However, within these watersheds, there have been long-term, largescale changes in land management: reduced tillage to minimize erosion and particulate P loss, and increased tile drainage to improve field operations and profitability. These practices can inadvertently increase labile P fractions at the soil surface and transmission of soluble P via subsurface drainage. Our findings suggest that changes in agricultural practices, including some conservation practices designed to reduce erosion and particulate P transport, may have had unintended, cumulative, and converging impacts contributing to the increased SRP loads, reaching a critical threshold around 2002."

The important point garnished from above is any recovery of cost due to the sale of the manure-based nutrient more likely does not compensate for the cost of delivery, as shown in the following statement from the Hess (2022) paper.

**"Follow the money."**

> Fleming et al., in the aforementioned 1998 paper provides information of the economics of hog and manure value in Iowa. "The sale of manure nutrients can be beneficial to a swine producer. Note, however, that while a finished hog may earn \$3.37 or less for its manure nutrients, it earns \$115 or more as a consumer product. Hence, it is the market value of the hog that will drive swine production decisions, not the value of manure nutrients that a hog produces. This finding supports the conclusions drawn by Roka and Hoag (1994) that, while the value of manure nutrients is nonzero, this value is insignificant compared to the value of primary product, pork. In this situation, a swine producer will minimize the cost of manure storage and delivery and simply accept what value there is in the manure nutrients generated." **Certainly, the information from this paper shows the hog is 34 times more valuable than the hog manure.** (emphasis added)

The big picture question is whether, based upon the lack regulatory oversite, in the past and articulated in the draft TMDL, is there a **reasonable assurance** that the nonpoint source load allocations will be achieved, and water quality standards will be attained. There will need to be some adjustments before the US EPA should be able to make a reasonable assurance finding for the draft TMDL.

**It is debatable whether the current ODA and Ohio position on the enforcement of Ohio and federal regulations are substandard, which unless altered, leads to the question of whether the TMDL demonstrates a reasonable assurance that the nonpoint source load allocations will be achieved, and water quality standards will be attained.**

**It is an erroneous assumption that manure will be uniformly transported from all CAFF's to the 2.3 million acres of cropland in the watershed. To reduce the transport costs, the liquid and sludge manure is deposited as close as possible to the production areas. Repeated application of manure near to CAFF's creates a legacy buildup of phosphorous, that washes away during wet seasons. The use of synthetic fertilizer is not dropping as fast as the increase of manure-based fertilizer growth, and in some counties it is increasing.**

* (Sustainability or Waste Disposal? Use of Manure as a Nutrient in the Maumee River Lake Erie Watershed. P. Hess, June 30, 2022. Proceedings of the 115th Annual Conference and Exhibition. Paper # 1234601)

# COMMENT 9: REASONABLE ASSURANCE

**It is difficult to believe the US EPA will find that the Ohio TMDL demonstrates Reasonable Assurance when the best available science shows the targets may never be met, or if so, it will be multiple decades away. The attainment date for the TMDL target does not meet definition of Reasonable Further Progress.**

The demonstration of Reasonable Assurance is one of the tests which the US EPA must make to approve a TMDL. The test is not evaluated out of thin air. The data to make the determination of Reasonable Further Progress must be contained in the TMDL.

The US EPA demonstration of meeting the Reasonable Assurance test is based upon the agencies ability to make a positive factual finding in the TMDL. In other words, the content of the TMDL document must make a demonstration, which as currently structured and written, the document fails that test.

The position that the US EPA will not be able to make a positive finding of Reasonable Assurance for the Ohio TMDL (**a point source and a non-point source TMDL**) is based upon many factors. However, one of the strongest factors is contained in Appendix 2 of the draft Preliminary Modeling Report (PMR) prepared by Tetra Tech, a consultant under contract to the Ohio EPA. The PMR is one part, and a mandated critical part of the TMDL.

The following are the standards and the procedures specified in the US EPA guidelines that is the test for determining Reasonable Assurance will be met.

(Guidelines for Reviewing TMDL's under Existing Regulations issued in 1992. May 20, 2002)

> "When a TMDL is developed for waters impaired by **point sources only**, the issuance of a National Pollutant Discharge Elimination System (NPDES) permit(s) provides the reasonable assurance that the wasteload allocations contained in the TMDL will be achieved. This is because 40 C.F.R. 122.44(d)(1)(vii)(B) requires that effluent limits in permits be consistent with "the assumptions and requirements of any available wasteload allocation" in an approved TMDL."

***(This paragraph is not applicable to the Reasonable Assurance determination because the Ohio TMDL is a point source and a non-point source action. Emphasis added)***

"When a TMDL is developed for waters impaired by both **point and nonpoint sources**, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the **TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable**. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards. "

***(This paragraph is applicable to the Ohio Reasonable Assurance determination because the Ohio TMDL is a point source and a non-point source action. Emphasis added)***

"EPA's August 1997 TMDL Guidance also directs Regions to work with States to achieve TMDL load allocations in waters impaired **only by nonpoint sources**. However, EPA cannot Guidelines for Reviewing TMDLs under Existing Regulations issued in 1992 May 20, 2002, disapprove a TMDL for **nonpoint source-only** impaired waters, which do not have a demonstration of reasonable assurance that LAs will be achieved, because such a showing is not required by current regulations."

***(This paragraph is not applicable to the Reasonable Assurance determination because the Ohio TMDL is a point source and a non-point source action. Emphasis added)***

Therefore, for the Maumee River Watershed impaired waters, which is a point and a non-point source TMDL, the following Section of the Guidelines for Reviewing TMDLs under Existing Regulations issued in 1992, May 20 2002 applies to the approval of the TMDL pertaining to Reasonable Assurance.

When a TMDL is developed for waters impaired by both point and nonpoint sources, and the WLA is based on an assumption that nonpoint source load reductions will occur, EPA's 1991 TMDL Guidance states that the TMDL should provide reasonable assurances that nonpoint source control measures will achieve expected load reductions in order for the TMDL to be approvable. This information is necessary for EPA to determine that the TMDL, including the load and wasteload allocations, has been established at a level necessary to implement water quality standards.

The scientific evaluation of the ability to reach the targets contained in the PMR shows that the water quality standards and the TMDL targets **would never be met** using the current Ohio mitigation strategies set forth in the draft TMDL.

| |
|---|
| The strategies relied upon in the draft TMDL fails to ever meet the Annex 4 targets. |

An appraisal of the capability to meet the TMDL targets was made by the consulting firm *Tetra Tech* by using a suite of predictive models. (This evaluation was contained in the draft PMR, and I commented on its findings as seen in the Ohio EPA document comments and responses on the PMR. The Ohio EPA website no longer has a link to the PMR and those comments.)

A cursory look at the phosphorous numbers in the Maumee River watershed is telling.

- The amount of metric tons of TP generated from animals is up dramatically from 2,900 MT in 2002 to an estimated 5,300 MT in 2017. (Table A3.5)
- The amount of $P_20_5$ fertilizer sales is up slightly from 105,101 MT in 2007 to 111,483 MT in 2017.(Table A3.6)
- The 73 ODA DLEP CAFF's generate about 60% (3,500 MT) of the 5,300 MT of animal produced phosphorous in the basin. No information has been provided to the public which of these 73 CAFF's, and the associated land application crop area, of whether they are enrolled in the $H_2$Ohio BMP program, no data has been provided to the public, or is contained in the TMDL for the calculated TP and DRP reductions from this non-point source category. No data has been provided to the public, or is contained in the TMDL, of the acreage used by the 73 CAFF's to ascertain whether there is overapplication of manure-based fertilizer.
- There is no calculation (or demonstration) in the TMDL pertaining to the possible control strategies that will reduce the TP and DRP necessary to reach the TMDL target of (40% reduction from the 2008 baseline) or the load allocation from the current level phosphorous loading (the current level phosphorous loading is not identified in the TMDL).

| |
|---|
| There is an overwhelming lack of data in the TMDL to demonstrate that the non-point load reductions will be met. |

To add to the uncertainty of the $H_2$Ohio BMP program becoming effective, the Ohio administration proposed to dilute funding for the program by expanding the applicability for funding from the Maumee river watershed to the entirety of Ohio.

In order to assure the current level of effort, one would assume the same funding level would need to be maintained. To accelerate the subscription into the $H_2$Ohio BMP program, it would be logical to assume **an increase, rather than a decrease of funding is necessary.**

Selected excerpts from the 47-page memorandum from Tetra Tech reviewing Soil and Water assessment Tool (SWAT) models and publications contained in Appendix 2 of the draft PMR, Dated June 29, 2022, by Bill Carlson and Jon Butcher (Tetra Tech) authors and Kevin Kratt (Tetra Tech) reviewer, (work commissioned by the Ohio EPA) follows:

Based upon the marked comments from the Ohio EPA consultant, it would be overly generous to comment that the implementation of the H2Ohio voluntary BMP phosphorus reduction programs will not be sufficient to meet the water quality goals Annex 4. (The Annex 4 targets are the same as the TMDL targets, the BMP referred to is the same as those outlined on page 121 of the draft TMDL, Figure 50, (improve non source management) as discussed in the earlier comments.)

• *Under high spring precipitation and high spring stream flow conditions, Annex 4 DRP load* ***targets can be met in about 25 years*** *without manure application and* ***in about 45-50 years with manure application****.*

• *Under higher spring precipitation and higher spring stream flow conditions, annex 4 TP load targets* ***are never met****.*

• *Without manure application, under higher spring precipitation conditions, annex 4 TP load targets* ***are almost met after 45 years****.*

• *In higher spring precipitation and stream flow conditions, without phosphorus fertilizer application, annex 4 targets* ***will not be met*** *due in part to phosphorus losses from legacy soil phosphorus.*

• *The average of model results for each BMP scenario* ***never resulted in the Annex 4 TP target load being met in 9-of-10 years*** *(Martin et al. 2019,2021).*

• ***None of the model scenarios averages of results met the Annex 4 target for DRP load in 9-of-10 years*** *(Martin et al. 2019,2021).*

• ***None of the scenarios of in-field agricultural BMPs met Annex 4 targets*** *for both TP and DRP loads averaged over 2005-2014 (Scavia et al. 2016,2017;Martin et al. 2019, 2021), nor were the FWMC targets met in 9 of 10 years (Martin et al. 2019,2021).*

• ***All but one scenario failed to achieve Annex 4 targets****. BMPs were targeted to the 50% of the row cropland with the highest TP losses. Random Series Practices (#9), with distribution to random cropland,* ***did not meet the DRP target****.*

• *Evaluation of ensemble modeling of BMP implementation scenarios generally indicated that* ***achievement of the Annex 4 targets in 9-of-10 years will be difficult even with widespread adoption of a suite of BMPs****.*

• *Finally, in the Maumee River watershed, researchers concluded that the rates of implementation considered feasible for stakeholders (25%-33%)****would not achieve Annex 4 phosphorus load goals****, and that significantly higher rates of implementation and targeting of critical DRP source areas are needed (Kalcic et al. 2016).*

• *In the St. Joseph River watershed (Western Lake Erie Basin), the authors found that the highest performing* ***BMPs were not widely implemented and BMPs were not implemented in the areas where they would do the most benefit*** *(Her et al. 2016).*

• *However, solely* ***targeting BMP implementation areas of high Phosphorus loading may be unrealistic*** *because multiple factors affect if and when farmers may install BMPs (Kast et al. 2021b); instead, BMP placement should target areas of high phosphorus loading with willing landowners.*

- *The large amount of legacy soil phosphorus will need to be addressed during BMP implementation. At present****, the spatial distribution of higher and lower concentrations of legacy soil are unknown*** *(Kast et al. 2021a).*

The 13 examples where the non-point source allocation of pollutant load is deficient, is more than sufficient to raise concern to the US EPA that there is a lack of Reasonable Assurance in the draft TMDL.

Because US EPA does not approve ‘TMDL implementation plans’ the proof of reasonable assurance is very important.

**The US EPA will not be able to approve the TMDL because the allocation of pollutant loads to both point and nonpoint sources shows there is no reasonable assurance that the LAs will be achieved, and Water Quality Standards will be attained.**

The Ohio EPA and the Ohio State agencies will need to increase by at least an order of magnitude, their efforts to demonstrate to the US EPA that the TMDL be approved. The Ohio agencies must show to the public, that trusts their efforts, that "reasonable assurances that nonpoint source control measures will achieve expected load reductions." There is time to make a sufficient showing to US EPA. Another option is for US EPA to provide a conditional approval or disapproval of the Maumee River Watershed TMDL with the requirement to make a showing (new assurance of reductions) withing six months of a specific date.

**Voluntary BMP's, $H_2$Ohio programs, and Nutrient Management Plans (NMP), coupled with crop assimilation will not be sufficient to reach the TMDL LA allocation target.**

**The amount of phosphorous from the non-point sector that needs to be reduced is greatly underestimated in the draft TMDL.**

**A possibly more accurate estimate of the amount of phosphorous needed to meet the TMDL allocation is near to or above 1,900 MT TP/Season (2022 baseline). The TMDL's 458 MT TP/Season estimate of TP reductions from non-point sources (based on 2008 loading) does not account for the increased numbers of animals and loading.**

**The use of "P nutrient reduction technology" is needed because, without it, there is no realistic path to clean water.**