

Maumee Watershed Nutrient TMDL FAQs

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General Information Questions

What is the Maumee Watershed Nutrient TMDL?

A total maximum daily load (TMDL) is sometimes referred to as a “pollution diet.” Like a diet, it is the plan for how much phosphorus (i.e., the total load or the “loading capacity” of the TMDL equation) the western basin of Lake Erie can receive and remain healthy to support important uses like drinking water and recreation. After determining the total load of phosphorus, this value is divided among point sources (like publicly owned wastewater treatment plants) and nonpoint sources (like septic systems and agricultural lands runoff). The difference between the point and nonpoint source allocations and the current loads determines how much a source must reduce its phosphorus contribution; its phosphorus diet.

Just as a diet works best when the dieter cuts calories and increases activity levels, the Maumee Watershed Nutrient TMDL will only work if actions to cut phosphorus are taken now. Given the substantial reductions required, meeting the TMDL’s phosphorus targets will require the immediate, concerted and sustained efforts of all Lake Erie stakeholders.

The water quality problems in the western basin of Lake Erie are the culmination of a myriad of human activities over years that resulted in excess phosphorus in Lake Erie, largely flowing from the Maumee River Watershed. To implement the TMDL and achieve phosphorus reduction targets, Ohio EPA will need to identify farmers willing to take measures to control nutrients. Lowering phosphorus loads to Lake Erie will ultimately reduce algal blooms and restore beneficial uses. It will be crucial to monitor and assess progress and to adjust implementation, if needed.

EPA’s approval of the Ohio TMDL will not immediately reduce the size or severity of toxic algal blooms in Lake Erie. The TMDL recognizes a lag time due to nutrients that are already in the watershed (i.e., legacy phosphorus in soil). Implementation will take time to establish (e.g., wetland restoration) and produce water quality improvements in the watershed. The TMDL includes a biennial review process and anticipates that it

may be necessary to adjust strategies to support designated uses for drinking water, aquatic life and recreation in the western basin.

What is the Total Maximum Daily Load established by Ohio's application that EPA has approved?

Attachment 1 to the Decision Document explains the TMDL equation, (Wasteload allocation + load allocation + margin of safety + allowance for future growth) = loading capacity.

The Loading Capacity, or TMDL, for the Maumee River Watershed, calculated to the mouth of the Maumee River at Maumee Bay is 914.4 metric tons of total phosphorus per spring season (March 1 to July 31) which equates to 5976.8 kilograms per day (NOTE: the per day calculation is applicable to the March 1 to July 31 timeframe). The TMDL endpoint is based on a 40% reduction of the measured 2008 spring seasonal load at the Waterville, Ohio USGS flow and water quality gage.

What does the Maumee Watershed Nutrient TMDL do?

Ohio EPA developed total phosphorus (TP) TMDLs to address impaired conditions in three areas of the western basin: shoreline, open waters, and island shoreline. The TMDL addresses recreational use impairments due to excessive algae, public drinking water use impairments due to excessive algae (cyanotoxins), and aquatic life use impairments due to excessive phosphorus.

It was developed to meet Ohio's *narrative* water quality standards. To translate the *narrative standards into a numeric target*, Ohio EPA looked to Annex 4 of the Great Lakes Water Quality Agreement which established Lake Ecosystem Objectives. These include maintaining a mesotrophic condition in the open waters of the Western and Central Basins of Lake Erie. The Annex 4 Task Team developed a target to cut total phosphorus by 40%. Ohio EPA employed the Annex 4 Team's recommended numeric total phosphorus target for the Maumee Watershed.

Why is EPA approving this TMDL?

The Clean Water Act gives states primary responsibility for developing TMDLs for impaired waters. EPA reviews state TMDLs to ensure consistency with Clean Water Act requirements and federal regulations. EPA reviewed and approved Ohio's TMDL

because it satisfies federal requirements. EPA's detailed basis for approval is found in the Decision Document at <https://www.epa.gov/tmdl/epas-approval-ohios-maumee-watershed-nutrient-total-maximum-daily-load>.

Does the Maumee Watershed Nutrient TMDL meet the federal requirements?

Yes, EPA worked with Ohio EPA to develop a TMDL that meets the following federal requirements/elements:

- Identification of Waterbody, Pollutant of Concern, Pollutant Sources and Priority Ranking.
- Applicable Water Quality and Numeric Water Quality Target.
- Loading Capacity.
- Load Allocations and Waste Load Allocations.
- Margin of Safety.
- Consideration of Seasonal Variation.
- Reasonable Assurance for Point Source/Nonpoint Sources.
- Monitoring Plan to Track TMDL Effectiveness.
- Implementation Plan.
- Public Participation.

What is the TMDL's Loading Target?

The TMDL target for total phosphorus spring loadings (March 1-July 31) is 860 metric tons (MT) in the Maumee River at the Waterville USGS gage, and 914.4 MT at the mouth of the river in Maumee Bay. The total phosphorus target of 860 MT at the Waterville location is calculated to result in a bloom no greater than the blooms observed in 2004 or 2012, 90 percent of the time (i.e., nine out of ten years) consistent with Annex 4 targets.

The TMDL accounts for "critical conditions." For nutrient loadings the critical condition is the spring season (March 1-July 31). Ohio EPA stated that reducing total phosphorus loading from the Maumee River Watershed during this critical spring loading period will reduce the severity and size of HABs in the Western Basin and attain water quality standards.

What happens when EPA disapproves a TMDL?

If EPA disapproves a state TMDL, the agency must replace it with a federal TMDL to address the deficient components. The Clean Water Act gives EPA 30 days to publish a public notice of its federal TMDL. The consent decree settling the litigation with Lucas County and the Environmental Law and Policy Center established that if EPA disapproves Ohio's TMDL, it must develop a replacement within six months. Adhering to a six-month deadline would make it very difficult for EPA to collect new data or conduct new analyses to develop a federal TMDL. The 6-month deadline would constrain EPA to rely on much of the same data and analysis used to develop the state TMDL.

What are the biggest sources of nutrients to the Maumee River Watershed and the western basin of Lake Erie?

Nutrients from nonpoint sources are largely responsible for harmful algal blooms in the western basin of Lake Erie. Row crop fertilizers (commercial or organic fertilizers) and soil account for most of the nutrients in Maumee River. Manure is a relatively small part (estimated to be 10%-12%) of the phosphorus load to Lake Erie. While the use of manure for fertilizer in the watershed has increased in the last decade, it is not the largest source of phosphorus. Ohio EPA explains (on pg. 37) that commercial (i.e., inorganic) fertilizer use is a larger source of nutrients than manure (i.e., organic) fertilizers.

Dissolved Reactive Phosphorus

What are the different forms of phosphorus that are considered by the TMDL?

Phosphorus, an essential nutrient for plant and animal life, is present in surface waters in a variety of forms that reflect land use, biology, climate, elevation, and geology. Different forms of phosphorus affect aquatic algae to different degrees.

Total phosphorus (TP) is the sum of all forms of phosphorus in a water sample. TP concentration in a water sample does not change over time due to biological and geochemical processes.

Dissolved Reactive Phosphorus (DRP) is the portion of the total phosphorus in the dissolved (as opposed to bound/filterable forms) form. DRP has the greatest direct and immediate effect on plant and algae growth. Unlike TP, DRP easily changes form so its proportion in a water body varies due to biological and geochemical processes. These local variations make it difficult to model, manage and track DRP loads in a watershed.

If DRP is so important in controlling the blooms, why doesn't the TMDL include targets for dissolved reactive phosphorus?

Ohio EPA concluded it is more feasible to develop TMDL allocations for total phosphorus as it moves through the watershed. EPA agrees with Ohio EPA's decision not to include DRP in the TMDL now due to, among other things, the availability of information and because of the following uncertainties regarding:

- The delivery of DRP from landscape sources (i.e., agricultural loading) to stream environments,
- The DRP fate and transport (i.e., in-stream DRP cycling) within stream environments, and
- Applying a mass balance methodology, to model DRP movement.

EPA and Ohio EPA agree that the TMDL's approach to data collection, assessment, reporting and refinement will allow for revisions as needed based on improved understanding of the behavior of DRP.

As the scientific understanding improves and Ohio and its partners collect additional water quality data, the TMDL may be revised to directly address DRP.

How does the TMDL attempt to address DRP?

Ohio EPA noted that controlling DRP is an important part of the TMDL. The TMDL management practices which include fertilizer control, targeting locations with more legacy phosphorus, and better stormwater retention will reduce both TP and DRP. Ohio EPA and EPA will continue working with other federal and state programs to learn more about new efforts to control DRP. Starting in 2024, Ohio EPA will issue biennial reports on the effectiveness of TMDL implementation efforts in the Maumee River Watershed.

Concentrated Animal Feeding Operations (CAFOs)

What is a CAFO?

Animal Feeding Operations (AFOs) are agricultural operations where animals are kept and raised in confined situations. An AFO is a lot or facility where:

- animals are confined for 45 days or more in any 12-month period, and
- vegetation is not sustained in the normal growing season over any portion of the lot or facility.

Animal feeding operations that meet the regulatory definition of a concentrated animal feeding operation (CAFO) are regulated under the NPDES permitting program. The NPDES program regulates the discharge of pollutants from point sources to waters of the United States. CAFOs are point sources, as defined by the CWA [Section 502(14)]. To be considered a CAFO, a facility must first be defined as an AFO, and meet the criteria established in the [CAFO regulation](#).

How does the TMDL address CAFOs?

The TMDL is a planning tool that identifies sources of pollutants and the amounts of specific pollutants that can enter a water body without compromising water quality standards, including designated uses. It relies on existing regulatory authorities and programs and does not create new authorities to regulate CAFOs or to require National Pollutant Discharge Elimination System (NPDES) permits for agricultural stormwater, or to determine if CAFOs are discharging non-agricultural wastewater.

EPA regulates manure, litter, and process wastewater discharges from CAFO production areas through the NPDES Program. Ohio EPA is authorized to administer the NPDES program which includes CAFO permitting. More information about specific Ohio EPA permitting requirements for CAFOs can be found at:
<https://epa.ohio.gov/divisions-and-offices/surface-water/permitting/concentrated-animal-feeding-operations>.

The land application of manure, litter, and process wastewater from CAFOs are discharges subject to NPDES permit requirements except where the discharge is agricultural stormwater. This exemption applies for precipitation-related runoff if the manure is applied consistent with a site-specific nutrient management plan. Under the

federal regulations, precipitation-related runoff that qualifies for the exemption is considered a nonpoint source of phosphorus. Section 319 of the Clean Water Act, as well as other federal and state-run programs such as H2Ohio, provide resources to help farmers take voluntary steps to reduce nutrient losses from farm fields.

The Clean Water Act and federal regulations, and consequently the TMDL, recognize two, separate aspects of CAFOs: production areas and land application of manure. Production areas are recognized as point sources. The TMDL does not allow for *any* discharge from production areas, setting a phosphorus allocation of zero. *Any* unpermitted discharge from a CAFO production area to waters of the United States is subject to enforcement action. Similarly, *any* discharge containing phosphorus from land application of manure that is *not* consistent with a site-specific nutrient management plan is also subject to enforcement.

The Clean Water Act, federal regulations, and the TMDL all recognize runoff from application of manure consistent with a site-specific nutrient management plan as agricultural stormwater and part of the nonpoint source load (or load allocation). The TMDL focuses on promoting Best Management Practices throughout the watershed to cut the total phosphorus load from the Maumee River to Lake Erie by 40%.

Is runoff from land application of manure the primary source of phosphorus in the western basin of Lake Erie?

No. As noted above, manure is a relatively small part (estimated to be 10%-12%) of the phosphorus load to Lake Erie. While use of manure for fertilizer has increased in the last decade, it is not the largest source of phosphorus in the watershed. Ohio EPA explains on pg. 37 that commercial (i.e., inorganic) fertilizer use is a larger source of nutrients than manure (i.e., organic) fertilizers. Ohio EPA will continue to work with federal and state programs to better identify and target sub-watersheds in the Ohio portion of the Maumee with the most phosphorus.

How will phosphorus in runoff from land application of manure from CAFOs be reduced?

Restoration of the western basin of Lake Erie depends on reducing the amount of phosphorus that flows into the lake from nonpoint sources. The TMDL focuses on enhancing nutrient storage on the landscape (e.g., improving nutrient “sinks”),

encouraging landowners to adopt more practices to keep precipitation on the landscape and prevent runoff overland or via subsurface drainage networks and improving overall nutrient management efforts in the Maumee River Watershed.

Ohio EPA has targeted the following approaches for agricultural areas in Maumee River Watershed:

Nutrient Management

- Soil testing and nutrient management planning efforts (e.g., Voluntary Nutrient Management Plans via H2Ohio funding)
- Variable rate fertilization and subsurface placement of fertilizer (e.g., following the '4 R's' of nutrient management: using the right nutrient at the right rate and right time in the right place)
- Manure incorporation (mixing manure into soils or placing the manure below the soil surface)

Erosion Management

- Conservation crop rotation and cover crops (e.g., improving soil health, increasing soil organic matter, improving soil moisture storage capacity, etc.)

Agricultural Water Quantity Management

- Drainage water management (e.g., management of discharge from agricultural tile drainage lines to store water in the water table beneath fields and reduce discharge to surface waters)
- Edge-of-field buffers (e.g., planting in riparian areas to increase water storage and decrease nutrient and sediment inputs)
- Two-stage ditch deployment (e.g., modifying the profile of stream channel bottoms by constructing a bench/floodplain adjacent to the existing stream channel to slow water flow during high flow events and trap nutrients and sediment)
- Wetland restoration and preservation (e.g., the restoration/protection of existing wetlands are beneficial for storing water and nutrients on the landscape)

Margin of Safety

What is a “margin of safety” and why is it set at 3%?

A margin of safety accounts for uncertainty in the loading calculations assigned to point sources (the wasteload allocation) and nonpoint sources (the load allocation) to attain water quality standards. There are two ways to describe a margin of safety: An implicit margin based on conservative assumptions in the calculation or modeling to derive an allocation and/or an explicit margin, which apportions part of the loading capacity.

Ohio EPA used both explicit (3% of the loading capacity) and implicit margins in its TMDL calculation. The Clean Water Act and federal regulations do not require an explicit margin of safety at any specific level or value. The seemingly small 3% explicit margin is inextricably linked to Ohio EPA’s water quality data, mass balance model verification analysis and assumptions employed to account for uncertainties in setting the nonpoint source loads (via the nonpoint source landscape load allocation) and point source loads (via the wasteload allocation)

EPA considered whether Ohio EPA could have set a higher --or a lower-- explicit margin and concluded that the state used its best professional judgment in setting the explicit margin at 3%. EPA’s conclusion is supported by the record. EPA notes that if new data become available, this TMDL should be reexamined to see if revision is warranted.

Reasonable Assurance

What is “reasonable assurance”?

When waters are impaired by both point and nonpoint sources, the waste load allocation assigned to point sources assumes that nonpoint source loadings will also be reduced. EPA’s 1991 guidance states that the TMDL must provide reasonable assurance that nonpoint source control measures will achieve expected load reductions.

How can we be sure that the TMDL will be implemented?

EPA’s approval of the TMDL is not the starting point for on-the-ground efforts in the Maumee River Watershed. Ohio EPA and its partners are already taking actions in the

watershed to support TMDL goals (e.g., U.S. Department of Agriculture's [USDA] Farm Service Agency [FSA], USDA's Natural Resources Conservation Service [NRCS], U.S. EPA's Great Lakes Restoration Initiative [GLRI], EPA's CWA Section 319 program, etc.). The Ohio Domestic Action Plan will be updated to include the HUC-12 landscape loading calculations to be consistent with the assumptions employed to calculate the TMDL. Once this effort is complete, the far-field total phosphorus targets of the TMDL will be reflected for each of the 194 HUC-12 sub-watersheds.

Ohio EPA and its partners will follow a two-year iterative approach to deploy Best Management Practices and track their success in targeting source reductions. This will allow Ohio EPA and its partners to monitor the success or failure of implementation efforts and adjust the current strategy based on lessons learned and emerging research. Ohio EPA's first biennial progress report is expected in 2024. The TMDL depends upon the voluntary participation of landowners in the Maumee River Watershed. EPA believes strongly that Ohio's TMDL offers the best opportunity to recruit more landowners as partners.

What other efforts are underway outside of the TMDL to address nutrient loading and HABS in the western basin of Lake Erie?

Ohio and its partners have been working for many years in the Maumee River Watershed. Examples include H2Ohio (since 2020), nonpoint source (under CWA Section 319) implementation efforts (since early 2010s and likely earlier), and Great Lakes Restoration Initiative implementation efforts (since early 2010s). Other federal agencies (i.e., U.S. Department of Agriculture) have also supported efforts to reduce nutrients in the watershed through their programs (Environmental Quality Incentives Program (EQIP), their Conservation Reserve Program (CRP) and their Conservation Reserve Enhancement Program (CREP) and efforts completed via the Ohio Assembly (e.g., House Bill 64 - in the Ohio portion of the Western Basin of Lake Erie, no person shall surface apply manure under the following circumstances: on snow covered or frozen soil; when the top 2 inches of the soil are saturated from precipitation; when the weather forecast in the application area calls for greater than 50 percent chance of rain exceeding one-half inch in a 24 hour period).