Phosphorus Treatment Capability Study and Other Lab Updates

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Ohio Environmental Protection Agency

Topics

- Senate Bill 1 (Ohio 131st General Assembly)
  - Phosphorus Technical & Financial Capability Study
- Nutrient Mass Balance
- New ammonia WQS and OWDA funded study
- Priority Pollutant Scanning for NPDES renewal

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Senate Bill 1

- Signed by Gov. Kasich on April 2, 2015; effective July 1, 2015.
  - Restricts application of manure and fertilizer in Western Basin of Lake Erie
  - Designates Director of OEPA to coordinate HAB management and response
  - All WWTPs with design flow of 1.0 MGD or more or designated a major need to monitor for TP and dissolved reactive P (ortho P) no later than December 1, 2016.

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Senate Bill 1 (cont)

- All WWTPs with design flow of 1.0 MGD or more or designated a major that do not have a P limit as of July 3, 2015 need to complete a technical and financial capability study to get down to 1 mg/L.
- Prohibits open lake disposal of dredge material by July 1, 2020.
- Provisions of the bill were incorporated into ORC 6111.03 (U)

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Senate Bill 1 – Effects on WWTPs

- TP and Ortho P monitoring no later than December 1, 2016.
  - Sent out letters to effected WWTPs in July 2016.
  - Agency initiated minor mod to include Ortho P in outfall tables and amend Part II.
  - Affected permits have been modified and permittee's should be monitoring.

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Senate Bill 1 – Dissolved Ortho P Sampling

- Part II condition: The permittee shall filter the grab sample within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.
  - No digestion of Dissolved Ortho P sample
  - Separate samples for dissolved Ortho P and TP

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Senate Bill 1 – Effects on WWTPs

- Study evaluating technical and financial capability of reducing TP to 1 mg/L by December 1, 2017
  - Only for plants who don't already have a TP limit
  - OEPA estimates this requirement to effect 112 WWTPs, only 2 of these are in the WLEB
  - Letters sent to potential facilities in November '16

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Technical and Financial Capability Study

- “a study that evaluates the technical and financial capability of the existing treatment facility to reduce the final effluent discharge of phosphorus to one milligram per liter using possible source reduction measures, operational procedures, and unit process configurations”

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Technical and Financial Capability Study

- Template for the study is available on Ohio EPA's website
  - Intended to be completed by POTW staff
- Permittee's are allowed to use their own format
  - Using the template standardizes the results and the data collected

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Technical and Financial Capability Study

- Three main parts in OEPA template
  - Based on current effluent data can you meet 1.0 mg/L now.
    - Provide 12 months of data, answer " Yes" or "No".
    - If yes, sign and submit, you are done! If no, continue on.
  - Identify which P reduction methods have been evaluated or attempted (technical capability)
  - Identify costs associated with P reduction methods (financial capability)

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Technical and Financial Capability Study

- Source Reduction - Reducing influent concentrations of TP.
  - Evaluating industrial sources for potential to reduce phosphorus in their discharges. Examples: non-phosphorus based additives to replace those that use phosphorus, creating nutrient awareness programs, and BMPs that could be put in place for any discharger contributing phosphorus loads. Imposing phosphorus limits in pretreatment permits.

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Technical and Financial Capability Study

- Operational Changes
  - Altering conventional treatment methods to increase removal of phosphorus. This could include changes to aeration procedures allowing for the creation of anaerobic zones, changes in septage receiving procedures, change in the collection or distribution of return sludge in the waste stream process, and any other changes to process flow.

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Technical and Financial Capability Study

- Unit Process Configuration Changes
  - Physical adaptations to the treatment system to increase treatment of phosphorus. Ex. retrofitting existing tanks to create anaerobic zones; modifications to gravity thickeners, sludge fermenters, or baffles; or any other changes to the system that increase treatment of phosphorus.

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Technical and Financial Capability Study

- Additional Treatment
  - Installation of new treatment technologies that are specifically designed to treat phosphorus. This could include a chemical dosing mechanism that adds phosphorus-treating additive or installation of a new biological phosphorus removal treatment process. This study is not intended to require that additional treatment be considered. OEPA is attempting to gather information that may already be available

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II. Total Phosphorus Data from the Previous Twelve Months	
Select which of the following best describes the numeric total phosphorus concentrations in the influent at your facility:	Choose an item.

Include the average monthly effluent concentration for total phosphorus for the most recent twelve months below. Unless you marked "Unknown" above, also include the average monthly influent concentration for total phosphor us as well.

Month	Average Monthly Concentration of Total Phosphorus	
	Influent (mg/L)	Final Effluent Outfall (mg/L)
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.

Based on the above discharge information, does the permittee believe that it is currently able to discharge total phosphorus at or below a one milligram per liter monthly average concentration without any additional changes to treatment processes?

Yes ? (Continue to Section III)	No ? (Continue to Section IV)

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IV. Identification of the most economically feasible method(s) to reduce the discharge of total phosphorus to a monthly average effluent concentration of 1.0 mg/L. Complete the following questions to identify which phosphorus reduction methods have been evaluated or attempted and which could be used in the future to reduce the total phosphorus monthly average effluent concentration to 1.0 mg/L or lower.			
IV. A.	Has Source Reduction been evaluated?	Yes ☐	No ☐
If yes, has Source Reduction been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☐	No ☐
Have Source Reduction concepts been implemented?		Yes ☐	No ☐
IV. B.	Have Operational Changes been evaluated?	Yes ☐	No ☐
If yes, have Operational Changes been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☐	No ☐
Have Operational Changes been implemented?		Yes ☐	No ☐
IV. C.	Have Unit Process Configuration Changes been evaluated?	Yes ☐	No ☐
If yes, have Unit Process Configuration Changes been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☐	No ☐
Have Unit Process Configuration Changes been implemented?		Yes ☐	No ☐
IV. D.	Has Additional Treatment (beyond your existing facility) been evaluated?	Yes ☐	No ☐
If yes, has Additional Treatment been identified as a potentially feasible means to reduce Phosphorus in the effluent?		Yes ☐	No ☐
Has Additional Treatment been implemented?		Yes ☐	No ☐
IV. E. Include a brief summary as to how the procedures identified above could be performed and/or installed to reduce the total phosphorus monthly average effluent concentration to 1.0 mg/L or lower.			

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V. Economic Information and Total Estimated Costs of Reducing Total Phosphorus Concentrations			
Were chemical treatment additives identified in Section IV as part of the most economically feasible method(s) to reduce the discharge of total phosphorus to a monthly average concentration of 1.0 mg/L or lower?			
Yes ☐ (Continue to Section V.A)		No ☐ (Continue to Section V.B)	
V.A. Economic Information Associated with Chemical Feed			
Capital Cost Associated with Chemical Feed:			
Chemical Tank Cost:	Click here to enter text.	Pump Cost:	Click here to enter text.
Piping and Dosing Mechanism Cost:	Click here to enter text.	Any Other Expected Capital Costs (e.g.: new building):	Click here to enter text.
Total Associated Capital Costs (summation of the above capital costs):		Click here to enter text.	
Associated Operations and Maintenance (O&M) Cost Associated with Chemical Feed:			
Monthly Chemical Cost:	Click here to enter text.	Monthly Labor Costs:	Click here to enter text.
Monthly Electric Cost:	Click here to enter text.	Other Monthly Costs:	Click here to enter text.
Additional Monthly Costs Associated with Increased Sludge Volumes:		Click here to enter text.	
Monthly Associated O&M Costs (summation of the above O&M costs):		Click here to enter text.	

V.B. Economic Information Associated with Non-Chemical Feed Alternatives			
Complete the following information for each option identified in Section IV. Please provide an explanation for the costs (electric cost, labor, etc.) in the column titled 'Reasoning':			
TP Reduction Method:	Capital Cost:	Monthly O&M Cost:	Reasoning:
Choose an item.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Choose an item.	Click here to enter text.	Click here to enter text.	Click here to enter text.

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Ohio Nutrient Mass Balance Study

- SFY 2016-2017 Operating budget requires director to “study, examine, and calculate nutrient loading from point and nonpoint sources…to determine the most environmentally beneficial and cost effective mechanisms to reduce nutrient loadings to Lake Erie and the Ohio River.”
- Director is required to report and update the results with release of “Integrated Water Quality Report” every two years beginning spring 2016.

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Ohio Nutrient Mass Balance Study

- 2016 Loading study published and available on OEPA website.
- Includes loadings for seven of the major watersheds in the state.
- Looked at both total P and total N.
- Scioto and Maumee highest in total P load; 2200 metric tons each
- Maumee highest in total N load; 41,000 metric tons

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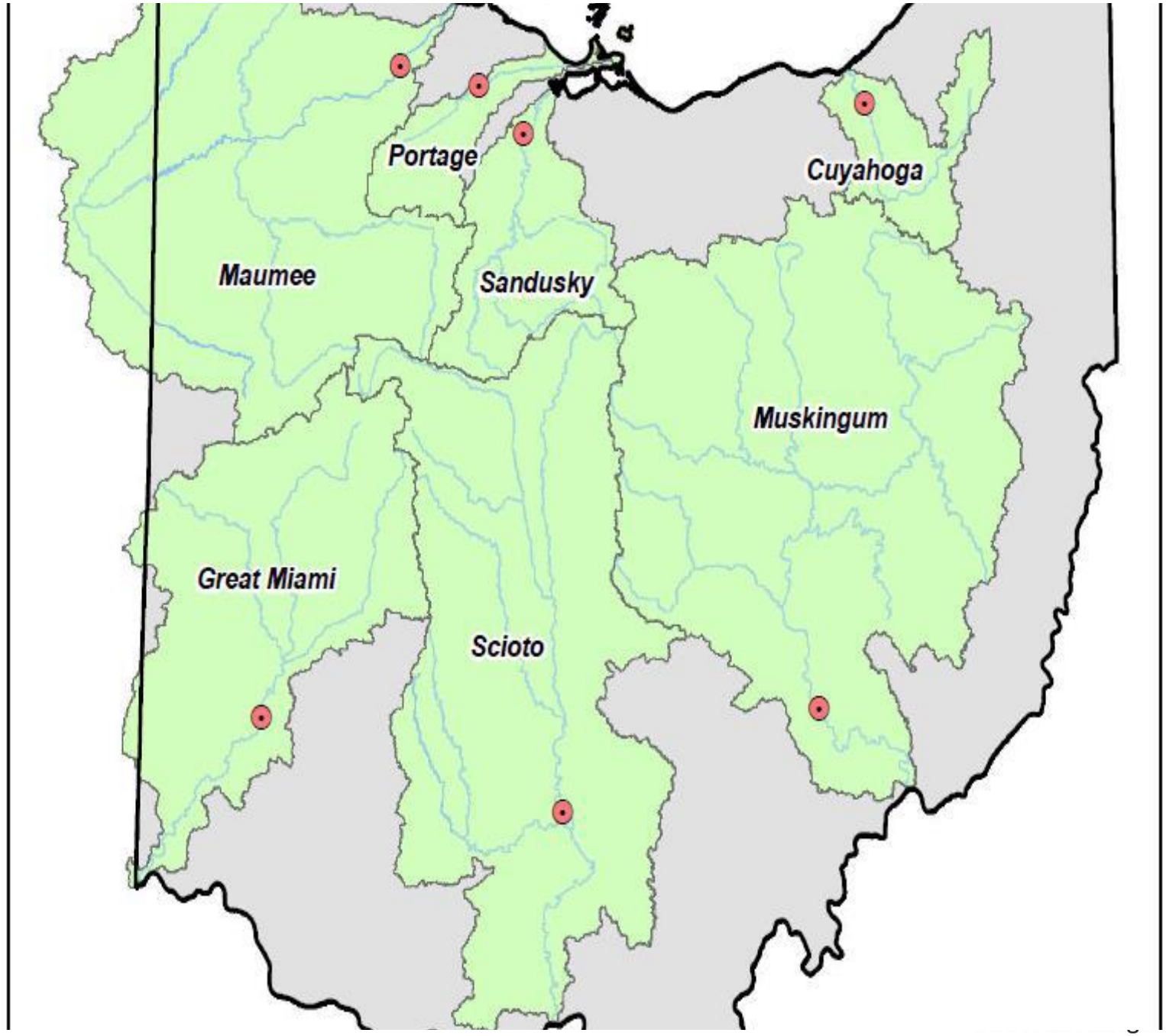
Portage
Cuyahoga
Maumee
Sandusky
Muskingum
Great Miami
Scioto

Ohio Nutrient Mass Balance Study

Table 6 — Total phosphorus and total nitrogen contributions from household sewage treatment systems (HSTS), NPDES permitted sources (NPDES) and nonpoint sources (NPS) relative to the total load at the watershed outlet (expressed as percent). Values reported for wy13.

Watershed	Total P (percent of total)			Total N (percent of total)		
	HSTS	NPDES	NPS	HSTS	NPDES	NPS
Maumee	4	9	87	1	10	89
Portage	5	11	84	2	8	86
Sandusky	2	5	93	1	3	95
Cuyahoga	11	29	60	6	62	32
Great Miami	6	37	56	3	17	80
Scioto	4	30	66	3	16	81
Muskingum	10	49	41	7	25	68

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New Federal Ammonia WQS

- In 2013 USEPA adopted new aquatic life ammonia criteria based on the protection of freshwater mussels.
- Ohio needs to move to be equal to or below these new criteria.
- Currently in information gathering phase of rulemaking.

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New Federal Ammonia WQS

Ohio Ammonia Criteria vs New National Criteria at pH 8

Temp (°C)	USEPA 7 day	Ohio WWH 7 day		USEPA 30 day	Ohio WWH 30 day
5	8.8	9.9		1.8	3.3 / ----
10	8.8	9.5		1.5	3.3 / 1.4
15	5.9	9.2		1.1	2.3 / 1.4
20	3.9	9.1		0.78	1.6 / 1.4
25	2.6	9.1		0.56	---- / 1.0
30	1.7	6.6		0.41	--- / 0.70

Dec-Feb / Mar-Nov

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New Federal Ammonia WQS

- What's this mean to you
  - Should Ohio adopt these criteria, WWTPs that have a water quality based ammonia limit may see there limit decrease, possibly in a significant way.
  - WWTPs with BADCT limits for ammonia may see these limits reduced as well.

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New Federal Ammonia WQS

- OWDA funded project for GLEC study of ammonia removal at the Johnstown, Pataskala, Canal Winchester and Southwest Licking Sewer District.
- Instream evaluation of effluent ammonia and total N.
- All four plants showed ability to meet proposed new criteria.

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Priority Pollutant Scans for NPDES Permit Renewals

- Federal rules require POTWs with design flow of > 1.0 MGD to provide the results of three priority pollutant scans with NPDES renewal applications; 40 CFR 122.21(j)(4)(ii)-(iv)
- Ohio has not traditionally required these scans as part of the application
- Permits expiring after March 1, 2018, will now need to include these scans with the application

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Priority Pollutant Scans for NPDES Permit Renewals

- POTWs with pretreatment programs are already completing these scans as part of their annual report (with the exception of a few parameters)
- Major POTWs with no pretreatment program will have to complete additional sampling for the priority pollutant scans
- Tables 1A, 1, and 2 of Appendix J

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Questions ?

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