Surface Water Update
Nutrients

OTCO Wastewater Workshop

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Overview

- Program updates
- Audience Q&A on current practices in regards to nutrients in TMDLs & permits
- Set stage for discussions today

Photograph by Peter Essick, Lake Erie in 2011, National Geographic

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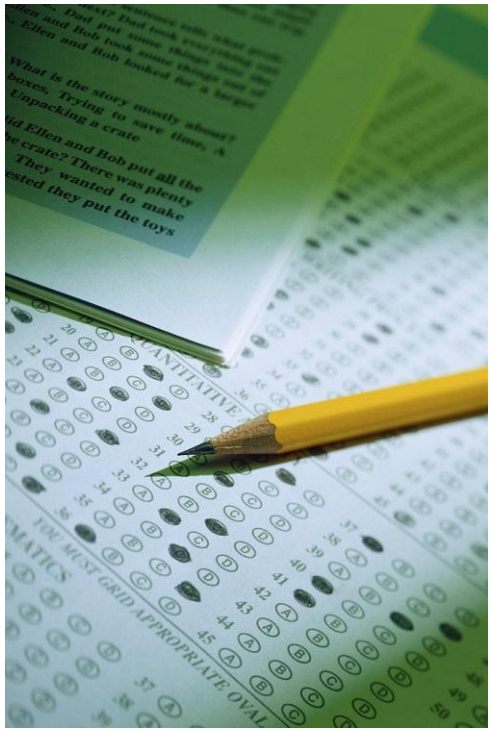
Rules Update

- **Interested Party Review**
  - OAC 3745-1-34 Wildlife and Human Health Criteria for Ohio River Drainage Basin – removing thallium human health nondrink criterion
- **Original Filed with JCARR**
  - OAC 3745-1-21 Use Designation Rule for Great Miami River – incorporating site specific criteria for copper at two locations & use updates for 11 waters (1 new, 10 verifications)

Water/Wastewater Operator Certification

- As of January 2014
  - 3rd party exams across the state instead of twice per year in Columbus
  - Make it more efficient to take test



Definition of Water of U.S.

- USEPA/Corps coauthored *Connectivity of Stream and Wetlands to Downstream Waters*
  - Address CWA Navigable Waters
  - Discusses Perennial, Intermittent, Ephemeral stream
- Water of the US rule out soon

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NUTRIENT Q&A

How does Ohio EPA currently address nutrients in CWA programs?

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History – National Level

- No national recommended criteria back in day
- U.S. EPA's 1976 *Quality Criteria for Water* (aka Red Book)
  - Nitrate-nitrogen 10 mg/l for protection of water supplies, prevent over enrichment
  - Phosphorus 0.10 ug/l for protection of marine and estuarine waters (not based on potential to cause eutrophication)

History – National Level

- National Water Quality Inventory: 1996 Report to Congress
  - Nutrient impaired: 40% rivers, 51% lakes, 57% estuaries
  - Hypoxic zone in gulf of Mexico, hypoxia in east coast states, *Pfiesteria*-induced fish kills and human health problems in coastal waters

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History – National Level

- 1998 – National Strategy for the Development of Regional Nutrient Criteria
- 2001 – U.S. EPA published recommended water quality criteria for nutrients
- Ongoing support from U.S. EPA for states to develop & adopt nutrient criteria

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History – State Level

- For past 10 years, Ohio EPA has been working on developing new nutrient standards
- April 2013 - Early Stakeholder Outreach public comment period regarding nutrient criteria in Ohio's WQS
- November 2013 - formed Nutrient Technical Advisory Group (TAG) to advise Agency through next steps in developing nutrients standards

Ohio EPA's Role - Nutrients

- Regulation (scope is set by law)
  - Standards (set uses of water and how clean)
  - Monitoring
  - Total Maximum Daily Loads
  - Point source discharge permits
- Incentives
  - Grants & loans for PS and NPS projects
- Leadership & partnering
  - State agency with authority over water quality

Question 1

- Does Ohio have **narrative** nutrient water quality standards?
  - Yes

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Question 2

- What are they?
  - "Free-from" language in OAC 3745-1-04 and narrative & numeric biological criteria in OAC 3745-1-07

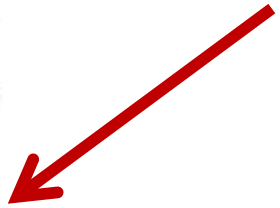
3745-1-04 **Criteria applicable to all waters.**

The following general water quality criteria shall apply to all surface waters of the state including mixing zones. To every extent practical and possible as determined by the director, these waters shall be:

(A) Free from suspended solids or other substances that enter the waters as a result of human activity and that will settle to form putrescent or otherwise objectionable sludge deposits, or that will adversely affect aquatic life;

(B) Free from floating debris, oil, scum and other floating materials entering the waters as a result of human activity in amounts sufficient to be unsightly or cause degradation;

(C) Free from materials entering the waters as a result of human activity producing color, odor or other conditions in such a degree as to create a nuisance;



(D) Free from substances entering the waters as a result of human activity in concentrations that are toxic or harmful to human, animal or aquatic life and/or are rapidly lethal in the mixing zone;

(E) Free from nutrients entering the waters as a result of human activity in concentrations that create nuisance growths of aquatic weeds and algae;

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3745-1-04 **Criteria applicable to all waters.**

All surface waters of the state, to every extent practical and possible as determined by director, these waters shall be:

- (E) Free from nutrients entering the waters as a result of human activity in concentrations that create nuisance growths of aquatic weeds and algae

Table 7-11. Statewide water quality criteria for the protection against adverse aesthetic conditions.

Chemical	Form[1]	Units[2]	IMZM[3]	OMZM[3]	Drinking
2-Chlorophenol	T	µg/l	--	--	0.1[a]
2,4-Dichlorophenol	T	µg/l	--	--	0.3[a]
MBAS (foaming agents)	T	mg/l	--	0.50	--
Oil & grease	T	mg/l	--	10[b]	--
Phenol	T	µg/l	--	--	1.0[a]
Phosphorus	T	mg/l	c	--	c

1 T = total.
2 mg/l = milligrams per liter (parts per million); µg/l = micrograms per liter (parts per billion).
3 IMZM = inside mixing zone maximum; OMZM = outside mixing zone maximum.
a This criterion is based on the protection against organoleptic (taste and/or odor) effects.
b Surface waters shall be free from floating oils and shall at no time produce a visible sheen or color film. Levels of oils or petrochemicals in the sediment or on the banks of a watercourse which cause deleterious effects to the biota will not be permitted.
c Total phosphorus as P shall be limited to the extent necessary to prevent nuisance growths of algae, weeds, and slimes that result in a violation of the water quality criteria set forth in paragraph (E) of rule 3745-1-04 of the Administrative Code or, for public water supplies, that result in taste or odor problems. In areas where such nuisance growths exist, phosphorus discharges from point sources determined significant by the director shall not exceed a daily average of one milligram per liter as total P, or such stricter requirements as may be imposed by the director in accordance with the international joint commission (United States-Canada agreement).

3745-1-07 Table 7-11. Statewide water quality criteria for the protection against adverse aesthetic conditions.

Footnote c TP shall be limited to the extent necessary to prevent nuisance growths of algae, weeds, and slimes that violate OAC 3745-1-04(E) or, for public water supplies, that result in taste/odor problems.

Where nuisance growths exist, P discharges from point sources determined significant shall not exceed daily avg of 1 mg/l TP, or stricter requirements as may be imposed in accordance with IJC

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3745-1-07(A)(6) Biological criteria provide direct measure of attainment of WWH, EWH & MWH aquatic life uses.

- (a) Demonstrated attainment of take precedence over application of chemical-specific aquatic life or whole-effluent criteria associated with use
- (i) Director may develop, or discharger may provide, site-specific water quality criterion;
- (ii) Director may establish WQBELs consistent with attainment of use

Question 3

- Does Ohio have assessment methods to identify waters impaired by nutrient pollution?
  - Yes, Ohio conducts biological and water quality surveys that provides data necessary to list impaired waters
  - Reports available at: http://epa.ohio.gov/dsw/document_index/psdindx.aspx

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Question 4

- Has Ohio included waters on the 303(d) list for nutrients using narrative standards?
  - Yes, since 1992 (First report)
  - Draft 2014 303(d) list available at: http://epa.ohio.gov/dsw/tmdl/OhioIntegratedReport.aspx

Question 5

- Which water body types has Ohio listed for nutrients?
  - Watersheds, Large Rivers & Lake Erie
  - Inland lakes are not listed at this time

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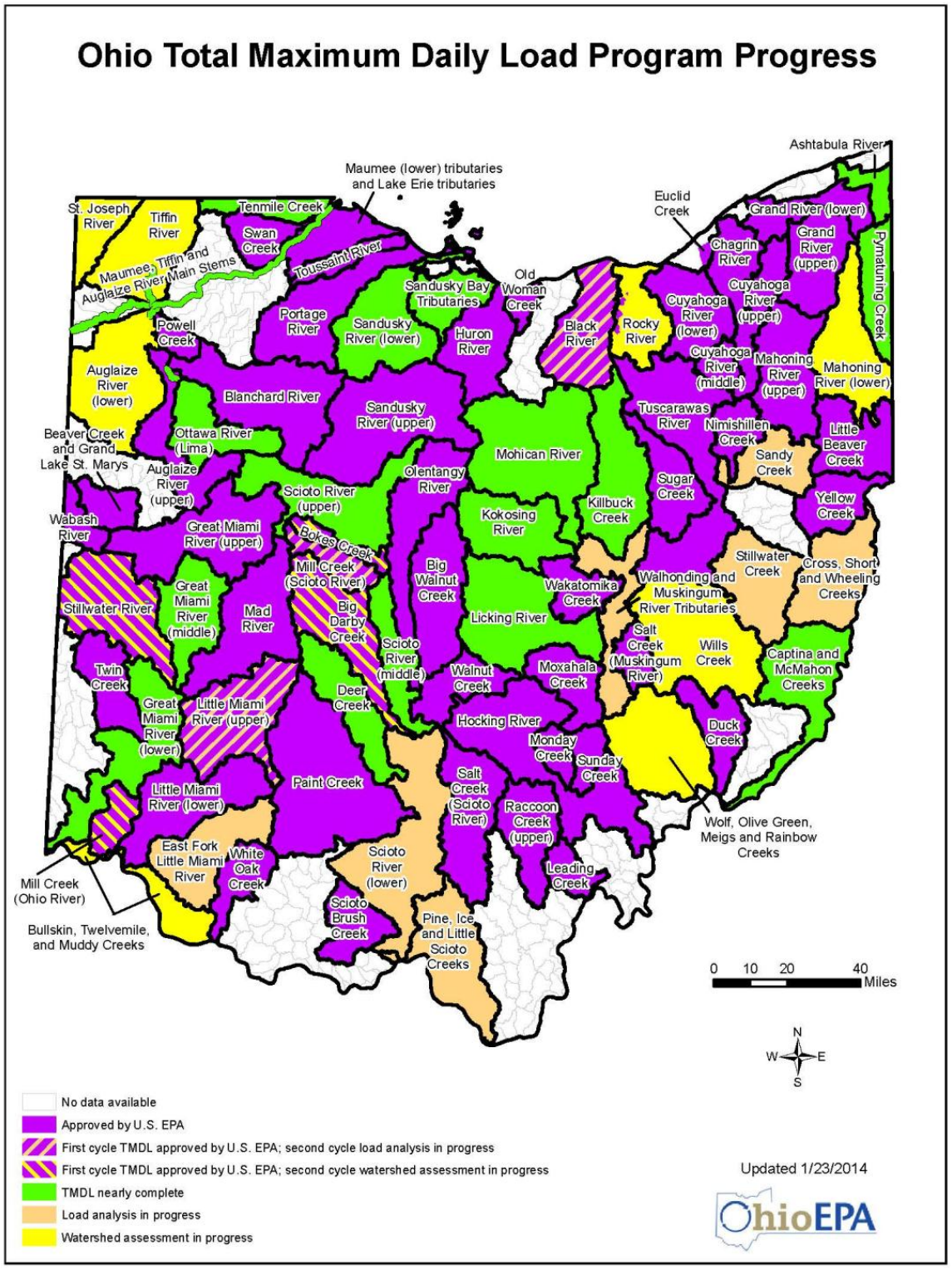
Question 6

- Has Ohio EPA developed TMDLs for nutrients based on narrative standards?
  - Yes, since 2001
  - 64 TMDL projects had been approved by U.S. EPA and 40 included nutrients
  - TMDLs available at: http://epa.ohio.gov/dsw/tmdl/index.aspx



Key

- Purple = Final
- Green = Nearly Complete
- Peach & Yellow = In progress

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Question 7

- What approach was used to set the TMDL target concentrations?
  - N& P targets empirically developed through associating field measured nutrient concentration with evidence of aquatic life use attainment
  - See 1999 Associations document
  - Legal and Technical Basis for Nutrient Target Values Used in TMDL Projects (WQS Guidance #4, 11/27/2000)

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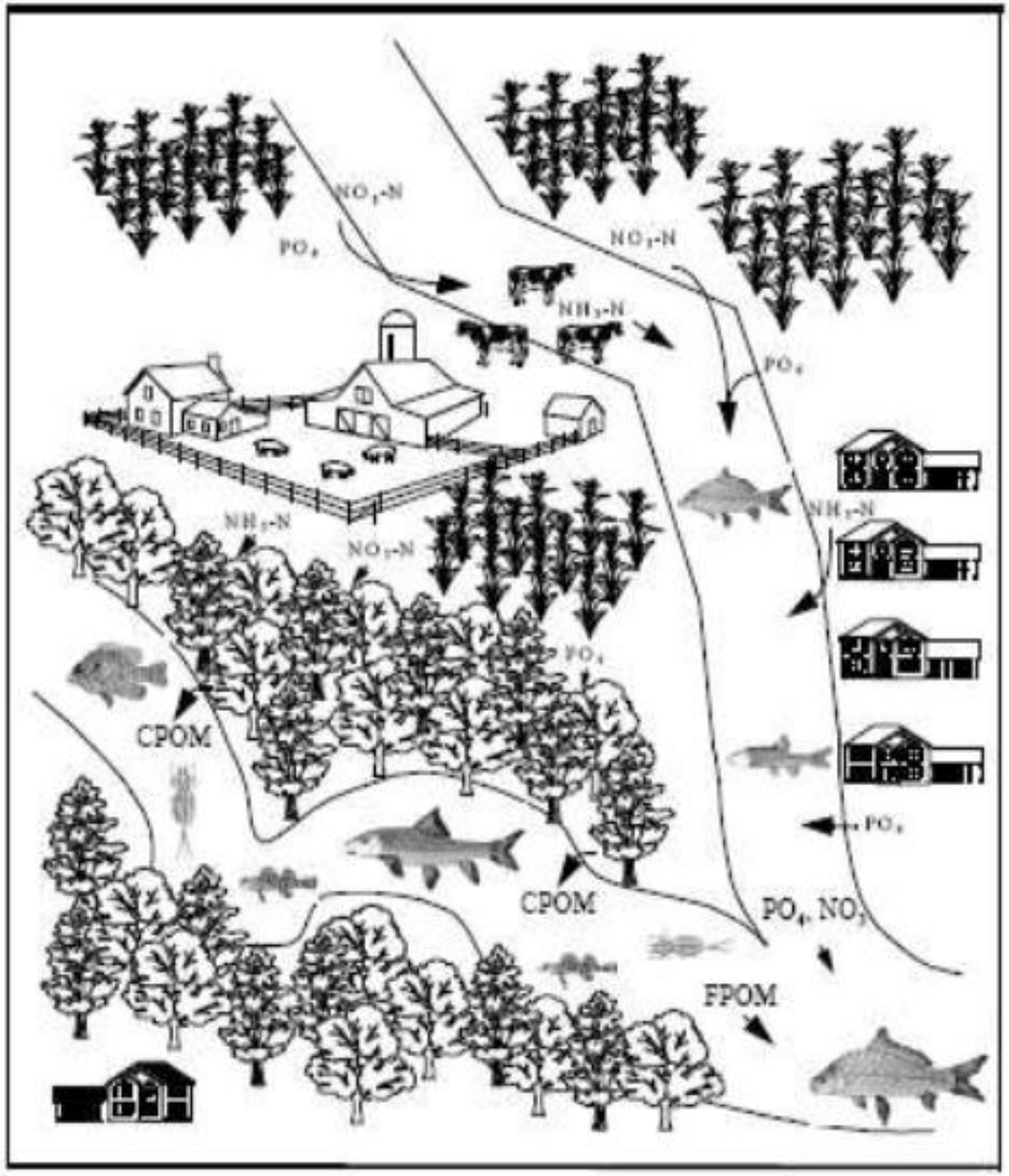
Association Between Nutrients, Habitat, and the Aquatic Biota in Ohio Rivers and Streams

Ohio EPA Technical Bulletin MAS/1999-1-1



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Nutrient Targets From the "Associations" Document

- Table 2. Median total phosphorus concentrations by IBI range (from the ALL data set), ANOVA results, and suggested criteria for the protection of aquatic life.

	Ecoregion Criteria						Statewide Criteria		
IBI Range[1]	HELP	IP	EOLP	WAP	ECBP	ALL[3]	WWH†	EWH†	MWH
Headwaters (drainage area < 20 mi^2)									
20 - 29	0.42	2.88	0.19	0.05	0.58	0.34			
40 - 49	-	0.13	0.05	0.05	0.07	0.06			
50 - 60	-	0.05	-	0.05	0.05	0.05			
ANOVA[2]	ns	ns	0.05	ns	0.05	0.05	0.08	0.05	0.34
Small Rivers (drainage area ≥ 200 mi^2 < 1000 mi^2)									
20 - 29	0.25	-	0.20	0.25	0.25	0.25			
40 - 49	-	0.33	0.12	0.08	0.16	0.18			
50 - 60	-	0.15	0.08	0.05	0.17	0.14			
ANOVA	ns	ns	0.10	0.10	ns	ns	0.17	0.10	0.25

Question 8

- Does Ohio EPA use narrative standards to determine need for nutrient limits in NPDES permits?
  - Yes

Phosphorus monitoring & limits for NPDES permitted sources

Watershed	Number of Sources	
	Lake Erie	Ohio River
Municipal Permits Total	729	1,345
Municipal Permits with P Limits	105	117
Municipal Permits with P Monitoring	223	397
% of POTW Permits with P Limits/Monitoring	30.6%	29.5%

Source: Ohio EPA, DSW Permit Retrieval and Analysis Tool. Query conducted 03/02/2011.

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Question 9

- How does Ohio EPA determine what the limits should be?
  - A final WQBEL is calculated in TMDL. Initial/interim NPDES limits set using commonly accepted achievable effluent limits (1mg/l for TP), or
  - Nutrient limits imposed without completed TMDL if
    - Data confirms non-attainment of WQS uses due to nutrient enrichment
    - Point source(s) in question are significant contributors to problem

Question 10

- When Ohio incorporates WQBELs for nutrients into permits, does it use any of the following to provide implementation flexibility?

  Variances, compliance schedules or staged implementation of TMDLs

  – Ohio EPA currently uses compliance schedules and staged implementation of TMDLs

Question 11

- Are there other opportunities for making strong, near-term progress on reducing pollution in Ohio?
  - Input welcome

Ohio EPA's Thoughts

- Evaluating addition of Compliance Assistance Unit staff to assist POTWs in optimizing nutrient removal through operational changes
- Partnering with organizations to increase POTW education & outreach in nutrient removal technologies
- Assisting in agricultural NPS nutrient reduction (grants, technical assistance)

Questions?

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