

Ohio Lake Erie Phosphorus Task Force Meeting Minutes
May 23, 2007
Riffe Center, Columbus, OH

Meeting Objective: *Present information on the impact of nutrients on Ohio streams; look at trends and stratification in phosphorus soil tests; and begin identification of all the potential sources of dissolved phosphorus.*

Task Force Chair Gail Hesse opened the meeting by welcoming new task force members Robert Mullen (OSU Extension – Wooster) and Seth Hothem (Northeast Ohio Regional Sewer District). She presented a recap of the March 27 meeting and noted that the minutes are posted to the Ohio Lake Erie Phosphorus Task Force web site at: www.epa.state.oh.us/dsw/index.html.

Julie Weatherington-Rice offered that the Ohio Fractured Flow Work Group may provide assistance in translating scientific information into more common language for general distribution and outreach.

The focus of the first meeting was on establishing conditions in Lake Erie as related to nutrients. This meeting would begin a discussion of the impact of nutrients on streams in the Lake Erie watershed and begin to look more at land use as a source of phosphorus.

Trinka Mount, TMDL Program Manager in the Division of Surface Water at Ohio EPA, gave a presentation titled *Phosphorus Impairment in Lake Erie Tributaries in Ohio*. Defining impairment is based mainly on biological criteria while chemical data is used primarily to track down causes and sources of the impairments. Phosphorus is one of the chemical parameters used, but only total phosphorus is analyzed.

Under the Clean Water Act Ohio is required to report out on the status of state waters (305(b)) and list and prioritize impaired waters (303(d)). Ohio EPA does this via the *Integrated Report*. Ohio assessment is done via 11-digit HUC. Of 331 HUCs statewide, 98 are in the Lake Erie Basin. Trinka presented several slides detailing the status of the HUCs in the Lake Erie Basin, comparing which were classified as impaired, the status of aquatic life use, and which HUCs were impaired by nutrients, organic enrichment/DO, siltation and a combination of the above. She also showed the status of TMDLs in the Lake Erie Basin HUCs. 55% of the Lake Erie Basin HUCs are listed as impaired due to nutrients.

Currently, there is no numerical criterion for phosphorus. However, the narrative criterion states phosphorus should be limited to prevent nuisance growths of algae and aquatic weeds. Based on observations of best aquatic communities and the associated ambient total phosphorus concentrations, typical targets set for TMDLs are as follows: headwaters-0.08 mg/l; wadeable streams-0.1 mg/l; small river- 0.17 mg/l; and, for a large river-0.3 mg/l. Typical recommendations

to reduce phosphorus in the TMDL watersheds include: for point sources – limit P in effluent to 1 mg/l or less; eliminate SSOs; and limit CSOs. Nonpoint source control recommendations include: habitat restoration and protection; agricultural conservation practices; manure management plans; home septic systems improvements (including tie-in to a central sewer system); education; and working with local watershed plans. (The full presentation is on the P Task Force web page.)

In the follow-up discussion, it was noted that the agricultural basins didn't seem to show impact from nutrients. This is because monitoring is typically done at low flows and nutrient loads are more associated with runoff events. Ohio EPA's monitoring program is largely based on assessing use attainability and locating point source impacts, so monitoring is done during low flows. High phosphorus during low flows would be indicative of a point source. Trinka distributed fact sheets on how monitoring and TMDL decisions are made as well as where all the long term ambient monitoring stations are located (see web page handouts). The Phosphorus Task Force can potentially have some influence as to where TMDLs and monitoring is done. Additional resources would be needed to add sampling to capture loadings and to monitor for other forms of phosphorus.

John Crumrine, Heidelberg NCWQR, gave a presentation on *Phosphorus Soil Test Trends in Northwest Ohio and the Potential for Stratification of Phosphorus*. He provided an overview of the NCWQR tributary loading program. DRP concentrations were declining until the mid 1990s and have now risen to 1970s levels. Peaks in DRP concentrations now coincide with peak storm water runoff, particularly in winter. Research has shown that phosphorus concentrations in runoff increase as the soil test levels for phosphorus in the surface two inches of soil increase. More than half of standard soil test P values exceed levels required for optimal crop production. Conservation tillage can elevate soil test P at the soil surface. Elevated soil test P values on poorly drained soils can further increase the potential for DRP in the runoff. DRP increases in tributaries began at the same time there were increases in the adoption of conservation tillage practices.

The discussion following this presentation suggested that the connection between soil test values and increasing DRP concentrations is not an exact science. Soil test values can change from week to week due to a number of factors including soil moisture. Soil test values could show an increasing trend because more samples have been taken to show livestock farmers did not need to add P. You won't see much conservation tillage on livestock farms as they have to incorporate manure management. In long-term no-till areas they are not seeing increased P runoff, but there are few examples of multiple years of no-till on the same fields. Chemical structure of soils impacts the amount of phosphorus runoff. The Coshocton experimental watershed project and the paired watershed project in NE Indiana may have some useful information. Results are just beginning to be published.

There could be a number of causes for the increasing DRP loads/concentrations, and they are likely different in the Cuyahoga and Grand vs. the Maumee and Sandusky. Changes in the Cuyahoga and Grand are noted under low flow conditions while those in the Maumee and Sandusky are noted under high flow. This suggests that low flow increases are related to point sources while high flow results are related to nonpoint sources.

The group then moved into a discussion on identifying the potential sources of phosphorus. The sources essentially broke out into five major categories and the results are presented by category as follows.

Point Sources

- Municipal wastewater treatment plants (majors and minors)
- Small package plants
- Industry
- CSOs
- Household sewage treatment systems
- Orthophosphate addition to drinking water supplies

Agriculture

- Commercial agricultural fertilizers
- Pasture-based feeding operations
- Manure applications (dry, liquid, compost, biosolids)
- Rural storm water runoff
- CAFOs
- AFOs
- Construction site runoff

Urban/Residential

- Residential fertilizer application
- Urban storm water runoff
- Golf course fertilizer application
- Construction site runoff

Internal Loading

- Zebra and quagga mussels
- Mayflies burrowing
- Regeneration under anoxic conditions
- Sediment resuspension

Other

- Precipitation (rain and snow)
- Release from plant material
- Natural release from soils

- Glacial and carbonate related sources
- Geese
- Gypsy moth droppings
- Streambank erosion
- Weather patterns
- Dredging and shipping impacts

Transport Mechanisms

- Tile drainage
- Urban storm water
- Critical source areas (connectivity)
- Channelized streams and ditches
- Tile blowouts
- Macropores
- Detroit River/Upper lake loads

Use these topics as potential themes for topics of discussion at future meetings. Agricultural sources will be the number one priority followed by Urban/Residential and then Internal Loading. The question to explore is “what is the relative contribution of each of these to DRP concentrations/loadings”?

Commercial fertilizer sales have not changed recently and livestock numbers are ½ of what they were in the 1950s. The amount of land in turf (golf courses) has expanded.

For all of these topics, address conditions as pre-1995 and post-1995 periods. What happened in 1995? We will also need to consider policy changes and economic considerations.

Is increasing DRP an issue nationally, regionally, in the other Great Lakes, all of Ohio or just in the Ohio Lake Erie basin?

Is Canada seeing a similar problem? Jeff Tyson of ODNR-DOW said they are seeing problems arising in the southern Ontario tributaries.

There may be a need to bring in experts outside of the Task Force membership to address specific issues. Jeff Reutter offered that Ohio Sea Grant may be able to provide some funding to reimburse these speakers for their expenses.

To begin further investigation of sources of DRP, Amy Jo Klei of Ohio EPA Division of Drinking and Ground Water (DDAGW) gave a presentation on the addition of ortho-phosphate to treated drinking water to prevent corrosion and leaching of lead and copper from pipes used to transport finished drinking water. A rule was passed in 1991 to control the leaching of lead and copper and went into effect around 1995. Some industries also add phosphate to boiler water. We don't know if WWTP operators are seeing an increase in influent

concentrations of phosphorus. However, as long as the treated/finished water ends up at a WWTP it won't make much difference because WWTPs have an effluent standard to achieve.

The DDAGW will explore this issue further by offering treatment options where increasing phosphorus may be a concern and potentially do a case study in a watershed with input from water treatment plant operators. The intent is to prove that this is not an issue. Amy Jo's presentation is on the Task Force web page.

There was a brief discussion on the web page and how it is organized. There will be a bibliography of peer-reviewed relevant references on the site. Rick Wilson provided a number of references. A list of these will be posted on the web page.

Decision Items

1. There is potential for the Task Force to influence the watersheds where TMDLs will be done next.
2. Ohio EPA should consider monitoring for other forms of phosphorus than just total phosphorus.
3. There is potential for Ohio EPA (or other watershed groups) to alter sampling to better capture loadings.
4. There are differing opinions on what soil test trends may be telling you as related to phosphorus concentrations in streams. Soil test values can change significantly from week to week based on a number of factors.
5. The chemical makeup of soils impacts the amount of phosphorus that is adsorbed or released.
6. During the discussion of sources, six major themes materialized (point sources, agriculture, internal loading, urban/residential, natural sources, and transport mechanisms. These topics should be used to frame future meeting agendas.
7. Agriculture should be the priority theme for this group.
8. For each theme, the issue should be examined for the pre-1995 and post-1995 time periods and any major events which may have impacted this particular issue should be identified.
9. All meeting materials as well as selected peer-reviewed and relevant reference papers will be posted to the web page in accordance with copyright laws.
10. The next meeting will be on July 17 with a focus on agriculture.

Attendance: Dave Baker, John Crumrine, Pete Richards, Jack Kramer-Heidelberg NCWQR; John Kessler-ODNR/DSWC; Robert Mullen-OSU Extension; Kevin Elder-ODOA; Rick Wilson, Gail Hesse, Julie Letterhos, Trinkka Mount, AmyJo Klei-OEPA; Chris Riddle-OLEC; Gerry Matisoff-CWRU; Paul Bertram-USEPA/GLNPO; Julie Weatherington-Rice-OFFWG; Seth Hothem-NEORSD; Larry Antosch-OFB; Jeff Reutter-Ohio Sea Grant; Norm Fausey-ARS; Dan Button-USGS; Jeff Tyson-ODNR/DOW; Steve Davis-NRCS.