Ohio Lake Erie Phosphorus Task Force Meeting Minutes
March 27, 2007
Riffe Center, Columbus, OH

Meeting Objective: *Present information/data on the current state of Lake Erie as related to nutrients; discuss the increasing loads of soluble reactive phosphorus to Ohio Lake Erie tributaries; determine if the increases are of concern; and plan next steps to address the situation.*

This was the first meeting of the Ohio Lake Erie Phosphorus Task Force. Introductions were made around the table. Ohio EPA Director Chris Korleski gave a brief welcome and emphasized that Ohio EPA has no preconceived notion as to the outcome of the Task Force. Ohio EPA is asking the Task Foce to examine collectively the existing conditions of Lake Erie and explore potential options.

Gail Hesse (OEPA), Task Force chair, reviewed the agenda and logistics. Ohio EPA is developing a web site for the Phosphorus Task Force to include minutes, presentations, member contact information, and various references that will be useful to the group. The membership of the group was designed to include a balanced representation of all the sectors with a stake in the phosphorus issue. Kevin Elder suggested that we also invite Dr. Robert Mullen, a soil fertility specialist at OSU Extension/Wooster.

Gail described the focus of the day was to learn about existing conditions and determine if soluble reactive phosphorus levels are at levels of concern. Five presentations were given to frame the issues. They included: an overview of phosphorus; phosphorus and DO monitoring in Lake Erie; summary of the 2004 Lake Erie trophic study; algal blooms in Maumee Bay; and an overview of tributary monitoring data. The presentations are summarized below and can be found in full at www.epa.state.oh.us/dsw/index.html.

Dave Baker provided an overview of the various forms of phosphorus, the bioavailability of the different forms, external vs. internal loading, and point vs. nonpoint source loading. Most point source phosphorus is dissolved and 100% bioavailable. Nonpoint source phosphorus is largely particulate and mostly from agriculture. Point sources of phosphorus discharge at a relatively steady rate, while nonpoint sources are pulsed in association with rainfall. Approximately 25% of total phosphorus is bioavailable. SRP appears to have begun increasing in 1995. Point source loads are calculated from NPDES permit reports. Nonpoint source loads are calculated by taking the total watershed export load (as measured at the most downstream gauging station) and subtracting the point source load, and are likely somewhat underestimated.

Dave included a satellite shot of Lake Erie's western basin during a Microcystis bloom in August 2003 (there was a heavy bloom that year). It was pointed out

that the shot was taken 10 days after the huge power outage that summer. However, Tom Bridgeman confirmed that the bloom was well underway before any impacts from the outage were experienced. A question was raised concerning the monitoring requirements for CSOs and bypasses. Reporting requirements are mostly for number of occurrences and flows. No monitoring for concentrations of contaminants is done.

Paul Bertram gave a presentation on USEPA/GLNPO's Lake Erie monitoring program. They sample 73 stations in spring and summer for nutrients, dissolved oxygen, conservative ions and plankton. Just started including SRP again in the last couple of years. 46 stations are sampled for benthos. They also analyze lake trout and walleye for fish tissue contaminants (filets) and whole body coho salmon. There is also an atmospheric deposition network with a master site at Sturgeon Bay, New York and satellite stations in Cleveland and Point Pelee, Ontario.

Central basin TP concentrations showed a decreasing trend until 1988 and started increasing in 1990. Concentrations have been decreasing again over the last four years. There appears to be about a 10-year lag between loadings and measurable impacts in the lake. Shoreline growth of *Cladophora glomerata* is influenced by phosphorus, nitrogen, temperature, clarity and changing lake levels.

Gerry Matisoff provided an overview of the Lake Erie Trophic Status Collaborative Study which was done in 2004. A number of projects were conducted, the results of which are presented in a special edition of the Journal of Great Lake Research (Volume 31, Supplement 2, 2006). Noted findings were: there appears to be a disconnect among the typical TP loading, plankton biomass and Chl *a* relationship; central basin dissolved oxygen depletion rates appear to be related to TP loading from the previous year; more intense and frequent winter storms are producing high loading of phosphorus from land runoff; there is a longer stratification period; organic carbon is increasing, particularly near the bottom; there are new pathways of internal phosphorus cycling (nearshore shunt/move from a pelagic to benthic energy based system); very little work has been done on nitrogen; and TP loading is dominated by tributary discharge. There has been no major impact on anoxia/hypoxia in the central basin from zebra mussels, however; they may be influencing the nearshore.

Tom Bridgeman discussed algae in Maumee Bay and the western basin. *Microcystis* blooms are erratic. No bloom in 2002, huge bloom in 2003, moderate bloom in 2004, small bloom on 2005, moderate bloom in 2006. Blooms occur in July or August and appear to initiate in outer Maumee Bay. Phosphorus that comes in during June and July, and not the spring and winter pulses, is what supports blooms in Maumee Bay. *Microcystis* has superior buoyancy and does much better in turbid waters than other algal species.

Microcystis makes water more basic. Post bloom, species transition to *aphanizomena* when nitrogen becomes limiting. *Lyngbya wollei*, net-forming cyanobacteria, is showing up in Maumee Bay littering shorelines and creating floating mats. The traditional transition of algae is out of whack in the western basin. Diatoms that used to dominate in the spring are now blooming in August. Water clarity in the western basin has improved since the 70s.

Pete Richards provided an overview of total and dissolved phosphorus trends from 1975-2005, as well as trends in sediment loading, nitrate loading and stream discharge. Dissolved phosphorus is highest from the Maumee with the Cuyahoga close behind. Nitrate loading is highest in the Maumee and Sandusky. Most streams are showing increases in overall discharge, with the most significant increase seen in the Grand and Cuyahoga rivers. Sediment load (by unit area) is highest in the Cuyahoga. Reversal of downward trends is fairly universal. These increasing loads are showing more impact in the nearshore and little in the open lake. When Heidelberg first started to notice the increase in dissolved phosphorus, they checked all QA/QC and all other available data to verify that the increase being measured was real. Increasing flows were ruled out as the cause as trends in concentrations were similar to trends in loads. 58% of the TP load in the Cuyahoga is from point sources. Again, impacts are being seen in the nearshore rather than the open lake. In 2007, USGS will be initiating two new gauging stations on the Blanchard and Tiffin Rivers. Analysis for pesticides, TP and dissolved P will be done by Heidelberg from these sites.

Group Discussion raised the following issues:

- What percentage of phosphorus is being generated internally by anoxia?
- Iron and aluminum tend to tie P to sediment/soil.
- Soil type can influence phosphorus content and runoff.
- Where are the populations of cyanobacteria originating?
- Weather conditions need to be monitored
- A rising pH can raise phosphorus concentrations significantly
- Is sediment pH different than that in the water column?
- What's different now than in the early 1990s?
- Are other areas around the Great Lakes experiencing increasing dissolved phosphorus concentrations? (Saginaw Bay, Green Bay, Bay of Quinte – also seeing algal problems in these areas)
- What are the impacts of tile drainage? Should tiles be plugged during certain times of the year?
- There is increasing organic matter and soil carbon.
- Things are worse now than they were 15 years ago.
- The west central basin has always gone anoxic, but this area is expanding considerably.
- Should we be looking at the rivers as conduits to the lake or should we be looking at impacts on the rivers as ecological units?

Decision Items

1. The more we know the more we don't know.
2. From a human use perspective (fishable, swimmable, drinkable) the nearshore is more important than the open lake. Further changes in this area could significantly impact our use of the lake.
3. Although the impact on rivers as an ecological unit is important, this task force will focus more on the rivers as a conduit to the lake. We also need to recognize the various on land management actions that influence the rivers as conduits under runoff conditions. This includes trends with regard to historical maintenance practices, ditching, tile installations and any land use changes.
4. A key conclusion of the day was the agreement that dissolved (and thus bioavailable) phosphorus is indeed increasing and therefore a concern.
5. The Task Force agreed we need to identify all the potential sources/causes of increasing dissolved phosphorus levels.

Attendance: Larry Antosch-OFBF; Dave Baker, Pete Richards, John Crumrine, Jack Kramer-NCWQR; Paul Bertram-GLNPO; Tom Bridgeman-UT; Dan Button-USGS; Steve Davis-NRCS; Kevin Elder-ODOA; Norm Fausey-ARS; Gail Hesse, Rick Wilson, Julie Letterhos-OEPA; Todd Hesterman; John Kessler-ODNR; Gerald Matisoff-CWRU; Chris Riddle-OLEO; Julie Weatherington-Rice-OFFWG; Joe Conroy for Dave Culver-OSU; and Jill Jentes-Banicki for Jeff Reutter-Ohio Sea Grant.