

**Ohio Lake Erie Phosphorus Task Force Meeting Minutes**  
**June 25, 2008**  
**ODNR Building H-2, Columbus, OH**

**Attendance:** Jack Kramer, Robert Mullen, Julie Weatherington-Rice, Eugene Braig, Seth Hothem, Larry Antosch, Steve Davis, Kevin Elder, Pete Richards, Dave Baker, Chris Riddle, Paul Bertram, Dan Button, Libby Dayton, Gail Hesse, Rick Wilson, David Hanselmann, Amy Jo Klei, Michael Eggert

**Meeting Objectives:** *Continue to work through the list of possible sources of DRP with presentations on orthophosphates in public water supplies and package plants. Identify 2 – 3 priority funding themes for consideration under the Lake Erie Protection Fund and outline the process for development of the Task Force Report.*

Gail Hesse opened the meeting with welcoming remarks and members provided several updates, including the following:

- Briefing with Ohio EPA Director Korleski on the current status of the P Task Force Report and draft recommendations. The Director is supportive of where the Task Force is to date and would like to see things wrapped up by September. He also supports developing an MOU with Scott's on lawn fertilizers.
- Dishwasher detergent bill passed in Ohio. A federal bill supporting the elimination of phosphorus in dishwasher detergents nationwide was introduced by Senators Voinovich and Levin,
- The Ohio Lake Erie Commission has a draft Lake Erie Protection and Restoration Plan out for review. It embodies the Great Lakes Regional Collaboration, Ohio Lake Erie Action List and the 2000 Lake Erie Protection and Restoration Plan. It includes "complete and implement the P Task Force recommendations" as an action.
- The Lake Erie Protection Fund is moving toward a themed approach for funding. Small grants of \$15,000 will remain mostly as they have in the past. In place of large grants, targeted priorities will be recommended for funding of about \$225,000. We want to submit several priorities related to the P Task Force recommendations.
- For the P Task Force Report, Ohio EPA will do the heavy lifting and will ask for input from others as it begins to take shape. Ohio EPA will pull together the narrative for review at the July 30 meeting.
- Cooperative conservation partnership initiative funds have been set aside for states under the Farm Bill. An attempt is being made to focus on a topic for use of these funds. Nutrients are among those on the short list. There are still a lot of generalities, but they are trying to align a good number of partners for a common goal.
- Dave Baker was recognized with an award at the recent River Network conference.

- The Joyce Foundation has funded a project to focus on Bio-Char. The process uses organic matter (manure) to create a charcoal like substance which is then applied to fields to allow slow nutrient release and phosphorus absorption potential. They are looking for a dairy or poultry facility in the Lake Erie basin to test the application from bench top to a 200-300 acre head farm operation. The Western Lake Erie Basin project involvement in this effort has been ongoing and researchers have been working with NRCS. Bio-char is a carbon sequestration practice to create a stable form of carbon.
- As an outcome of the Phosphorus session at the Ohio Academy of Sciences conference, an effort is being made to look at what it would take to put organized sampling for blue-green algae associated with loads/peak storm events into practice. Costs are being determined by USGS.

### **Package Plants**

Rick Wilson gave a presentation on the potential DRP contributions from package plants (50,000gpd design capacity or less). A review of Ohio EPA SWIMS database revealed that most package plants in the Lake Erie basin do not have permits that require phosphorus monitoring (only 26 out of 460). The total daily flow for all of these facilities is 5.8 MGD. Phosphorus discharge from package plants constitutes a small fraction of the total load to Lake Erie but can have localized impact on stream ecology.

#### Q&A Session after presentation

- Why is there such a range in P concentrations?
  - o Likely due to seasonal/non-consistent use.
- Discharge is 4500 lbs of total P
- Can phosphorus be removed at these plants?
  - o Probably not realistic. Systems are poorly maintained in many cases.
  - o We likely need to recognize that it is a load, and while it may be significant to a given stream, it is a minor load to Lake Erie.
- We need to characterize how this fits within the list of problems.
- Of the 74 TMDLs completed to date, how many are in the Lake Erie basin and how many have P & package plants link in them?
- These sources are permits to discharge without P-limits. Unlike some of the others sources we have discussed so far, there is a regulatory ability to control these.
- TMDLs are focused on ambient quality, not loading – and % that makes it to the lake (of P) is probably much less than ambient loading – and hard to characterize.
- TMDL puts a flag on those with ambient impacts.
- What about info on what isn't working - % of plants, etc.
- What types of systems require an operator?

- All... but likely they only get visited once a week or month.
- What types of systems require disinfection?
  - All.
- What about local monitoring programs for these systems? There seems to be an opportunity here to get volunteers involved.
- Any idea what % are down at any one time? What is this impact?
  - Some of the package plants still haven't even been found.

### **Orthophosphate in Public Water Supplies**

Amy Jo Klei of Ohio EPA's Division of Drinking and Ground Water revisited the use of orthophosphates in drinking water supplies. U.S. EPA issued a rule in 1991 that required actions to prohibit corrosion of lead and copper pipes in the distribution system. This rule was adopted by Ohio EPA in 1993 and resulted in public water systems adding phosphate based corrosion inhibitors. Forms of phosphorus used include; phosphate, orthophosphate, polyphosphate, zinc orthophosphate

#### Orthophosphates in Public Water Supplies – Amy Jo Klei

- 2007 Presentation Cliff's Notes
  - Phosphates – used for corrosion control to sequester Fe/Mn, help filter solids, inhibit scale formation and stabilize chlorine
  - Forms – phosphate, orthophosphate, polyphosphate, zinc orthophosphate
  - Examples of when various plants began using PO<sub>4</sub> include:
    - Bucyrus prior to '79, Upper Sandusky prior to '82, Fremont prior to '78, Toledo '97, Cleveland '96, Akron prior to '92.
    - In 1998, OEPA sent a letter to WTPs requiring 0.6 mg/L minimum P in treated water
  - Corrosion Control Options
    - pH & CaCO<sub>3</sub> Control - used often
    - lead line replacement - rarely done – expensive
    - Inhibitor – phosphate or silica based - not sure anyone uses silica. Phosphate is widely used.
  - Lead/Copper rule – caused some to change their inhibitor form.
- Has the change in cost of orthophosphates made silica more cost effective, or is it still heavily used out of habit alone?
- Typical Dosing
  - Build-up period – target 1.0-3.0 mg/L – total PO<sub>4</sub>
  - Maintenance levels – target 0.5 – 1.0 mg/L

- Actual phosphate levels in finished water in NW/NE Districts is 0.59 mg/L (most places range from 0.05 – 1.2 mg/L).
- ... tap water in Libby's lab is 0.5 mg/L P
- Is there a de-stabilization if you change product?
  - Any change in product would lead to a change in the coating built up on the pipes... so there would be about a 3 month impact.
  - There is an approval process for whatever method is being used at a given facility.
- Finished water – is this tested at home or at the plant?
  - At the plant.
- So some of the orthophosphate is lost to the pipes along the way...
  - They try to plan for this – they maintain a higher than necessary level at the plant.
- Any impact of silica use out east due to the Chesapeake Bay issues?
  - We don't have enough info to really know the specifics of this.
- What is being formed in the line to protect it from corrosion?
  - Calcium or similar crust is being formed.
- Ran the NEDO and NWDO numbers...
  - Coding in the databases is different for each district.
  - Calculations assumed all chemicals added were phosphate – probably over-estimates the amount of phosphate added.
  - 5% of plants use some form of PO<sub>4</sub>, these plants serve 50% of the LE basin population.
- Minnesota conducted a study to determine phosphorus sources and loads to MN waters. Results indicated that the load into WWTPs from the use of PO<sub>4</sub> in drinking water supplies ranged from 1.7%-5.7% by basin (3.1% statewide) of P into plants. About 40% of their systems add P.
- Study also shows 15% contribution from atmospheric deposition.
- The link to this report is <http://www.pca.state.mn.us/hot/legislature/reports/phosphorus-report.html>
- The Ohio EPA Division of Drinking and Groundwater was asked to review OEPA PWS phosphate data in greater detail & compare it with WWTP effluent (total P)
  - 1990-2006 data from the SWIMS database was reviewed. Looked at TP and flow from both major and minor WWTPs
- For majors – mostly all data below permitted limit of 1mg/l, tight window of data

- For minors – higher levels with greater distribution of values. There are no limits on minors.
- Despite very different scales of concentrations, the mean change follows a similar pattern. There is a much different % of change, but same slope at the same time when comparing change in P levels between majors and minors
  - o Major scale is .55 to .65 mg/l, while minors is 1.0-5.0mg/l.
- We are interested in the load from consumptive uses.
- 20% of water is consumptive use ( does not return to WWTP)
  - o 80% goes back to the WWTP
- There doesn't seem to be a change at the WWTP from PO<sub>4</sub> addition
- Statewide, 0.82 mg/L P leaving the WTP
  - o Akron – 300 lbs a day @ 39 MGD
  - o 60 lbs/day probably leaves through consumptive uses
  - o Roughly the same as 2 acre/day of fertilized field, or 730 acres over the course of a year.
- Can we produce a pie chart of the amount from various sources?
- Not sure we want to do that... a “low” – “medium” – “high” ranking is about as close as we may get.
- It would seem a sage guess to say that per acre, Akron is a greater source of P than ag land.
- Columbus storm water sampling data seems to disagree with that.
- No increase in TP with ortho, but is there a DRP increase? There is no testing for it, so we may not know what is happening with the ratio.
- Most of the outfall is DRP.
- 76% is DRP at NEORSD plants.
- **Question – Do we take this issue any further?**
- **NO. Its there, but its small.**
- Most goes through a WWTP; only 20% could be important – and it's not that significant.
- We should include a back-of-the envelope estimate for the sources we have discussed – just to show what their contribution may be.
- Can we chart these?
- Not sure we are comparing apples to apples.
- Can we at least look at them in relation to tributary monitoring numbers?
- The dishwasher detergent P ban is much like orthophosphate in drinking water. Most of it is in WWTP bound water
  - o Not sure ortho will come off as SRP

- WWTP & WTP service areas do not match up exactly.
- Two suggestions for inclusion in final report:
  - o Back of the envelope calculation – lets us look at things relative to each other/the total in some light ... OR...
  - o More narrative and characterize them as Low, Med, High
- We need to get & provide numbers in a pie chart as best we can – and there are research needs that come from that for what we have too little info on.
- Report is some basis for the policy discussion -> we need to give what we have for data and what the holes are. You want to determine how we can use this. Does this let us direct funding? A relative comparison will help with this.
- A visual comparison will help with selling this to various audiences.
- Ohio EPA will put together a description of what calculations we can do for those things we have looked at.
- This is just a step in the process – this isn't the final word on the topic.
- And we need to organize things to get our units the same – i.e. elemental P, soluble P, particulate P....
  - o And these forms change once they are in the stream system
- Equilibrium and the environment are players in the form of P as it changes within the system.
- We will need to talk about Total P, and then DRP where we can. Managers will need to connect the dots they can, and find the holes.
- There is data to suggest that phosphonates can be broken down and used by blue-green algae. Phosphonates are applied to the landscape as Round-Up.
- With high application of glyphosate, it's a negligible P load
  - o About 450 tons total P across Ohio @ .23 lbs/ac.
- And what percent of the .23 lbs/ac even makes it to the stream?
- What is bio-available depends to a point on the organism trying to take it up.
- Ohio EPA will see what general calculations they can make by July for some of the sources we have discussed so far – at least a narrative approach for the calculations.
- The info on who presented what is important to focus on in the report.
- Is the timeframe (September"ish") a realistic deadline?
- There is some flexibility on the details of when – it's the thrust of it, and getting the next steps going that really matters.

**Storm Water Monitoring – City of Columbus** Rick Wilson presented some information on storm water in Columbus, which is the only permittee in Ohio with a P monitoring requirement.

- Flow-weighted sampling is done for storm events.
  - o Flow weighted average is generally below detection levels.
  - o Dilution factor on runoff from impervious surface is something to consider.
- Large % of what does come off is DRP
- City of Bryan – runoff quantity is 8 times that of ag land – so there is a dilution factor when considering concentrations.
- Numbers are mean concentrations for the events. First flush is higher, but the rest of the storm will pull this down... and higher urban runoff volumes dilute these numbers.

### **Lake Erie Protection Fund Priorities Discussion**

- Chris Riddle provided a brief overview of the Lake Erie Protection Fund (LEPF)
  - o Formerly, there were small grants and large grants. For the last several years, due to decreasing resources, there have only been small grants.
  - o In an effort to focus LEPR funds to show progress and effect state agency management decisions, beginning in 2008, there are now small grants (still with \$15,000 limit) and large grants focused on one or several priority topics.

### Discussion of P Task Force priorities recommended for funding under LEPF

- According to the Lake Erie LaMP, internal P-cycling is not fully understood.
  - o If we only address ag land, we don't know how this will impact things at the lake level.
  - o LEPF would be the appropriate way to look at the water side of this to understand the P-cycling process/component.
    - Nearshore, offshore, shunt, timing, etc.
- There is a need to tie into earlier research and what has already changed.
- Research Question: What change in the nuisance algal phenomenon would occur with a 10% reduction in loads from the tribs?
- We lack data on what and how much extra nuisance algae is growing.

- It's agreeable that we don't know what impact a change will make, but if we do nothing to make progress we are further from getting results, and it's a 10-15 year project to make change in the watershed.
- But we don't know that the tribs are the cause – we need the evidence to prove that.
- There was algae in the ditches well inland in April.
- Low load years are low algae years.
- We need to look at the various blooms, etc and realize that time & temp also have an impact.
- Planktonic vs benthic organisms.
- So is DRP the smoking gun?
- There is some support for it.
- Do we also need to look at the internal sources and cycling of P?
  - o Stream bottoms, urban landscapes, in-lake, field edge
- Discovery farm idea – right sampling in the right places could teach us a lot.
- What is the state of the soil in the state? Look at the data, the labs, etc. Getting a handle on the data sources first.
- Director Boggs seems on board with work to get soil lab uniformity in analysis and data.
- Stratified soil testing process and procedures should still be considered.

Group seems to be leaning towards

- o Algal biomass
- o Sources and Cycling
- o Soil Labs
- Field – direct trib – lake cycling interface could all be looked at.
- Would rather choose a field in the Maumee, more tied to the impacts at the lake.
- Seems we have moved from off-land to in-lake in a hurry – we have spent much of our time discussing land based issues, now we are ready to push money towards in-lake items.
- What is the trigger(s) that sets algal blooms off? Is there a trigger?
- This may be the backbone that supports the recommendations the agencies make to stakeholders regarding WHY we need to change practices, and HOW as well as HOW MUCH we need to make these changes.
- Final Suggestions:

- Algal biomass – the stick – gets an understanding of what a change in the P-loading equation does in the lake.
- The soil labs – helps us understand the data we are getting, and provides for better data down the road.

### **NEXT MEETING**

July 30<sup>th</sup>

Topics:

- Further discussion of In-lake issues (This may be a second chance to tidy up our LEPF recommendations prior to their Exec. Comm meeting)
- Chagrin Storm water Monitoring (maybe)
- Draft narrative (at least partial)
- Calculations narrative for sources (and maybe even a few calculations)
- Discussion of Minnesota lawn care fertilizer results