

**Phosphorus Task Force-Phase 2 Meeting
November 7, 2012 (10:00 AM -3:00 PM)
Ohio Fire Academy**

Attendance

Task Force

Larry Antosch, Doug Busdeker, Steve Davis, Libby Dayton, Kevin Elder, Karl Gebhardt, Gail Hesse, Kevin King, Amy Klei, Allison Kunze (for Dan Button), Greg LaBarge, Joe Logan, Peter Richards, Mark Scarpitti, Jeff Tyson, Julie Weatherington-Rice, Chris Wible, Rick Wilson, Ron Wyss

Observers

Mike Bailey, Tom Fontana, Jack Irvin, Jack Kramer, Linda Merchant-Masonbrink, Trinkka Mount, Michael Murray, Anthony Sasson

Handouts

Agenda

Minutes from October 3, 2012 Meeting

Phosphorus Targets Discussion Paper (for discussion only, do not distribute)

Drainage Management Discussion Paper (for discussion only, do not distribute)

Map of Dissolved Phosphorus Sampling Locations

Summary of "Managing agricultural phosphorus for water quality protection: principles for progress," provided by Ron Wyss

Point source/urban workgroup, provided by guest speaker Dan Dudley

Announcements

- The December 5 Task Force meeting is cancelled due to conflicts with other meetings. The next meeting of this group will be on Jan 9 at the Riffe Center in Columbus (original meeting location).
- The Nov 14 Nutrient Forum is getting a lot of attention and many registrants. The forum will be at the Hyatt in Columbus. Over 200 people have registered.
- The Water Management Association of Ohio is meeting next week, sessions on phosphorus.
- Gail announced that today is about discussion and moving forward on several topics. The group will use the discussion papers to continue the conversation on targets and drainage after hearing about the point source work group that Ohio EPA convened.

Presentation on final report: *Point Source and Urban Runoff Nutrient Workgroup – Dan Dudley, Ohio EPA*

The Kasich administration saw need for action on nutrient issues. The agriculture group was set up and began working. Ohio EPA Director Nally saw a need for input from point sources and the urban environment. Dan served as the facilitator of the group, which consisted of 25 invited members, including large and small WWTPs, consultants, electric utilities, food industry, environmental, lawn care.

The group's charge was to identify actions to take in short term to reduce nutrients and to identify roadblocks to progress. The group established several workgroups and eventually distilled their work into 6 recommendations:

1. Ohio EPA should develop a state-wide nutrient mass balance sheet that accounts for point and non-point sources of nutrients.
2. Ohio EPA should encourage and promote operational experimentation at wastewater treatment facilities aimed at achieving low cost nutrient removal.
3. Wastewater treatment plant owners should be prepared to determine cost effective means to achieve lower effluent limits wherever facilities are shown to be significant contributors to nutrient enrichment.
4. State government should appoint a panel of economic, financial, and policy experts to consider options for funding the implementation of Ohio's nutrient reduction strategy.
5. Ohio EPA should publish an annual report on nutrient loadings and resulting water quality conditions in our lakes and rivers.
6. Ohio EPA should integrate watershed management and green infrastructure planning with Ohio's nutrient reduction strategy.

The point source group's report is available online at http://www.epa.ohio.gov/portals/35/documents/point_source_workgroup_report.pdf.

Generally, point sources want to see a mass balance sheet of relative contributions of all sources. Where there is a near field impact, they are willing to go lower if demonstrated to be necessary. Regarding operational expectations, point sources can tweak operations somewhat "without concrete" (building new facilities), but this could result in violations which they will need relief from.

Dan's handout also included notes on agriculture task force and the draft nutrient strategy. The draft nutrient strategy was started during the previous administration at the behest of U.S. EPA. The current draft is on Ohio EPA's website (http://epa.ohio.gov/portals/35/documents/nutrient_reduction_strategy_framework.pdf). There will be many new materials to consider in the future versions, including the recommendations of this task force.

Discussion:

- Did group address CSO/SSO correction? Costs to correct the problem, rate payer increases?
Costs were a concern. Point sources want to be able to tell rate payers that costs are worth it. Everyone should speak up at forum. It's one thing to identify the science, another to address social aspects.
- What is being done with golf courses, which are a major source?
Some soil and water districts are working with golf courses. Also, the turf industry has established guidelines.
- In the first phosphorus task force, someone from NEORSD estimated total phosphorus in metric tons/year from CSOs (90.4 tons from CSOs – about 1% of total load). Do we know much about dissolved phosphorus loadings in CSOs? Do facilities have to collect data?
Facilities do sample, just not every outfall in every event and as total phosphorus. Not much data available for dissolved phosphorus. Total phosphorus in CSOs will be discussed at forum.

Update on seasonal running averages – Pete Richards

During the last meeting, an update of data collected since the last task force was presented. The group asked for additional analysis of tributary data, specifically from the Maumee River. See today's

presentation at http://epa.ohio.gov/Portals/35/lakeerie/ptaskforce2/Richards_2.pdf. The presentation looked at 5 years of data and ran seasonal analysis using running averages (reduces scatter; can't be higher or lower than the values it runs through), flow-weighted mean concentrations (FWMCs), and 5th order polynomials.

From an annual discharge perspective, 2011 and 2012 are similar, sort of medium compared to period of record. Annual total and dissolved phosphorus are similar. However, the loads delivered during the spring (April-June) of the two years are dramatically different:

Spring discharge	2012 is 8.2% of 2011
Spring total phosphorus	2012 is 2.5% of 2011
Spring dissolved phosphorus	2012 is 2.6% of 2011

For 1975-2012, Maumee River trends show through a 5 year running average that there was not much change in TP load. The fifth order polynomial showed DRP as an inverse bell curve. The winter total P loading increased.

Between 1978 and 1993, the DRP flow weighted mean was trending down. In 1993, the DRP started to rise. The DRP load in the winter increased between 2003 and 2012 for January through March. Recently, there may be a leveling off of DRP discharge, but it will be ten years of additional data before we know for sure.

The group discussed how seasons were defined. In this analysis, seasons were defined as simple 3-month increments, spring is April-June. NOAA uses Mar-May. Maybe Dec 1 – March 15 would better define typical spring in agricultural terms; may realistically need 2-3 periods of differing lengths, perhaps June 15 – Nov, Dec – March 1, March 1 – June 15.

Observations from slides:

- 5 year running average is a good compromise.
- FWMCs much less variable than loads.
- March – May was important this year.
- May point to need for cover crops.
- Spring discharge seems to drive HAB production.

IV – Discussion of targets for total phosphorus

- Discussion paper lays out existing targets in Great Lakes docs, and goals in recent documents.
- The binational group is looking to the LAMP and the LAMP is looking to the P Task Force to set targets.
- Whatever we do has to be based on tributaries, not open lake. DRP will be low in the lake since algae take it up.
- The 11,000 metric ton total phosphorus goal is instructive (problem has returned but that's because of change in P type).
- Lean toward a load-based target; lake was in good shape during dip, so maybe we should look to that period of time to determine goal.

- Tricky part is to back calculate from (desired response) – lake condition back to tributary loading. Need to determine internal load, point source, nonpoint source, all sources. Timing of delivery is also important to consider.
- Need to keep in mind there are two problems: algae growth and hypoxia. Hypoxia and blooms respond to loading in a different way.
- We should look at a load standard established by concentration and then deal with agricultural input.
- Internal loading will never get better until external loading is decreased.
- The mass balance approach is probably workable, but we won't have all the info and that can't keep us from acting.
- We need to recognize financial burden will be placed on people. Needs to be worth it (sacrifice is relevant to solving the problem). This points to the importance of adaptive management.
- Pete has suggested a 5-year average loading target for tributaries.
- Consider the more intense storms as a factor. Do we plan on assessing DRP during heavy storm events? We would be looking at lower concentrations but higher loads during heavy storms. Choose BMPs that are resilient to strong storms and drought.
- Mussels are thought to be a complicating factor; however, the zebra mussel effect is minimal.
- The 11,000 metric tons TP target should not be expected every year. The long-term trend would be half or below. We should look at the long-term trend for DRP, like the 5 year running total. The problem is that we would have to accumulate 5 years of data to see if we are meeting this target.
- A target should be based on a standard for DRP and acknowledge this target can't be met every year. A target should be load-based with a five year average.
- What were the loads in the 1990s when the lake was in good condition at that time? We should shoot for a target in a range of loads at the 1995 level.
- What is the goal? No more HABs?
- What concentration does it take to prevent algae? (e.g., no greater than "X" concentration)
- Does Joe DePinto's (JD) modeling work tell us anything about this? JD is part of the Eco 4 effort that is focusing on hypoxia. There also is a SWAT model (USACE) that includes runoff from land in addition to his lake models.
- We need to know what JD's assumptions about inputs are. At least for starters, he's using Heidelberg's trib data.
- If we are establishing loading target to lake, do we know enough about what's coming from upper lakes, MI, Canada?
- We need to recognize that Ohio's number won't apply to others, but we need to put forth the assumption that others will also act.
- Loadings from various sources were estimated in the Phase 1 Phosphorus task force report – p. 18.

- One benefit to working with JD is that he can provide visuals that can explain this group's reasoning.
- It would help to hear JD, but can we identify specific questions for him to answer?
- What about SPARROW model from USGS? SPARROW is land based, not lake response model.
- Who should come with JD to talk about lake response?
- Targets in LAMP are based on literature looking at trophic levels of fish.

V – Discussion of drainage management

Flow Rate

- Flow rate is the biggest issue.
 - Farmers install more tile to increase yields which are lower because of impaired soil health.
 - Topography and slope affects backwater controls and where tiles are tied in.
 - Should we address 25% of the tiled land?
 - What about wetlands installed on 25% of tile drainage?
 - The problem with wetlands is that they affect drainage 2 to 3 feet below the surface. The water needs to get to a pond or treatment area.
 - A wetland is a sink for P until it becomes saturated with P and then it becomes a source of P. Winter is the most critical time to address P and wetlands are most saturated in winter. So wetlands may not address the problem.
 - This could be addressed by cropping wetlands to take up the P over time. If cropping wetlands is allowed, farmers may be willing to cooperate. Consider rice to remove P.
 - Others have experimented by incorporating wetlands and water table management:
 - New Zealand - 75% DRP reduction
 - Sweden - 85% DRP reduction
 - Minnesota - 63% DRP reduction
 - Timeframe, incentive to landowners such as credits are drivers for landowners. Set a goal of 10-20% of crop acres to be addressed in a specified length of time.
 - We could focus on 10% of crop acres in watershed.
 - A 1987 survey indicated that 1.5 million acres of farmed land in Ohio with 37% drained. The new agriculture census asks 2 questions about drainage:
 - How many acres drained by tiles?
 - How many acres drained by artificial ditches?
- It will probably be 2013-14 before results are available.
- We need to know the real number of acres tiled. And then decide what percentage to address with drainage management structures. Possibly 25%?
 - Could be estimated by looking at poorly drained & somewhat poorly drained soils; assume 100% of poorly drained, 60-65% of somewhat poorly drained.

- Consider soil test level. There may be a problem with water quality if you hold back water until March and release nutrients in one big slug.
- There is concern about backing up water for a long time which will eliminate air on the soil profile. It may affect soil structure and aerobic biota, converting to anaerobic biota. Is water that's in a drainage structure for a long time anaerobic? Does it dump a highly concentrated "effluent"? More research is needed on this.
- We could grade the soil - Poorly drained is targeted for more good practices. Less poorly drained – needs fewer practices.
- In reality, where a particular area is drained depends on whether it is farmed by the owner or rented.

Surface blind inlets

- The blind inlets are used to control moisture. Indiana is promoting these now with cost share and a standard has been developed. Blind inlets are very beneficial to promote de-nitrification. There may not be the same benefit for P reduction.
- Open sources to blind inlets can reduce DRP by 68% and TP by 65%. Also consider soil's ability to hold water.
- Blind inlets needs separate recommendation.

Controlled traffic

- We also need to focus on controlled traffic. One year's tillage undoes all the good work. How about reducing controlled traffic by a certain percent?
- Strip till is not good to use on sloped land.

Soil health

- We should also make recommendations around soil health. The tiling is part of the solution to poor soil quality.
- What about a goal to increase organic matter by a certain percent? Or address infiltration?
- We need to encourage cover crops regardless of soil type. But it is not the whole answer in most cases The A horizon has matrix flow and the C horizon does not have matrix flow, but secondary porosity.
- We need to consider: carbon content, active root in the ground all year, soil ecology, More permeability, controlled traffic.
- It is hard to measure carbon in soil. It is easier to measure controlled traffic, strip tillage and cover crops.
- But soil analyses are an on-going effort. So soil carbon is an organic indicator. Organic carbon will not change quickly. It may take 5 years to increase carbon level. NRCS has field testing kits that could be used.
- No-till by itself is not the answer. In heavy clay soil, if it is tilled when wet, the soil becomes like a brick. All farmed acres probably contribute nutrients even if not tilled. We need to recommend changes to all the acres.
- What do you measure in soil health? – We should link management practices to influence on soil health.

- For example - Continuous no-till is better than rotational no-till for soil health. Or wider tile spacing to make up for poor soil health.
- We could specify that one needs to improve soil health by a certain % and list management options that would help achieve that goal. If achieve level of certain health, then some kind of award would be issued.
- Use index with before/after testing with reward for improving; maybe a sign, money, other reward.
- Infiltration test would be best way to measure. Depends on what the objective is. Many types of infiltration tests from simple to complex.
- Measurements using an infiltrometer are full of error and done differently. This would have to be normalized. We could use infiltration as an endpoint by tying back to management tools. Farmers could get points.
- Use infiltration as endpoint. Libby Dayton has hired student to measure aspects of soil health to look at water transport. How does that impact nutrient transport?
- The P-index may be revised once more data is available. What factors are in a soil quality index? We need to know how soil health affects infiltration and how that affects P transport.
- There is currently a demo project to give incentives to farmers for reducing their P-risk index scores.
- We need data to show controlled traffic increases yield. And then we can have yield as an endpoint. Soil health should be related to yield. Healthy soil will reduce need to add lots of nutrients. That will make a point to farmers.
- Yield and transport should be endpoints.
- Programmatic use of incentives: concentrate on tools, targets (cover crops, controlled fertilization, strip tillage), examples of soil quality.
- Tie the crop insurance subsidy to the level of using management tools. Can this be placed in the Farm Bill?
- Goals: tile structures (25%), cover crops (? %).
- Promote systems approach. A single year practice is a waste of money. There should be farm specific practices to affect change in soil over the long term. This could be win/win. We just need to get the message about the value of healthy soil out there.
- Soil tests are directly proportional to runoff. More than 80% of the load can come from 20% of the land. 40 ppm=agronomic threshold for P
- How do we reach producers who are not in cost share programs? Need to get adoption of 4 Rs.
- A respected farmer getting recognition has big impact to influence other farmers.
- Fertilizer industry working on program with retailer to gain access to former retailer would need CCA on staff.
- How many acres are in cost share in NW Ohio?
- King will send out to the group "A Simple Proposal" (Peter Nowak of Wisconsin) which focuses on watershed as a co-op. This relies on peer pressure.

- 2003-2006 CEAP- 0410 Maumee HUC unit-4.8 million total watershed acres in the Maumee (OH, IN, MI). About 72% of the watershed is drained (3.7 million acres). It doesn't say how much is systematically tiled.
- Probably easier to recommend desirable practices, relatable to operators
- NRCS fact sheets are available on aspects of soil health.

Gail will work with Joe De Pinto to bring info to next meeting.

Kevin Elder will work on the tile goal.