NOTES

Phosphorus Loading Subgroup
Thursday, January 7, 2021
10:00-12:00
Virtual Meeting

Members: Matt Diebel, Laura Good, Dale Robertson, Dick Lathrop, Paul Dearlove, Mark Riedel, Jake Vander Zanden, Greg Fries, Todd Stuntebeck, Kyle Minks

Lead/Spokesperson: Matt Diebel

Recorder: Paul Dearlove

Charge: From 12/6/19 Steering Team Notes: *"The group will focus on the biophysical side of the issue, and not social impacts. It will address questions such as: How does the system work? What kind of lake responses can we expect with different phosphorus reduction scenarios? What models and assumptions should we be using? The process will start with a system inventory and focus on the science and technical aspects of the problem. The subgroup will not get into the recommendation of specific strategies."*

Meeting Attendance: Matt Diebel, Dick Lathrop, Paul Dearlove, Kyle Minks, Dale Robertson, Laura Good, Todd Stuntebeck, Mark Riedel, Greg Fries, James Tye

Phosphorus-loading target
Is the drought-load target that was set for CLEAN 2.0 still valid, or does it need to be revised?
Consensus: The CLEAN 2.0 drought-load target is still valid (~18,000 Kg as long-term average)

- It will be a major challenge to achieve this target load as a mean, given predicted increases in precipitation. It is questionable if it is even possible.
- Baseflow load from groundwater might be able to be moved slightly lower, but it's mostly about reducing the runoff-event loads.
- While the target is ambitious, it represents an observed condition in which the lakes responded favorably.
- The role of in-lake phosphorus recycling is not currently well understood. This could be recommended as a question to address through future research.

Description of gap between current and target loading

- The gap between the current and target load is not a single number but a distribution.
- We are not getting anywhere close to the target. Do we need an interim target that is more attainable?
- We don't need to reach the target to see observable improvements. It is more of a question of what lake responses we might expect to see with mid-range load reductions.

- We can set milestones (i.e., amount of practices adopted by certain dates) to gauge progress over time. Our focus should be on the reasons we are failing to close the gap to the target. This likely includes paying more attention to when and where most of the loading is occurring to better target the source.
- It will ultimately come down to the type of practices that are available to close a sizeable gap. We've done a lot historically to address soil erosion, but our focus needs to shift to dissolved phosphorus during frozen soil conditions. How do we tackle our new challenges that relate to the type of P and timing of those loads? Increased flow and runoff volumes are masking the impacts of conservation practices. In next 5-10 years, we need to outline what is still needed from an implementation perspective to guide investments.
- Legacy P in the system can continue to mask progress. Still need to address that so we can figure out how long it might take for us to get to the target.

Description of lake conditions across range of loading scenarios

- Relating phosphorus loading to in-lake conditions is challenging given the impact of biology and lag times. This is not fully addressed in the current models.
- We should figure out a range of likely lake responses based on in-lake phosphorus concentrations that link back to loading scenarios.
- For pubic messaging, it will be more relatable if we communicate goals in terms of Secchi transparency vs. phosphorus load. It also makes sense to coordinate modeling and public messaging with Yahara WINS for consistency purposes. It will be important to show that the work being done is making a difference, even if climate change and other impacts are masking those impacts. We have evidence to support that premise.
- An effort was made to try to relate phosphorus loading to water clarity as part of CLEAN 2.0. Zebra mussel and spiny water flea grazing is a relatively new phenomenon, and we won't be able to get any better data in the next few months to evaluate its impact on clarity. It would be advisable not to complicate things by trying to do this analysis, but instead focus how we're going to close the gap to the loading target.
- It may be a good idea to make recommendations for a better lake-response model. For example, none of the updated models deal with changes in aquatic plan communities.
- Single metrics like Secchi transparency from the middle of the lake can be deceiving. This is especially true as the type of algal community changes and impacts different areas of the lake. Instead, it would be advisable to use phosphorus concentrations at fall turnover as a better metric.
- Let's use what we have, but then say what we should do if we have more time and money, like developing a better model. We will eventually need an index for conditions within shallow, near-shore areas. CLEAN 2.0 had a recommendation section that included near-shore monitoring that Clean Lakes Alliance is now addressing through its LakeForecast program.

Additional Discussion

- We should strive to give the community estimates of what kind of water quality we can get under different investment scenarios, although these estimates will always be somewhat

uncertain. We should leave it up to the community to decide how much it wants to spend to achieve various outcomes.

- One option would be to use a hotspot approach by paying 100% of the costs for projects that get implemented in those critical areas.
- Our messaging should be of progress and hope. We should put the suite of practices out there and let the policymakers decide what investments to make, focusing on solutions that address phosphorus runoff during late winter and early spring.
- Diebel presented on a tool he has been working with to identify hotspots. It involves mappling flow paths and depressions with LiDAR. It is estimated that 20-50% of the HUC-12 subwatersheds are internally drained. These areas can essentially be ignored since they are not hydrologically connected to the lakes.
- Dane County LWRD has focused a lot of its resources on the area north of Lake Mendota and relies on voluntary participation. Much of that participation is located within “hotspot” subwatersheds as determined by SWAT modeling. The County has not focused below the HUC-12 level (i.e., farm field scale) due to limited resources. There are about 18 HUC-12 subwatersheds within the larger Yahara River Watershed.

Action Items

- The subgroup will come up with a recommended research agenda to be included in CLEAN 3.0. Lathrop agreed to draft a list of outstanding research questions that should be worked on to better understand the link between changes in P loading and lake response.
- The subgroup will set the guiding frameworks for what type of action is needed to reach our target loads. This could include examples of what we might expect in terms of outcomes from different levels of investment and effort. Diebel felt this could be ready by the February Steering Team meeting.