



Date: Sept. 1, 2017

FROM: Karl Berger, Chair, Biosolids Task Force

TO: Tanya Spano Chair
Wastewater Treatment Workgroup

RE: Recommendations for Further Steps to Improve the Simulation of Biosolids Phosphorus in the Chesapeake Bay Program's Phase 6 watershed model.

As chair of the ad hoc Biosolids Task Force, I am requesting that the Wastewater Treatment Workgroup endorse the attached recommendations regarding the simulation of biosolids phosphorus in the watershed model for future consideration.

Background

The Blue Plains Users hired a consultant, Dr. Herschel Elliott of Penn State University, to advise the Chesapeake Bay Program on how to better simulate the fate and transport of phosphorus from biosolids land application in the new version 6 of the watershed model. Dr. Elliott participated in several Bay Program Modeling Workgroup meetings and interacted with the CBP modeling team. He eventually proposed three recommendations for improving the simulation, only one of whose development times was short enough to fit into the Bay Program's schedule for finalizing the first version of the Phase 6 watershed model. The other two recommendations could be incorporated in future iterations of the model.

Recommendations

1. Include a sensitivity to water-extractable phosphorus (WEP) along with the three other sensitivities the Bay Program uses to quantify the geographic variation in P loads from agriculture across the watershed. This suggestion was accepted by the Modeling Workgroup and has been incorporated into the Phase 6 model. Because biosolids tend to have low WEP levels in comparison to animal manures and fertilizers, this change should result in some change in the relative contributions of manure, fertilizer and biosolids to P loads to the Bay as simulated by the model. However, further changes are needed to fully account for the differential loss potential of biosolids P.
2. Develop a post-process Best Management Practice for P sources with high enough levels of aluminum and iron to reduce the environmental availability of their phosphorus. This change would

require the establishment of an expert panel. Currently, the Bay Program has decided the model will undergo no further changes to BMPs reduction efficiencies for at least two years. However, it is expected that new BMPs could be added thereafter without having to recalibrate the model.

3. A second possible approach for modifying the watershed model to more accurately address materials with high $[Al+Fe]/[P]$ ratios is to alter the Applied Phosphorus Loss Equation (APLE) model that the Bay Program used to quantify several of its P sensitivities. The APLE model did not consider such materials in its initial development. It is not clear, however, whether this is feasible or when it could happen.

A copy of Dr. Elliott's final report is included as an attachment.