Lag Times in the Watershed and their Influence on Chesapeake Bay Restoration

October 16-17, 2012

Annapolis, MD

Overview of the Workshop

- Nine speakers, 48 participants
  - Lag times in the CBWM and how it affects simulated loads
  - Lag times associated with sediment and attached pollutants; and with dissolved pollutants.
  - Presentations on 3 different models used to incorporate lag times – MODFLOW, SPARROW, PSU algorithms
  - Lag times as affected by landscape position, land use, and management

Three Breakout Groups

- Processes associated with the erosion, storage and re-entrainment of sediment and associated nutrients (N and/or P).
- Processes associated with transport, reaction, and storage of N and/or P in their dissolved form in soils, vegetation, shallow groundwater, and across the groundwater/surface water interface.
- Dealing with lag times in the context of regulation, enforcement, pollutant trading, and public perception.

Seven Discussion Questions

1. What new data collection, data analysis, and research is needed at the scale of individual management actions (a single BMP implementation)?

2. What new data collection, data analysis, and research is needed at the scale of river reaches, reservoirs, floodplains, wetlands, and aquifers?

3. What new approaches to modeling should be developed and/or enhanced to better understand and predict lag times?

4. Are there modifications (perhaps post processing) of existing watershed models that could adjust their results to better accommodate lag times? Would implementing these likely be worthwhile?

5. Are there some broad general statements that STAC can make to the Bay community about the typical lag times for sediment, nitrogen and phosphorus associated with broad categories of BMPs that would be applicable over the entire Bay watershed (or significant portions of the Bay watershed)? Is it even useful to try to do this?

6. Does the consideration of lag times matter to the implementation of policies such as load allocations or effluent trading? How should these policies deal with the issue of lag times?

7. What, if anything, can or should be done about improving the understanding by the public and public officials regarding lag times?

Current Status

- Each of the 3 breakout groups is currently synthesizing their notes and comments
- Notes from all 3 will be combined to emphasize commonalities and highlights within each group

A Sample of Highlighted Comments from the Discussions

- Need for an overall conceptual model of distribution, storages, and sources, as well as particle size distributions or sediment
- Monitoring needs to be organized at nested scales to better understand fate dynamics from upstream to downstream
- Better inventorying of existing BMPs; details of NM plans and MS4 permits; preferably in accessible databases

Selected Highlights (cont.)

- Importance of upper cm of soil for understanding P transport and mass balance
- Lag time not so critical for setting TMDL targets (set by estuarine model) or for WIPs (based on level of implementation); but would improve accuracy of calibration and for reality-checking implementation progress against monitoring data

Selected Highlights (cont.)

- Average distribution of ages/residence times in GW is needed
- General description of which BMPs are lag-time dependent and which are not
- Influence of lag time on nutrient trading uncertainties is likely to be huge
- Illustrations and case studies are needed to convey the nuances and importance of lag times to the public