MEMORANDUM FOR RECORD   22 October 2007
SUBJECT: Chesapeake Bay Sediment Model Review Meeting

The subject review meeting took place on 16 Oct 2007 at the U.S. EPA's Chesapeake Bay Program Office in Annapolis Maryland. It was the tenth meeting of the review group.

        Presentations were made on recent sensitivity runs made with the ROMS model on a schematic bay grid by Drs. Cerco and Kim, U.S. Army Corps ERDC, Vicksburg, Mississippi. The ROMS model refers to the combination of ROMS bed model and bed-interface flux functions developed by Dr. Larry Sanford. Central to the model is the concept that erodibility is related to the previously eroded mass (the M-parameter). Model runs were made with clay only, silt only, and sand/silt/clay mixed. Other runs varied freshwater inflow and horizontal diffusion. ROMS model results on the schematic bay grid showed problems related to the clay and silt erodibility when M was reset on a tidal time scale. The M and minimum erosion threshold values come from field experiments at sites with very soft sediments that might not be representative of the bay as a whole. Silt and clay were winnowed from the model bed in high shear stress areas until the bed was exhausted of most or all these materials. No distinctive turbidity maximum at the area of maximum salinity intrusion was seen in the model results. Instead results at the end of yearlong simulations showed turbidity maxima over lower-bay erosion zones. These maxima move land ward during simulations as the bed changed and formed large deposits to land ward.

        Some additional ROMS model results for the 57K cell bay grid showed that the surface suspended sediment concentration, and thus light attenuation, compared fairly well to observed data. The problem is that the lower water column suspended sediment concentrations in the mid-bay area are too high. Model runs apparently continue to erode substantial or all clay/silt bed mass in high shear stress areas and heap this material into low-stress depositional cells.

        The ERDC model team proposed and will pursue a SEDZLJ model alternative to the ROMS model. They argue that ROMS results are as good as they are likely to get and, to make real progress in the short time left to the study, a radical change is required. SEDZLJ is a proven model. Dr. Earl Hayter, EPA Athens Lab, has installed an advanced version of SEDZLJ into the water quality model - replacing ROMS. An earlier, less advanced version of SEDZLJ was recently installed into the model as part of a separate ERDC program and tested. Both these approaches will be followed quickly and a final model selection made in the next few weeks.

        I agree that the ROMS model has not performed well and that SEDZLJ will likely improve prospects for sediment model simulations. However, given the limited study time remaining, a huge effort will be required to implement SEDZLJ, then adjust and validate it.

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