MIDPOINT ASSESSMENT PRIORITY WORK PLAN: REVISIT WATERSHED MODEL CALIBRATION METHODS LEAD: MODELING WORKGROUP

Full Title of Priority: Revisit Watershed Model calibration methods with the goal of improving local watershed results, including revisiting regional factors. The workplan also includes activities to extend the simulation period and to revise the Airshed and WQSTMs.

High Priority, 20 votes to revisit Watershed Model calibration methods; 2 votes to extend the simulation period; 2 votes to revise Airshed and WQSTM;

Short Description of Priority: The initial prototype Phase 6 Model version essentially replicated the Phase 5.3.2 results in PQUAL. With acceptance of the initial Phase 6 Model work in March 2013, work will begin to revisit calibration methods and regional factors. Different calibration methods will be assessed for the calibration of flow, sediment, and nutrients as described in Task 4 below. One approach to improving regional factors could include 'nudging' loading/export sensitivities toward land-segment aggregate values associated with different of physiographic regions. In addition, the simulation period will be extended from 1985 to 2011. This will also allow additional flow and water quality stations to be added to the Phase 6 Model.

The work of refining the Phase 6 Prototype is separated below into six tasks.

Supporting Partners: Modeling Workgroup, CBPO Modeling Team, Watershed Technical WG, other Sector Workgroups, and Water Quality GIT

Necessary Datasets, Analyses, or Decisions: All needed datasets and analyses are available or will be developed as identified in the workplan below

Start Date: March 11, 2013

Interim Deliverables, Including Lead and Deadlines:
Task 1 – A precipitation data set for the entire Phase 6 simulation period from 1985 to 2011 will be developed, applied, and calibrated. Land use and atmo. dep. loads will need to be added for the new years.
Start Date: March 11, 2013
End Date: April 12, 2013
Key Staff: Bhatt, Yactayo, Tian

Task 2 – New calibration stations allowed by the expansion of the simulation period will be applied and calibrated.

Start Date: March 11, 2013
End Date: April 12, 2013
Key Staff: Bhatt, Yactayo, Pruzinsky

Task 3 – Assessment in the changes that are due only to the change in the hydrology calibration from steps 1-2 will be quantified and documented.

Start Date: March 11, 2013
End Date: April 12, 2013
Key Staff: Bhatt, Tian, Yactayo, Pruzinsky, Linker

Task 4 – Adjustments to the input load/export sensitivities, changes in regional factors, and other changes will be made to examine the practicality of providing a more rational approach to regional factors. One approach would be input load/export sensitivities aggregates of major physiographic regions, i.e., Coastal Plain, Piedmont, Ridge and Valley, and Appalachian Plateau. Another approach would be to expand to the TMDL basin so that the Coastal plain would be divided into three East Shore subbasins and a West Shore subbasin. Another example of subregions of the physiographic regions is shown in Figure 1. The extent of the aggregation of the land segment load/export sensitivity will be determined by the practicable approaches available. Included in this task would be adjustment of regional factors where practicable.

In addition to developing a more rational approach to regional factors other aspects will be investigated including 1) calibration approached associated with quintiles of flow, 2) new methods to calibrate PQUAL land loads, particularly groundwater nitrogen loads, to observed riverine concentrations, and 3) examining the trapping of additional reservoirs not currently simulated and perhaps even trapping efficiencies of farm ponds and other small impoundments depending on data availability, and 4) the use of SPARROW and other model system in calibration.

The work will continue on the load-export sensitivities developed in the initial Phase 6 prototype and bring in other modeling groups to the extent practicable. The calibration task is large and complex and includes new land uses and loads from the expert groups. For example the urban groups are interested in expanding urban lands to include commercial, industrial, new urban, old urban, and others.

The extended simulation period will incorporate refined Airshed Model inputs and linkage to a refined WQSTM.

Start Date: April 1, 2013
End Date: January 7, 2014
Key Staff: Bhatt, Tian, Yactayo, Pruzinsky, Shenk, Linker

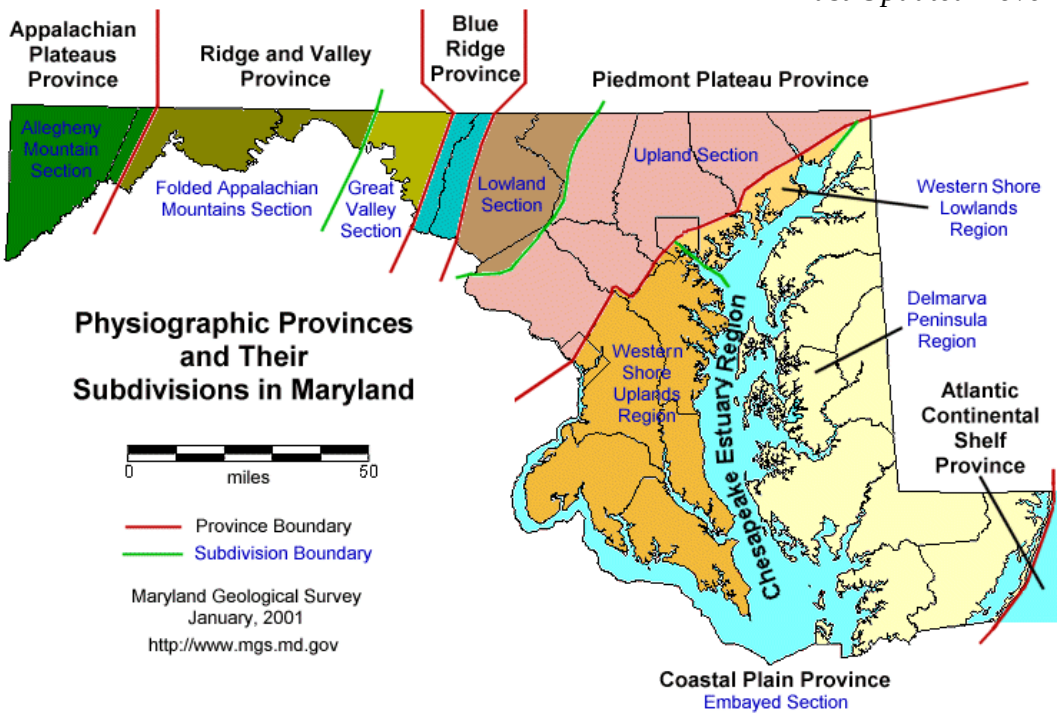

Figure 1. Physiographic regions and subregions.

Task 5 – Documentation of the input load/export sensitivities, changes in regional factors, and other changes will be completed.

Start Date: November 1, 2013
End Date: January 7, 2014
Key Staff: Bhatt, Tian, Yactayo, Pruzinsky, Linker

Task 6 – Presentation of the refined prototype Phase 6 Model for review and approval by the Modeling Workgroup (technical assessment) and the WQGIT (management assessment and implications).

Completion Date: December 2013

Level of Effort for Lead and Supporting Partners, Including (as relevant) CBPO Modeling Team: High level of effort for the CBPO Modeling Team.

Potential Conflicts with Other Priorities: The Modeling Workgroup has identified this task as a high priority.

Issues Requiring Input from Full WQGIT: Approval of the prototype Phase 6 PQUAL Model in March 2013 is required before this work can begin and approval by the WQGIT of the refinements of the Phase 6 Model by the close of 2013 is needed.

Issues Requiring Input from Management Board and/or Principals' Staff Committee: None foreseen.

Other Notes: After approval of the refined prototype Phase 6 Model in December 2013 further refinements of the Watershed Model resulting from Sector Group recommendations and refined land uses estimates will be will be an ongoing operation until refinements are completed prior to application of the Phase 6 Model for the 2017 Midpoint Assessment.

The work plan supports Guiding Principle 2.