

Refinements to the Phase 6 Prototype PQUAL Model

November 28, 2012

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 add additional years to the simulation period to extend the simulation period from 1985 to 2011. This will also allow additional flow and water quality stations to be added to the Phase 6 Model. Refinements to the Phase 6 Model prototype will include 'nudging' loading/export sensitivities toward land-segment aggregate values associated with different of physiographic regions.

The work of refining the Phase 6 Prototype can be separated into six tasks.

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:

End Date:

Key Staff: Bhatt, Shenk, Yactayo

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

Start Date:

End Date:

Key Staff:

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:

End Date:

Key Staff:

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.

Start Date:

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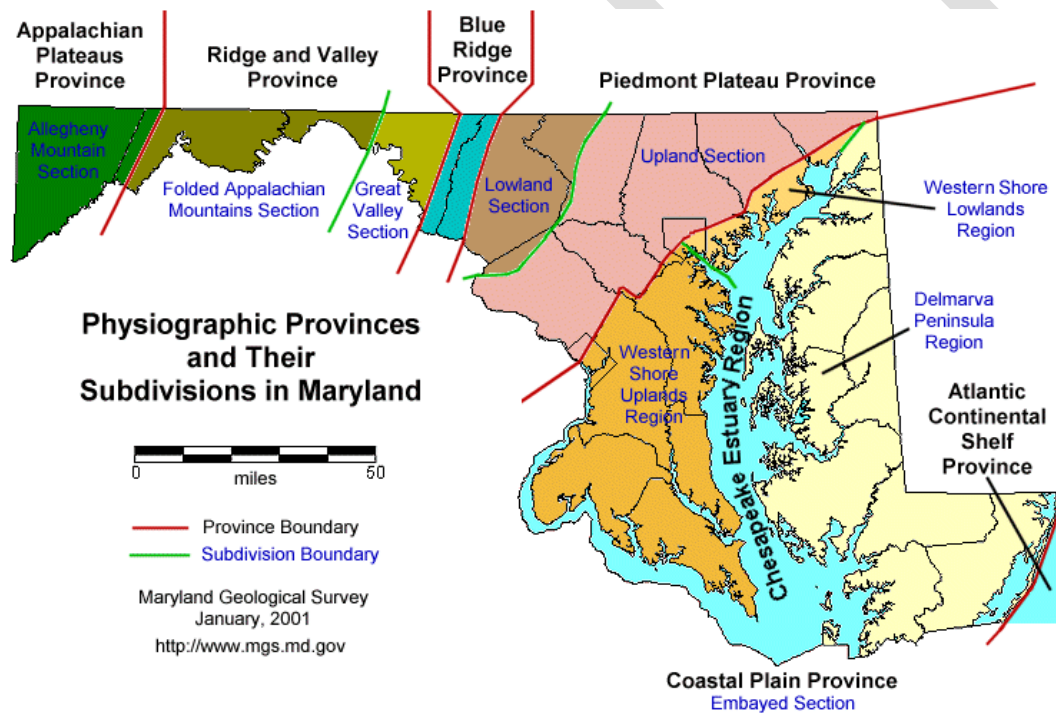


Figure 1. Physiographic regions and subregions.

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

Start Date:

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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).

End Date:

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