MIDPOINT ASSESSMENT PRIORITY WORK PLAN:
REVISE MODELING SYSTEM STRUCTURE TO AN ALL PQUAL MODEL
LEAD: MODELING WORKGROUP

Full Title of Priority: Revise watershed modeling system structure, i.e., transition to an all PQUAL model, to enhance decision support and to improve transparency, accuracy, and confidence.

High Priority, 5 votes

Short Description of Priority: The benefits of a PQUAL Model is that the calibration would be simple, fast, and precise. The Watershed Model run times would be shorter, and sensitivity to inputs would be explicitly specified, which provides clarity. The workplan for this activity has 6 separate tasks which are described below.

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

The Modeling WG is the lead for setting specific model development deadlines. Development and refinements in preparation for the implementation of the Phase 6 Watershed Model will be completed by the CBP Modeling Team. The Modeling WG, and the WQGIT will review development of the prototype Phase 6 PQAUL Model at strategic points in the development process.

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

Start Date: November 13, 2012

Interim Deliverables, Including Lead and Deadlines for the Development of the Initial Prototype Phase 6 PQUAL Model:
The initial work in the development of the Phase 6 PQUAL Model for the 2017 Midpoint Assessment is to convert the current Phase 5.3.2 Model, which is a combination of AGCHEM and PQUAL module applications, to an entirely PQUAL application. This resultant PQUAL version will be the prototype Phase 6 Watershed Model that will be further refined by the addition of simulation years, monitoring stations, and updated BMP efficiencies for application to the 2017 Midpoint Assessment.

The work is divided into four separate tasks with the overall objective of the work being to ensure the land use input load/export sensitivities are set in a reasonable manor and provide loads to the tidal Bay and state-basin loads similar to Phase 5.3.2.

Task 1 – Make a copy of the current Phase 5.3.2 Model and convert all AGCHEM modules into PQUAL modules. The existing Phase 5.3.2 remains the model to be used for assessment of the annual progress scenarios, 2-year milestones, and the 2017 Midpoint Assessment. The PQUAL copy will become the prototype Phase 6 Watershed Model.

Start Date: December 10, 2012
End Date: December 17, 2012
Key Staff: Shenk, Bhatt

Task 2 – The sensitivities of land use nutrient exports to input nutrient loading will be derived for all land uses in all land-segments. These sensitivities are essentially what CAST currently represents. The sensitivities will be calculated to match the Phase 5.3.2 AGCHEM sensitivities as closely as possible so that the first version of the PQUAL model will match Phase 5.3.2 throughout the scenarios. These will be documented into the default sensitivities that workgroups and panels can modify with additional information.

We will likely use existing scenarios as well as synthetic scenarios which would be a factor of that base scenario to get a sense of the land use input load export relationships. Also, the differences in the types of input loads including atmo dep, manure, and fertilizer load sensitivity to nutrient input and export will be examined. A start will be made with the forest land use and its sensitivity to atmo deposition and the analysis will be expanded to all the other Phase 5.3.2 land uses from there.

Care will be taken to develop a rational scale for the sensitivities. Sensitivity relationships may best be drawn along geomorphic or basin lines. In many cases the depiction of the sensitivity relationship can be a graphical description of the function, particularly with nonlinear functions, as well as a table of function values, particularly with linear or piecewise linear functions. Documentation of the input load/export sensitivities, any changes in regional factors, and other changes will be completed.

Start Date: November 13, 2012
End Date: January 14, 2013
Key Staff: Shenk, Tian, Yactayo, Linker, Bhatt

Task 3 – A library of the key scenarios will be run with the prototype Phase 6 Model to ensure that the input load/export sensitivities for the full range of scenarios appropriately match the Phase 5.3.2 Model. The key scenarios would include the low loading All Forest Condition and the high loading No Action Scenario as the 'book ends' representing the loading extremes. Key intermediate scenarios would include a selection of Progress runs from 1985 to 2010, the TMDL Allocation, and other scenarios.

Start Date: January 15, 2013
End Date: January 22, 2013
Key Staff: Shenk, Pruzinsky, Linker

Task 4 – Documentation will be prepared particularly of the functions describing the sensitivities of input loads (of TN and TP) to the export of TN or TP. The functions will be described by equations and, as appropriate, by plots. A presentation of the prototype Phase 6 Model for review and approval by the Modeling Workgroup (technical assessment) and the WQGIT (management assessment and implications) will be prepared.

End Date: March 11, 2013 WQGIT Meeting.

Completion Date: March 11, 2013

Level of Effort for Lead and Supporting Partners, Including (as relevant) 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.

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

Other Notes: This priority is directly related to Guiding Principle 2.