WQSTM Sensitivity Scenarios

Modeling Workgroup Quarterly Review
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Lew Linker, Ping Wang, Richard Tian,
and CBPO Modeling Team

Overview:

- The motivation:
  - To get an early look at simulated water quality standard sensitivity to nutrient changes.
  - To test scenario operations.
  - To become practiced in scenario operations.

- Done by a proportional change to TN, TP, and TSS loads at land-water-segment, i.e., the same degree of nutrient reduction from the base calibration of the 2010 WQSTM and the current version

- A look at changes in WQSTM nutrient load sensitivity in isolation from any changes in Watershed Model phases.

Deep Channel DO

CB Segment	State	Phase 5.3.2 Calibration 1993_1995 DO - DC	1985 Progress 1993_1995 DO - DC	2009 Progress 1993_1995 DO - DC	2010 TMDL 1993_1995 DO - DC	All Forest 1993_1995 DO - DC	G3 Base Calibration 1993_1995 DO - DC	1985 Progress 1993_1995 DO - DC	2009 Progress 1993_1995 DO - DC	2010 TMDL 1993_1995 DO - DC	All Forest 1993_1995 DO - DC
CB3MH	MD	16%	17%	7%	0%	0%	16%	17%	11%	4%	0%
CB4MH	MD	46%	49%	25%	3%	0%	46%	47%	37%	18%	0%
CB5MH	MD/VA	15%	18%	1%	0%	0%	15%	16%	8%	0%	0%
CHSMH	MD	39%	39%	34%	16%	0%	39%	39%	32%	27%	0%
POTMH	MD/VA	20%	23%	0%	0%	0%	20%	20%	6%	0%	0%
POMMH	MD	20%	23%	0%	0%	0%	20%	21%	6%	0%	0%
RPPMH	VA	19%	25%	0%	0%	0%	19%	20%	3%	0%	0%
EASMH	MD	25%	29%	15%	3%	0%	25%	26%	21%	14%	0%
PATMH	MD	25%	42%	13%	0%	0%	25%	22%	11%	0%	0%

Initial Conclusions:

• A consistent, systematic loss of sensitivity to nutrient load changes in Deep Channel DO, Deep Water DO, Open Water DO, and in James Chlorophyll water quality standards.

• Loss of nutrient change sensitivity is consistent among all segments and nutrient load changes.

• A possible cause for the loss of nutrient sensitivity are the addition of largely uncontrolled loads of nutrients from tidal shoreline erosion.

• Other causes of a loss of sensitivity to nutrient changes could be due to ocean boundary conditions or to the inclusion of G3 reactivity rates applied to a portion of watershed loads.

Next Steps:

- Understand reason(s) for decreased sensitivity:
  - Ocean boundary
  - G3 in tidal shore erosion
  - G3 in watershed loads
- Can observed nutrient sensitivity give guidance?
- Examine reactivity rates of G3. A half life of several years would be reasonable and could resolve reduced sensitivity problems.