WQSTM Sensitivity Scenarios

Modeling Workgroup Quarterly Review
August 10, 2016

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

		Phase 5.3.2 Calibration	1985 Progress	2009 Progress	2010 TMDL	All Forest	*Beta* 1 Calibration	1985 Progress	2009 Progress	2010 TMDL	All Forest	*Beta* 2 Calibration	1985 Progress	2009 Progress	2010 TMDL	All Forest
		1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995	1993_1995
CB Segm	State	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC	DO - DC
CB3MH	MD	16%	17%	7%	0%	0%	16%	17%	11%	4%	0%	16%	18%	9%	0%	0%
CB4MH	MD	46%	49%	25%	3%	0%	46%	47%	37%	18%	0%	46%	47%	33%	4%	0%
CB5MH	MD/VA	15%	18%	1%	0%	0%	15%	16%	8%	0%	0%	14%	15%	5%	0%	0%
CHSMH	MD	39%	39%	34%	16%	0%	39%	39%	32%	27%	0%	39%	39%	31%	23%	0%
POTMH	MD/VA	20%	23%	0%	0%	0%	20%	20%	6%	0%	0%	20%	21%	5%	0%	0%
POMMH	MD	20%	23%	0%	0%	0%	20%	21%	6%	0%	0%	20%	21%	5%	0%	0%
RPPMH	VA	19%	25%	0%	0%	0%	19%	20%	3%	0%	0%	19%	23%	2%	0%	0%
EASMH	MD	25%	29%	15%	3%	0%	25%	26%	21%	14%	0%	25%	26%	19%	8%	0%
PATMH	MD	25%	42%	13%	0%	0%	25%	22%	11%	0%	0%	25%	30%	12%	0%	0%

Initial Conclusions:

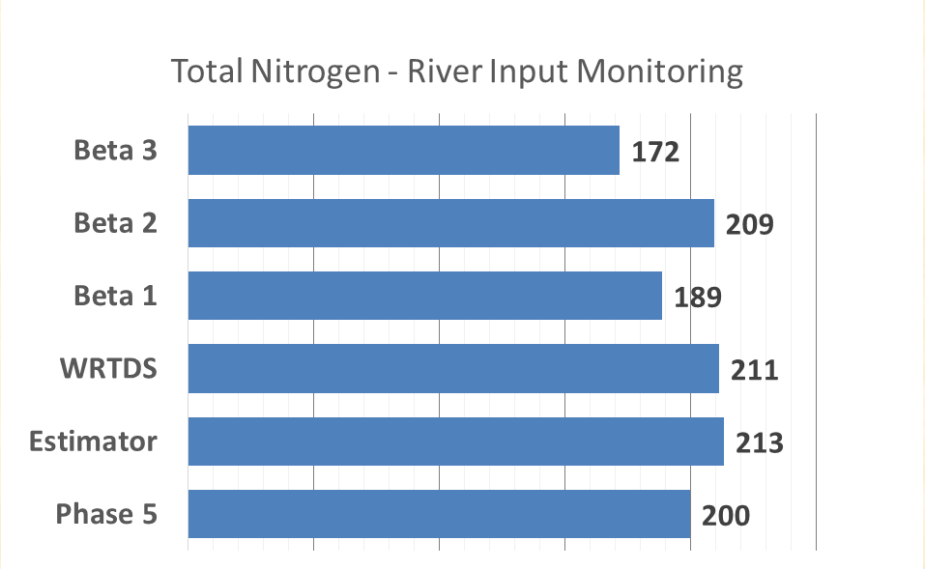
• A consistent, systematic loss of sensitivity to nutrient load changes in Deep Channel DO, Deep Water DO, Open Water DO, and in James Chlorophyll water quality standards was seen in the calibration of the WQSTM to the *Beta* 1 WSM loads. The loss of nutrient change sensitivity is consistent among all segments and nutrient load changes.

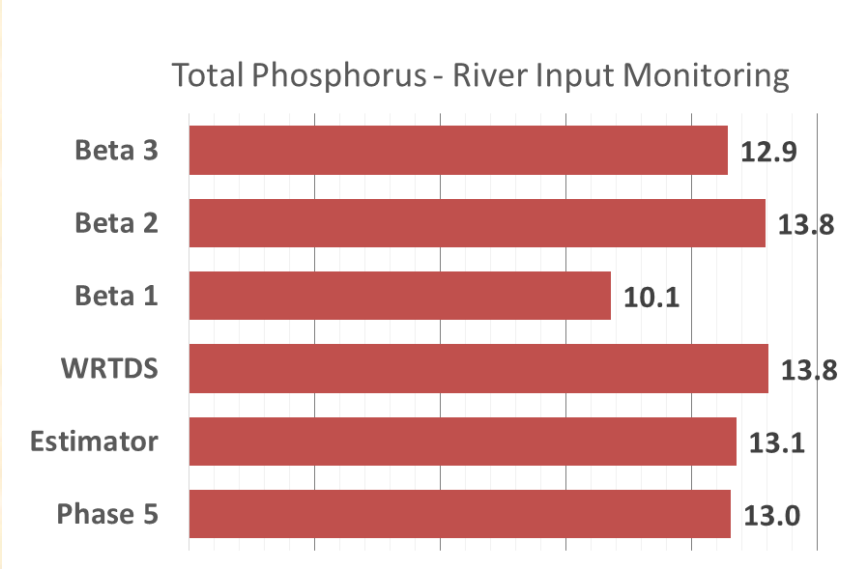
• The August WQSTM calibration to the *Beta* 2 WSM loads shows considerable improvement over the *Beta* 1WQSTM.

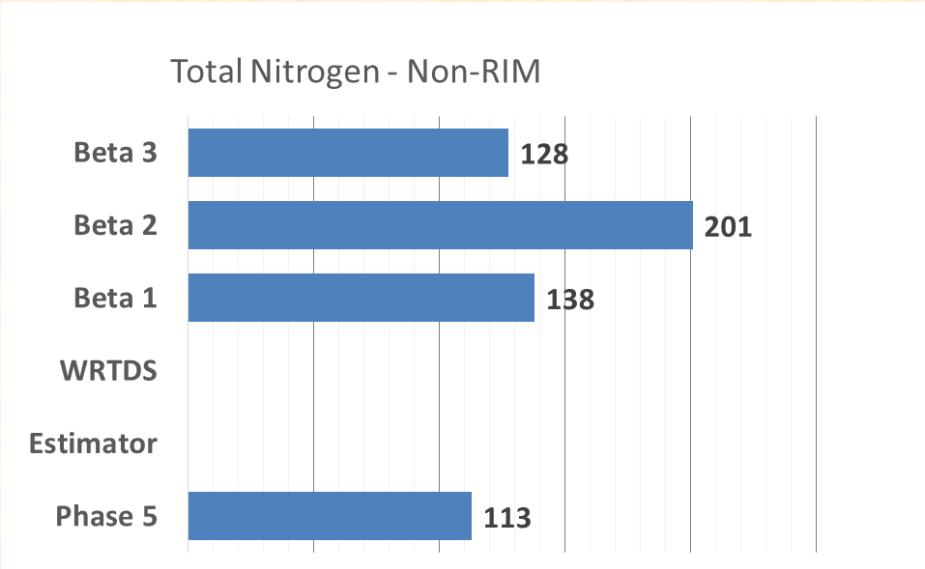
• Factors influencing the improved WQSTM sensitivity to nutrient loads are an improved WQSTM calibration and a better (lower) estimate of non-RIM (coastal plain) nutrient loads.

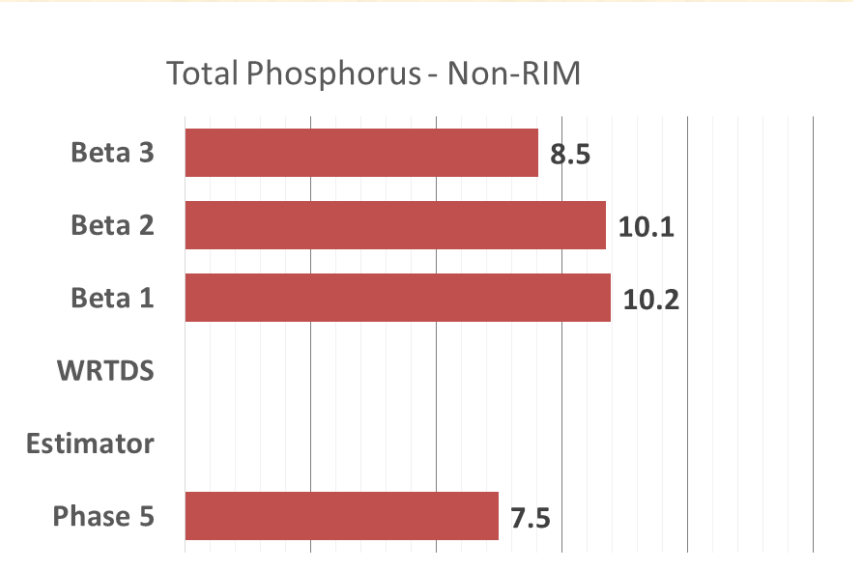
RIM and Non-RIM Loads

(in millions of pounds / year)









Next Steps:

- Apply improved *Beta* 3 estimates of coastal plain loads to calibration of WQSTM. *Beta* 3 input loads will be delivered to ERDC by August 19.
- Reexamine WQSTM sensitivity to nutrient loads in September once its recalibrated to *Beta* 3 input loads