WQSTM Assessment over the 92 TMDL Segments

Richard Tian, Ping Wang, Lewis Linker

Modeling Working Group Conference Call

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Approach

- **Earlier look at an earlier version Beta 4.**
- **Based on designated uses in each segment.**
- **Comprehensive comparison between observation and model prediction over all stations and depths.**
- **In total over 1000 stations.**
- **DO data: 752,890; CL: 222,158; KD: 54,308; TN: 244,758; TP: 249,900; TSS: 260,967.**
- **Model runs P532 and Beta 4 from 1991-2000.**

Method

Follow Guido Yactayo and Carl Cerco's work.

Correlation coefficient (r) $r = \frac{cov(x,y)}{sd(x)sd(y)}$

Percent bias: $PBIAS = 100\frac{\sum_{i=1}^{N}(S_i - O_i)}{\sum_{i=1}^{N} O_i}$

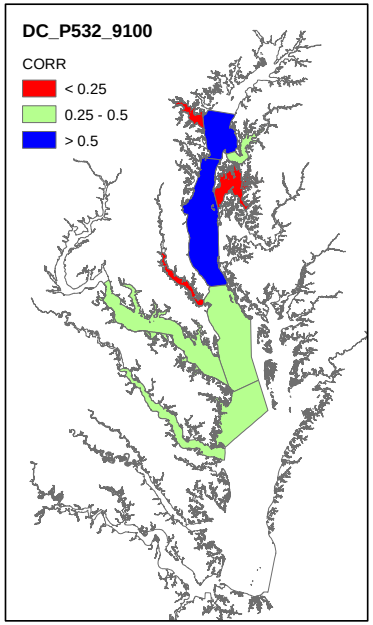
DO comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation in Deep Channel

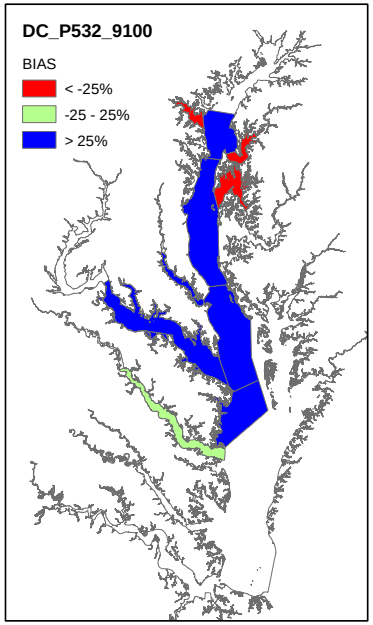
(1) CB3 and CB4 were better simulated in P532.
(2) Improvement for CB5 and Patuxent.
(3) Problem segments persist: Patapsco R. and Eastern Bay.

R

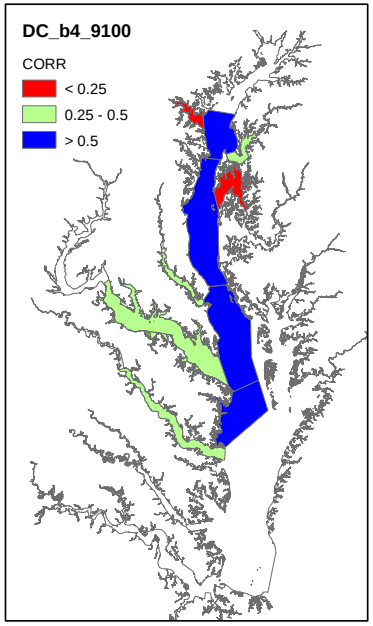
Bias%

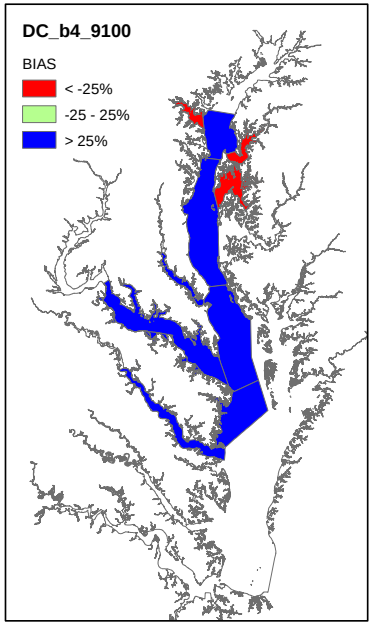
P532





Beta4





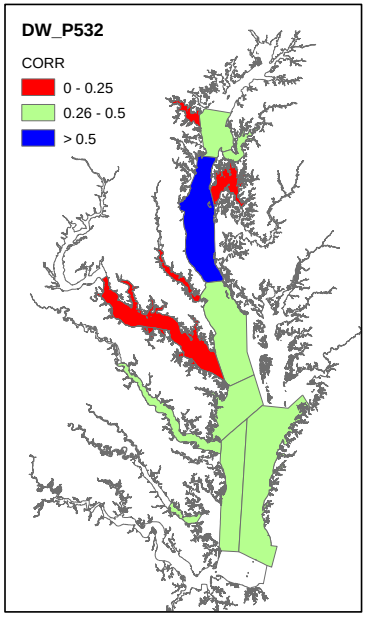
DO comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation in Deep Water

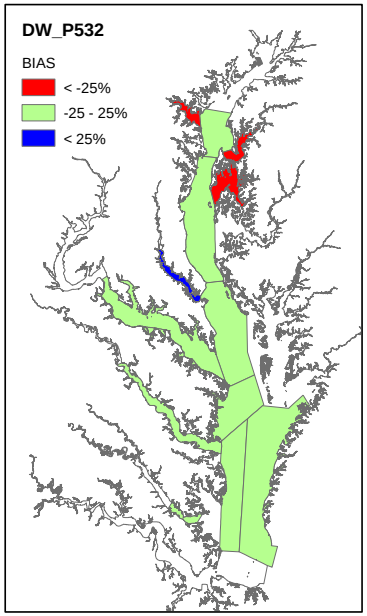
(1) CB4 were better simulated in both versions.
(2) Improvement in Patapsco and Patuxent R.
(3) Eastern Bay and Potomac R have low R in both models.
(4) Beta 4 bias is higher in the main stem than P532.

R

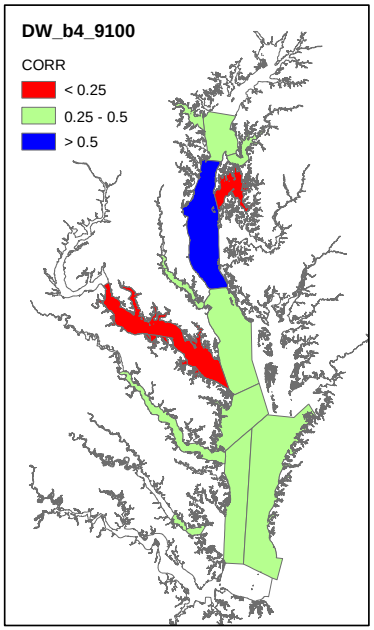
Bias%

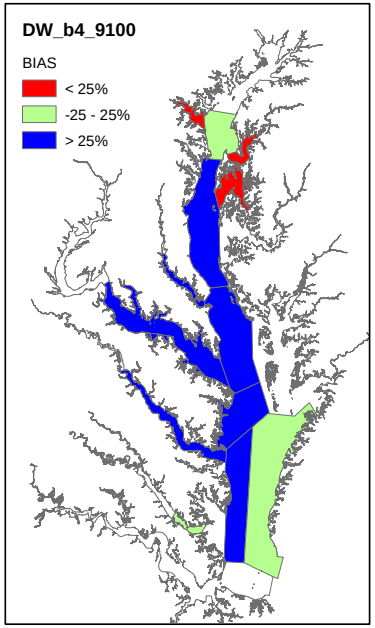
P532





Beta4





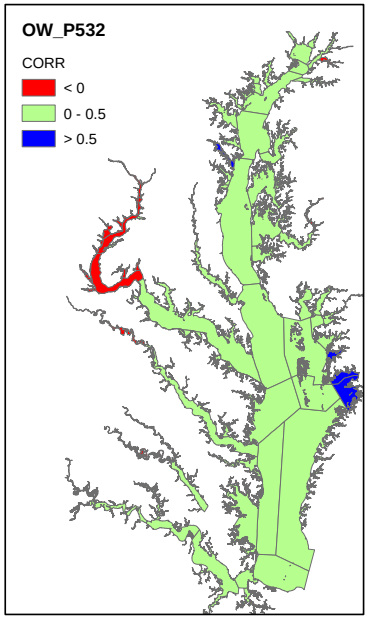
DO comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation in Open Water

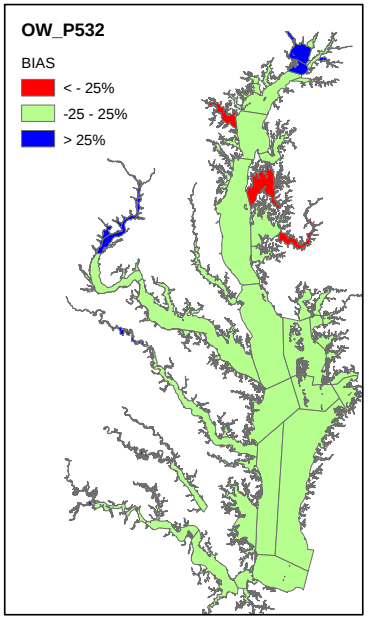
(1) Quite similar between the two versions of the model.
(2) Potomac Oligohaline has lower R in both versions.
(3) CB1 and CB2 have relative higher bias for both versions of the model.

R

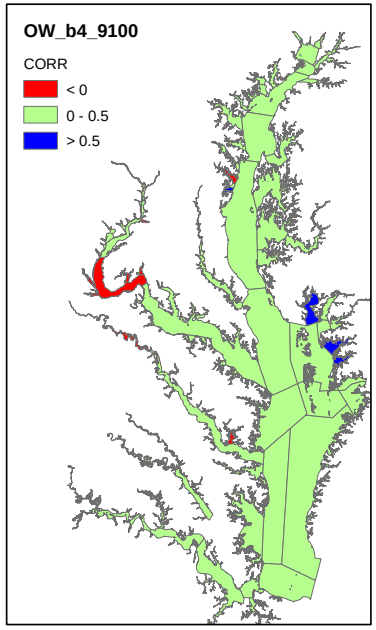
Bias%

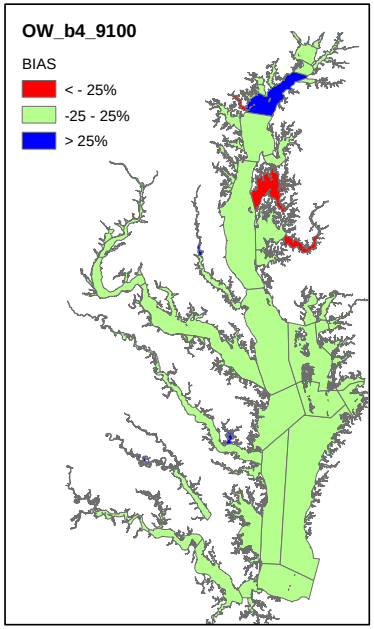
P532





Beta4



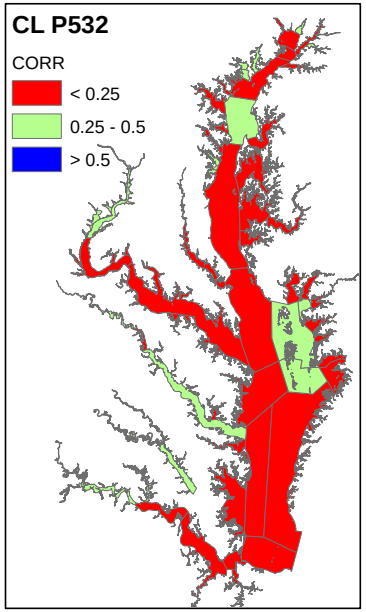


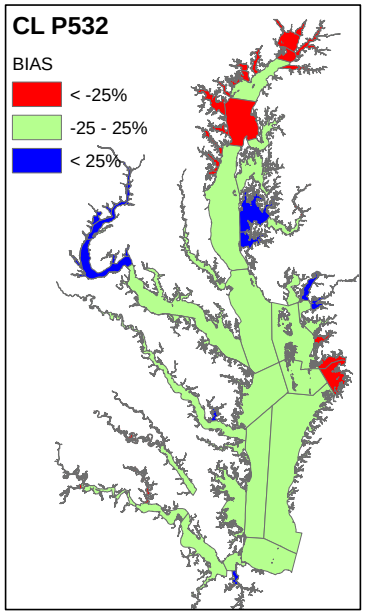
Chl comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation

R

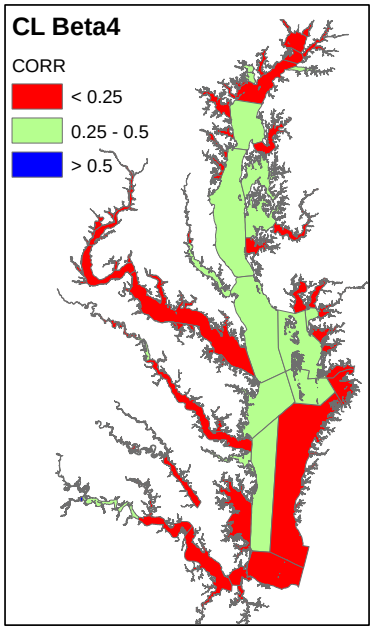
Bias%

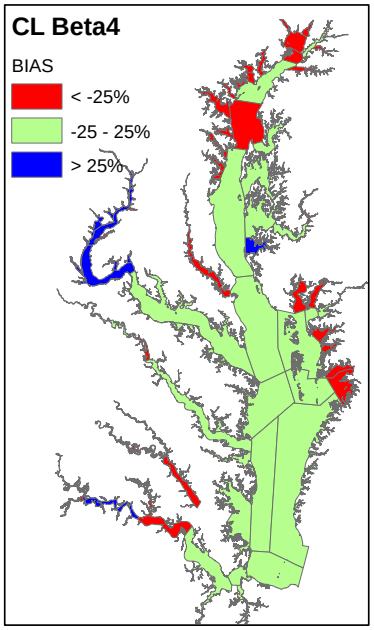
P532





Beta4





(1) R is not great for CHL
(2) But improvement in the main stem.
(3) High bias segments persist.

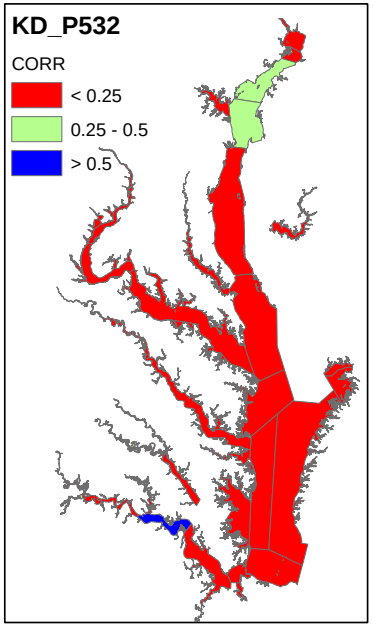
KD comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation

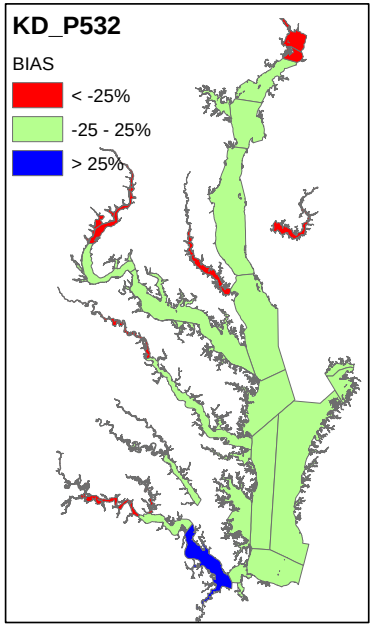
(1) R is not great for KD in P532
(2) But improvement in the main stem and certain tributaries.

R

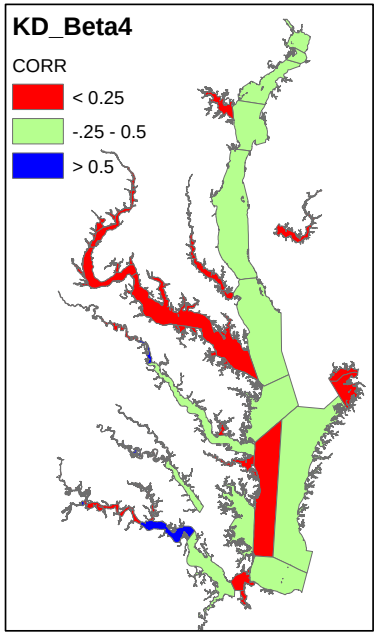
Bias%

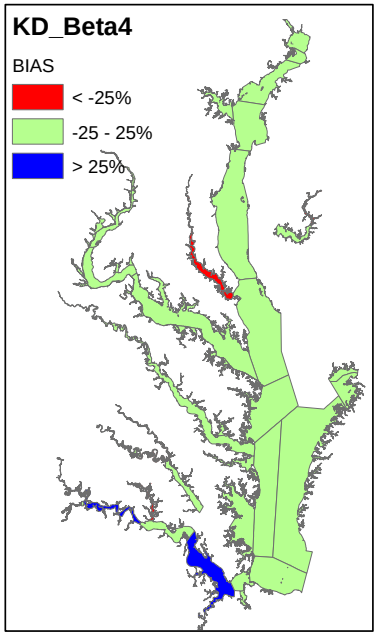
P532





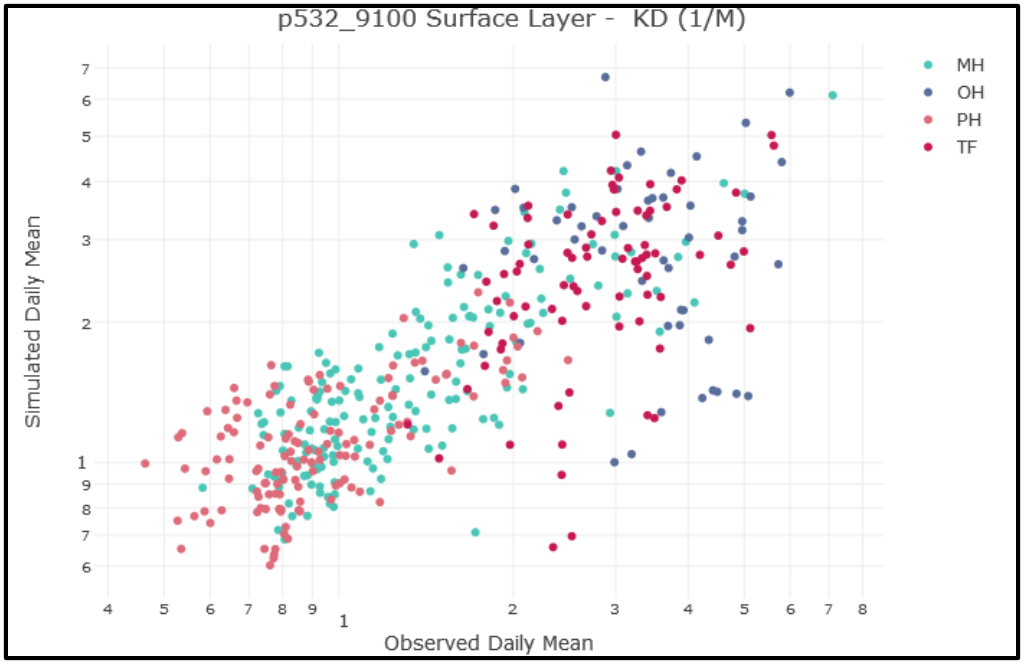
Beta4



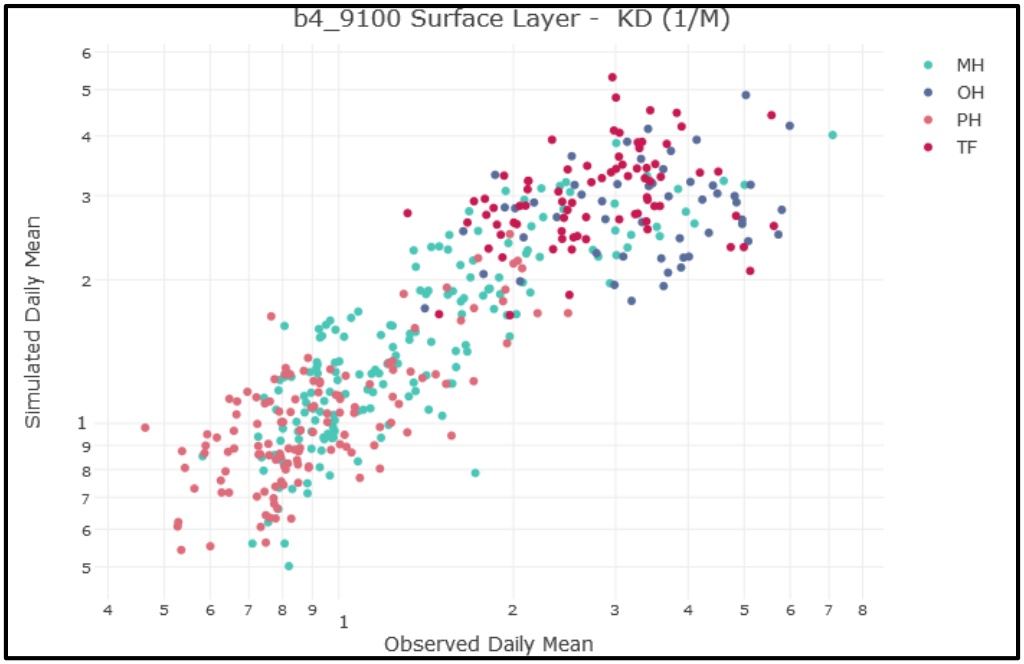


KD scatter plot

P532



Beta 4



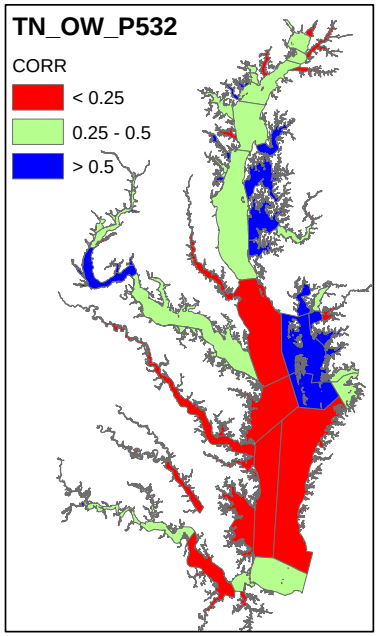
TN comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation in open water

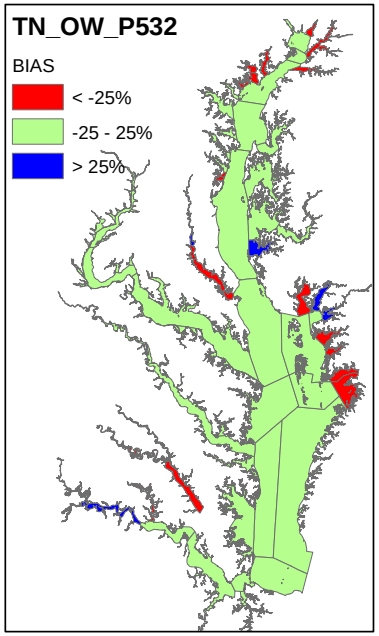
Beta 4 less good than P532 in terms of R and percent bias in the surface layer of certain segment.

R

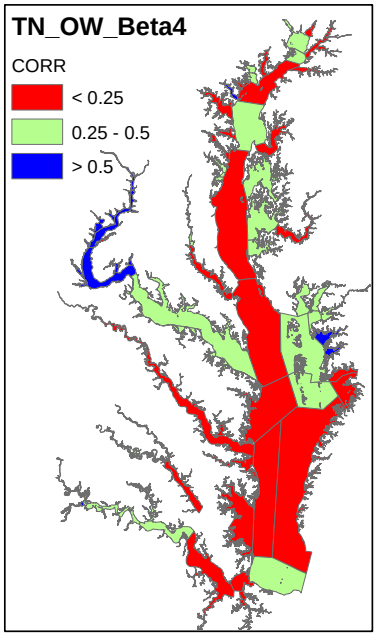
Bias%

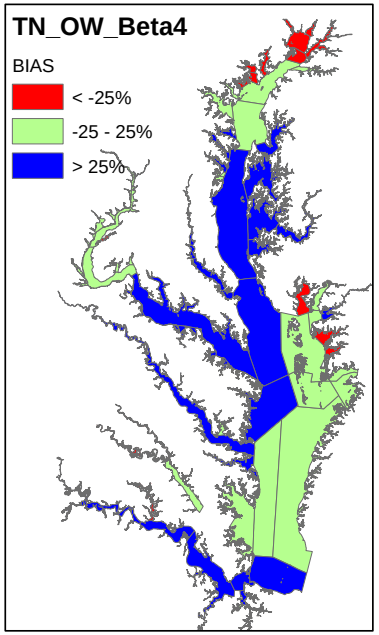
P532





Beta4





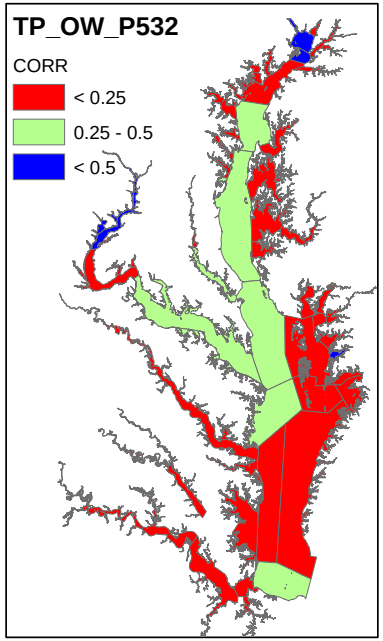
TP comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation in open water

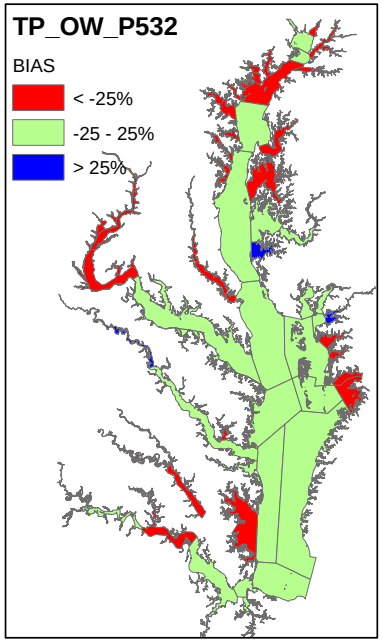
Similarity prevails between the two versions; Bias slightly higher in CB4 in Beta 4 than in the P532 simulation..

R

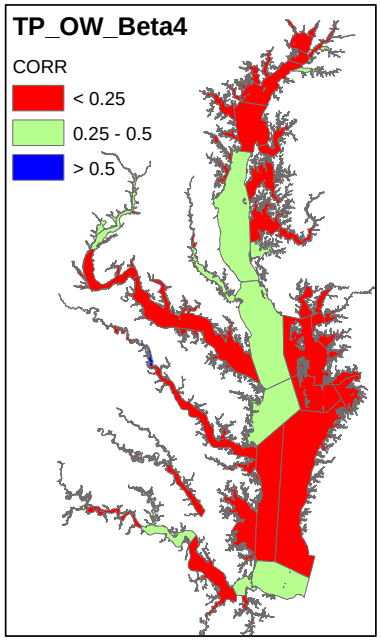
Bias%

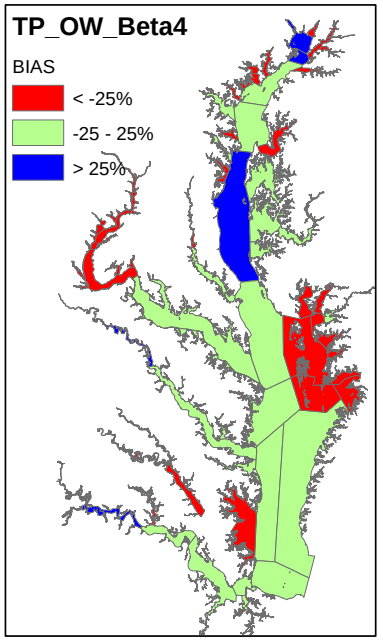
P532





Beta4





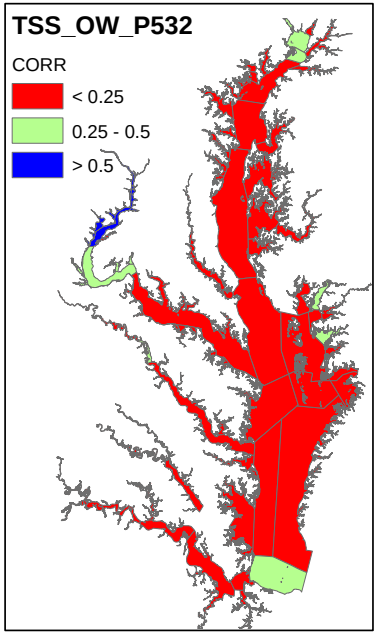
TSS comparison between P532 and Beta 4 in terms of R and relative bias between data and simulation in open water

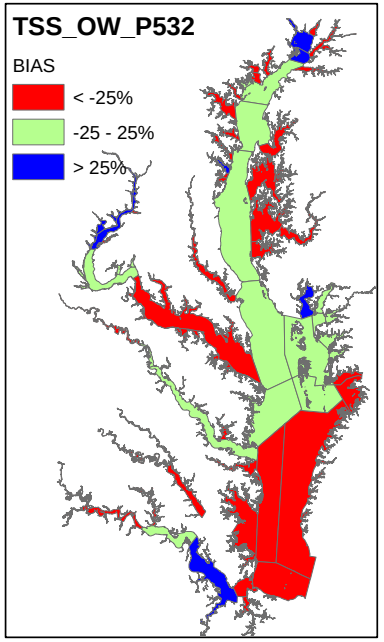
R is not great, but slightly improved in Beta 4 in the main stem.

R

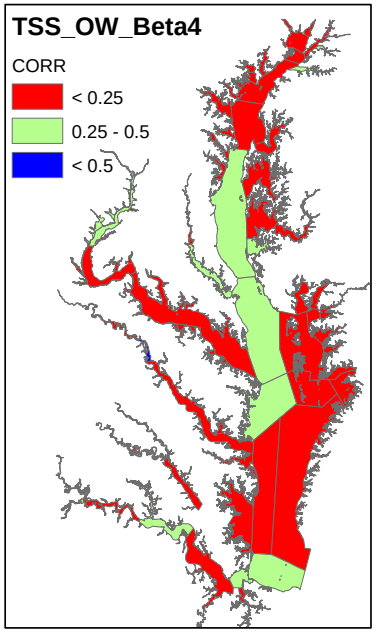
Bias%

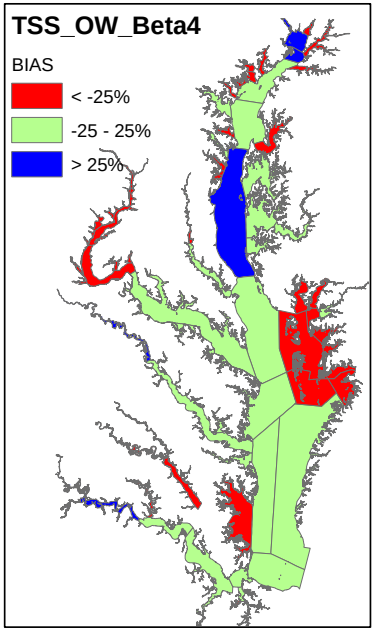
P532





Beta4





Messages

- **In general, beta 4 is as good as or better than P532.**
- **Reminder: The beauty of the Bay Program in applying the WQSTM is that the relative changes are used in the scenarios and not the absolute values.**