Analysis of Relative Estuarine Effectiveness

Modeling Workgroup Quarterly Review
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Science, Restoration, Partnership

Overview:

- The relative estuarine effectiveness assessment evaluates the effects of both riverine transport (location of the discharge/runoff loading in the watershed) and estuarine transport (the location of the discharge/runoff loading to the tidal Bay).
- In the 2010 geo runs we used a base of the E3 Scenario and split the Potomac into above fall line (AFL) and below fall line (BFL).

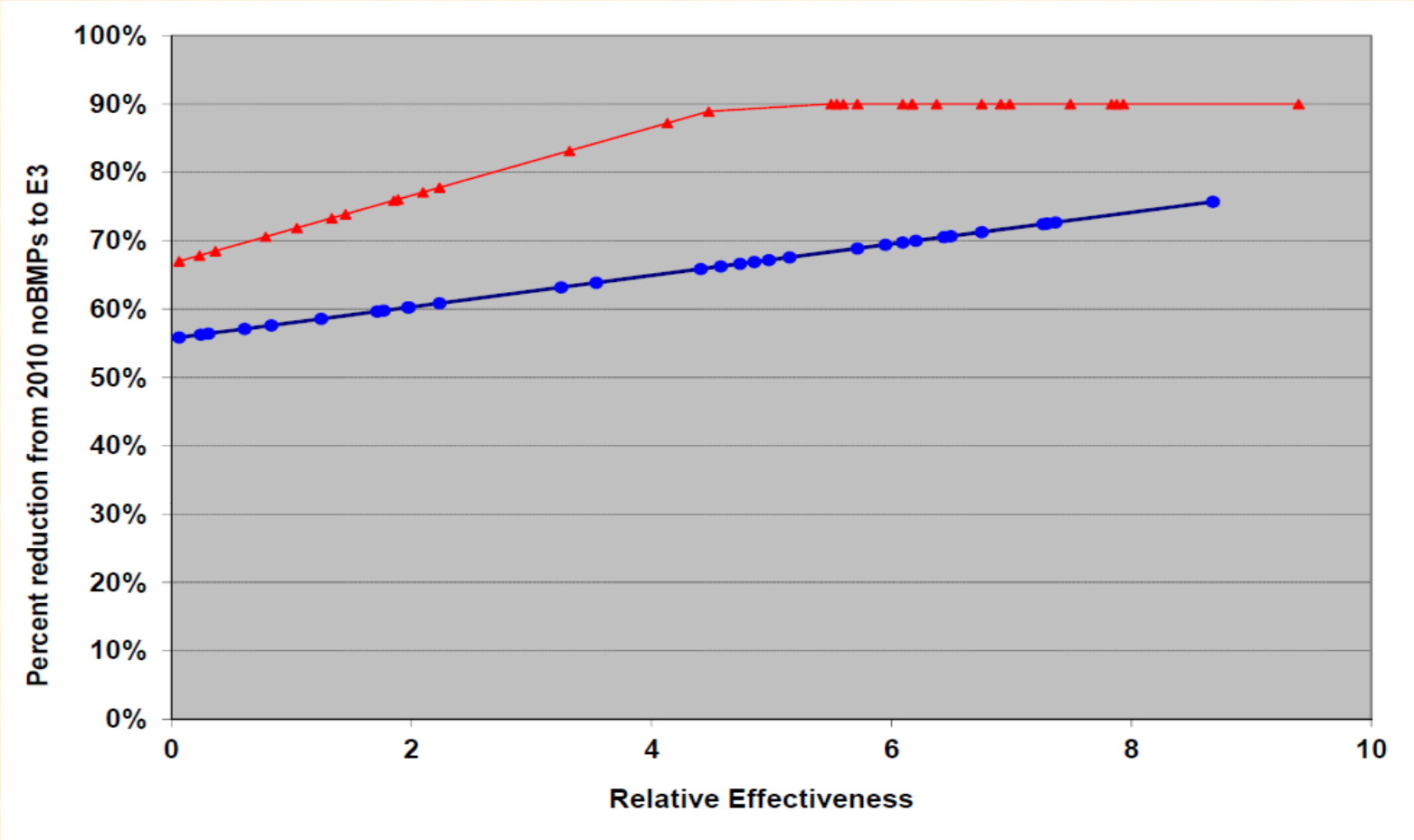
Overview:

• For the current test round of the geo runs the E3 Scenario (based on the proportional E3 Phase 5.3.2 run) is first used to run the AFL and BFL Potomac for TN & TP as before. Then a separate run of the Tidal Fresh BFL Potomac and everything else in the BFL other than the tidal fresh is done.

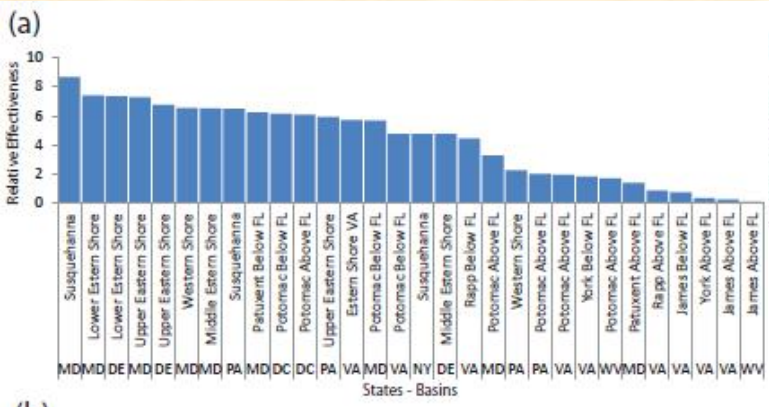
• Also, in the 2010 geo runs the West Shore Basin was assessed as a single unit, but the West Shore straddles four CB segments. Therefore, as a test the West Shore is split into the four main Bay CB segments.

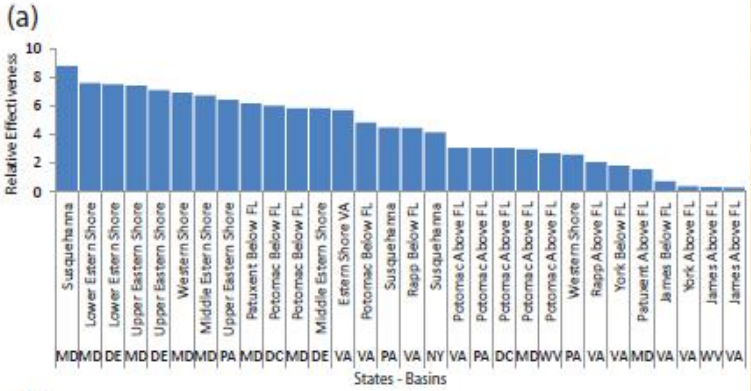
Georuns as completed in 2010:

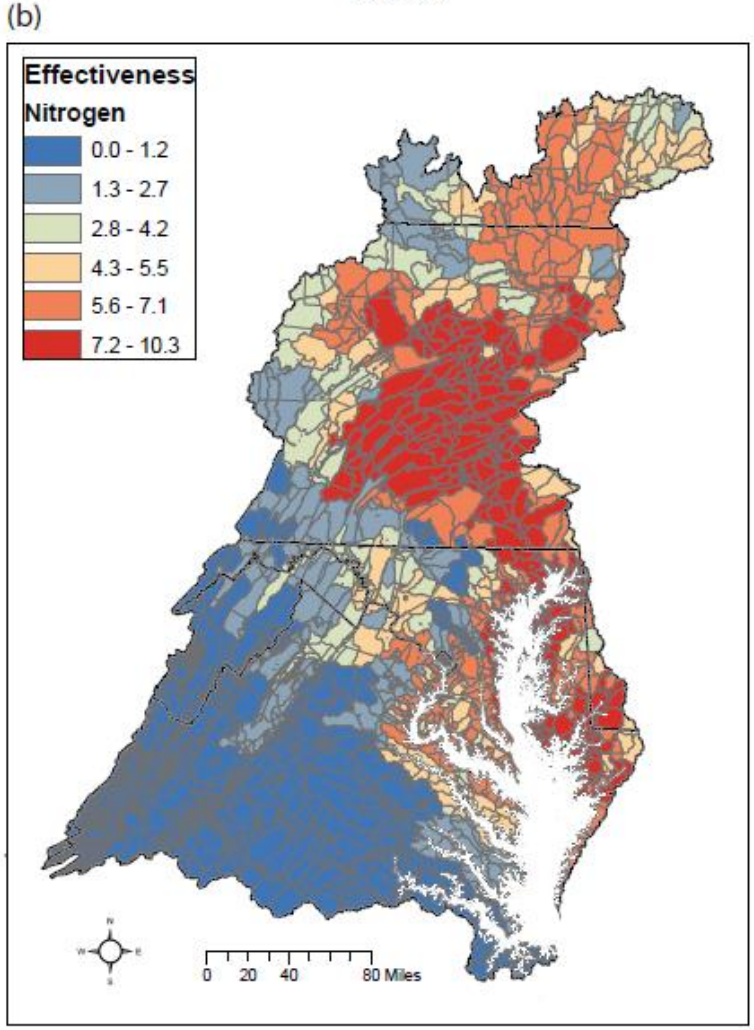
Allocation methodology example showing the straight line reduction approaches to all loads other than point sources (bottom blue line with circle symbols) and the two-piece linear approach, to point source nitrogen (top red line with triangle symbols). Each of the circles or triangles represents a particular basin jurisdiction.

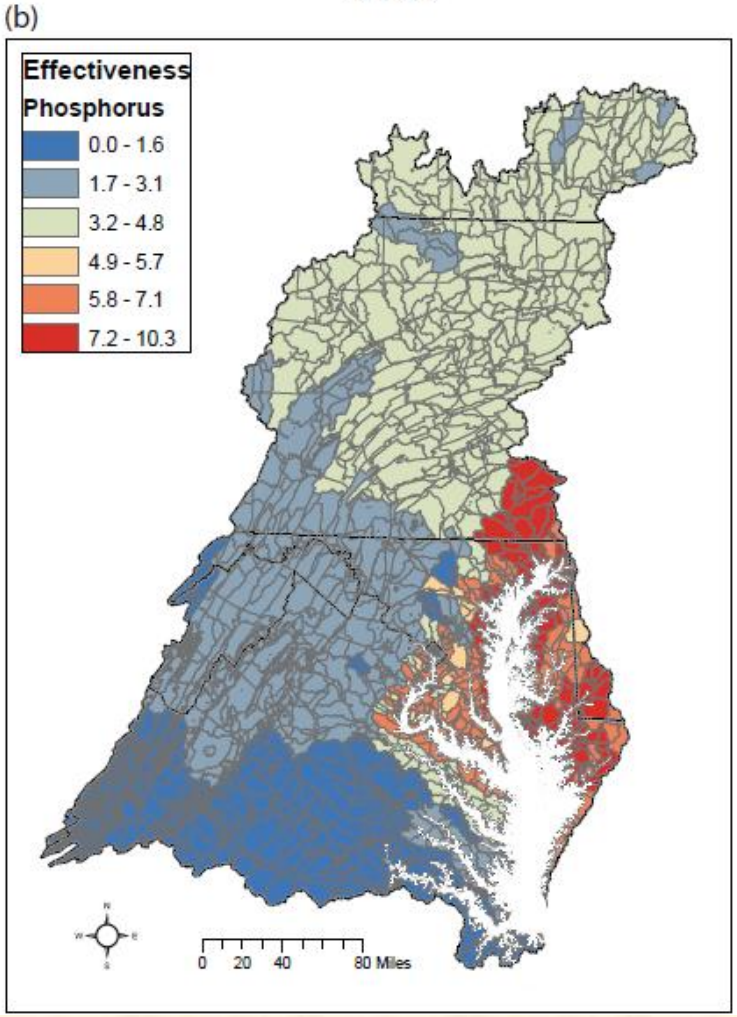


(a) Relative effectiveness for nitrogen aggregated up to the level of the major jurisdiction basins in descending order and (b) relative effectiveness for all the land-river-segments to nitrogen loading. Units are the change in ug/L DO per 454,000 kg nitrogen load (as N).

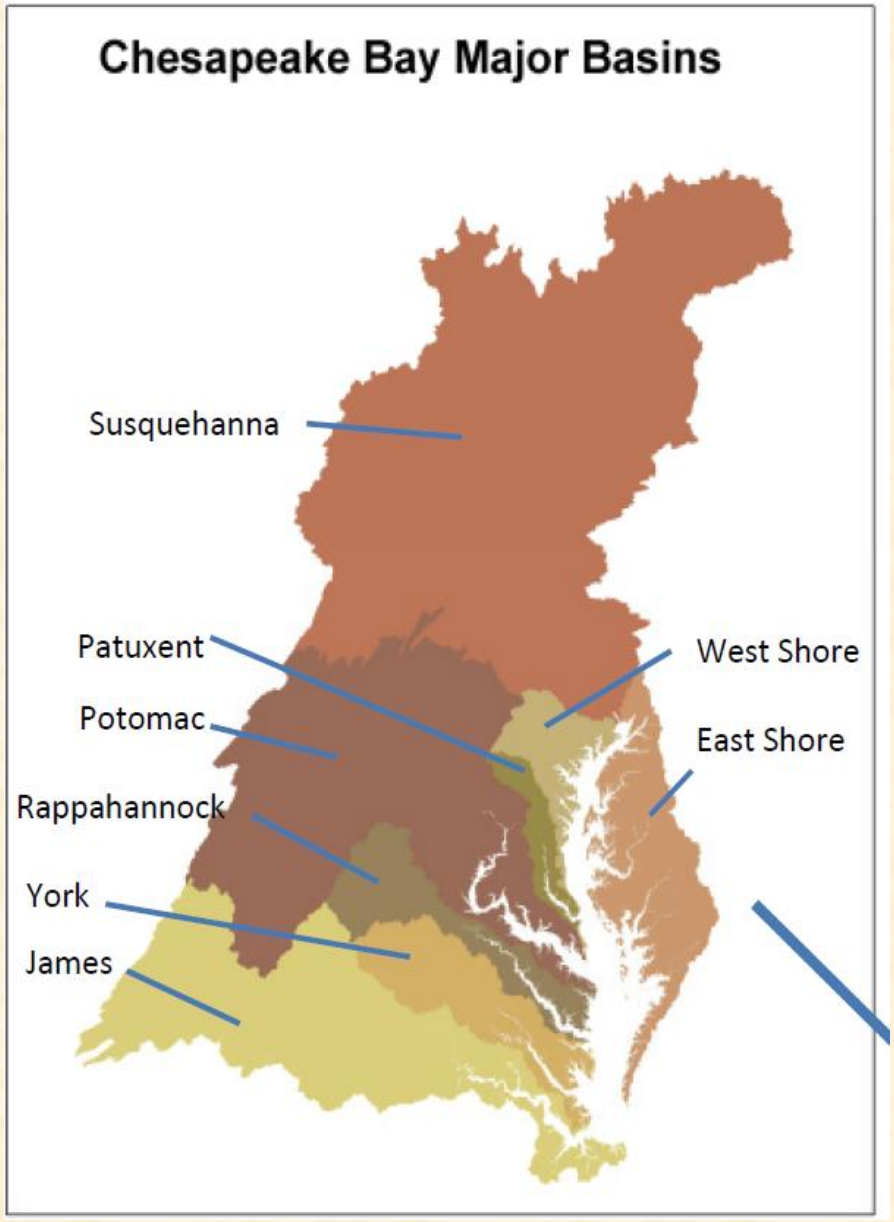


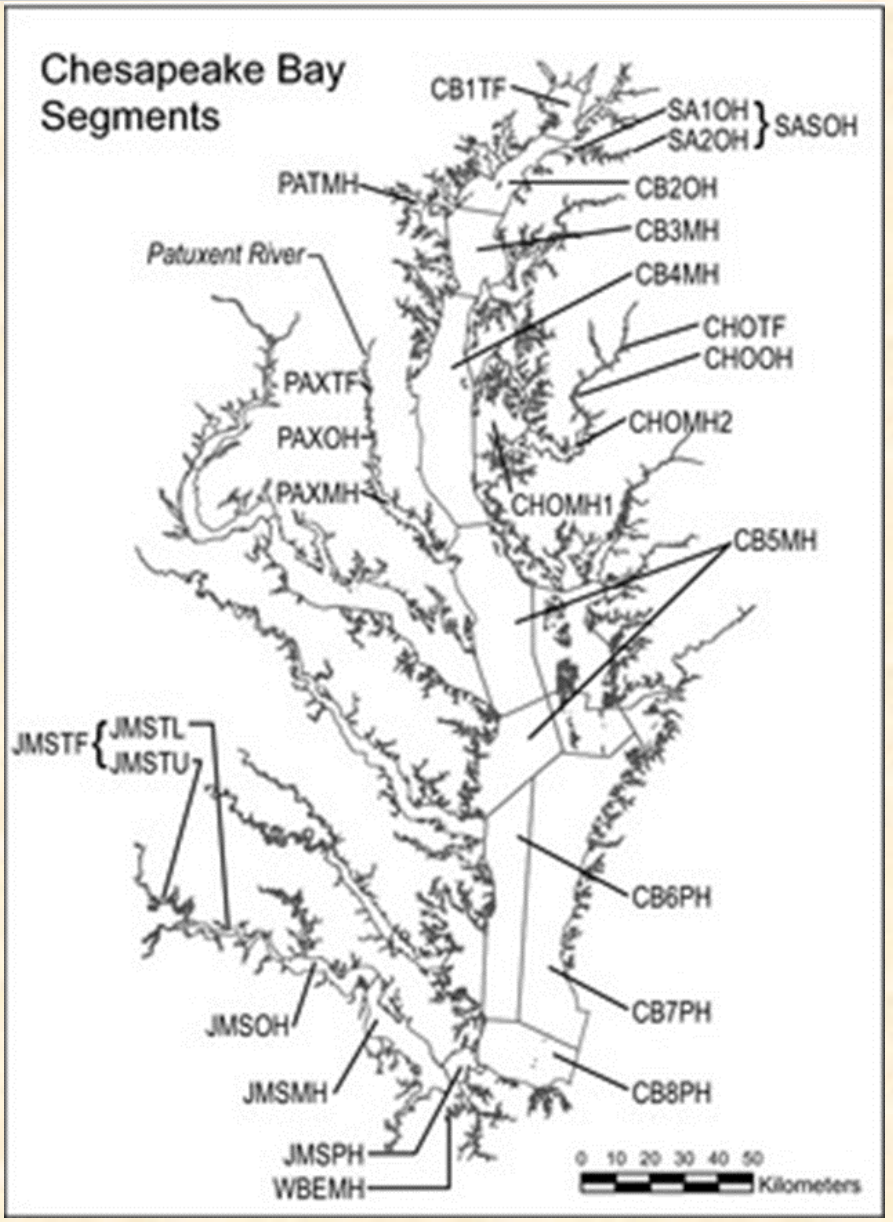


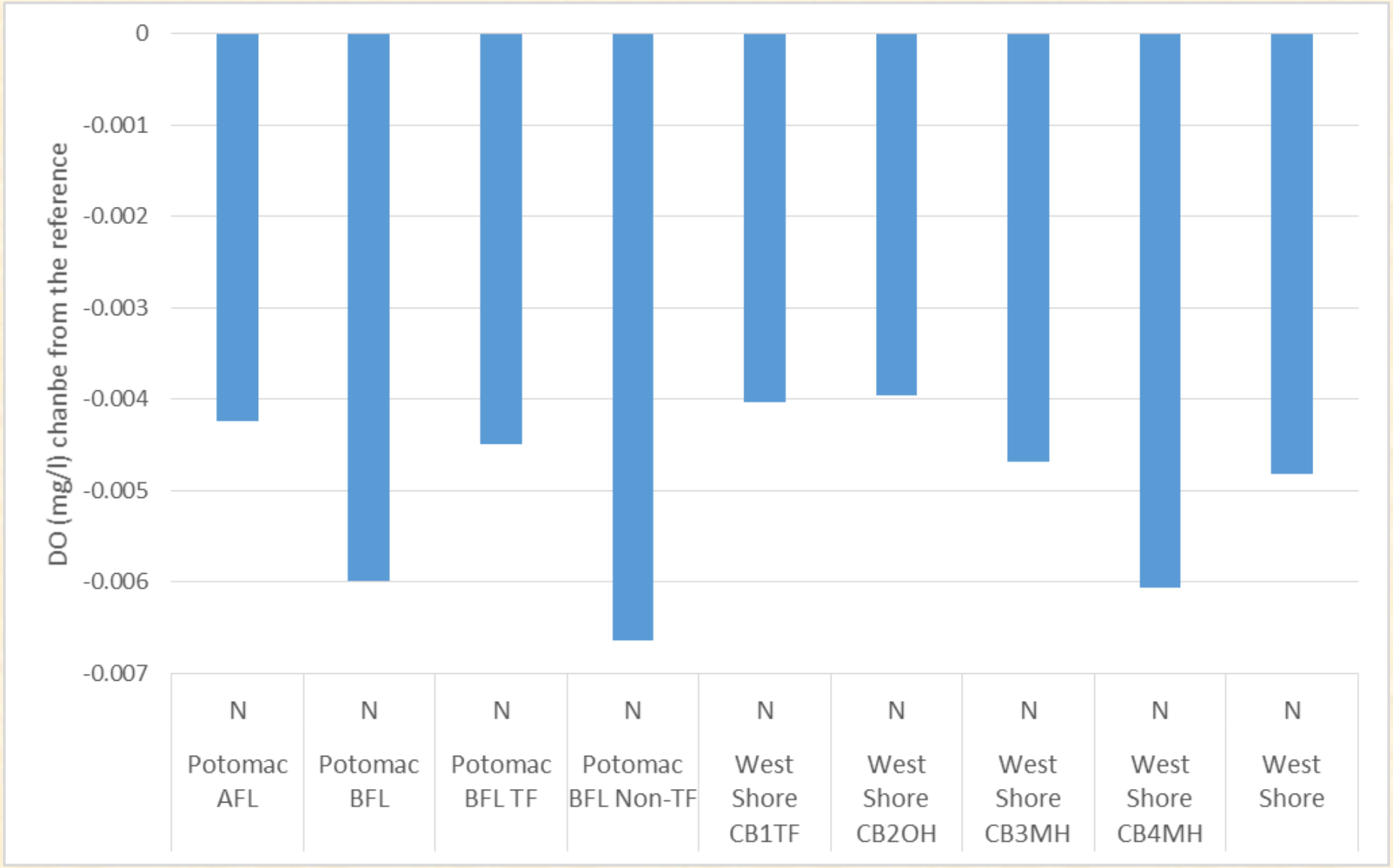




Georuns as completed in 2010:



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-0.006
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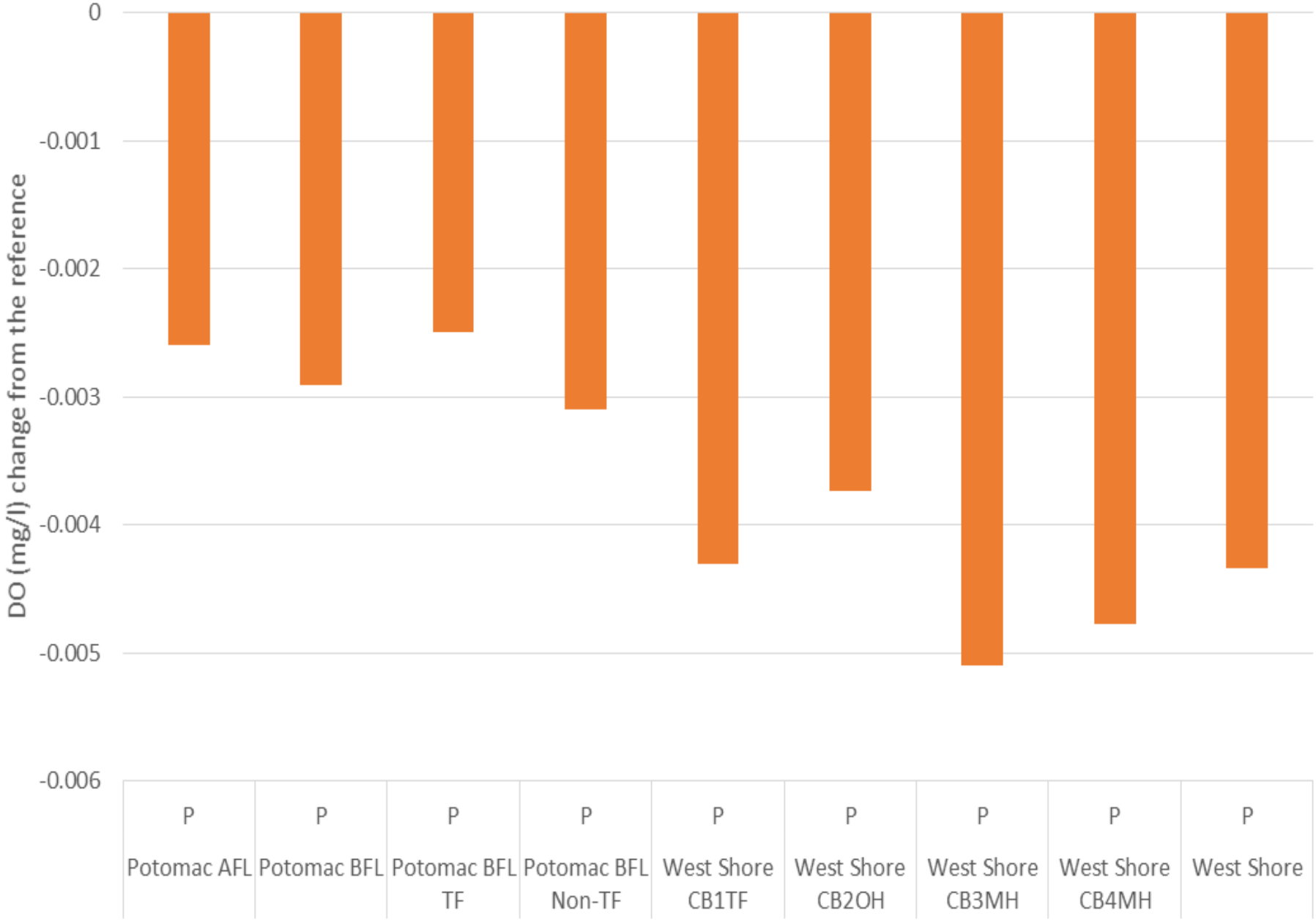
DO (mg/l) chanbe from the reference
N
Potomac AFL
N
Potomac BFL
N
Potomac BFL TF
N
Potomac BFL Non-TF
N
West Shore CB1TF
N
West Shore CB2OH
N
West Shore CB3MH
N
West Shore CB4MH
N
West Shore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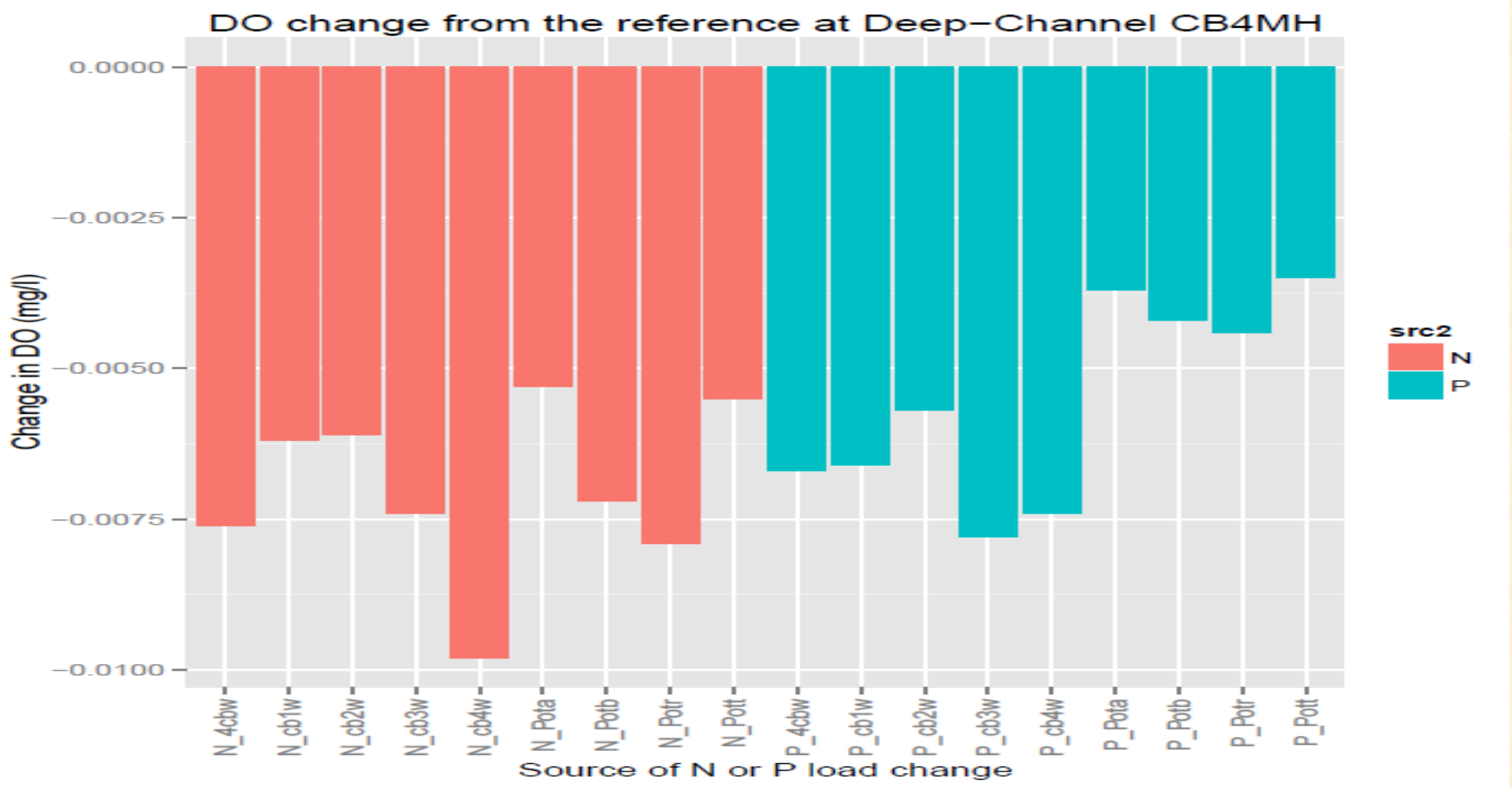
Potomac BFL
P
Potomac BFL TF
P
Potomac BFL Non-TF
P
West Shore CB1TF
P
West Shore CB2OH
P
West Shore CB3MH
P
West Shore CB4MH
P
West Shore

Initial Conclusions:

- The finer scale of the relative estuarine effectiveness scenarios makes a difference.
- The increase of AFL, TF-BFL, and rest of BFL for major rivers of the James, York Mattaponi and Pamunkey tidal fresh), Rappahannock, Potomac, and Patuxent will result in 22 relative estuarine effectiveness scenarios to cover nitrogen and phosphorus as opposed to the 10 runs made in 2010 to cover the major western tributaries.
- Using the major main Bay CB segments of CB1TF - CB5MH/ Tangier Sound will increase West Shore and East Shore relative estuarine effectiveness scenarios from 1 and 4 in 2010 to 4 and 6 respectively.
- The proposed increase in relative estuarine effectiveness scenarios is manageable in the timeframe available (till April 2017).

Compare 2010 Potomac Geo Run with new Potomac geo runs using 2010 AFL BLF & 2016 AFL, TF, and BFL non TF



Compare 2010 W. Shore Geo Run with new W. Shore geo runs