Status of Conowingo Infill and Climate Change WQSTM Scenarios

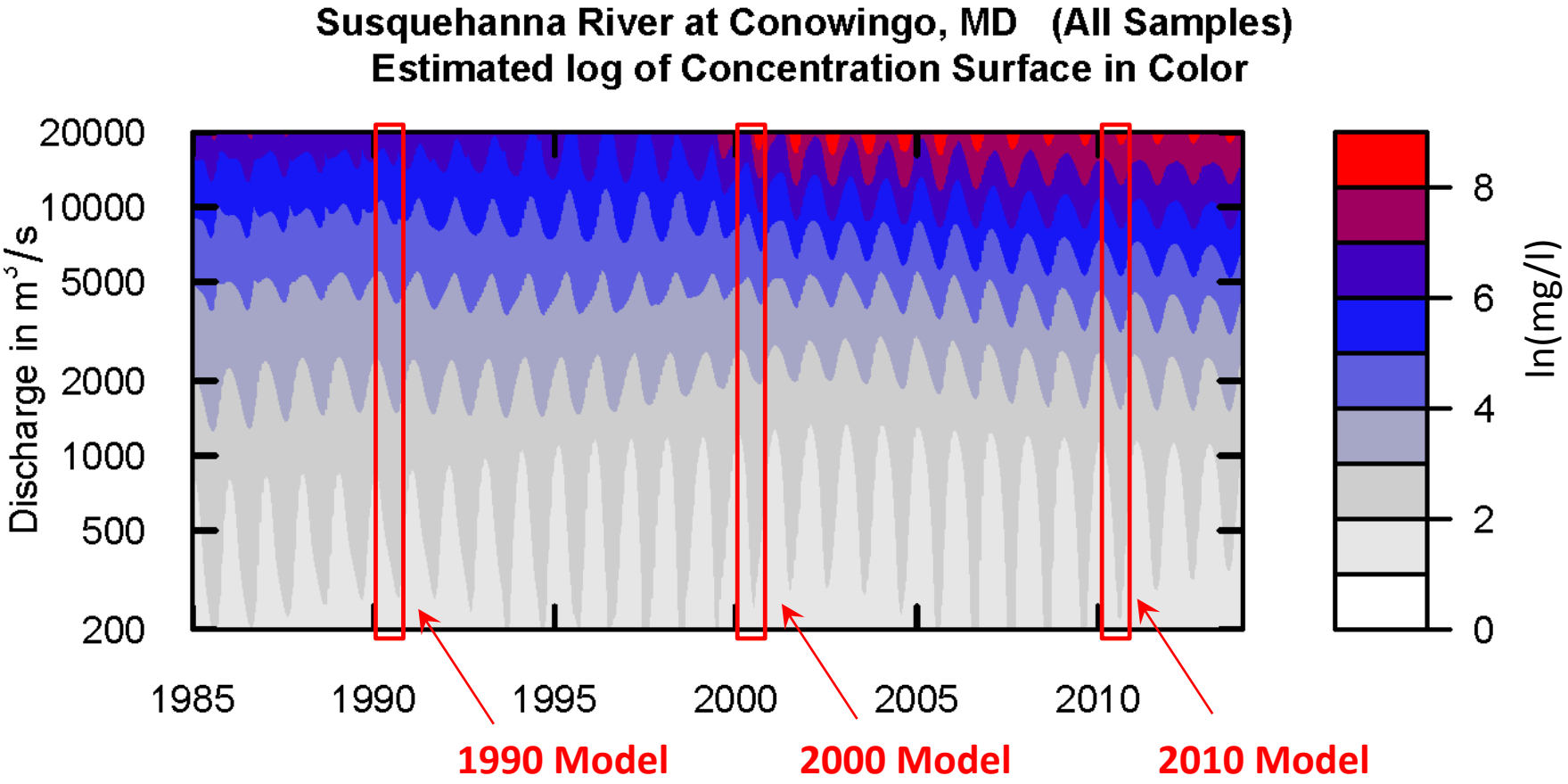
Modeling Workgroup Quarterly Review
October 13, 2016

Lew Linker and the
CBPO Modeling Team

Stationary Model of Conowingo: an analysis using WRTDS

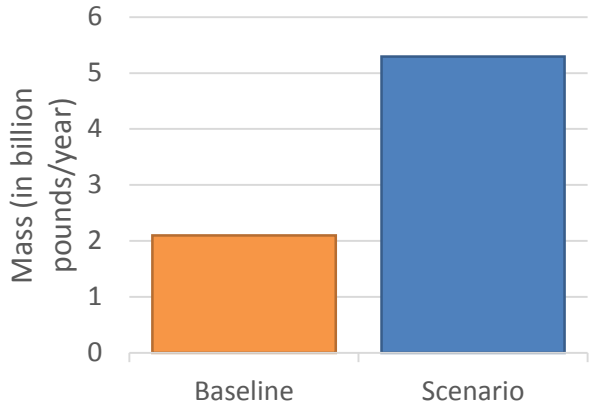
Qian Zhang

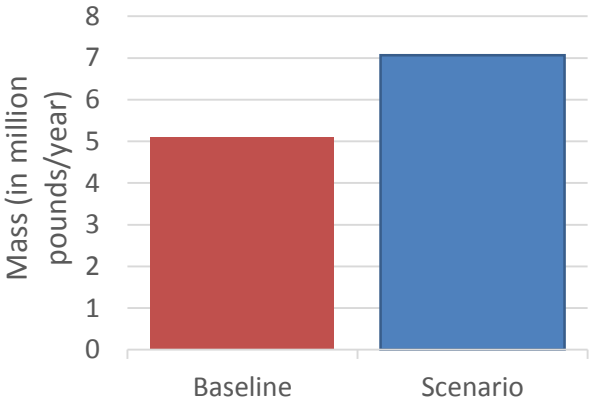
- Stationary WRTDS concentration surfaces were developed:



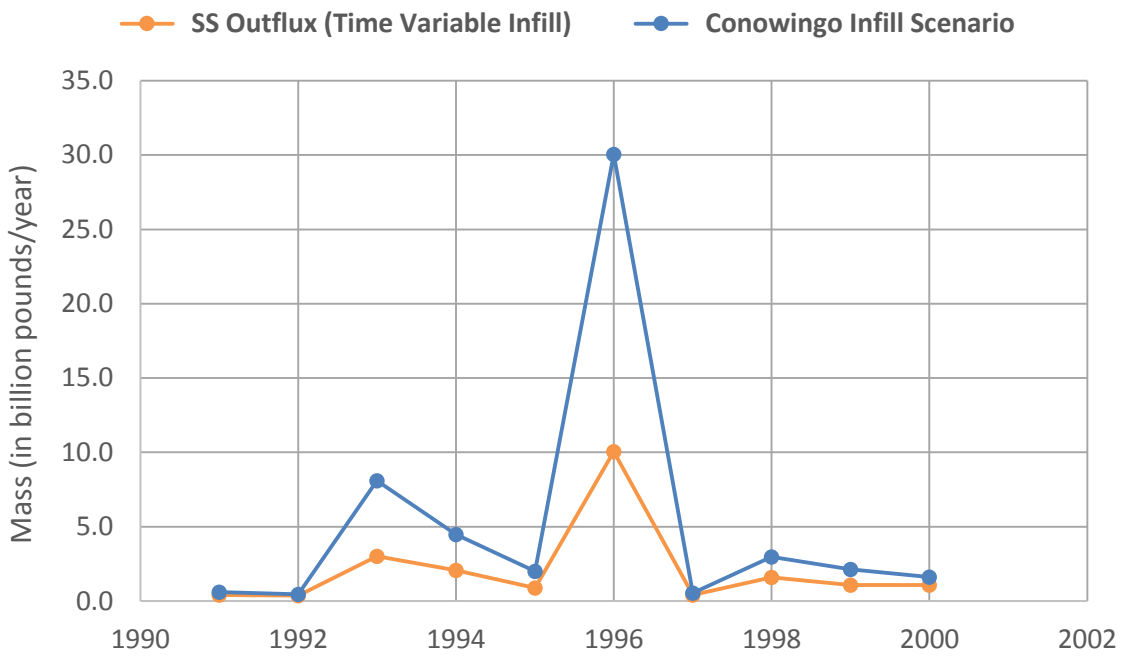
Zhang, Hirsch, and Ball ES&T (2016)

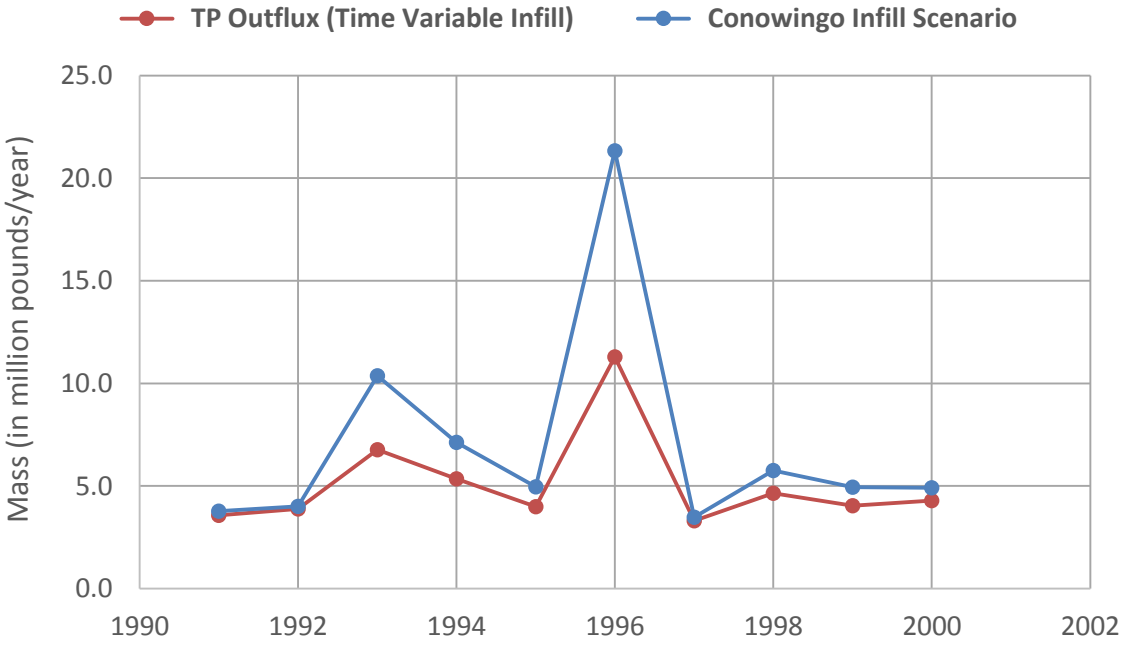
Conowingo Infill Scenario



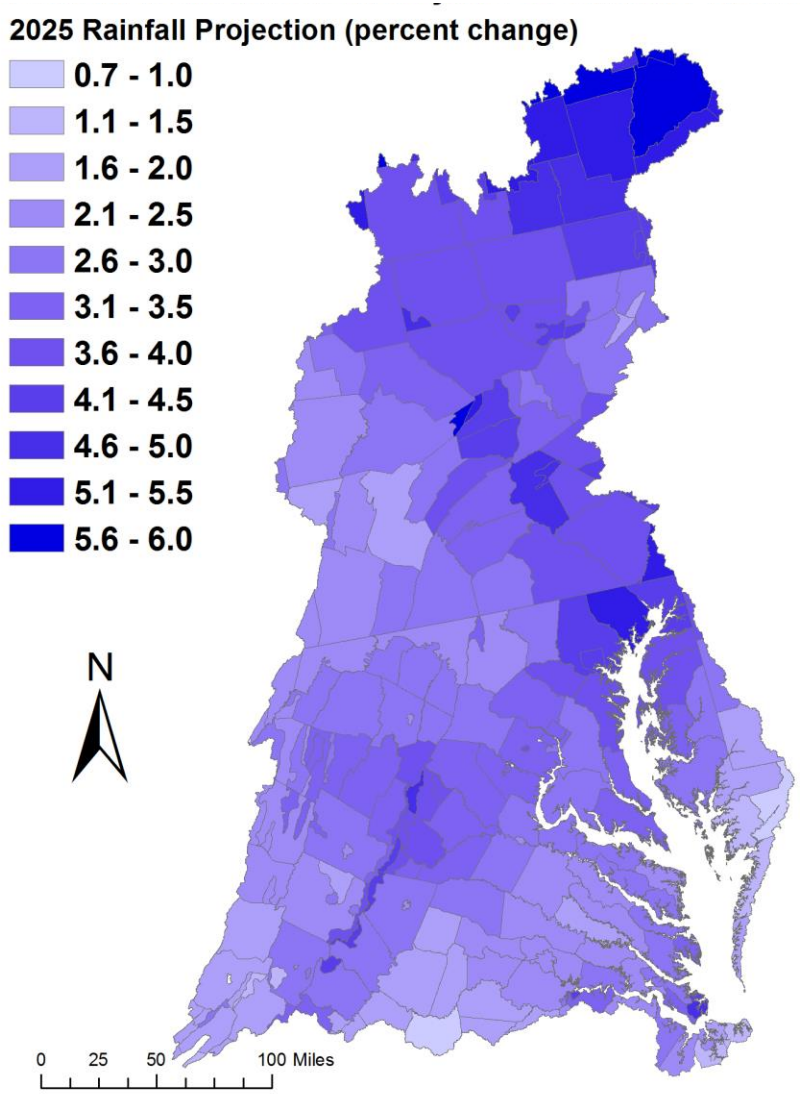


less net deposition over the 10 year period as compared to baseline





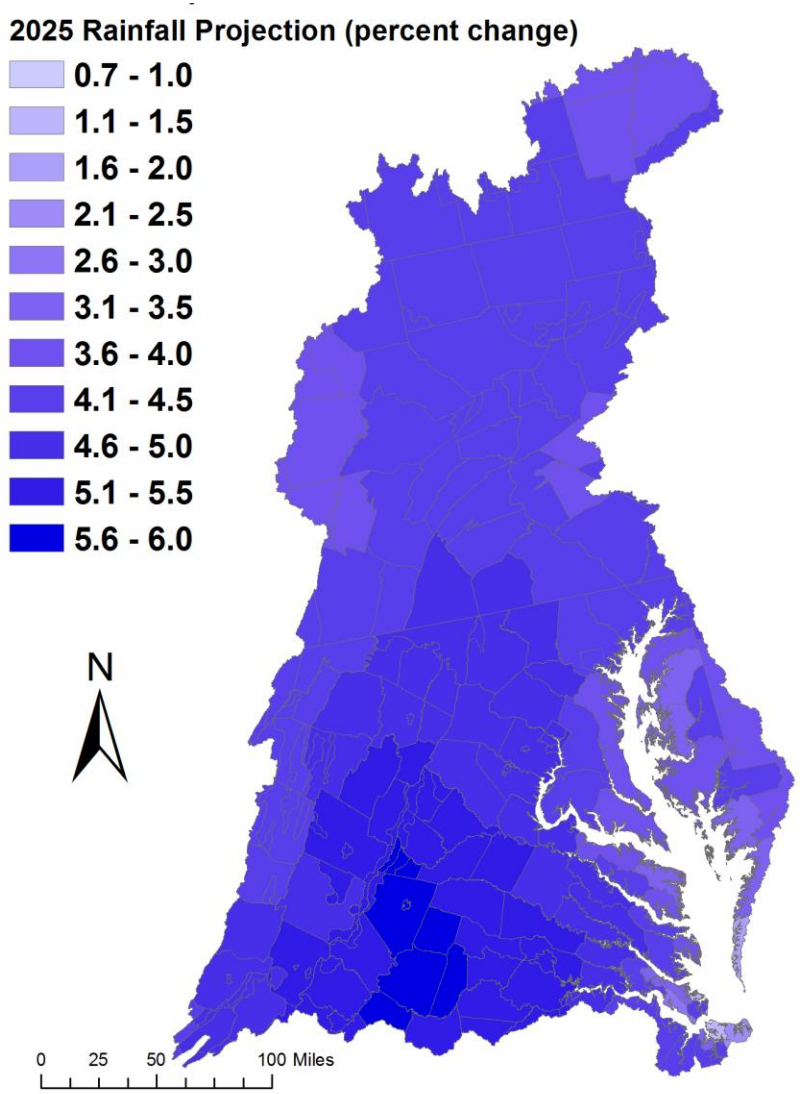
Change in Rainfall using Annual Trend in PRISM data (88 Years)



Change in Rainfall Volume 2021-2030 vs. 1991-2000

Major Basins	PRISM Trend
Youghiogheny River	2.1%
Patuxent River Basin	3.3%
Western Shore	4.1%
Rappahannock River Basin	3.2%
York River Basin	2.6%
Eastern Shore	2.5%
James River Basin	2.2%
Potomac River Basin	2.8%
Susquehanna River Basin	3.7%
Chesapeake Bay Watershed	**3.1%**

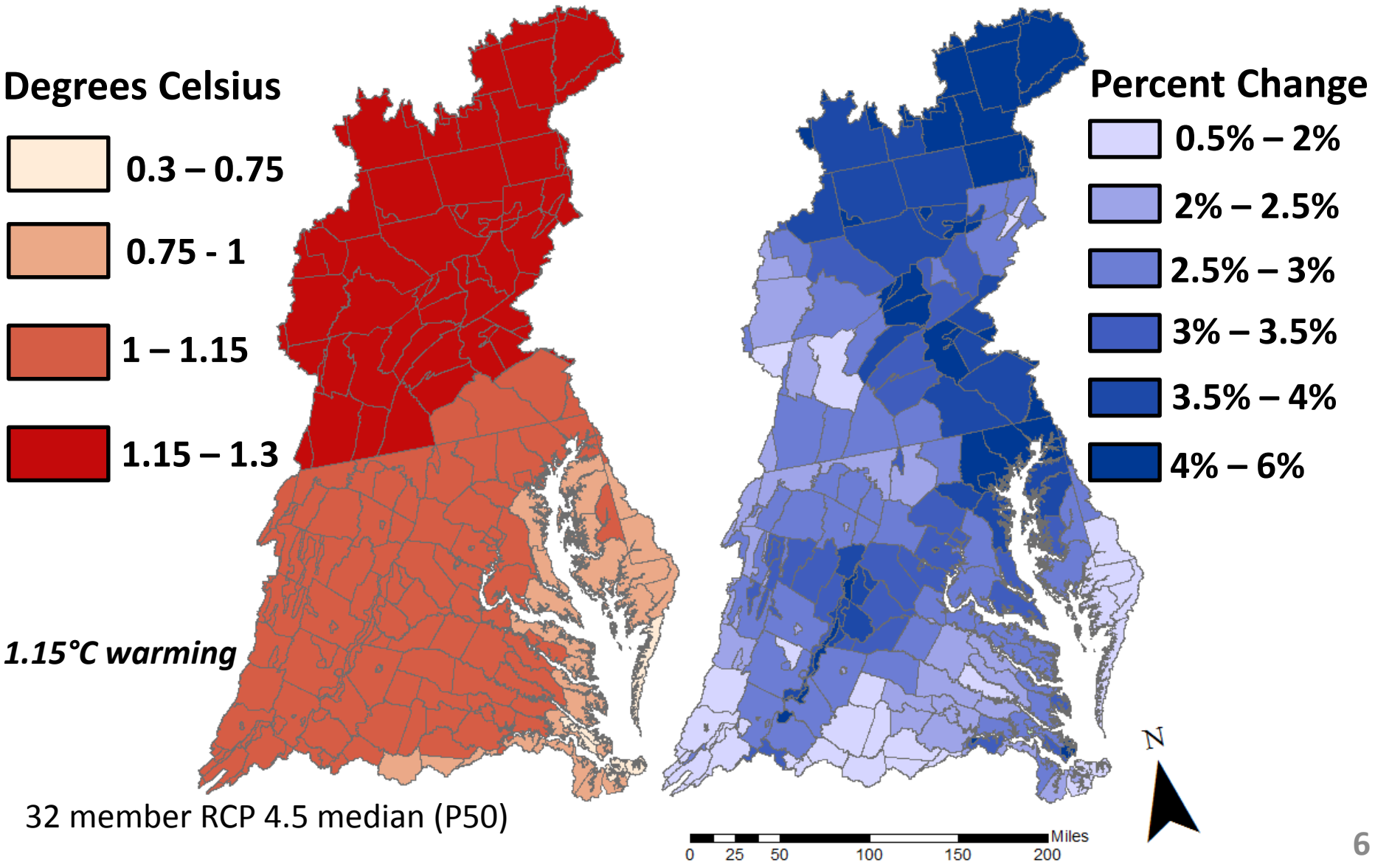
Change in Rainfall using Multiple Model Ensemble of Downscaled GCMs (RCP 4.5)



Change in Rainfall Volume 2021-2030 vs. 1991-2000

Major Basins	CMIP5
Youghiogheny River	4.1%
Patuxent River Basin	4.2%
Western Shore	4.2%
Rappahannock River Basin	4.9%
York River Basin	4.7%
Eastern Shore	3.7%
James River Basin	5.0%
Potomac River Basin	4.7%
Susquehanna River Basin	4.1%
Chesapeake Bay Watershed	**4.4%**

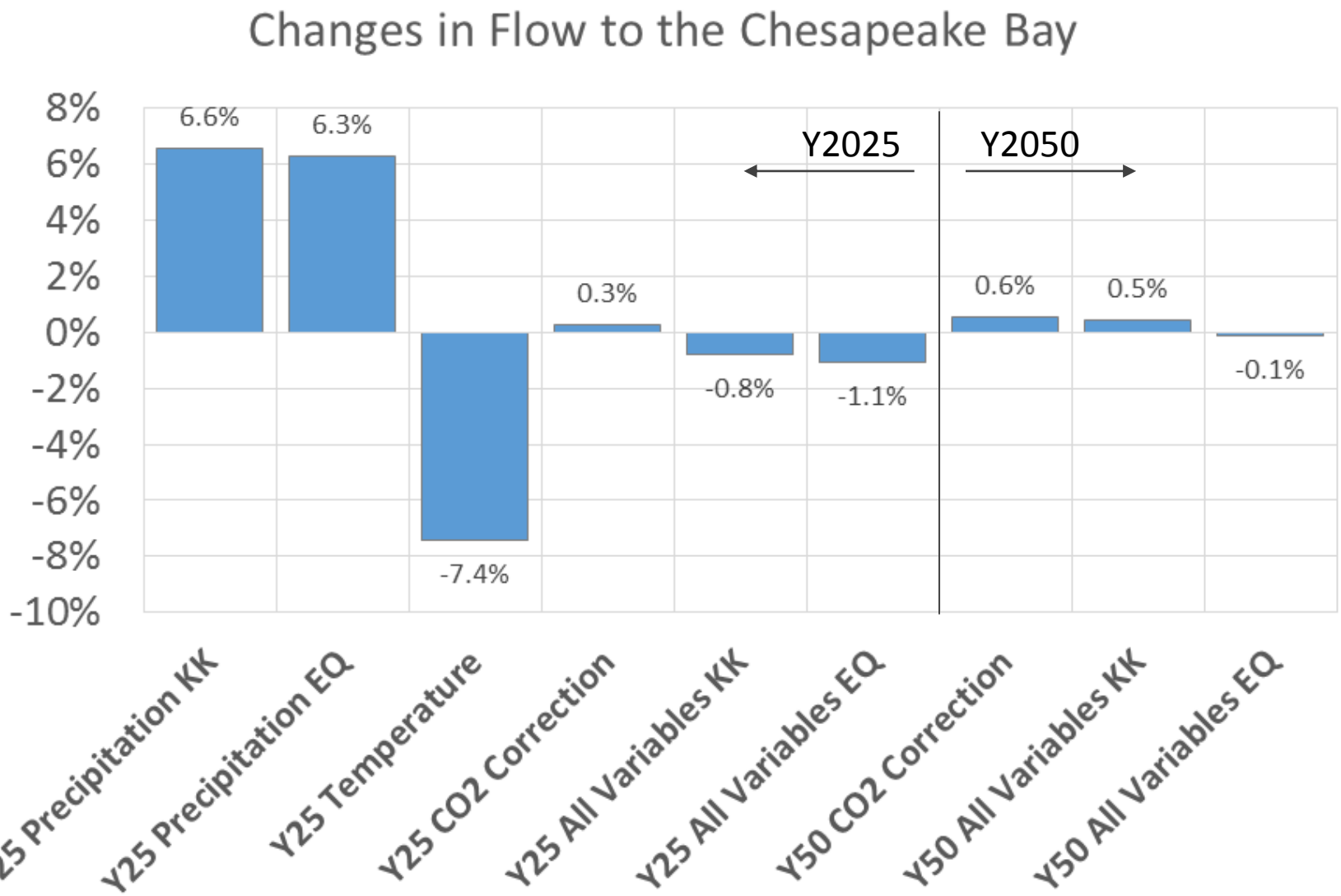
Year 2025: Changes in Temperature* and Precipitation



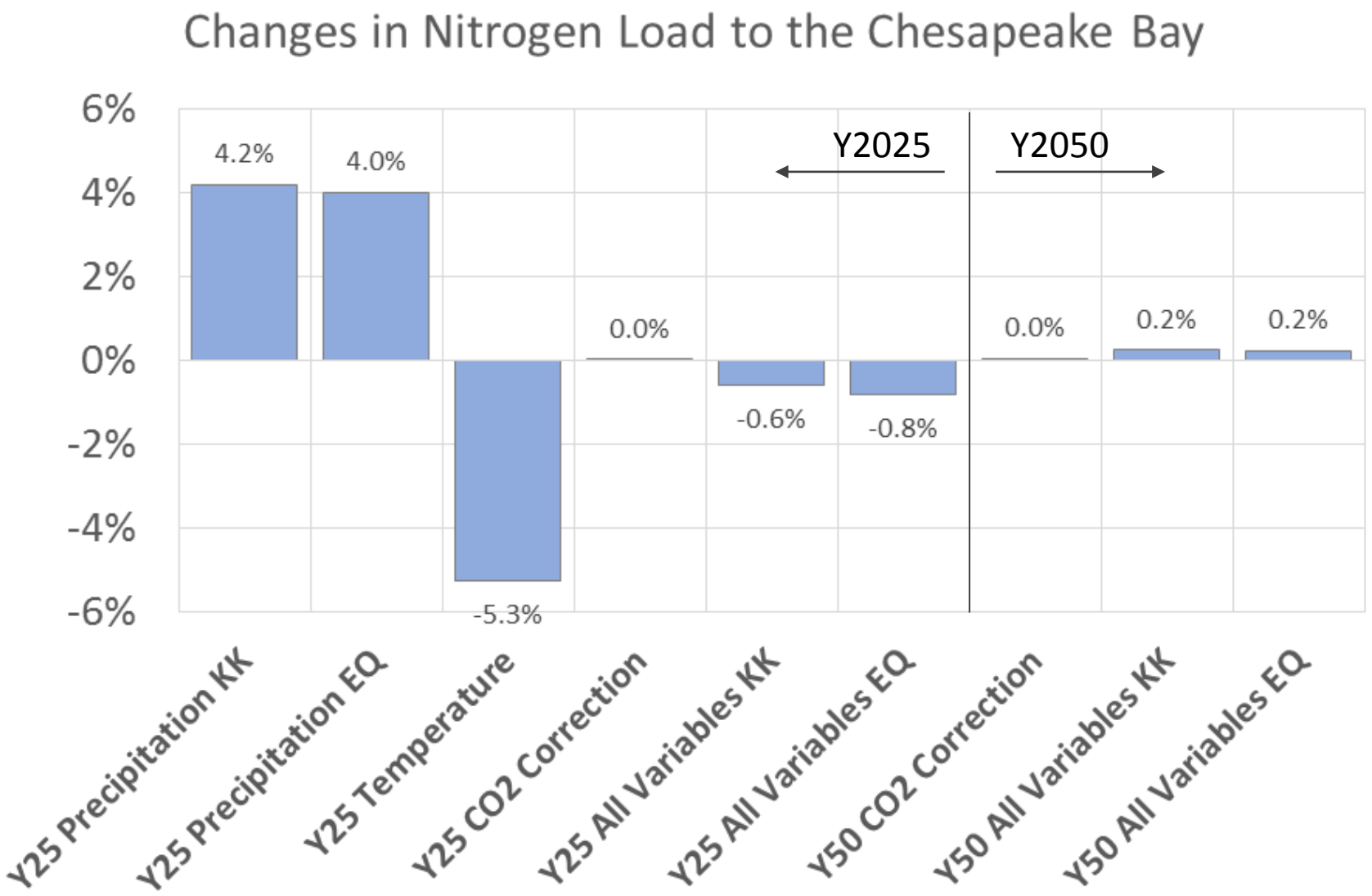
1.15°C warming

32 member RCP 4.5 median (P50)

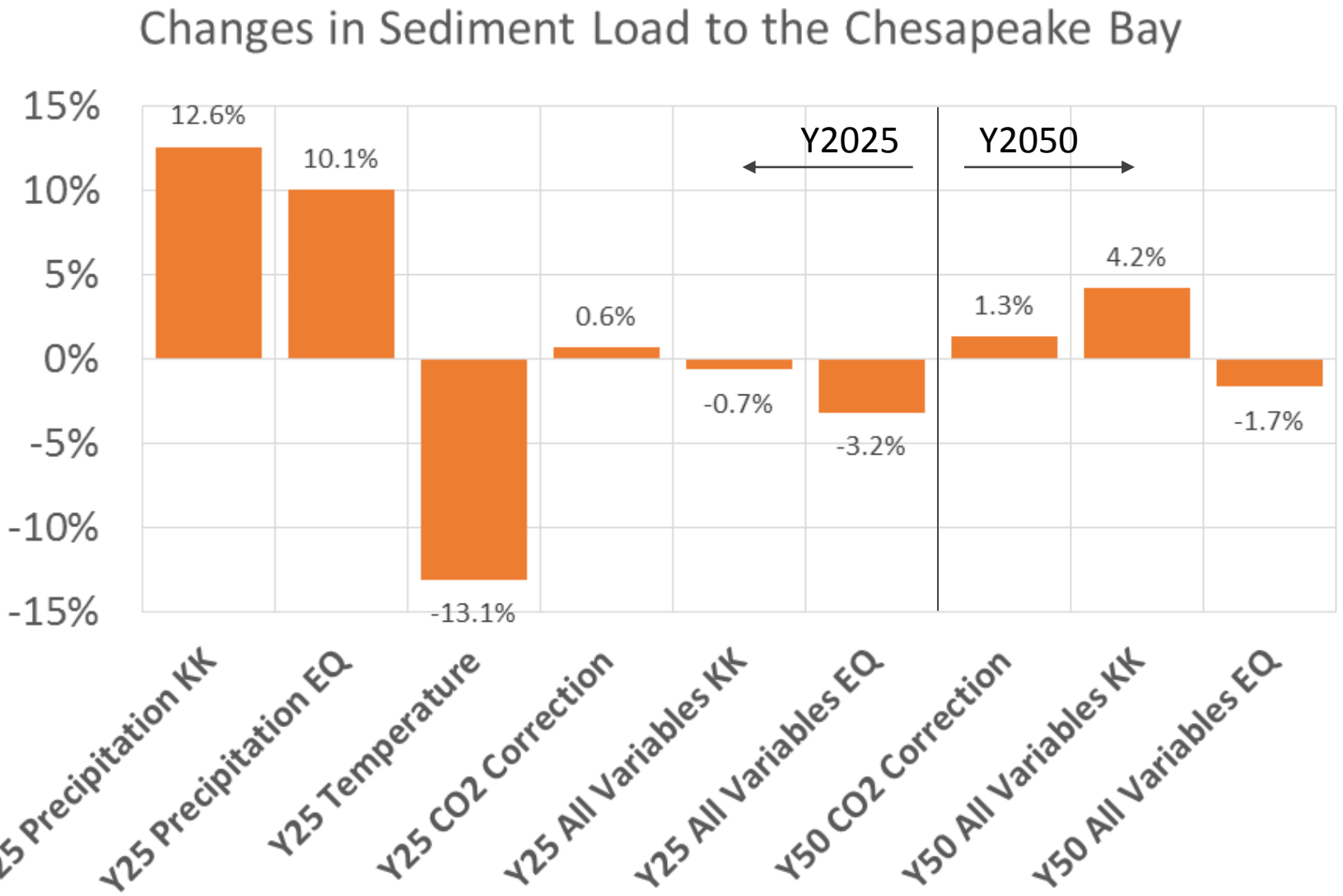
Model results



Model results

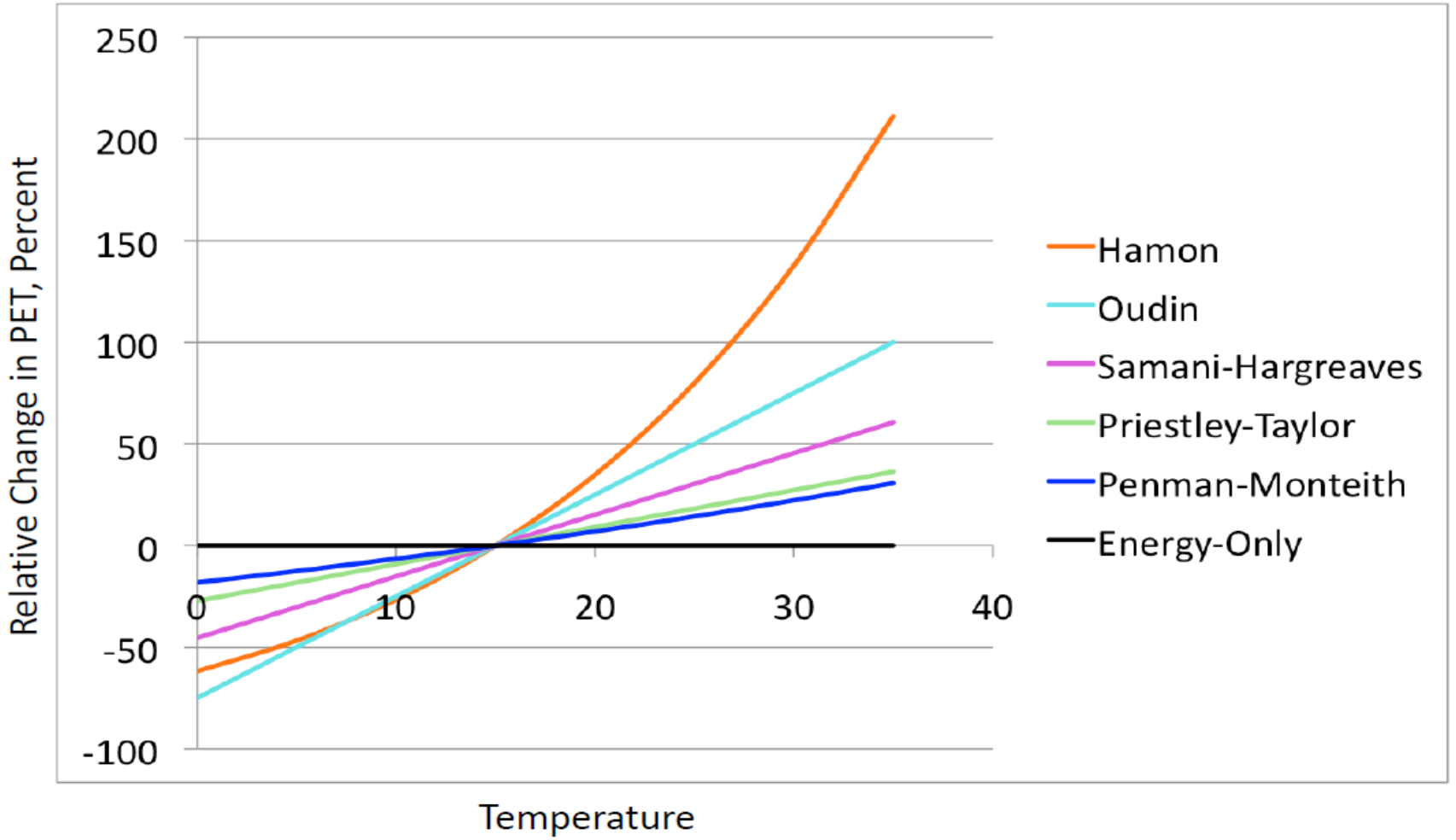


Model results



Modeling Team is Examining Alternative Evapotranspiration Approaches for Climate Change Scenarios

Typical Temperature Dependence of PET, Radiation Being Held Constant



From: Milly, STAC Workshop on Climate Change March 7, 2016

Conclusions:

- The Modeling Team is working on the operational challenge of moving through the WQSTM and water quality standard assessment procedures two Conowingo infill scenarios, fourteen climate change scenarios, and a calibration of CH3D to 2025 sea level rise and temperature conditions.
- Completion of the climate change scenarios are further complicated by a reexamination of potential evapotranspiration (PET) estimates from different methods including Penmen-Monteith, Hargreaves, Hamon, and others.
- If warranted, there is potential to use one of these PET estimates or an ensemble approach to PET under climate change conditions.