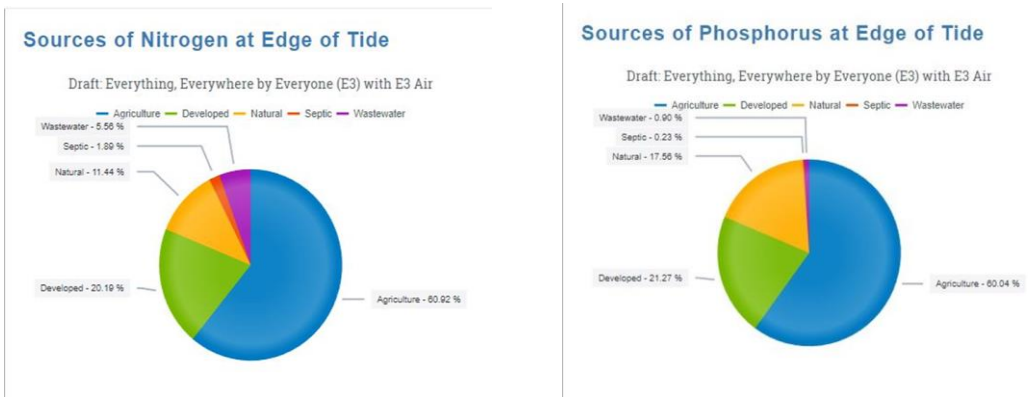
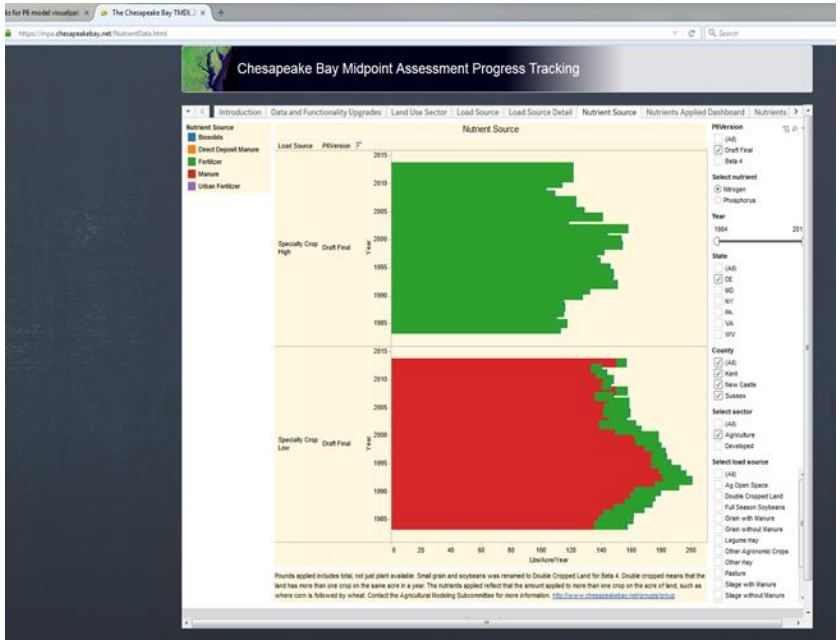
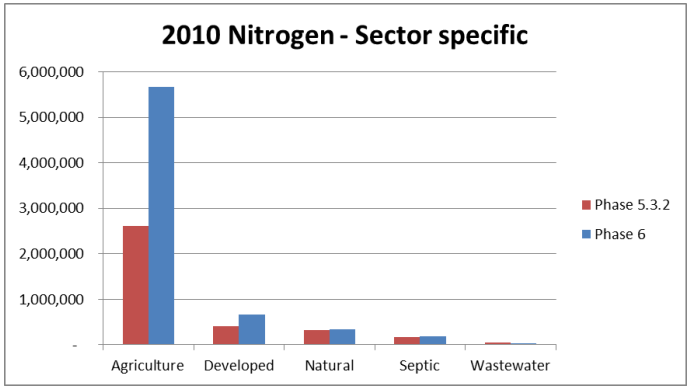
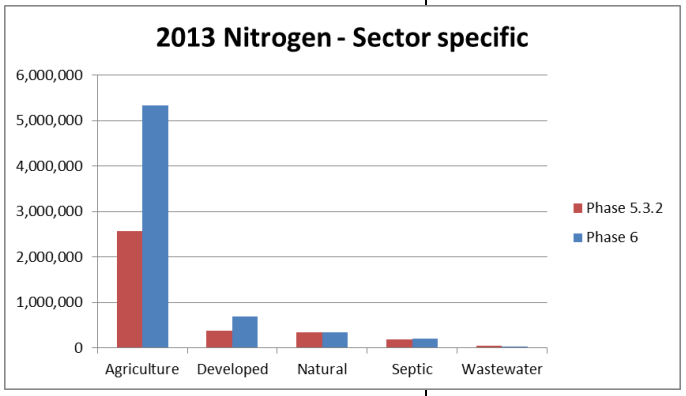
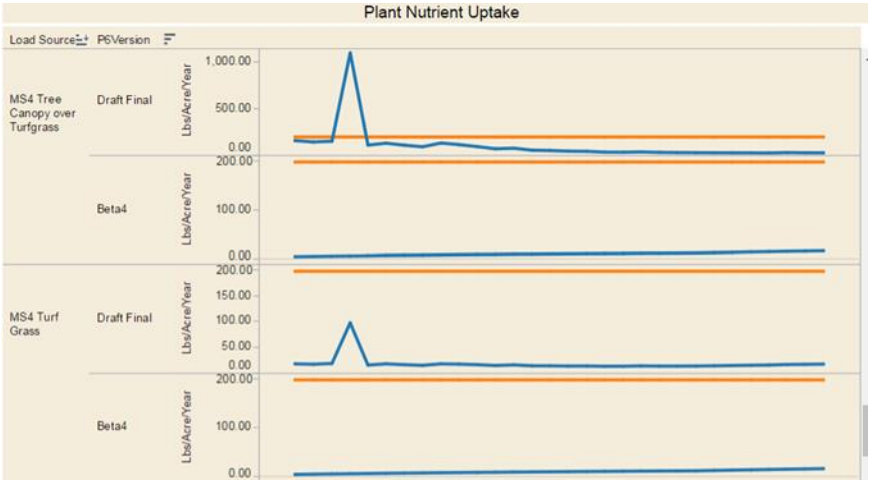
Delaware Chesapeake Bay Model Fatal Flaw Comments		
Sector	**Comment**	**Status**
Calibration	No uncertainty analysis has been performed to adequately measure performance between sectors and equity of BMP efficacy.	
Calibration	Loads from some sectors are negative and disproportionately impact non-Ag land uses.	
Calibration	12.8 million pounds of phosphorus were added during the calibration period. Please explain how these loads were dispersed, spatially and temporally. How is this load distributed to land uses? Which states and sectors are most affected by this load and what basins are considered deficient? How will this additional load be simulated through time as the model is projected to 2025 and beyond? What are the management strategies the Phase 6 Watershed Model can accommodate for jurisdictions to abate this additional load?	
Calibration	Delivery factors greater than one result in uncontrollable load in Phase 6.	

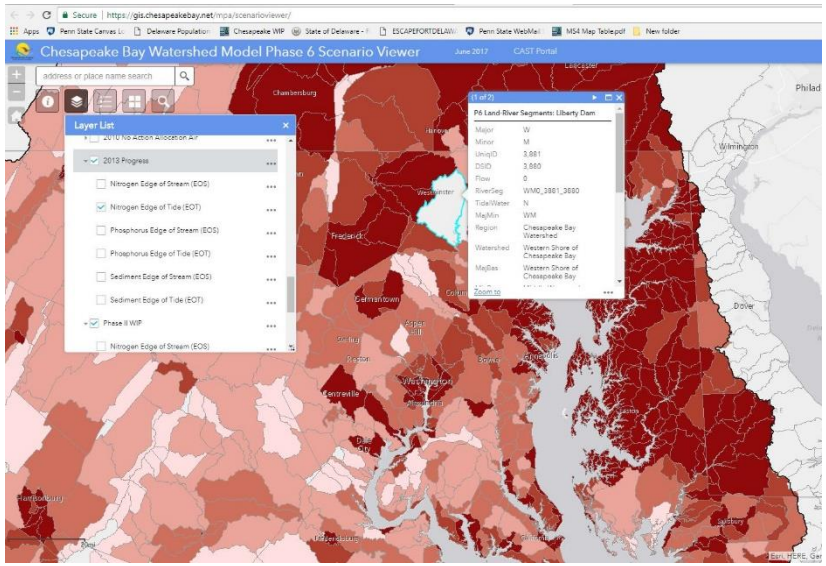
All	The per acre load from Agriculture in the CAST E3 simulation resulted in a higher load than the developed sector (septic + waste water + developed). This is in direct contrast to results from Phase 5.3.2. 	
Agriculture	Nutrient Management as a BMP has not been verified as functioning according to the Panel recommendations. Review of CAST in Delaware suggests approaching WIP level target implementation can result in no reduction of loads.	CBPO negligent in addressing commitment to Agriculture Work Group.
Agriculture	Manure transport results in higher loads even in manure-rich counties. Counties, like Sussex, with manure surpluses as compared to crop need and uptake are not yielding nutrient reduction by implementing manure transport or manure transport-like BMPs.	Outcome violates intent of manure transport or manure transport-like BMPs; CAST explanation inadequate: "If you put a nutrient reduction BMP, like Nutrient Management, on crop and hay, the pasture load will increase. The manure and fertilizer is applied to each crop type according to a curve. So restricting the amount on one crop moves the manure and fertilizer to another crop or to pasture. Details about the curves and how the load

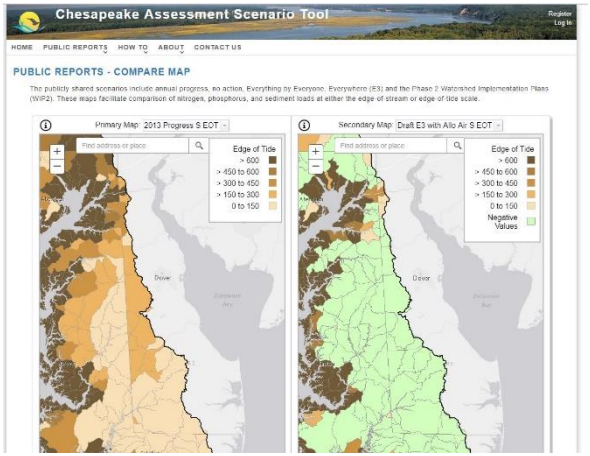
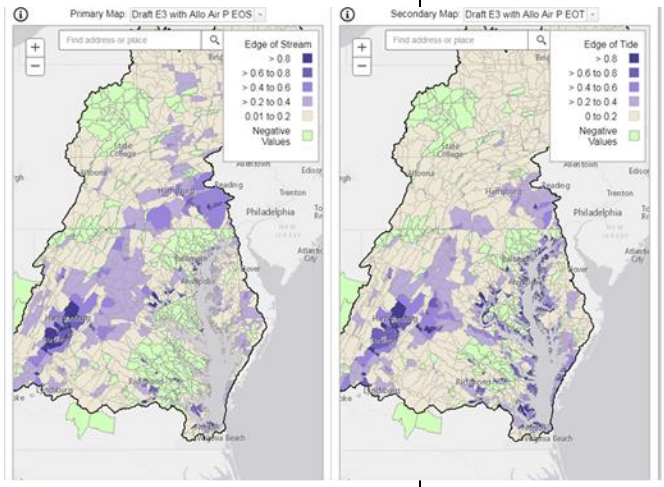
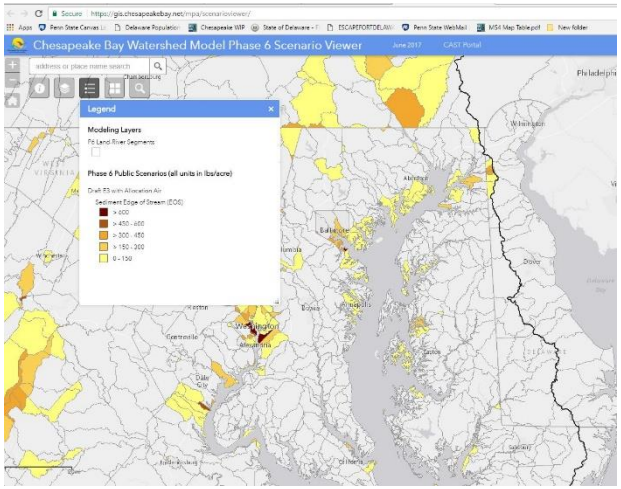
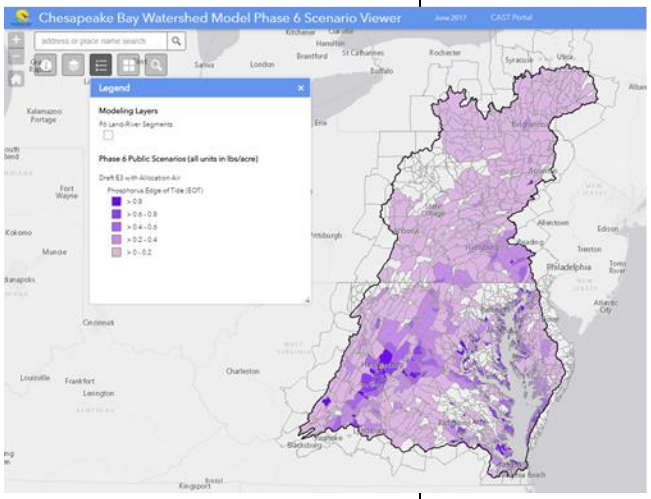
		sources influence each other may be found in the Model Documentation, Section 3, found on the CAST home page."
Agriculture	Soil Test P values gleaned from participating lab data are insufficient in time, space and detail to be applied in an APLE model simulation representing Agriculture for calibrating TP loads. In some counties, outside DE, no data was used to build a soil P history. In other areas, like DE, lab data were not indicative of the landuses for which the data was used to represent. Specifically, UD Soil Lab data is skewed toward home garden samples and these would not be appropriate to inform the APLE model. The APLE model has not properly supplied with hydrological connectivity data to accurately simulate TP load from DE soils.	No alternative has been offered to remedy this deficiency.
Agriculture	The Bayesian estimated Mehlich 3 soil test phosphorus in parts per million was not an approved method by the AMS or AGWG. These decisions were made for Ag stakeholders by the MWG, which is a violation of P6 development protocol.	
Agriculture	APLE simulation on agricultural land is inequitable with the developed sector. Soil samples and relative load should be simulated in a similar fashion; either the P5 or APLE method.	
Agriculture	The APLE simulation does not sufficiently demonstrate soil P decline as a result of P-based applications. This is due, in part, to P-based applications not being accurately simulated in the model, but also because some lag effect of the soil test P in the model was rudimentarily tested based upon an Agriculture Work Group and Water Quality Goal Implementation Team emergency decision.	

Agriculture	In all scenarios up to 2012, nutrients were capped so that a finite amount of manure, biosolids and inorganic nutrients were applied to crop needs/goals. In 2013, the amount of inorganic nutrients, both phosphorus and nitrogen are not constrained by any upper bounds and can be used to backfill the purported new crop needs established by 2012 post-BMP levels. This violates the intent of the Agriculture Modeling Subcommittee decisions to simulate mass balance and quick fixes approved by the AMS were never revisited diligently to remedy them ahead of the release of the Phase 6 Model.	
Agriculture	It does not seem to make sense that the soil test P values are the same for grains/silage with manure and grains/silage without manure.	Similar comment submitted by VA's James Davis-Martin on 7/7 and proposed resolution is to send this comment to the workgroup.
Agriculture	DE appears to be the only state where the Specialty Crop Low loads are greater than the Specialty Crop High loads. What is the reason for this? And what is the specialty crop receiving the manure? 	Question submitted to Matt Johnston on 7/13.

Agriculture	A specific and cogent response regarding the volatility in specialty application rates and uptake/removal is necessary because the CBPO response is supposition and contradictory to USDA annual statistics collection methods. This may be related to the inequity of DE loads to other states' Specialty Crop Low landuse for nitrogen.	Response: Specialty is made up of a number of crops, and thus can vary in relative crop acreages significantly from one year to the next. This variability in crop acreages will absolutely result in variability in applications, yields and removal estimates. Action recommended: None
Agriculture	Uptake and removal of nutrients by crops are used interchangeably as parameters in Phase 6, but the viewing interfaces exclusively use uptake. The Ag stakeholders would prefer uptake as the parameter for communication and consistency with nutrient management recommendations.	In process by Agriculture Modeling Subcommittee.
Agriculture	N loading rates have varied widely between Phase 5 and Phase 6 development models based on expert opinion. This variation is not well understood or documented and should not result in a greater responsibility for the Ag sector. If it does, this change has not been adequately documented.  	

Agriculture	Turf grass of any landuse looks similar to below. Uptake is unrealistically high, especially compared to applied pounds. An under fed crop will have reduced uptake potential. The spike seen below in draft simulations needs to be explained. 	Response: This appears to be a mistake in the data which is being investigated by CBPO Staff. Action recommended: Review and update by CBPO Staff.
Urban	It appears the No-P fertilizer credit is not being applied to developed land classes in Delaware in the Phase 6 model. If that is the case, please clarify the policy for gaining this credit back for jurisdictions that do not have No-P/Lo-P legislation. Delaware has provided documentation in the past based on the State Chemist's data to demonstrate that the bulk of the fertilizer sold to consumers has a No-P formulation. In fact, earlier guidance from the CBP has used Delaware's data as an example of the type of data that a jurisdiction would need to provide to support this credit.	
Urban	Although Section 2 of the model documentation includes a table with the loading rates for the various developed land classes, it does not include the TN and TP Event Mean Concentrations (EMCs) used to derive those loading rates. It is our understanding that the EMCs were revised from the Phase 5.3.2 values based on a review of more recent data and that they vary between the land classifications. This should be explained more fully in the documentation and the final EMC values used in the P6 model provided along with the loading rates.	
Miscellaneous	While there are available water quality monitoring data for the Nanticoke River near Bridgeville site in Delaware for the period from the mid 90's to present, it appears that only the data for the period from 97 through 2002 has been used for calibration of the watershed model.	

Miscellaneous	Monitoring data collected at the Nanticoke River and Marshyhope Creek sites in Delaware show that nitrate concentrations decrease with increasing flow. However, the calibrated model predicts increasing nitrate concentrations with increasing stream flow. This trend contradictsthe observed trend.	
Miscellaneous	There appear to be some issues with the data appearing in the land river segments. Below is an example from the 2013 Progress scenario nitrogen – EOT (Edge of Tide). Note that there are two Land River Segments without data. This was observed in other scenarios with phosphorus as well as nitrogen. 	

Miscellaneous	In the E3 model scenarios, the sediment levels (left) and phosphorus levels (right) are shown as negative (green) in the Scenario Comparison Viewer and as no data (gray) in the Scenario Viewer.     	

Miscellaneous	In comparing scenarios in Phase 5.3.2 and Phase 6, there were some notable differences. We looked at the 2010 Progress scenarios from both versions of CAST. In the developed sector, the model outputs show P decreased by 43% from Phase 5.3.2 while TSS increased by 85%. One would expect these two parameters to move in the same direction. Also, we see a 93% overall increase in N between the two models in 2010 progress (117% increase in Ag, 63% increase in developed, 3% increase in natural, 11% increase in septic, and a 41% decrease in wastewater). While we expected to see differences between the two versions of the model, a 93% increase in N is alarming.