Elements of the Climate Change Scenarios: What's In and What's Out

Modeling Workgroup
December 5, 2019

Lew Linker, EPA; Gary Shenk, USGS; Gopal Bhatt, Penn State;
Richard Tian, UMCES; and the CBP Modeling Team
llinker@chesapeakebay.net

Chesapeake Bay Program
Science, Restoration, Partnership

Chesapeake Bay Program
Science, Restoration, Partnership

In: Phase 3 Targets Decided by PSC

Out: Phase 3 WIPS. Some of the CBP partners Phase 3 WIPs go far toward addressing climate change and others have yet to address climate risk. Need to use the WIP3 targets for "clean" decision on climate change impacts.

Chesapeake Bay Program
Science, Restoration, Partnership

In: Atmospheric Deposition Estimates 2035 - 2055

Atmo dep from 2035 - 2055

- **Scaled for continued emission reductions from 2025 through 2055 mostly due to fleet turnover and other actions due to current CAA rules and regulations.**
- **Scaled for increase in wet deposition loads of nitrogen due to estimated future higher precipitation volumes.**

Out: Previous thinking that atmospheric deposition of nitrogen is uninfluenced by climate change in Chesapeake region.

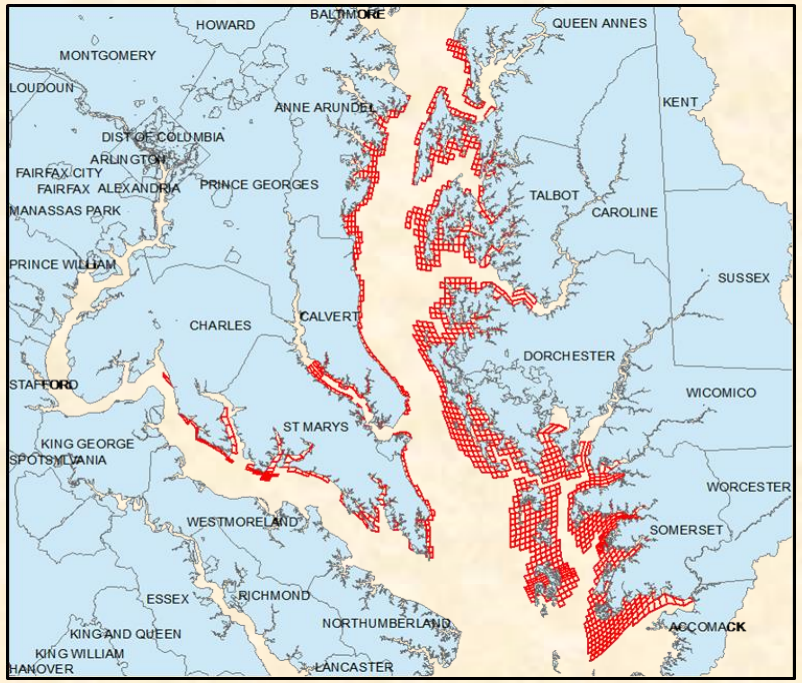
Chesapeake Bay Program
Science, Restoration, Partnership

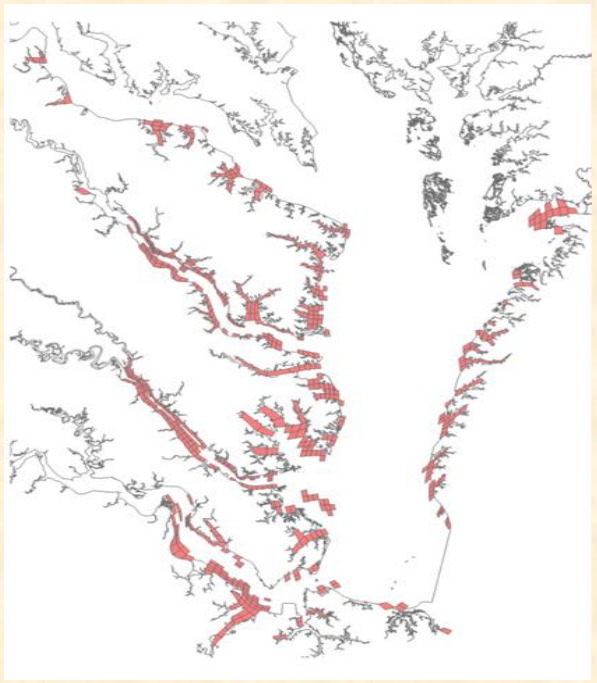
In: Aquaculture Oysters at 2025 Buildout Levels

Out: Aquaculture at current levels

The 2017 WQSTM oyster module considers four populations:

- Natural populations on reefs and subject to harvest
- Natural populations in sanctuaries and not subject to harvest
- Smaller areas within sanctuaries where oyster habitat is restored
- Aquaculture operations





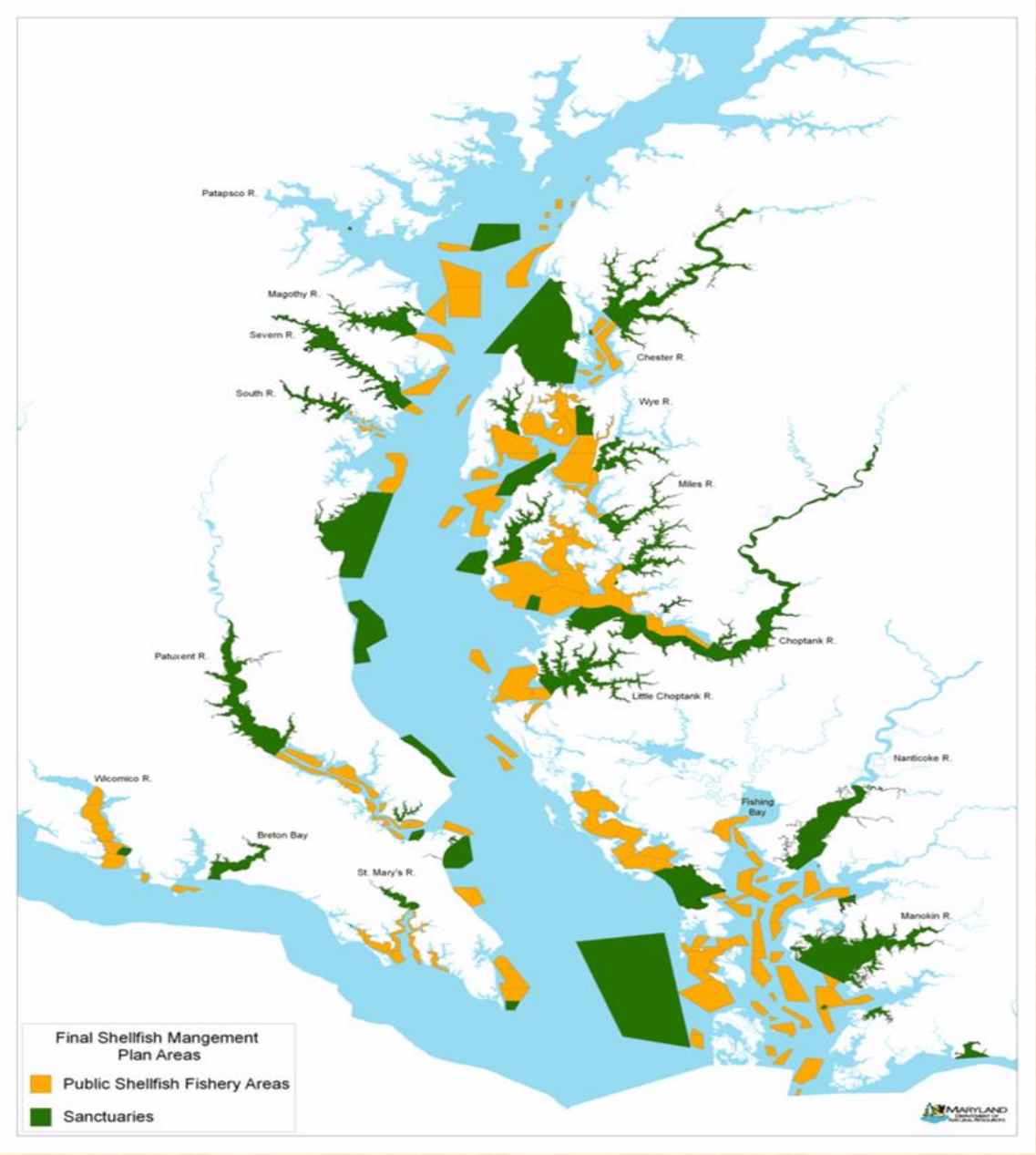
Year	VA Biomass (kg DW)	VA Harvest (kg DW)	MD Biomass (kg DW)	MD Harvest (kg DW)
2005	3398	2124		
2006	11892	7433		
2007	16989	10618		
2008	25483	15927		
2009	32279	20174		
2010	56063	35039		
2011	79847	49904		
2012	93438	58399		
2013	103631	64770		
2014	134211	83882	40905	21529
2015	118921	74326	60612	31901
2016			64550	33974
2025	508032	317520	241315	127008

Chesapeake Bay Program
Science, Restoration, Partnership

In: Oyster Sanctuaries

Out: Full harvest everywhere in Bay.

Note: The elimination of oyster mortality in sanctuaries increases oyster biomass slightly and makes DO Deep Channel and Deep Water standards easier to achieve for all CBP partners.



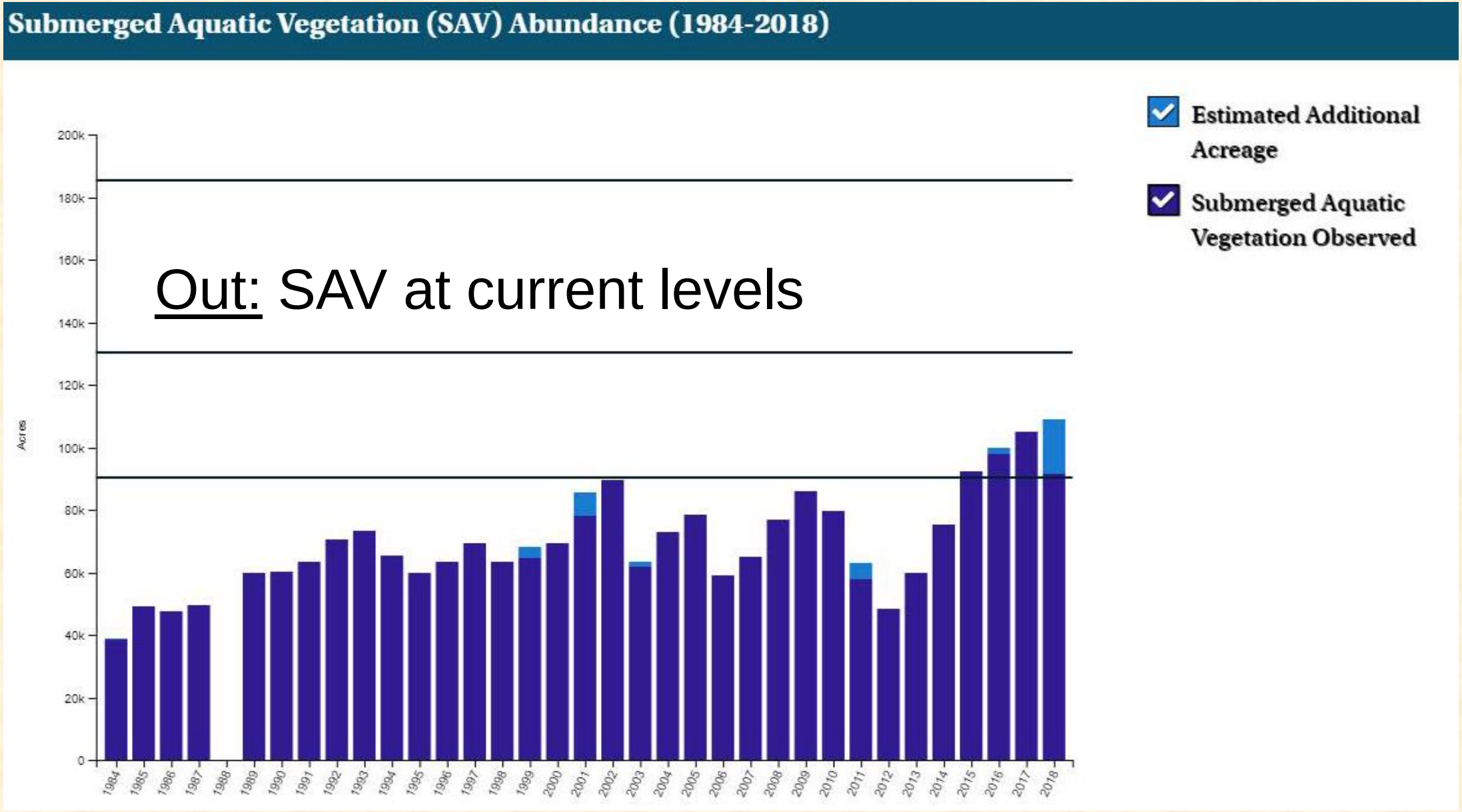
Chesapeake Bay Program
Science, Restoration, Partnership

In: Habitat Restoration In Sanctuaries

Oyster sanctuary areas with habitat reconstruction are not in simulation and are handled by nutrient reduction recommendations of 2nd Expert Panel Report (in preparation for March 2020 Review by WQGIT).

Chesapeake Bay Program
Science, Restoration, Partnership

In: SAV at Full Restoration Levels



Chesapeake Bay Program
Science, Restoration, Partnership

Conclusions:

- Need Modeling Workgroup approval of the scenario approach in climate change only scenarios for 2025, 2035, 2045, 2055 and in climate change and land use scenarios of 2035, 2045, and 2055.
- An immediate decision today is not required. A quantification of the influence each of the scenario elements discussed here will be presented at our January 2020 Quarterly Review.