STARTING WITH THE BASICS

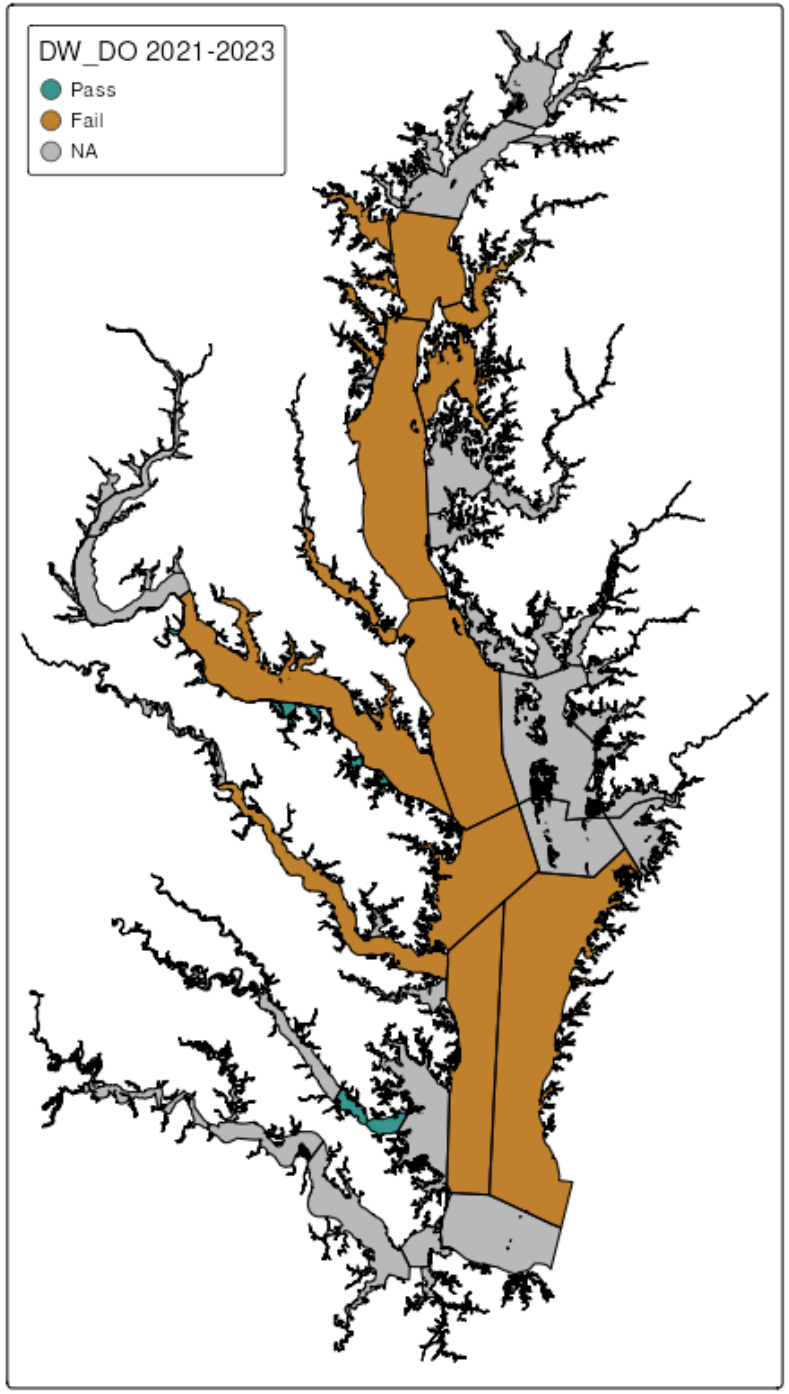
- Chesapeake Bay and tributaries are suffering from ***excess nitrogen (N), phosphorus (P), and sediment (S)***

- These pollutants have many sources:
  - Urban lands and wastewater
  - Natural sources (e.g., streambank erosion)
  - Agriculture

CHESAPEAKE BAY IMPAIRMENTS

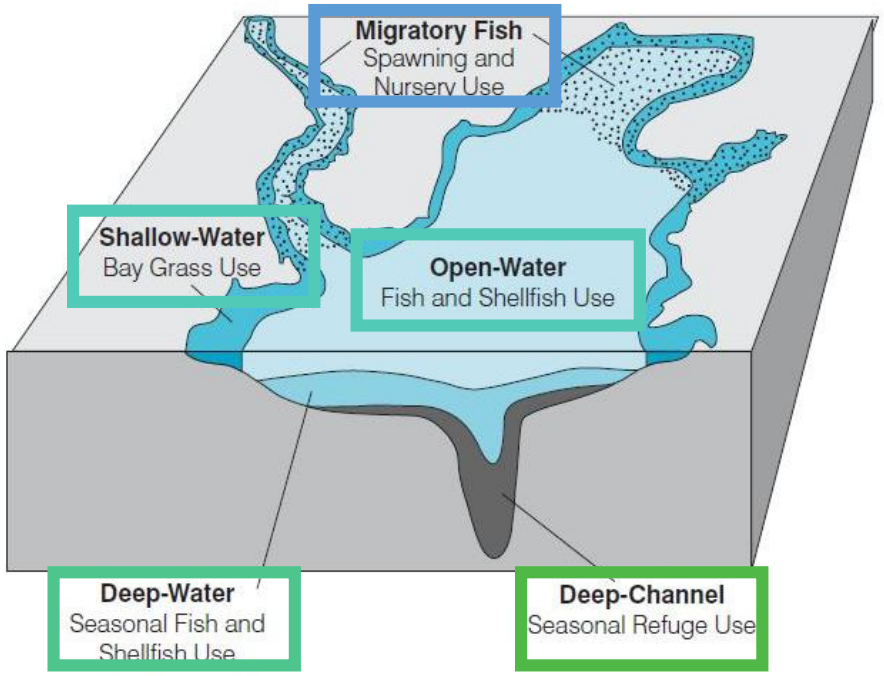
- Dissolved oxygen
- Chlorophyll-a
- Water Clarity
- Submerged Aquatic Vegetation

***Clean Water Act requires a TMDL for waters identified by a state as not meeting Water Quality Standards**

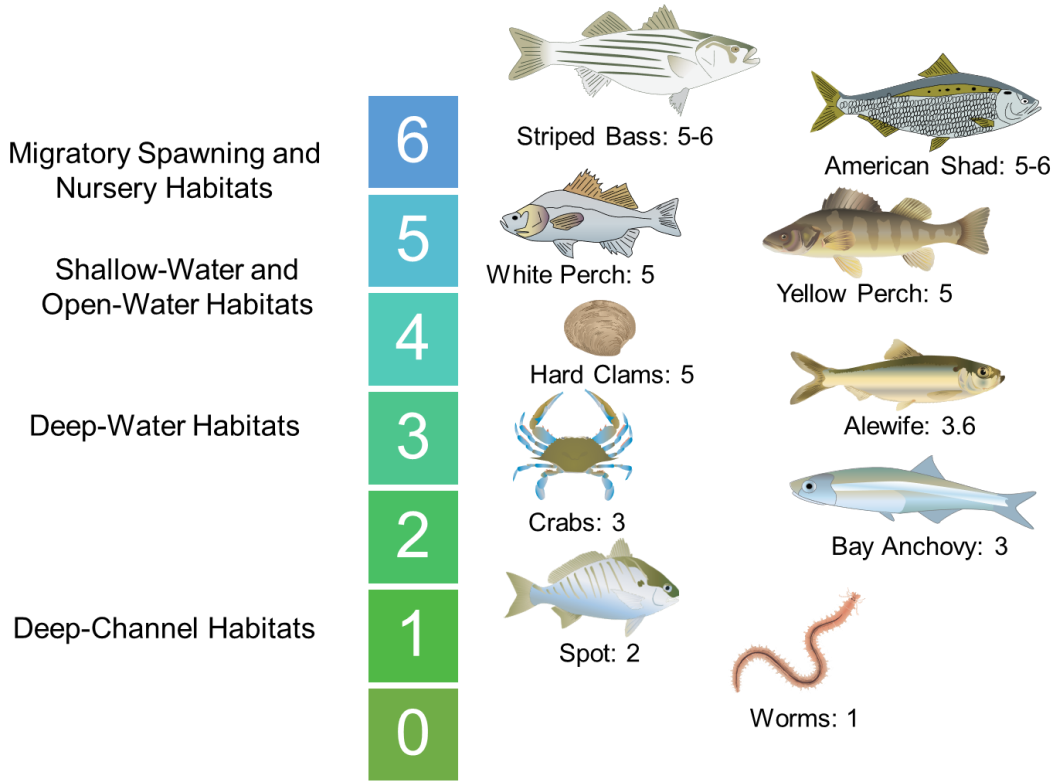


…To Achieve WQ Standards and Restore Living Resources

Five Chesapeake Bay tidal water designated use zones.



Dissolved oxygen (mg liter^{-1}) concentrations required by different species and communities.



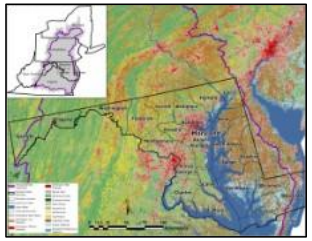
Water quality criteria were derived to protect species *and* communities during specific time periods

The Chesapeake Bay Program (CBP) Model Suite – What goes into the Model

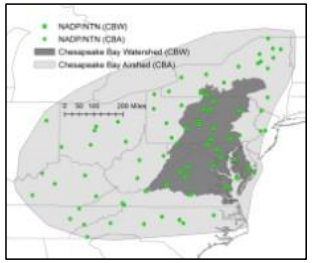
A suite of models

Data and Model Inputs

BMP Data
Land Use Data
Point Sources Data
Septic Data
U.S. Census Data
Agricultural Data



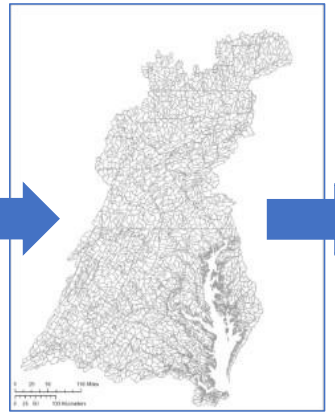
Land Use Change Model



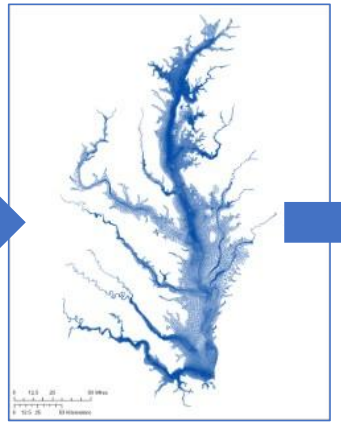
Airshed Model

Precipitation Data
Meteorological Data
Elevation Data
Soil Data

Phase 7 Watershed Model/CAST



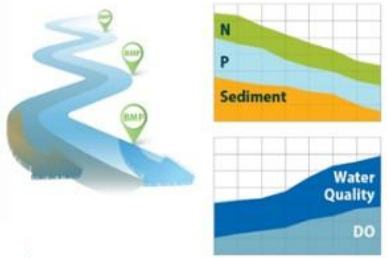
Estuary Model



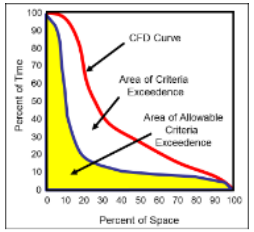
Model Outputs

Prediction of Impacts

BMP Implementation Results



Criteria Assessment Procedures



Nutrient and sediment targets for CBP state and Federal partnership

Effects

Targets

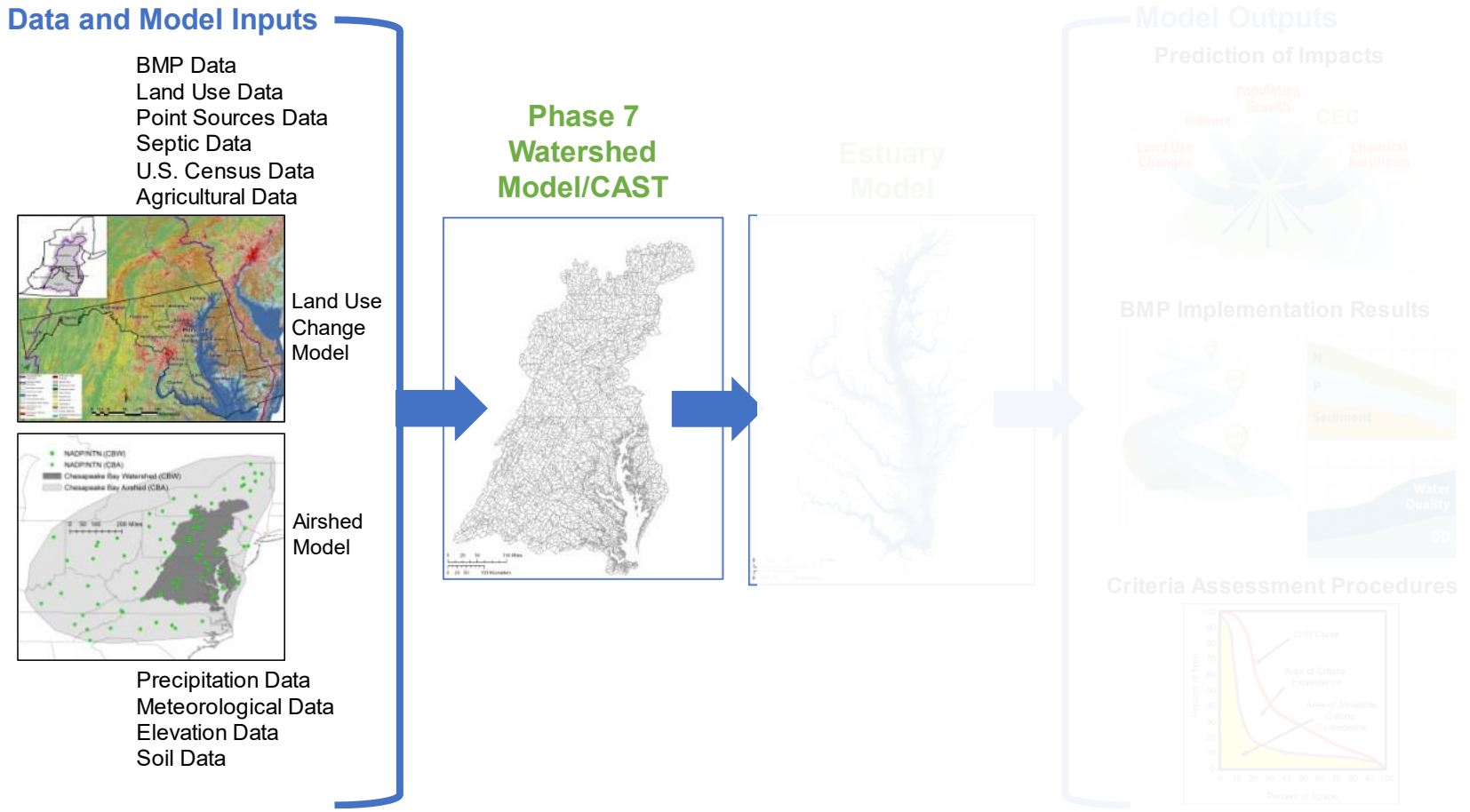
*BMP=Best Management Practice

The CBP Model Suite – What goes into the Model

The modeling suite is used to answer these questions:

CAST/Watershed Model:

- How are land use & environmental conditions changing over time?
- What are the sources of nitrogen, phosphorus, and sediment (NPS)?
- How much NPS reaches the Bay?



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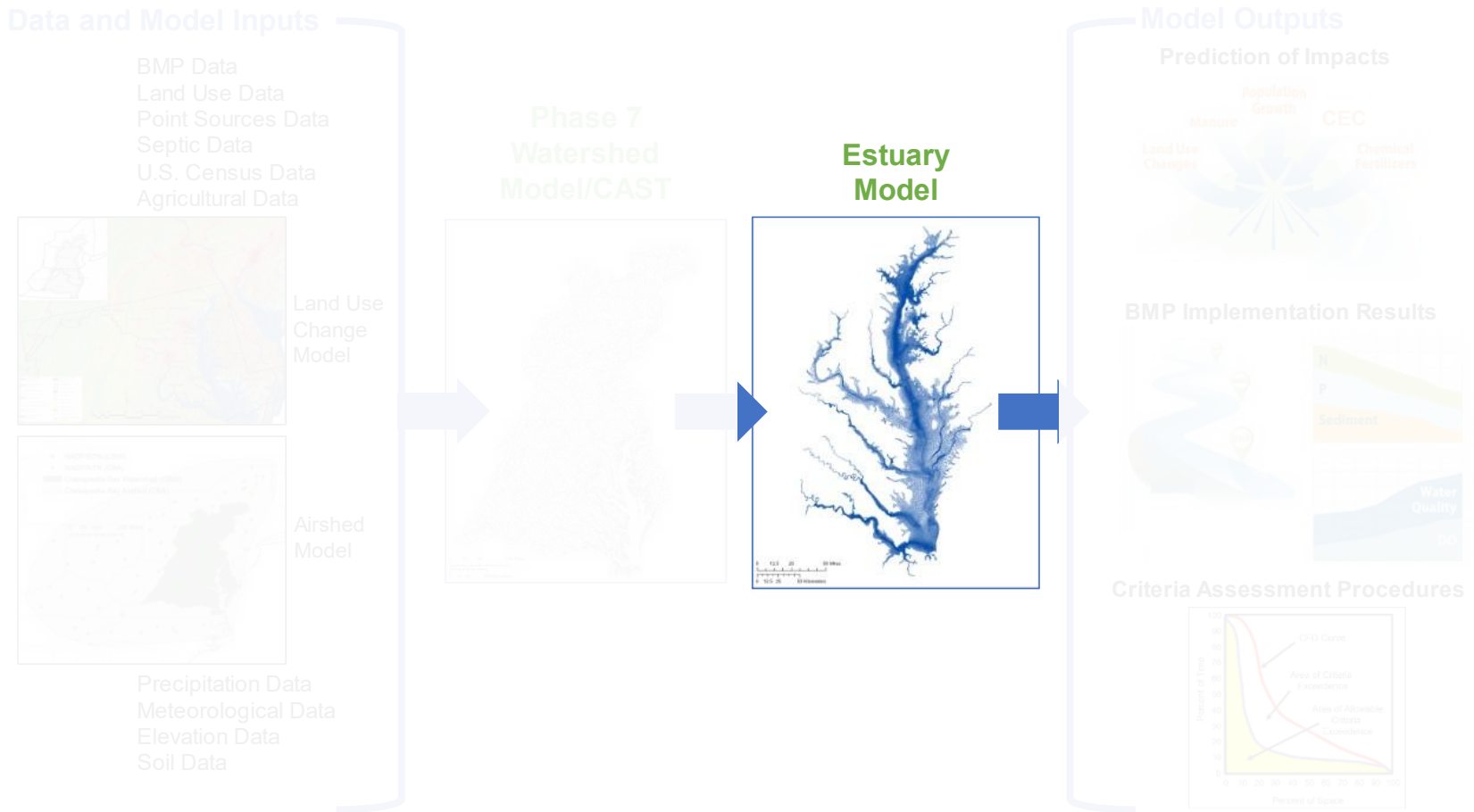
Estuary model

- How does oxygen in the Bay respond to different levels of NPS?



The CBP Model Suite – How CBP Makes a Plan

CBP uses the model suite to:

- Set targets for nutrient and sediment reductions for jurisdictions
- Estimate levels of nutrients and sediment that reach the bay under different land management scenarios
- Plan for practices that will allow us to reach goals (Watershed Implementation Plans)
- Track progress towards restoration goals

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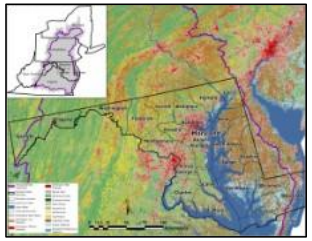

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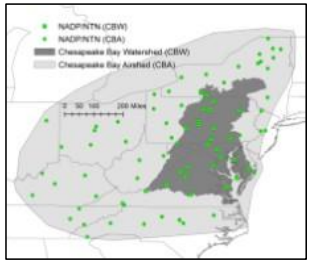

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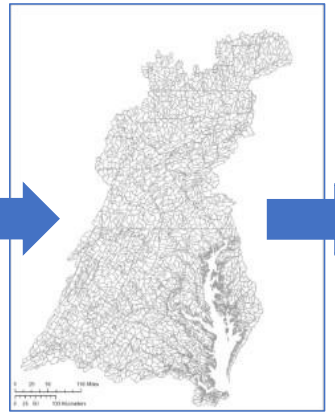
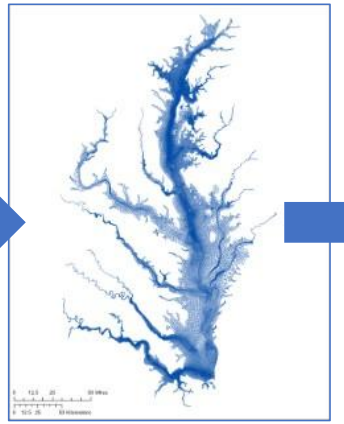


Estuary Model



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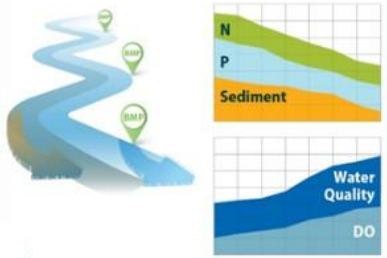

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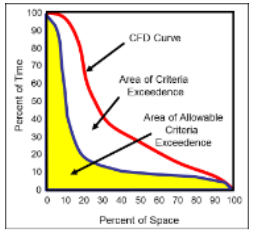


Nutrient and sediment targets for CBP state and Federal partnership

Effects

Targets

The CBP Model Suite—Why we update the model

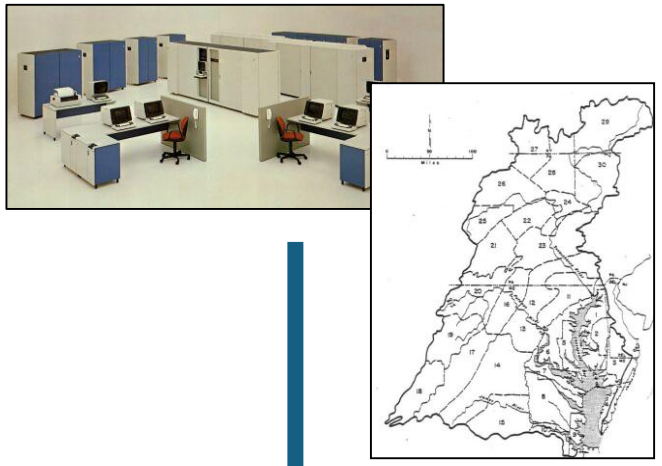
The models are built by the partnership

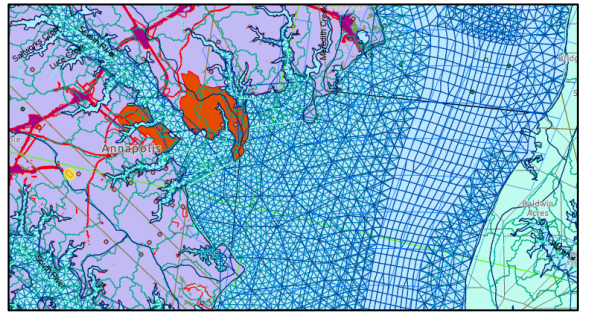
- Expression of the CBP partnership's knowledge about the Chesapeake system.

Updates ensure confidence and credibility

- New model every ~ 10 years
- Smaller updates within (2-4 years)
- Incorporation of new data, scientific advances, and partner feedback… *more confidence, more credibility*

Time	Name	Scenarios
Mid 1980s	NA	0
Early 1990s	Phase 2	<10
Late 1990s	Phase 4.1	37
Early 2000s	Phase 4.3	400+
2009 – 2010	Phase 5.3.0	300+
2011 – 2017	Phase 5.3.2	1000 or so
2017	Phase 6	1000s per year
2028 – 2040	Phase 7	Many more…

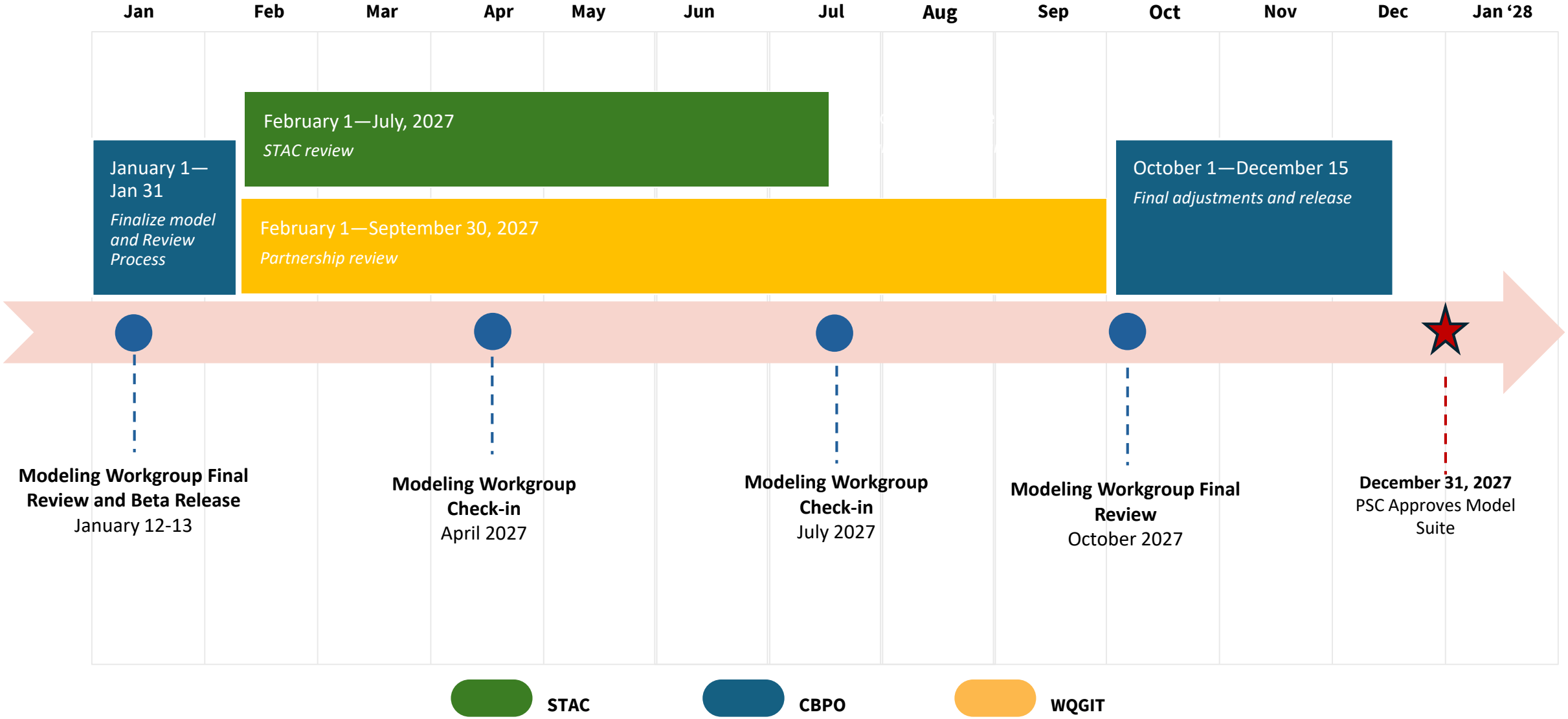




2027 MODEL YEAR OF REVIEW DRAFT SCHEDULE

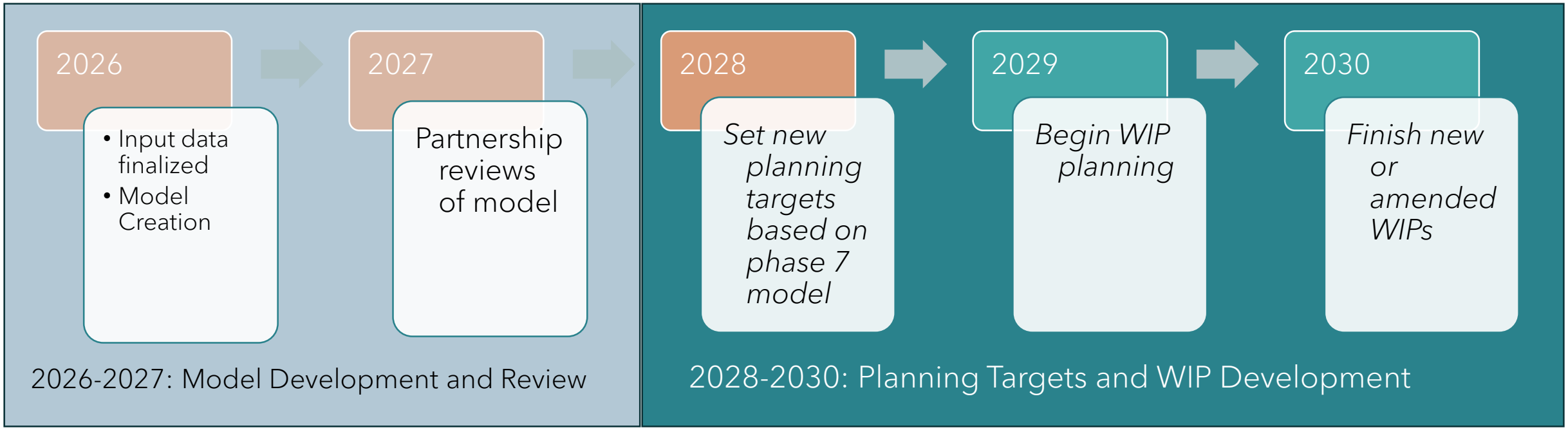
← Ramp-up

Target Development →



CBP MODEL AND PLANNING TIMELINE

Through 2030 continue to accelerate completion of all interim water quality planning targets



TO DO LIST

Finish the Phase 7 suite of models

Develop new planning targets – could be different than what we've done in the past

- Ability to evaluate all Dissolved Oxygen Criteria
  - Should be able to evaluate short duration criteria
  - previously limited to 30 day mean
- On going discussion of "tiered Implementation" – what does this mean and how does it change past practice

- Development (new or enhanced) of new WIPs
  - Expectation is that reaching our objective of meeting water quality standards is going to get harder, not easier