CHESAPEAKE BAY COMPREHENSIVE WATER RESOURCES AND RESTORATION PLAN

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Climate Resiliency Workgroup (CRWG) Meeting

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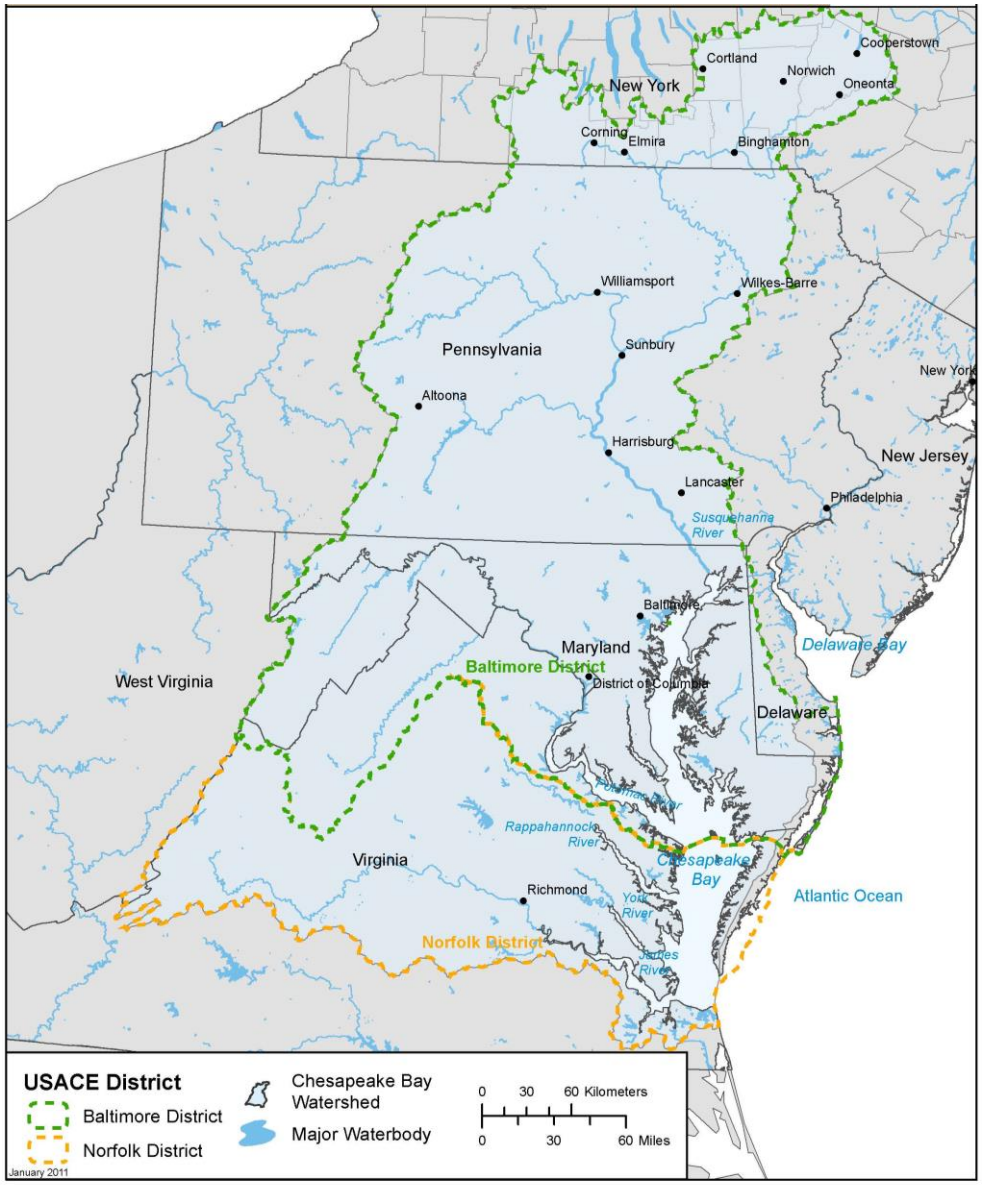
"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."

STUDY AREA


Cooperstown
Cortland
Norwich
Oneonta
New York
Corning
Elmira
Binghamton
Williamsport
Wilkes-Barre
Pennsylvania
Sunbury
New York
Altoona
Harrisburg
New Jersey
Lancaster
Philadelphia
Susquehanna River
Baltimore
Maryland
Delaware Bay
Baltimore District
West Virginia
District of Columbia
Delaware
Rappahannock River
Virginia
Chesapeake Bay
Richmond
Atlantic Ocean
York River
Norfolk District
James River
USACE District
Baltimore District
Norfolk District
Chesapeake Bay Watershed
Major Waterbody
0 30 60 Kilometers
0 30 60 Miles
January 2011

SHARED VISION

- June 16, 2014, the Chesapeake Bay Watershed Agreement was signed.
- Signatories from all Bay states and the Federal Leadership committee.
- CBCP will ALIGN with the Vision established in the 2014 Agreement with a slight change per stakeholder collaboration

"We envision an environmentally and economically sustainable AND RESILIENT Chesapeake Bay watershed with clean water, abundant life, conserved lands and access to the water, a vibrant cultural heritage, and a diversity of engaged citizens and stakeholders."

GOAL

Develop a comprehensive and integrated master plan that would assist with implementation of the 2014 Chesapeake Bay Agreement:

- Effectively and efficiently engage Bay stakeholders to identify problems, needs and opportunities in the watershed and avoid duplication of ongoing or planned actions by others.
- Determine where and how USACE mission areas could be utilized in the watershed to support the goals of the 2014 Chesapeake Bay Agreement.
- Identify actions by other federal, state, and local government agencies and NGOs in the watershed to address problems outside of USACE mission areas.

BACKGROUND

CBCP will result in a single, integrated restoration plan to:

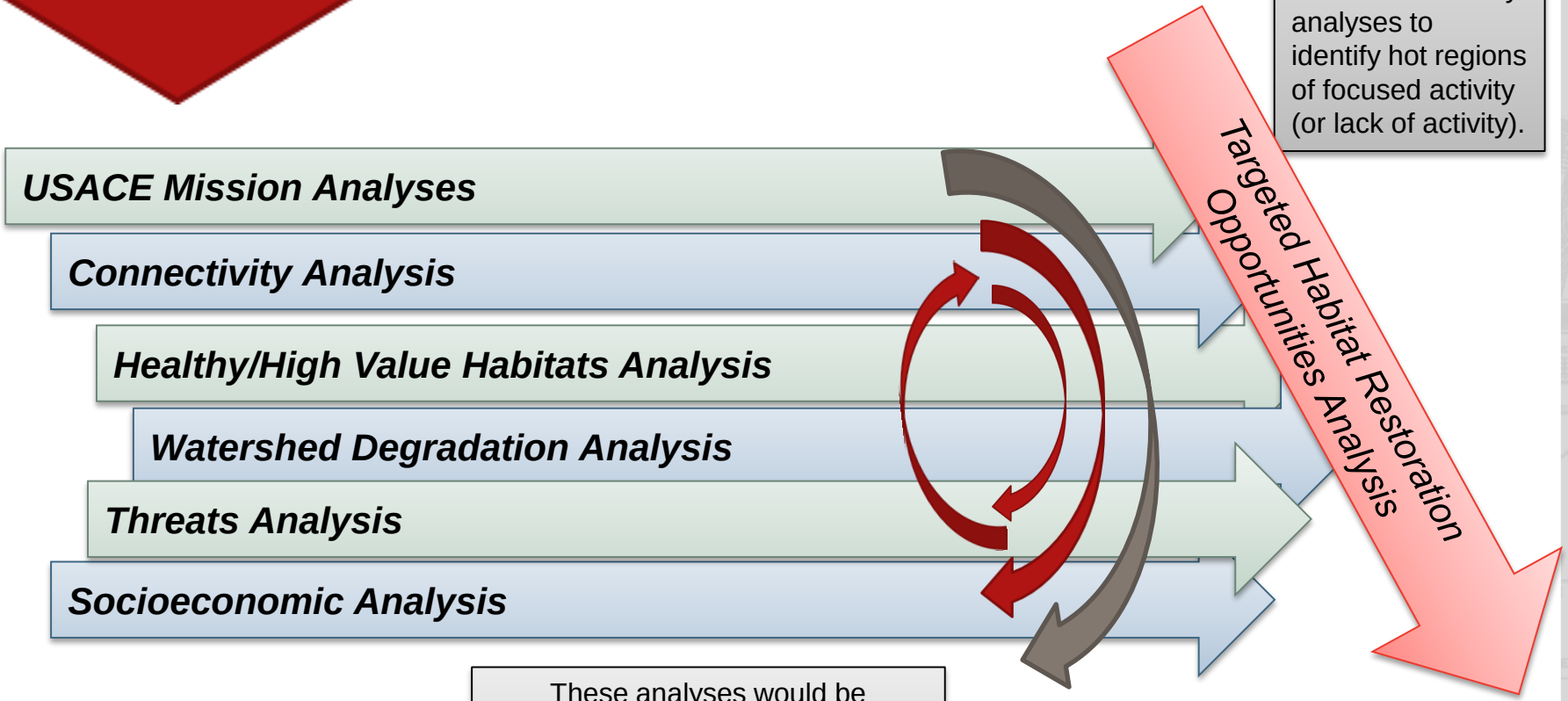
- **Guide** implementation of actions that **protect**, **restore** and **preserve** the Bay
- **Adopt and Align** actions with what others are doing
- **Avoid duplication** of ongoing or planned actions by others
- Make maximum use of **existing information**
- **Identify** ecological problems, needs, and opportunities
- **Identify** projects for **further study** and **implementation**, including at least one for each Bay state and the District of Columbia

STAKEHOLDER COLLABORATION

- ✓ Study Initiation Notice
- ✓ Federal Agency Coordination Letters
- ✓ Webpage, email updates
- ✓ Interagency watershed planning collaboration workshop
- ✓ Strategic Engagements: Cross GIT, SAGE, FWS, DoD Chesapeake Bay Action Team
- ➢ Upcoming
  - ➢ Topical Webinars
  - ➢ Review of Draft Report

COMPOSITE ANALYSES + **Identified Priorities by others** + **Action by others**

GIS cluster analysis or other processes for these evaluations such as a scoring scheme or density analyses to identify hot regions of focused activity (or lack of activity).



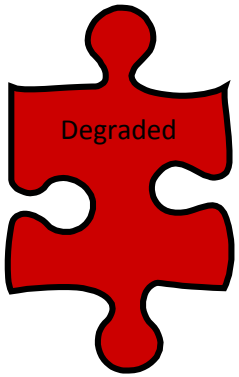
These analyses would be completed independently. The results will then be used with results from other analyses to answer questions and develop recommendations.

US Army Corps of Engineers
Baltimore District

U.S.ARMY

WATERSHED DEGRADATION ANALYSIS

- What subwatersheds are the most degraded?
- Can we summarize the primary problems regionally?



Pertinent data:

- Land use:
  - Percent impervious cover
  - Percent forest
  - Percent forested riparian buffer
- Fish passage blockages
- Stream health
  - Water quality - Impaired streams on 303(d) list
  - Biological integrity – watershed-wide Benthic-IBI
- Impact of nutrient impacts – highest yielding watersheds for Nitrogen (N) and Phosphorus (P)

Outstanding questions:

Should we include areas contaminated with polychlorinated biphenyl (PCBs)?

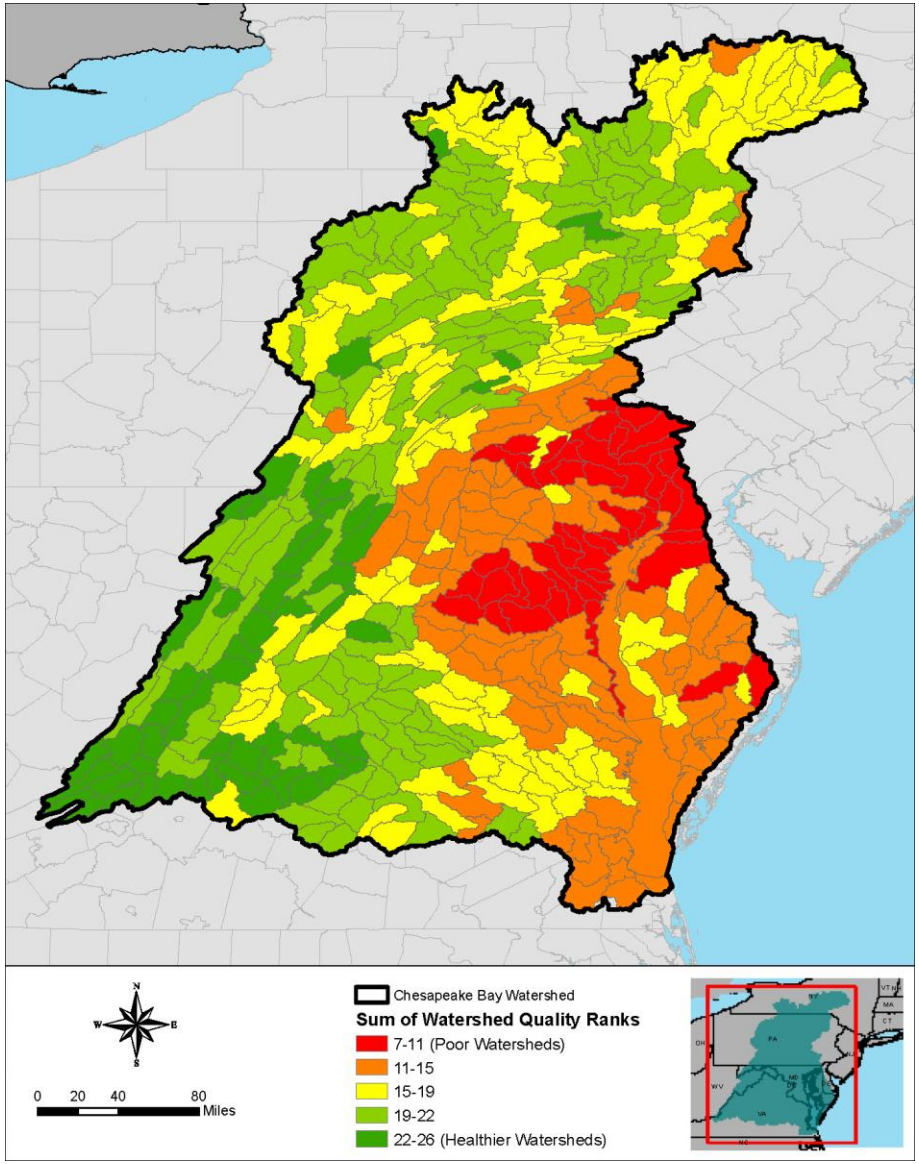
Is there a relevant wetlands metric to incorporate?

WATERSHED DEGRADATION - PROPOSED SCORING SCHEME

Parameter	Data Source	Metric	Scoring	notes for updating for Comp Plan
Landuse (measures of landscape alterations from development)	EPA 2010	Percent impervious cover. Scoring based on relationships established by Center for Watershed Protection (CWP 2003).	0 = >60% 1 = 40-64% 2 = 10-40% 3 = 0-10%	use updated land use?
	EPA 2010	Percent forest cover. Scoring based on goals set and relationships determined in USFS State of Chesapeake Forests (2006)	0 = 0-30% 1 =>30-37 2 =>37-51% 3 = >51	
	EPA 2010	Percent of stream network within subwatershed with forest (riparian buffer). Scoring based on goals set and relationships determined in USFS State of Chesapeake Forests (2006).	0 = 0-56% 1 = >56-63% 2 = >63-70% 3 = >70%	
Stream health- water quality	303(d) Impaired waterways list (EPA)	Stream miles listed as impaired within subwatershed (scoring based on groups determined using Natural Breaks Method (Jenks) in GIS).	0 = 84.64 - 183.33 1 = 34.45 - 84.64 2 = 0.02 - 34.45 3 = 0	use updated layer
Stream health- biological integrity	Chesapeake Bay Program Benthic Index of Biotic Integrity 2000-2010 (watershed-wide B-IBI)	Subwatershed rating assigned by Chesapeake Bay Program based on B-IBI determined by stream monitoring.	0 = NA 1 = poor or very poor 2 = good or fair 3 = excellent	This is latest layer shown on website, but website also states that data will be updated in fall 2016 - http://www.chesapeakebay.net/indicators/indicator/health_of_freshwater_streams_in_the_chesapeake_bay_watershed
Air Quality	Non-attainment zones (EPA)	Yes/no -attainment or non-attainment	0 = non-attainment for both 1 = non-attainment for ozone 2 = non-attainment for PM25 3 = attainment for ozone and PM25	use current listings
Fish Passage	Chesapeake Bay Program Fish Passage Prioritization dataset of blockages (2012)	Number of blockages in a subwatershed (scoring based on groups determined using Natural Breaks Method (Jenks) in GIS).	0 = >51 blockages 1 = 16-51 blockages 2 = 1-15 blockages 3 = no blockages	use updated prioritization list from fish passage workgroup (TNC)
Impact of nitrogen loading on water quality (dissolved oxygen) in Chesapeake Bay	Chesapeake Bay Model output- relative effectiveness-nitrogen (EPA 2012)	Overall relative effectiveness (µg/L DO increase per million edge-of-stream nitrogen pound)	1 = 0-1.28 2 = 1.29-3.03 3 = 3.04-5.89	Should we use the Sparrow Incremental Yields instead of these layers?
Impact of phosphorus loading on water quality (dissolved oxygen) in Chesapeake Bay	Chesapeake Bay Model output- relative effectiveness-phosphorus (EPA 2012)	Overall relative effectiveness (µg/L DO increase per 100,000 edge-of-stream phosphorus pound)	1 = 0-0.67 2 = 0.68-2.14 3 = 2.15-4.1	

WATERSHED DEGRADATION

- EXAMPLE MAP



THREATS ANALYSIS

- What areas are threatened by urbanization and climate change in the watershed?
- What areas are prone to increased/persistent flooding in the future?
- Anticipated to include an eroding shoreline analysis, a wetlands migration analysis, North Atlantic Coast Comprehensive Study (NACCS) outputs, storm risks, species migrations, etc.

Pertinent data:

- Eroding shorelines/vulnerable shorelines
- Uncontrolled N and P loads
- Sediment starved wetlands in Bay proper
- CBP – Sea Level Rise threatened areas – NOAA sea level rise viewer and temperature changes (Cross GIT)
- Areas threatened by more frequent normal flooding
- Resources at risk to coastal storms
- Resources at risk to non-tidal flooding
- Tidal marsh migration corridors
- Future projected development – CBP Cross GIT has a layer
- Future conversion of ag lands – CBP Cross GIT has a layer
- National Fish Habitat Assessment (risk of current habitat degradation) – available via CBP Cross GIT

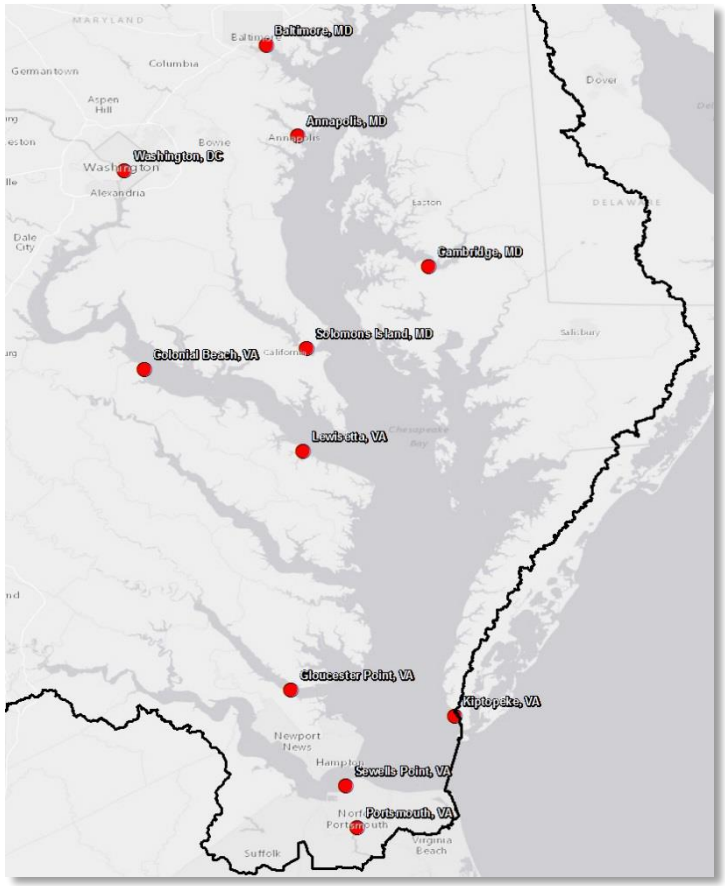
SEA LEVEL CHANGE MAPPING – 2025, 2050, 2100

USACE Sea-Level Change Curve Calculator (2015.46)
http://www.corpsclimate.us/ccaceslcurves.cfm

8638610, Sewells Point, VA
NOAA's Published Rate: 0.01457 feet/yr
All values are expressed in feet relative to NAVD88

Year	USACE Low	USACE Int	USACE High
1992	-0.3	-0.3	-0.3
1995	-0.2	-0.2	-0.2
2000	-0.1	-0.1	-0.1
2005	-0.1	-0.1	-0.0
2010	0.0	0.0	0.1
2015	0.1	0.1	0.3
2020	0.1	0.2	0.4
2025	0.2	0.3	0.6
2030	0.3	0.4	0.8
2035	0.4	0.5	1.1
2040	0.4	0.6	1.3
2045	0.5	0.8	1.6
2050	0.6	0.9	1.8
2055	0.7	1.0	2.1
2060	0.7	1.1	2.4
2065	0.8	1.3	2.8
2070	0.9	1.4	3.1
2075	0.9	1.6	3.5
2080	1.0	1.7	3.9
2085	1.1	1.9	4.3
2090	1.2	2.0	4.7
2095	1.2	2.2	5.2
2100	1.3	2.4	5.6

Print Table



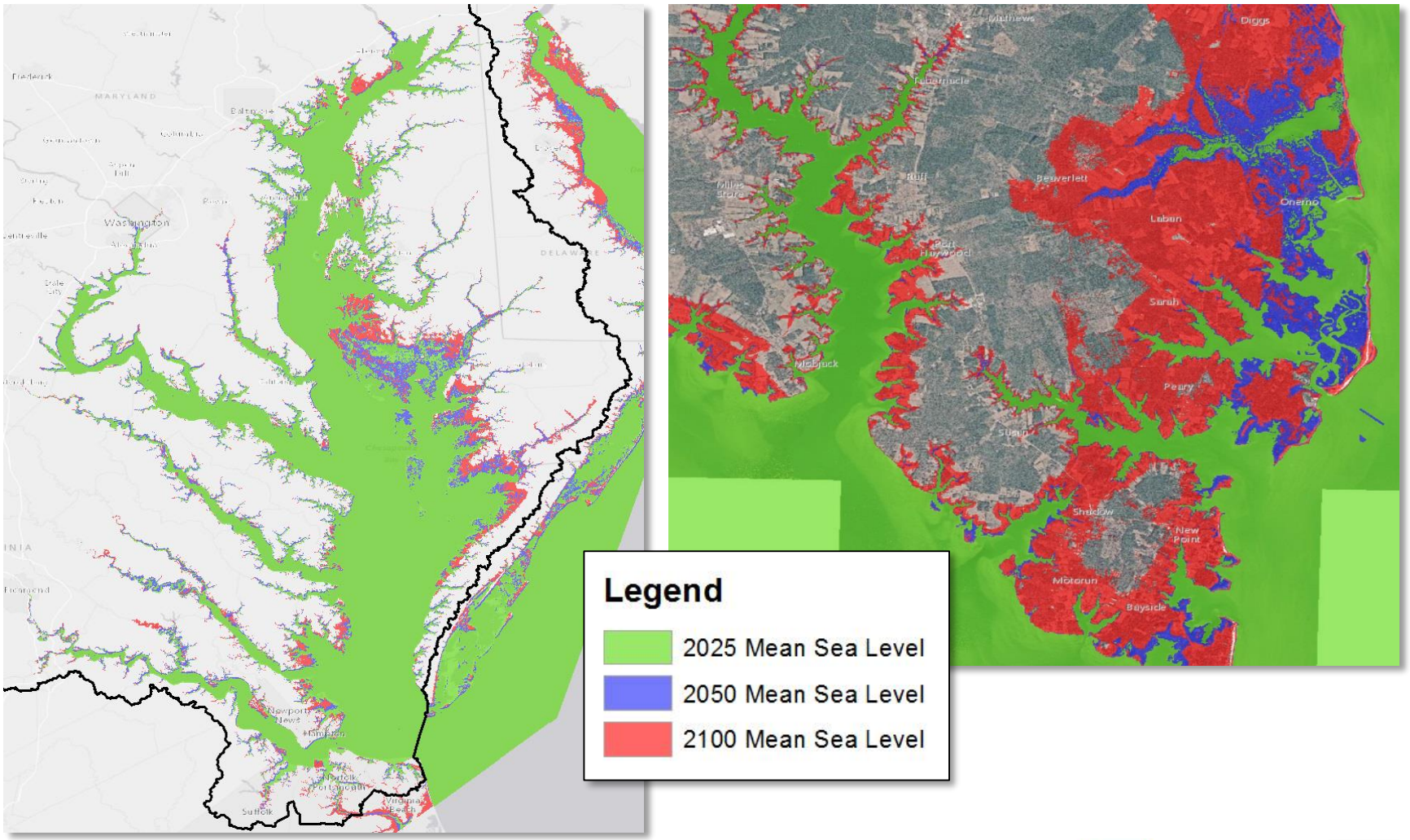
2050 SLC

Kiptopeke, VA
1.43’

Annapolis, MD
1.85’

Colonial Beach, VA
2.14’

SEA LEVEL CHANGE MAPPING – 2025, 2050, 2100



NEXT STEPS

- Data calls due March 7
- U.S. Fish and Wildlife Service Planning Aid Report - late March
- Stakeholder webinars - April and June
- Draft Report for review – Fall 2017
- Final Report - Summer 2018

Chesapeake Bay Comprehensive Plan Milestone Schedule

July 2016 Cost-Sharing Agreement Execution

Chesapeake Bay Program Management Strategies and Action Plan Synchronization

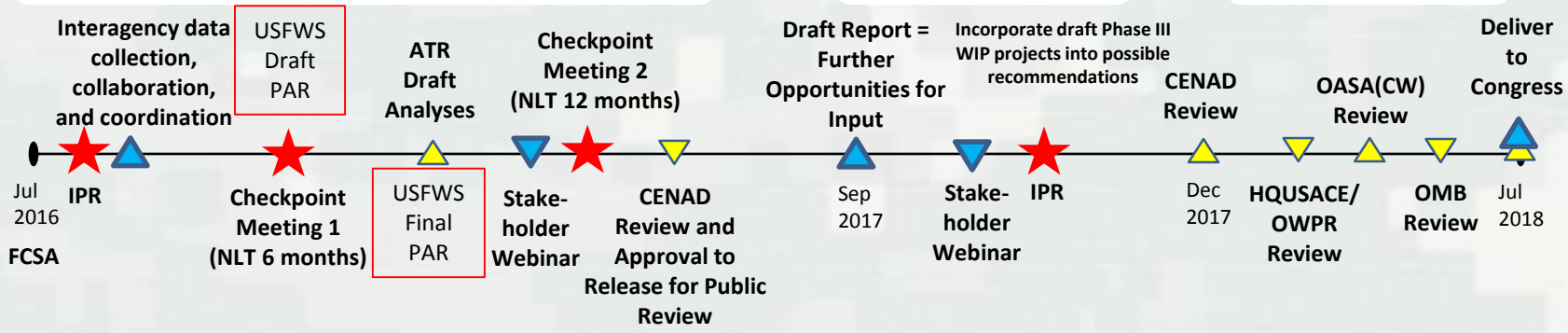
State Draft Phase III WIPs 2017-2018

DEVELOP SOW AND PMP

PHASE 1 [Months 1-13] TECHNICAL ANALYSES

PHASE 2 [Months 14-17] STATE AND OTHER STAKEHOLDER FEEDBACK

PHASE 3 [Months 18-21] FINALIZE WATERSHED ASSESSMENT REPORT



PHASE 1 [Months 1-14]

1. ~~Vertical team IPR~~
2. ~~Interagency watershed planning collaboration workshop~~
3. Data collection-**ONGOING**
4. Existing and future conditions forecast/geospatial analyses **ONGOING**
5. Coordinate and synchronize Chesapeake Bay Program management strategies and biennial work plans **ONGOING**
6. Vertical team IPR – Checkpoint Meeting 1 - **TODAY**
7. Review Draft USFWS PAR
8. Complete geospatial analyses
9. ATR draft geospatial analyses
10. Stakeholder webinar
11. Vertical team IPR – Checkpoint Meeting 2
12. Draft report preparation
13. District quality control and sponsor/state POC reviews
14. CENAD review and approval to release for public review

PHASE 2 [Months 15-18]

1. Release draft report for state, other stakeholder, and public review
2. Respond to comments
3. Incorporate latest information related to draft Phase III watershed implementation plan data
4. Final report preparation
5. District quality control and sponsor/state POC reviews

PHASE 3 [Months 19-21]

1. CENAD review
2. Comment response
3. HQUSACE/OWPR review
4. Comment response
5. OASA(CW) review
6. Comment response
7. OMB review
8. Comment response
9. HQUSACE Chief, Planning and Policy approval
10. HQUSACE RIT coordinates with OASA(CW) delivery of final report to Congress

Initiate New Start USACE Feasibility Study Funding Requests/
Initiate New Start CAP or Technical Services Actions/
Coordinate Section 510 Implementation Plan

★ = USACE Vertical Team Integration Action
△ = USACE Reviews
△ = Stakeholder Collaboration Opportunity