

# WETLANDS IN THE WATERSHED



# OVERVIEW

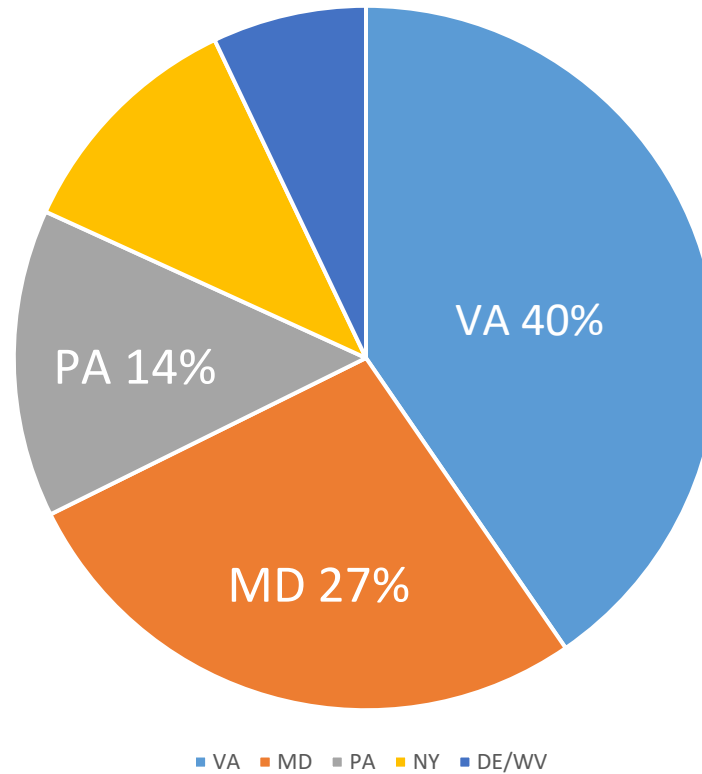
- 1.5 million acres of wetlands in the Bay Watershed – 86% nontidal
- Wetlands in the Bay Watershed are facing climate change challenges: non-tidal wetlands from rainfall flood/drought cycles, tidal wetlands from sea level rise.
- Recent tidal wetlands loss estimates run from 50% by 2100 to 89% by 2080.
- Loss range is dependent on policy response – full restoration/living shorelines PLUS allowing marsh migration will produce “only” 50% loss.
- Policies to address future threats to wetlands exist but represent major shifts in policy focus, will generate pushback, and will be expensive.

# Wetlands Values

- Nutrient pollution and sediment removal = base of food chain
- Habitat = tidal wetlands host 90% of fish and finfish of commercial or sport significance.
- Flood and Storm Control = nontidal wetlands slow and soak up rainfall flooding, tidal wetlands slow wave and storm surge.
- Groundwater recharge/base flow to streams = nontidal wetlands
- Carbon storage = more than tropical rainforests

# Wetlands In Bay States

Percentage of Bay Wetlands by State

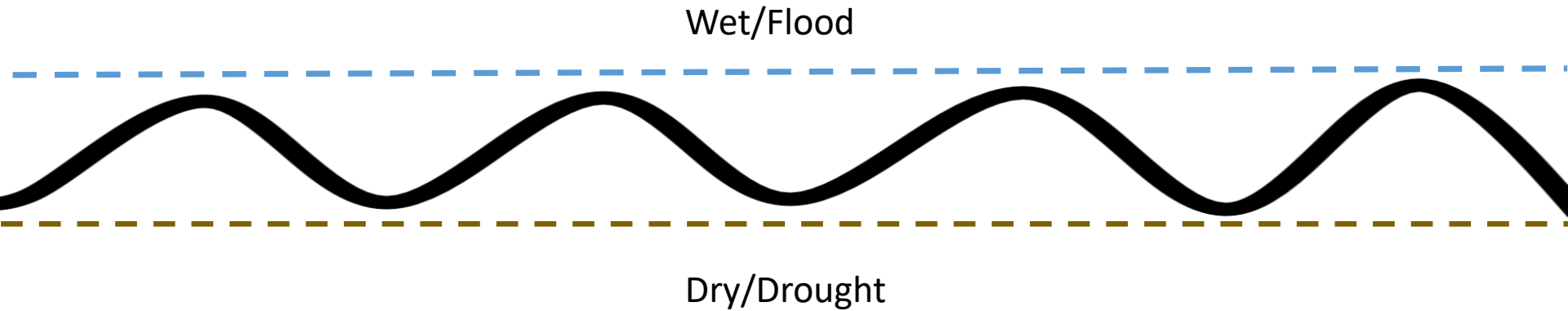


Chesapeake Bay Commission States Have 71% of Bay Wetlands

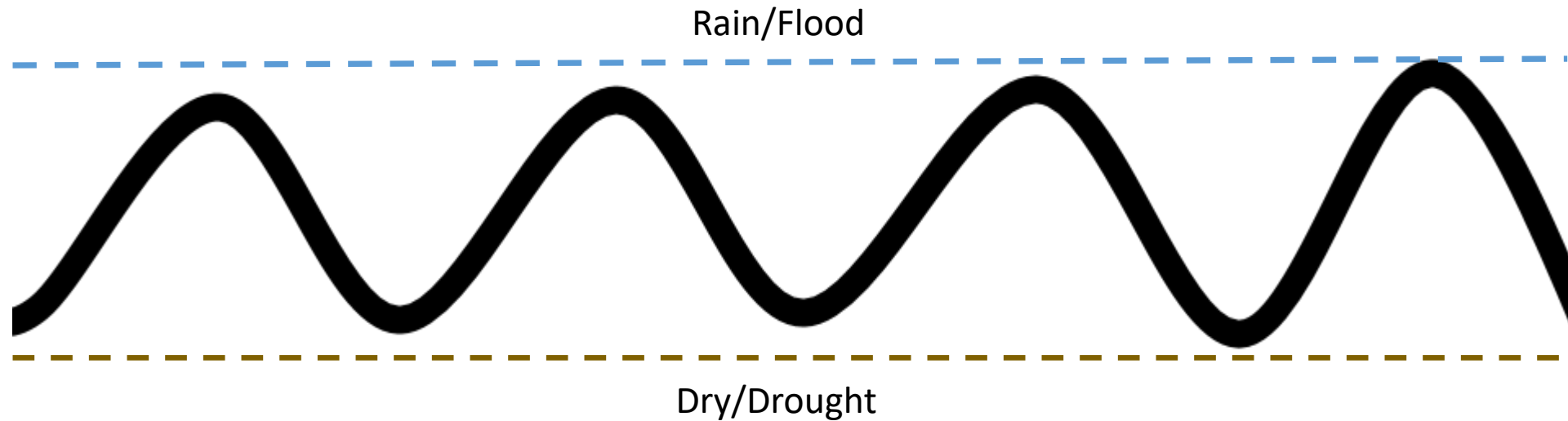
# Nontidal Wetlands

- Largest acreage of wetlands in the Bay watershed = 86% of total wetlands.
- Dependent upon rainfall and vulnerable to flood and drought cycles.
- Climate Change impacts not well studied or monitored.

# Nontidal Wetlands Cycle Through Normal Rain/Dry Periods



# Longer/More Intense Rain/Dry Periods With Climate Change Threaten Nontidal Wetlands

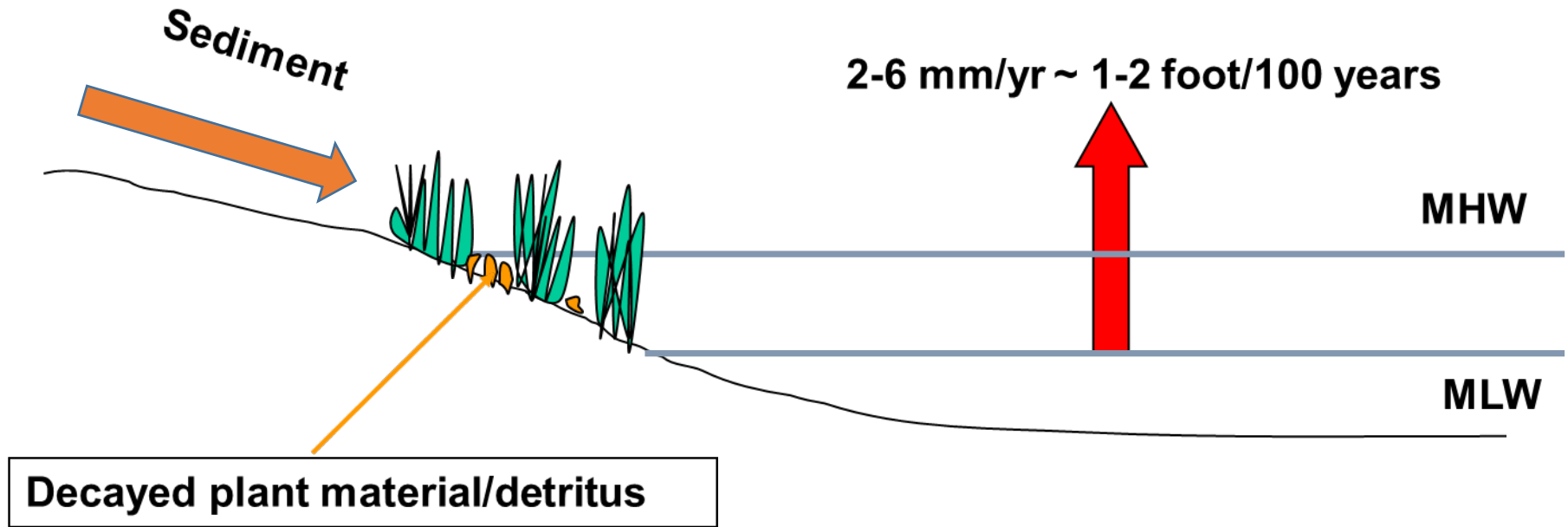


# Tidal Wetlands

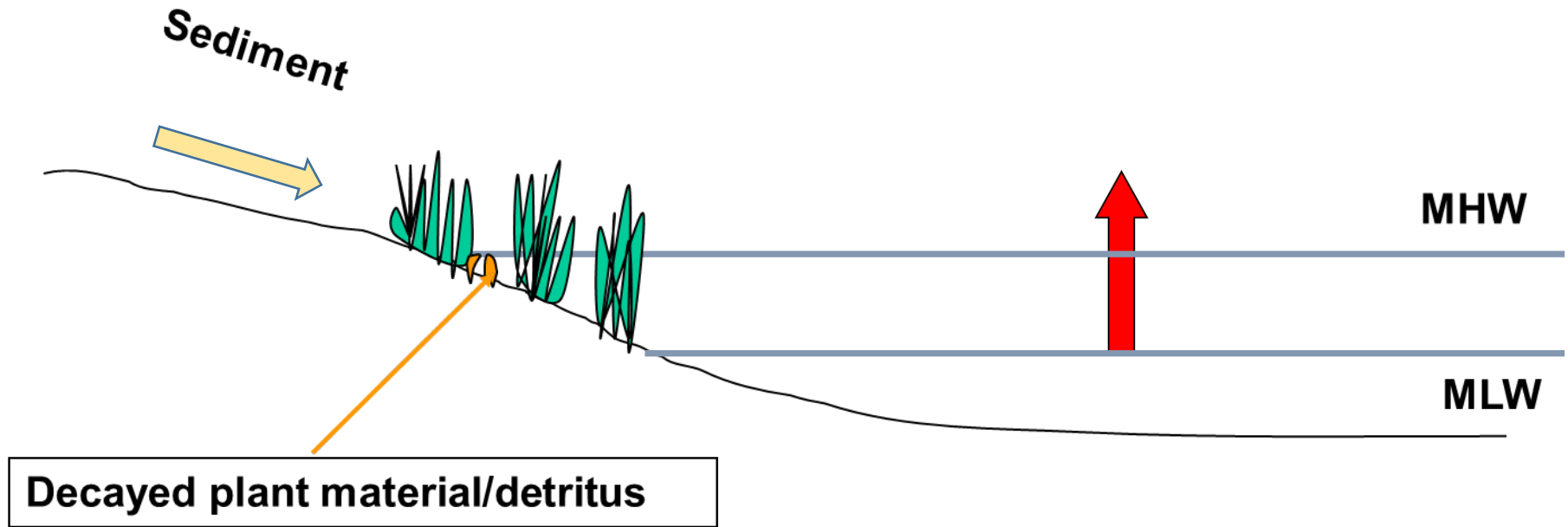
- Exist in the intertidal zone = tidal water levels determine the extent of the wetlands.
- Well studied = estimates of vegetated tidal marsh loss due to sea level rise range from ~50% to 89%.
- Some areas will see tidal wetlands gains, some will see losses.



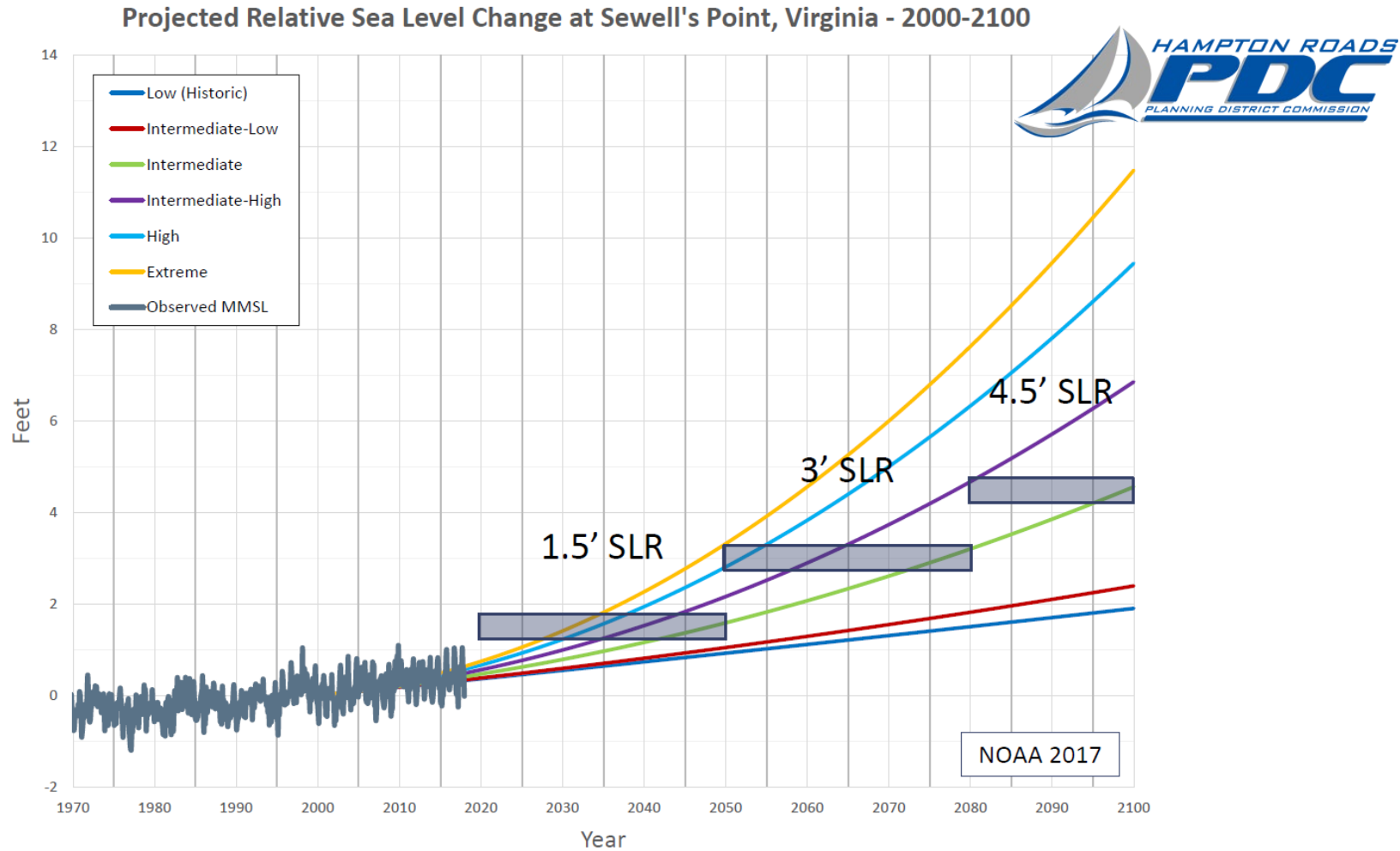
# Wetlands Keep Pace with Modest SLR



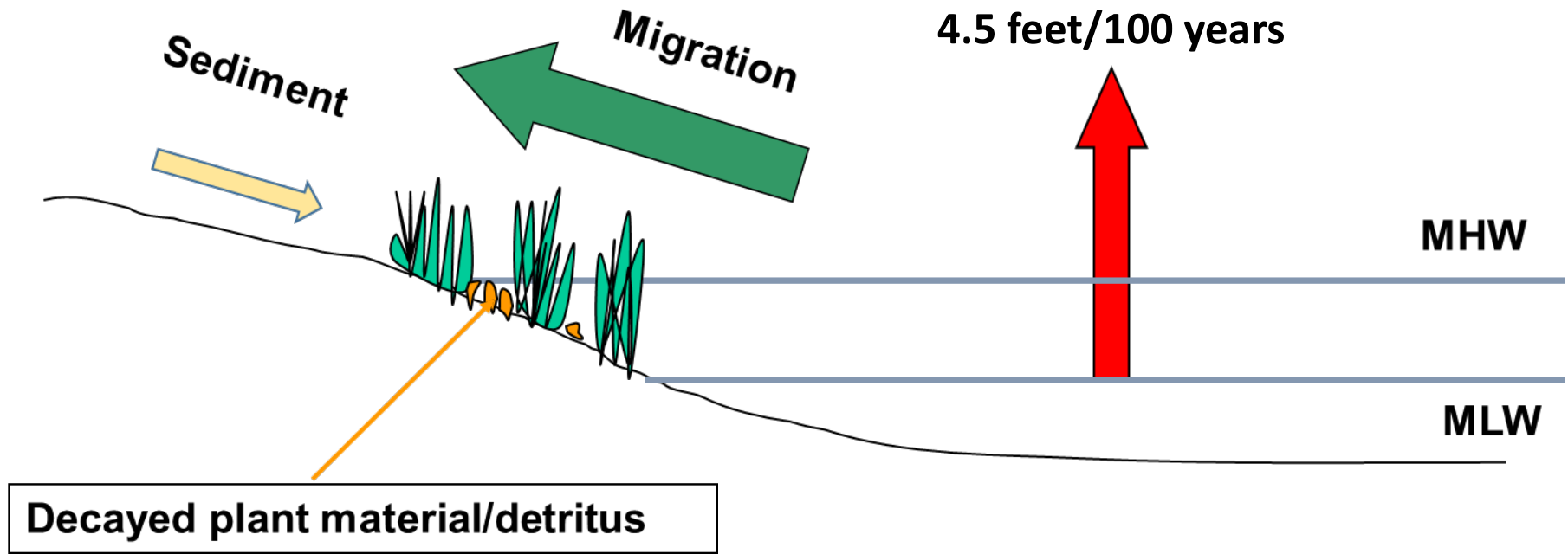
# Erosion and Sediment Control Reduce “Needed” Sediments = Slowing Vertical Movement



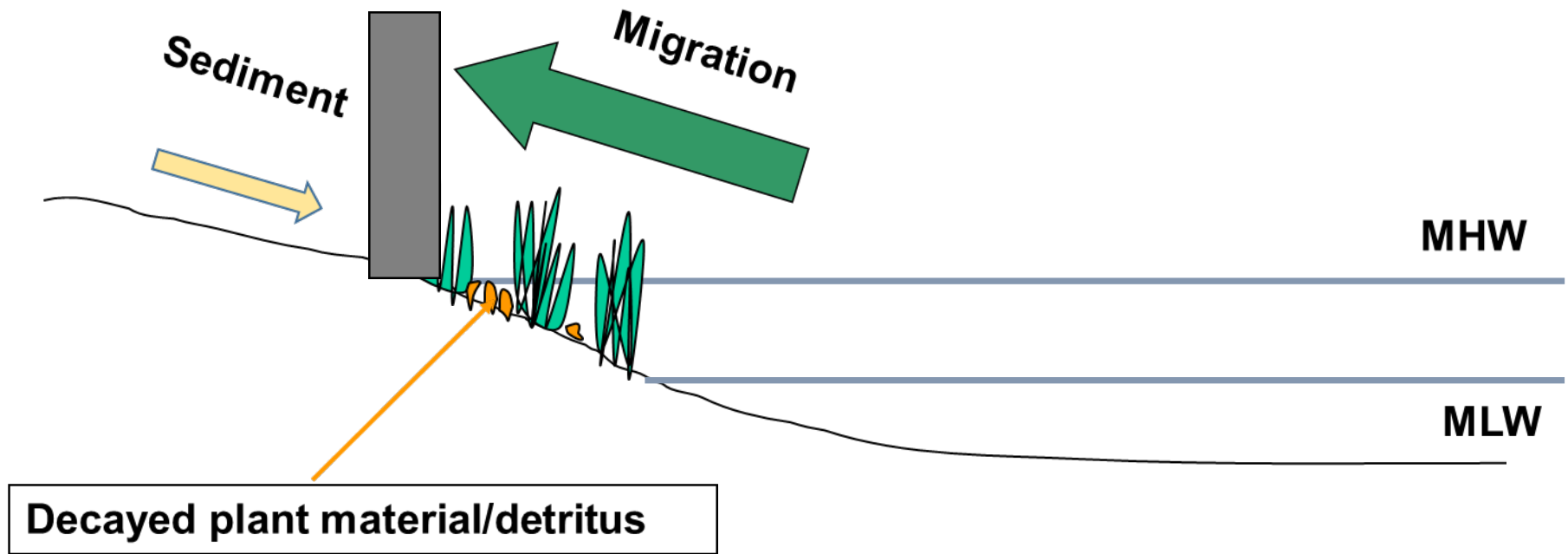
# Virginia Sea Level Rise Projections



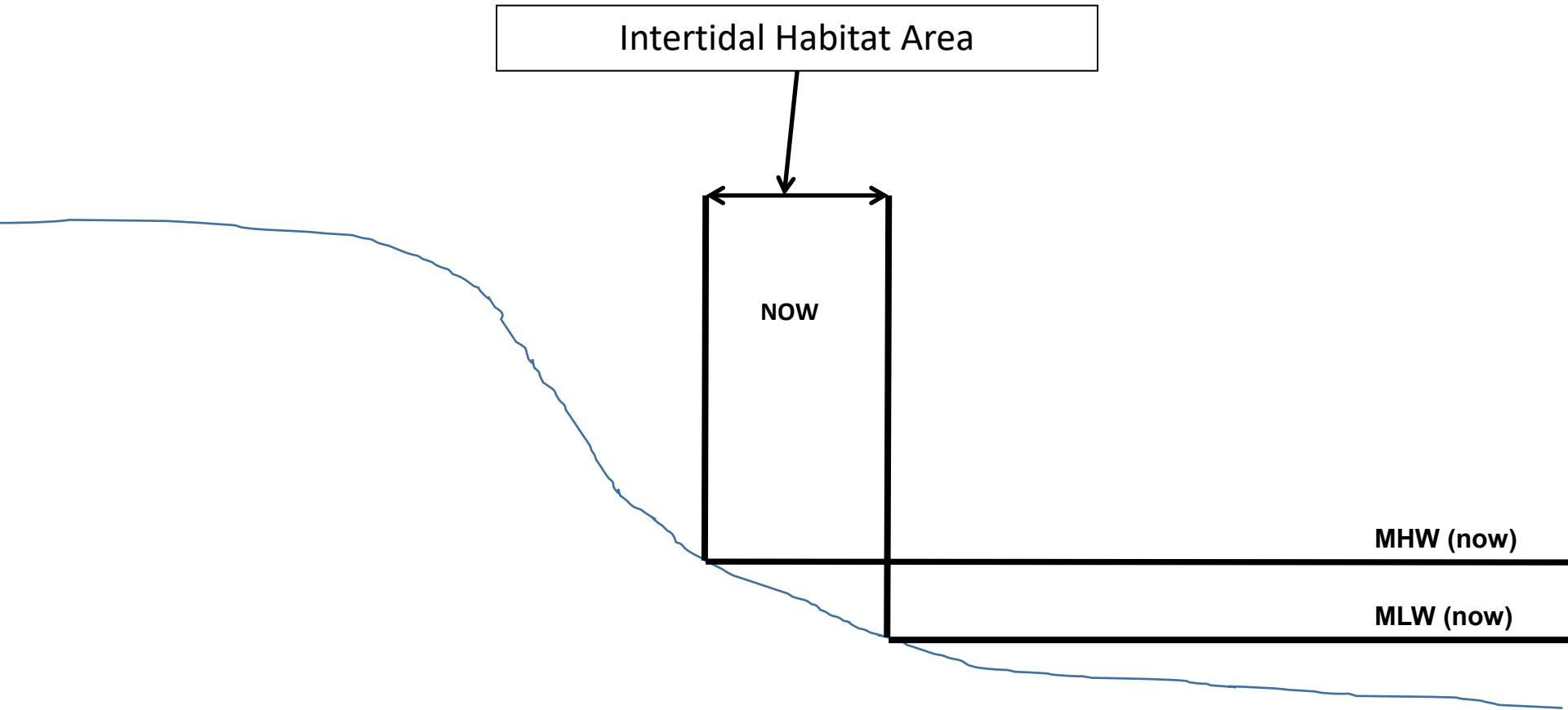
# Higher Rates of SLR = Wetlands Migrate (Transgress) Into Newly Created Intertidal Zone



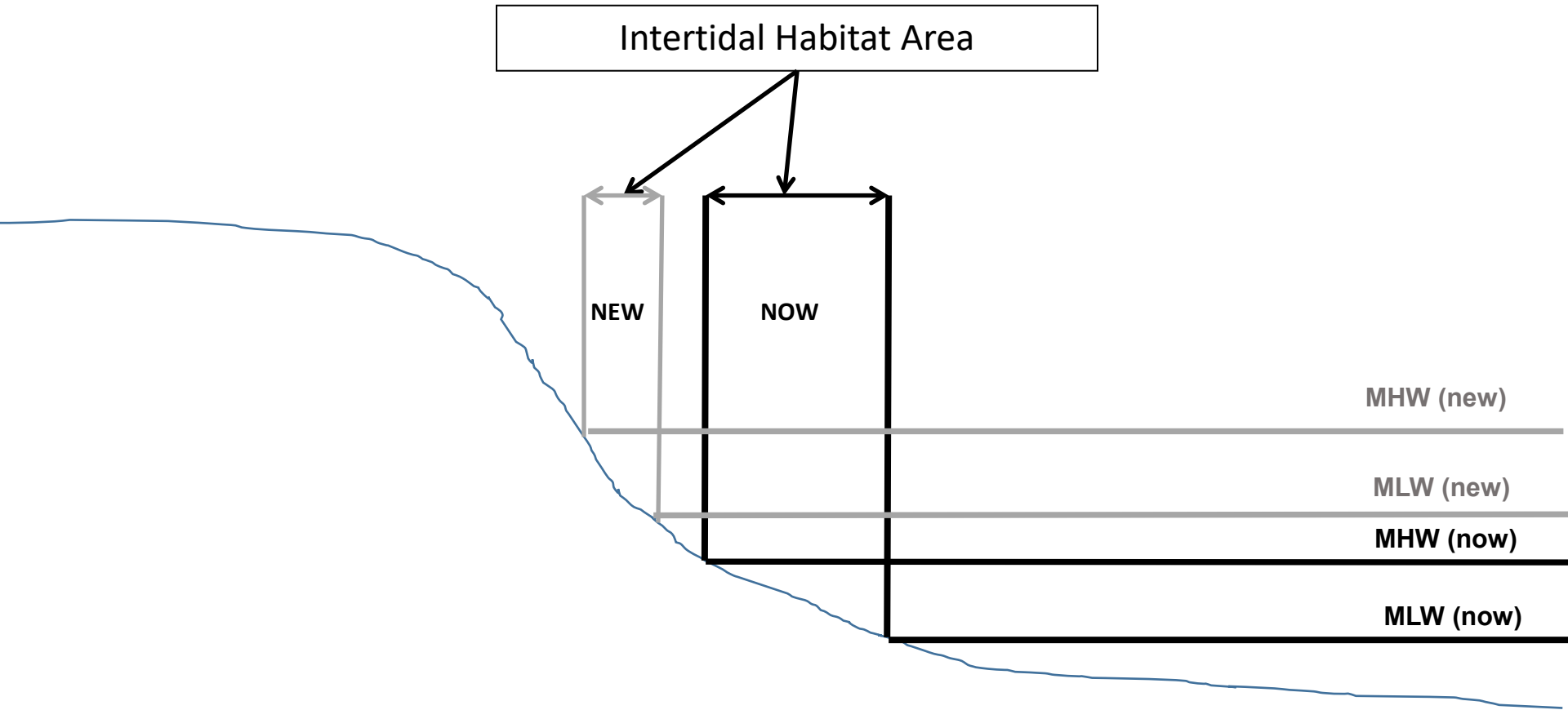
...until a Barrier is Encountered



# Land Elevation/Slope Determines Wetland Area



# As the Intertidal Zone Moves Upslope, There is Less Area for the Wetlands



# Bay Program Responding to These Changes

**Chesapeake Executive Council**

*Directive No. 21-1 Collective Action for Climate Change*



**Chesapeake Bay Program**

*Science. Restoration. Partnership.*

**BIENNIAL STRATEGY REVIEW SYSTEM**  
*Chesapeake Bay Program*

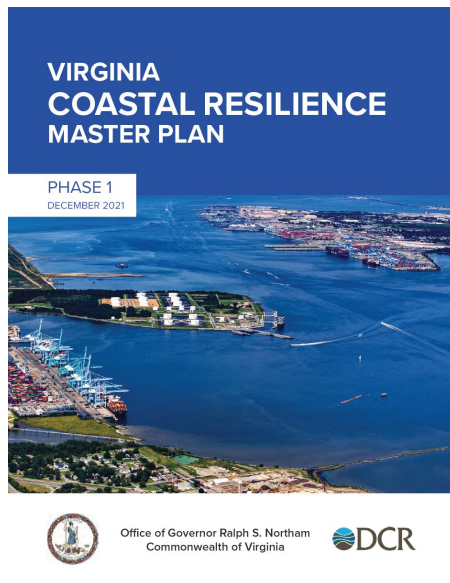
Narrative Analysis



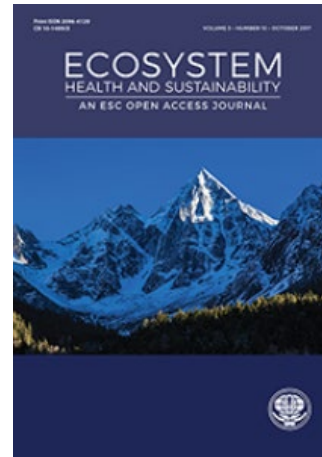
**CLIMATE RESILIENCY OUTCOMES – NOVEMBER 14, 2020**

## Climate Change Indicators for the Chesapeake Bay Program: An Implementation Strategy





An estimated 170,000 acres, or **89%, of existing tidal wetlands** and 3,800 acres, or **38%, of existing dunes and beaches** may be permanently inundated, effectively lost to open water. (2021)

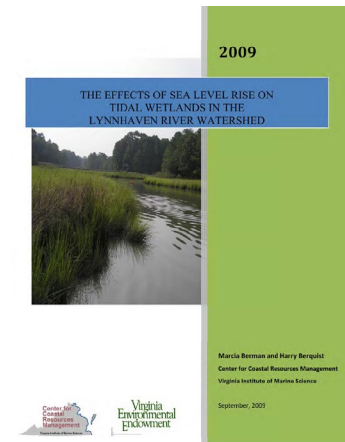


Marsh change varied spatially along the estuary (York River), with watershed changes between a 32% loss and an 11% gain in marsh area.

Virginia could see tidal wetlands losses of 42% by 2100, if shoreline development continues



95% of tidal wetlands in the Lynnhaven River will be gone by around 2080.



# Wetlands Loss Projections - Summary

December 2020 – VIMS projects a wetland loss of up to 50% by 2100 (migration of wetlands maximized).\* Some areas gain marshes (tidal fresh/upriver)

November 2021 – Coastal Master Plan projects 89% loss of tidal wetlands by 2080, 51% of nontidal marshes, and 38% loss of beach and dune habitat. (no migration of marshes assumed).\*\*

June 2022 – Climate Central study projects a wetland loss of 42% by 2100.\*

\*Without ability for marsh migration, the total goes much higher.

\*\* Losses at these levels make Chesapeake Bay cleanup goals unattainable.

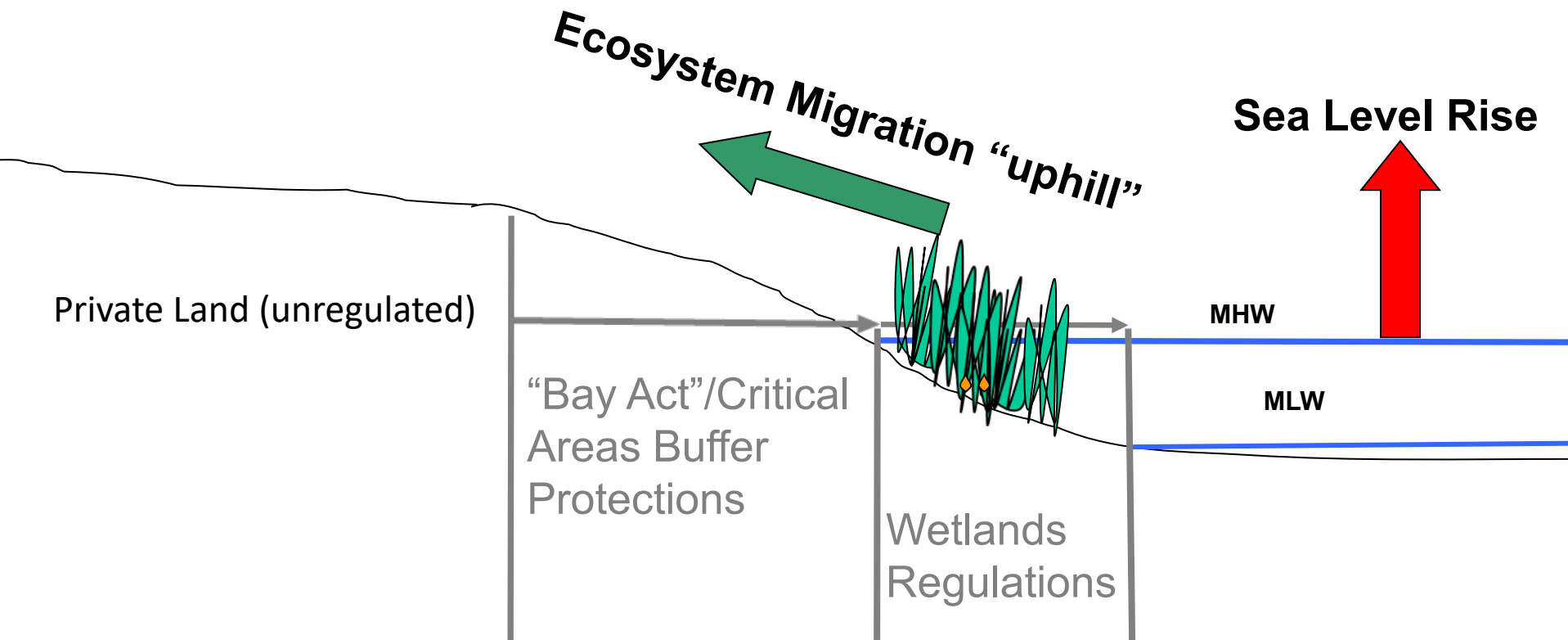


# Bottom Line for Vegetated Tidal Wetlands

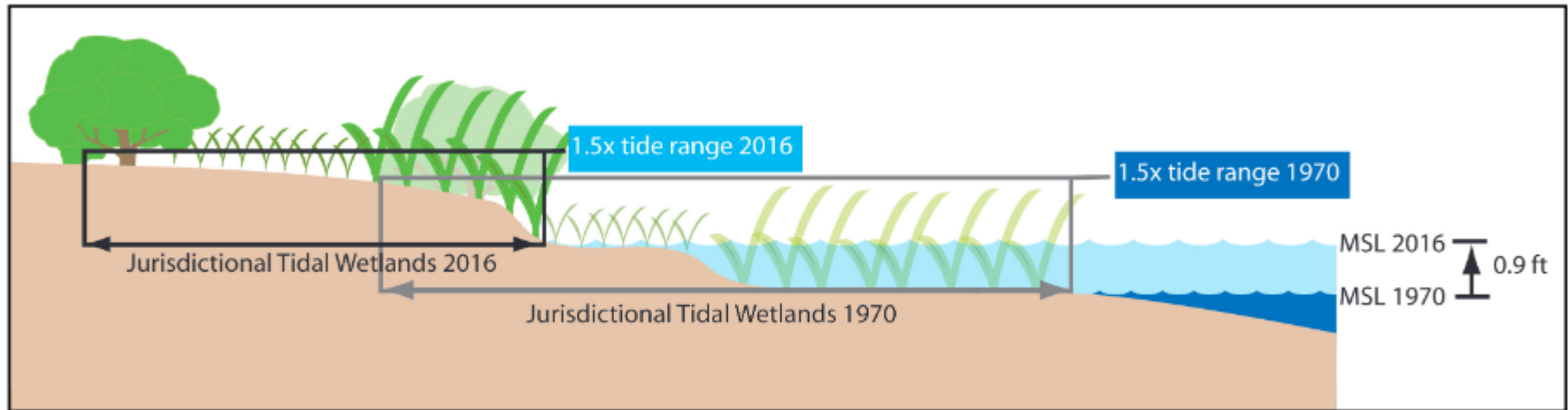
“Vertical Accretion” of tidal marshes is off the table in the mid-Atlantic where rates of sea level rise exceed the observed vertical accretion rates of vegetated tidal wetlands and where erosion and sediment control has limited the availability of sediments.

Creating “Migration Corridors” or refugia for tidal wetlands is the difference between large losses (~90%) and smaller losses (~50%) and even gains in some areas (although gains in tidal wetlands will come at the expense of other ecosystems as they are converted: nontidal wetlands/scrub-shrub wetlands, coastal forests, agricultural lands, etc.)

# Today's Static Shoreline Regulatory Scheme Needs to Change with the New Reality



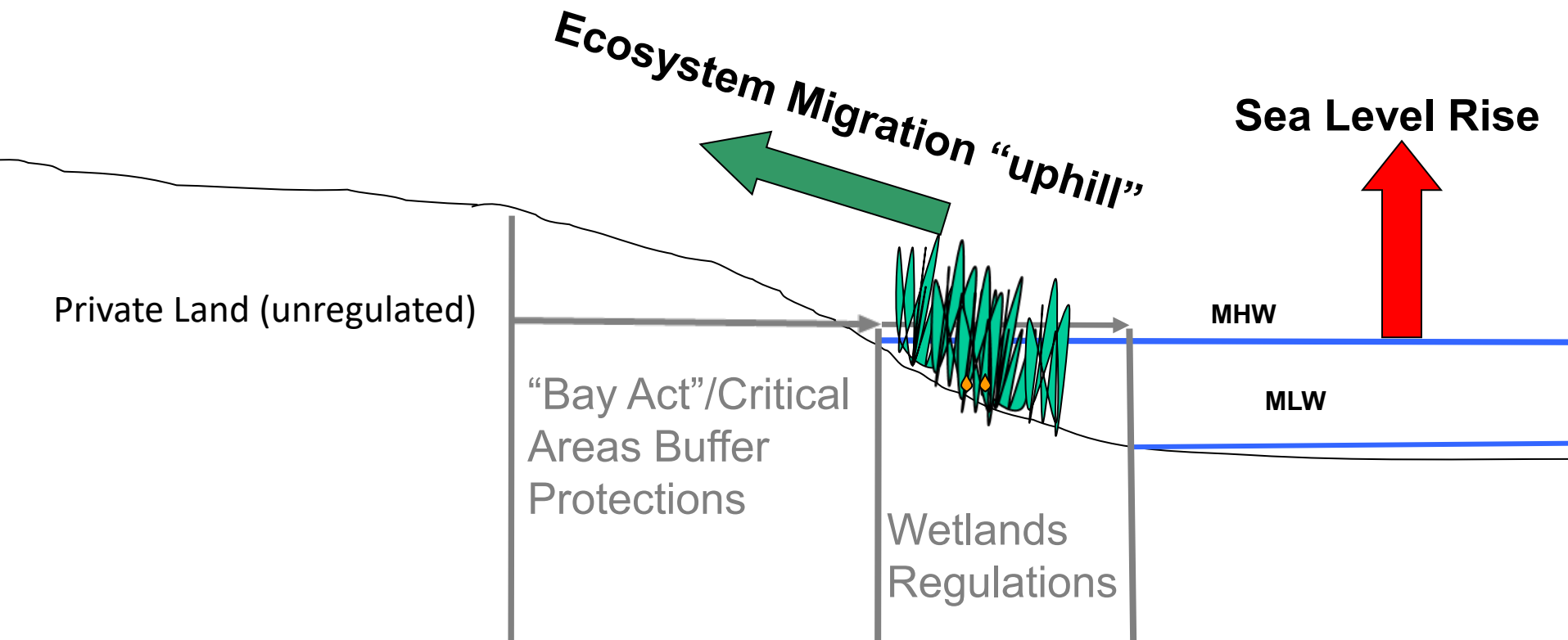
# The Shoreline is Moving Now



**Figure 8.** *Illustration of how jurisdictional vegetated tidal wetlands change with a rising sea level.* VIMS

+ .9 feet of Sea Level Rise since 1970 has shifted the jurisdiction of the Tidal Wetlands Act uphill from its previous location.

# Today's Static Shoreline Regulatory Scheme Needs to Change with the New Reality



# Dynamic Shoreline Demands a Dynamic Regulatory Scheme, Coordinated Across Statutes

Developable “by-right”  
= How do you impose  
future conditions?

**Sea Level Rise**

**Ecosystem Migration “uphill”**

MHW

MLW

“Bay Act” Buffer  
Protections

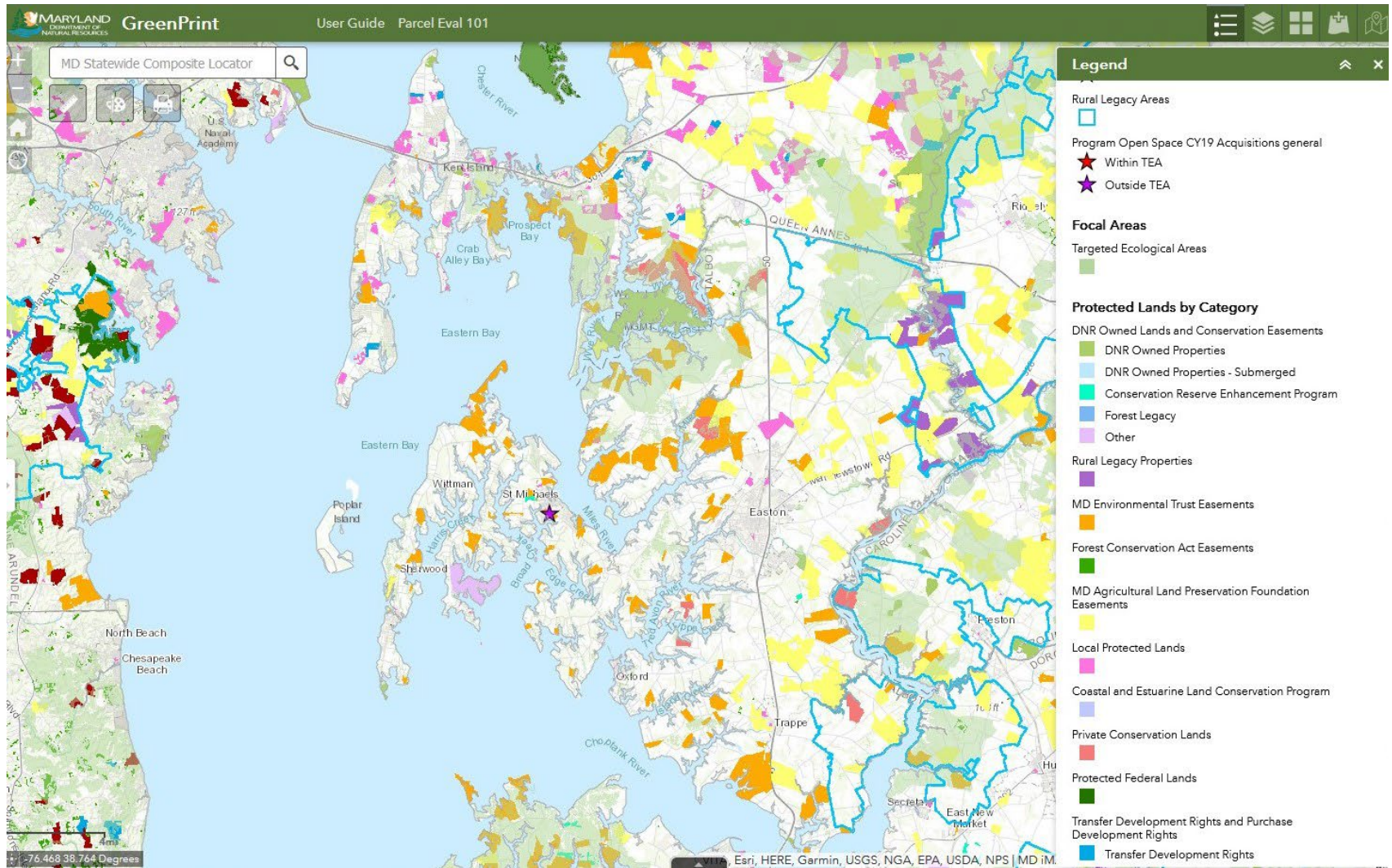
Wetlands  
Regulations



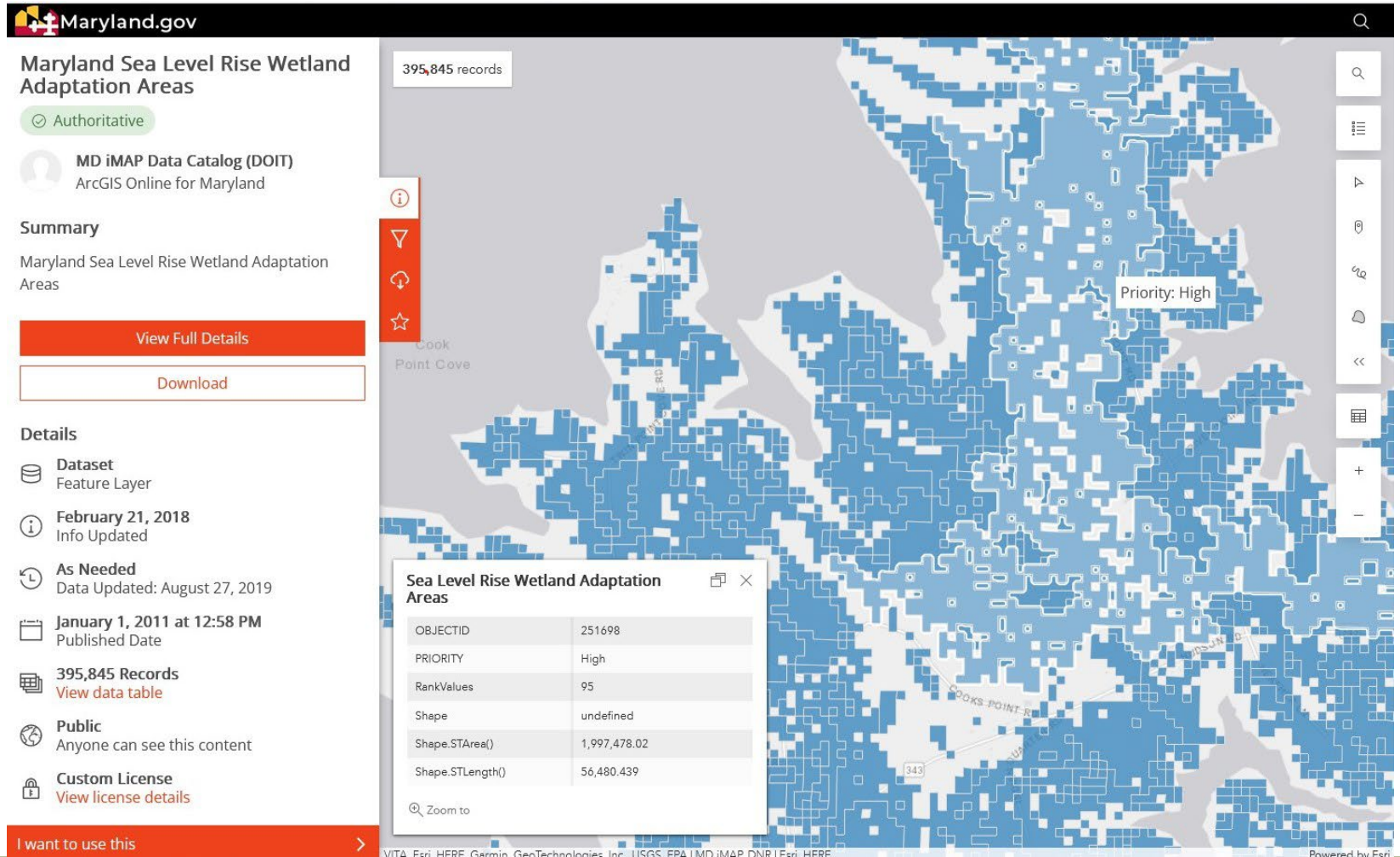
# Policies Required to Respond to These Changes



# Maryland Green Print and Targeted Ecology Areas



# Marsh Migration Planning is Underway



# Policy Options Exist in Virginia

A series of new laws and regulations in Virginia take future conditions into account when issuing tidal wetlands permits, Chesapeake Bay Preservation Act variances, and septic permits.

Together these laws and regulations can provide the means to create wetlands migration corridors along the tidal shoreline.

These laws and regulations can be duplicated in other Bay states, especially Maryland with its Critical Areas Act.

# SIGNIFICANT CHANGES: CHESAPEAKE BAY ACT

HB 504 (Hope) amends the Chesapeake Bay Preservation Act (§ 62.1-44.15:72)

“The criteria adopted by the Board, operating in conjunction with other state water quality programs, shall... encourage and promote ‘coastal resilience and adaptation to sea-level rise and climate change.’” as a purpose of the Act.



## SIGNIFICANT CHANGES: TIDAL WETLANDS

SB 776 (Lewis) amends the powers and duties of the Virginia Marine Resources Commission at § 28.2-1301, related to wetlands regulation to read:

“B. The Commission shall preserve and prevent the despoliation and destruction of wetlands while accommodating necessary economic development in a manner consistent with wetlands preservation and any standards set by the Commonwealth in addition to those identified in § 28.2-1308 to ensure protection of shorelines and sensitive coastal habitats from sea level rise and coastal hazards, including guidelines and minimum standards promulgated by the Commission pursuant to subsection C.”



# SIGNIFICANT CHANGES: SEPTIC PERMITTING

SB 1396 (Hashmi) amends the powers and duties of the Board of Health at § 32.1-164 B related to septic permitting regulations to read:

B. The regulations of the Board shall ... be designed to protect the public health and promote the public welfare and may include, without limitation:

16. Consideration of the impacts of climate change on proposed treatment works based on research and analysis from the Center for Coastal Resources Management at the Virginia Institute of Marine Science at The College of William and Mary in Virginia.

# Importance of Septic Siting



# Looking Ahead to Solutions



# Funding Options

- Property purchase
  - FEMA - only NFIP insured properties (~20%)
  - USACE - Decades-long backlog of funding.
  - State/Local funding - Community Flood Preparedness Fund, post-disaster funding (federal), local funds.

# PROPERTY PURCHASE IN NEWPORT NEWS, VIRGINIA

- 79 properties acquired, 80<sup>th</sup> is in process (since 1999)
  - 67 properties purchased with City funds
  - 12 properties purchased with FEMA grant funds (FMA & HMGP in 2001/2002 and 2005)
- \$4,236,370 total invested
  - \$3,619,570 City Funded
  - \$616,900 Grant Funded
- 15.2 acres restored to greenspace
  - 13.63 acres purchased with City Funding
  - 1.57 acres purchased with Grant Funding



# Community Rating System

- FEMA program lowers flood insurance rates in a locality that takes extra flood protection measures.
- Greatest protections come from protecting open space in the floodplain (where wetlands are/will migrate).
- CBPA and Critical Areas Act lands qualify and can provide flood insurance reductions, effectively “monetizing” open space for marsh migration.

# Conservation Easements

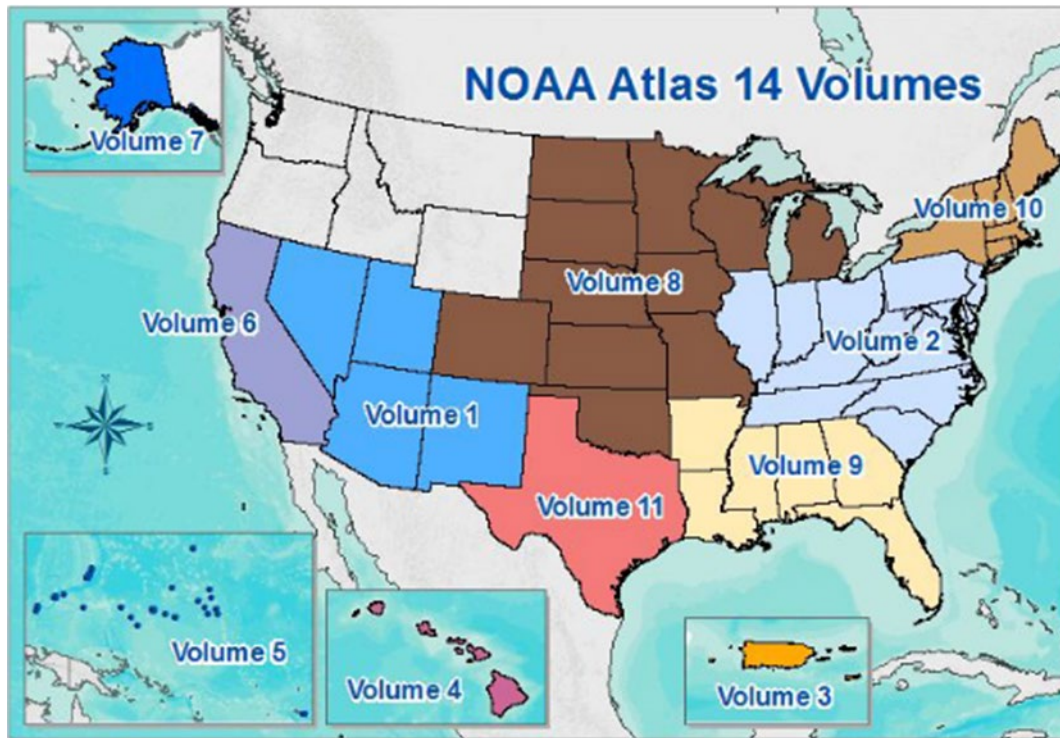
- Maryland Department of Natural Resources (DNR) has developed “Coastal Resilience Conservation Easements” to provide a development setback based on future wetlands zones.
- Wetlands Watch is working on the use of conservation easements – “Rolling Easements” – to allow people to take conservation credits with a promise to vacate when a certain flood risk trigger is met.

# Work Underway

# WETLANDS WATCH

## Rainfall Updates: Next Step

Virginia, Pennsylvania, Delaware, Maryland, North Carolina, South Carolina have all contracted with NOAA for an update of the official rainfall document, "Atlas 14," last updated in 2006. It is expected to show the same results as the MARISA IDF work ~+18%. (Update expected by 2024)



## Needed Work?

- Better research/monitoring/information on nontidal wetlands stressors and impacts on acreage and function. Updated hydrologic cycle impacts.
- Better marsh loss estimates integrating physical projections for marsh migration with realistic property owner and local government reactions.
- Identify marsh migration corridors to prioritize conservation work.



# Needed Work?

- Full implementation of Virginia's new laws: adoption of future conditions in other Bay state permitting statutes.
- Emphasis on restoration and natural shoreline management (living shorelines) in developed areas.
- Emphasis on future conservation and migration in undeveloped areas.
- Consideration of wetlands as critical infrastructure in resilience plans



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