

SHORELINE PROTECTION Suitability Assessments



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Site Evaluation Process

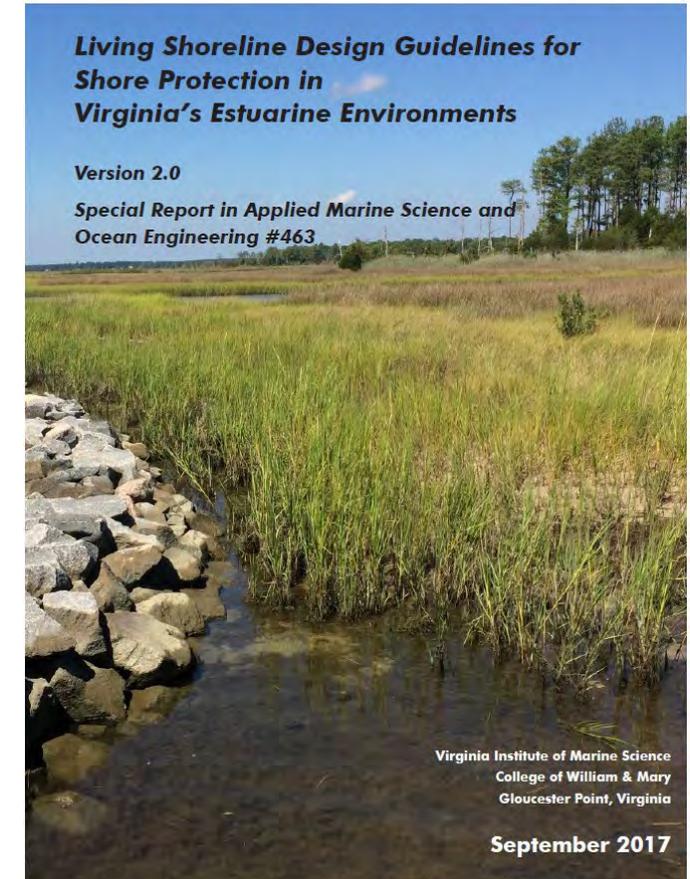
[Living Shoreline Design Guidelines: Chapter 2](#)

PARCEL LEVEL

- Erosion evidence & history
- Local tide range & tidal flooding
- Land & development risks

PARCEL LEVEL & BEYOND

- Natural erosion buffers – vegetation & slopes
- Wave climate & fetch
- Existing shoreline protection structures
- Stormwater runoff patterns & management practices
- Land & recreation uses including water access



Find Address & Parcels

AdaptVA Interactive Map

All Boxes must be checked for map display

Main Category: Infrastructure

Sub-category: General Infrastructure

GIS Data Layer: Virginia Parcels

Enter address or zoom to locality

The screenshot displays the AdaptVA Interactive Map interface. On the left is a layer selection panel with a list of categories and sub-categories. The 'Infrastructure' and 'General Infrastructure' categories are checked and highlighted with a red box. At the bottom of the list, 'Virginia Parcels' is also checked and highlighted with a red box. On the right is a search panel with a search bar and a dropdown menu. The search bar contains the text 'Find address or place'. The dropdown menu is open, showing options: 'All', 'ArcGIS World Geocoding Service', 'VGIN Composite Locator', and 'Virginia Locality'. This search panel is also highlighted with a red box. The main map area shows an aerial view of a coastal area with roads like Franklin Rd, Greente Rd, and Spencer Rd. Labels for 'Virginia Institute of Marine Science' and 'Gloucester Point Beach' are visible. A scale bar at the bottom right indicates 1:4,514, with 100m and 300ft markers. The bottom of the map shows attribution for Maxar, VGIN, Esri, and OpenStreetMap.



Grayed out layers are scale-dependent
Zoom in or out until layer is activated

▼ Natural Resources

Tidal Marsh

▼ Natural and Nature-Based Features (NNBFs) less than 10 feet land elevation

▶ Existing Living Shoreline Projects (all types)

Dunes

Beaches

Tidal Marshes

▶ Wetlands (less than 10 feet land elevation)

Upland Wooded Areas

Upland Scrub-shrub

▶ Shoreline Conditions

▶ Nontidal NWI Wetlands (all Virginia)

▶ Submerged Aquatic Vegetation (SAV) 

▶ Hydrology

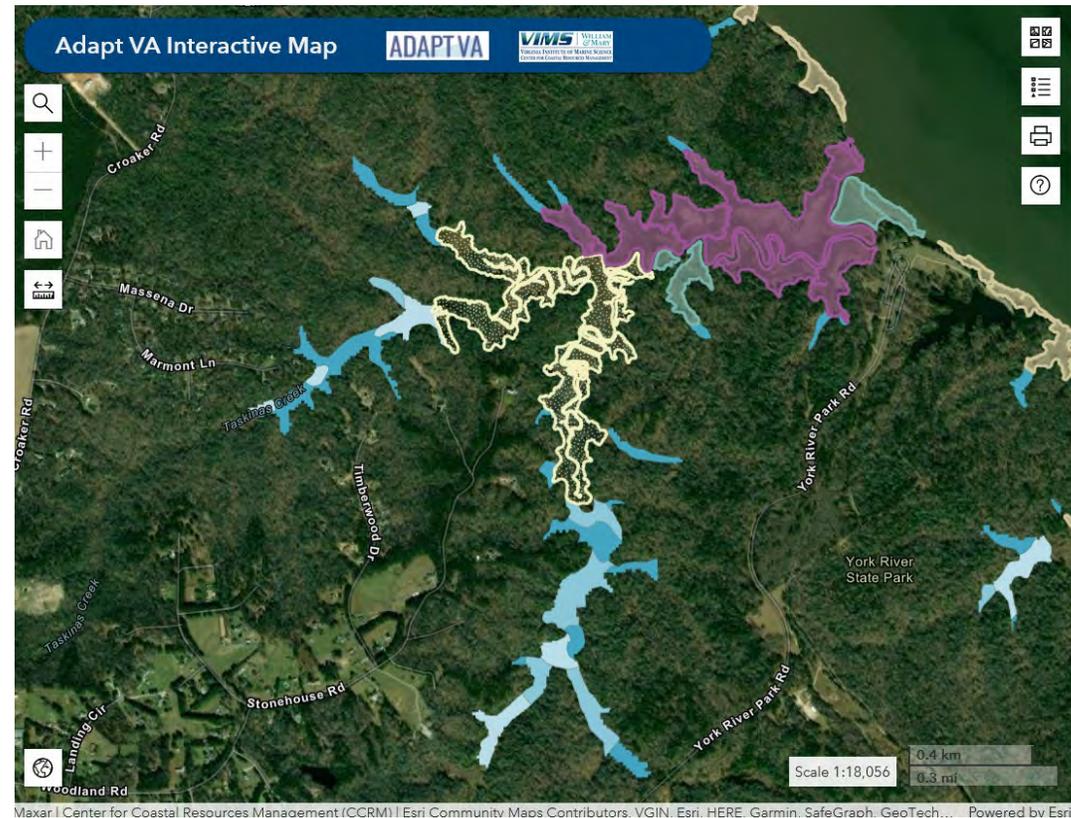
Contours

Natural Features Evaluation

[AdaptVA Interactive Map](#)

Look for presence and connections between natural features beyond parcel boundary

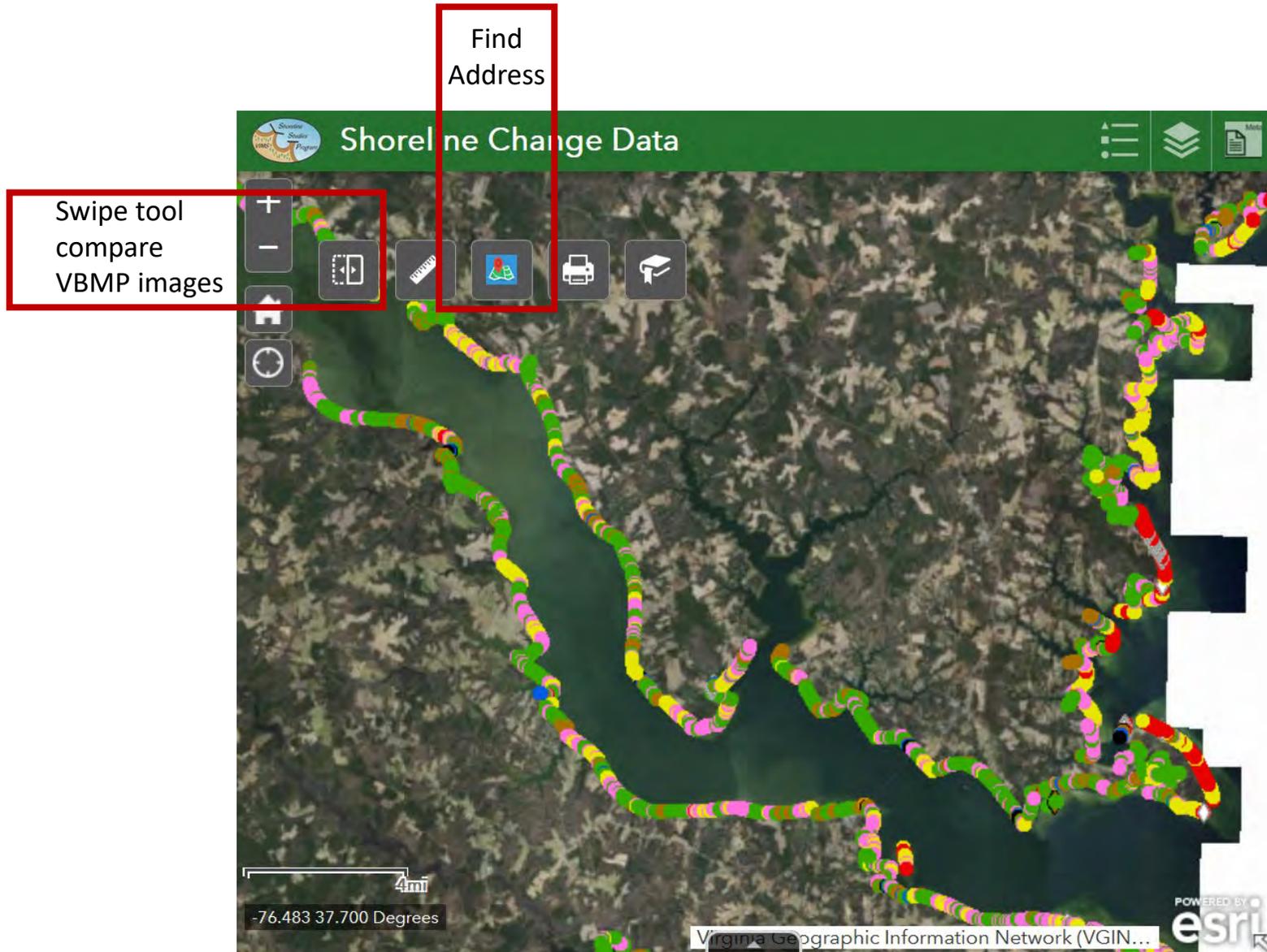
- ▼ Submerged Aquatic Vegetation (SAV)
 - SAV (most recent)
- ▼ SAV Habitat
 - SAV Habitat (5 years)
 - SAV Habitat (10 years)



Tidal Marsh + Wetlands <10 ft elevation

Erosion Evaluation

Shoreline Change Map



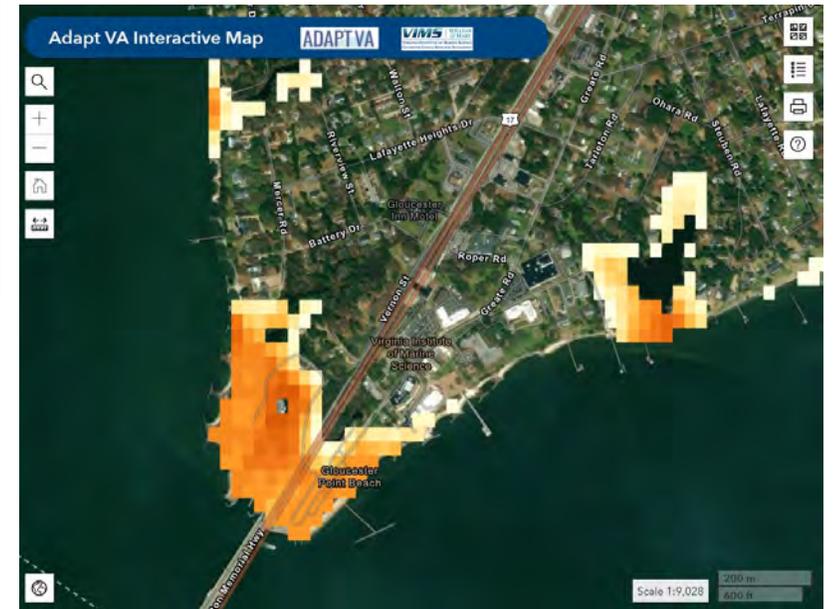
- End Point Shoreline Change Rates
 - EPR_Pts_1937_2009
 - EPR Points 1937/38 and 2017
 - Very High Accretion: > +10 (ft/yr)
 - High Accretion: +10 to +5 (ft/yr)
 - Medium Accretion: +5 to +2 (ft/yr)
 - Low Accretion: +2 to +1 (ft/yr)
 - Very Low Accretion: +1 to 0 (ft/yr)
 - Very Low Erosion: 0 to -1 (ft/yr)
 - Low Erosion: -1 to -2 (ft/yr)
 - Medium Erosion: -2 to -5 (ft/yr)
 - High Erosion: -5 to -10 (ft/yr)
 - Very High Erosion: > -10 (ft/yr)
 - EPR Points 1949 and 2017
 - VBMP2002_WGS
 - VBMP2006_2007_WGS
 - VBMP2009_WGS
 - VBMP2013_WGS
 - VBMP2017_WGS
 - VBMP2021_WGS

Virginia Base Mapping Program VBMP Imagery collection

Tidal Flooding Evaluation

[AdaptVA Interactive Map](#)

Future	<input checked="" type="checkbox"/> Sea Level Rise/Flooding /Storm Surge <input type="checkbox"/> Sea Level Rise (mean high water)
Present	<input type="checkbox"/> Flooding <input type="checkbox"/> Limit of Moderate Wave Action (LiMWA) <input checked="" type="checkbox"/> Flood Hazard Zones (FHZ) <input type="checkbox"/> Coastal Barrier Resource System
Storms <i>SLOSH model</i>	<input checked="" type="checkbox"/> Storm Surge <input type="checkbox"/> Category 4 - Flood Height <input checked="" type="checkbox"/> Category 3 - Flood Height <input type="checkbox"/> Category 2 - Flood Height <input type="checkbox"/> Category 1 - Flood Height

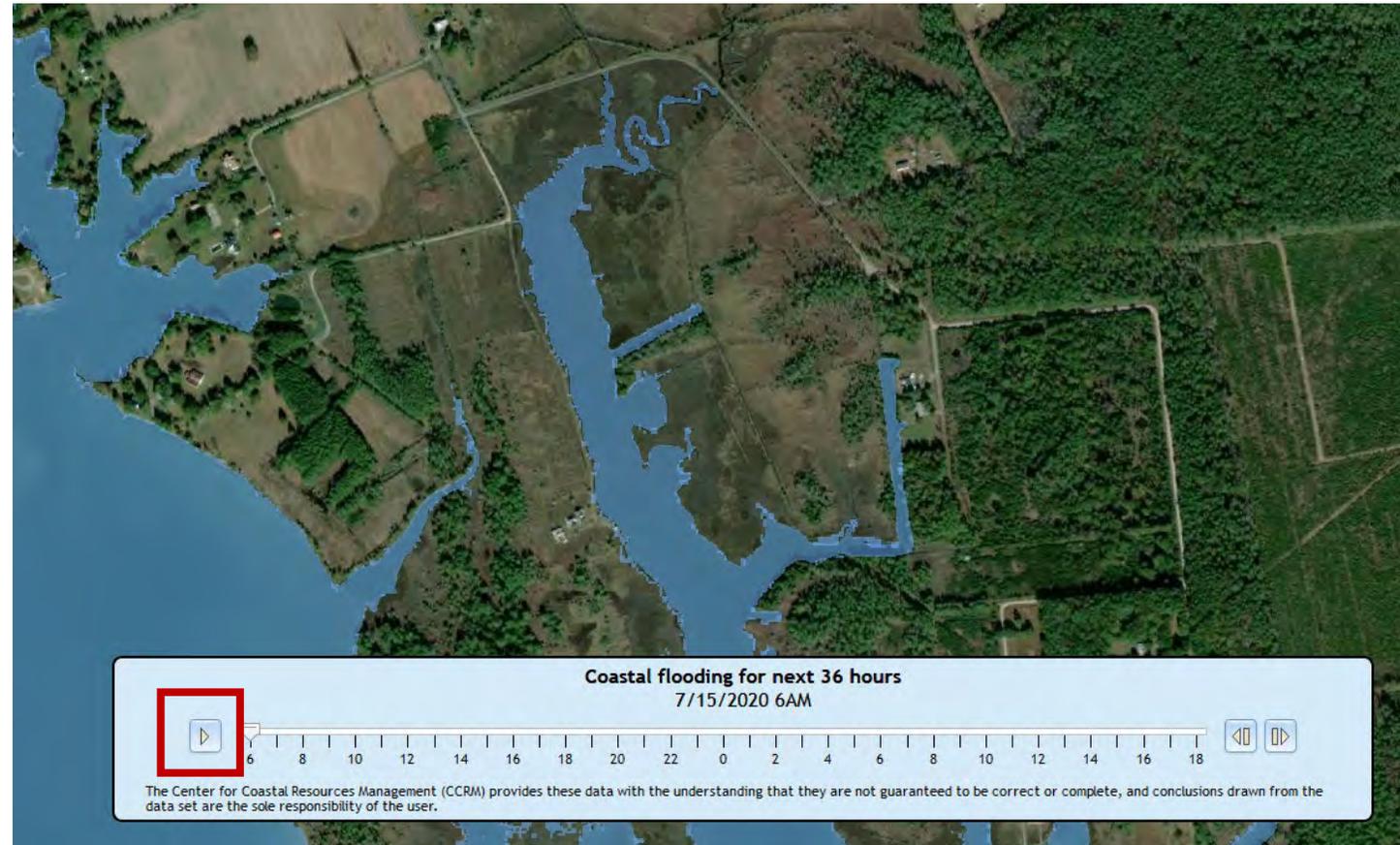


Tidal Flooding Evaluation

[TideWatch Map](#)

Projected 36-hour water levels for all shorelines extrapolated from fixed tide stations

Updated twice daily



Click play arrow to start animation

Tidal Flooding Evaluation

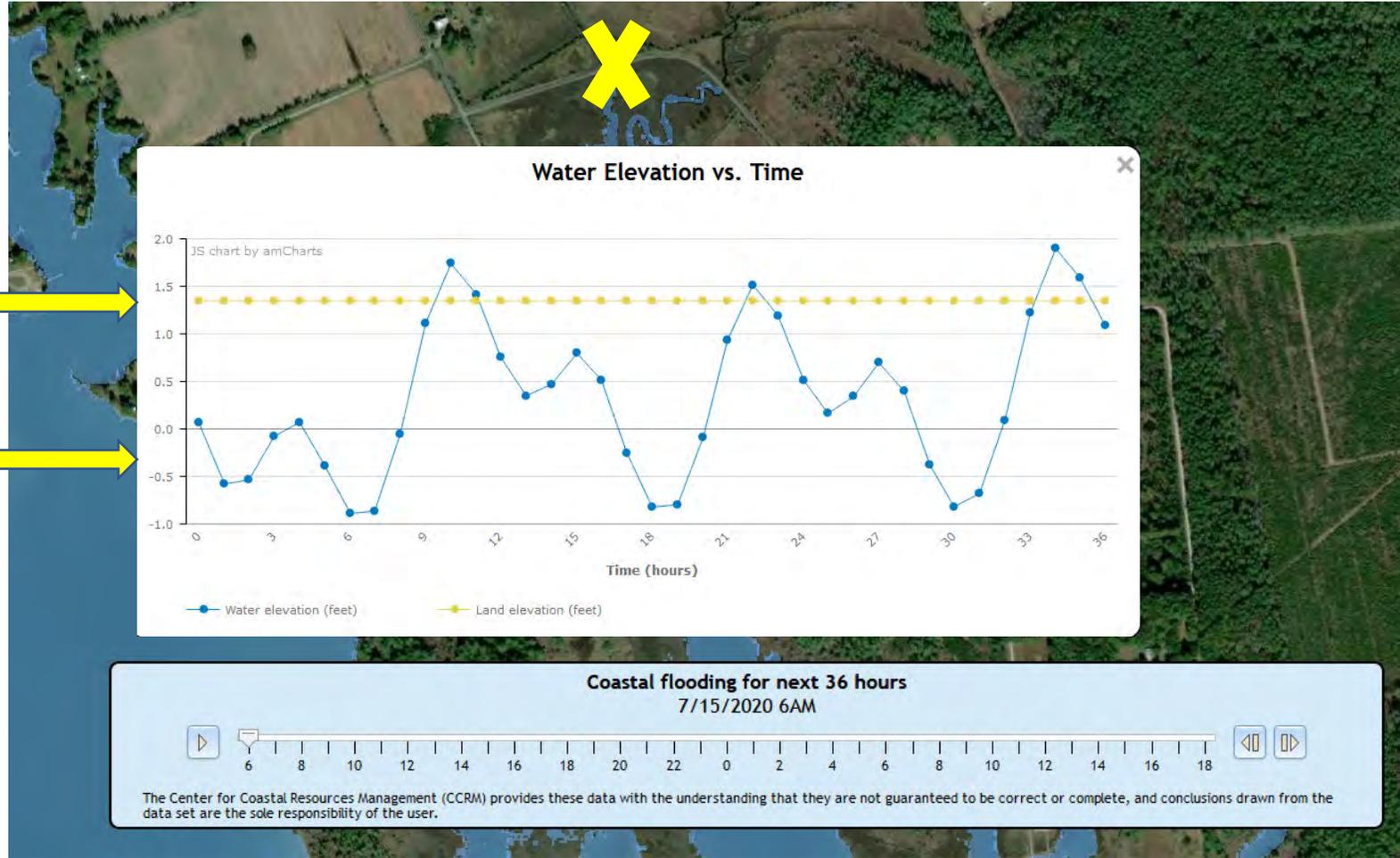
[TideWatch Map](#)

Charting Tool shows land & water level elevations at selected location

Click on map to display a chart

Land elevation at selected site

Water elevations



Tidal flooding over road elevation 3 times

Sea Level Rise Resilience

AdaptVA Interactive Map

- Sea Level Rise/Flooding /Storm Surge
- Sea Level Rise (mean high water)
- Sea Level Rise Low Scenario
- Sea Level Rise Intermediate Scenario
- Sea Level Rise Intermediate-High Scenario
- Sea Level Rise Extreme Scenario

NOAA 2017
Scenarios



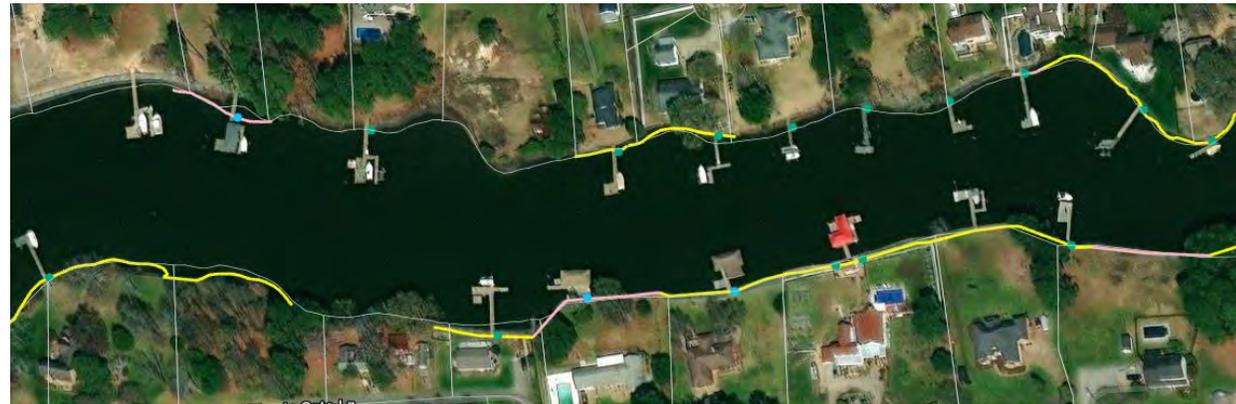
Time slider with 10-yr increments

Existing Shoreline Protection & Access Structures

[AdaptVA Interactive Map](#)

Existing living shorelines in vicinity (2018)

- ▼ Shoreline Management
 - Shoreline Management Model
- ▼ Existing Structures
 - Public/Private Access
 - Defended Shoreline
 - Marina



- ▼ Natural and Nature-Based Features (NNBFs) less than 10 feet land elevation
- ▼ Existing Living Shoreline Projects (all types)
 - Beach Nourishment
 - Hybrid: Breakwater
 - Hybrid: Marsh Sill
 - Hybrid: Oyster Sill
 - Marsh Plantings

Extent of existing defense structures suggests erosion potential

Number of piers & marinas nearby indicates boat wake potential

Pier length indicates nearshore water depths
(shallow – long piers; deep – short piers)

Alternatives Analysis

Shoreline Management Model [AdaptVA Interactive Map](#)

GIS Data Layers

- Natural buffers presence-absence
- Bank height
- Nearshore bathymetry
- Wave exposure (fetch)
- Existing shoreline protection structures
- Proximity of roads & development
- Other locally-based GIS data



Automatic Measurements

Model Analysis

- Building setbacks from shoreline
- Fetch distances
- Nearshore slope and more



Shoreline Management Model

Preferred Shoreline BMPs

SMMv5Class

- Non-Structural Living Shoreline
- Plant Marsh with Sill
- Maintain Beach or Offshore Breakwater with Beach Nourishment
- Groin Field with Beach Nourishment
- Revetment
- Revetment/Bulkhead Toe
- Revetment
- Highly Modified Area. Seek expert advice.
- Land Use Management. Seek expert advice.
- Ecological Conflicts. Seek regulatory advice.
- Special Geomorphic Feature. Seek expert advice.
- No Action Needed

Preferred Shoreline Best Management Practices (BMP)

Maintain Beach or Offshore Breakwater with Beach Nourishment

Best Management Practice Definition:
If shoreline exceeds 200 feet in length, remove existing shoreline structure, add beach nourishment

Click on line feature for recommendation & additional information

Alternatives Analysis

Shoreline Decision Support Tool

Answer questions
about
shoreline conditions

Shoreline Decision Support Tool

Answer a series of questions and follow the prompts below to arrive at a recommended shoreline erosion control strategy.

[< Back to Introduction and How To](#)

Is the shoreline currently defended with an erosion control structure?	<input type="radio"/> yes, with bulkhead or seawall <input type="radio"/> yes, with revetment (riprap) against the upland <input checked="" type="radio"/> no
Is the shoreline part of a residential canal?	<input type="radio"/> yes <input checked="" type="radio"/> no
Is the shoreline part of any of the following?	<input type="radio"/> marina <input type="radio"/> defended shoreline along commercial or industrial area <input type="radio"/> next to road, parking area, or railroad bed <input checked="" type="radio"/> no
Is there submerged aquatic vegetation (SAV) or mangroves within 30 feet of the shoreline, or is the shoreline part of a sand spit?	<input type="radio"/> sav present <input type="radio"/> mangroves present <input type="radio"/> sand spit present <input checked="" type="radio"/> no
The height of the bank at the interface between the shoreline and the upland can limit the type of management solutions that would be effective at countering erosion. Erosion on very high banks (those greater than 30 feet) may not be driven by wave energy, and therefore shoreline management strategies would not be appropriate.	<input type="radio"/> yes <input checked="" type="radio"/> no
Is your bank height greater than 30 feet?	<input type="radio"/> yes <input checked="" type="radio"/> no
Can the shoreline bank be graded, if necessary?	<input type="radio"/> yes <input checked="" type="radio"/> no
What is the length of the shoreline of interest?	<input type="radio"/> less than 200 feet <input checked="" type="radio"/> 200 feet or greater
Is there an established marsh along this shoreline?	<input type="radio"/> yes <input checked="" type="radio"/> no
Is there a beach along the shoreline?	<input type="radio"/> yes <input checked="" type="radio"/> no
What is the shoreline exposure/fetch?	<input type="radio"/> low (0 to 0.5 mile) <input type="radio"/> moderate (0.5 to 2 miles) <input checked="" type="radio"/> high (>2 miles)
Reset	
What is the nearshore water depth?	<input type="radio"/> shallow <input checked="" type="radio"/> deep

[Submit My Answers](#)

?

Interactive Help Info

What is the nearshore water depth? ? shallow deep

[Hide panel](#)

Nearshore water depth refers to the vertical distance between the water surface and the submerged bottom usually referenced in feet below the mean low water elevation (e.g. -2 ft MLW). Shallow water depths are less than 1 m (3 feet) at a distance 30 feet from the upland bank.

Measuring water depth. ©SCRM/VIMS

Submit My Answers

Recommendation Info

Recommendation for Defended (Bulkhead) shoreline with Moderate Exposure, and Bank can be Graded

Plant Marsh with Sill

Remove existing failing or failed structure, plant tidal marsh (or maintain/widen existing marsh) and construct a rock sill placed offshore from the marsh. The target area for planting tidal marsh should extend from mid-tide to an elevation 1.5 times the tide range above mean low water where the presence of upland vegetation begins, with wetland vegetation planted at appropriate elevations to establish both low and high marsh zones where possible. Consider widening an existing marsh by grading bank landward and/or adding sand fill channelward to increase marsh width and/or elevation and placing a sill just offshore from the new marsh edge

In nontidal, fresh water systems, plant wetland vegetation in elevation zones to mimic local, natural wetlands and to accommodate various water levels including extreme high and low water levels during floods and droughts.

The site-specific suitability for a sill must be determined, including bottom hardness, navigation conflicts, construction access limitations, orientation and available sunlight for marsh plants.

For a list of wetland plants, consult the [Lady Bird Johnson Wildflower Center](#) or the NRCS [Plant Materials Program](#) websites.

This recommendation is derived from basic shoreline conditions. Additional factors to consider include land and water uses, adjacent shoreline conditions, construction access, and sensitive cultural and natural resources.

[Show/hide pictures ...](#)



Shoreline Protection Suitability Assessments Questions?



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