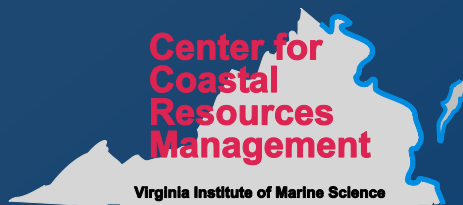


Coastal Web Atlases in the Chesapeake Bay Region: Examples from Virginia and Maryland

Marcia R. Berman

Center for Coastal Resources Management

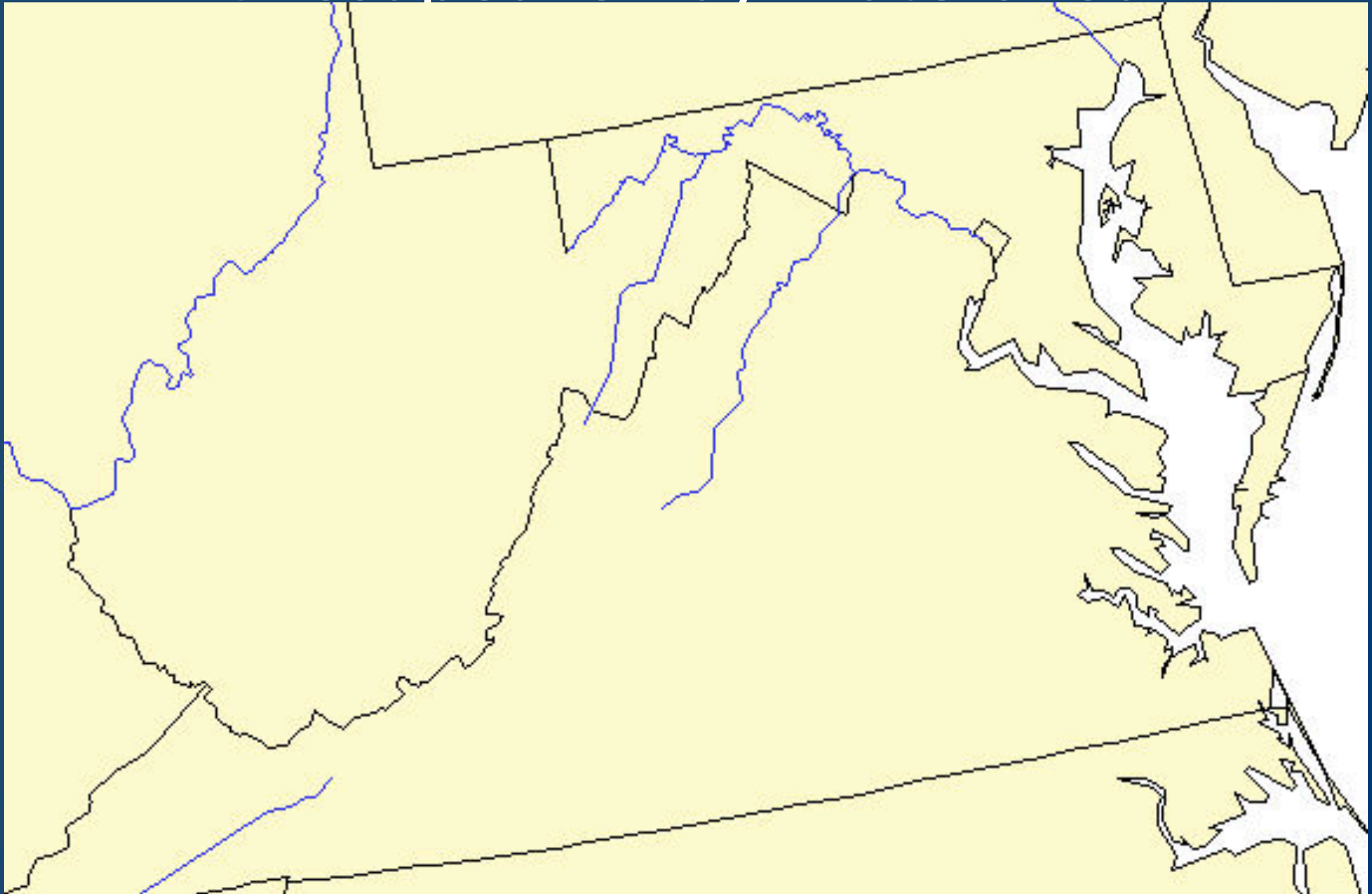
Virginia Institute of Marine Science



Where are we?



Virginia – Maryland Chesapeake Bay Watershed



Virginia

Coastal Geospatial Education Mapping System

Maryland

Shorelines Onlines

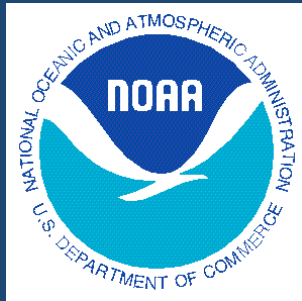
With respect to



- What works well
- Common problems
- Do they meet the definition of a coastal atlas?
- Are they interoperable?

VIRGINIA

Coastal Geospatial and Education Mapping System



GEMS



Virginia Coastal Zone
MANAGEMENT PROGRAM

VA Coastal GEMS

[Virginia DEQ Home](#) > [Virginia CZM Program](#) > [Coastal GEMS Homepage](#)

Main Menu

[Home](#)

[Description & boundary](#)

[Staff & policy team](#)

[Laws & policies](#)

[Goals & accomplishments](#)

[Funds, initiatives, & projects](#)

[Grantee guidance & information](#)

[Coastal GEMS - Geospatial data](#)

[Publications & presentations](#)

[Links & online resources](#)

[Help your coast](#)



Virginia Coastal Zone
MANAGEMENT PROGRAM

Protecting, restoring, and strengthening our coastal ecosystems and economy

[Executive Order](#)

[Coastal zone map](#)

[Projects](#)

[Public Notices](#)

[CZM contacts](#)

Coastal GEMS

What Is "Coastal GEMS"?

- A gateway to Virginia's coastal resource data and maps; coastal laws and policies; facts on coastal resource values; and direct links to collaborating agencies responsible for current data.
- A growing inventory of water and land based natural resources, conservation planning tools, and planning examples that can help us to protect Virginia's coastal ecosystems.
- A tool to promote community involvement and environmental education.

How Coastal GEMS came to be...

During a Virginia CZM Program workshop in 2001, state and local partners expressed the need for a "vision" of Virginia's Coastal Zone or a comprehensive inventory of Virginia's coastal resources. Many questions were raised. What is the current status of Virginia's coastal resources? How can these coastal resources be managed in a sustainable fashion in light of increasing development pressures?

As a first step in achieving this "vision," our partners agreed it was important to identify and map the best remaining blue (water-based) and green (land-based) natural resources within Virginia's coastal zone. We began collecting spatial data and creating management tools to

[Launch Coastal GEMS v.2](#)

(If this is your first visit to Coastal GEMS, please read our [disclaimer](#) before entering the GEMS application.)

Need Help Navigating Coastal GEMS?

Customized group training sessions are available with Virginia CZM staff!

Contact [Nick Meade](#) - (804) 698-4297 - to schedule your training session today!

[Coastal GEMS Brochure](#)

Data Categories

- Water Features
- Shoreline Features
- Land Features
- Wildlife
- Recreational Features
- Conservation Planning Tools
- Conservation Planning Examples
- Reference Layers

55 Data Layers

Water Features

- Commercial Shellfish Aquaculture Sites
- Oyster Gardening Sites
- State Constructed Oyster Reefs
- Baylor Grounds (Public Oyster Grounds)
- Private Oyster Leases
- Seaside SAV Planting Sites
- Submerged Aquatic Vegetation (SAV)
- Anadromous Fish Use Areas
- Fisheries Management Areas
- Threatened & Endangered Species Waters
- Healthy Streams

Shoreline Features

- Beaches Above High Water
- Chesapeake Bay Dunes
- Wetlands (Tidal & Non-Tidal)
- Restored Riparian Buffer Sites
-

Land Features

- Conservation Lands
- Forest Cover
- Barrier Island Ownership

Wildlife

- Essential Wildlife Habitat
- Important Bird Areas
- Migratory Songbird Stopover Habitat

Recreational Features

- VDGIF Boat Ramps
- Scenic Rivers
- Birding & Wildlife Trail Sites and Loops
- Seaside Eastern Shore Water Trail
- Public Access Sites

Conservation Planning Tools

- Oyster Aquaculture Vulnerability Model
- Clam Aquaculture Vulnerability Model
- Biotic Stream Assessment (INSTAR) Sites
- Benthic Index of Biotic Integrity
- Historic & Cultural Value Model
- Predicted Growth Model
- Forest Economics Model
- Ecological Cores
- Landscape Corridors
- Agricultural Model
- Recreation Model
- Watershed Integrity Model
- Tidal Flushing Rates
- Condemned Shellfish Areas
- Accomack County Bayside Buffer Classification
- Clam Aquaculture Suitability Model
- Oyster Aquaculture Suitability Model
- Invasive Reed (Phragmites)
- Marina Siting Suitability
- Impediments to Fish Movement
- Impaired Waters

Conservation Planning Examples

- Dragon Run Program Boundary
- Seaside Heritage Program Boundary
- Southern Watersheds Program Boundary
- Hampton Roads Conservation Corridors

Reference Layers

- County Boundaries
- Watershed Boundaries
- Detailed Streams
- Roads

VA Coastal GEMS

Commonwealth of Virginia | Governor

Contact Us



Address Search | Coastal News & Events | Zoom To Locality

Go!

Map Layers Results

Show Map Layers

- Healthy Streams
- Shoreline Features**
 - Beaches Above High Water
 - Chesapeake Bay Dunes
 - National Wetlands Inventory
 - Restored Riparian Buffer Sites
- Land Features**
 - Forest Cover
 - Conservation Lands
 - Barrier Island Ownership
- Wildlife Features**
 - Essential Wildlife Habitat
 - Important Bird Areas
 - Migratory Songbird Stopover Habitat
- Recreational Features**

Advanced Tools Export/Print

06/07 Aerials 2002 Aerials Aerials Off

A map of the Virginia coastal region showing major highways (Interstates 81, 66, 495, 95, 64, 295, 85, 264) and various coastal features. Red and black markers are scattered along the coast, likely representing the features listed in the map layers panel. A mouse cursor is hovering over the Interstate 66 shield. On the right side of the map, there are controls for aerial imagery, including a vertical zoom slider and buttons for "06/07 Aerials", "2002 Aerials", and "Aerials Off". An inset map in the bottom right corner shows the location of the main map area within the state of Virginia.

Developed By: Virginia Commonwealth University *In partnership with:*



Conservation Planning Tools



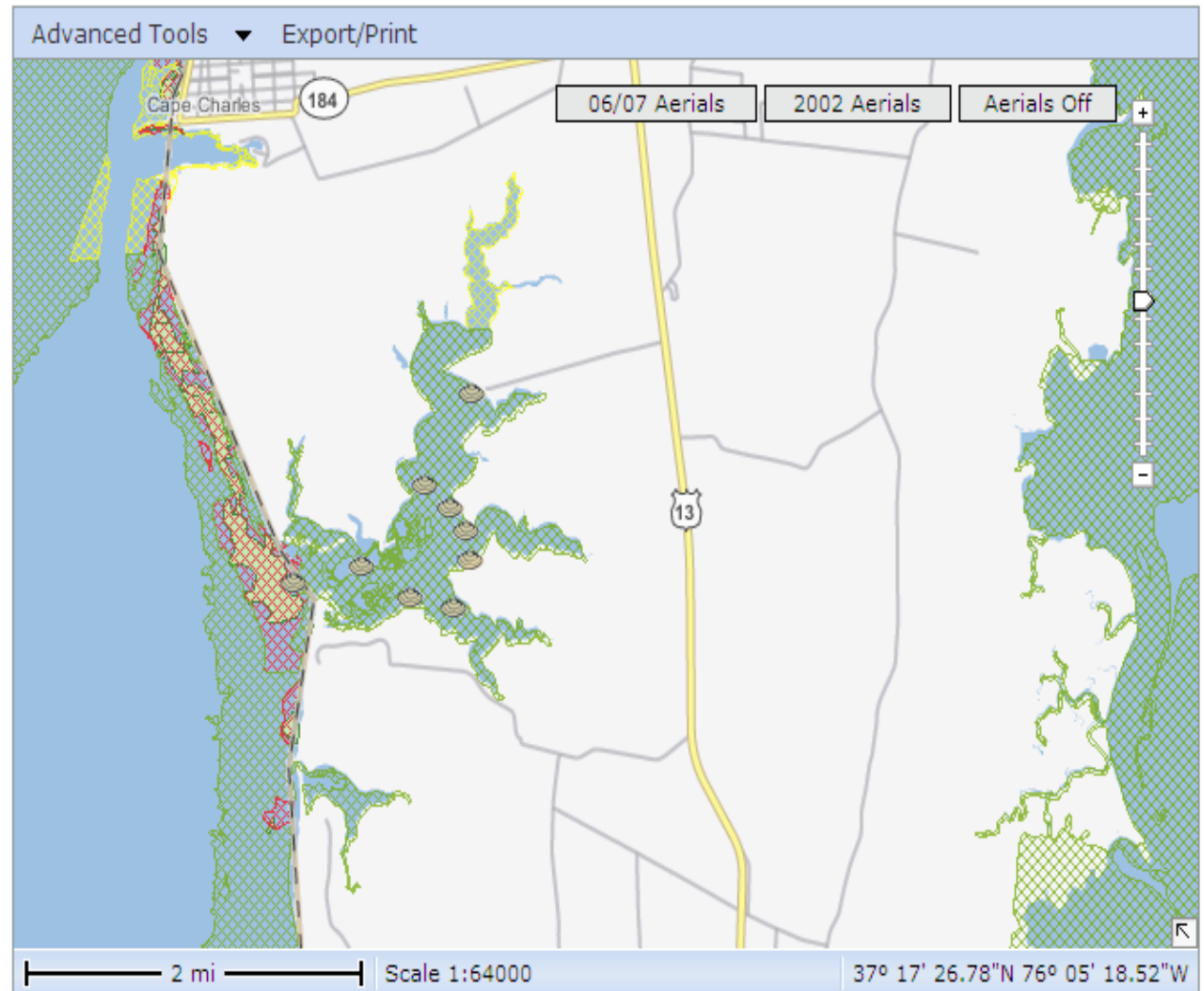
Address Search | Coastal News & Events | Zoom To Locality

Go!

Map Layers Results

Show All Map Layers

- Clam Aquaculture Suitability Model
 - Optimal
 - Suitable
 - Unsuitable
- Oyster Aquaculture Suitability Model
- Ecological Cores
- Biotic Stream Assessment (INSTAR) Sites
- Impediments to Fish Movement
- Marina Siting Suitability
- Invasive Reed Survey (Phragmites)
- Conservation Planning Examples
 - Seaside Heritage Program Boundary
 - Southern Watersheds Program
 - Hampton Roads Conservation Corridors
 - Dragon Run Program Boundary
- Reference Layers



Developed By:
Virginia Commonwealth University
Center for Environmental Studies

In partnership with:



Fact Sheets

Commonwealth of Virginia | Governor

Virginia Coastal Zone
MANAGEMENT PROGRAM

Address Search | Coastal News & Events | Zoom To Locality

Go!

Map Layers | Results

Show

- Benthic Index of B...
- Impaired Waters
- Clam Aquaculture Suitability Model
 - Optimal
 - Suitable
 - Unsuitable
- Oyster Aquaculture
- Ecological Cores
- Biotic Stream Ass...
- Impediments to Fi...
- Marina Siting Suit...
- Invasive Reed Su...
- Conservation Planning E...
 - Seaside Heritage
 - Southern Watersh...
 - Hampton Roads Conservation Corridors

Fact Sheet

[Printer Friendly](#)


Clam Aquaculture Suitability Model

The shallow waters of Virginia's Coastal Zone are ideal areas for many activities including crabbing, clamming, fishing, swimming, recreational boating, and submerged aquatic vegetation (SAV) growth. This data, developed as part of the Shallow Water Use Conflict project, shows the "unsuitable," "suitable" and "optimal" locations for cultivating hard clams in Virginia waters.

Status of the data
This layer was created in 2003. Updates of the model for Virginia's Eastern Shore and the Rappahannock River are under contract and should be available in 2008.

Data Source
Hard Clam Aquaculture Model (2003). Virginia Institute of Marine Science

To access this data layer/tool directly, please visit:
<http://rmapnt52.wetlan.vims.edu/blueinfra/viewer.htm>



Clam farm enclosure on Virginia's Eastern Shore. Photo courtesy of the Virginia Institute of Marine Science.

For original datasets, please contact:

Marcia Berman
PO Box 1346
Gloucester Point, VA 23062
Phone: (804) 684-7188
Fax: (804) 684-7179
Email: marcia@vims.edu


Developed By:
Virginia Commonwealth University
Center for Environmental Studies

In partnership with:
WorldView SOLUTIONS

2 mi | Scale 1:64000 | 0° 00' 0"

Advanced Tools ▾ Export/Print

Measure

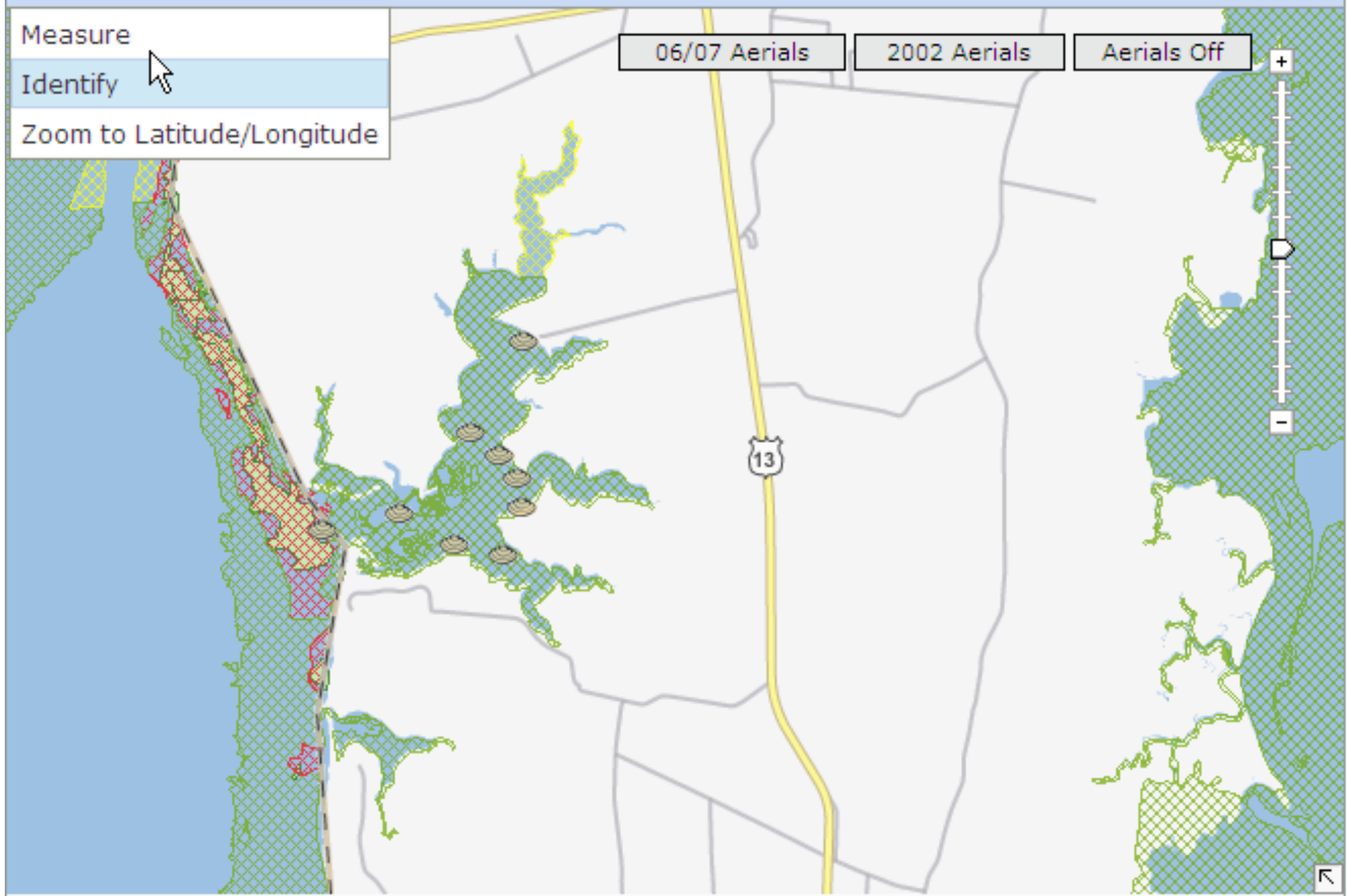
Identify 

Zoom to Latitude/Longitude

06/07 Aerials

2002 Aerials

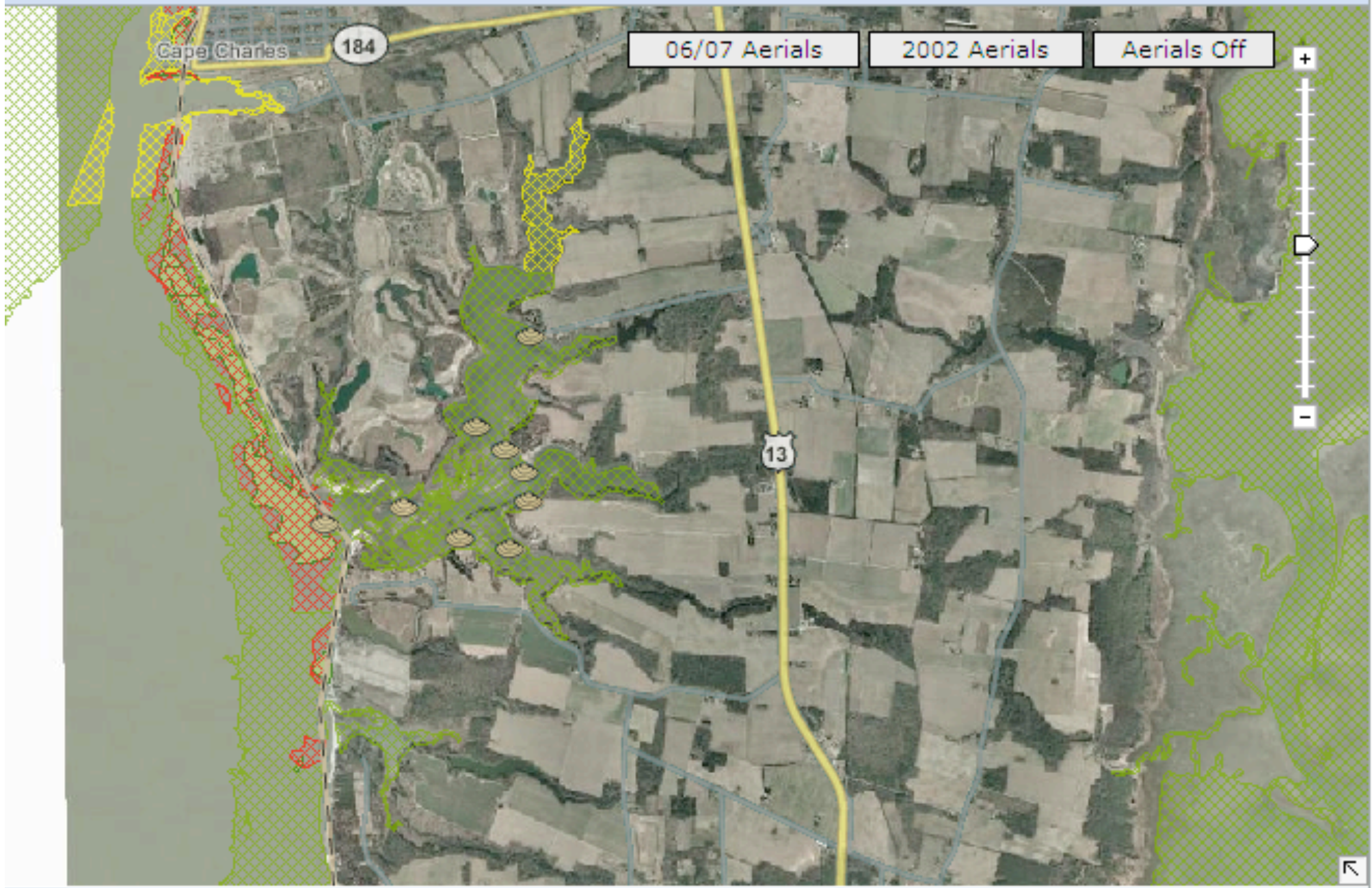
Aerials Off



2 mi

Scale 1:64000

37° 16' 03.11"N 76° 01' 41.12"W



2 mi

Scale 1:64000

37° 17' 09.93"N 76° 00' 13.88"W

06/07 Aerials

2002 Aerials

Aerials Off



1500 ft | Scale 1:12000

37° 15' 32.74"N 75° 59' 46.46"W

06/07 Aerials 2002 Aerials Aerials Off



1500 ft Scale 1:12000

37° 15' 32.74"N 75° 59' 46.46"W

Address Search

Address Search | Coastal News & Events | Zoom To Locality

11147 Piankatank Drive Gloucester, VA 23061

Go!

Advanced Tools

Export/Print



06/07 Aerials

2002 Aerials

Aerials Off

125 ft

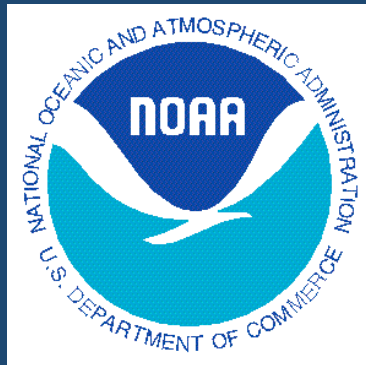
Scale 1:1200

37° 30' 56.25"N 76° 27' 26.53"W


Implementation and Feedback of Coastal GEMS

- Workshop
 - Training: CWA developers
 - Active Users : representing target audience
 - Monitors: representing data developers
- Feedback
 - none

Maryland Shorelines Online




MD Shorelines Online



MARYLAND
shorelinesonline

home
contact us



Home

Mapper

Education and Outreach

Assistance

Coastal Hazard Management

Interactive Mapping

News and Events

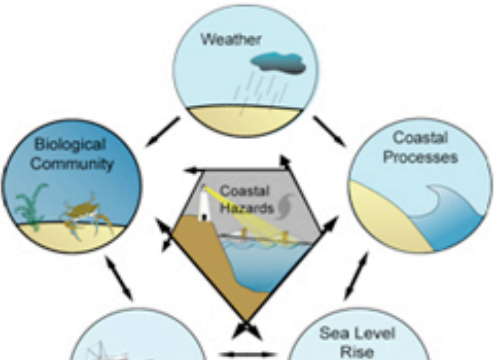
Maryland Shorelines Online is a coastal hazards web portal, centralizing information and data on shoreline and coastal hazards management in Maryland.

This website works to enhance coordination and understanding of shoreline management processes, assistance, and practices appropriate for maintaining the rich cultural and natural resources associated with the State's coastal and shoreline areas. This site is a resource for many groups including:

Coastal Managers - State and local planners and regulators will benefit from this site when interfacing with the public that have questions on Maryland's [coastal hazards](#) and the [law/regulations/permits](#) that guide activities in the coastal zone. An interactive mapping tool, [Maryland Shoreline Changes Online](#) and the [Comprehensive Shoreline Inventory](#) will also assist in better understanding the risk to coastal development and communities from natural hazards.

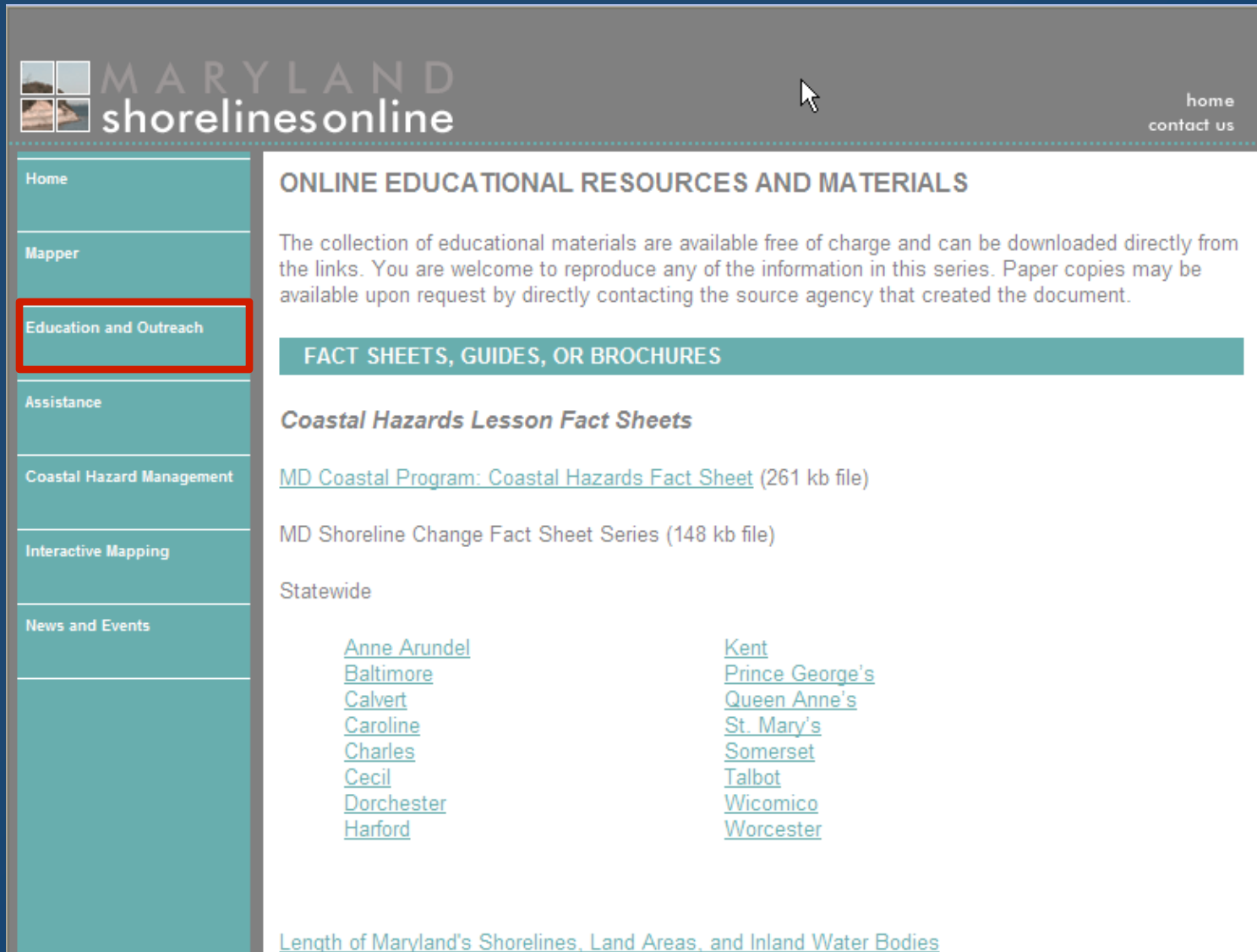
Property Owners can gain more information on their risk and [vulnerability from erosion](#), flooding and inundation, as well as determine [technical](#) and [financial assistance](#) available when determining the best option to mitigate [coastal hazards](#).

Marine Contractors – This site represents a resource to determine the historical rates of [shoreline change](#) and [technical information](#) on protection and restoration approaches like ["living shorelines"](#) to address shoreline erosion.



```
graph TD; Weather((Weather)) --> CH[Coastal Hazards]; BiologicalCommunity((Biological Community)) --> CH; CoastalProcesses((Coastal Processes)) --> CH; SeaLevelRise((Sea Level Rise)) --> CH; CH --> Weather; CH --> BiologicalCommunity; CH --> CoastalProcesses; CH --> SeaLevelRise;
```

Educational Materials



MARYLAND shorelinesonline

home
contact us

Home

Mapper

Education and Outreach

Assistance

Coastal Hazard Management

Interactive Mapping

News and Events

ONLINE EDUCATIONAL RESOURCES AND MATERIALS

The collection of educational materials are available free of charge and can be downloaded directly from the links. You are welcome to reproduce any of the information in this series. Paper copies may be available upon request by directly contacting the source agency that created the document.

FACT SHEETS, GUIDES, OR BROCHURES

Coastal Hazards Lesson Fact Sheets

[MD Coastal Program: Coastal Hazards Fact Sheet](#) (261 kb file)

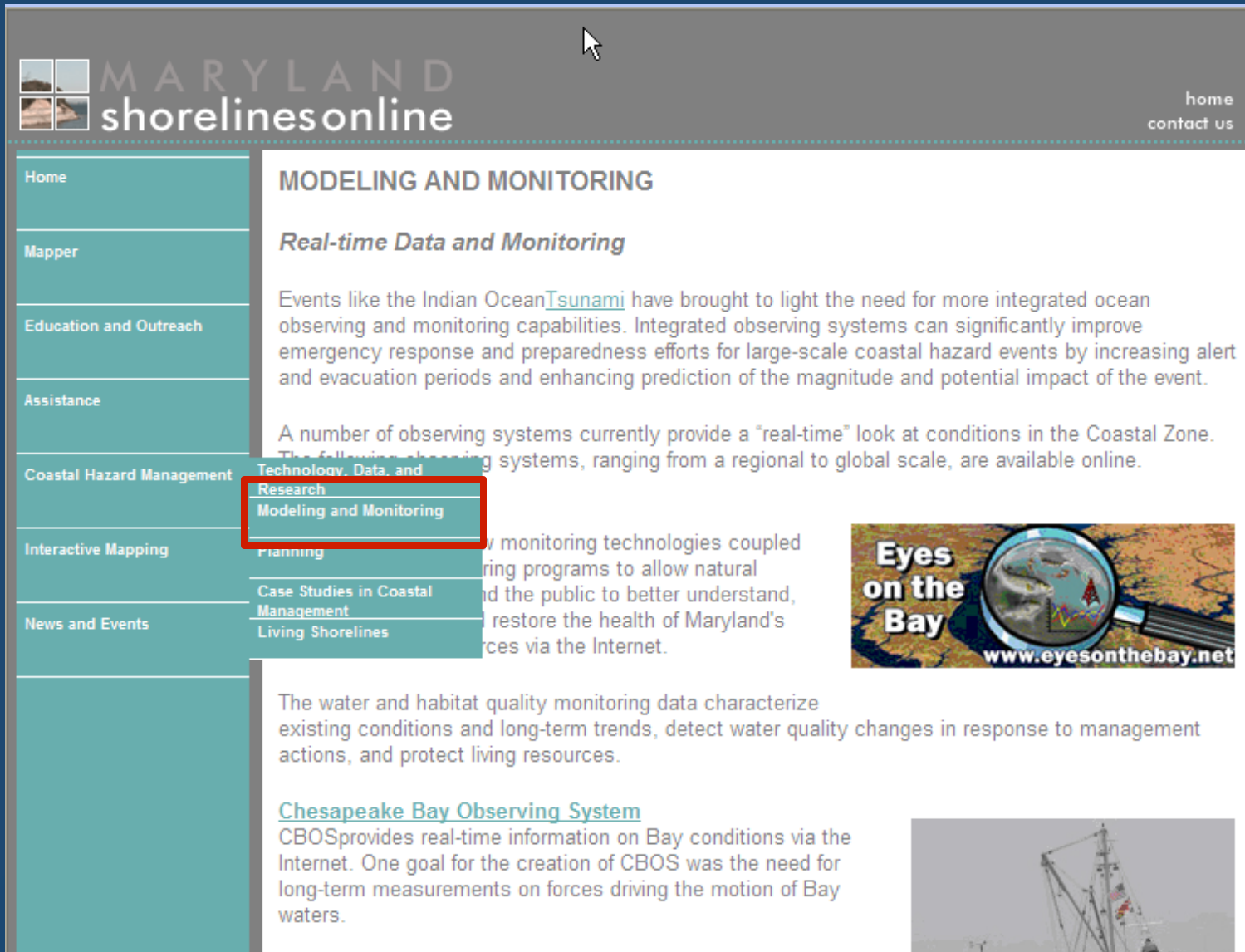
MD Shoreline Change Fact Sheet Series (148 kb file)

Statewide

Anne Arundel	Kent
Baltimore	Prince George's
Calvert	Queen Anne's
Caroline	St. Mary's
Charles	Somerset
Cecil	Talbot
Dorchester	Wicomico
Harford	Worcester

[Length of Maryland's Shorelines, Land Areas, and Inland Water Bodies](#)

Coastal Hazard Management



The screenshot shows the Maryland Shorelines Online website. The header includes the logo and navigation links for 'home' and 'contact us'. A left sidebar contains a menu with items like 'Home', 'Mapper', 'Education and Outreach', 'Assistance', 'Coastal Hazard Management', 'Interactive Mapping', and 'News and Events'. The 'Coastal Hazard Management' menu item is expanded, with a red box highlighting 'Technology, Data, and Research' and 'Modeling and Monitoring'. The main content area is titled 'MODELING AND MONITORING' and features a sub-section 'Real-time Data and Monitoring'. The text discusses the need for integrated observing systems following the Indian Ocean Tsunami and lists several online observing systems. An image of a magnifying glass over a map is labeled 'Eyes on the Bay' with the URL 'www.eyesonthebay.net'. Below, text describes water and habitat quality monitoring data, followed by a section on the 'Chesapeake Bay Observing System' (CBOS) which provides real-time information on Bay conditions.

MARYLAND shorelinesonline

home
contact us

Home

Mapper

Education and Outreach

Assistance

Coastal Hazard Management

Interactive Mapping

News and Events

MODELING AND MONITORING

Real-time Data and Monitoring

Events like the Indian Ocean [Tsunami](#) have brought to light the need for more integrated ocean observing and monitoring capabilities. Integrated observing systems can significantly improve emergency response and preparedness efforts for large-scale coastal hazard events by increasing alert and evacuation periods and enhancing prediction of the magnitude and potential impact of the event.

A number of observing systems currently provide a "real-time" look at conditions in the Coastal Zone. The following observing systems, ranging from a regional to global scale, are available online.

Technology, Data, and Research

Modeling and Monitoring

Planning

Case Studies in Coastal Management


Living Shorelines

Monitoring technologies coupled with modeling programs to allow natural resource managers and the public to better understand, manage, and restore the health of Maryland's coastal resources via the Internet.

Eyes on the Bay
www.eyesonthebay.net

The water and habitat quality monitoring data characterize existing conditions and long-term trends, detect water quality changes in response to management actions, and protect living resources.

Chesapeake Bay Observing System
CBOS provides real-time information on Bay conditions via the Internet. One goal for the creation of CBOS was the need for long-term measurements on forces driving the motion of Bay waters.



Interactive Mapping

MD Shoreline Changes Online



- Home
- Mapper
- Education and Outreach
- Assistance
- Coastal Hazard Management
- Interactive Mapping**
- News and Events

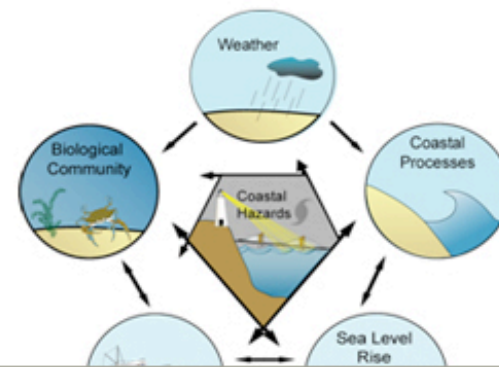
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Maryland Shoreline Changes Online

- Blue Infrastructure
- Coastal Bays
- Rates of Change
- Historical Shorelines
- Shoreline Inventory
- Littoral Drift Maps
- Transportation
- Hydrology
- Storm Surge Areas
- Watersheds
- Municipal Boundaries
- Sea Level Rise Vulnerability
- Imagery
- Boundaries

Maryland Shoreline Changes Online

http://coastalatlascowson.edu/BI/standard/

MARYLAND
blueinfrastructure

About DNR Coastal Atlas

Navigation Tools

- Zoom In
- Zoom Out
- Pan
- Zoom to Coord.
- Full Extent
- Zoom Previous
- Locate Address

Analysis Tools

- ID
- Select Rectangle
- Find
- Measure

Display Tools

- Print
- Add Mapservice
- Clear
- Adjust Mapservices

Jump to County:

Jump to Watershed:

overview set options help layer/legend save map

Refresh Map

Visible Layers

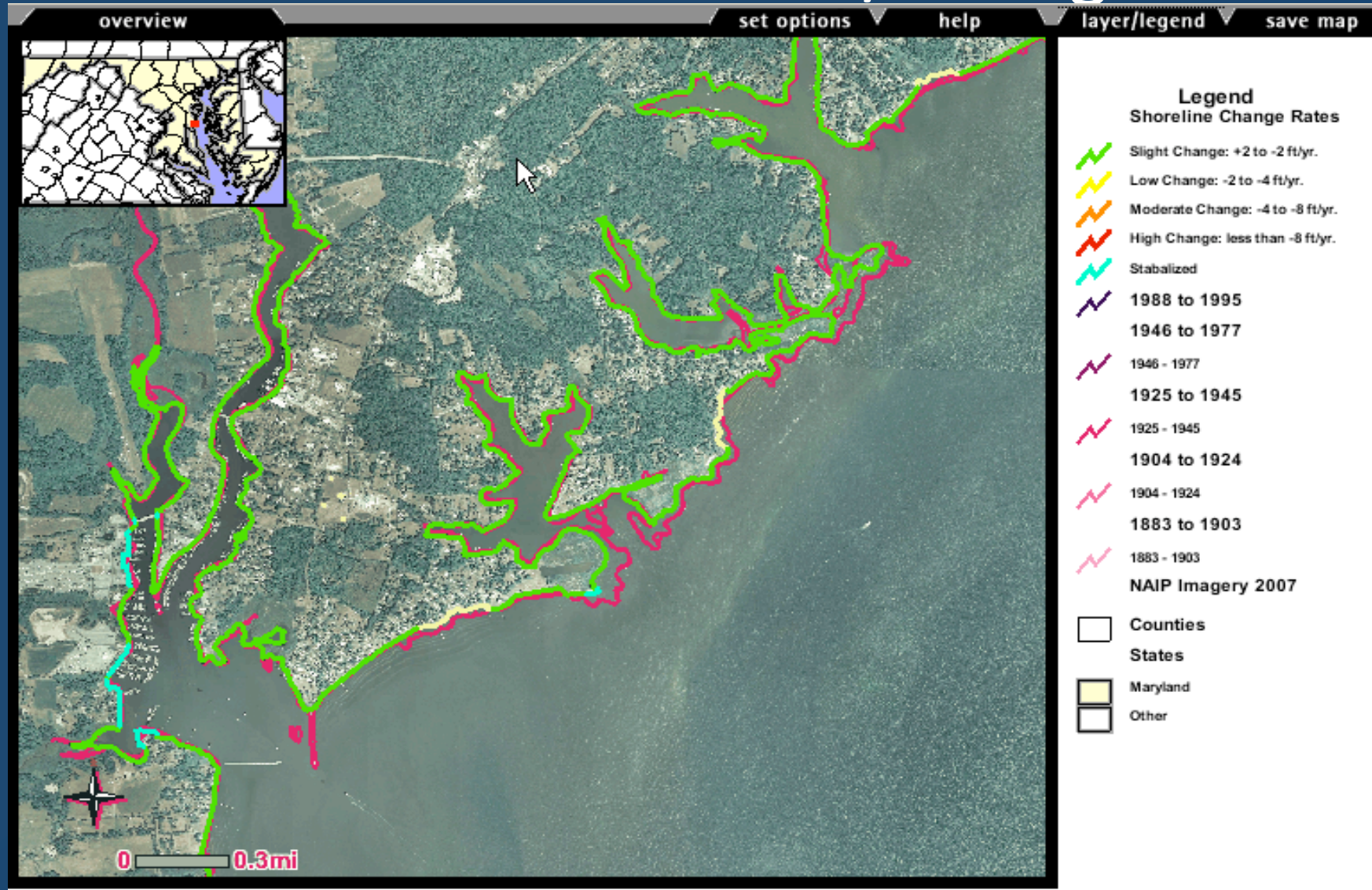
- Blue Infrastructure
- Coastal Bays
- Rates of Change
- Historical Shorelines
- Shoreline Inventory
- Littoral Drift Maps
- Transportation
- Hydrology
- Storm Surge Areas
- Watersheds
- Other
- Municipal Boundaries
- Sea Level Rise Vulnerability Areas
- Imagery
- Boundaries

Maryland Shoreline Changes Online

- Blue Infrastructure
- Coastal Bays
- Rates of Change
- Historical Shorelines
- Shoreline Inventory
- Littoral Drift Maps
- Transportation
- Hydrology
- Storm Surge Areas
- Watersheds
- Municipal Boundaries
- Sea Level Rise Vulnerability
- Imagery
- Boundaries

Shoreline Changes Online

Historical Shorelines/Change Rates



Shoreline Changes Online

Blue Infrastructure

overview
set options
help
layer/legend
save map

MARYLAND
blueinfrastructure

About DNR Coastal Atlas

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- Adjust Mapservices

Jump to County:

Jump to Watershed:

0 2mi

Legend

- Sandy Beaches
- Silty Sand
- Silty Clay
- Oyster Planting Sites
- Major Roads**
- Ferry Crossing
- Limited Access Highway
- Other Highway
- Other Through Highway
- Principal Highway
- Rivers and Lakes Labels**
- Counties
- States
- Maryland
- Other

Active Layer
Silty Sand

Functions	OBJECTID	AREA_	PERIMETER	SEDIST1_	SEDIST1_ID	LAYER	class	Shape_Leng	OBJECTID_1	area
zoom	63	0.00017923	0.08705288	419	418	Silty-Sand	0	0.08705407	63	1732459.066

Implementation and Feedback of Maryland Shorelines Online

- Workshop
 - Interim Training: data developers
 - Active Users : representing target audience
 - Feedback: feedback surveys

Observations with respect to



- What works well
 - data partners
 - simple /familiar layout
 - comprehensive
- Common problems
 - Offsite management
 - Cartographic challenges
 - Loading speeds
 - Metadata completeness
- Do they meet the definition of a “coastal atlas”?
- Are they interoperable?
 - Benefits for collaboration are not obvious
 - No incentives

Chesapeake Bay Coastal Atlases in Review

VA Coastal GEMS

- NOAA funded
- Developed and served offsite
- ArcIms
- Data partners
- Baseline and modeled data
- Interactive map interface

MD Shorelines Online

- NOAA funded
- Developed and served offsite
- ArcIms
- Data partners
- Baseline and modeled data
- Web portal with map interface

Recent Progress

- Regional meeting with Chesapeake Bay CWA managers
- Reviewed programmatic structure
- Demonstrated the prototype
- Opportunities for collaboration

Observations

- Observed disconnect between developers and end users
- Incentives for participation are not clear or obvious to management level