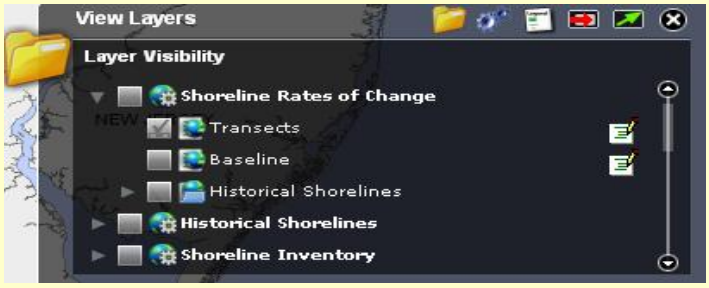
COASTAL ATLAS:

SHORELINES ONLINE MAP DATA SELECTION (www.dnr.state.md.us/ccp/coastalatlas/)



** Data is available through the use of Coastal Atlas Shoreline Map (www.dnr.state.md.us/ccp/coastalatlas/) or downloadable in ArcGIS format from the MD iMAP server (www.imap.maryland.gov/portal/services.asp) or DNR GeoSpatial Data Center (http://dnrweb.dnr.state.md.us/gis/data/)*

**Sections I-VI: Use the parcels data layer to determine project evaluation boundary*

I. Sea Level Rise Vulnerability

i. Sea Level Rise Vulnerability layer 0-2 feet

ii. Sea Level Rise Vulnerability layer 2-5 feet

II. Wetland Transition Potential

i. Sea Level Rise Vunerability layer, 0-2 feet and SLR Vulnerable Wetlands (current wetlands layer turned on)

ii. Sea Level Rise Vulnerability layer, 2-5 feet and SLR Vulnerable Wetlands (current wetlands layer turned on)

iii. Land Use/Land Cover layer (view the legend for details)

iv. Living Shoreline Suitability layer (currently available for Worcester, Somerset and Calvert Counties)

III. Restoration Potential

i. Imagery layer (turn off Shoreline and Street Map layers to view) and/or property description

ii. Imagery and Sea Level Rise Vulnerability layers

a. Sea Level Rise Vulnerability 2-5' inundation over Imagery (turn off Shoreline and Street Map layers to view Imagery)

iii. Sea Level Vulnerable Wetlands layer (only current layer turned on)
  a. Shoreline Inventory layer
    1. Shoreline Inventory – turn on *Phragmites* layer
    2. Imagery and/or property description for visible signs of diked or ditched wetlands

IV. Natural Storm Surge Protection

i. Shoreline Inventory layer
  a. Stabilization Structures (i.e. groin, rip rap, marina, bulkhead, etc.)
  b – d. Bank Cover (i.e. bare bank cover, partial bank cover, total bank cover)

ii. Shoreline Rates of Change (transect data) or Erosion Vulnerability Assessment

iii. Storm Surge Areas layer
  a – d. Turn on and off Hurricane Categories 1-4
iv. Land use/Land cover data (view the legend for details)

V. Barriers to Habitat Transition

i. Shoreline Inventory layer
  a – b. Stabilization Structures (if no data exists for the area refer to the property description)
  c. Stabilization Structures and Imagery/property description of the shoreline for information on vegetation
  d. Imagery and property description or site visit

ii. Shoreline Inventory layer – turn on Bank Cover

iii. – iv. Shoreline Inventory layer – turn on Bank Height and Condition

v. Shoreline Rates of Change
  a. Use transect data or use Erosion Vulnerability Assessment layer

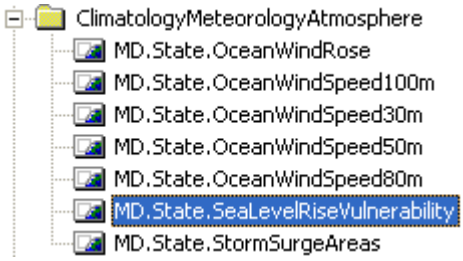
VI. Environmental Hazards

i. – iii. Property description, Sea Level Rise Vulnerability, and aerial Imagery layers
  c. Use Sea Level Rise Vulnerability layer 2-5 feet
  d. Use Sea Level Rise Vulnerability layer 0-2 feet

DESCRIPTIONS OF DATA LAYERS

Sea Level Rise Vulnerability – This is a basic bathtub simulation based on elevation data that displays potential inundation at 0-2', 2-5' and 5-10' of sea level rise. The inundation breakouts roughly correlate to Maryland's projected inundation rates for years 2050 (0-2') and 2100 (2-5'). The dataset is a derivative of high-resolution topographic data LiDAR (Light Detection And Ranging). The resolution of Maryland's LiDAR is in 2-foot contours, which provides us with an estimate of future vulnerable resources. Metadata can be downloaded at the DNR GIS data site: http://dnrweb.dnr.state.md.us/gis/data/

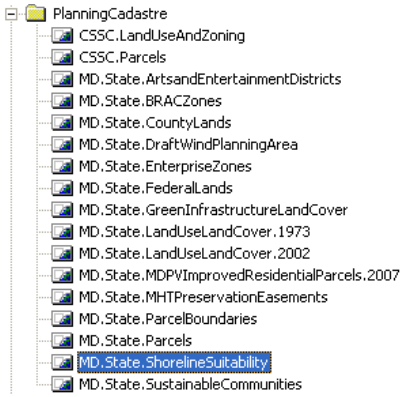
MD iMAP Folder



SLR Wetland Vulnerability – this is based on projections from Sea Level Affecting Marshes Model (SLAMM), which simulates the dominant processes in wetland conversions and shoreline modifications during long-term sea level rise. Map distributions of wetlands are predicted under conditions of accelerated sea level rise, and results are summaries in tabular and ArcGIS grid forms. Statewide data can be visualized on the Shorelines Coastal Atlas. County level data can be downloaded from http://dnrweb.dnr.state.md.us/gis/data/.

Living Shoreline Suitability – The Virginia Institute of Marine Sciences developed a model to geographically target shoreline areas potentially suitable and potentially unsuitable for the placement of a variety of living shoreline projects to counteract erosion problems. To date, models have been completed for Worcester, Calvert and Somerset Counties. This data can be downloaded from the iMap server in the following folder.

MD iMAP Folder



Shoreline Inventory – A Comprehensive Shoreline Inventory (CSI) was completed for the tidal regions of Maryland's coastal counties in partnership between Maryland DNR and the Virginia Institute of Marine Science (VIMS). The CSI captures baseline shoreline conditions throughout the tidal portions of the Chesapeake and Coastal Bays. Shoreline features and conditions were identified through a three-tiered shoreline assessment approach. Data from the survey was processed to create three GIS coverages, displayed through reports, summary tables, and maps, which are viewable Shorelines iMAP. This data can be downloaded from the iMap server in the following folder.

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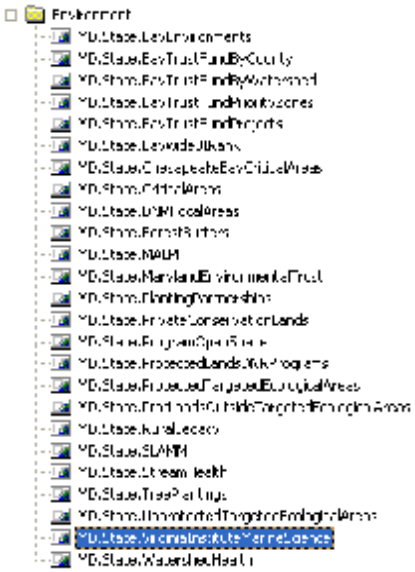
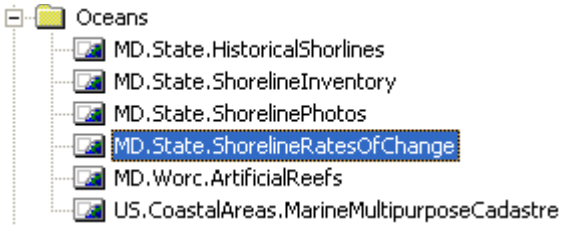


NAIP Imagery – National Agriculture Imagery Program (NAIP) collects aerial imagery for the U.S. during the growing season to make the digital ortho photography. NAIP imagery for Maryland can be downloaded from http://dnrweb.dnr.state.md.us/gis/data/

DNR Wetlands – were defined by the U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) program. The dataset was produced from aerial photography (Digital Orthophoto Quarter Quads) flown from 1988-1995. The metadata and spatial data can be downloaded from http://dnrweb.dnr.state.md.us/gis/data/

Shoreline Rates of Change – In 2003 Maryland Geological Survey (MGS) compiled historical digital shorelines for 1841-1977 time period. MGS contracted with EarthData International, Inc. to extract the shorelines from existing wetland coverage to estimate the shoreline rates of change for the Chesapeake and Coastal Bays. Metadata and spatial data can be downloaded from http://dnrweb.dnr.state.md.us/gis/data/ or pulled in from the iMAP server.

MD iMAP Folder



Storm Surge Areas – The US Army Corps of Engineers (USACE) completed two hurricane evacuation studies for the eastern (2007) and western (2010) shores of Maryland. The storm surge zones were generated using the Sea, Level, and Overland Surges from Hurricanes (SLOSH) model. SLOSH is a computerized model run by the National Weather Service to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes. The model provides geographical displays of color-coded storm surge heights for a particular area based on the shoreline, unique bay and river configurations, water depths, bridges, roads, and other physical features. This data can be downloaded from the iMap server in the following folder.

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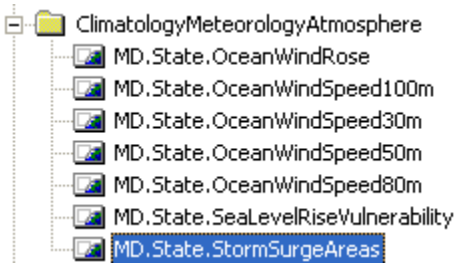

Erosion Vulnerability Assessment Tool (EVA) – the Baltimore District Army Corps of Engineers and DNR developed EVA to identify areas alongshore that have demonstrated historic patterns of instability, and currently support valued natural, social, or economic resources. As a planning tool, EVA uses a 50-year planning window to project shoreline position in 50 years to inform local planners where community infrastructure, cultural resources, and habitat are potentially at risk in the future. The map outputs identify where resources will be vulnerable, and can enhance or redirect future development options for individual communities, and define areas where opportunities for conservation easements could be directed. This data can be pulled from the iMap server in the following folder.

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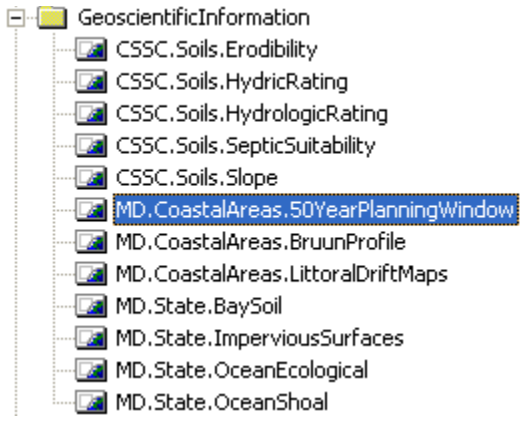

Parcel Boundaries – For each county, parcel polygons were extracted from a comprehensive parcel dataset. Depending on the County, the comprehensive parcel dataset may have contained parcels, rights of way, easements, annotation, subdivision boundaries, parcel centroids, and other property related features. The Maryland Department of Planning (MDP) collected the data from Maryland counties from May to July 2010. The parcel data is maintained and updated by the counties. Most of the coastal counties and municipalities (Baltimore City and Ocean City) were updated in 2010 with the exception of Worcester (2008), Wicomico (2009), Somerset (2007/08), and Caroline (2006) Counties.

Additional Data:

Hydric soil data (sSURGO) from Natural Resources Conservation Service may help identify areas for wetland restoration based on soil drainage; this may include restoring the natural hydrology to the site through the removal of dilapidated and unmanaged ditches and dikes. (http://soils.usda.gov/survey/geography/ssurgo/)

USGS Topographic Map – Digital color composite images of topographic quadrangle maps were produced by scanning a set of the USGS 7.5' topographic quadrangle maps covering the state of Maryland. The hardcopy source maps used for scanning were produced by USGS on loftrite, a white opaque stable base medium. The hardcopy maps were scanned at 250 dpi in 8-bit color by STS Systems of Parker, Colorado. The scanned images include all map collar information. The digital images and hard copy meet National Map Accuracy Standards at 1:24,000. This data can be pulled from the iMap server in the following folder.

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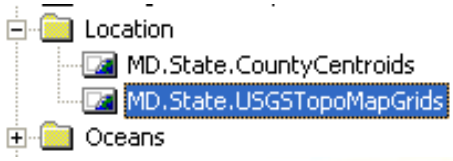

Coastal Atlas
Shorelines Map Data Disclaimer

The historical shorelines and the rates of change, and predictive marsh modeling derived from this application are intended for informational use only. This application reports average rates of shoreline change over about the last 50 years. Please contact Maryland Geological Survey for specific questions about how the shoreline change data were generated. The information is not intended to predict future shoreline position, nor can it determine short-term changes associated with short-term storm events.

The marsh modeling displayed on this application is intended to be viewed at the landscape level and is based on the Sea Level Affecting Marshes Model (SLAMM) version 6.0.1 that was run by DNR in 2011. The model was run at the county level, for all 16 coastal counties and Baltimore City using local erosion, sedimentation, accretion rates and an estimated 3.4 foot rise in sea level by the year 2100 as outlined in Maryland's Climate Action Plan. This project brings together multiple data layers from different sources, and thus is challenged by spatial and temporal scales. In the coastal environment, this is most evident when comparing data originally referenced to different shoreline bases and mapped at different scales. Efforts to correct data to a single baseline can consume resources, and for that reason some data have been corrected; others have not.

While every effort has been made to provide useful coastal planning tools in the Coastal Atlas, the State of Maryland, its agencies, officers, employees, agents, and representatives, and SLAMM contributors can not guarantee the accuracy, reliability or timeliness of any information contained in the Coastal Atlas. Users rely on information contained in the Coastal Atlas at their own risk, and any conclusions or decisions based on the use of these tools are the responsibility of the user. The data, maps, and information provided should be used only as a screening-level tool for management decisions. As with all remotely sensed data, all features should be verified with a site visit. The data and maps in this tool are provided "as is," without warranty to their performance, merchantable state, or fitness for any particular purpose. The entire risk associated with the results and performance of these data is assumed by the user. This tool should be used strictly as a planning reference tool and not for navigation, permitting, or other legal purposes.