Sentinel Site Cooperatives

Leveraging metadata to foster collaboration and inform strategic investments

Philippe Hensel  Christine Gallagher  Galen Scott
National Geodetic Survey, Ecosystems & Climate Operations
Sea Level Trends in the Chesapeake Bay
It's not just sea level rise…
Sea Level Rise and Coastal Flooding Impacts

Sea Level Rise

Legend
- Water Depth
- Low-lying Areas
- Area Not Mapped
- Visualization Location

Overview
Use the slider bar above to see how various levels of sea level rise will impact this area.

Levels represent inundation at high tide. Areas that are hydrologically connected are shown in shades of blue (darker blue = greater depth).

Low-lying areas, displayed in green, are hydrologically "unconnected" areas that may flood. They are determined solely by how well the elevation data captures the area's.

Understanding The Map

Additional Information
Encroaching Tides
How Sea Level Rise and Tidal Flooding Threaten U.S. East and Gulf Coast Communities over the Next 30 Years

Union of Concerned Scientists
Goals
Goals

Tool

Management Decisions

Laws, Policies, Action
Goals

SE Virginia sea level rise scenarios

- sea level rise (feet)
- Year

1992, 2000, 2020, 2040, 2060, 2080, 2100

Graph showing sea level rise projections for SE Virginia.
Chesapeake Bay Sentinel Site Cooperative Boundary

- District of Columbia, Maryland & Virginia
- Atlantic coast to tidal freshwater
Cooperative Members

Federal
- NOAA
- National Park Service
- USGS
- Smithsonian Environmental Research Center

State
- Maryland Department of Natural Resources
- DEQ (Virginia Department of Environmental Quality)
- Sea Grant Maryland
- Sea Grant Virginia
- Old Dominion University

Academic
- VIMS
- ORC
- VCU
- University System of Maryland

Non-Governmental Organizations
- The Nature Conservancy
- University of Virginia
Sea Level Change Sentinel Sites in the Chesapeake Bay

Shared Elements:
- Local geodetic control networks
- Tide gauge/local water level obs
- SETs
- Permanent vegetation plots
<table>
<thead>
<tr>
<th>Sentinel Site</th>
<th>SET Geographical Location</th>
<th>Geomorphic Setting</th>
<th>Site Label</th>
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</thead>
<tbody>
<tr>
<td>Chesapeake Bay</td>
<td>Jug Bay, MD</td>
<td>Tidal freshwater marsh</td>
<td>Mataponi Creek</td>
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<td>Sweet Hall Marsh</td>
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Expansion of SETs in Chesapeake Bay

Years Before Present (2014)

# SET Plots

0 50 100 150 200 250 300 350 400
SET Metadata Inventory

Geomorphic Settings

- Back-Barrier Lagoon
- Brackish marsh
- Managed Wetland
- Other
- Tidal Fresh Marsh
Vegetation Communities

- S. alterniflora
- S. patens
- Distichlis
- Schoenoplectus
- Juncus
- Phrag
- S. cynosuroides
- Polygonum
- Typha
- Zizania
- Peltandra
- Nuphar
- Other
SET Metadata Inventory

Benefits include:

– Communication
– Discovery
Benefits include:

- Communication
- Discovery
- Collaboration
- Strategic investments
- Complementation
- Quality Assessment
Sentinel Site Metadata Inventory

- Surface Elevation Tables ✔
- Local water level data
- Elevation transects
- Vegetation Monitoring
- Other data sets?
“Human-Built” Sentinel Site
Sea Level Rise and Coastal Flooding Impacts

Socioeconomic Vulnerability

Legend
- Water Depth
- Unconnected Areas
- Area Not Mapped

Social Vulnerability

Overview
By overlaying social and economic data on a map that depicts sea level rise, a community can see the potential impact that sea level rise can have on vulnerable people and businesses.

The Social Vulnerability Index, which shows areas of high human vulnerability to hazards, is based on population attributes (e.g., age and poverty) and the built environment. By looking...
“Human-Built” Sentinel Site

Baltimore
Cambridge MD
According to Union of Concerned Scientists:

Mid-Atlantic especially sensitive to tidal flooding

10 of the 30 top cities/towns reported by UCS are in the Chesapeake Bay Sentinel Site Cooperative
“Human-Built” Sentinel Site

• What does an urban sentinel site look like?
• What data, models, and tools are lacking?
• How can we better leverage existing assets?
• How can we provide actionable information?
• How can we foster community involvement?
• How can we help coastal human communities adapt to changing water levels?
Chesapeake Bay Sentinel Site Cooperative

Thank you very much!
Monitoring wetland elevation capital over large spatial scales using real-time GPS

Laura Mitchell\textsuperscript{1}, Matt Whitbeck\textsuperscript{1}, Amanda Bessler\textsuperscript{1}, Jim Lyons\textsuperscript{1}, Galen Scott\textsuperscript{2}, Philippe Hensel\textsuperscript{2}, Doug Adams\textsuperscript{2}, Glenn Guntenspergen\textsuperscript{3}, Don Cahoon\textsuperscript{3}

\textsuperscript{1} US Fish & Wildlife Service, Chesapeake Marshlands Complex
\textsuperscript{2} NOAA National Geodetic Survey
\textsuperscript{3} USGS Patuxent Wildlife Research Center
Does *Kosteletzkya pentacarpos* Facilitate Upland Transition to High Salt Marsh?
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