Archaeology at the Water’s Edge:
Quantifying the Effect of Shoreline Change on Maritime Archaeological Resources in Virginia’s Northern Neck & Middle Peninsula

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Brian Bates, Mary Bennett, Craig Rose, Walter Witschey,
One Problem & Three Basic Questions

Too Many Sites & Not Enough Money, People or Time

1. Which *known* sites are most threatened?

2. Where do we look for new sites?

3. Which of the *unidentified* site locations are most threatened?
Project Area: 4 Virginia Counties
- Northumberland
- Lancaster
- Middlesex
- Mathews

1,237 Miles of Shoreline
312 Sites within 50 meters of the water’s edge

Question #1:
Which of these known sites are most at risk from shoreline change?

The Answer…
28 sites will be gone in less than 50 years

DHR focuses resources where needed most
High-Resolution Aerial Imagery

1937 Aerial

1994 Aerial

2013 Aerial

Robust Shoreline Change Rate Analysis Using GIS Modeling
Vulnerability Assessment Results

Shoreline change rate at 5 meter intervals

Forecast shoreline position in 50 years

Middlesex County WLR in Meters

-15.00 -0.27
-0.26 -0.13
-0.12 -0.07
-0.06 -0.01
0.00 - 6.00

Miles
28 sites will be gone in less than 50 years

DHR focuses resources where needed most
6.3 feet lost per year

24 years left

Site is gone!

High risk site
High risk site

20 feet lost per year

14 years left
Vulnerability Assessment

SHORELINE TREND FOR 312 SITES ANALYZED IN THE PROJECT COUNTIES

- Eroding or Drowning 49%
- Stable 36%
- Submerged 7%
- Accreting 2%
- No Data 6%
Question #2
Where should we look for unknown sites?
Potential Assessment

- Geology
- Soil Types
- Elevation
- Proximity to Water
- ...
Heat Map
Question #3

Which “hot spots” are most threatened by shoreline change?
Combine:
High Vulnerability

+ “Hot Spots”
Condition Assessment

Collaborative Effort

DHR, MHT, NPS…

ASV, ASM…
Longwood IoA Vulnerability, Potential & Condition Assessment

Vulnerability Assessment + Potential Assessment “Hot Spots” → Condition Assessment
The Longwood VPC Assessment Method matches the NPS Cultural Resources Climate Change Strategy (CRCCS)

“Use the best available science to develop and apply a process to prioritize cultural resource adaptation projects that combine established management tools with newer methods, such as vulnerability assessments.

Expand the NPS capacity to conduct inventory and monitoring of archeological sites in anticipation of climate change impacts and support curation of artifacts and associated documentation.”

NPS CULTURAL Resources Climate Change Strategy 2017
Future Directions

“...we cannot afford to wait for absolute certainty about where and when impacts will occur, we must act based on the best available sound science...”
(former National Park Service director, Jonathan Jarvis, 2014)

Bay-Wide Vulnerability & Potential Assessment
Thank You!

Questions and Discussion