



TREADING WATER: A THREE PRONGED APPROACH FOR MITIGATING THE IMPACTS OF EROSION AND RISING SEA LEVELS ON FORT EUSTIS ARCHAEOLOGICAL SITES



PATRICK BARRY

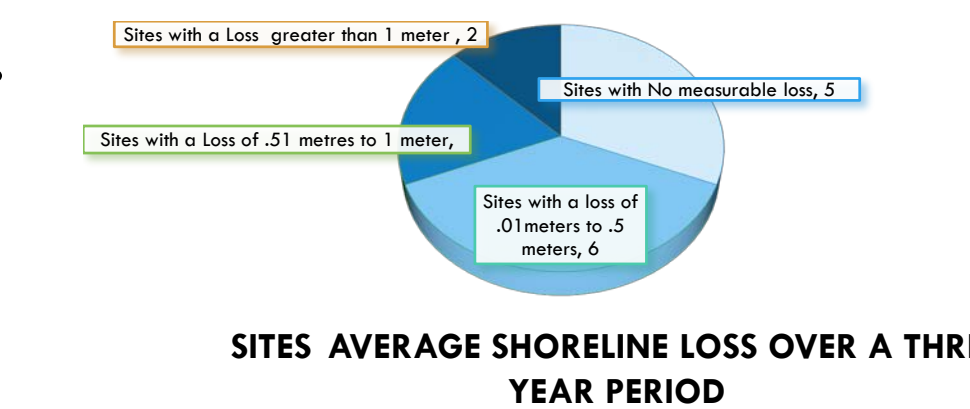
**Fort Eustis Cultural Resources, Fort Eustis, Virginia
Center for the Environmental Management of Military Lands**

Introduction

Fort Eustis has 233 known archaeological sites, 31 of those sites are under continuous siege by erosion and rising sea levels. Located on The James and Warwick Rivers, Mulberry Island has lost countless features, and three sites have been reclaimed by the James. Left unchecked, we will most certainly lose many more sites and the potential knowledge that could be gained from those sites.

Conclusions

- Three previously undetermined eroding sites evaluated for listing on the NRHP (44NN118 and 44NN105 not recommended as eligible, work at 44NN14 begins this year.
- Temporary stabilizations methods such as coir logs and other low energy solutions may be able to perform in more higher energy environments if frequent maintenance is performed on the stabilization. At site 44NN107, we were able to hold a feature in place for almost five years using this technique. Over that time period the rest of the site lost almost 4 meters of shoreline.
- 31 sites currently being monitored with numerous features recorded, site specific shoreline loss recorded thru our in-house erosion study.



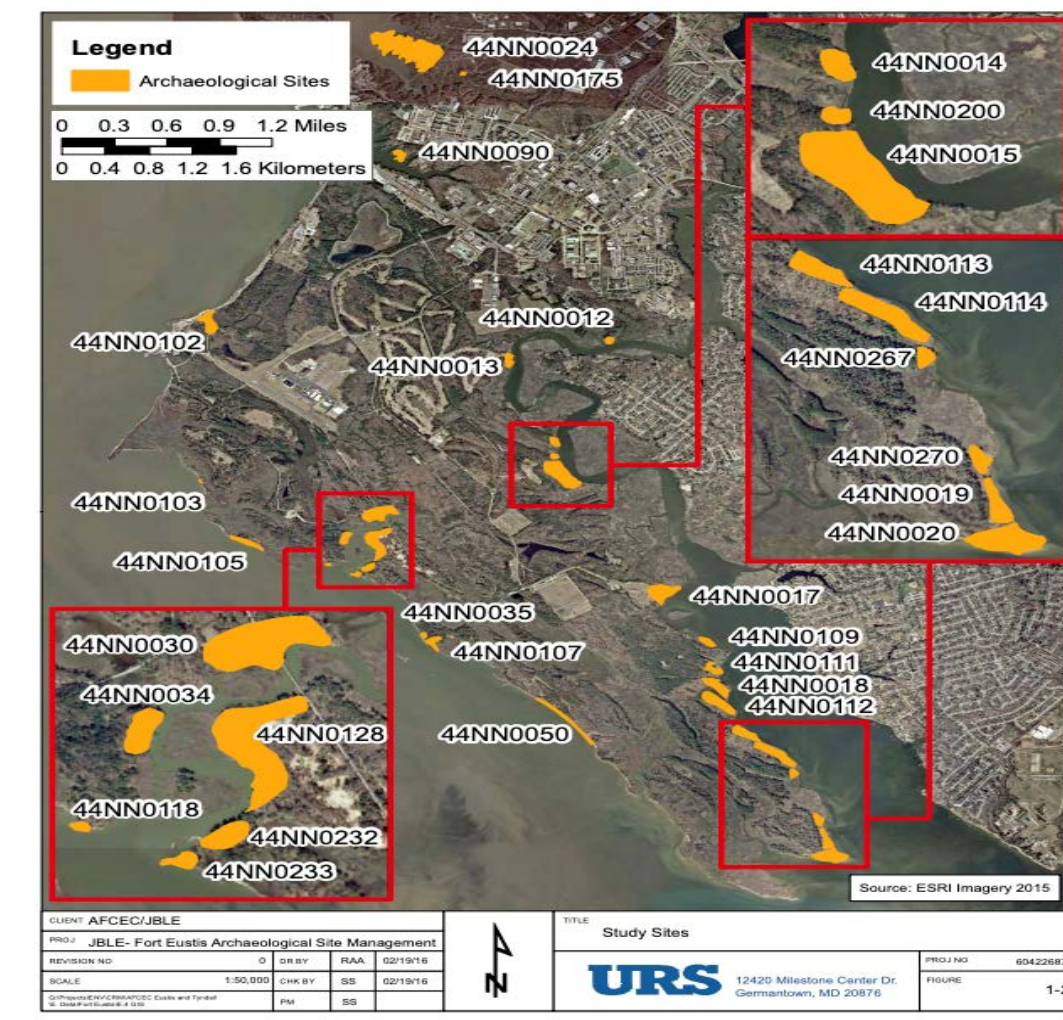
METHODS

ANALYZE

- ❖ URS PERFORMED AN OVERALL ASSESSMENT OF THE 31 ARCHAEOLOGICAL SITES IMPACTED BY EROSION ON MULBERRY ISLAND AND CATEGORIZED BY THREAT LEVEL.
- ❖ JBLE CULTURAL RESOURCE STAFF BEGAN ASSESSING SITES ON AN INDIVIDUAL LEVEL WITH AN IN-HOUSE EROSION STUDY THRU SITE MONITORING VISITS. WE ARE CURRENTLY RECORDING SHORELINE LOSS ON A YEARLY BASIS AT 22 SITES.
- ❖ USE ALL INFORMATION GATHERED TO PRIORITIZE SITES ACCORDING TO SPECIFIC CRITERIA AND AVAILABLE FUNDING.



RPA Courtney Birkett taking an erosion measurement at site 44NN15.



Fort Eustis sites evaluated and categorized by threat level by URS.

IMPLEMENT

- ❖ JBLE CULTURAL RESOURCES SECURED FUNDING FOR PHASE II EVALUATIONS OF ERODING SITES 44NN118, 44NN105, AND 44NN14 BEGINS THIS YEAR.
- ❖ CONTINUED SITE MONITORING.
- ❖ JBLE CULTURAL RESOURCES BEGAN DEPLOYING TEMPORARY SHORELINE STABILIZATION AT SITES 44NN107 AND 44NN14.



CSU monitoring director Patrick Barry taking GPS points of features uncovered by the low tide at 44NN14.



Louis Berger Principal investigator Andrew Wilkins leading the phase 2 evaluation at site 44NN118



CSU monitoring director at the new coir log stabilization at 44NN14.



Environmental Tech Paul James assists with stabilization of site 44NN107.

ADAPT

- ❖ WE HAVE ADAPTED OUR SHORT TERM STABILIZATION TECHNIQUES FROM HEMP ROPE BINDING AND OAK STAKES AS ANCHORS, TO ZIP TIES AND PARACHUTE CORD AS BINDING AND METAL TENT STAKES AS THE ANCHOR SYSTEM.
- ❖ INCREASED MAINTENANCE IS A MUST FOR TEMPORARY STABILIZATION METHODS AS WE TRANSITION TOWARD MORE LONG TERM SOLUTIONS FOR OUR SITES SUCH AS FLOATING BREAKWATERS WITH OYSTER BAG SILLS.



The oak stake anchors at site 44NN14 continued to pull up collapsing the stabilization.



CSU employee William Feltz installs the new metal tent stake anchoring system at site 44NN14.



Floating breakwater technology for site stabilization is available at www.wavebrake.com



Oyster bag sills like this one illustrated by VIMS paired with floating stabilization and vegetation planting offer a more cost effective solution for long term site stabilization than traditional methods such as rip rap.

Acknowledgements

Dr. Christopher McDaid, CSU RPA Courtney Birkett, CSU employee William Feltz, Environmental Specialist Paul James, URS (now AECOM) principal investigator Scott Seibel, Louis Berger principal investigator Andrew Wilkins, Owner of Wavebrake Jonathan Clarke