

Case Study 3: Shell Mound Sites Threatened by Sea Level Rise and Erosion, *Canaveral National Seashore, Florida*

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Building a living shoreline with volunteers at Castle Windy mound site, Canaveral National Seashore. Image credit: Margo Schwadron, NPS.

Goals

Canaveral National Seashore contains several of the largest, most intact, and most significant prehistoric shell mounds in North America. Four of these mounds are threatened by erosion induced by sea level rise and increased storm activities. The goals of this project are to recover archeological, environmental, and paleoecological data that are threatened with irrevocable loss from erosion; to document the threatened mound sites with national historic landmark (NHL) level documentation; to work to stabilize and protect sites; and to offer effective communication and civic engagement with youth and volunteers.

Challenges and Needs

Turtle Mound, Ross Hammock, Castle Windy, and Seminole Rest shell mounds were key prehistoric/proto-historic monuments and settlements, and later served as important navigational landmarks along the east coast of Florida during the early European exploration and colonization of the Americas.

Turtle Mound is the tallest extant shell mound within the national park system, and is one of the tallest in North America, at 11 m (37 ft) high; it is composed of mostly oyster and clam shell formed into two main peaks, forming a saddle. Very limited archeological documentation of Turtle Mound, Castle Windy, and Ross Hammock has ever occurred, and all are threatened with severe erosion. Seminole Rest was listed in the National Register of Historic Places, and is also undergoing erosion from sea level rise and increased storm activities.

Climate change effects are already producing severe, measurable, and detrimental impacts to these mound sites, including erosion and loss of significant and unevaluated archeological, environmental, and paleoecological data. Impacts from sea level rise and increased storm activities are predicted to continue to accelerate erosion, loss of archeological data, destabilization of mounds, and eventual total loss of site integrity; the National Park Service (NPS) is addressing these threats through some of the following actions.

Responsive Actions

The NPS Southeast Archeological Center designed a project to address these threats in three ways: documenting the resource, offsetting stressors, and interpreting the change.

The center is working to thoroughly spatially map and document the current cultural landscape, and to recover important archeological, environmental, and paleoecological data before significant portions of the mounds are lost. The four mound sites were mapped to capture and document the contextual terrain and site details by using existing maps and generating new terrestrial LiDAR data. Additionally, airborne LiDAR and high-resolution aerial imagery were used to examine the larger environment, document the present state of erosion on sites, and examine possible related terrain features. Archeological testing included NHL-level documentation and archeological and scientific data recovery of the four threatened mound sites to support a national historic landmark eligibility study. NHL status would allow for more surveys to be completed and increase opportunities for education and outreach.

On-the-ground conservation and stabilization methods and techniques are being successfully employed to strengthen, protect, and stabilize eroding sites by combining soft armoring and living shoreline techniques. This hybrid approach involves planting of cordgrass (*Spartina alterniflora*) and mangroves in the intertidal zone, deploying bags of oyster shells seaward of the cordgrass, and placing oyster restoration mats seaward of the bags.

This project is intended to engage a wide spectrum of the public at all age levels. Volunteers, local school groups, and park visitors have multiple opportunities to gain hands-on experience with archeology, building oyster mats, and planting the living shorelines. Civic engagement with stakeholders and the public includes effective communication about the effects of climate change on cultural resources. The project has been successful and can therefore also serve as a model to other coastal parks with similar management challenges.

This case study is an example of the following adaptation strategies:

- Incorporating climate change into policies, plans, and regulations
- Increasing/improving public awareness, education, and outreach efforts
- Conducting/gathering additional research, data, or products
- Conducting vulnerability assessments and studies
- Developing/implementing an adaptation plan

For more information:

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