Archaeological Approaches to Identifying Submerged Cultural Landscapes and Ancient Native American Archaeological Sites in Southern New England

David S. Robinson
Fathom Research, LLC
Offshore Development Projects
Southern New England
(2001 – present)

All Project Types
(Wind; LNG; Submarine Cables; Dredging; Beach Nourishment; Bridge Replacement; Artificial Reefs; HAZMAT Remediation)

▲ = Proposed Wind Energy Project
Post-Glacial Sea Level Rise

Ca. 20-18,000 BP = Sea Level @ -350 ft ("Lowstand")
Ca. 10,000 BP = Sea Level @ -130 ft
Ca. 5,000 BP = Sea Level near modern levels

Source: after Kraft 1985
Source: after Oldale 1992
High Sensitivity = 10,316 sq mi
Low Sensitivity = 3,214 sq mi
No Sensitivity = 11,857 sq mi

Largest marine archaeological survey conducted to date in Massachusetts waters
46 km long x 1,200 meters wide survey corridor across Massachusetts Bay

HOW???

MA SHPO (MHC & MBUAR):
Required developer to consider potential presence of submerged ancient Native American archaeological sites, as well as shipwrecks, within the offshore project area.
Finding submerged settlement sites requires a *paradigm shift* from underwater archaeology’s present shipwreck-focused, target-based research strategies to one that includes …

**… Submerged Landscape Reconstruction**

Using available technologies and oceanographic data, we can now “peel away” water and marine sediments to expose intact remains of the inundated paleolandscape.

It is in these areas alone that we should focus our attention.

They are the only places where submerged settlement sites will be preserved in meaningful primary contexts.
Look for variability – sometimes associated with preserved foundation & relict elements of the pre-inundation paleolandscape; sometimes indicative of the potential for paleosols preservation.
Apply **Local** Sea Level Rise Models

General indicator of shoreline locations and archaeological sensitivity
COLLECT DATA:

Sidescan Sonar; Sub-Bottom Profiles; Vibrocores from Select Reflectors
Plant Macrofossil Evidence of Paleosols
(also includes: cattail, sedge, and birch cone seeds, and even insect parts!)

**Flatsedge Seed**
* (bushy pond weed) Root Hairs

**Pondweed Seed**
* (Potamogeton sp.)

**Naiad Seed**
* (Najas sp.)

**Large Birch Wood Fragment**
* (Betula sp.)

**WHOI AMS C-14 Date:**
ca. 10,100 BP

**WHOI AMS C-14 Date:**
ca. 5,500 BP

**Miscellaneous Plant Debris**
* (wood, leaves & charcoal)
Preservation of the Submerged Paleolandscape

- Extremely limited due to “shoreface retreat”
- Erosive shoreface retreat is the dominant coastal regression process

Source: Waters 1992
Preservation of the Submerged Paleolandscape

- Preservation in isolated cases of “stepwise retreat” of shoreline
- Low-lying areas (i.e., paleochannels, ponds, estuaries, lagoons, etc., and their margins) flooded, buried & preserved in-place

Source: Waters 1992
Submerged Stone Age Settlement Research in Denmark

- >2,000 known sites in Danish waters
- 1978: first u/w stone age sites excavated
- preservation of cultural materials unparalleled by anything on land
- established & proven financially – & technologically – feasible methods for predicting, testing, excavating submerged settlements
- submerged settlements archaeology an important element of Danish underwater archaeological research & CRM projects
Tybrind Vig:
The “pearl” of Danish Stone Age Underwater Archaeology

- 6,500 yrs B.P. Ertebolle Culture (late Mesolithic Period) hunting/fishing settlement in western Fyn
- first and most comprehensive excavation of submerged stone age site (1978 – 87)
- proved technological feasibility of excavating submerged stone age sites
- revealed great research potential of submerged settlements
Tybrind Vig:
The “Pearl” of Danish Stone Age Underwater Archaeology
Tudsehage Submerged Settlements Project
Skaelskor, Denmark (June 29 – July 19, 2009)
Site Grid Establishment & Push-Coring
# Core Documentation & Test Unit Placement

**Project:** Tuscanage  
**Date:** Coring Log Results  
**Date:** 02 July 09  
**Diver:** David Robinson  
**Coring Log:** 2009-05

**Comments:** Datum stick at start of day (0925 hrs) was exposed 22 cm above water. Datum stick at end of day (1745 hrs) was exposed 70 cm above water. Core samples were collected southwest to northeast. Water depths were taken at each location at the time of sampling. Ends of coring line correspond with survey grid node locations.

<table>
<thead>
<tr>
<th>Location On Liner</th>
<th>Total Sample Depth Below Seafloor</th>
<th>Measured Water Depth</th>
<th>Time (Local)</th>
<th>Depth Below Seafloor</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 meters (start of log)</td>
<td>17 cm</td>
<td>2-10 meters</td>
<td>1000</td>
<td>0-8 cm</td>
<td>Loose fine sand with mud gravel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| | | | | | Light gray fine sand, mixed with slightly yellowish-brown clay, dry (solid?)  
| | | | | | Grayed  
| | | | | | 
| 5 meters | NO SAMPLE TAKEN | | | | |
| 10.1 meters | 67 cm | 2-10 meters | 1000 | 10-17 cm | Loose fine sand with mud gravel and fine fragments  
| | | | | | Light gray fine sand, mixed with yellowish-brown clay, dry (solid?)  
| | | | | | Grayed  
| | | | | | 
| 15 meters | NO SAMPLE TAKEN | | | | |
| 20 meters | 19 cm | 2-20 meters | 100% | 9-19 cm | Loose fine sand with mud gravel  
| | | | | | Gray has sandy clay  

**Marine seds**  
**Paleosols**  
**Glacial Clays (culturally sterile)**
Excavation
Excavation
Documentation
Organic Materials

Sharpened Wooden Stake
(assoc. w/fish weir & possible dwelling)

Charred Cut Firewood

Hazelnuts & Acorns
Interpretation
Gyttja – “The Cultural Layer”
Gyttja-like “Peat” Deposits – Nantucket Shoals & George’s Bank – Evidence of Intact Paleosols?
PREDICTIVE MODELING ON THE SNE OCS:

What Have We Learned …

1. The SNE OCS where archaeological deposits may be present is a very large area (between around 10,000+ to 13,000+ sq mi) (equivalent size to MA or MD); intact paleosols with archaeological sensitivity will likely be a widely dispersed, very small subset of that area.

2. It is possible to effectively predict where paleosols are likely to be present and to test those hypotheses. This is important, because doing so allows for focused archaeological testing in areas where archaeological deposits in meaningful and informative contexts may be found.

3. Bathymetry can sometimes be a general indicator of paleotopography and, thus, paleosol preservation potential and archaeological sensitivity.

4. High-energy dynamic marine sedimentary environments are not necessarily an indicator of a low potential for paleosol preservation – case in point – Nantucket Sound.

5. Sub-bottom profiling (boomer and CHIRP) and targeted selective vibrocoring are effective techniques for identifying paleosols.

6. Multi-disciplinary collaboration with environmental scientists is a must.
POINTS FOR DISCUSSION ...

1. Inclusion of contemporary Native peoples and their values, perspectives, and preservation concerns in the archaeological research & management of submerged ancient Native American settlements is absolutely necessary.

2. Partnerships between government, industry, and academia, the identification of existing, available, and useful geophysical/geotechnical data sets for the archaeological assessment of the OCS and establishing a program of integrated data management would be beneficial. Can and how do we do it?

3. What advanced technologies and techniques are available or are about to come online that would better enable us to identify and test intact submerged paleolandforms?

4. How do we address, manage, and archaeological test deeply buried, (i.e., > 10 ft) archaeologically sensitive paleosols that are within a Project APE?
References


THANK YOU!

“All we do is touched with ocean,  
Yet we remain on the shores of what we know.”  

Richard Wilbur, 1947