MARITIME ARCHAEOLOGICAL AND HISTORICAL SOCIETY

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Raising a 3,200-Year-Old Sewn Boat from the Croatian Adriatic

Archaeological Museum of Istria

Marine archaeologists have raised a hand sewn boat dating back over 3,200 years from the bottom of the Mediterranean Sea. Known as the Zambratija boat, after the bay in the Adriatic in northern Croatia where it lay in shallow water, the vessel was raised to allow extensive studies of the well-preserved wreck.

In early July of this year, a team of French and Croatian researchers recovered the remains of the vessel that is a type believed to have defined regional shipbuilding between the 12th and 10th centuries B.C. The boat, which is the oldest entirely hand-sewn boat yet found in the Mediterranean, has withstood the test of time: seven meters of its original length, estimated to have been 12 meters, are still remarkably well preserved. The vessel represents a rare example of the ancient shipbuilding tradition of Istria and Dalmatia, two regions on the Croatian coast.

Documenting the remains of a hand-sewn boat in the Adriatic in northern Croatia. Photo by Philippe Groscaux (CNRS, CCJ).

The French National Center for Scientific Research (CNRS) conducted the project in collaboration with the Archaeological Museum of Istria in Pula, Croatia. The task is a delicate one, since the boat is made from pieces of wood that were intricately sewn together using flexible fibers. Sections of the vessel were placed on specially made lifting supports to bring them safely to the surface.

Sewn boat construction techniques were used in many parts of the world prior to the development of metal fasteners. The so-called solar barque, or funerary boat, found near the Great Pyramid of the pharaoh Khufu, in Egypt, dates to c. 2500 B.C., although it is part of a Pharaonic-era shipbuilding tradition that does not appear to have parallels in the Mediterranean. Otherwise, the oldest known sewn craft comes from North Ferriby, in the English county of Yorkshire, dated by mass-spectrometry to 2030 B.C. The oldest find from Scandinavia is the Hjortspring boat discovered in a bog in southern in Denmark, dated about 300 B.C.

The Zambratija remains were initially thought to be from the Roman era. As reported in the online magazine *Croatia Week*, Ida Koncani Uhač, Museum Advisor and Head of the Underwater Archaeology Collection at the

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Notes from the Prez – Steven Anthony

It seems that daily life has returned to normal in 2023 and the Covid 19 plague and its variants appear to be under control in the general population. However, it is still posing challenges to those over the age of 50 or whose immune system is compromised. For that population, vigilance (masking) and vaccination are still the watchwords. But the good news is that all those who previously refrained from diving are returning to diving again. For those who never stopped diving, I extend my congratulations as it is a testament to your overall good health.

The 2023 Introductory Course in Underwater Archaeology concluded in April and exams were submitted and graded this summer. The MAHS grading committee enjoyed reading the exams and I personally marveled at the extent of the class interest in maritime archaeology and their commitment to the preservation of our historic shipwrecks.

Though MAHS didn't get in the water in 2023, we intend to restart our Field School in 2024. As I previously mentioned, we would like to return to our Pamunkey River Project and pursue our efforts in nominating Garlick's Landing on the Pamunkey River to the National Register. A.J. Daverede volunteered his time this year to document JEB Stuart's famous ride around General McClellan's army in 1862 and his related raid on the Yankee supply ships tied up at the Garlick's Landing wharf. So, we have made some important progress in archival research this year.

I was also pleased to learn that almost 70% of the students who completed the MAHS exam and earned the MAHS Diploma also applied for the PADI Specialty designation which is managed by Earl Glock, our long-standing Dive Safety Officer. A great big "Thanks" goes out to Earl for taking care of that for our students.

Dr. John Seidel, who has long been an advisor to MAHS and a mainstay in our Intro course, co-authored a chapter about MAHS in coordination with me and Jim Smailes, which will be included in a book scheduled for publication titled *What's in a Name? Discussions of Terminology, Theory and Infrastructure of Citizen Science in Maritime Archaeology, Volume 2***.** This publication will explore the various roles that citizens play and the contributions they make to the field of underwater archaeology. The topic reinforces the MAHS view that recreational scuba divers can play a significant role in underwater archaeology and preserving historic shipwrecks.

Dr. Seidel also worked with the MAHS Education Committee over the summer to upgrade and modernize

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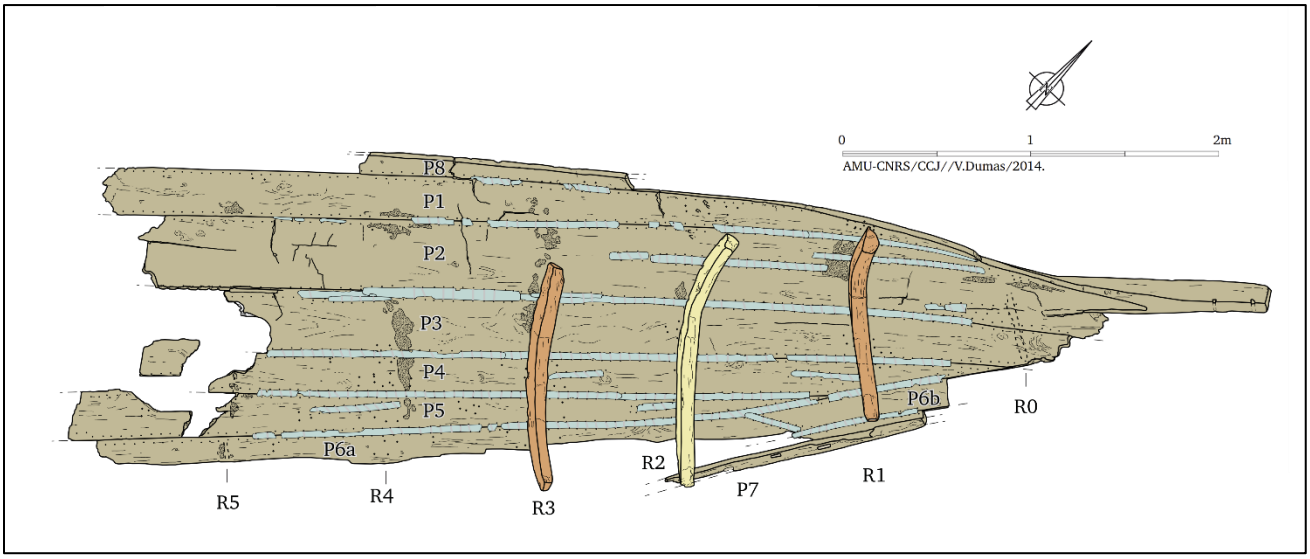
MAHSNEWS is the official publication of the Maritime Archaeological and Historical Society (MAHS), a non-profit educational organization dedicated to preserving our global maritime heritage.

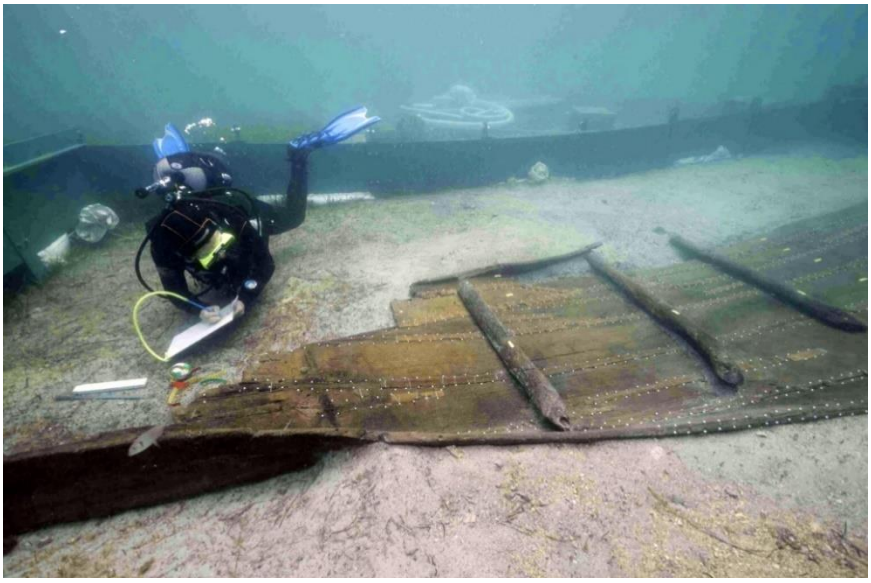
MAHSNEWS will consider articles and notices for publication which enhance public awareness and appreciation of maritime history, archaeology, and heritage preservation.



Plan drawing of the Zambratija boat. Image by V. Dumas (CNRS, CCJ).

Archaeological Museum of Istria, noted that the biggest surprise came with radiocarbon dating of the boat's structure by four world laboratories, conducted at the end of two archaeological campaigns in 2011 and 2013. The dating was performed on four samples of the planks, which placed the construction of the boat in the early phase of the Histrian culture, during the transitional period between the Late Bronze Age and the Iron Age.

The researchers marveled at the sewing technique employed on the planking and the related water tightness, which they describe as unparalleled. Carefully shaped planks are connected at the edges with overlapping sections, which are sewn together. The stitching is still visible in many areas, and the frame appears largely undamaged.



Diver examining the boat elements. Photo by Philippe Groscaux (CNRS, CCJ).

Preliminary analysis conducted prior to removing the remains from the water was reported by Patrice Pompey and Giulia Bonetto of Aix-Marseille University, CNRS, Centre Camille Jullian (CCJ). They indicated that the vessel has:

> a keel-like timber carved from an elm log [with planking strakes, also of elm]. The sewing is irregular and is made up of simple overedge vegetal stitches ... set diagonally rather than perpendicular to the plank edges … Small pegs lock the stitches. Fir laths holding wadding made of a layer of vegetal fibres, were placed over the seams prior to sewing. Finally, an internal coat of pitch ensured water tightness, and was probably used on the external surface too, but the excavators have not yet been able to observe the outboard. The frames are lashed to the planking. They have a round back and a narrow foot for stronger clamping. The foot is not crenellated over the seams but has rectangular limber holes.

Removing the boat from the waters of the bay will enable a Franco-Croatian team of researchers from the CCJ and the IstriaMuseum to carry out more detailed analysis using modern day technologies. CNRS said that once the pieces have been removed and placed in a custom support in the lab, the scientists will reconstruct the boat in 3-D. This will help them identify the fibers used for sewing and further the study of techniques used to shape the wood.

"Handling relics of this caliber is a delicate affair; therefore, every stage of the process will require the utmost care," said CNRS. When the analysis is completed, the vessel and its components will be desalinated in Croatia before being taken to Grenoble in

Diver stitching the holes between planks. Photo by Philippe Groscaux (CNRS, CCJ).

Naval engineer scanning a section of the hull for 3-D modeling at the depot of the Archaeological Museum of Istria in Pula. Photo by Löic Damelet (CNRS, CCJ).

2024, where they will be preserved by the Arc-Nucléart restoration workshop. The ultimate plan is to have the fully restored boat exhibited in a new maritime heritage museum in Pula, Croatia.

The decision to recover a wreck from the sea floor is always difficult, considering the effort required to fully document the site, lift the fragile pieces, conserve the waterlogged remains, and provide funding for the costs involved at each stage. The Archaeological Museum of Istria made the decision to recover the Zambratija boat for several reasons. When discovered, the remains lay in shallow water (approximately two meters deep) and close to the coast, where they were subject to seabed erosion intensified by climate change and associated extreme weather phenomena. By raising the remains, more extensive and detailed analysis of the boat and its components will be possible, advancing knowledge of this early construction technique in a rare regional prototype. In addition, the eventual display of the boat in the museum exhibit will represent a direct means of increasing public awareness of the underwater cultural heritage in the region.

Divers preparing hull planking for removal on the lifting support. Photo by Philippe Soubias (CNRS, CCJ).

"The boat serves as the archetype for all the vessels that were later found and built in the Adriatic," said Darko Komšo, director of the Archaeological Museum of Istria. "It represents not only the discovery of a material artifact but also the unveiling of a technology that is Adriatic in nature. This is something that our ancestors were doing 3,200 years ago, and it bears witness to our identity and craftsmanship traditions that need to be preserved and presented."

This article was compiled from the online sites Maritime Executive, Croatia Week, and from technical reports by several project participants:

Ida Koncani Uhač, Giulia Boetto, Marko Uhač. *Zambratija. Prehistoric sewn boat. Katalog (85), Archaeological Museum of Istria, 2017. https://halshs.archives-ouvertes.fr/halshs-01977636.*

Pierre Poveda, Giulia Boetto. *The first hypothesis of the reconstruction of the hull shape. Katalog (85), Archaeological Museum of Istria, pp.54-59, 2018. https://halshs.archives-ouvertes.fr/halshs-01978870.*

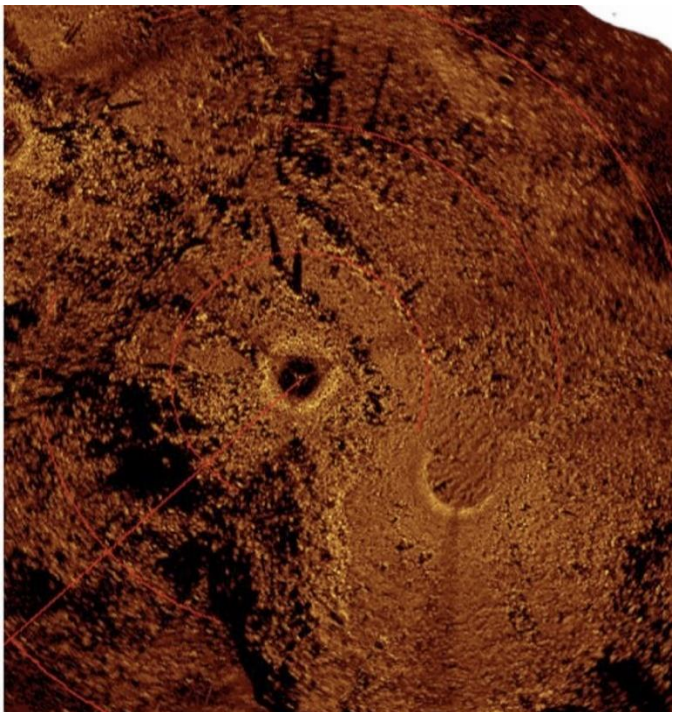
Patrice Pomey and Giulia Boetto. *Ancient Mediterranean Sewn-Boat Traditions. International Journal of Nautical Archaeology, 2019, 48 (1), pp.5-51. ff10.1111/1095-9270.12337ff. https://shs.hal.science/halshs-02059329v2.*

Eric Staples and Lucy Blue. *Archaeological, Historical and Ethnographic approaches to the study of sewn boats – past, present and future. International Journal of Nautical Archaeology, 2019, 48 (2), pp 269-285. DOI: 10.1111/1095-9270.12361.* ⚓

Using Autonomous Underwater Vehicles to Explore Submerged Prehistory

by Ashley Lemke

Prehistoric sites underwater are by definition not new, although their detailed study is an emerging science. They are typically much older than shipwrecks and many other submerged maritime sites. While scholars have been investigating "Submerged Prehistory" for several decades – research concerning these sites has ramped up exponentially in the last 10 years. Taking North America as an example, prehistoric sites have been found underwater off both the Pacific and Atlantic coasts, as well as in many large inland lakes, rivers, sinkholes, and marshes. With the acknowledgement that sea level rise and other water level fluctuations over millennia have exposed, and then submerged large areas of land where prehistoric peoples were living, new sites are being discovered and explored every year.



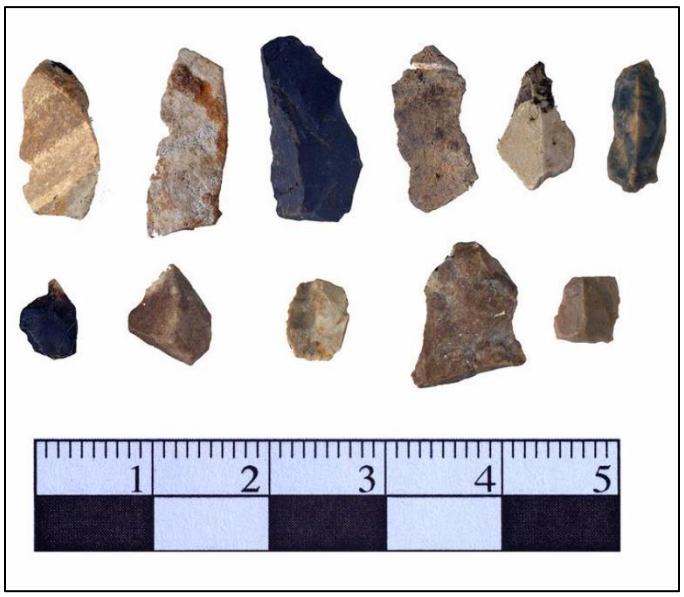
Acoustic image of a drive lane produced from scanning sonar images. The scanning unit is the black circular area near the center of the image. A trace of the second scanning sonar location is visible in the southeast of the image. (O'Shea and Meadows 2009).

My own research takes place on land and underwater, and for the last several years I have worked with an interdisciplinary team exploring a 9,000-year-old prehistoric landscape that is 80-120 feet underwater in Lake Huron, one of the North American Great Lakes. At the end of the last ice age, glaciers were slowly retreating and carving out the lakes. Starting 12,000 years ago, some of the frigid melt water flowed into the basins and created the first lakes. At this early stage, lake levels were much higher than they are today, creating a very large glacial lake known as Lake Algonquin.

By 9,000 years ago, drainages and precipitation patterns had changed and water was flowing out of the Great Lakes. This process, compounded by glacial isostatic rebound (where the land rises after the weight of the glaciers is gone), resulted in water levels that were much *lower* than today, creating large, new areas of dry land for prehistoric peoples to live on. During this time Lake Huron was considerably smaller than today and is known by paleo-geographers as Lake Stanley. A narrow land bridge was present connecting what would be the modern-day state of Michigan and the province of Ontario. This ridge provided an ideal corridor for ancient caribou migrations. Our team conducted underwater archaeology on the ridge and discovered on the modern lake bottom stone-lined lanes for driving game, along with hunting blinds and other structures, as well as stone tools and bone – evidence of prehistoric hunters targeting the caribou.

More recently, beginning with my dissertation work in 2016 and continuing through 2022, we have used Autonomous Underwater Vehicles (AUVs) to map this prehistoric landscape and get high resolution sonar images of these hunting sites. Using AUVs has been transformative, as they are not tethered to a boat (like traditional side scan sonar), but instead dive below the surface unhindered. This allows the sonar to be much closer to the bottom (5 meters in our study) – and the closer you are the better the images. Sonar data recovered from the AUV as well as still photographs taken every one second with a GoPro camera have found

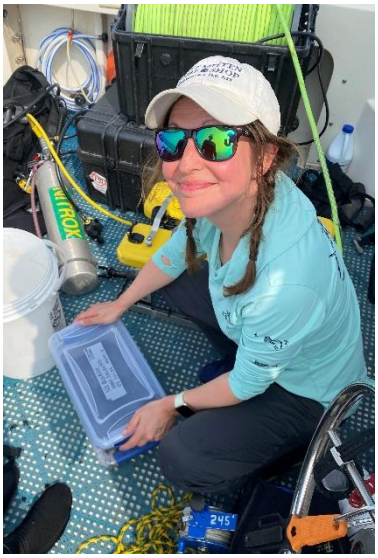
Caribou drive lane on Southern Victoria Island. (University of Wisconsin Press).



Systematic sampling along the length of the lane yielded a total of 11 chipped stone flakes. (O'Shea et al. 2014).

new sites. The sonar maps generated allow us to see how different types of hunting features were used together across the landscape.

We have also been working with students and teachers from Alpena High School of Alpena, Michigan, as part of a class called Science in the Sanctuary. We constructed a virtual reality model of the ancient landscape of Lake Huron when portions of it were dry land. The students entered the VR landscape and



The author with a sample of ancient peat collected from a bog identified 100 ft below the surface of the lake. Environmental DNA analysis will be conducted on the peat, so the box containing the sample was sealed underwater. We hope the results will help us understand and reconstruct the ancient landscape.

John O'Shea (back row, center left), the author (second from the right), and students, parents, and teachers from Alpena High School.

selected locations they thought would be likely areas containing prehistoric occupations.

We then went out with some of the students on a research vessel to check their locations with a remotely operated vehicle. They had great attitudes!

While research into submerged prehistoric sites isn't new, our methods for investigating them are. We use some of the latest technology and adapt it in new ways to explore these ancient sites. Using sonar and AUVs is a non-destructive method for finding and mapping archaeological sites underwater, allowing us to preserve these unique features exactly where they were left by the peoples who made them 9,000 years ago.

For further reading:

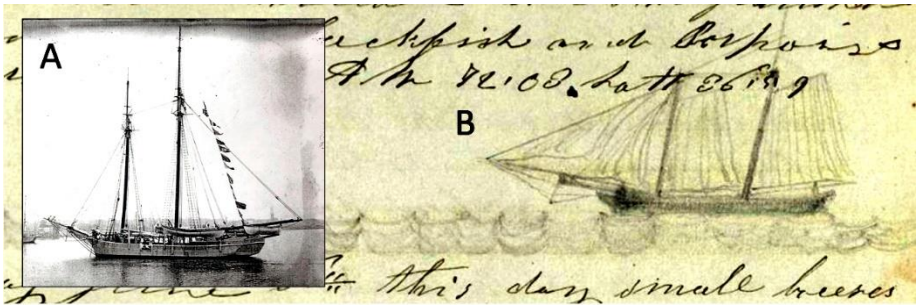
John M. O'Shea, Ashley K. Lemke, Elizabeth P. Sonnenburg, and Brian D. Abbott. A 9,000-year-old caribou hunting structure beneath Lake Huron. Proceedings of the National Academy of Sciences (PNAS) 2014. *https://www.pnas.org/doi/full/10.1073/pnas.1404404111*

John M. O'Shea and Guy A. Meadows. Evidence for early hunters beneath the Great Lakes. Proceedings of the National Academy of Sciences (PNAS) Vol. 106 No. 25, 2009. *https://www.pnas.org/doi/full/10.1073/pnas.0902785106*

Ashley Lemke holds a PhD in Anthropology from the University of Michigan. She is an Associate Professor of Anthropology at the University of Wisconsin-Milwaukee, was formerly Associate Professor at the University of Texas in Arlington, and former Chair of the Advisory Council on Underwater Archaeology. She is a leading researcher on the archaeology of hunter-gatherers, having worked extensively on both terrestrial and underwater archaeological projects from the Lower Paleolithic in Europe to 19th-century Nunamiut archaeological sites in the Arctic, and sites in the Gulf of Mexico, Great Lakes, and Atlantic Ocean. ⚓

New Investigations into the Radford Wreck: Interpreting a Candidate for Cape Lookout's Lost Whaler

by Lindsay Wentzel



A. Picture of the Cook company plum-pudding schooner, Mary E. Simmons *(Mystic Seaport). B. The only known depiction of* Seychelle *(from* Remarks on board the Schooner Seychelle *(1851) – Harvard Houghton Library).*

Plum-pudding whaling generally refers to short, between-season voyages in the Atlantic Ocean undertaken by Provincetown, Massachusetts whalers. The term probably derived from the brief nature of the fishing expeditions which allowed a crew to easily restock fresh provisions, in effect, turning duff (a plain, cake-like dish) into sweeter plum duff or plum pudding. The ease of shorter voyages also meant that the vessels in the trade, referred to as *plum-pud'ners*, often left their home ports in early spring and returned before the September gales. Thus, not only did the crews have greater and more regular access to fresh produce and plum-pudding, but ships were home in time for the Christmas holiday.

One of the more obscure references to plum-pudding whaling mentions an earlier name, "cranberry pudding voyage," perhaps drawing similar parallels to raisins but with specific reference to one of the three native New England fruits. In addition to its physical connotation with plum duff, plum-pudding whaling has also been characterized by a variety of alternate contributing factors including its association with Provincetown, its poor reputation amongst multi-year whalers, and as a whimsical definition occurring in popular literature.

Prior to the expansion of American whaling into the Pacific Ocean, plum-pudding voyages referred to Provincetown rival New Bedford whalers operating small vessels. Once the New Bedford plum-pudding fleet was replaced by larger ships that also brought with it a militaristic disciplinary system, the term was more commonly applied to Provincetown schooners. The whalers of Provincetown were said to have had an abundance of raisins and dried fruit to add to duff, while the owners of New Bedford whaling companies prohibited fruit onboard for sanitary reasons, sanctioning only plain duff.

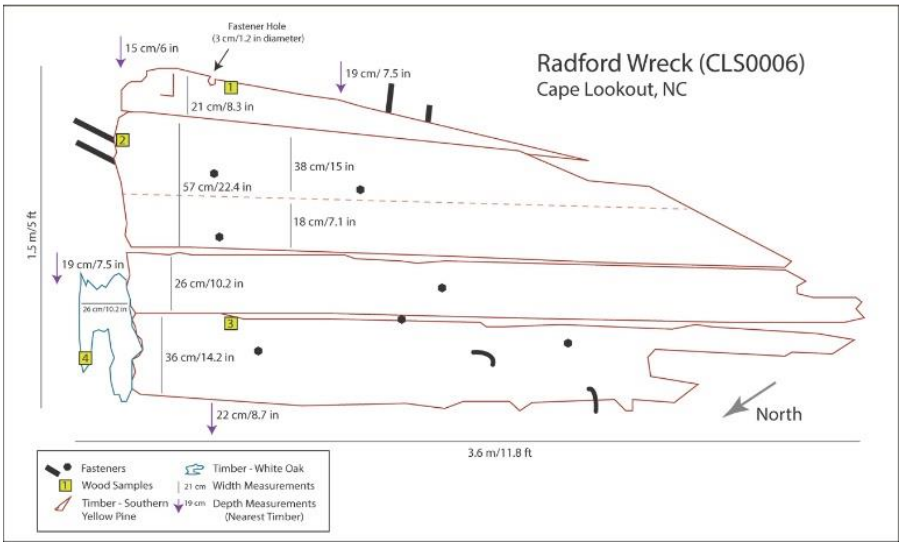
It is also thought that the plum-pudding name was developed and applied to Provincetown whalers by New Bedford whalers under the impression that Provincetown voyages were easy and unchallenging due to the simplicity of this strategy compared to multi-year voyages to the Pacific.

E. & E. K. Cook & Company operated from 1837 to 1879 out of Provincetown, Massachusetts, engaging in cod and mackerel fishing, as well as blackfish, sperm, and humpback whaling in the Atlantic Ocean, using plum-pudding vessels in their fishing and whaling activities. In 1879, one of Cook's plum-pudding schooners, *Seychelle* (built 1847), wrecked in Cape Lookout, North Carolina, during a hurricane.

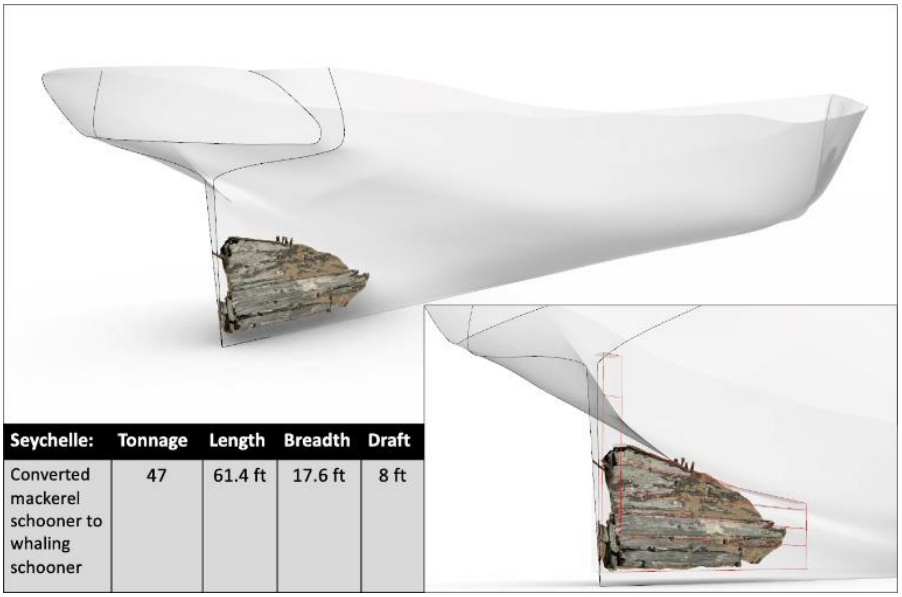
A site situated in the Cape Lookout National Seashore and possibly associated with *Seychelle* is known as the "Radford Wreck." Listed as CLS0006 in the NC-Underwater Archaeology Branch site files, it consists of a small portion of disarticulated wreckage that could have been swept into Cape Lookout bight. Fieldwork completed during the 2021 field season included a photogrammetric model and orthomosaic

The author (left) and Dr. Jason Raupp collecting wood samples from the Radford Wreck site. (Photo by Jeremy Borrelli, ECU Program in Maritime Studies).

A segment of debris from the Radford Wreck, presumed to be from the ship's stern. (Orthomosaic by Jeremy Borrelli, ECU Program in Maritime Studies).



Drawing of the Radford Wreck segment. (Drawing by the author).



Seychelle:	Tonnage	Length	Breadth	Draft
Converted mackerel schooner to whaling schooner	47	61.4 ft	17.6 ft	8 ft

Rhino 3D model of the Radford wreck imposed on a rendered shell of a fishing schooner similar in size to Seychelle. *(Image by the author).*

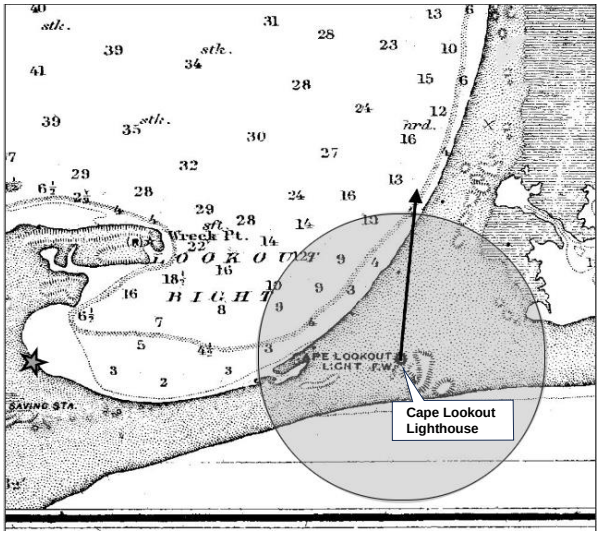
image of the remains (see photo to the left), along with basic diarized observations of timber lengths, widths, and the presence of fasteners and bolts, mapped through basic measurements taken by hand. It is important to note that CLS0006 was only briefly surveyed, as it was not the focus of field school activities at that time.

During post-processing of the data recorded at CLS0006, the resemblance to the stern assembly of a small fishing schooner prompted a follow up visit in the spring of 2022. Observations were aided by discussion with noted Gloucester fishing schooner expert, Erik Ronnberg, of the Cape Ann Museum in Massachusetts. The site was re-recorded via diarized observations of timber lengths, widths, and depths, along with fasteners and bolts, all noted and mapped by hand (drawing, center left). Analysis of data recovered from CLS0006 suggests that it is an intact 3.6 m by 1.5 m portion of a wooden vessel consisting of four or five articulated timbers, including a sternpost, deadwood assembly, and the after portion of keelson. A seven-foot-square area around the wreck fragment was probed for the presence of any buried remains; the lack of positive returns suggested that the feature represents disarticulated wreckage. The site was re-imaged for modelling, after which wood samples were recovered for dendrological analysis and identification.

Due to wood degradation, it is unclear whether the wreckage consists of four or five timbers, as noted by the dashed line in the figure to the left. All recorded timbers are angled and degraded on their southeastern ends.

When compared to data listed in the 1879 *Record of American and Foreign Shipping*, the measurements of the CLS0006 sternpost best reflect those of a 100-ton vessel. The measurements for the possible keelson timber are less conclusive but are within reason for those of a 100-ton vessel. Based on the sizes of these timbers alone, CLS0006 most likely represents a portion of a small, wooden vessel.

Initial reconstruction of the vessel using Rhinoceros, a 3-D computer graphics and computer-aided design application, resulted in a model that appears consistent



Projected wrecking of the schooner Seychelle *at Cape Lookout based on historic signal station reports and journal entries. Arrow indicates probable landing, star (lower left) indicates the approximate position of the Radford Wreck (Compiled and drawn by the author).*

with measurements and construction of *Seychelle* (bottom image on the previous page). Analysis of wood samples was conducted at the Virginia Tech Department of Sustainable Biomaterials Lab. Samples from the sternpost were identified as white oak, samples from the deadwood and keelson as southern yellow pine.

In a 1955 interview with local resident and descendent of the nearby Shackleford Banks community, Jimmy Guthrie, author David Stick reports that *Seychelle* was salvaged where it lay shortly after its wrecking.

Although this is only one line of evidence, the wreck would have likely been scavenged for its resources if readily accessible in the shallow water environment. Stripped of its timbers and hardware, leaving only the heavier, foundational portions of the vessel such as the keel or stern assembly that were more difficult to transport, the resources taken from *Seychelle* could have provided structural material and a potential risk management tool for the Shackleford Banks community. In this case, years of storm activity likely broke apart whatever remained of *Seychelle*, dispersing wreckage into the bight.

Regardless of the lack of positive identification of the wreck, relatively little is known regarding the construction elements of converted whaling schooners. And thus, this current research undoubtedly shines new light on features of the vessel type through the archival survey conducted of ship~~s~~ plans and the techniques employed for plum-pudding whaling voyages documented in logbooks and catch reports. More importantly, risk assessment provides evidence of a distinct and calculated strategy represented by plum-pudding whaling that has long been forgotten or flippantly discredited. And in terms of *Seychelle* itself, the investigation provides further context for examining the operational history of Cook & Co. and factors that may have contributed to *Seychelle*'s final outcome.

Lindsay Wentzel is a master's degree candidate in the Program in Maritime Studies, East Carolina University. Greenville, North Carolina, and a Research Technician for the Coastal Studies Institute of the Outer Banks. ⚓

A Multi-Factor Approach towards Assessing Northwest Florida's At-Risk Maritime Cultural Resources

by Sorna K. Knight and Barbara Clark

The maritime cultural landscape of northwest Florida comprises many unique archaeological sites, heritage attractions, and historical buildings that are evidence of a wide variety of maritime activities spanning prehistory to the present. The significance of this landscape is that it portrays an image of the past that can be seen today and holds many lessons for present and future generations. A group of people have come together to designate it the Florida Panhandle Maritime National Heritage Area. According to the National Park Service, "National Heritage Areas are places where historic, cultural, and natural resources combine to form cohesive, nationally important landscapes." The Northwest Florida Maritime Landscape Alliance for Preservation was formed in 2020 as a nonprofit organization with the mission of creating a partnership among natural, cultural, and archaeological organizations and local groups in northwest Florida to encourage grassroots collaboration, provide education, advocacy, guidance, facilitation, and a vision for the sustainable preservation of heritage and environmental resources for present and future generations.

One of the main factors that is affecting the preservation of archaeological and historical sites in

Erosion damage to a shell midden site from storm surge worsened by sea level rise. Santa Rosa Island. Photo courtesy of Michael Thomin.

Mid-19th century Cape St. George Light in 1999 before it collapsed in 2005 due to storm surge worsened by sea level rise. St. George Island. Image in public domain.

coastal areas is flooding and sea level rise (SLR). It is important to find out what sites may be at risk from these threats, and to understand the extent of the potential impacts.

Florida's geography and unique concentration of development within the first few feet above high tide make coastal areas especially vulnerable to extreme flooding. With sea-level rise, these areas will experience higher probability for inundation, damage from coastal erosion, and increased wave action during major storms. Many of the state's cultural resources lie in such low-lying coastal zones and are thus exposed to these hazards.

Initiatives have been developed through different organizations to help assess the impact of climate change and other natural and anthropogenic factors on the cultural resources in the state. In 2016, the Florida Public Archaeology Network (FPAN) developed the Heritage Monitoring Scout (HMS) program as a citizen science initiative, inspired by the work of other similar programs, to document coastal and inland sites in Florida that are at risk from climate change effects. The information they gather through this program is entered into an FPAN-managed database and shared with the Florida Division of Historical Resources and public land managers. It provides some understanding of the impact of climate and environmental changes on archaeological and historical sites. The data from HMS is compared with analysis that is conducted in this paper to better understand the impacting factors that are threatening Northwest Florida's cultural resources.

Florida is acting to assess and plan for future climate change and flooding impacts on the state's natural and real resources (See Bill CS/CS/SB 1957 2021), providing an opportunity for an inclusive appraisal of different resources, including natural and cultural resources that contribute to the economy and tourism development. In the past two years the Florida Legislature Office of Economic and Demographic Research (EDR) has been collecting information and conducting analysis on the impact of flooding and sea level rise on the state's resources.

This article attempts to gather information from the findings of both EDR and FPAN to assess cultural and archaeological resources that may be at risk due to SLR and storm surge within the next 50 years and beyond to the year 2100. Results of the first- and second-year findings from EDR are applied to select flooding scenarios that may affect Florida's coastal cultural resources. The state of these resources has been compared with the reports from FPAN HMS to augment the reliability of the spatial analysis and to evaluate the challenges of the data collection by the volunteer monitors. The ultimate goals of this study are to:

- identify risk zones and specific risks that threaten Florida's coastal cultural and natural resources;
- estimate the number of resources that are at immediate risk;
- and recommend actions for preservation of these resources, prioritization of action, and potential management strategies for the future.

Methodology

The first step in this analysis was to quantify the flood risk and the risk areas. Risk is defined as the combination of the probability of a hazard occurring and the exposure of resources to the hazard. For the purpose of this paper, hazard is defined as flooding resulting from two flooding factors, including storm surge and

SLR. According to EDR, these are the most probable flooding hazard factors for Florida. For each of these flooding factors, multiple probability scenarios can be projected to define the hazard areas and to estimate resource exposure to these hazards. Exposure is defined as the number of cultural and archaeological assets within a hazard area. Two main steps were involved in developing this study: 1) data collection and 2) data analysis and modelling.

Data Collection

Data compiled and used in this study that had already been collected by reliable sources. No actual field study for data collection was conducted. The study uses three types of data.

a) Data related to flooding and climate-change factors. Through a literature review, the study identified possible sources of information from relevant Federal agencies and State organizations. These sources include National Oceanic and Atmospheric Administration (NOAA), United States Geological Survey (USGS), United States Army Corps of Engineers (USACE), Federal Emergency Management Agency (FEMA), and state agencies, such as Water Management Districts and the state Department of Environmental Protection. The risk factors that were included in the analysis are SLR and storm surge.

b) Data on cultural and archaeological resources. The primary source is the Florida Master Site File, which is the State of Florida's official inventory of historical, cultural resources, archaeological sites, historical structures, historical cemeteries, historical bridges, historic districts, landscapes, and linear features.

c) Data collected on archaeological sites assessment. This data was gathered through the FPAN HMS program. However, sometimes HMS volunteers in the field could not verify the location some sites in the database and therefore marked those sites as "not found." It should be mentioned that the FPAN HMS program has not assessed all the archaeological sites in the State's database.

Data Analysis and Modeling

Modeling is a method used here to visually and analytically project the impact of hazard factors on resources. Two types of models are used for this study. The first is based on the latest results from the USACE South Atlantic Coastal Studies (SACS) study that was released in February 2022 and on NOAA SLR and storm surge models. The other model type is ArcGIS modeling and analysis that is performed through superimposing flooding data on archaeological and cultural data. In the latter modeling, the study considers different scenarios of SLR and storm surge to assess the state of cultural and archaeological sites. The assessment mainly highlights sites and locations that may be affected by one or multiple flooding factors.

Delineating the Study Area

This study focuses on Northwest Florida and the assessment of the area that has been studied to be designated as a National Heritage Area. A factor that has short-term and long-term impact on temporary and permanent flooding is SLR. Therefore, SLR is of particular importance, especially for coastal areas, such as in Florida. SLR can intensify storm surge, high tides, and cause permanent submergence of many coastal areas. Additionally, Florida is prone to hurricanes and tropical storms, with a common threat of storm surge.

Boundary of the proposed Florida Panhandle Maritime National Heritage Area. Map from the Northwest Florida Maritime Landscape Alliance for Preservation, Inc.

Based on recent regional observations in Florida, projections anticipate an increase in the acceleration of SLR. Some impacts of SLR are already visible in Florida. Scientific studies discuss and offer multiple scenarios of SLR based on a variety of climate and environmental factors. NOAA released a new report and accompanying datasets from the U.S. According to this report, 2005–2060 projections show an average of 2 ft. SLR can be expected in the next 50 years in Florida.

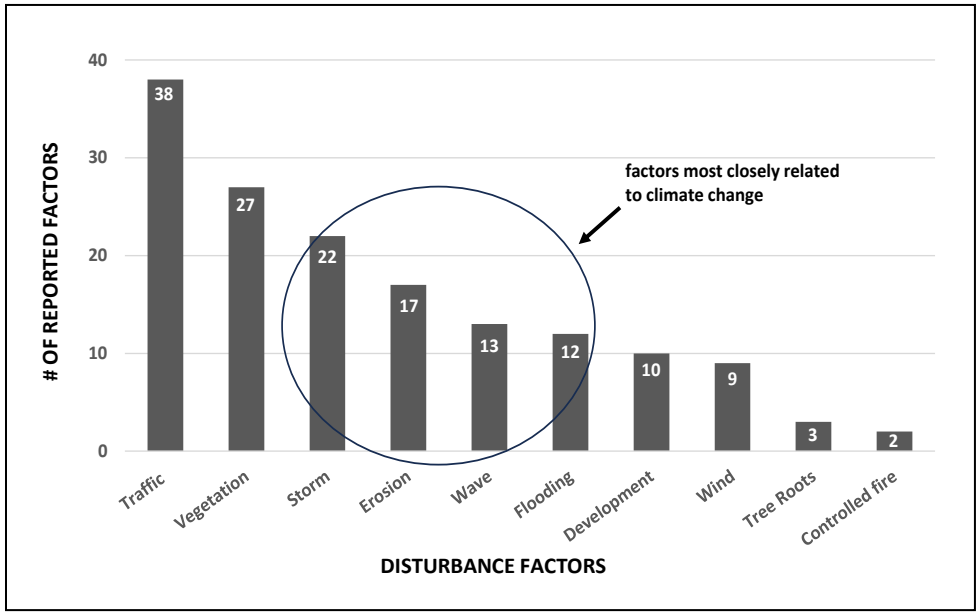
Storm surge is an abnormal rise of water generated by a storm, over and above the predicted astronomical tides. Florida is already suffering from intense storm surges induced by hurricanes and storms, and experiencing frequent loss-causing flood and wind events as a result. Studies project that Florida probably will become more vulnerable to coastal flooding and storm surges in the near future.

Based on the NOAA Hurricane Research Division, from 1851 to 2020, 37 major hurricanes struck different areas in Florida. Twenty-two of these hurricanes were identified as Category 3. Since 1995, nine hurricanes have hit Florida, of which five were Category 3. The remainder of hurricanes are categorized as Categories 4 and 5. As the state is experiencing increasing numbers of

Factor Impacting Sites	2 ft. SLR	3 ft. SLR	Hurricane Cat. 5 Storm Surge	Hurricane Cat. 4 Storm Surge
# Affected Florida Sites based on the authors' analysis (Total of 12,406)	~996	~1154	3612	3179
# Affected Sites reported by HMS monitors (Total of 133)	116	~116	Not reported by HMS	Not reported by HMS

The number of affected sites by four impacting factors.

high intensity hurricanes, this paper has analyzed the impact of hurricane categories 4 and 5 on the cultural and archaeological resources.



Impacting factors and their frequencies as recorded by HMS study.

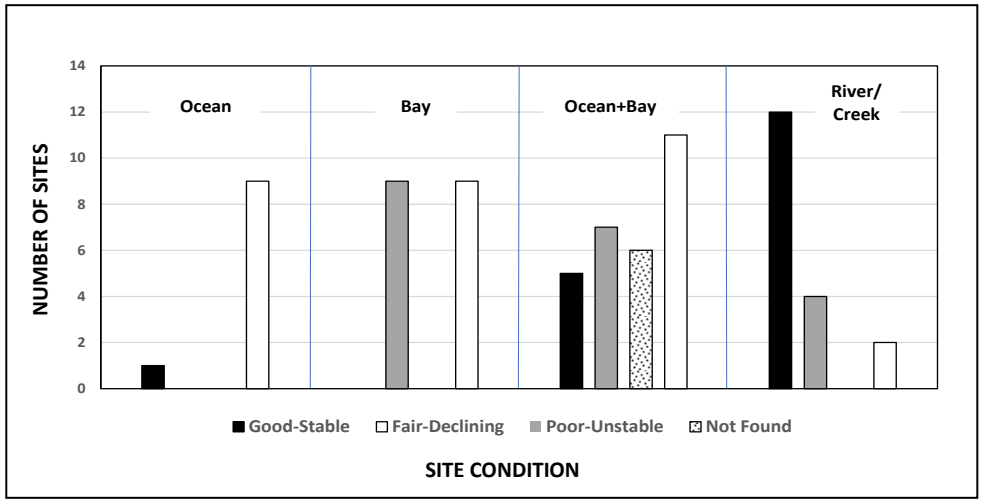
Assessment of Coastal Cultural Resources

The proposed Florida Panhandle Maritime National Heritage Area has12,406 archaeological and cultural sites within its boundary. Most of the archaeological sites in this area consist of campsites, shell middens and mounds, artifact and lithic scatters, and quarries. Standing structures include historic houses, buildings, forts, lighthouses, schools, churches, and government buildings. A number of historic landscapes and historic districts are also present. Many of the exposed archaeological sites are in the lowlands, deltas, and wetlands surrounding rivers and bays.

Overlaying the Florida Master Site File data with the SLR and storm surge scenarios shows that these factors affect the coastal areas differently. The low-lying areas in the eastern region of the panhandle, such as Apalachicola, and riverine areas may see more intense storm surge and flooding. The table above highlights the number of affected sites by four impacting factors based on the authors' analysis and HMS site reports.

As HMS data provides some information about the factors that are affecting the archaeological sites, analysis was undertaken to understand the correlation between site locations and site status based on the HMS reports.

Most of the sites close to the ocean and/or bays are reported as not found. The majority of the sites that are close to a bay are reported in fair to declining state or not found. Some of the sites that are close to both bay and ocean are reported as poor to unstable, which was expected. These sites might have been submerged or eroded away. Countering a working hypothesis that sites along rivers and creeks would be in



Correlation between the locations of the sites and their condition or preservation.

decline, most sites in those locations are reported in a good to stable state.

Discussion and Challenges

Flooding is a complicated factor that unpredictably affects inland and coastal areas. Any projections are entirely hypothetical and based on assumptions that might not take into consideration all natural and anthropogenic factors. The aptitude of science and technology also plays an important role in making the analysis hypothetical at best. The uncertainties regarding SLR, changes in precipitation and the magnitude of hurricanes and storm surges make it impossible to have a perfect assessment and prediction of future situations.

The impacts of hurricanes include a combination of strong winds, precipitation, and storm surge. Therefore, it is difficult to predict the exact impact of hurricanes due to variability in the strength of the wind, the amount of precipitation, and the duration of the storm. Presently, NOAA storm-surge data projects the extent of flooding caused by hurricane storm surge. The analysis, as such, cannot predict the amount of damage and destruction caused by wind or other factors, but the model offers an indication of the number of potentially impacted properties. A challenge with archaeological site documentation is that many sites have not been monitored at regular intervals and some may not have been visited since their original discovery, which may have been decades ago. Therefore, changes due to SLR, erosion, looting, and other factors remain unknown or are not well recognized. Furthermore, the nature and location of some sites makes them difficult to access, which can inhibit regular monitoring. This makes it hard to understand the direct and indirect impacts of climate change on these resources, as well as within what time frame damage may be occurring. While numerous sites have been monitored throughout the panhandle region thus far, it has not been systematic and no methodology for prioritizing sites based on SLR projections has been instituted. The information offered through the present study can help to identify sites in need of monitoring, those that require subsequent monitoring, and the foundation for a method to prioritize sites that are projected to experience the most direct and dire impacts.

The HMS program utilizes Arches, an open-source data management platform that was developed for cultural heritage management by the Getty Conservation Institute and the World Monuments Fund. The platform is customizable and, because there is no licensing fee, it is financially accessible to most organizations. This platform allows for the collection and management of sensitive archaeological data due to its ability to create and customize different user permission settings. However, this proved to be a hindrance when it came to analyzing the data sets and comparing them to those that exist on other platforms. Without the ability to efficiently transfer and compare data, the information had to be analyzed manually, which was time consuming and increased the potential for error.

Spatial analysis of the impact of storm surge on archaeological and cultural resources would not provide a clear outcome of the impact. Since some sites are buried and some are exposed, the impact of flooding and waves varies significantly. Buildings, or remains of buildings, may also be affected differently depending on the structures and materials. Middens and burial grounds could be affected in a variety of ways, depending on the state of exposure and other factors. In addition, the hurricane data sets only provide the extent of storm surge. This limited information cannot be used to project the impact of wind and rain on sites. Also, some sites are close to several bodies of water. These sites are at risk of more wave actions, storm surge, and high-tide events.

This study focused on the sites that were in the HMS study, with the purpose of having more information for analysis. The HMS program's goal is to provide baseline data for how climate change affects cultural resources, which also can be used as a tool for land managers to assess their sites and prepare disaster response. This program also has the potential for use by policy makers to guide legislation and policy regarding the state's response to climate change.

However, a few issues were raised during the analysis for this paper: what did HMS use in selecting sites; the status of the assessed sites is subjective; and the terminology used in the dataset was not consistent.

Studying the impact of climate change on cultural resources has multiple benefits, including proactive actions to preserve cultural resources as well as being a part of the solution for mitigative action. The connection between climate change and cultural heritage has been well noted, however integrating archaeology into climate response has not been common practice. Archaeological science has a long tradition of studying past climate change and cultural adaptation to climatic events. This knowledge and understanding has the potential to contribute greatly to the study of and response to climate change but has been underutilized.

Dr. Sorna Khakzad Knight is a researcher with the State of Florida Legislature's Office of Economic and Demographic Research. She holds doctoral degrees in engineering from KU Leuven (Belgium) and Coastal Resources Management from East Carolina University

Barbara Clark is Regional Director for both the Northwest and North Central Regional Centers of the Florida Public Archaeology Network. She has masters degrees in Archaeology and Heritage (University of Leister) and in Public Administration (University of West Florida).. ⚓

The Slave Wrecks Project – Recent Episodes in Transformative Maritime Archaeology

by Stephen Lubkemann

In January 2023, the Slave Wrecks Project (SWP) brought together over thirty scholars at the Society for Historical Archaeology annual meetings that were held in Lisbon, Portugal to assess the state of the art of the maritime archeology of the slave trade. In addition to over two dozen papers presented on past, ongoing and/or prospective research across the globe, a discussion forum brought senior figures in the field together with up-and-coming maritime archeologists from Africa and across the diaspora to critically assess the field's historical neglect of the slave trade, to envision invigorated research agendas going forward, and to re-think research as a form of socially engaged practice that places community/stakeholder engagement, the mission of fostering diversity, and public engagement on equal footing with scholarship.

SWP modelled this approach in Lisbon by working together with a group of Portuguese institutional partners including the City Museum of Lisbon, Culturgest, the Natural History Museum (MUNHAC), and the Luso-African community association Batoto Yetu Portugal (amongst others) to organize a day-long symposium immediately after the SHA, which brought together over a dozen museum professionals from institutions across the globe to address the topic **"**Reckoning with Racism: The Slave Trade and Social Memory." Over 200 Portuguese museum professionals and members of the broader public were in attendance.

In conjunction with the symposium, SWP also organized a major public talk on "Race in the Public Square: Difficult Conversations" that was delivered by Smithsonian Secretary Lonnie Bunch. These events offered an opportunity to bring scholarship into active dialogue with current public debates in Portugal about how this country's deep involvement in the slave trade is—or is not—remembered, and to critically explore the problematic present-day consequences of deeply embedded forms of social amnesia. Since January, SWP has continued to work with several Portuguese institutions to discuss how we can continue to collaborate with their efforts to challenge Portugal—and Europe more broadly—to critically engage with this past and its enduring legacies. A pilot teacher training program will be launched in Lisbon in 2024 in collaboration with the Gulbenkian Foundation. Support is also being sought for a major exhibition on the slave trade at the City Museum of Lisbon in 2025 that would bring the story of the shipwrecked Portuguese slaver *Sao Jose Paquete D'Africa*—already featured in exhibits at the Smithsonian in Washington DC and at IZIKO-Museums of South Africa in Cape Town—directly to the Portuguese public for the first time.

At the SHA, Dr. David Conlin (NPS-SRC) co-organized a panel of SWP collaborators who have been working in Mozambique with colleagues from CAIRIM (Eduardo Mondlane University's research Center on Mozambique Island), in which they announced that after several years of painstaking searching, archeological documentation would now begin on a site that has been provisionally identified as the final resting place of a French vessel that shipwrecked in 1790 with over 600 enslaved person's on board. The panel reviewed the independent lines of evidence that led to the identification of the site—including an innovative petro-chemical analysis that demonstrated new ways to trace the origins of ballast stones (one key clue in this site's identification). Documentation on the site began in late July, with an international team led by Marc-Andre Bernier (recently retired from Parks Canada), Stephen Lubkemann (George Washington University), and Ricardo Teixeira-Duarte and Cezar Mahumane (UEM/CAIRIM's founding and incoming Directors respectively). Work on this site also provided the most skilled cohort of trainees in the SWP-Academy program—including participants from Senegal, Brazil, South Africa, and Mozambique—with advanced documentation and site management training and an introduction to excavation techniques. Integrated

Documentation by SWP-Academy trainees on a slave ship research site in Mozambique, July 2023. Courtesy of The Slave Wrecks Project.

AfroOrigems President Dr. Luis Felipe Santos (far left), SWP Co-Director Dr. Stephen Lubkemann (second from left), AfrOrigems Technical Director Dr. Gilson Rambelli (second from right) other Brazilian members of the team searching for the Camargo *wreck site in Angra dos Reis, June 2023.*

Cezar Mahumane, incoming Director of UEM-Cairim, Mocambique; Julio Cesar Marins, VP of AfroOrigems, Brazil; and Dr. Madicke Gueye, Cheikh Diop University, Senegal. Mozambique (July 2023 SWP-Academy. training/research).

research and training will continue in January and July 2024.

This past June, SWP co-Directors Dr. Paul Gardullo and Dr. Stephen C. Lubkemann, were pleased to join a team of collaborators from SWP's newest major theater of operations in Brazil in their search for the sunken remains of the *Camargo* (the ship documented as having undertaken Brazil's last slaving voyage in 1858). Sailing under the only US captain ever convicted and executed for the capital crime of slave trading, the story of the *Camargo* highlights the central role that US vessels, finance, and crews continued to play in extending the global slave trade from Africa for over fifty years after the trade was made illegal in the US. The story of the *Camargo* is also challenging Brazilian society to reckon with its past–as evidenced by the many dozens of major media stories that have broken in the Brazilian press since the search was announced at a major public symposium held in mid-June at the Brazilian National Archives in Rio de Janeiro.

As my colleague Kate McMahon wrote in an article last year "new kinds of engagements are needed with individuals and communities from a variety of positions and perspectives locally, nationally, and internationally––especially ones that foreground the often untold and unvoiced stories, histories, and perspectives of the enslaved and their descendants— while remaining resonant for all." SWP's Brazilian partners—AfroOrigems—led by two young Afro-Brazilian maritime archeologists (Dr. Luis Felipe Santos and Julio Cezar Marins) and guided by Technical Director Dr. Gilson Rambelli, is constituted by an interdisciplinary team of researchers, together with public educators, media specialists—and most importantly—includes participants from the community of descendants of the *Camargo* survivors. For no one is the recovery of this story—and the location of the *Camargo* site—more important or consequential than for this community from the Quilombolo Santa Rita do Bracui, since it factors in their longstanding efforts to claim communal land rights, and to confront growing threats of encroachment. Moreover, no one's voice is more consequential to showcase than that of the community itself. Quilombolo leader, Dona Marilda's powerful intervention on the panel SWP co-organized at the National Archives, brought new public and official attention to their decades-long struggle—and not two weeks later national authorities finally granted the Quilombolo the charter for its land! The unfolding story of the search for the *Camargo* is teaching us how maritime archeology can not only provide new understandings of the historical slave trade, but can also be a powerful transformative force in the present, that helps address the enduring legacies of social injustice that stem from that past.

Stephen Lubkemann, Ph.D., is an Associate Professor of Anthropology, International Affairs and Africana Studies at The George Washington University in Washington D.C. He is one of the co-founders of The Slave Wrecks Project and one of its current co-directors

The Reckoning with Racism symposium can be viewed at https://www.youtube.com/watch?v=-kLBDA98ds8).

The Camargo Slave Ship seminar can be seen at https://www.youtube.com/watch?v=BWmdZVfLOyg. ⚓

BOOK REVIEWS

Under the Mediterranean I: Studies in Maritime Archaeology

edited by Stella Demesticha and Lucy Blue (Sidestone Press 2021)

reviewed by Dennis Knepper

The Mediterranean Sea is arguably the birthplace of modern underwater archaeology, going back to the time of Peter Throckmorton, Honor Frost, and George Bass and their pioneering investigations of shipwrecks at sites such as Yassi Ada and Gelidonya in the 1960s and 70s. How the discipline has matured in the intervening years is displayed in an outstanding collection of articles assembled in a recent book, *Under the Mediterranean I: Studies in Maritime Archaeology*, published by Sidestone Press. The work is an edited volume based on presentations at a conference held in Nicosia, Cyprus in 2017 honoring Frost and her groundbreaking underwater research.

The level of interest in the conference among the regional archaeological community was high, as evidenced by the number of registered participants (380), and the number of papers submitted (180). *Under the Mediterranean I* is the second publication resulting from the conference. Several articles in the original volume published in 2019 examined Frost's career, while others presented preliminary findings of research inspired by her work.

For the current book, participants were invited to publish longer, peer reviewed articles based on their conference presentations. Nineteen papers were submitted and published. The title of the volume commemorates Frost's 1963 publication of the same name, a work said to be among the formative publications in the field.

Frost was trained as an artist and worked as a ballet set designer. She was also somewhat of an adventurer who began diving in the 1950s. She was struck by the history lying beneath the surface of the Mediterranean after a dive on the Roman-era "Chrétienne A" shipwreck located along the French Riviera. She brought her artistic sensibilities to bear in her approach to archaeology through painstaking accuracy in mapping, recording, and artifact documentation. Frost made significant contributions in the study of ships, harbors, and stone anchors, focusing particularly on the ports and anchors of the Bronze Age Levantine coast. She examined the trade routes that linked harbors by analyzing vessel sizes, tonnages, origins, and cargos. She later worked with Throckmorton and Bass at Yasi Ada and, eventually, Cape Gelidonya. Frost adopted an interdisciplinary approach to research, combining historical and geographic data, the latter including marine geology, relative sea-level changes and maritime paleo-landscape reconstructions, along with the distribution of wrecks and artifacts, essentially introducing harbor geoarchaeology a generation before its more recent development. She later established the foundation that bears her name to encourage growth of maritime archaeological research.

The articles in *Under the Mediterranean I* fall under three main themes: ships and shipwrecks; harbors; and maritime cultural landscapes. The articles are balanced in number among the themes. Geographically, the papers highlight the extensive and varied work being conducted in all parts of the region, from France, Spain, and Italy, to Greece, Turkey, the Levant, and the Black Sea. The articles present new findings and approaches to data gathering and analysis, synthesizing the current state of research and the implications derived from the studies for future investigations.

The first section, containing shipwreck reports, displays the variety of modern, largely digital techniques currently used for gathering, analyzing, and presenting data. Carefully applied use of photomosaics and photogrammetric imagery the Mazotos wreck (Cyprus), for example, allowed detailed analysis of amphora stowage. Other articles describe the use of digital imaging in the analysis of construction techniques in vessels from the ancient harbor of Naples, from an abandoned harbor channel near Narbonne in southern France, from a Byzantine wreck off the north end of Rhodes, and in the replication of a shell-first vessel dated 400 BCE recovered near Haifa.

The section on harbors is chronologically ordered. At the port of Akko, in the central Levant in what is now Acre, excavations conducted outside a seawall from the Ottoman period, built on much earlier foundations, documented an early port constructed on a Hellenistic plan that separated commercial and military activity. Under the modern fishing harbor, evidence was found of

a deepwater facility that could accommodate the largest Hellenistic ships. Another article describes changes in the channel of the Guadalquivir River in Spain as it traverses Seville. As the river altered its course from Roman to Islamic times, the earlier port was abandoned and relocated, substantially enlarging the city, in effect creating new districts and urban development. Additional port facilities were also required, including quays, shipyards, shipsheds (covered slipways for hauling out and housing vessels), and various military defenses.

Articles in the final section, on maritime cultural landscapes, adopted a wider perspective, synthesizing geographic as well as anthropological data. The Fournoi archipelago, in the eastern Aegean Sea, for example, is described as an obscure island group containing an unusually large number of known shipwrecks (50+). Analysis of archival texts and maps suggests the importance of the route for commerce, while the navigational context—numerous constrictions or chokepoints for shallow draft sailing ships—made it perilous for several millennia leading to the accumulation of wrecks. Another article examines the geography of the Roman naval world by examining the locations of abandoned anchors, identifying naval routes and safe havens, the connections between ports and their main towns or cities, and the growth of the cities and construction of new ports.

Sidestone Press is a small Dutch imprint that initially specialized in academic publishing in archaeology and anthropology but has expanded over the last decade into subject areas ranging from art history to linguistics, medicine and health, philosophy, and political studies. Considered an open access press, authors are free to share PDF versions of their work.

Under the Mediterranean I is handsomely produced, with clear text, high-quality, full-color graphics that include surface and underwater photographs, maps, charts, drawings, and computer imagery. Our review copy is softcover, and perfect-bound and printed on heavy bond paper. Hardcopy and eBook versions are available and, in keeping with the open access philosophy, the book can be read online at the publisher's web site. The volume editors are Stella Demesticha, an Associate Professor of Maritime Archaeology at the University of Cyprus, and Lucy Blue, Senior Lecturer at the University of Southampton and Maritime Archaeological Director of the Honor Frost Foundation. Six additional co-editors, affiliated with universities in France, Italy, Great Britain, and Israel, are listed separately for each thematic chapter.

The text runs to 362 pages, with articles averaging about 17 pages in length, each with a separate bibliography. A short appendix lists the presentations and posters presented at the conference. There is no index.

While of varied academic background, geographic location, and research perspective, the article authors are motivated by a similar sense of driving the discipline forward, carrying on Frost's innovative and directed research into the history of the Mediterranean region through study of the remains of the maritime commerce that was at its center. *Under the Mediterranean I* will be of interest to historians and maritime archaeologists from many regions for its substantive and methodological contributions to Mediterranean archaeology and the field of maritime archaeology in general. ⚓

Citizen Science in Maritime Archaeology: The Power of Public Engagement, Vol. 1

edited by Della A. Scott-Ireton, Jennifer E. Jones, and Jason T. Raupp

(University of Florida Press 2023)

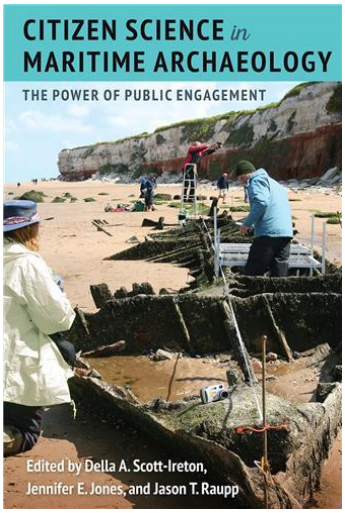
reviewed by James Smailes

This book is the first to address how maritime archaeologists have engaged members of the public as scientists, and presents examples of projects, organizations, and the development of training opportunities that are now available to sport divers and non-divers alike. It includes practical case studies that provide guidance for archaeologists who wish to design their own programs that could benefit from the support of citizen scientists. The program descriptions can also provide potential volunteers with ideas on just how they might be able to get involved and the training opportunities that exist.

The twelve chapters provide a range of insights and experiences, from larger state-run organizations in Virginia, Massachusetts, Florida, and South Carolina that provide training, to smaller volunteer organizations like Diving With a Purpose, which trains adults and youth in documenting African slave trade shipwrecks, and Diver-Archaeological Reconnaissance Cooperative, which provides combat veterans opportunities to do meaningful research and diving to support archaeologists. Also included are foreign citizen-run

organizations in the United Kingdom, like the Nautical Archaeology Society and a coastal archaeology group CITiZAN, to the Gathering Information via Recreational and Technical Scientific Divers in New Zealand and Australia.

The final chapter describes the adventures of a terrestrial archaeologist who became a citizen scientist on a sailboat, measuring ocean plastics pollution. All of the chapters describe practical considerations for training strategies and how program development occurred, with case studies describing the work done in the field, and lessons learned.



In their introduction, the editors describe the training and field experience volunteers can gain that may allow them to see the value of their contributions and lead to their becoming more active participants, better team members, and really true partners in scientific inquiry and heritage stewardship.

One of the areas of training highlighted by all of the organizations is the importance of ethics, conveying important elements of conduct related to historic shipwreck sites and underscoring the importance of stewardship and protection for these cultural resources.

The infrastructure for citizen science already exists in maritime archaeology, having developed through avocational training courses, field schools, site stewardship programs and community archaeology initiatives. The descriptions of the training programs show just how versatile training programs can be. The work volunteers can do goes beyond academic training, and involves them in archival research and then actual field work. The benefits of involving citizens in maritime archaeology involves more than just extra hands to do the work, but draws on the volunteers' various backgrounds and education which contributes to the projects. Long term site preservation, legal protection, and increased public engagement to monitor and protect historic resources can be helped by the efforts of citizen scientists.

Citizen Science totals 294 pages. The essays average from 18 to 24 pages in length, with black and white surface and underwater photographs, maps, charts, and other graphics. Each essay is accompanied by several pages of notes and references. An appendix provides short biographies of the 31 contributors and a four-page index. ⚓

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continued from page 2

our classes and exam questions for our new Zoom presentation format. Though the asynchronous course that we have been developing is still under construction we have also developed a strategy to make our Intro course available to anyone from any time zone around the world. The 2024 course is scheduled to begin on Tuesday, January 23

Finally, I want to report on the efforts the MAHS Board of Directors made during 2023 in upgrading our survey gear, oxygen kit and first aid kit in readiness for our 2024 Field season. Currently, a program schedule is also in the works for returning to our bi-monthly general membership meetings. We will let everyone know when the schedule is finalized and posted on our website.

On behalf of the MAHS Board, I wish all of you joy and peace this holiday season and good health and prosperity for the coming New Year.

See you in the water.

Steven Anthony

MARITIME ARCHAEOLOGICAL AND HISTORICAL SOCIETY

Statement of Ethics

The Maritime Archaeological and Historical Society is organized for the purpose of enhancing public awareness and appreciation of the significance of submerged cultural resources and the science of maritime archaeology. In pursuit of this mandate, members may come into contact with unique information and cultural material associated with terrestrial and underwater sites containing evidence of the history of humankind. To protect these sites from destruction by commercial salvors and amateur souvenir hunters, the Society seeks to encourage its members to abide by the highest ethical standards. Therefore, as a condition of membership and pursuant to Article 2, Section 1 (A) of the bylaws, the undersigned executes this statement of ethics acknowledging adherence to the standards and policies of the Society, and further agrees as follows:

1. To regard all archaeological sites, artifacts and related information as potentially significant resources in accordance with federal, state, and international law and the principles and standards of contemporary archaeological science.
2. To maintain the confidentiality of the location of archaeological sites.
3. To excavate or otherwise disturb an archaeological site solely for the purpose of scientific research conducted under the supervision of a qualified archaeologist operating in accordance with the rules and regulations of federal or foreign governments. Artifacts shall not be removed until their context and provenience have been recorded and only when the artifact and related data have been designated for research, public display or otherwise for the common good.
4. To conduct oneself in a manner that protects the ethical integrity of the member, the archaeological site and the Society and prevents involvement in criminal violations of applicable vandalism statutes.
5. To observe these standards and aid in securing observance of these standards by fellow members and non-members.
6. To recognize that any member who violates the standards and policies of the Society shall be subject to sanctions and possible expulsion in accordance with Article 2, Section 4 of the bylaws.

Signature _____ Date

MARITIME ARCHAEOLOGICAL AND HISTORICAL SOCIETY
PO Box 44382, L'Enfant Plaza, Washington, D.C. 20026

Application for Membership

Membership in the Maritime Archaeological and Historical Society is open to all persons interested in maritime history or archaeology whether or not they are divers. Members of MAHS have first preference for enrollment in all courses and other activities and projects of the Society. To join MAHS, please sign the Standards of Ethics above and send it to MAHS along with your check and this application form. You may also submit dues via our website at http://www.mahsnet.org/membership.php.

Name (print) _____

Address _____

City_____ **State** _____ **Zip** _____

Phone
(H) _____ **(O)** _____ **(FAX)** _____

E-mail _____

DUES ENCLOSED

____ **$30 Individual**
____ **$35 Family**
____ **$50 Sponsor**
____ **$100 Patron**

Skills (circle): research/dive/video/communications/writing/first aid/other:

_____

General membership meetings of the Maritime Archaeological and Historical Society are held on a bi-monthly basis, the second Tuesday of each month. Meetings are conducted by Zoom Technology starting at 7:30 pm EST. See the Meeting Schedule posted on our website at https://www.mahsnet.org/meetings.php for more information.

Renew Now!

It's time to renew your membership in MAHS. It's easy. Just complete the application form on the inside back cover, sign the Statement of Ethics, add the applicable dues payment, and mail to MAHS at the address listed at the top of the form.

An online payment can be made on our website at https://www.mahsnet.org/membership.php. Scroll down to the "PAY NOW" button to make a credit card or PayPal payment.

MARITIME ARCHAELOGICAL AND HISTORICAL SOCIETY
PO BOX 44382, L'Enfant Plaza
Washington, DC 20026
www.mahsnet.org

ADDRESS SERVICE REQUESTED