

Heritage as Social Action: Sarasota/Manatee in an Age of Rising Sea Levels

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Summary: The *Tidally United Summit*, held in Sarasota in August 2018, focused on heritage and rising sea levels. This report, part of the New College Public Archaeology research series, offers the background for rising sea levels in southwest Florida and provides lessons from archaeology to increase community resilience in Florida for life in the Anthropocene. An appendix describes the planning, context, and details for the Summit.

Preface: The Time for Warning about Climate Change is Over

Archaeology makes news, with the general public in the United States seemingly have an unending interest in discoveries and interpretations of the past. Both the romantic and the scientific aspects of archaeology capture the imagination. Archaeology focuses on materiality, human history, and social change, and archaeologists work hard to ensure their efforts are relevant, as a science, as a humanity, or for the present and often in combination of those different strands. Today archaeologists around the world, and increasingly those in the USA, are grappling with climate change, in terms of the preservation of heritage sites, disseminating lessons from the past, and building this information into resiliency, adaptation, and mitigation plans. Not surprisingly, the professional concerns reflect personal experiences and, for some, radiate out of the sustained work on a long-term perspective that allow visualization of potential futures. In Florida, archaeologists face the climate crisis in many ways, through public initiatives, collaboration, and research; since the New College Public Archaeology Lab began in 2008, the focus area has been on the Sarasota/Manatee region. For this region, for southwest Florida and beyond, the time for warning about climate change is over. Hurricanes Matthew (2016), Irma (2017), and Michael (2018) each confirmed the confluence of increased coastal population density, rising sea levels, and more intense storms devastating lives and property. More challenges are coming for future decades. With scholarship demonstrating that we have entered a new geological epoch, the Anthropocene replacing the Holocene, thinking in terms of

centuries and new social and material adaptations is necessary. This report offers optimistic possibilities from archaeology in a pessimistic age.



Heritage as Social Action: Sarasota/Manatee in an Age of Rising Sea Levels sketches out issues and concerns that orients research on rising sea levels for regional archaeology and sets the stage for increasing civic engagement on the crucial issues of coastal heritage in this age of rising sea levels. The impetus for this report comes from the third annual Tidally United, a summit on rising sea levels and heritage held in Sarasota in August 2018. *Tidally United* is a project of the Florida Public Archaeology Network, and in 2018, Sarasota offered the opportunity to focus on community engagement. Planning for the conference began in the previous fall, shortly after Hurricane Irma came through the tip of southern Florida and headed north slashing the state, with impacts felt statewide. The destruction from the storm made it clear that the time for warning about climate change was over and residents, citizens, scientists, *et al* needed to accelerate programs and projects for community resilience. With heritage seen as a pillar of community identity, protecting, preserving, and recording heritage sites is social action.

This report provides our review of the third Tidally United Summit, noting the formation of a collaborative outcome, the Coastal Heritage at Risk Taskforce, for the acronym CHART, and a call for increased access to Florida's regional historical and archaeological contexts.

Making a 'scene' - Rising Sea Levels and Storm Surge in the Anthropocene

The sea is not level. It is a simple observation but significant when we consider the contentious politics of climate change. The warming temperatures are melting the polar ice and the warmer waters take up more space than cooler water; the increased size of water means rising sea levels. The rise in the seas, the movement of the waters onto land, is not even because the sea and land are not level, both a point of departure and a reason the implications of sea level rise, globally, is uneven. It might not be a surprise then to visitors and residents alike that one of the global crisis locations for rising sea levels is Florida. We are not being only self-concerned when, as Floridians, we raise fears on the implications of climate change on our coastal zones, landscapes, and lives: the strategies, approaches, and actions we take in Florida, or do not take, will be lessons for other coastal regions in the coming decades.

As an archaeological project, the study of coastal heritage and rising sea levels follows researchers of climate change who are paying close attention to Florida. While the city of Miami is receiving a large portion of the attention, communities on the Florida Gulf Coast also have similar challenges. These challenges were brought to light in alarming coverage by the *Washington Post* in July 2017. The title of the story *Tampa Bay's Coming Storm* evokes a clear warning. The challenges are widespread for sustaining the current coastline with its residences, business, leisure activities, and *heritage*. Surprisingly the warnings seem to ignore coastal heritage so this report meets the challenge. The expanded dangers of storm surge and flooding mark the Anthropocene and together with rising sea levels hasten transformations of our coastal

heritage. We can meet the challenges if we act, and successful actions on the Florida Gulf Coast will matter to other communities.

The discussions are not new. Robert van de Noort, in a 2013 book *Climate Change Archaeology: Building Resilience from Research in the World's Coastal Wetlands*, focuses attention in four regions of the Globe, the North Sea (on the European continental shelf), the Sundarbans (the forest at the Bay of Bengal), the Iraqi marshlands (between the Tigris and Euphrates rivers), and Florida's coastal wetlands, mangrove swamps, barrier islands, and oyster reefs of the Gulf of Mexico coastline. The goal of van de Noort's project: how to strengthen the resilience of coastal communities was based on research into adaptive pathways from the past. It is a goal to be taken up by residents and community leaders, informed by scientific insights, and propelled by grassroots' concern for today and the future. Central to the approach that employs the insights from archaeological research is heritage, a sense that the past is part of the present in ways that can enlighten and inform. Heritage offers values, a plural form of value, but really a different formulation, that moves beyond the economic to consider the social and long-term, by looking backwards and raising concerns for the present and future of communities (see Baram 2018).

Archaeology can, and has been contributing to understanding climate transformations. Humans emerged during the Plio-Pleistocene, living as gather-hunters; with the Holocene, our species developed village life, mass migrations, and a multitude of ways of life. Geological epochs correlate to massive transformations for human societies, with even relatively minor shifts in climate boosting cultural change. Increasingly, the archaeological evidence points to a shift to a new geological age, the Anthropocene, named for the transformation by *Homo sapiens* of this planet. The archaeological indicators for this new geological era are found world-wide:

plastics/synthetic organic polymers and nuclear fallout/radionuclides in the upper strata of excavations. Archaeologists debate the Anthropocene, not surprisingly on the basis of dating since chronology is the backbone of archaeological studies; Lewis and Maslin (2018) offer the intellectual background and the debate over the timing of the Anthropocene in their recent *The Human Planet: How We Created the Anthropocene*. Those debates over whether our current geological epoch started with the rise of agriculture, 17th century colonialism, or mid-20th century nuclear testing in 1945, do not take away from observations that one of the distinctive features of the Anthropocene is sea level rise. Scientists have described and explained the Greenhouse Theory and the relationship of the Earth's average surface temperature to concentrations of CO₂ since the 1800s. However, the warnings in terms of public perception consolidated only during the 1990s. Two decades later, the time for warnings, especially on Florida's Gulf Coast, is over.

The rising sea levels are a coastal threat but also represent stress on our ecology and our lives. For those in the United States of America, as Hurricane Katrina for New Orleans (2005), Superstorm Sandy (2012) in the New York City area and along the eastern seaboard, Hurricane Harvey (2017) over Houston, Hurricane Maria for Puerto Rico (2017), and Hurricane Florence (2018) showed storm surge and rains can be massively disruptive and destructive for major cities. Rising sea levels, the warmer water temperatures, and the rising water table accelerate the consequences of the storms. And, while it is a simple point, it is part of the concern: there are more than seven billion people on the planet, more *Homo sapiens sapiens* than ever in history. And a greater percentage of humans live near the coast, many more people and much more infrastructure than ever in human history. Concern for our families, friends, and fellow humans makes understanding rising sea levels a pressing issue.

The well-known and continually retold biblical story is relevant: Noah knew the flood was coming (Genesis 6-9) and built an ark. We are in a similar age: we know our world is changing and we need to act. We must go beyond the warning to locate ideas and insights to increase resilience to the continuing threats to peoples, homes, and locations.

Hurricane Irma – a turning point

Disasters are turning points, moments that shift one's thinking, or should. In September 2017 the news reports focused Florida's attention on a looming hurricane, Irma, and revealed the immediacy of the challenge in Sarasota/Manatee. Memories or knowledge of Hurricane Andrew devastating Miami (1992), Hurricane Charley (2004) landing at Charlotte Harbor, and Hurricane Katrina (2005) flooding New Orleans, inspired fear. As greater than a category 5 hurricane, Irma caused, as Wikipedia reminds us "catastrophic damage in Barbuda, Saint Barthélemy, Saint Martin, Anguilla, and the Virgin Islands" and as the cone of uncertainty shifted from the Florida east coast to the west coast, residents of Manatee and Sarasota fled, went to shelters, or hunkered down. There was dread in this region, and rightly so.

The damage was severe but not catastrophic. Schools were closed for a week and homes and businesses went without electricity. Piles of lawn debris remained by the roadside for a few months. The next storm might lead to a different outcome for the region, and there will be a next storm. Though there is folklore in Sarasota and Manatee that either the burials of ancient inhabitants, a blessing offered during the forced departures Seminole people from Egmont Key, or peoples associated with the early 20th century Ringling Brothers Circus protect the region from hurricanes, the historic record includes several massive storms devastating the area (see Baram 2017). The difference today, however, is there are many more people living along the

coast who require an infrastructure for survival. Increasing resilience within the communities, educating on the heritage of the region and learning from the past, and popularly-supported strategies for determining the future of archaeological and historic sites are all necessities in the Anthropocene.

Some magazine stories and popular books are stating that we are doomed, that the new geological era will destroy the earth. The planet will be fine, it survived previous change. The challenge is protecting our ways of life through resilience and adaptation; the issue is not the rock we are on. Pessimism, nihilism, and ignorance are choices that can be overcome. Over the 20th century archaeologists, as professionals, were trained to address the challenges of impacts to the archaeological record from development and commercialization. The Society for American Archaeology, for instance, includes those concerns in its code of ethics: the profession opposes both with clarity and offers solutions when sites are to be affected by construction projects. More recently, looting of the archaeological record has received important intellectual attention that brings forward recognition of how archaeologists can grapple with the individuals in the antiquities trade and support policies to protect sites and artifacts. Concerns over the silencing of the past, the uneven attention given to events, places, and people in history, gives voice those whose heritage has been erased in productive ways. But a new challenge to the archaeological record is climate change, particularly rising sea levels (see the extent for the USA southeast in Anderson et al 2017) and there is little to be done about the present trajectory that threatens the archaeological record around the world but particularly in coastal regions, like Florida. Meeting that challenge is the task before us now. It is the stimulus for Tidally United and the focus as we welcomed Summit participants and attendees to Sarasota in the summer 2018.

Protecting Sites is more than Preservation

The concern with climate change has engaged those concerned with the environment for decades; preserving the natural heritage has been at the center of concern. The emphasis on cultural heritage in an age of rising sea levels is relatively new but preserving the past is an ethical mandate for archaeologists. Climate change is only a new part of the challenge.

An example for archaeologists began decades ago in Charlotte Harbor when William Marquardt (1994) of the University of Florida organized the Calusa project to raise environmental consciousness. Archaeologists, volunteers, and the general public are still engaged in that important project. These types of efforts are turning understandings of heritage work, archaeological or historical, localized or global, as being social action.

As Rodney Harrison (2010) states: “If heritage can be a form of cultural capital and a way of connecting people with each other and with the environment that surrounds them, the promotion of heritage or involvement of heritage can be considered to be a form of social action.” The notion, heritage as social action, raises the significance of protecting, conserving, and representing the materiality and intangible traditions for our world today and for future generations. But to make change requires engaging policy-makers, just not the civil service but the elected officials. Lobbying, demanding, informing and running for political office is necessary to create change; popular consciousness on the issues matters but focused attention is needed to enact legislation or protect existing regulations. While archaeologists have advocated, for decades, protection of the past, the heritage as social action framework expands archaeology beyond the professional focus on artifacts, archaeological sites, and research. The transformation, the expansion of archaeology to be an intervention in contemporary affairs, alleviates the politics of past from being a sole responsibility of archaeologists, to encourage the

grassroots approach to heritage protection. Reaching out to communities, is the key, it seems, for archaeology to contribute to making positive social change in our contemporary world.

As David Graeber and David Wengrow (2018) point out, if we want to change the course of history, we have to tell of the past in a manner that fits the evidence and makes the point that our future matters. Empirical material evidence and the interpretations generated by scholars, oftentimes with guidance from the general public and stakeholders, allows the present generation to consider the consequences of human decisions and actions over extended periods of time. Archaeology is equipped to provide climate stories through its place-based traditions.

Learning from Archaeology: We can Handle This

A. Life in the Anthropocene

Rising sea levels are a concern being addressed by a range of scientists. Archaeology offers insights to two important questions:

1. How did we get to the present dilemmas? With more than seven billion people on the planet, there are more people living on the coast than ever in human history. Florida is a prime example of the expansion of coastal living and, as a result, is a primary area of concern with the resulting dangers associated with rising sea levels. Archaeology pulls together information from varied datasets including geological transitions and landscape changes to offer explanations on the social implications of factors related to climate change.
2. What are the multiscalar material, historical, and social implications of the transformations coming with the rising seas? Archaeology provides a long-term perspective on the responses and adaptations to encroaching seas, detailing evidence for the origins and problems faced by people

and societies, and highlighting potential solutions to the new landscapes of the Anthropocene. There is much work to do.

Van de Noort (2013) cites the role of research is to strengthen resilience of coastal communities by: 1) studying the interactions of climate change, sea level rise, and coastal wetland development on a millennia scale; 2) encouraging cooperation and collaboration on a range of levels for local communities and institutions by recognizing previous generations engaged in such cooperation while living by the sea; 3) finding ways to reformulate relationships with the sea and coast; and 4) recognizing the coast as a highly valued and varied economic landscape.

For Sarasota/Manatee, as well as in the larger Tampa Bay and Southwest Florida regions, many have been working for years now to strengthen our area's resilience. More recently, the Tampa Bay Regional Planning Council spearheaded the creation of the Tampa Bay Regional Resiliency Coalition and has brought together municipalities and institutions to facilitate these pathways and information flow to strengthen resilience and more for our communities. Incorporating archaeological information and research at this level is possible. Resilience is the ability of communities to rebound from challenges and adversity like sea level rise and the hurricanes that have and will continue to come at our coast.. Archaeological insights are particularly useful for a long term perspective on a place, offering awareness of the successes and short-comings, the adaptations and maladaptions of previous generations.

Though the popular image for archaeology continues to be the lone (usually male, played by Harrison Ford) excavator, archaeological research requires interdisciplinary teams. Professionals are trained to work with others and manage funding sources, field and lab crews, and engagement with the public. With the climate crisis, many archaeologists are stepping

forward to engage policy makers, the interested public, and political leaders on the lessons and significance of archaeology for engaging current and near-term concerns (the Florida Public Archaeology Network organized Tidally United for this purpose). Such archaeologists are not claiming unique contributions but the insights from archaeology can support efforts to make our homes and communities more resilient to storm surge, hurricanes, and sea level rise.

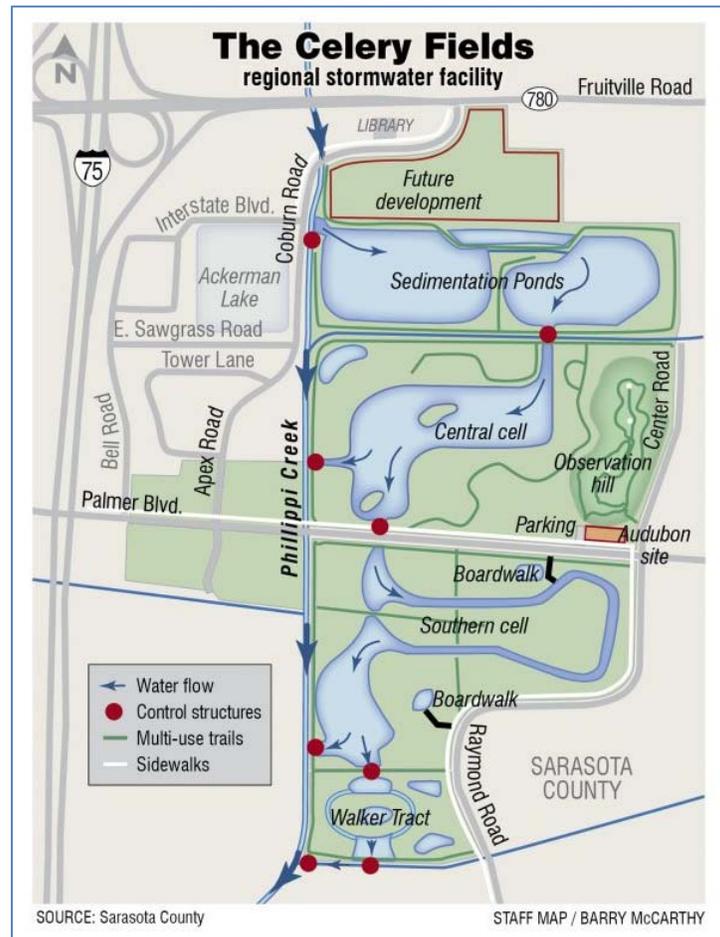
Application of Climate Change Archaeology for the Present

The insight from archaeology, a future-oriented archaeology, is to ask and encourage discussions of the goals for this region and its communities. The seas are rising, the climate is changing; we are in the Anthropocene. The 20th century approaches will not sustain us but perseverance is possible to meet the challenges of our era and create a way-of-life that allows us to enjoy the coastline without fear. Below are four brief examples.

A. The Return of Lake Tallant: Phillippi Creek Floods No Longer

The first example comes from the senior author: after his purchased of a home, a neighbor asked if our family owned a kayak. Seems the neighborhood used to flood, a lot, because of Phillippi Creek. Phillippi Creek is a navigable body of water and major drainage for Sarasota. The river runs approximately six miles northwest to southeast crisscrossing Sarasota. Because of the town's north/south and east/west road grid, for many residents Phillippi Creek has low visibility but used to overflow its banks regularly. To address flooding, Sarasota County turned what had been in recent historic times known as the Celery Fields (from the early 20th century use of the land) into a system of reservoirs. Not only do the reservoirs collect water but fill dirt and soil created during the digging and dredging of the reservoir is piled up into the

highest hill in the county. The area has been reformed into a natural area destination and attracts birds and birders. By solving the flooding issue, residents and visitors have a beautiful spot to walk, watch birds, and learn about the ecology of the region.



Source: *Sarasota Herald-Tribune*

The reservoirs at the Celery Fields solve the flooding issue downstream along Phillippi Creek. They also seem to evoke the return of an ancient lake, known locally and from archaeological literature as Lake Tallant. In 1935, Montague Tallant, a well-known amateur archaeologist and collector in Florida, reported on dugout canoes found in those fields; as Almy et al (2016:i) describe in their notes from a 2016 cultural resource management (CRM) report on the area by the reservoirs:

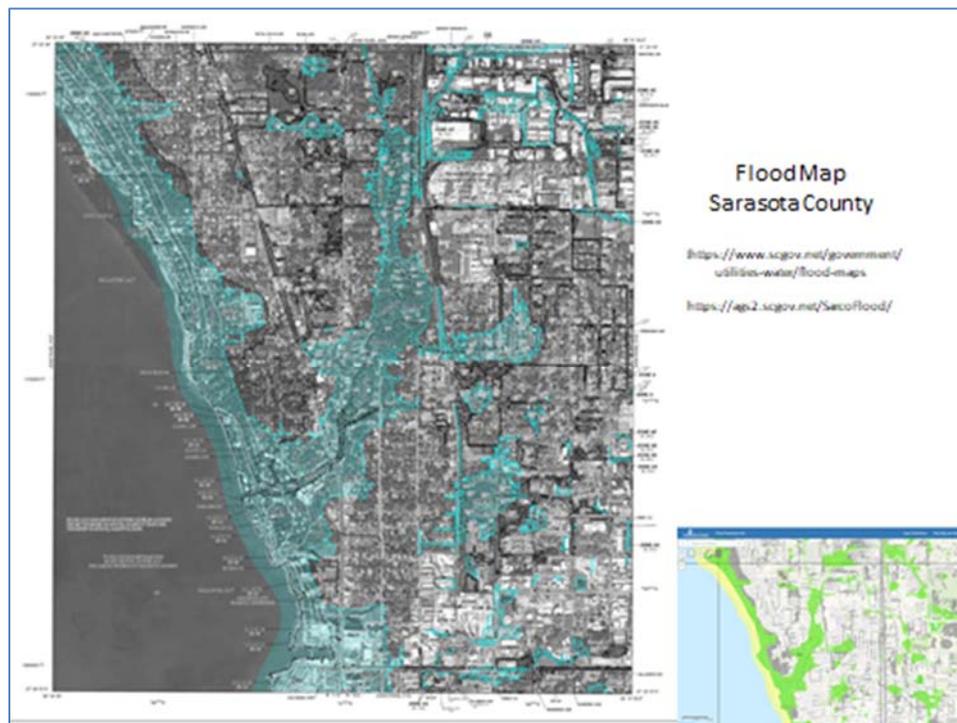
Background research, including a review of the Florida Master Site File (FMSF), and the NRHP indicated no prehistoric archaeological sites were recorded in the project area. However, when drainage of the general area began in the 1920s, it was discovered that much of the land consisted of mucky soils and that in this muck were several wood canoes. According to Montague Tallant, these canoes were found in “muck from two to three feet deep and all boats are resting in the hard sand underneath” (Tallant 1935b). Although the exact location of the canoes remains unknown, letters between Dr. M. W. Stirling and Tallant indicate that they came from the general area southeast of the I-75/Fruitville Road intersection (Tallant 1935a, 1935b), away from the project area [north of Fruitville Road].

Those Tallant references are taken from two letters available at the Sarasota County Historical Resources. While Montague Tallant was not a professional archaeologist, he wrote to professionals at the Smithsonian Institute. His observations remind us that water seems to return, even when drained away. Sarasota County chose well, having the opportunity and the support to return what had been agricultural fields into a reservoir system prevents flooding for residents of Sarasota downstream. The deep past makes the case for the county government’s decision to develop a storm water mitigation plan at the Celery Fields, replicating a natural reservoir located at the headwaters to Phillippi Creek

B. Ask the Elders: Newtown is a Basin with Swimming Holes

Sarasota is a coastal community and the historic segregation has led to African American homes, the neighborhoods of Newtown, located in places with increased dangers of flooding. Hurricane Katrina’s devastation of the 9th Ward of New Orleans provided a devastating lesson in the intersection of racism and climate change. For Sarasota, Newtown is century-old African-American neighborhoods separated from Sarasota Bay by a ridge containing historically white-residential neighborhoods and the Ringling Museum of Art and New College of Florida and bounded to the north by the Sarasota/Bradenton International Airport. The slightly elevated ridge

likely a relic coastal sand dune of a wind-swept past and the high ground of the airport create a basin. A contemporary flood map shows the potential flooding dangers for Newtown, particularly due to Whitaker Bayou, an easily overlooked tidal creek. Beyond rising sea levels, storm surge is a potential a threat to homes and livelihoods.



Flood Map from Sarasota County showing potential flooding through Whitaker Bayou

What to do about the probable flooding of Newtown? Local elders tell of swimming holes. Incorporating these historic locations into a new system for drainage would ensure that more frequent flooding and high water events do not drown the community. The Calusa built canals in Southwest Florida for ceremonies, transportation, and exchange. Organizing and sustaining community discussions in Newtown to plan a network of canals for the waters that are coming and focusing on the engineering to take advantage of residential memory but also incorporate the social and economic potential of useable canals for socializing, alongside a network of heritage and ecological education

C. Mangroves in the Anthropocene: We are our Coast

Karl Bickel wrote in 1942 about Sarasota and the Florida Gulf Coast and labeled his work *The Mangrove Coast*. As he wrote: “The ecological truth is that mangroves are giving trees.” Predating Shel Silverstein’s children story *The Giving Tree*, the image works to remind us that such trees act as parents for our built landscape: mangroves break up storm surge to protect what is behind them. The World Bank offers a working paper based on studies of 42 countries (Blankespoor et al 2016) that recognizes mangroves for coastal protection from storm surge in this age of rising sea levels. The challenge is competing land uses and creating awareness: both are topics for archaeological contribution, rising mindfulness of what has worked and will continue to work if the collective in any particular region wishes to protect coastal communities.

D. Lessons from Archaeology

Archaeological research into the Lower Suwannee River (Sassaman et al 2017) brings out the strategies used by the Archaic-period people who faced climate change and the end of rising sea levels. Though it seems straightforward, a lesson from the ancient ones is the importance of storytelling, of using tales to ascribe meaning to our places, histories, and decisions. Bureaucratic decisions, distant leadership, and sterile policies rarely resonate with communities; scholars have shown the importance of storytelling for our species. Our climate stories matter, especially the ones from policy makers. We can do better, by telling the history from below for the regions being transformed by climate change. Below is a sketch of the climate adaptation story for Sarasota/Manatee from Florida archaeology, from the decades of research and study that has produced an increasingly complicated, nuanced, and informative history for the peninsula.

Archaeology, as a discipline, intertwines collecting information from sites before, and sometimes after, they were and are inundated by rising sea levels and disrupted by storm surge with the knowledge on the past radiating from excavations, archives, and local knowledge.

Learning from the Ancients: The Chronology and Climate Story for Southwest Florida

Archaeology, by scholarly traditions, starts with the oldest and moves through time to the present. The oldest, of course, offers the greatest challenges, having the least information, less material remains, and tremendous difference from the present. For sea level rise, starting at the earliest known human habitation of this region takes us back more than 12,000 years – a very different world from our own.

The Florida Division of Historical Resources provides these dates for the archaeological sequence (see <http://info.flheritage.com/comprehensive-plan/chap7.cfm>)

12,000+ BP	PaleoIndian Warm Mineral Spring and Page/Ladson
11,000 BP	Glaciers began to melt, sea levels began to rise
9500 BP	Early Archaic Period
7000-5000 BP	Middle Archaic Sites along the St. Johns River and the Hillsborough River; contemporary environment established
5000 BP	Late Archaic Period, marked by shell middens on coasts and rivers
4000 BP	First fired clay pottery
2500 BP	Mound building, Crystal River Indian Mounds
1300 BP	Rise of Complex Societies, known to the Spanish as Timucuan, Apalachee, Tequesta, Calusa

The Florida Chronology, from the Division of Historical Resources

A. PaleoIndian

During the PaleoIndian period, the era of the first archaeological evidence of people in southwest Florida, the Florida peninsula was much larger than today. During the Pleistocene,

much of the earth's water was locked up in ice, resulting in much lower sea levels and a considerably drier environment than the Florida at the end of the 20th century.



Map of Ancient Florida (©Uzi Baram)

The megafauna of the Paleoindian era are on display at the South Florida Museum in Bradenton and the Florida Museum of Natural History in Gainesville, among other locations, where the public can see skeletons and reconstructions of giant sloths, ancient horses, mammoth or mastodon, and other creatures They have vanished from the Florida landscape but once lived in the much larger, and cooler, peninsula.

On first glance, the map of Florida before the Holocene, the geological age that started approximately 11,700 years ago, might suggest the rising sea levels is a natural cycle; it is. But we are not seeing a continuation of a long-term process recorded in the Earth's geological past. The many centuries of the Holocene include relatively stable coastlines. Yet the Holocene is over. It has been replaced by the Anthropocene, which also has rising sea levels. The obvious difference between the two episodes: today is there are more than seven billion *Homo sapiens* on

the planet and more situated along the coast than ever in human history; for Florida the relatively low number of people in the PaleoIndian period can be compared to the current 21 million inhabitants of the state – the demographic difference matters.

B. Marking the Coast during the Archaic

During the PaleoIndian period, the melting of the ice led to a rise in sea levels over thousands of years. There are robust debates on the nature of the surging seas for Florida but the result is a much reduced peninsula by somewhere between 5000 to 6000 years ago as shorelines stabilized and the satellite image of a Florida we recognize today took shape. As *Tampa Bay Times* environmental journalist Craig Pittman pointed out in a December 2015 headline for a story on University of Florida Professor Kenneth Sassaman’s research: “Ancient Floridians knew how to cope with rising seas, archaeologists find.” The article (<https://www.tampabay.com/news/environment/globalwarming/ancient-floridians-knew-how-to-cope-with-rising-seas-archaeologists-find/2255732>) provides insights from Professor Sassaman and along with University of South Florida Anthropology Professor Nancy White and William Marquardt of the Calusa Project, who have dedicated their careers to studying human interactions along the Florida coasts. Throughout their research, they have documented actions taken by Florida’s earliest people in response to sea level fluctuations and extrapolate broader explanations on the human decisions in facing a changing coastal zone.

When the coastline stabilized somewhere between 5000 to 6000 years ago, archaeologists call the era the Archaic. As the reports from the Southeastern Archaeological Center of the National Park Service show

(e.g.,

[https://scdah.sc.gov/sites/default/files/Documents/Historic%20Preservation%20\(SHPO\)/Research/ArchaicShellRingsThemeStudy.pdf](https://scdah.sc.gov/sites/default/files/Documents/Historic%20Preservation%20(SHPO)/Research/ArchaicShellRingsThemeStudy.pdf)) people living during the Archaic adapted to ever shifting coastal zones and eventually leading to the construction of earthen monuments marking the land's retreat., shell rings from the Late Archaic period, circa 4600 to 3000 years ago are significant indicators of the cultural responses to sea levels. The shell rings have been the topic of much archaeological debates; here we put forward a hypothesis that the shell rings are markers along the coasts for later generations to utilize when calculating decisions on where to set up upon their return to the coastline. In archaeology, as any scientific discipline, previous studies are augmented by further research, and in the case for the Lower Suwannee River (see Sassaman et al 2017) the archaeological evidence for shifts to large civic centers and monuments on the coast, offer insights into how people thousands of years ago responded to a moving coastline and the changing trajectories of water.

Not only do the Archaic-period shell rings offer evidence of how people respond to climate change, lessons useful for today's challenges, they provide evidence that the coastline is being transformed. Across the coastal southeastern United States the documented shell rings are routinely being inundated today. At Historic Spanish Point, in Sarasota County, the Cottage Hill shell ring is an example of the monumental architecture correlating with a stabilized coastline that is undergoing preservation concerns. With the Archaic period, archaeologists offer thousands of year of year for the evidence of rising sea levels for our contemporary shores as well as insights into the successful adaptations and cultural decisions made by the ancient people of Florida; heritage work on these sites provide double aspects, past and present, of archaeology as social action.

C. Mounds on the Coastline

After the Late Archaic, people across the region built up shoreline middens and prominent mounds on the coastline as expressions of village life, commerce, and ritual. Harvesting estuarine and marine resources, the Native peoples of the Gulf Coast did not need to engage with agriculture. Instead, they augmented diet and lifeways largely based upon the sea with encouraged promotion of native plants in the wetland and upland regimes. Even though only a small percentage of those mounds and middens remain, their destruction due mostly due to reuse of their shell content in the late 1800s and early 1900s as fill material, archaeological maps today still show us that many still exist today. On Snead Island, the Portavant Mound at Emerson Point Preserve, dates to Manasota and Safety Harbor cultures, approximately between 1100 to 300 years ago (900-1725 CE) and is nine meters (about 27 feet) high with a base measuring 45 meters by 75 meters (approximately 135 by 225 feet). Today the mound's flat top has an observation deck; the previous historic structures are no longer extant but are relatively easy to visualize from their ruined structural remains. Smaller, subsidiary mounds lie to either side of the large mound. And from that spot on the top, the shoreline to the south and west and the mouth of the Manatee River can be easily surveyed. The time before contact with European colonists a water court opened from the river flanked by the three mounds and would have provided access for food and raw materials brought by villagers and visitors alike. Narratives for the lives of those ancient peoples are still waiting to be told.

D. A Disaster for the Spanish

The historian Fernand Braudel divided history into three layers. Environmental history moves along on the scale of the long-term: ecological even geological factors, the *longue durée*. Then there's the medium-term: ideological, social, or political economic causation. *moyenne durée* or *conjunctures*, history on the scale of fifty to one hundred years. The third layer is the short-term: personal or military/political history. *l'histoire événementielle* – acts of individuals, the fireflies of history. One such moment shifted the history of Spanish Florida, and a hurricane was the agent of change. Tristán de Luna y Arellano led an expedition from Veracruz, Mexico to modern-day Pensacola, Florida in 1559 to begin the Spanish colonization of the northern Gulf Coast. One month after they arrived, the colony was struck by a hurricane: archaeologists have recovered the evidence at the Emanuel Point shipwreck as well as Luna Settlement Land Site (located in 2015). The colony lasted for two years but the devastation ended that early Spanish settlement before the ships were mostly unloaded.

E. Ranchos on the Bay

The Pensacola settlement was delayed; no significant Spanish settlement occurred on the coasts of what is today Sarasota and Manatee counties. But it was not empty land. Without imperial oversight, maroons congregated by the Manatee River and Seminoles across the region; on the coast, fisherfolk came from Cuba and set up ranchos. At first seasonal camps and then year-round hamlets that harvested the plentiful fish of Sarasota Bay and surrounding waters for the Havana market.

As Michelle Zacks argues in her 2013 dissertation on the history of fishing in southwest Florida, "...mullet-fishing people in southwest Florida have embodied modes of life deeply

situated within the environmental contours and social history of the region” (page 4). During the rancho era (1770s-1840s), the way of life was multi-ethnic, multi-racial, and profitable for those coming from Cuba to harvest the fish of Sarasota Bay and other waters of the Florida Gulf Coast.

The ranchos are a successful use of the Gulf for resources and a way of life. During the Second Seminole War (1835-1842, part of the century-long war against the Seminoles in Florida), the approach was destroyed by military means, as the US navy razed the ranchos and a new fishing industry arose focused on red snapper.

G. Seminoles

We can learn much from the Seminole peoples, with their long traditions of living in this region. And the relationship has to be one of learning, respectful and with the recognition of historic injustices on their lands.

One example is the architecture: as Carrie Dilley (2015:50) relays from James Billie (Chairman of the Seminole Tribe of Florida from 1979 to 2001 and from 2011 to 2016) a well-built chickee can withstand tropical storms and hurricanes; the key is their flexibility. Another is the tradition of not fearing but respecting hurricanes entered the popular media after Hurricane Irma when Betty Osceola was quoted “The generations of our people today need to remember and to share the stories with our younger generations so they too will respect and love the natural world.”

http://therealnews.com/t2/index.php?option=com_content&task=view&id=31&Itemid=74&jumival=19991

In August 2017, the Seminole Tribe of Florida joined the Florida Public Archaeology Network in hosting Tidally United, a summit on climate change and heritage. The Tribe

recognizes the risks to cultural heritage and has been pro-active in addressing concerns, across the region. The place to start is the Ah-Tah-Thi-Ki Museum.

G. Condominiums on the Coast

The modern period for Sarasota consists of marketing the region as paradise, encouraging tourists and new residents to visit and settle on the coast. Karl Bickel (1946:261) wrote in the *Mangrove Coast*: "Just one hundred years ago, in January 1842, Josiah Gates established the first permanent white settlement on the Manatee after three hundred years of intermittent effort by other men. Four flags, the Spanish, the British, the Confederate and the Stars and Stripes have flown over this coast....But the pull of the Mangrove Coast is not its history, for neither historians nor its own people have laid claim or put great value on its past. Its attractions lie in its intangibles: the gleam of white sand, the softness of southwest winds, pink and turquoise sunsets, and the abiding simplicity of its people." Jack Davis (2017: 399) invokes a novel by John D. MacDonald for green flash "a metaphor of the fast green money to be made in the Palm city real-estate scheme. Another metaphor, not explicit in the book, relates to MacDonald's artistic context: the natural green of the Mangrove Coast disappearing in a flash."

John D. MacDonald was more expansive on that view when he wrote *Condominium: A Novel*, a story of corruption that ends with a hurricane washing away what should not have been built as it was.

Conclusion

Heritage as Social Action: Sarasota/Manatee in an Age of Rising Sea Levels documents the insights and processes for moving beyond warning about climate change to including

heritage as social action to rethink our approaches to the coastline. Sarasota/Manatee has beautiful beaches and a rich marine environment. Jeff Moates can describe his grandfather taking him and his brothers to DeSoto Point; that land is eroding away due to watercraft and rising sea levels. There is no expectation for potential grandchildren to be able to see and engage that landscape, all predictions indicate the point will be gone. There is much to learn about the ancients and their approaches to rising sea levels, much to debate about what aspects of material heritage on the current landscape to preserve, and little time to rethink our relationship as terrestrial beings to the seas as they rise.



Heritage Matters
Photograph by Uzi Baram (New College of Florida bayfront August 2018)

Acknowledgements

This report grows out of Tidally United 2018, held in Sarasota with support from the Florida Public Archaeology Network, New College of Florida (the Environmental Studies program and the New College Public Archaeology Lab), Time Sifters Archaeology Society, Historic Spanish Point, Archaeological Consultants Inc, AWAIRES, South Florida Museum, and Little Greek Fresh Grill. The summit's participants, audiences at public presentations, and members of the Cultural Heritage at Risk Taskforce contributed the impetus to setting forward these propositions and examples. The authors are solely responsible for the argument and descriptions.

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Appendix: Tidally United – Public Archaeology in an Age of Rising Sea Levels

Tidally United: Collaborations Across a State Facing Challenges

Tidally United is a project of the Florida Public Archaeology Network whose mission is: "To promote and facilitate the stewardship, public appreciation, and value of Florida's archaeological heritage through regional centers, partnerships, and community engagement." FPAN has three core areas: Public Outreach, Assistance to Local Governments, and Assistance to the Florida Division of Historical Resources. To meet those goals in an age of rising sea levels, FPAN started Tidally United in 2016. The first Tidally United was held in St. Augustine and focused on Cultural Resources Shoreline Monitoring and Public Engagement Summit; the second, in Fort Lauderdale, highlighted indigenous groups and climate science, planning, and the importance of cultural heritage. For Sarasota the gathering, co-organized by the New College Public Archaeology Lab, took on the theme is Heritage as Social Action.



The Florida Public Archaeology Network, since the first summit, has partnered with a wide range of organizations (Image from <https://fpan.us/projects/tidally2016.php>)



Flyer for the Second Tidally United Summit

Planning for a Summit: Asking for Community Input

In its ten years of existence, the New College Public Archaeology Lab has taken what its founding director Uzi Baram has come to call “radical openness,” an approach that exposes all steps of the archaeological process. With FPAN’s support Tidally United, in Sarasota included public discussions, archaeological presentations, and networking among historic preservationists. The process began with a February 2017 roundtable at the South Florida Museum.

TIDALLY UNITED 2018

“Protecting Heritage as Social Action”

roundtable discussion
 February 14th 10-Noon
 South Florida Museum
 201 10th St W, Bradenton

We want to know what you think!

You are invited to attend a roundtable discussion on heritage and rising sea levels. Co-hosted by the Florida Public Archaeology Network (FPAN) and the New College Public Archaeology Lab (NCPAL), the roundtable will start a discussion that will continue through a series of public events and engagements culminating with the Tidally United Summit in August 2018.

Supporting community interest and engaging diverse communities is the goal as we work toward solutions to rising sea levels across Florida. If you are interested in participating, or finding out more about the series of public events and the Tidally United Summit, join us.

Please RSVP to Rebecca O’Sullivan at rosulliv@usf.edu.
 Go to www.fpan.us/HMSflorida for more information

6 foot sea level rise projection

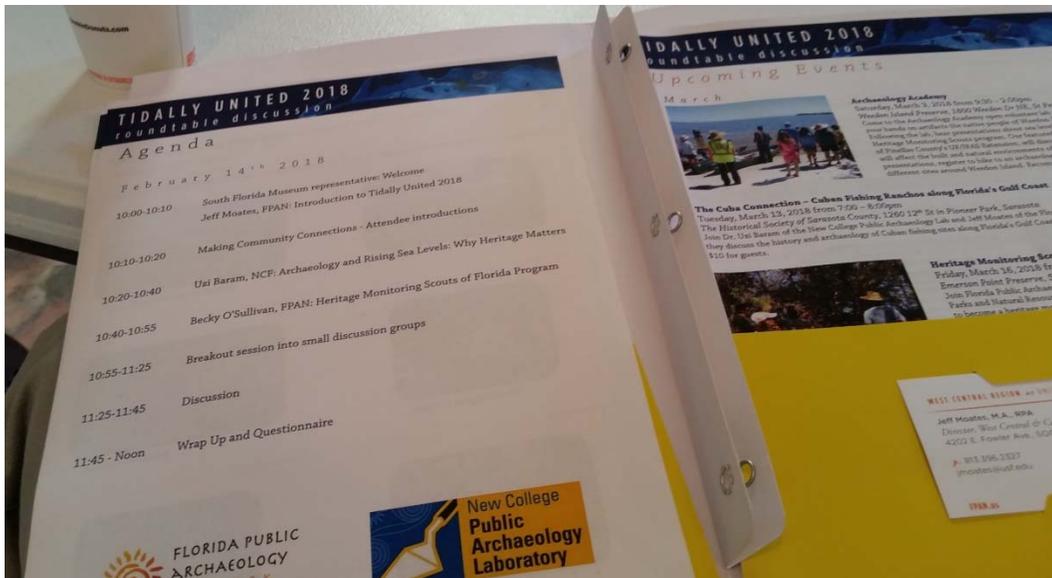
Invitation to the February 2018 Roundtable Discussion

On behalf of FPAN and NCPAL, individuals from the following groups were invited to the February round table held at the South Florida Museum, listed to give a sense of the range of organizations:

- Manatee County Historic Preservation Board
- City of Sarasota Sustainability Manager
- Manatee County Natural Resources & Parks Programming, Volunteer and Education Division
- Manatee County Clerk of Court, Historical Resources
- City of Bradenton, City Council Members
- City of Bradenton, Department of Planning, Community Development
- City of Bradenton, mayor
- City of Palmetto, mayor

- The Islander Online
- Sarasota Extension, Sustainability Manager
- Sarasota Sustainability Outreach Coordinator
- Sarasota County Historical Resources
- Sarasota County Archaeologist
- Manatee Extension
- Around the Bend Ecotours
- Newtown Alive!
- Historic Spanish Point
- Sarasota Bay Estuary Program
- Florida Park System, Gamble, Bickel State Park Manager
- Terra Ceia Aquatic Preserve
- Time Sifters Archaeological Society
- Science and Environmental Council of Southwest Florida
- Creative Preservation LLC
- Mote Marine
- Conservation Foundation of the Gulf Coast
- Sarasota Water Atlas
- University of South Florida - College of Marine Science
- Sarasota Herald Tribune
- Friends of the Sarasota County History Center
- Florida History Museum using Augmented Reality
- Sarasota Museum of Art
- Sarasota County Openly Plans for Excellence
- Arts and Cultural Alliance of Sarasota County
- Manatee County Natural Resources Department
- Bradenton Beach
- Friends of Little Salt Spring
- Family Heritage House Museum
- Seminole Tribe of Florida Tribal Historic Preservation Office
- State Archaeologist
- Desoto National Memorial
- Archaeological Consultants Inc
- Alliance for Weedon Island Archaeological Research (AWAIRE)
- Florida Maritime Museum
- Gulf Coast Community Foundation
- City of Venice
- USF Anthropology
- Florida Public Archaeology Network
- USF College of Marine Science

Not all organizations sent representatives but the gathering embraced the agenda and worked through questions and issues.



Agenda for the February 2018 Roundtable

- 10:00-10:10** South Florida Museum representative: Welcome
Jeff Moates, FPAN: Introduction to Tidally United 2018; (agenda, expectations, goals)
- 10:10-10:20** Making Community Connections - attendee introductions: what is already happening? Name, organization, what one word jumps to mind when you think of SLR and climate change impacts in your community?
- 10:20-10:40** Uzi Baram, NCF Archaeology and Rising Sea Levels: why heritage matters:
- 10:40-10:55** Heritage Scout Program - Becky O'Sullivan, FPAN
- 10:55-11:25** Issues and Concerns in the Age of Climate Change: Break out sessions (10:55, separate into groups; 11:05, groups individually discuss; 11:25, begin group discussion)
- 11:25-11:45** Discussion (What are the common threads and take-away thoughts?)
- 11:45 - Noon** Wrap Up and Questionnaire

As the agenda shows, the process began with asking for input, described the FPAN program of Heritage Monitoring Scouts, and posed specific questions. The break-out session questions and the gathered responses indicate the significance of the challenges facing Florida heritage in an age of rising sea levels.

1. Not all heritage sites will be protected from rising sea levels, what are the places that must have conservation and preservation? Who can/should pay to protect and sustain those places?
 - a. Cemeteries and burial grounds should be preserved; National Registry-listed sites; identification and inventory of significant sites; taxes?

- b. Oldest sites?; more Heritage Monitoring Scours-like programs; creating personal connections to heritage sites; Who should pay?; studies of heritage tourism \$ to the economy; focus on beaches by public

2. Several archaeologists have argued that information from heritage studies enhance resilience. How do we share that concept while helping communities retain their heritage values?

- a. How is knowledge of the past relevant to the future? (Hard sell to the public); if humans dealt with this how did they handle it? They could move, can coastal cities of today? Communicate with public to find out what they care about. Is it their neighborhood? Homes? Heritage sites?; Empowering people to learn about their own heritage; How have other communities dealt with these issues?
- b. Archaeology - opens peoples' eyes; give message of hope - not just acceptance, fait accompli; resilience; people did this before us; they took action in the past; people weren't living on the coast; disasters - learn the lessons of the disasters!!; heritage; understanding traditional responses - i.e. current and past archaeology and anthropology
- c. Not all communities in our region have access to information and resources, including for protecting and disseminating heritage. How do we increase opportunities for more equity in preservation and conservation?
- d. Interpretive signs at Parks where sites are located, e.g. interpretative post at Lido Beach; Storm surge, boat wash question = opportunity for Sea-Level Rise discussion; be proactive - identify groups/organizations and provide visuals; present to non-archaeology groups, don't 'preach only to the choir.'
- e. Newtown - engagement with New College students; building partnerships - use "privilege" to reach out to affected communities - rather than going in and saying "we're going to do this..." - make connections with the local communities; sustainable pre-existing connections/communities; climate change - we can't ignore it!!; response to disasters; how to get out of trap/complacency - getting out of keep making the same mistakes; need to deal with issues head-on.
- f. Have you heard questions/concerns about heritage, history, archaeological sites from the public you serve? What are they generally focused on? Is archaeology/heritage seen as significant? If not, why?
- g. Yes we have heard concerns; Some folks are concerned about their own property first and historical sites second.
- h. Discuss climate change through time as entry to current climate efforts on sites; People not knowledgeable about Sea-Level Rise, but when informed they become more interested; no, arch/history of site. Yes, but not as a primary concern, not aware.

Questionnaire:

1. Who else should be in the room? Who needs to be part of the conversation and how do we get them involved?
2. Does heritage figure into your climate story? How can archaeology, both in terms of the information from the past and the focus on materiality, be beneficial to your programs?
3. What are the questions or concerns your organization/your public has about archaeology? How do we increase archaeological/historical knowledge for the public?
4. What training or additional information on historic preservation and heritage is important for your staff and volunteers?

Roundtable Discussion Summary and Results:

Heritage at Risk - not all heritage sites can be protected from rising sea levels, what sites do you think should take priority? Directions: Rank these heritage site types in order from 1 (highest priority) to 6 (lowest priority). Total of 7 survey forms completed and included in table below:

Place type:	respondent: 1	2	3	4	5	6	7	total/average
Traditional working waterfront	1	3	5	1	6	2	1	19/ <u>2.7</u>
Historic structure	3	4	2	5	5	1	5	25/ <u>3.5</u>
Shipwreck	4	6	6	6	2	6	6	36/ <u>5.1</u>
Museum	6	5	4	4	3	5	3	30/ <u>4.2</u>
Historic neighborhood	2	2	3	2	4	4	4	21/ <u>3</u>
Archaeological preserve	5	1	1	3	1	3	2	16/ <u>2.2</u>

The round table guided the efforts toward the summit, building on this input to stress public engagement as the theme for Tidally United in August 2018. The organizing partners continued to present on the issues and ask for input over the spring months.

Planning for a Summit: Public Presentations

Several public presentations, including a dialogue on the Cuban Fishing Ranchos by Uzi Baram and Jeff Moates, brought out the intersection of the regional past and sea levels concerns. The audience for the Sarasota Historical Society sponsored event titled “Coastal Inspirations: How the Cuban Fishing Ranchos Created Modern Sarasota and Manatee and What We Can

Learn from them in this Age of Rising Sea Levels” held at the historic Crocker Memorial Church on March 13, 2018 recognized the intersection of transformations in the coastline that require archaeological investigations to reveal the past.

Time Sifters Archaeology Society sponsored a May presentation by Uzi Baram on “Archaeology and Rising Sea Levels: Global Perspectives and Local Concerns” at the Selby Public Library. The *Sarasota Herald-Tribune* provided this headline for the talk: “Archaeologist Hopes Sea Level Summit Spurs Ideas.”

82 Saturday, May 19, 2018 | Herald-Tribune *5* | heraldtribune.com

Archaeologist hopes sea level summit spurs ideas

By Earle Kimel
earle.kimel@heraldtribune.com



Uzi Baram, director of the New College Public Archaeology Lab, says communities need to take a serious look at how to address rising sea levels.
(HERALD-TRIBUNE ARCHIVE)

SARASOTA — Uzi Baram decided it was time to start speaking out on the impact of rising sea levels after Hurricane Irma hit Florida last September.

“After Hurricane Irma, I have teenagers, they’re out of school for a week and a half, New College closed for a week and a half, damage was pretty severe, considering it was really far away from us,” said Baram, a professor of anthropology and director of the New College Public Archaeology Lab.

People have been dealing with and adapting to changing sea levels for millennia, Baram

Perspectives and Local Concerns,” to a crowd of almost 50 people at the May meeting of the Time Sifters Archaeology Society in the Geldbart Auditorium at Selby Library.

“This is the first draft of what I can say for this sort of public audience about these issues,” said Baram, who acknowledged that the presentation was essentially a literature review of available research.

Baram, a lifetime member of Time Sifters, plans to give a more refined version of his talk during the third annual Tidally United Summit, set for Aug. 9-11 at venues including the Mildred Sainer Pavilion at New College on Aug. 9, Payne Park Auditorium Aug. 10 and Historic Spanish Point Aug. 11.

Baram said he hoped candidates for public office would be invited to the summit and perhaps address questions regarding their thoughts on how to best address rising sea levels.

“Hopefully we’ll get some good answers,” Baram said. “We need to put it on the agenda much stronger than it’s been done.”

While Baram points out a variety of challenges, such as the erosion of Egmont Key at the mouth of Tampa Bay — a culturally significant Native American burial ground that also served as a departure point for those banished on the Trail of Tears — he’s concentrating on hopeful lessons learned from the past.

“I don’t think that gloom and doom is the way to talk about this; humans have dealt with this before,” Baram said. “I know that sounds so broad, but there’s nothing about this particular set of challenges that we can’t meet.”

To do so, people have to identify those challenges and make the right choices in finding solutions.

“Part of the archaeology is to show the challenges but also to show there’s a lot of good things going on,” Baram said.

As a modern example, Baram, who lives in the Phillippi Creek drainage basin, recalled that when he first bought his home, a neighbor asked if he owned a kayak, because the neighborhood was prone to flood.

But in his time there, the neighborhood hasn’t been inundated, Baram said, because Sarasota County built a stormwater control system at the Celery Fields.

“The system of reservoirs and moving the water away has worked,” Baram said.

From a more global perspective, Baram said over the last 50 years humans have fundamentally changed the planet. The secondary impact of that change — prompted by everything from plastics to an increase in radiation because of nuclear testing — is climate change, while the tertiary change can be seen in rising sea levels.

For example, the United States Geological Survey marker at the DeSoto National Memorial is now partially submerged.

“DeSoto Point is now considerably smaller than it had been a couple decades ago,” Baram said.

Florida isn’t the only state feeling the oceans’ push. The village of Shismaref in Alaska voted to move because it is at Sarichef Island, which is disappearing. And in 2016, the federal government authorized a \$48 million grant to move the residents of Isle de Jean Charles in Southeast Louisiana because of sea level rise.

“It’s happening. It’s not about to happen, it’s not predicted to happen, it’s happening now,” Baram said.

Baram noted that contractors in coastal areas of Pinellas County are bringing in fill dirt before building new homes, to hedge against rising tides.

“They’re basically doing what the ancient Safety Harbor people did,” he added. “Build a big mound then put the rich person’s house on top of it.”

During the last ice age, the peninsula of Florida was significantly larger, as evidenced by the recent find of a peat burial ground offshore of Manasota Key from the Archaic Period, when sea levels were 30 feet lower.

From an archaeological perspective, more than 13,000 sites could be lost with a one-meter rise in sea levels and more than 32,000 with a two-meter rise.

Steps for preserving, or at least recording those sites are being taken worldwide. Baram highlighted a citizen archaeology program in Scotland, where people can be trained to use a smartphone app to document coastline change to significant areas.

A similar program, The Heritage Monitoring Scouts Program, was established in Florida in 2016 and has found the most success around St. Augustine and Pensacola.

Baram hopes that the present political climate will allow for successful solutions. “The political discourse has become so polarized that people forget that actually getting solutions is the goal, not proving the other side wrong,” he said.

“It’s not just ‘be angry’ — I would prefer driving on dry roads,” he added. “What can we do so the water has a place to go? That’s the challenge.”

Sarasota Herald-Tribune May 19, 2018

The story was one of many in the local newspaper on rising sea levels. The information is being disseminated but the challenge is great, requiring a historical perspective on landscapes and place. Archaeologists have information on the long term process and concerns for the preservation and protection of heritage sites. Those twin dynamics set the tone for the summit.

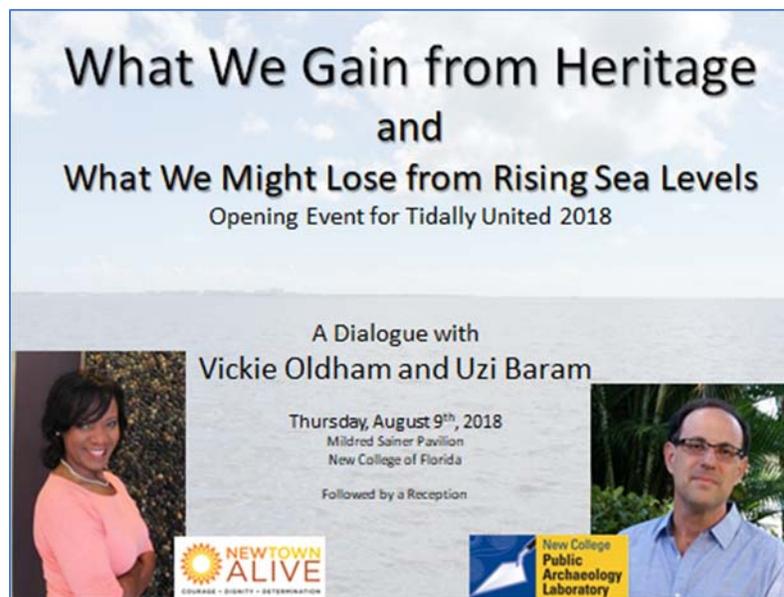
Tidally United August 2018 in Sarasota



Flyer for Tidally United 2018

The August 9th-11th Tidally United conference started with a free, open to the public presentation at Mildred Sainer Pavilion on the New College of Florida campus. For a dialogue on heritage, Vickie Oldham, Founder and Project Director for both Looking for Angola (the public anthropology program that located material traces of an early 19th century maroon community on the Manatee River) and Newtown Alive (the community-based historic preservation program for Black Sarasota) joined Uzi Baram, Professor of Anthropology at New College of Florida and

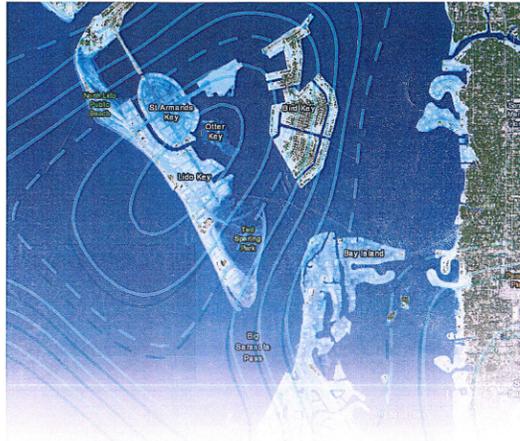
founding Director of the New College Public Archaeology Lab. Focusing on heritage work in Newtown, Sarasota, the presentation describes how heritage matters for Sarasota and how heritage is under stress, stress from those who forgot or want to forget the past, from development that replaces the historic with the new, and from rising sea levels. Focusing on the challenges from the sea for Sarasota and Manatee counties, the dialogue explores the opportunities created by engaged heritage work and the implications of storm surge, increasingly powerful hurricanes, and rising sea levels locally and globally on material heritage for immediate concerns and on the long-term implications for future generations. The potential loss of heritage sites is particularly chilling for Newtown: the Newtown Alive program, started two years as a heritage initiative, is raising the profile of the last century of the courage, dignity, and determination of the African American community – the potential flooding through Whitaker Bayou in a storm surge could erase what is now being remembered.



Opening Presentation for Tidally United

On Friday, August 10th Tidally United moved to the Payne Park Auditorium with the necessity of public engagement, new and innovative approaches for community resilience in an

age of rising sea levels, recognized, Tidally United offered cultural heritage as a focal point to what is more typically an environmental concern.



TIDALLY UNITED SUMMIT 2018

PRESENTED BY:




Friday, August 10 - Payne Park Auditorium, 2050 Adams Lane, Sarasota

8:20-8:30 Welcome!

8:30-8:45 Review of Local Heritage and Challenges in Sarasota/Manatee
Sherry Sveviks, *Time Sifters Archaeological Society*

8:50-9:20 Keynote Address - Drowned Deserts, Breached Beaches, and Sunken Springs: How sea level rise has impacted what we know about the First Floridians
Jessé Halligan, PhD, *Department of Anthropology, Florida State University*

Panel Session 1: Into Planning and Practice
9:30-9:55 Five-Slides Presentations
Steve Koski, *County Archaeologist, Sarasota County History Center*; "With Rising Tides: Policy and Planning for Sarasota's Vulnerable Coastal Cultural Resources"; **Garrett Murto**, *Curator and Site Manager, Historic Spanish Point*; "Turning the Tide on Coastal Erosion"; **James H. Williams, PhD**, Program Leader, South Florida Collections Management Center, National Park Service; **Kendal Jackson**, *University of South Florida*; "Ancient Shellscapes: Living Infrastructures"; **Penelope Del Bene**, *Chief of Cultural Resources, Everglades and Dry Tortugas National Park*; "Shifting Sand Islands at Dry Tortugas"

10:00-10:45 Into Planning and Practice Panel Discussion
Recognizing that not all heritage sites will be protected from rising sea levels, what are the places that must have conservation and preservation? Who can/should pay to protect and sustain those places? What organizations and avenues are open for residents and visitors to use to advocate for preservation? And how sympathetic are local governments and environmental groups for protecting cultural heritage? The panelists will discuss planning and current practices and advocate for innovative new approaches.

Into Planning and Practice Panelists
Stevie Freeman-Montes, *Sustainability Manager, City of Sarasota*; **Sara Ayers-Rigsby**, *Regional Director, Florida Public Archaeology Network*; **Charlie Hunsicker**, *Director, Manatee County Parks and Natural Resources*; **Jamie Letendre**, *Aquatic Preserve Staff, Florida Coastal Officer*; Moderator: **Jeffrey Moates**, *Regional Director, Florida Public Archaeology Network*

10:45-11:00 Into Planning and Practice Perspective
Adrienne Burke, *Assistant Director, Planning and Economic Opportunity, Nassau County*

HMS Florida Session
11:00-12:00 HMS Florida Presentations
The Florida Public Archaeology Network (FPAN) launched the Heritage Monitoring Scout (HMS Florida) program statewide at the first Tidally United Summit in 2016. Since that time, over 300 volunteers signed up and submitted over 800 monitoring forms from across the state. These presentations will review highlights from the second year of HMS, share preliminary findings from the formal assessment, discuss overall patterns of data collected on site conditions and assessments, and present next steps of the HMS Florida program as it enters its third year in August of 2018.

11:00-11:15 HMS Florida 2018 Update
Sarah E. Miller, *Regional Director, FPAN, Flagler College*

11:15-11:30 HMS Florida - ARCHES Launch
Rebecca O'Sullivan, *Public Archaeology Coordinator, FPAN, University of South Florida*

JOIN THE CONVERSATION! WWW.MENTI.COM and type in 32 11 1

11:30-11:50 Five-Slides HMS Case Studies
Rachel Kangas, *Southwest Region FPAN*; "Submerged HMS"; **Emily Jane Murray**, *Northeast Region FPAN*; "Shell Middens, Hurricanes, and HMS: Shell Bluff Landing"; **Amy Spurling Gatebece**, *University of South Florida*; "Mounds, Middens, and Mangroves: HMS Tampa Bay"; **Nigel Rudolph**, *Central Region FPAN*; "FPAN and FCO Partnership in Florida's Aquatic Preserves"

12:00-1:00 Lunch

12:15-12:30 Luncheon Presentation
Kevan Main, PhD, *Senior Scientist, Program Manager, Mote Marine Laboratory and Aquarium*; "Vulnerability of Gulf of Mexico Fisheries and Aquaculture to Climate Change"

12:30-12:50 Five-Slides Presentations
Nathan Souder, *De Soto National Memorial, National Park Service*; "Small Park, Large Issues"; **Jono Miller**, *Environmental Leader*; "Capturing Florida Sea Level Rise: Window Homer and George Lehman"; **Hunter Vaughan** and **Meryl Shiver-Rice**, *University of Miami*; "Storytelling and Sea Level Rise: Outreach, Heritage, and Digital Media"; **Darwin "Smitty" Smith**, *Time Sifters Archaeological Society*; "Digging It for Over 32 Years in Sarasota"

Panel Session 2: Public Connections
1:00-1:15 Public Connections Perspective
Rebecca Zarger, PhD, *Department of Anthropology, University of South Florida*

1:15-2:00 Public Connections Panel Discussion
Climate change is a political issue. Rather than messaging the public about the scientific consensus, a more productive approach provides access to the scientific process and the flow of information works to gain support for policies that build resilience. Listening for nuances of people's experiences offers the process for the climate story developing for contemporary Sarasota/Manatee and Florida. The panelists will provide productive examples of community resilience building for and from Florida, and particularly southwest Florida.

Public Connections Panelists
Libby Carnahan, *Marine Agent, Florida Sea Grant*; **Karen Willey**, *Around the Bend Tavern*; **Tim Rumage**, *Ringling College of Art and Design and This Spaceship Earth*; **Gary Mitchum, PhD**, *College of Marine Science, University of South Florida*; Moderator: **Rebecca Zarger, PhD**, *Department of Anthropology, University of South Florida*

2:00-2:20 Public Connections Perspective
Gary Mitchum, PhD, *College of Marine Science, University of South Florida*

2:25-2:45 Five-Slides Presentations
Diane Wallman, PhD, *University of South Florida*; "Archaeology as a Gateway Science for the Anthropocene"; **Susan Burke**, *Arts and Cultural Alliance of Sarasota County*; "How the Arts can Help Communicate the Urgency and Extent of Sea Level Rise"; **Michelle Leahy**, *Manatee County Parks and Natural Resources*; "Volunteers as Vital Resource"

Panel Session 3: Task Force Florida Archaeology
2:50-3:40 A call for action: With the number of archaeological and historic sites threatened by rising sea levels being in the thousands, and larger numbers by the inevitable changes in the landscape as people move from the coast, professionals are being pro-active in organizing information, discussing significance of sites, and planning for the future. The Task Force formed at the annual meeting of the Florida Anthropology Society in May 2018 will provide recommendations and open up discussions for Florida archaeology in an age of rising sea levels.

Friday, August 10 - Payne Park Auditorium, 2050 Adams Lane, Sarasota

8:20-8:30 Welcome!

8:30-8:45 Review of Local Heritage and Challenges in Sarasota/Manatee
Sherry Sveviks, *Time Sifters Archaeological Society*

8:50-9:20 Keynote Address - Drowned Deserts, Breached Beaches, and Sunken Springs: How sea level rise has impacted what we know about the First Floridians
Jessé Halligan, PhD, *Department of Anthropology, Florida State University*

Panel Session 1: Into Planning and Practice
9:30-9:55 Five-Slides Presentations
Steve Koski, *County Archaeologist, Sarasota County History Center*; "With Rising Tides: Policy and Planning for Sarasota's Vulnerable Coastal Cultural Resources"; **Garrett Murto**, *Curator and Site Manager, Historic Spanish Point*; "Turning the Tide on Coastal Erosion"; **James H. Williams, PhD**, Program Leader, South Florida Collections Management Center, National Park Service; **Kendal Jackson**, *University of South Florida*; "Ancient Shellscapes: Living Infrastructures"; **Penelope Del Bene**, *Chief of Cultural Resources, Everglades and Dry Tortugas National Park*; "Shifting Sand Islands at Dry Tortugas"

10:00-10:45 Into Planning and Practice Panel Discussion
Recognizing that not all heritage sites will be protected from rising sea levels, what are the places that must have conservation and preservation? Who can/should pay to protect and sustain those places? What organizations and avenues are open for residents and visitors to use to advocate for preservation? And how sympathetic are local governments and environmental groups for protecting cultural heritage? The panelists will discuss planning and current practices and advocate for innovative new approaches.

Into Planning and Practice Panelists
Stevie Freeman-Montes, *Sustainability Manager, City of Sarasota*; **Sara Ayers-Rigsby**, *Regional Director, Florida Public Archaeology Network*; **Charlie Hunsicker**, *Director, Manatee County Parks and Natural Resources*; **Jamie Letendre**, *Aquatic Preserve Staff, Florida Coastal Officer*; Moderator: **Jeffrey Moates**, *Regional Director, Florida Public Archaeology Network*

10:45-11:00 Into Planning and Practice Perspective
Adrienne Burke, *Assistant Director, Planning and Economic Opportunity, Nassau County*

HMS Florida Session
11:00-12:00 HMS Florida Presentations
The Florida Public Archaeology Network (FPAN) launched the Heritage Monitoring Scout (HMS Florida) program statewide at the first Tidally United Summit in 2016. Since that time, over 300 volunteers signed up and submitted over 800 monitoring forms from across the state. These presentations will review highlights from the second year of HMS, share preliminary findings from the formal assessment, discuss overall patterns of data collected on site conditions and assessments, and present next steps of the HMS Florida program as it enters its third year in August of 2018.

11:00-11:15 HMS Florida 2018 Update
Sarah E. Miller, *Regional Director, FPAN, Flagler College*

11:15-11:30 HMS Florida - ARCHES Launch
Rebecca O'Sullivan, *Public Archaeology Coordinator, FPAN, University of South Florida*

The day started with a welcome by Jeff Moates, Director of Florida Public Archaeology Network West Central Region and an inspiring overview of the archaeology of Sarasota/Manatee by Sherry Robinson Svekis, long-time president of Time Sifters Archaeology Society.

Florida State University Professor Jesse Halligan provided the keynote presentation on her underwater archaeology in Florida that has recovered evidence of the ancient peoples whose sites are now underwater. Maybe one of the most important contributions from archaeology today is detailing the terrestrial sites that are now under the waves. Professor Halligan focused on the Page-Ladson site in the Aucilla River; off the coast of Manasota Key the Archaic period burial site known as the Manasota Key Offshore Site has received tremendous support from the Florida Division of Historical Resources and large audiences for public presentations explaining the finds. Knowing and understanding that ancient peoples lived full lives on landscapes that are now under the Gulf of Mexico might help segments of the public look at our contemporary landscapes with an archaeological lens.

After the keynote, the summit alternated between panel discussions and five-slide presentations. The first panel consisted of Stevie Freeman-Montes, Sustainability Manager, City of Sarasota, discussing practices and policies; Sara Ayers-Rigsby, Regional Director, Florida Public Archaeology Network, describing FPAN activities; Charlie Hunsicker, Director, Manatee County Parks and Natural Resources, recognizing the productive partnerships with archaeologists for the public parks; and Jamie Letendre, Florida Coastal Office. The panelists were asked: Recognizing that not all heritage sites will be protected from rising sea levels, what are the places that must have conservation and preservation? Who can/should pay to protect and sustain those places? What organizations and avenues are open for residents and visitors to use to advocate for preservation? And how sympathetic are local governments and environmental

groups for protecting cultural heritage? With Jeff Moates moderating, the panelists discussed planning and current practices and advocate for innovative new approaches: the integration of the various approaches highlight the positive efforts ongoing in the state. Director Hunsicker bluntly stated that governments need to protect, interpret, and educate for conservation of sites, with a robust sense of how that matters to residents. Similarly Freeman-Montes, who put together a climate plan for the City of Sarasota, talked about getting information from archaeologists like Uzi Baram and Jeff Moates; the cross-over between historic preservation and sustainability illustrated the process for making decisions. Jeff Moates explained the significance of reaching out to city and county staff and Jamie Letendre explained the challenges for the aquatic preserve, especially for submerged cultural resources and FPAN's success in figuring out what to see from boats. FPAN's Sara Ayers-Rigsby described the ranking of sites for southeast Florida counties, leading to a robust discussion among the panels on the central question of ranking and significance, with a request to have a methodology to help managers. Adrienne Burke, Assistant Director, Planning and Economic Opportunity, for Florida's Nassau County wrapped up the session by explaining the legal context for the policies of preservation.

Following the discussion, the audience was treated to five-slide presentations by Steve Koski, County Archaeologist, on *With Rising Tides: Policy and Planning for Sarasota's Vulnerable Coastal Cultural Resources*, a clever title from Garrett Murto, Collections and Site Manager at Historic Spanish Point: *Turning the Tide on Coastal Erosion*, and insights into the challenges of shellscapes (by Kendal Jackson of the University of South Florida) and managing cultural resources at National Parks by William James, Collections Manager, and Penelope Del Bene of the Everglades and Dry Tortugas National Parks.

The centerpiece of FPAN's efforts with rising sea levels and heritage is the Heritage Monitoring Scout (HMS Florida) program launched statewide at the first Tidally United Summit in 2016. As FPAN notes, since that time over 300 volunteers signed up and submitted over 800 monitoring forms from across the state. The presentations reviewed highlights from the second year of HMS, share preliminary findings from the formal assessment, discuss overall patterns of data collected on site conditions and assessments, and unveiled a new app for HMS. The panelists included Sarah E. Miller, Regional Director for FPAN Northeast and Rebecca O'Sullivan Public Archaeology Coordinator for FPAN West Central. HMS is central to involving residents in the monumental task of documenting heritage sites across the coasts of Florida. The value of HMS was shown with hurricanes impacting sites since the program began, scouts provided the visual evidence of damaged sites to provide avenues for preservation.

The round of five-slide presentations focused on marine and coastal sites by Rachel Kangas of FPAN Southwest Region, Emily Jane Murray of FPAN Northeast Region, and Amy Gatenbee of the University of South Florida – illustrating the work of the Heritage Monitoring Scouts across the state.

For the lunchtime presentation, Kevan Main, Senior Scientist at Mote Marine and past President of the World Aquaculture Society spoke on the “Vulnerability of Gulf of Mexico Fisheries and Aquaculture to Climate Change” One of the interesting details for her presentation on fisheries was recognition that the currents will change, with implications for fish. The extent of the transformations as the coastline changes needs to be added to consideration of preservation – there will be many surprises along with the rising seas.

The next round of five-slide presentations featured insights from DeSoto National Memorial and Winslow Homer, storytelling and the local chapter of the Florida Anthropology Society; fitting the theme, the presentations had engaging titles:

- Small Park, Large Issues, by Nathan Souder, DeSoto Memorial
- Capturing Florida Sea Level Rise: Winslow Homer and George Lehman, by Jono Miller, Environmental Leader
- Storytelling and Sea Level Rise: Outreach, Heritage, and Digital Media, by Hunter Vaughn and Meryl Shiver-Rice, University of Miami
- Diggin' It for Over 32 Years in Sarasota, by Smitty of Time Sifters Archaeology Society

The afternoon panels pushed forward, as the title indicates, with “Public Connections” starting with cultural anthropologist Rebecca Zarger of the University of South Florida. The panel focused on recognizing climate change is a political issue. Rather than messaging the public about the scientific consensus, a more productive approach provides access to the scientific process and the flow of information works to gain support for policies that build resilience. Listening for nuances of peoples’ experiences offers the process for the climate story developing for contemporary Sarasota/Manatee and Florida. The panelists provided productive examples of community resilience building for and from Florida, and particularly southwest Florida. The discussion recognized that dissemination of scientific observations and conclusions on rising sea levels is a surprisingly challenging endeavor. The shift to a politicized discourse has increased the pressures on heritage managers to present the challenges for preservation and conservation, offer solution, and enlist public support (archaeology in the USA continually requires public support, on multiple levels). The panelists provided productive examples of community resilience building for and from Florida, and particularly southwest Florida. Libby

Carnahan (Marine Agent, Florida Sea Grant), Karen Willey (Around the Bend Tours), Tim Ramage (Ringling College of Art and Design and Spaceship Earth) offered experiences and successes on engaging community members. Most memorable from the presentation: Tim Ramage offered the image of elephants as representing carbon entering the atmosphere: all in the audience engaged that image, recognizing that the outrageously worked well. Gary Mitchum (College of Marine Science, University of South Florida) concluded the panel with his long-experience in shifting from telling audiences about climate change to listening to audiences and working with others to convey the information and insights.

The last set of five-slide presentations exemplified the public outreach sought for addressing heritage in an age of rising sea levels. Diane Wallman of the University of South Florida introduced Archaeology as a Gateway Science for the Anthropocene; Susan Burke from the Arts and Cultural Alliance of Sarasota County illustrated the intersection of the science for climate change and the humanities with beautiful sets of images; and Michele Leahy from Manatee County Parks and Natural Resources described the work being done on Sned Island, an county park that contains the Portavant Mound Complex, an impressive remain from PreColumbian times.

The sustained theme for the Summit was Heritage as Social Action, and the gathering organized archaeologists and the public to move policies, practices, and programs forward. The late afternoon panel came from the Task Force Florida Archaeology. For this stage of the summit, we organized a call for action: With the number of archaeological and historic sites threatened by rising sea levels being in the thousands, and larger numbers by the inevitable changes in the landscape as people move from the coast, professionals are being pro-active in organizing information, discussing significance of sites, and planning for the future. The Task

Force formed at the annual meeting of the Florida Anthropology Society in May 2018 will provide recommendations and open up discussions for Florida archaeology in an age of rising sea levels.

The panelists brought a wide-range of experience to addressing preserving archaeological heritage: Margo Schwadron of the Southeastern Archaeological Center of the National Park Service; Thomas Pluckhahn of the University of South Florida; Sarah Miller from the Florida Public Archaeology Network Northeast Region; Joseph Nicholas Butler of the Tribal Historic Preservation Office, Seminole Tribe of Florida; and Bill Stanton from the Florida Park Service. Ramie Gougeon of the University of West Florida ensured a productive presentation to highlight the ongoing programs. William Lees, Executive Director of the Florida Public Archaeology Network wrapped up the tasks for what was preliminarily named the Coastal Heritage at Risk Task Force (CHART Force)

To conclude the academic aspect of the summit, Uzi Baram offered the following remarks (reproduced in full):

Where We Are

The time for warning is over: we have gone through solutions to protecting heritage and using archaeology in this age of rising sea levels

We have heard of the archaeology of this region and the fantastic finds from the rivers of Florida and of other sites and programs. We have heard of the planning and practices and the public outreach, we have seen Heritage Scouts and the Task Force.

We are in challenging times and need serious solutions

And we have them

From the efforts over several generations, we have tremendous amount of information on climate change and human societies. The history is not simple but the lessons can be made clear. And it starts with how we are conceiving of archaeology.

Archaeology and Rising Sea Levels

Three aspects of archaeology are 1) The study of the human past, 2) The study of material culture, and 3) The study of social change. That last one: the transformations of human history is not just backward looking, archaeology can be future oriented. When archaeology uses the past to look into the future, we are engaged in heritage work. And heritage matters.

Last night, with Vickie Oldham we talked about heritage, showing all of us the power of heritage for Newtown, for Sarasota. We cannot reproduce that energy easily but we can work with communities:

- Really work with community members toward community goals
- Move beyond our colonial and imperialist legacies to using the insights of archaeology in socially responsible ways
- And we have guidelines and experiences from faith communities

The key from heritage, I believe, is the questions we must ask. The primary one right, here and now: What will be our human future in Florida? Seems like we have three possibilities:

- a. complete disaster
- b. continuing our present trajectory with its stresses and increasing challenges
- c. a better world

Taking our archaeological efforts and trying to make the world better seems a worthy goal, fits the idealism that led many us to the study of the past, to the study of social change, to recovering, preserving, and presenting the lives of ancestors and others from the past.

The Way Forward

The research and publication on climate change is becoming overwhelming. Recent headlines – with social media, the actual newspapers seem less relevant – range from crisis to solutions.

We are preparing for a new reality where archaeologists and heritage managers must deal with a growing number of vulnerable sites and formulate new strategies to prioritize heritage sites for preservation, documentation, or abandonment. The choices will not be easy.

Therefore it is crucial that knowledge is shared between cultural resource managers, researchers and those engaged in international projects dealing with the issue of climate effects on heritage, and community members.

Politics and Science

How to share the knowledge of the danger to sites and of the potential of archaeological research? The answer: engage, engage, engage

For our last session, we have candidates for public office

Keith Fitzgerald, from New College of Florida is moderating the forum; he served two terms in the Florida House of Representatives and that service matters for our democracy. I want to thank those running in this cycle, for believing in democracy. And to particularly thank those who came this afternoon.

Candidates Forum

Keith Fitzgerald, New College of Florida professor of political science and former state representative, began by asserting that citizens need to talk straight with their representatives. Avoiding challenging issues is self-defeating. Even if the state discourse downplays climate change, as citizens we do not need to follow that lead. And Professor Fitzgerald demonstrated that point by asking the candidates, bluntly, on their view on the science of climate change. The republican and democratic candidates for local offices expressed concern and support for addressing heritage and its challenges.

Dale White wrote up the candidates forum as “Candidates share views on importance of addressing climate change” <http://www.heraldtribune.com/news/20180810/candidates-share-views-on-importance-of-addressing-climate-change> on August 10th. Following the introductory comments by moderator Keith Fitzgerald, the article noted “Uzi Baram, professor of anthropology at New College of Florida, told the roughly 60 attendees that he regards it as “crucially important” that people concerned about protection of the environment and cultural resources “talk to the politicians, the policymakers.”” It is a point underscored by the summit: archaeologists have been raising consciousness about the past and the environment for decades with the general public; professionals need to engage policy makers and politicians listen most closely just before elections. The article covered the views of the candidates as did SNN <http://www.snnv.com/2018/08/10/tidally-united-archaeological-summit-comes-to-sarasota/> and quoted FPAN’s outreach coordinator: “Historical sites, archaeological sites those are really the places that are unique about our community, uh the unique heritage and history that we have, so

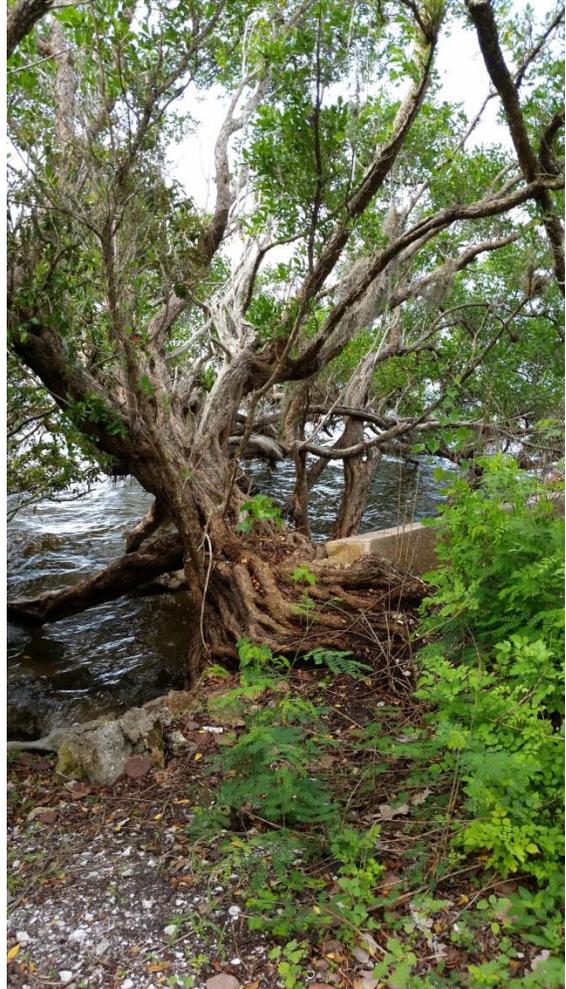
the more that we lose those places the more that we're losing an asset to our community," said Rebecca O'Sullivan.

Carrie Seidman wrote an August 14th column in the *Sarasota Herald-Tribune* titled "The Importance of Preserving our History." She wrote

<http://www.heraldtribune.com/news/20180814/seidman-importance-of-preserving-our-history:>

"But as I learned at the Tidally United Summit hosted last week by the Florida Public Archaeology Network (FPAN) and the New College Public Archaeology Lab, hundreds of Florida's heritage sites are under such a significant threat from climate change and sea level rise that it's no longer a matter of "how do we save them?" but rather "what can we record before they're gone?" She goes on to state: "But as I learned at the Tidally United Summit hosted last week by the Florida Public Archaeology Network (FPAN) and the New College Public Archaeology Lab, hundreds of Florida's heritage sites are under such a significant threat from climate change and sea level rise that it's no longer a matter of "how do we save them?" but rather "what can we record before they're gone?" and points to the Heritage Scouts Monitoring program; the summit sought to inspire participants and the public to use that vehicle as social action.

The Summit concluded on Saturday at Historic Spanish Point, to see the challenges to archaeological historic sites from rising sea levels and participate in demonstrations of how to document and address the concerns for the past today.



Historic Spanish Point – Midden and Sea Wall (photographs by Uzi Baram)



Historic Spanish Point, on Little Sarasota Bay
The Challenge from Rising Sea Levels is Clear on the Map

The tours of Historic Spanish Point provided a sense of the richness of the regional heritage, from the Archaic-period shell ring (Cottage Hill) to the current boat building. FPAN workshops offered training in Historic Cemetery documentation and monitoring; Shoreline midden documentation; Photogrammetry demonstration as well as Heritage Monitoring Scouts. The rains damped the workshops but not the sense of mission.

Tidally United propelled frameworks for solutions to the challenges of rising sea levels and encourage long-term engagement with protecting and learning from the archaeology and heritage on our shores. The Summit met the goals for discussions radiating from “Time to Warn about Climate Change is Over: Community Resilience for the Anthropocene, Lessons from Archaeology and History.” The goals included:

- Raise awareness of threats to heritage sites (particularly archaeological sites) in Florida and disseminate information on changing coastlines from Pleistocene through Holocene to the Anthropocene to the public, examples of adaptation and maladaptation from Florida archaeological research, and explanations of the past as futurology - heritage sites as resources for climate history and as evidence of the changes to our coastlines
- Recognizing that every places has a climate story, and developing the climate story for Sarasota/Manatee
- Provide productive examples of community resilience building for and from Southwest Florida in the spirit of co-production of knowledge
- Promote a call to action

These were met with the recognition that there is much more work to do. Coastal Heritage at Risk Task Force (CHART) is the professional mobilization program coming out of Tidally United.

Additional Resources:

UNESCO

2018 Climate Change and World Heritage

<http://whc.unesco.org/en/climatechange/>

US Government Documents:

Three reports available on the City of Sarasota Sustainability page for Climate Change:

<http://www.sarasotagov.org/sgc/index.cfm>

- Interim Vulnerability Report
- Technical Report
- One-page summary

National Park Service:

2016 Cultural Resources Climate Change Strategy

https://www.nps.gov/subjects/climatechange/upload/NPS-2016_Cultural-Resoures-Climate-Change-Strategy.pdf

Margo Schwardon 2016 Research Design for Climate Change Response: Archaeological Survey of De Soto National Memorial, Florida. Southeast Archaeological Center. SEAC Assession No. 2827

Sarasota Bay Estuary Program - Climate Change

<https://sarasotabay.org/sarasota-bay/climate-change/>

Sarasota Bay Estuary Program -Embracing Our Future: Climate Vulnerability Assessment

<https://sarasotabay.org/wp-content/uploads/2017-SBEP-CVA-Final.pdf>