

Crafting Guidelines for Flood Risk: Historic Properties and the Challenges of Regulating Adaptation

with Jenifer Eggleston, Jenny Parker, Jen Wellock, Dominique Hawkins, Helen Johnson, Erin Minnigan

Flooding risk, while long a major challenge for historic properties, exposes properties to more than one enemy. Beyond the risk of water damaging the property, flood risk includes pressures from increased insurance, maintenance costs from repeated repairs and lack of guidance for navigating the process of adapting a historic property. This session will focus on new guidance from the Federal, State and local governmental entities which is intended to build capacity on this issue within the preservation field.

In November of 2019, the Technical Preservation Services branch of the National Park Service released a Guidelines document to add practitioners in evaluating the risk and the potential flood adaptation strategies for historic properties. The Guidelines for Flood Adaptation for Rehabilitating Historic Buildings is intended to provide information about how to adapt historic buildings to be more resilient to flooding risk in a manner that will preserve their historic character and that will meet The Secretary of the Interior's Standards for Rehabilitation. This session will provide an overview of the document with a focus on the various available adaptation strategies that can address flood risks.

(Jenifer Eggleston, Jenny Parker, Jen Wellock – speakers) 25 minutes.

State Historic Preservation Offices in states which have recently suffered a flood or hurricane disaster declaration have commissioned guidance documents to address adaptation, in particular elevation and in-fill. Dominique Hawkins will discuss her work with the New Jersey and other states in crafting site specific guidance that is meant to assist residential property owners and commissions in the establishment of parameters for historically appropriate building elevation specific in their municipalities. She will discuss how communities need to consider flood risk; floodplain management requirements; parcel site limitations; as well as building typology, style, and materials.

(Dominique Hawkins – speaker) 40 minutes

Local government groups, such as historic landmarks commissions, or boards of architectural review are faced with providing useful information for owners of historic properties faced with risk, rising insurance costs, and potential issues with resale of their properties. Learn from two local preservation professionals, Helen Johnson and Erin Minnigan of their efforts and success in producing approved elevation guidelines for their local governments in Newport and Charleston.

(Helen Johnson, Erin Minnigan- speakers)



Rising Waters: Hardening Your Heritage-Based Economy

with Lisa Craig, Phil Thomason

Workshop Format

The goal for this session is to educate attendees on the threats that climate change poses for the heritage tourism of coastal communities and identify innovative approaches to make both buildings and their businesses more resilient. The workshop will focus on resilient actions such as wet and dry flood proofing, elevation and hardening of historic buildings as well as how communities need to plan for tourism and business disruptions and recovery. The workshop will include a case study of St. Augustine, Florida. In St. Augustine, historic districts represent 41% of the city's total assessed value. The vast majority of those assets are in high-risk flood zones. Downtown St. Augustine is a National Historic Landmark district and home to the Castillo de San Marcos, a much-visited National Park Service site. How this heritage-based economy factors into the city's resilience planning for the financial impacts of storms is a model for other coastal tourism-based communities.



STAPLEE:
A Tool for assessing community priorities for flood adaptation

with Lisa Craig

Adaptation Without Loss: Developing Design Solutions and Guidelines for Elevating Historic Buildings in Newport's Point Neighborhood

with Stephen White, Greg Laramie, Helen Johnson

This paper documents the development of pilot design solutions and design guidelines for Elevating Historic Buildings for the City of Newport, RI's Point Neighborhood. The effort was undertaken as part of a Summer-Fall 2020 "Collaborative Revitalization + Teaching Practice" initiative between the City of Newport and Roger Williams University School of Architecture, Art and Historic Preservation, sponsored by the 1772 Foundation.

Undergraduate and graduate Preservation and Architecture students were led in a required collaborative design studio by the School's deans and by Newport's Preservation Planner, with consultation from numerous historic district, planning and zoning officials, preservationists and architects. The effort began with collaborative photographic, site elevation, FEMA Flood Zone, and property value mapping and analysis of the neighborhood's flood zone as identified in the City's Comprehensive Land Use Plan (2017), for short (20-50 years) and long term (100 years) sea level rise and storm surge projections. Design solutions were then proposed for three property types in the neighborhood

1. historically designated contributing buildings
2. non-contributing buildings
3. new construction

Students developed their work within the Newport Historic District Commission's two-step Conceptual Design+ Material and Detail Development Review process. The designs served as guidelines test cases used to develop of the City's Guidelines for Elevating Buildings being completed in Fall 2020. A Project Brief and Project Report were created as elements of a case study format useful to establish a body of knowledge on collaborative revitalization involving heritage, sea level rise, and related issues.



The North American Heritage at Risk Project

with Sarah Miller, Lindsey E. Cochran, Meg Gaillard, Karen Y. Smith, Emily Jane Murray, Lori Lee

The North American Heritage at Risk (NAHAR) Project began in 2020 in order to develop a standardized system of identifying, monitoring, documenting and triaging at-risk cultural sites prior to loss along the I-95 corridor. While the goal of the project is to include all states from Florida to Maine, the states of Florida, Georgia, and South Carolina will serve as the project's development lab in its first five years.

Approximately 11,109 cultural resources located on the southeastern Atlantic coastline are at risk due to erosion from storm surge and rising sea levels with just a 1 m increase in sea level (Anderson et al. 2017). In addition to the known risks, southeastern coastlines are experiencing sea level rise six times higher than the global average (Valle-Levinson et al. 2017:7878), increasing the urgency to address this looming threat.

The vastness of the Atlantic coastline and shores negate the ability of professional archaeologists to actively address the increasing threat to cultural resources. The NAHAR Project, building from models established by global organizations like SCAPE and with predictive models from SLAMM/MEM, will establish a standardized identification, monitoring and documentation protocol in collaboration with tribal representatives, the Gullah Geechee Corridor Commission, statisticians, geographers, geologists, climatologists, hydrologists, biologists, cultural anthropologists, coastal engineers, and information science to name a few. Once this protocol is established, citizen scientists, residents and tourists alike, will be asked to join professional archaeologists in their efforts. The purpose of this project is to encourage non-specialists to identify at-risk resources and continue to revisit those sites to document the rate and type of site erosion and destruction. When rapid or triage-level excavations are required, professional archaeologists will work with citizen scientists to extract data prior to total loss. Effectively establishing postmortem collections of cultural heritage for future research, interpretation, and outreach.



Conversations with the Community about Heritage at Risk

with Emily Jane Murray, Sarah E. Miller, Emma Dietrich, Robbie Boggs

With so many resources at risk of loss due to climate change impacts, professionals from many fields have tried to formulate ways to approach assessing site significance and triage. However, one important factor frequently overlooked is community input. In 2019, the Florida Public Archaeology Network launched a series of workshops in Florida focused on gathering community input about coastal heritage at risk. The series was inspired by similar workshops held during the Scottish Universities Insight Institute's Summer 2018 Learning from Loss Program. Each workshop posed the same series of questions to participants regarding the significance of their local community's coastal heritage, climate change threats and impacts, the responsibility for future actions, and how to tackle site prioritization. This paper will describe responses from the public from six workshops across North Florida, as well as compare trends observed between Scottish and Florida residents. The workshops are offered as one way to begin important conversations in the face of the loss of coastal heritage to climate change.



Community Archaeology on a Heritage at Risk Site, Pockoy Island Shell Rings on Botany Bay Plantation Heritage Preserve, Charleston County, South Carolina

with Meg Gaillard

The Pockoy Island Shell Ring Complex, composed of two Late Archaic period shell rings, is the latest archaeological discovery on Botany Bay Plantation Heritage Preserve, a South Carolina Department of Natural Resources (SCDNR) managed area on Edisto Island, Charleston County, South Carolina. The rings were found using LIDAR in 2017 following Hurricane Matthew. Pockoy Ring 1, the first of two shell rings that makes up the complex, is the oldest known shell ring in South Carolina – dating to approximately 4,300 years ago.

Since 2017, the SCDNR Archaeology team has organized hundreds of visitors, community members, students and professional archaeologists in an intense excavation effort of the Pockoy Island Shell Ring Complex as erosion of the site increases. Land loss on the windward side of Pockoy Island is occurring at an estimated rate of 15.5 m/year, and land loss to the marsh side is slowly increasing. For nearly 70 years, Botany Bay Plantation has experienced one of the highest rates of erosion in coastal South Carolina. The shoreline has moved as much as three quarters of a mile inland in some locations.

Heritage at Risk sites like the Pockoy Island Shell Ring Complex present interesting challenges and opportunities for archaeologists. While intense, triage-level archaeological investigations are required on sites like the Pockoy Island Shell Ring Complex before they are lost, these archaeological sites also present an opportunity for local community engagement, education, and heritage tourism to take place.

What Do We Do When We Cannot Keep Archaeological Heritage Above Water? Two Case Studies from Charleston County, South Carolina

with Karen Smith

The management and preservation of historic resources often draw on skills and knowledge from a variety of disciplines, depending on the resource. But what do we do when our knowledge, from whatever expert source, leads to the unpalatable conclusion that we cannot preserve and protect archaeological heritage? It is the unique, *in situ* nature of archaeological sites that limits choices often available to other heritage resources. One solution is to conduct a special form of mitigation. For archaeological sites, mitigation means salvage excavation, which ironically is also destructive. The advantage of mitigation to an archaeological resource is in retrieving data that would otherwise be lost without such efforts. Indeed, some form of mitigation (i.e., salvage excavation) may be the only option when rising seas and other catastrophic climate change effects put archaeological heritage directly at risk. In this paper, I discuss recent salvage excavations on two nearby late Archaic period shell-bearing archaeological sites taking a direct hit from rising seas and stronger coastal storms. Work on Spanish Mount (38CH62), a site that has been characterized as a shell mound, was conducted in 2016 and 2017. Work on Pockoy Ring 1 (38CH2533), one of two newly discovered shell rings just 9.2km (5.7 miles) north of Spanish Mount, was conducted in 2017, 2018, and 2019. Both sites are not simply at risk. They are in crisis. Fortunately, the threat of total site loss has stimulated the rapid recovery of archaeological information before these sites are lost forever.



Heritage at Risk: Bringing the Alliance for Response Initiative to Charleston

with Kimberly Roche

A team of Charleston-based heritage professionals, led by the Warren Lasch Conservation Center, have partnered with the American Institute for Conservation (AIC) to establish an Alliance for Response (AFR) network in Charleston. The AFR initiative was launched by AIC in 2003 to address a shortage in resources for emergency planning and training in the heritage sector. A 2005 Heritage Health Index survey of over 30,000 cultural institutions nationally identified that 80% of collecting institutions did not have an emergency plan with staff trained to execute it. The AFR initiative aims to reduce this percentage by organizing a network to support institutions with writing and maintaining an emergency plan and staff training.

In Charleston, the disasters most likely to impact collections are from water-related events: flooding, storm surge, lightning strikes, and hurricanes. In the immediate aftermath of a disaster, staff have a limited window to respond, mitigate further damage where safe and practicable, assess the damage to collections and/or resources, and undertake salvage efforts. A written plan with outlined response procedures and pre-existing relationships with emergency managers, first responders, and other heritage professionals may save critical response time.

The institutions working to establish a Charleston AFR are representative of the diversity of Charleston and Lowcountry heritage and include collecting institutions, historic properties, and cultural landscapes. The goal for this initiative is to draw on the existing efforts and expertise in Charleston and incorporate smaller institutions and underrepresented collections or sites which may suffer from a lack of staff or resources. In a city where life and culture are oriented toward the sea, and water-related events will continue with increasing frequency, Charleston's heritage is at risk now more than ever from these forces, and a Charleston AFR will seek to empower heritage custodians to prepare for the inevitable emergency.

Preserving Threatened Historic Resources on Jehossee Island

with Anna-Catherine Carroll

Located on the South Edisto River, 25 miles southwest of Charleston at 5-8 ft. AMSL, Jehossee Island is an uninhabited, former rice plantation and undisturbed cultural landscape at risk due to the threat of coastal flooding and storm-related inundation. Of Jehossee's 4,400 acres, 3,700 acres consist of salt marsh and freshwater wetlands. Defined by the site's relationship to the water, and historically driven by the labor of one of the region's largest enslaved populations, rice cultivation at Jehossee relied on complex infrastructure, including major canals, fields, berms, dikes, and rice trunks. In addition to remnants of this infrastructure and significant archaeological potential, architectural resources include an 1830s overseer's house and a ruin of a brick chimney used for threshing harvested rice, which is one of the few remaining examples in the region.

However, in addition to Jehossee's low-lying landscape, which requires constant mitigation to keep the water at bay, challenges to the preservation of the island's historic resources include access and ownership; Jehossee is only accessible by boat and federally-owned, presenting bureaucratic barriers to necessary funding, approvals, etc.

In 2018, the Preservation Society of Charleston initiated a collaborative effort to ensure sustainable, long-term preservation of Jehossee. Phase one of the task force's efforts consists of digital documentation scheduled to take place November 9-13, 2020. Documentation will produce an architectural investigative report, site plans, 2D CAD drawings, and 3D digital models of Jehossee's architectural resources to inform their stabilization and protection.

The proposed paper and presentation would detail the unique challenges of protecting an isolated, water-locked, historic site-including the nature of ongoing dike and levee reinforcement-historic water management practices implemented on Jehossee, findings from the Fall 2020 documentation project, and future plans for continued water management, flood mitigation, and preservation on Jehossee Island.

Disaster Resilience on the Texas Gulf Coast: Communities and Historic Sacred Spaces

with Sandeep Langar, Angela Lombardi, William A. Dupont, Saadet Toker-Beeson, Sedef Doganer, Jie Huang, Kasim A. Korkmaz

Natural disasters are increasing in frequency and intensity within the U.S., and the state of Texas has been impacted with the most within the nation in the past two decades. An interdisciplinary research team at The University of Texas at San Antonio (UTSA) has a work in progress to address the impact of hurricanes on historic structures in the Texas Gulf Coast region—specifically, houses of worship that date to the late 19th and early 20th centuries. These sacred places are not only specifically tied to religious worship but also have a larger social, educational, and community supporting role(s) in their physical and cultural context. Places of worship offer shelter to the surrounding communities with support both during and after the disaster. But before they can continue to serve their neighbors, they themselves first need to weather the storm.

The research team will present project methodology to include the criterion used for selection of case-study buildings for structural analysis. The research will also provide preliminary condition assessment of the selected historical structures to identify common problems among the analyzed case-studies to determine vulnerabilities impacting sacred places from the same era. Lessons learned from the case studies can be applied by all faith-based organizations in the community, and the research methodology can be generalized for similar future projects. Further, the selected case studies, an outcome of the research methodology, will be a representative sampling reflecting the rich diversity of the Texas Gulf Coast region's faith landscape. Because community engagement is a key component in the process, the team will also discuss how the knowledge café format will be used to facilitate community engagement (involving the general public, congregants, religious leaders, board members, operation and maintenance staff, agencies of local government, and others) to enhance the resilience of the religious facilities.

Tides of Change: A Decade of Climate Change Vulnerability Assessment and Mediation Protocol Development at the Strawberry Banke Museum in Portsmouth, NH

with Benjamin Curran

As global climate variation increase, so too will the number of culturally significant structures, landscapes, and buried archaeological resources whose integrity will be jeopardized or that will disappear altogether. Historic preservation as a discipline may face its greatest challenge mediating the impacts of climate change and rising sea levels on these resources. For the last 10 years Strawberry Banke Museum has partnered with numerous local institutions and organizations to develop a site specific climate change vulnerability assessment protocol, as well as engage in the creation and implementation of a site specific mitigation plan.

In this session we will present on the process of conducting a “proof of concept” assessment of the dynamic interactions between tidal estuaries, coastal aquifers, and the effects that tidal movements and storm surges may have on proximal cultural heritage. It is our hope that this information contributes to the development of a baseline for the determination of potential impacts that sea-level rise will have upon the conservation and preservation of the architectural and archaeological resources located within zones of impact.

Additionally, the recent advent of low-cost technologies of environmental sensing has revolutionized many areas of science. One of the facets of this project involved the testing of a WiFi/Bluetooth enabled “affordable” open-source Water Level Data Logger that could provide significant opportunities to expand the spatial resolution of deployment across worldwide coastal sites to examine the complex dynamics of seawater/freshwater interaction in proximity to vulnerable cultural heritage sites.

Preservation Work at Ca' d'Zan: A Case Study in Waterproofing a 20th-century Historic House

with Marissa Hershon, Amy Elizabeth Uebel

Ca' d'Zan, the winter residence of John and Mable Ringling in Sarasota, Florida, has been revered as a Mediterranean Revival architectural gem since it was completed in 1926. Designed by New York architect, Dwight James Baum, the mansion is best-known for its distinctive Venetian Gothic-inspired details, including colorful windows and architectural terra cotta. A major attraction on Florida's southwest coast, Ca' d'Zan has been susceptible to moisture-related problems since its construction. The thin masonry walls, harsh marine environment, and periods of benign neglect allowed for the terra cotta, brick, and stucco to become heavily saturated with little ability to fully dry. Restoration campaigns, including most recently in the late 1990s, have attempted to address these concerns with varying levels of success. Renewed curatorial and archival study of surviving designs and related ephemera will inform future restoration projects and advance highly localized work at Ca' d'Zan.

In consultation with Evergreene Architectural Arts, the Ringling undertook major efforts in the summer of 2020 to address the continual water intrusion with the goal of sealing the building's envelope on the west-facing façade. Nearly one hundred years of unnamed rainstorms have allowed the building envelope to remain heavily saturated, causing structural damage and deterioration of interior decorative elements. Work included repointing and repairing terracotta, stabilizing the degraded structural columns, and restoring windows framing the Mezzanine. Investigating the areas of water ingress and resulting structural instability in the Court corners has led to important discoveries about the structure's 1920s construction methods and a better understanding of the curtain wall system on the West facade. Sharing the results of this case study will shed light on the challenges unique to Ca' d'Zan's early twentieth-century structural design in a harsh marine environment where it has been susceptible to long-term water intrusion and saturation.



Flood Resiliency Testing of Pre-1970 Construction Building Materials and Techniques: Premiering a New Laboratory Capability in Virginia

with Paige Pollard, Kerry M. Shackelford

We value traditional (pre-1970) building materials and construction techniques from both an aesthetic design and a quality construction standpoint. We also know that these materials and techniques are inherently more resilient to repetitive inundation due to flooding; yet, they are often replaced during building renovation. The current emphasis on flood resiliency adaptation is on new construction techniques; however, in Norfolk, VA for example, the built environment vastly exceeds new construction opportunities, short of demolition and redevelopment. A paradigm shift in this thinking is needed in order to keep our built history above water, such that retention and retrofit of traditional building materials can also be valued as part of our solution to living with water.

Recognizing this, the National Park Service has recently published guidelines for retrofitting historic buildings for flood resiliency, based on limited testing. Building Resilient Solutions (BRS) has validated the need for more testing and data through interviews conducted with numerous stakeholders, including federal, state and local agency policy makers and regulators, realtors and insurance professionals, and property owners.

BRS is taking action by constructing the first dedicated lab in the U.S. in Suffolk, VA for testing the resiliency of traditional building materials and techniques during and after inundation. The project goals are:

- establishing a data library on how traditional building materials and systems perform and the efficacy of FEMA-compliant and alternative retrofit designs;
- providing data-driven and context-specific design solutions for preservation specialists, floodplain managers, property owners, and policy makers;
- risk reduction for property owners and FEMA;
- public education through demonstration workshops; and,
- workforce development training for the building industry.

Looking Towards the Future, Learning from the Past: A Case Study of Interdisciplinary Climate Adaptation Planning in Cambridge, MA

with Sarah Scott, John Bolduc, Bella Purdy, Jeff Roberts, Charles Sullivan

Cambridge has long been defined by its relationship to water. Its location between the Charles River, which separates it from Boston, and the vast marshes west of the oldest settled areas of the city once constrained urban development patterns; however, over time, many of these marshes, along with canals and ports in the eastern part of the city, were filled in to provide a foundation for new industry and economic opportunity. In the early- and mid-20th century, dams were built on the Charles and Mystic Rivers to tame tidal flooding that stems from the Boston Harbor. Today, Cambridge experiences significant precipitation-driven flooding that is projected to increase in the future due to climate change. The city also faces a potential threat from sea level rise and storm surge flooding if dam infrastructure is not improved.

In light of these challenges, over the past several years the City of Cambridge has been studying the local effects of climate change and investigating approaches to promote adaptation to the region's future climate. Some notable efforts include the two-part Climate Change Vulnerability Assessment, the Climate Change Preparedness and Resilience Plan, and a Climate Resilience Zoning Task Force. While none of these efforts specifically target historic resources, they have profound implications for the preservation of sites and structures throughout the city, including those that are protected by historic designation as well as those that aren't.

As the City is developing its climate adaptation guidance, it is not only looking towards the future, but is learning from the past. In this presentation, staff from the Community Development Department, the Cambridge Historical Commission, and the City's lead climate consultant will discuss historical development patterns in Cambridge, the City's interdisciplinary approach to tackling climate change, and the implications of this work for the preservation of historic resources in the city.

Preserving Paradise: Addressing PTSD (Post Tropical Storm Distress)

with Leslee Keys, Clay Henderson

In 2016, St. Augustine and Pensacola, small historic Florida coastal communities, became leaders in resiliency, setting policy and establishing best practices that can be national models. They are 16th century Spanish colonial cities founded in the midst of hurricanes. Today, each city features military installations, and both are major tourism destinations drawing millions of visitors. These communities established significant local, state and national partnerships bolstered by citizen coalitions.

Workshops in each city, held in November 2016 and March 2017, to draw the greatest number of winter residents, resulted by 2019 in preparation, adoption and implementation of resiliency action plans for each community. Today, actions in St. Augustine and Pensacola reflect community uniqueness and recognize customized adaptation actions.

St. Augustine's 2019 KHAW conference included a Community Values Workshop sponsored by the National Trust for Historic Preservation. A 2019 grant for "Resilient Heritage in the Nation's Oldest City" brought a national team that addressed economic impacts and developed adaptation measures for City-owned buildings as a framework for vulnerable private properties. Flagler College received a State grant to adapt two buildings that are part of the campus's Hotel Ponce de Leon National Historic Landmark district.

The City of Pensacola received a grant for its Resilient Coastlines Program from the Florida DEP. The project addresses properties from downtown Pensacola and southwest along the coast which have some of the greatest vulnerability to flooding due to sea-level rise. Using the FEMA community rating system, the project will develop mitigation strategies. The community's academic partner the University of West Florida documented historic/cultural properties along the coastline.

The presentation will showcase components of each city's policy decisions, action steps and results that have been achieved to date.

Bridging the Gap: An approach for integrating cultural resources inventory data and climate change vulnerability data to reduce risk and inform resilience policy and planning

with January Tavel, Tait Elder

While many agencies have developed, or are in the process of developing, policies, guidance, or programs to support climate change resilience, the unique need and risks associated with cultural resources are not typically highlighted in these efforts. Climate change policy, vulnerability assessments, and plans for hazard mitigation, climate action, and disaster response that are prepared without explicitly incorporating cultural resources considerations may not fully account for how to prioritize, treat, and avoid adverse effects to these resources. This omission risks not accounting for unexpected economic burdens that arise when management responsibilities require unanticipated investment to preserve or mitigate for effects to cultural resources.

Research suggests several inhibiting factors are barriers to incorporating cultural resource considerations into resilience policies and planning efforts and known needs. Among the range of challenges identified, one of the most fundamental for the purposes of planning is there are a paucity of cultural resource inventories that consider these resources in areas vulnerable to climate change impacts – like sea level rise and increased flood intensity and frequency.

This study provides examples of how to combine existing cultural resources inventory data with climate change vulnerability data to establish a baseline for considering climate change impacts to cultural resources. It relies on publicly available historic bridge inventory and coastal climate change hazard data from states in the mid-Atlantic, Southeast, and Pacific Northwest. While our study specifically focuses on transportation infrastructure, this approach is applicable to any sector where an entity has land and assets that are vulnerable to climate change impacts. We then propose recommendations for next steps that can be applied by practitioners working at the intersection of planning and asset management, cultural resources management, and climate resilience to address existing and future needs.

Coupled Infrastructures: Synergies between Global Economies and Coastal Landscape Communities at Risk of Permanent Flooding

with Andrea Hoxha, Dana Hills

Global economic systems have a significant footprint in the eastern coastal landscapes of the United States. Often overlooked, these large-scale infrastructural operations directly connect and impact the daily existence of small local communities along the coast. Climate change induced flooding, sea level rise, drought and heat are an increasing risk for such communities that have long had an intimate relationship with the water surrounding their land and the economic systems that tie places together. Synthesizing a series of academic design research proposals focused on landscape interventions in South Boston and the eastern shore of Virginia, *Coupled Infrastructures* speculates on means and methods of coupling global infrastructure system units with local economies in the effort of combating the imminent effects of climate change in coastal communities. The result is an array of emerging typologies of design interventions in both urban and rural landscapes vulnerable to storm surges and permanent flooding, specifically focused on novel synergies between flood storage, infrastructure, plants, governance, and farming. The assemblage of typological studies rethinks the linear processes of production on site, moving towards a model of stewardship of place, while simultaneously shifting from static structures and forms of settlement to dynamic and migratory cycles highly resilient to the peculiar repercussions of climate change.

Historic Buildings Lead the Way in Flood Hazard Mitigation/Adaptation

with Roderick Scott

A changing climate is increasing flood risk and that is now translating into massive flood insurance rate increases on almost all historic buildings in US flood zones. For the first 50 years of the NFIP (1968), we have had subsidized flood policy rates and had no incentive to adapt our historic buildings to reduce flood risk. The 30 years of the "FEMA Historic Exemption" for our historic buildings has resulted in very few adaptive projects. Now repetitive flooding and high insurance rates are going to lower property values and valuable property tax revenues. LMI populations are disproportionately impacted by flooding and disaster recovery. The flood mitigation industry estimates there are maybe 3-4 million of the older buildings, with the historic inventory a subset worth around \$1.5 trillion. But we have a solution.

For decades, the US has elevated homes and some non-residential buildings. Other bigger buildings have been dry flood proofed and certified for flood insurance rate reductions. These projects respect the buildings and make them safe from flooding. Flooding is devastating. Flooding happens but flooded buildings don't have to happen.

The NPS has now adopted their "Flood Adaptation Guidelines" and so the door has been opened for us to move forward. Multiple US communities are already at various stages of adapting their older and historic buildings in the flood zones. The mitigation industry estimates a \$600 billion cost to mitigate all the non-compliant older and historic buildings. These projects are going to provide architects and structural engineers, general contractors and all of the trades a lot of work in the coming decades.

This session will briefly review the hazard and economic issues as well as a current state of actual model adaptation projects across the US.



The Trials and Tribulations of Elevating the First House on the National Register of Historic Places in New York State

with Julie Nucci

Insanity is often defined as doing the same thing and expecting a different outcome. Unfortunately, that is what happens all too often when it comes to rebuilding after floods. The historic Village of Owego, New York, nestled along a bend in the Susquehanna River, experienced 100-year-floods in 2005 and 2006. A massive, 500-year-flood in September 2011 reached my home and 75% of all properties within the village limits. I had no desire to relive this painful experience and I didn't believe my 1840's Greek Revival would take another onslaught of abuse. Since my goal, from the start, was to elevate my home out of the floodplain and harm's way, all renovation/remediation was done with this in mind, even though I initially had no elevation funding. In late 2015, my house became the first home on the National Register of Historic Places in New York State to be elevated for flood mitigation. In this talk I will share my experience navigating FEMA, the NFIP (National Flood Insurance Program), the SHPO (State Historic Preservation Office), the OHPC (Owego Historic Preservation Commission), and the Historic Homeownership Rehabilitation Tax Credit program. I will also share the trials and tribulations of managing an elevation project amidst the emotional challenges of surviving a flood in a devastated village. This talk is a testimonial to the fact that you can protect and elevate a historic home whilst preserving its beauty and historic nature...and your sanity.

Harnessing Digital Technologies to Inform Flood and Sea Level Rise Adaptation Planning

with Simeon Warren, Lisa Craig, Brent Fortenberry, Sujin Kim, Morris (Marty) Hyton III

From Boston to Miami and along the Gulf Coast, coastal communities are engaging stakeholders and developing plans and projects to address increased flooding and sea level rise and enhance resilience. These efforts rely on accurate data and information. Digital technologies are helping gather and analyze the data needed to inform resilience strategies and adaptation approaches for historic coastal communities and cultural resources. Accurate First Floor Elevation (FFE) information is one example. On Nantucket, Massachusetts and in St. Augustine, Florida, the University of Florida Historic Preservation Program is employing terrestrial laser scanning to digitally record the historic urban environment and significant buildings and public spaces, prepare models and visualizations of sea level rise in three dimensions, and assess vulnerability. Among other uses, the data is being utilized by local municipalities to develop resilience guidelines for historic structures and districts. In Galveston Texas, preservationists, hazard planners, and marine scientists are using high-precision drone images and the resulting photogrammetric models to map FFE data to better predict flood impact at the community scale.

Organized by the National Center for Preservation Technology and Training, this session explores how digital technologies ranging from Geographic Information System (GIS), drone imaging, LIDAR, and terrestrial laser scanning, among others, are being employed to document historic coastal communities and generate data critical to enhancing resilience through adaptation of historic places.

Learning Objectives:

1. Participants will gain an understanding of some of the activities and plans being undertaken by coastal communities.
2. Participants will learn how emerging digital technologies are being used to collect data that can better predict how disaster events and sea level rise will impact the coastal historic built environment.
3. Participants will understand how this collected data impacts coastal resilience strategies and the adaptation of historic buildings, landscapes, and urban environment.



Saving our Nation's Heritage with Climate Change Litigation

with Andrea McGimsey, Elizabeth Merritt

This panel will discuss litigation as a key community action to protect our nation's historic places from the impacts of climate change, including sea level rise and extreme weather.

In April 2020, Environment America and the National Trust for Historic Preservation filed an amicus brief in support of a lawsuit challenging the Affordable Clean Energy Rule, a new set of regulations created by the Trump administration. Unless defeated in court, this plan will sharply increase U.S. greenhouse gas emissions driving climate change, posing an imminent threat to the preservation of historic places around the country.

Betsy Merritt, deputy general counsel of the National Trust, will discuss our decision to file an amicus brief which highlights risks created by climate change to four of our country's most historic cities and national landmarks: Annapolis, Maryland; Charleston, South Carolina; Ellis Island and the Statue of Liberty in New York City, New York; and St. Augustine, Florida.

Andrea McGimsey, senior director of global warming solutions for Environment America, will discuss how litigation can serve as a foundation for additional community action, including work with the press, community members, and elected officials at the local, state, and federal level to elevate awareness and action around climate solutions.



Relocating Historic Properties with the Tides of Change

with Diana Inthavong

As we have seen in the last several years sea levels continue to rise at an alarming rate. With it grows the concern for the protection of historic properties and cultural resources. Current trends in adapting historic properties for sea level rise have heavily focused on options like elevation, wet-proofing, and dry-proofing. This presentation focuses on the option of relocation. Relocation is more often than not the last possible option for many of these historic properties usually due to cost, but largely because moving a historic property or resource alters the historic integrity and character of the resource. While relocation is usually not an ideal option for a historic resource it is still an option, and is a preferred option to losing the resource entirely.

This presentation will examine the case study of a 1940s Lake Michigan Property in which relocation of the property was chosen by the homeowners as a preventative measure to protect the property from future storm surges of Lake Michigan. The property was pushed back 100' from the eroding shoreline. In this particular case study the relocation was conducted by Wolfe Historic Building Movers, a house lifting and moving company experienced with historic properties. Using the information from the case study, this presentation will examine the cost and total process of relocation, its impact on historic interpretation and character, and how this method can benefit other historic resources.