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High Water and High Stakes: Cultural Resources and Climate Change

National Trust *for* Historic Preservation
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Contents

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Cover: City Dock, Annapolis, Maryland

PHOTO BY AMY E. MCGOVERN

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Climate Change and Rising Sea Level: Implications for Historic Preservation

BY JOHN ENGLANDER

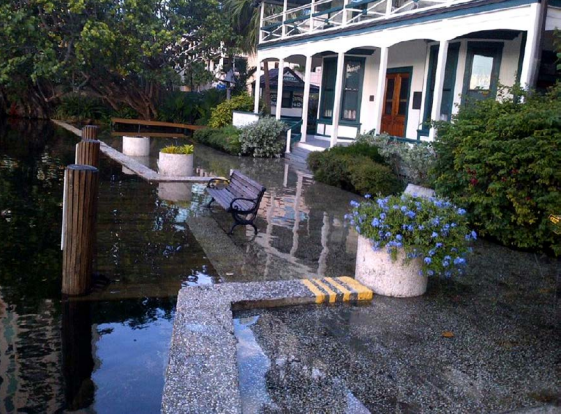
We have entered a new era, totally unprecedented in all human civilization. The melting of glaciers and ice sheets due to global warming has just started to raise sea level—a trend that is now unstoppable. Rising seas will have profound and permanent repercussions in all coastal regions worldwide.

I was delighted to give a talk at PastForward 2014 in Savannah, where I met many preservation advocates and professionals. It was immediately obvious that preservationists are uniquely suited to see what is at risk in this new era and to help communicate that to the public. You have a wonderful long-term perspective and passion. Climate change and rising sea level mandate a new kind of assessment of the vulnerability of historic resources, requiring stakeholders to look at adaptation options and to decide what will be saved for future generations—both in terms of determining what is technically possible, and also in terms of allocating finite resources.

Though it may be tempting to think of rising sea level like a storm event, it is quite different. Storms hit one area. They are sudden. The major impact is at the coast from wave damage. High waters recede rather quickly. But rising sea level is exactly the opposite in all those aspects. The impact is global and slow, it affects lowlands and tidal rivers far inland, and it is essentially permanent.

Unlike a storm, rising sea level does give us time to prepare. That is a blessing. We still have time to plan and adapt, but no time to waste.

This is the moment in history for us to change our perspective, to recognize a revolutionary reality, and, in many places, to plan for a new priority of preservation. History gives us context. One reason why we preserve buildings and landscapes is for education. The increasingly threatened state of some historic places can now help illustrate the depth and extent of the change



Routine coastal flooding, sometimes described as "king tides," can be predicted far in advance according to tide cycles and the alignment of the moon and planets. But the effects have been made worse by the rise in sea level over the last few decades. Pictured here is the historic Stranahan House in Fort Lauderdale, Florida, which is routinely flooded from the nearby New River.

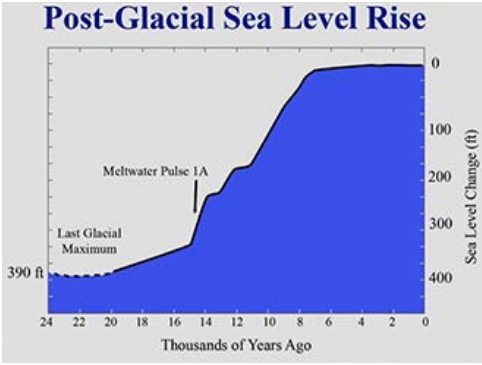
PHOTO BY NANCY GASSMAN

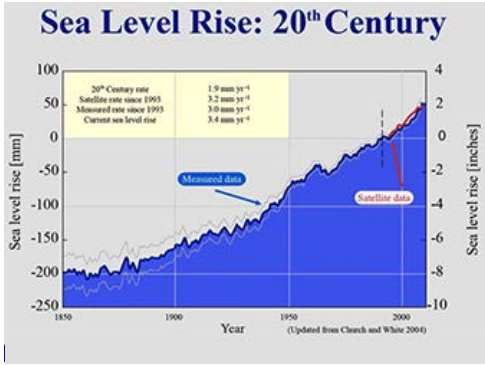
currently underway. This situation will also present us with some stark choices about what to preserve.

A foundational concept of preservation has been that historic buildings and cultural landscapes should be kept intact, and in place. Unfortunately in many places, that tenet will be directly challenged by rising sea level—the most dramatic effect of changing climate. The full scenario will play out over decades and centuries, but now is the time to reassess what needs to be preserved and to align the resources.

To understand the threats and to communicate well, we need to embrace a larger view and use a consistent lexicon. The challenge posed by climate change and rising sea level requires us to distinguish between six different phenomena:

- **Rising sea level**—caused by the shrinking of glaciers and ice sheets on land, thermal expansion of seawater, and land subsidence (the downward movement of land masses) or the opposite, uplift.
- **Storm surge**—the waves and wall of water pushed by a storm system and low atmospheric pressure.
- **Extreme high tide**—often called king tides, caused by the alignment of the moon and planets, resulting in unusually high water levels; these occur on predictable schedules ranging from 28 days to 19 years.
- **Rainfall runoff**—a natural and obvious phenomenon; however, unusual deluge rains are now causing new levels of flooding. Where the ground is already saturated from higher sea level, the runoff may also be worsened.
- **Downstream flooding**—when unusual floods migrate elsewhere via streams and rivers, or over land, as seen in some extreme events.





As the graph on the left illustrates, since the last ice age peaked 20,000 years ago, sea level has risen almost 400 feet, following a pattern that has been occurring roughly every 100,000 years for millions of years. It reached the current level about 5,000 years ago. The plateau phase was, in fact, the change in direction, as the natural cycle would have initiated the 80,000 years of sea level fall as the earth cooled toward the next ice age.

The graph on the right shows that during the 20th century global average sea level has risen approximately eight inches, with the rate increasing quite sharply during the last few decades. This is a signal that we have broken out of the natural sea level patterns of the last few million years. It should be noted that local sea levels can deviate substantially from the global average. For example, during the same time period, New Orleans had 46 inches of rise, Norfolk 30 inches, Miami 12, and Los Angeles only four inches.

- **Shoreline erosion**—a receding of the shoreline caused by currents along the shore or by shorter-term heavy wave action, possibly from storms.

GEOLOGIC HISTORY VERSUS HUMAN HISTORY

Those concerned with cultural history now need to consider some geologic and climate history to fully grasp the new era and challenge. Sea level has changed little in the last 5,000 years—almost the entire period of recorded human history. That led us to believe that sea level and its corollary, the location of the coastline, were essentially constant.

Changing sea level is the proof of changing climate, whether due to natural cycles or to human actions. For millions of years, sea level change has followed a long natural pattern, on a cycle of roughly 100,000 years, moving up and down significantly with the ice ages. We did not see it, because the emergence of our civilization occurred just at the time when the 20,000-year warming era with rising sea level was "turning the corner," heading for the roughly 80,000-year falling period of temperatures and sea level.

The apparent stability was in fact the turning point of an extremely long natural up-down cycle.

Over the last century, our planet has warmed about 1.5 degrees F. (0.85 C), a sharp departure from the natural climate cycle of the last several million years. As a direct result, the vast majority of the world's 200,000 glaciers are shrinking dramatically. And over the last century, global sea level has risen about eight inches (20 centimeters), with the rate of rise now accelerating substantially.

This is not an opinion. These things are happening. It is just hard to see the phenomenon on a timescale of years, our usual cultural perspective.

We are seeing other effects of the new climate regime. Extreme rainfall events are becoming more severe throughout the

FOUR DISTINCT CONCEPTS NEED TO BE RECOGNIZED

1. **Environmentalism**—A broad term that encompasses all things "green" including concern for nature to awareness of ecology to recognition of the benefits of recycling.
2. **Climate change**—A long-term trend in weather patterns, usually seen on a scale of decades and longer. The effects may be measured objectively by tracking regional or global changes in precipitation levels (drought, monsoons, rains, snowfall), atmospheric and oceanic currents, the size of ice sheets and glaciers, and sea level.
3. **Sustainability**—Practices that can be continued over time without depleting the underlying resource. Often applied to forms of energy that are renewable (such wind or solar power) and that may reduce the production of greenhouse gases that trap heat in the atmosphere.
4. **Rising sea level**—Sea level can change in the short term, locally, due to tides, currents and weather patterns. Longer term, over decades and centuries, sea level can rise or fall tens or hundreds of feet, primarily due to the size of the polar ice sheets and glaciers. Other factors are the thermal expansion of seawater, and the uplift or subsidence of landforms. Those large rather permanent changes to sea level will shift shorelines.

Superstorm Sandy illustrated the devastation that can be caused by unusual storm patterns. In this case, the storm was extremely large—a thousand miles in diameter. The effects were increased due to very high tides at the time, and by the fact that the region had experienced approximately 14 inches of sea level rise over the last century.

PHOTO BY BRIAN BIRKE VIA FLICKR UNDER CREATIVE COMMONS LICENSE

United States, especially east of the Mississippi, resulting in more floods. Rising temperatures are increasing the likelihood of damaging heat waves and severe droughts such as that which California is experiencing now. Warmer, drier conditions in the West have lengthened the wildfire season by two months, and the annual number of large wildfires has grown significantly since the 1970s. In general, we are seeing more "weird weather."

Severe weather (stormy seas on the coasts, tornadoes inland) has always been an unpredictable threat. We accept that and understand it intuitively. A changing shoreline is an entirely different matter however. It strains belief and imagination to consider that sea level will eventually be tens of feet higher, moving coastlines miles inland in some places. Yet geologic history and physics make this a certainty, beyond dispute.

IMPLICATIONS FOR PRESERVATION PLANNING

Climate change and rising sea level now cause us to consider a new reality or perspective that has a direct impact on the places we want to preserve. Regardless of one's understanding about the cause of climate change, people from diverse backgrounds and political views are anxious to know how more frequent flooding and shifting shorelines will affect property, communities and culture.

If you are reading this, you are almost certainly interested in history and preservation. If so, you are a great audience to consider climate change and rising sea level. My new collaboration with the

National Trust for Historic Preservation has opened my eyes to the powerful perspective of preservationists, the connection between looking back and looking ahead.

CONSIDERING OPTIONS

In many coastal areas, historic buildings will need to be elevated to be preserved. In other situations relocation might be appropriate. Depending on the geology, some areas may be protected with levees. But in areas with porous limestone, such as South Florida and most coral-based islands, levees will not work. Water percolates through the underlying structure and will come up far inland. Another geologic consideration is the varying rates of subsidence or uplift that can cause a tremendous difference in sea level rise for a particular location.

Our thinking needs to expand and evolve. These changes should encourage us to learn more from our past, and to set new priorities for what we should preserve, what we can preserve, and how we can accomplish that. In some cases we will need to make tough choices.

Established historic preservation practices—research, planning, and community engagement—can give us context, purpose and priorities. **FJ**

JOHN ENGLANDER is a consultant and author of *High Tide on Main Street*: *Rising Sea Level and the Coming Coastal Crisis* (2nd Edition, The Science Bookshelf, 2013). He is president of the Rising Seas Group, a firm that helps communities, companies and organizations understand, assess risks and plan for adaptation.

To receive John Englander's one-page "10 Surprising Facts about Sea Level Rise" and the graphs used in this article, go to www.johnenglander.net/NTHP

VIDEO

To watch Englander's presentation at PastForward, the 2014 National Preservation in Savannah, click here.

Preservation in a Changing Climate: Time to Pick Up the Tab

ANTHONY VEERKAMP

On June 23, 1988, Dr. James E. Hansen, director of NASA's Institute for Space Studies, testified before the Senate Energy and Natural Resources Committee, stating: "Global warming has reached a level such that we can ascribe with a high degree of confidence a cause and effect relationship between the greenhouse effect and observed warming...It is already happening now."[1]

By all accounts, the testimony provided by Hansen and other scientists was pretty convincing stuff. Senator Timothy E. Wirth, the Colorado Democrat who presided at the hearing, stated: "As I read it, the scientific evidence is compelling: the global climate is changing as the earth's atmosphere gets warmer. Now, the Congress must begin to consider how we are going to slow or halt that warming trend and how we are going to cope with the changes that may already be inevitable."[2]

At the time, one might have reasonably expected that by 2015, more than a quarter century later, Congress would have long since moved beyond the consideration stage and taken meaningful action to address the looming threat. One would be gravely disappointed.

HOW DID WE GET HERE?

At the time of Hansen's testimony on Capitol Hill, congressional—indeed, global—resolve to address climate change seemed certain. After all, the international treaty to phase out substances that deplete the ozone layer (the "Montreal Protocol") had just been agreed upon the previous fall, proving that a multilateral agreement to address a global environmental threat was politically feasible. It also proved to be remarkably effective: by 2009, 98 percent of the chemicals listed by the protocol as damaging to the ozone layer had been phased out.

Indeed, in 1992 the United Nations Framework Convention on Climate Change (UNFCCC) was signed by 165 countries, including

the United States. The problem with the framework is that it sets no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. It wasn't until the 1997 Kyoto Protocol that states were committed to reduce greenhouse gas emissions; as we all have learned, the U.S. proved to be commitment averse.[3]

While nations bickered about fairness and equity, the scientific consensus around anthropogenic (human-caused) climate change grew rock-solid, and the real-world evidence that climate change was already happening became impossible to ignore.[4]

While climate change is manifested in many ways, it is almost certainly sea level rise that will have the most devastating impact on our cultural heritage.[5] According to the Intergovernmental Panel on Climate Change (IPCC), if greenhouse gas emissions continue unabated, by the end of the century the combined effect of the thermal expansion of the oceans (remember, warming water expands) and the additional water from melting glaciers and polar icecaps will be a rise in sea level of between a half meter and one meter, with the best estimate of 74 centimeters, or just under 30 inches.

Even under the IPCC's best-case scenario, which (frankly, implausibly) assumes major emissions reductions starting in a few years and reaching zero emissions by 2070, we are still likely to see a sea level rise of over 17 inches during this century. (This is due in part to "committed warming"; past greenhouse gas emissions will continue to warm the planet for decades to come.) This sea level rise would be almost three times as large as what was experienced over the 20th century. And things aren't likely to get better after that: the IPCC 5th Assessment Projections of Sea Level Rise states, "it is virtually certain that global mean sea level rise will continue for many centuries beyond 2100, with the amount of rise dependent on future emissions."

FACING THE CONSEQUENCES

The challenge of responding to the threat of global climate change is typically framed in terms of two approaches: mitigation, or those actions intended to reduce the magnitude of climate change itself,

principally through reductions of greenhouse gas emissions; and adaptation, which involves efforts to limit our vulnerability to climate change effects. A simple way to think about it is that mitigation is avoiding the unmanageable while adaptation is managing the unavoidable.

Through the 1990s and into the new millennium, climate change activists in the U.S. and throughout the developed world continued to focus on the need to mitigate climate change, fearing that talk of adaptation would be perceived as resignation and also diminish the sense of urgency to take action to avoid the catastrophic impacts of climate change.

But a climate change response based exclusively on mitigation presented fundamental challenges. For starters, while the long-term return on investment in greenhouse gas reduction is enormous, even the most robust mitigation measures will have little discernible effect on the climate for decades to come. In addition, since the benefits of mitigation accrue at a global level and are enjoyed by all, regardless of contribution to the effort to reduce greenhouse gases, there is a strong incentive to let someone else do the heavy lifting. Indeed, every time the international community gathered together with the goal of taking climate action, countries behaved instead like a group of drunken coworkers in a bar, continuing to order drinks while expecting someone else to pay the tab.

This charade continued for years, but as it became increasingly evident that the opportunity to take decisive action on reducing greenhouse gas emissions to prevent climate change had, in fact, passed, calls to embrace adaptation strategies grew louder. A February 2007 commentary in the journal *Nature*

Flooding from king tides, such as this December 2014 king tide in San Francisco, provide a preview of how rising sea levels will affect our coastal cities.

PHOTO BY ANTHONY VEERKAMP

In recent decades, floods from the nearby Fox River have become more frequent and severe, threatening the integrity of the Farnsworth House in Plano, Illinois. The National Trust is investigating several solutions to this recurring and pressing threat.

called "Lifting the Taboo on Adaptation" stated, "renewed attention to policies for adapting to climate change cannot come too soon"; while a 2010 feature in *The Economist* called "Facing the Consequences" grimly observed, "global action is not going to stop climate change. The world needs to look harder at how to live with it."

The arguments to include adaptation (or "resilience")[6] measures in climate change policy are strong. While, optimally, adaptation should be a long-term strategy, specific adaptation measures can offer the potential for immediate protection from urgent climate change impacts. In addition, many adaptation measures can be designed at the local or regional level, making adaptation easier to sell to taxpayers. Adaptation strategies can also address climate vulnerabilities that are not specifically tied to climate change. Many have needlessly argued whether Hurricanes Katrina or Sandy was "caused" by climate change, but from an adaptation and resiliency planning perspective the question is moot. Adaptation measures can be equally effective in responding to risks stemming from climate change as well as those resulting from our own land use planning blunders.

For these reasons and others, climate change adaptation and resilience planning is now firmly established on the public policy agenda. According to the Georgetown Climate Center, 14 states (home to over 4 in 10 Americans) have completed statewide Adaptation Plans and another nine have plans underway. In addition, dozens of local adaptation plans have been completed for communities from Homer, Alaska, to Key West, Florida.

THE PRESERVATION COMMUNITY'S RESPONSE

The preservation community's response to the threat of climate change has largely paralleled those of the broader climate change and sustainability communities. In a 2008 speech called "Historic Preservation's Essential Role in Fighting Climate Change," then National Trust President Richard Moe spoke forcefully on the role of historic preservation in mitigating climate change:

> *If you remember nothing else I say, remember this: Nearly half of the greenhouse gases we send into the atmosphere comes from our buildings. With that fact in mind, it's clear that any solution to climate change must address the need to reduce emissions by being wiser about how we design and use our buildings. I'm not so naïve as to believe that preservation represents the way out of this crisis. But I do believe that historic preservation can be—and must be—a key component of any effort to promote sustainable development. Indeed, preservation is sustainability.*

HOW IS HERITAGE WEATHERING THE THREATS?

While the Statue of Liberty (the nation's unofficial climate change apocalypse flood gauge) is still above mean sea level, Hurricane Sandy gave us sobering evidence that one of the nation's most iconic historic sites and countless other heritage resources are very much in harm's way. As documented in the Union of Concerned Scientists 2014 report National Landmarks at Risk, Liberty Island had to close for repairs for more than eight months after the storm, resulting in major economic hardship. In at least one respect, the repercussions are likely permanent: the NPS decided not to rebuild the park superintendent's house, thus marking the end of a 200-year tradition of people living on Liberty Island.

Fortunately, well before Sandy The NPS had already been working to respond head on to the threats posed by climate change. In 2010 the NPS released its Climate Change Response Strategy, guiding all policies related to climate change through four areas of emphasis: science, adaptation, mitigation, and communication. In February 2014, Director Jonathan B. Jarvis signed a Climate Change and Stewardship of Cultural Resources policy

Historic St. Augustine is one of many communities along the Florida coast subject to flooding due to rising sea levels.

PHOTO BY STACEY SATHER / IMAGE PROVIDED BY FLORIDASHISTORICCOAST.COM.

memorandum that considers "cultural resources decision-making in an era of climate change." The memo states: "Cultural resources have long been subject to environmental forces. The risks of climate change for cultural resources lie in the alteration and recombination of these forces, which together are increasing the types and intensity of impacts on cultural resources."

While the memo is focused on the NPS's own cultural resource management practices, much of its guidance is relevant for any cultural resource steward or policymaker. It directs the NPS to concentrate resource inventory work on areas most vulnerable to observed and projected climate change impacts and other threats. (One thing that global warming doesn't change for preservationists: before we can protect a historic site, we have to know it exists.) The memo also instructs the NPS to prioritize projects that integrate vulnerability and resource significance: "all identified cultural resources should be evaluated in terms of their vulnerability and significance so that management decisions are directed to resources that are both significant and most at risk."

Unfortunately, while the NPS is moving in the right direction, as a nation our knowledge of our most vulnerable cultural heritage remains highly anecdotal—too often we don't document resources in harm's way until damage has already been done. While climate change adaptation plans proliferate, the vast majority fail to explicitly consider cultural heritage (the state adaptation plans for Connecticut, Delaware[7] and North Carolina are among the few exceptions).[8] Where specific vulnerability assessments have been conducted, they are rarely fine-grain enough to provide adequate guidance for appropriate adaptation and resilience measures.[9]

A CHANGE IN THE PRESERVATION CLIMATE?

Climate change is not merely a physical threat to our cultural heritage; it also challenges our understanding of what it means to "save" a place—indeed, it challenges our notions of permanence itself. Much conservation and preservation philosophy, law, and practice is grounded on the assumption of stability and permanence. The Organic Act directs the NPS to leave resources "unimpaired for the enjoyment of future generations." But what happens, for example, when the boundaries of a National Park no longer correspond to the habitat they were drawn to protect, or when rising sea levels inundate historic sites? And what are the implications for preservation easements that are intended to provide permanent or "perpetual" protection of a site if climate change makes it impossible to protect the physical fabric of historic resources and landscapes?[10]

The NPS cultural resources policy memo attempts to steel us for the challenges by stating that the National Park Service must "Recognize Loss":

> *We will ensure that our management options recognize the potential for loss. Responsible stewardship requires making choices that promote resilience and taking sustainable management actions. Funding temporary repairs for resources that cannot, because of their location or fragility, be saved for the long term, demands careful thought. Managers should consider choices such as documenting some resources and allowing them to fall into ruin rather than rebuilding after major storms.*

Secretary Jarvis is stating a hard truth: the threats posed by climate change are enormous, and we won't be able to save everything. Eventually, much of our heritage, along with other trappings of our civilization, will be lost. Of course, we've always known this; in the long run, John Maynard Keynes famously noted, we are all dead.[11] But that knowledge doesn't keep us from getting out of bed most mornings, nor should it cause us to write off our heritage prematurely. While the big-picture threats posed by climate change are well understood, it is essential that we recognize the profound

limits in our ability to predict specific impacts.[12] The IPCC notes that many studies "are based on coarsely defined climate change and adaptation impacts and only provide speculative estimates of adaptation costs and benefits."

Indeed, the NPS memo cautions that "decisions for loss cannot be made lightly nor without appropriate consultation and compliance," but acknowledges that "as with many aspects of climate change adaptation, as yet there are no specific guidelines for these decisions." As the hard costs of protecting our heritage against the impacts of climate change inexorably rise, there will be increasing pressure to "let go"—making stewardship decisions based solely on the dollar cost of protecting a place without an adequate consideration of the social, cultural, and economic cost of losing our history.

To avoid making premature and irreversible decisions concerning irreplaceable heritage, we need to move away from front-end planning that relies on possibly faulty predictions about the future and toward "adaptive management" strategies.[13] Fundamentally, this means scaling back front-end comprehensive planning and introducing formal follow-up mechanisms that integrate new information into an ongoing decision adjustment process.

NOT JUST PLACES AT STAKE

In the Fall 2008 edition of Forum Journal, I argued that it was time for preservationists to expand beyond touting preservation's green credentials and to focus on how climate change poses a direct threat to cultural heritage. But perhaps the relationship between historic preservation and climate change is more complicated than the binary formula I had in mind back then. We have documented that preservation can contribute to mitigation efforts to reduce climate change, and we are now working to assure that historic resources are included in efforts to adapt to the unavoidable impacts of climate change.

But while much of our attention must be focused on identifying and protecting specific historic resources at risk, there is even more at stake. Perhaps the most compelling argument for preservation is the fundamental role heritage can play in making society more resilient though its contributions to social cohesion, sustain-

able development and psychological wellbeing.

A 2013 paper called "Heritage and Resilience: Issues and Opportunities for Reducing Disaster Risks"[14] describes the role of cultural heritage as a "driver of resilience that can support efforts to reduce disaster risks." It notes, for one thing, that embedded in cultural heritage are traditional knowledge and skills that have enabled diverse societies around the world to prepare for, withstand and recover from past disasters.

But the report further explains: "In the same way that biological diversity increases the resilience of natural systems, cultural diversity has the capacity to increase the resilience of social systems. The maintenance of cultural diversity into the future, and the knowledge, innovations and outlooks it contains, increase the capacity of human systems to adapt to and cope with change."

It continues:

> *As a vehicle to express values and identity, and organize communities and their relationships through its powerful symbolic and aesthetic dimensions, cultural heritage is essential to the spiritual wellbeing of people. The acknowledgment and conservation of the diversity of cultural heritage, fair access to it and equitable sharing of the benefits deriving from its use enhance the feeling of place and belonging, mutual respect and sense of collective purpose, and ability to maintain a common good, which has the potential to contribute to the social cohesion of a community and reduce inequalities.*

Preservationists' experience in dealing with loss is going to come in handy in the coming years, but we should remain vigilant about undue pressure to "take one for the team." Yes, many historic places are indeed vulnerable to climate change, but our heritage is more than something "nice to have." Working together to protect the places we love offers the promise of making us collectively better equipped—more resilient—for the challenges ahead. You can't put a price on that. **FJ**

ANTHONY VEERKAMP is the field director in the National Trust's San Francisco Field Office.

1 http://www.nytimes.com/1988/06/24/us/global-warming-has-begun-expert-tells-senate.html

2 Ibid.

3 While the Clinton administration signed the Protocol, it was never submitted to the Senate for ratification, which had already passed the Byrd-Hagel Resolution by a vote of 95-0, expressing disapproval of any international agreement that 1) did not require developing countries to make emission reductions and 2) "would seriously harm the economy of the United States."

4 For an excellent layperson's primer on climate change science, see the American Association for the Advancement of Science's webpage and backgrounder "What We Know."

5 For a summary of projected U.S. impacts, see: http://www.epa.gov/climatechange/science/future.html

6 While most planners and government agencies still use the term "adaptation," there has been a trend toward the term "resilience" in recent years. While there is no single agreed-upon definition, The Resilience Alliance definition is broadly applicable to cultural heritage: "The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks—and therefore the same identity."

7 The Sea Level Rise Vulnerability Assessment for the State of Delaware documents 634 known historic sites (or 4 percent of the statewide total) in areas that could be inundated by sea level rise.

8 The fact that North Carolina adaptation plan addresses cultural resources does not mean that all is well in the state's overall climate change planning efforts. In 2010 the science panel that advises the North Carolina Coastal Resources Commission (CRC) released a report that said the state could expect a 39-inch sea level rise by the end of the century. The North Carolina General Assembly responded by passing a law forbidding communities from using the report to pass new rules. The CRC directed the panel to start over, this time limiting the scope of the study to only 30 years. That draft report is now out, and predicts that sea level rise will range from 2 to 6 inches along the North Carolina coast over the next 30 years.

9 Vulnerability is made up of three main components: a resource's location or exposure to risk, its sensitivity to future climate events, and its ability to adapt to those changes in climate. In general, resources with high sensitivity and low adaptive capacity are more susceptible to impacts and therefore have a higher overall vulnerability.

10 For a detailed analysis of this issue, see "Preserving Perpetuity?: Exploring the Challenges of Perpetual Preservation in an Everchanging World" Jess R. Phelps, *Environmental Law*, Vol. 43:941 http://law.lclark.edu/live/files/16068-43-4phelps

11 Today it's easy to misread that quote as some sort of 1920s version of YOLO, but the full quote is: "But this long run is a misleading guide to current affairs. In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again."

12 See "Climate Change Adaptation And The Structural Transformation Of Environmental Law" J.B Ruhl, *Environmental Law*, Vol. 40:363 http://biotech.law.lsu.edu/climate/docs/ssrn-id1517374.pdf "For purposes of climate change adaptation policy, the demand for predictive capacity will be the Achilles' heel for the application of conventional environmental impact assessment and cost-benefit analysis. As previously discussed, the impacts of climate change necessitating human and environmental adaptation will be excruciatingly difficult to predict…Indeed, even before climate change adaptation became a pressing need, the challenges of front-end environmental impact assessment were evident in ecological contexts increasingly understood to be exceedingly complex."

13 For more on how the Department of the Interior is using Adaptive Management, see http://www.doi.gov/initiatives/AdaptiveManagement/

14 Prepared for the 4th Session of the Global Platform for Disaster Risk Reduction, 19-23 May 2013 in Geneva, Switzerland.

TAKEAWAY

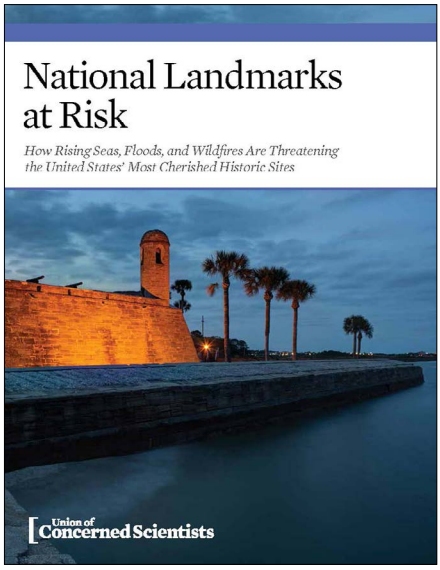
Click here to access an interactive map on cultural resources being affected by climate change.

A Heritage Coalition's "Call to Action" on Climate Change and Cultural Heritage

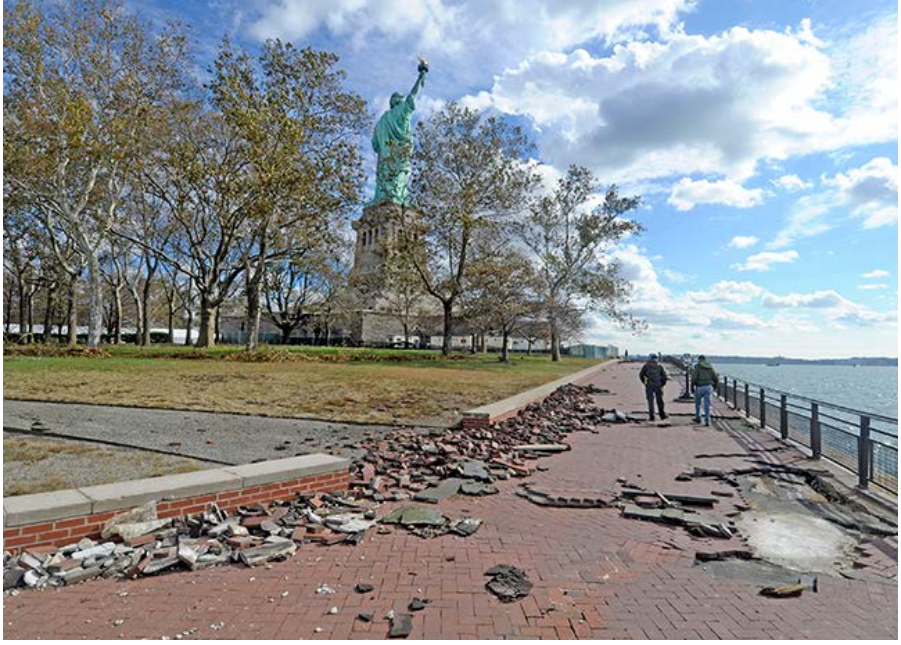
ADAM MARKHAM AND JEANA WISER

Global average temperatures have been rising since the late 1800s, with much of the warming due to human activities, especially the release of carbon dioxide and other greenhouse gases into the atmosphere from the burning of fossil fuels. This is causing sea levels to rise and extreme weather events—heat waves, droughts, rain deluges—to occur more often. Now these global environmental changes threaten built and natural resources, presenting new challenges for stewardship.

Numerous organizations around the country—indeed the globe—are concerned about the effects of climate change on historic resources. And not just cultural heritage organizations. The Union of Concerned Scientists (UCS), a nonprofit science advocacy organization that has worked on climate change science and policies for decades, had not previously addressed the issues of heritage preservation. But in 2014, with no prospect of congressional action in Washington in response to the problem, UCS turned its attention to highlighting how the impacts of a changing climate are already affecting communities across America. Its research drew on the knowledge of USC's network of more than 18,000 scientists nationwide as well as all the latest scientific reports and peer-reviewed literature. As UCS



The Union of Concerned Scientists released the report *National Landmarks at Risk* in May 2014 to draw attention to the threat to cultural heritage from sea level rise.



National Park Service staff survey damage to Liberty Island following Hurricane Sandy.
PHOTO BY NPS/DALEY VIA FLICKR UNDER CREATIVE COMMONS LICENSE

experts sifted through the information, they realized that one of the great untold stories of climate change was its serious repercussions on places that tell America's story, from its archeological sites to its historic buildings.

In May 2014, UCS released National Landmarks at Risk: How Rising Seas, Floods and Wildfires Are Threatening the United States' Most Cherished Historic Sites—a series of case studies detailing how climate change is already affecting some of the United States' most important and iconic heritage sites as well as local and traditional communities. With the report, UCS hoped to draw attention to an urgent threat to cultural heritage that has largely been ignored by policymakers. At the same time, UCS recognized that preserving local landmarks and places that matter is important to all Americans, and a discussion about doing so in the context of a rapidly changing climate could help to bridge the growing partisan divide over climate solutions in Washington. The impacts of climate change are experienced locally, whether it be the flooding of a historic district or the erosion of the cliffs that underlie an iconic lighthouse. So local communities are on the front line of climate change, and it is local people who are the stewards of their own cultural heritage.

POCANTICO WORKSHOP 2015

Following the release of the *Landmarks at Risk* report, UCS worked with the National Trust and other partners—including the Society for American Archaeology, the National Park Service, and the J.M. Kaplan Fund—to convene a high-level strategic workshop at the Pocantico Center of the Rockefeller Brothers Fund, held in Tarrytown, New York, in February 2015. The workshop aimed to identify priorities for action to preserve and maintain cultural heritage in a changing climate. The National Trust, UCS and the convening partners met for two days with representatives of groups including US/ICOMOS, the Gullah/

POCANTICO 2008

Pocantico was also the site of an earlier convening in 2008 on climate change. Some 30 cultural heritage professionals met at the Pocantico Center to discuss the relationship between sustainability and cultural heritage—essentially figuring out a role for the cultural heritage field in the then-growing sustainable practices field.

The meeting's outcome, the Pocantico Proclamation on Sustainability and Historic Preservation, outlined five principles to conserve the built environment that align with the goals of sustainability and resource conservation:

1. **Foster a culture of reuse.**
2. **Reinvest at a community scale.**
3. **Value heritage.**
4. **Capitalize on the potential of the green economy.**
5. **Realign historic preservation policies with sustainability.**

Since then the National Trust has delivered on a commitment it made to take a leadership role in sustainability efforts. Notably, it established the Preservation Green Lab—a National Trust research laboratory in Seattle—to study the intersection of historic/old buildings and sustainability. Among other activities, the National Trust is currently working in Annapolis, Maryland, to bring awareness to the effects of current and future climate change, such as sea level rise, on Annapolis' historic downtown and waterfront district and to support the local efforts to respond. [See "Weather It Together: Annapolis's Model Planning Effort" in this issue of *Forum Journal.*]

Participants at the 2015 Pocantico Workshop identified priorities for action to preserve and maintain cultural heritage in a changing climate.

PHOTO COURTESY UNION OF CONCERNED SCIENTISTS

Geechee Nation, the Galveston Historical Foundation, the City of Annapolis, The Trustees of Reservations, the Society for Historical Archaeology, the National Conference of State Historic Preservation Officers, and the Global Heritage Fund. From this was born a new coalition of local, national and international organizations committed to taking action to protect cultural heritage resources from the effects of climate change.

The outcome of the workshop was an identification of priority needs in responding to climate change, an agenda for action, and commitments by all participants to bring their organizations' resources and skills to bear wherever possible to help advance this agenda and raise public awareness of the urgent and growing threat to cultural heritage. Perhaps most significantly, the participants drafted and signed a "Call to Action," which is now open for signature by all individuals and organizations that care about the protection of cultural heritage in the face of climate change. To date, more than 20 national and international organizations have signed the Call for Action. The National Trust and the Union of Concerned Scientists invite individuals and organizations across the country and the globe to join as signatories. The time to act is now, to make a commitment to recognize and communicate the new reality of climate change and the threat it poses to our historic built environment, valuable cultural heritage, and irre-

placeable places that matter. Sign today and help spread the word to others. **FJ**

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JEANA WISER is an associate project manager in the Preservation Green Lab.

SLIDESHOW

To see UCS's slide show, "National Landmarks at Risk" click here.

TAKEAWAY

To read a blog post by Adam Markham on the future of historic sites, click here.

Climate Change and Cultural Landscapes: Observations and Options

ROBERT Z. MELNICK, FASLA

Ever since the Mount Vernon Ladies' Association enlightened our society to the value of preserving significant historic sites and resources in the mid-19th century, historic preservation has changed, adapted and evolved over time. We have seen the preservation movement mature from protecting the homes of past presidents to addressing a much wider range of concerns, including protecting sites where important events happened, historic districts of workers' housing, historic bridges and engineering accomplishments, and now also significant cultural landscapes.[1]

A cultural landscape is "a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. There are four general types of cultural landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes. Gettysburg National Military Park, Central Park, Chaco Canyon, and the Presidio of San Francisco are all examples of cultural landscapes.

As we come to grips with one of the most pressing problems of the 21st century, we can now ask: What can an understanding of cultural landscapes tell us about climate change? How has attention to historic landscapes altered our view of historic preservation? And how can concern for these landscapes help us grapple with the impacts of global climate change? As will be evident, there are more questions than answers.

Because of their inherent integration of natural and human systems, cultural landscapes can be understood as the "canary in the coal mine"—providing warning signs of the impact of climate change on cultural resources. They can also be the testing ground for making wise and thoughtful decisions, as we gain a better recognition of the certainty of uncertain change to these valued

Left: There has been a loss of many historic features within the streetscape of the historic district of Portsmouth Village, located in Cape Lookout National Seashore, North Carolina. Dwellings, churches, and the post office/general store along main roads have all been affected by environmental impacts such as flooding, salt spray and storm events.

Above: A significant Civil War-era structure, Fort Jefferson, in Dry Tortugas National Park, Florida, is seriously threatened by rising sea level, delamination of historic brickwork, and subsequent salinization of the historic parade ground.

PHOTOS BY ROBERT Z. MELNICK, FASLA

reminders of where we are in both time and place.

Climate change is already affecting cultural landscapes that are significant, in some cases precious, and in all cases worthy of our attention, concern and protection.[2]

At this moment in the 21st century, questions and concerns around climate change are ever more pressing.[3] Regardless of one's perspective, the overwhelming scientific evidence is that we have, in fact, embarked on a period of substantial human-caused climate change.

The best science expects and accepts many errors, mistakes and miscalculations on the way to establishing new understandings, new paradigms and new truths.[4] Of course, there is no sure way to know what is truth and what is misunderstanding while standing in the middle of the forest.

The same can be said for work in historic preservation. We need temporal distance and contextual perspective to even begin to assess the importance or significance of historic buildings, sites, structures, objects and landscapes in our society. We need to take chances and we need to make mistakes. Our strategies and protocols need to be reexamined on a regular and consistent basis. This

is particularly important since contextual conditions change or modify our perceptions and understandings.

In this era of climate change, preserving cultural landscapes can sometimes seem confusing, difficult and painstaking. How can the field of historic preservation, committed as it is to resource preservation, protection and continuity, respond and adjust to the seemingly invisible modifications to our cultural resources? And how can we address changes that are beyond our direct ability to soften, temper or qualify?

The response to the impact of climate change on cultural landscapes must also address a number of deeper and, in some cases, more deeply rooted issues and concepts. These stem from events that could not have been anticipated in the Venice Charter (1964), the Historic Preservation Act (1966), the Burra Charter (1979) or other fundamental declarations of preservation/conservation tenets. As we continue to protect critical and valued resources, climate change issues require that we are nimble and flexible, yet adhere to basic beliefs and ideals.

This is the backdrop for exploring how climate change is affecting the way we think about the protection of cultural landscapes as well as other significant heritage places.

CULTURAL LANDSCAPES AS DYNAMIC ENTITIES

Landscapes present us with a major challenge, as they are composed of elements and character-defining features that are dynamic by their very nature. In fact, the most challenging concept in cultural landscape preservation is the fundamental understanding that change is not merely tolerated (as it is for most other cultural resources) but that it is often an inherent and desired characteristic. I view "landscape" as a noun and a verb, as a "thing" and as an "activity," a "development," or a "process." Into this comes climate change—one of those big, broad, often subtle, and sometimes overwhelming forces that moderate the very processes that give the cultural landscape form and meaning.

Cultural landscapes are identified, analyzed, recorded and evaluated using standardized methods.[5] There is a need, we

The Rapidan Camp in Shenandoah National Park in Virginia was the summer retreat of President and Mrs. Hoover during his administration. Today the loss of hemlocks, due to the influx of woolly adelgid, has resulted in growth of understory vegetation that was not present during the Hoover era.

PHOTO BY ROBERT Z. MELNICK, FASLA

know, to codify our approach to historic resources. The intention is to provide uniform standards by which to achieve the goal of historic landscape preservation or protection. Established procedures, however, consider the landscape within a constant or predictable context and fail to fully recognize the dynamic nature of the larger environmental milieu. There is an assumption that the larger ecological context is predictable, within an acceptable dynamic range, such as seasons, warm or cold years, or wet or dry summers. Thus, each of the codified procedures for recognizing, evaluating and "treating" cultural landscapes assumes a greater level of constancy than we now experience or might reasonably anticipate.

Preservation guidelines and standards also assume a set of societal values that will not shift as resources become scarcer, and competition for them is heightened. What will happen when decisions are made to put a lower priority on preservation, and who will make those decisions? And what happens if the context for preservation decisions is no longer as predictable as it once was? What happens when the next Hurricane Katrina or Superstorm Sandy hits? What can we do?

FLEXIBILITY IN THE FACE OF UNCERTAINTY

We need to begin with the premise of an uncertain but certainly variable future. We can directly embrace flexibility in our approaches, encourage frequent reassessment of landscape conditions, and plan for the need to alter our course as conditions

change. These are not easy strategies, and they demand a dynamic approach.

We can adapt to change, developing new ways to think about it and mitigate it, by assuming a more flexible understanding of what we mean by character-defining features. For example, does it matter more, in preservation terms, whether a landscape retains the exact tree genus and species or that the spatial and visual characteristics of those trees are maintained? Would it be better to plant replacement trees that are more resistant to climatic warming and decreased precipitation, or to replant trees that will not survive our 21st-century environment? How much do these changes matter in terms of the landscape we are trying to protect? And do we need to talk about "protection" rather than "preservation"?

Making the landscape more resilient to change, as a strategy, may mean undertaking greater proactive intervention rather than waiting until undesired change has occurred. We need to be willing to set priorities, such as employing greater seed-banking or intensive management during re-vegetation—a labor-intensive and costly process that nonetheless may enable the protection of critical landscape features.

We must be prepared to make difficult decisions about which landscapes to try to save, which landscapes are salvageable, and which landscapes are not. We may need to practice a form of "cultural-landscape triage" and choose to save certain places while letting other ones remain only in the historical record. This may also require more stringent and demanding criteria for "significance," especially when compared to what we now practice.

How do we make these triage decisions, and is it even possible, since landscape don't die, they evolve?

Can there be such a thing as "landscape hospice," in which we care for defining characteristics that we can't save? In this changing environmental context, it may be appropriate to practice caring and grieving as valued cultural landscape features slip away from our presence.

But we need to be careful not to panic or overreact, first by recognizing "historical ranges of variation."[6] Taking both long and

Frequent flooding due to the intensification of storms has severely eroded stream and river banks throughout Valley Forge National Historical Park in Pennsylvania, destroying cultural resources. Intense storms have eroded most of the soil on the forested hills, and in combination with warmer temperatures, acidified rain, and decreases to soil moisture make it unclear what the native forest of the future will comprise.

PHOTO BY ROBERT Z. MELNICK, FASLA

short views is vital in this effort. While it is often tempting or convenient to look at the most recent past, landscape time demands that we consider variations over a long period. Taking only the immediate snapshot in the rearview mirror can result in a failure to recognize the nature and impacts of climate change, as we, perhaps, rely on last year's rainfall gauges, this year's storm data or next year's temperature graph.

DETERMINING THE APPROACH

As with all lengthy preservation projects, we need to think about how we can organize our decisions about what to do.[7] There are a number of direct adaptation approaches to cultural landscape preservation that can be taken in the face of climate change. These may vary in intensity, geographic and temporal scale, and urgency, and each will require regular evaluation.

In all cases, we must first assess the need for intervention. This requires clear documentation of the cultural landscape's character-defining features, climate change projections for the landscape's ecological zone, and known and anticipated impacts of those projections on the character-defining features. As we know in all preservation work, comprehensive documentation is the foundation for future efforts; this is true for cultural landscapes as well. This basic needs assessment provides a measure for making decisions about both long- and short-term interventions. That includes determining the speed of intervention. Is the impact of climate change on the cultural landscape an urgent problem that must be addressed as soon as possible in the early stages? Is change pro-

jected but not yet occurring, requiring no immediate action but careful monitoring?

On a larger scale, we may attempt to mitigate the climate change stresses through action off site from the cultural landscape, thereby offsetting the direct impact on the landscape, such as constructing a earthen berm to shield against future floods and stormwater as was proposed for Lower Manhattan following Superstorm Sandy. An on-site option is to improve the cultural landscape's resilience to climate change by making compatible alterations and additions that meet the Secretary of the Interior's Standards for the Treatment of Historic Properties, was as done at Vanderbilt Mansion National Historic Site in Hyde Park, New York.[8] In this context, climate resilience is generally defined as the capacity to absorb stresses and maintain the landscape's function in the face of external stresses imposed by climate change; and to adapt and evolve in order to improve the sustainability of the cultural landscape, leaving it better prepared for future climate change impacts.

We can also allow some change to occur but work to limit the impact on those character-defining features that are a high priority to preserve. And, of course, we can allow the landscape to deteriorate, without intervention. This implies taking no adaptation action except for extensive and detailed landscape documentation and data recovery.

Additionally, as always, there is the opportunity to use this challenge and the responses to it as an educational opportunity to tell the story of cultural landscapes and climate change, the integration of natural and cultural systems, and the lasting importance of these places to our cultural heritage.

MANAGEMENT OPTIONS

More specifically, what follows is a range of management options that can be used and modified, as changes to the cultural landscape require.[9] Importantly, these are not mutually exclusive, and can be employed in conjunction with each other, even though they are ordered from the least to the most used in terms of intervention.

- **No active intervention.** Taking no action is a decision. This may be an appropriate course of action in situations of low vulnerability (no action warranted) or when, due to one or more of a range of constraints, including lack of technological or economic feasibility, no action can be taken. This includes monitoring of the rate and degree of landscape dynamics, to assess whether or not it is within the historic range.
- **Offset stresses.** Removing or deflecting a stressor means taking one or more actions to reduce or remove the environmental or other force(s) acting on the resource, as noted above regarding Lower Manhattan. The goal is to enhance continued vitality of a cultural landscape while minimizing changes as much as possible. This includes consideration at a "landscape" scale, to ensure that the effort to deflect or remove a stressor does not have a negative impact on the larger ecosystem. As with other cultural resources, this may include both temporary and long-term measures.
- **Improve resilience.** Improving resilience requires taking actions that change the nature and/or setting of a cultural landscape to make it more resistant or resilient to environmental or other forces. Special attention is given to plant communities, soil structure and natural systems such as hydrology. This includes the integration of natural and cultural features, such as historic orchards. For example, in an environment with increased temperatures and more-arid climates, soil structure may require soil aeration to increase permeability and reduce root compaction.
- **Manage change.** Managing change is acomplished through an action or set of actions that incorporate change into the form of the landscape and/or into its preservation plan. The goal is to maintain character-defining features of the landscape, even if original specific materials or individual species are no longer part of the resource. As stated above, this also requires a broader acceptance of change as an essential process and often character-defining aspect. In

historic nut orchards, for example, as part of a normal agricultural practice, trees reaching the end of their productive cycles are regularly removed and replaced. This may require the addition of species that are resilient to changes in climate patterns.

- **Document.** As we know from standard preservation practice, documentation provides a record of a landscape. We can then allow the cultural landscape to undergo full effects of environmental or other forces, even those that are likely to destroy or remove all or portions of it. Documentation can be exhaustive or selective, and can include a range of techniques. In addition to standard tools such as field notes, ground photography and aerial photography, this may include collecting pollen and seeds or plant cuttings, or obtaining oral histories from the resource's users and visitors. It may be especially valuable to make video recordings, to ensure that the three-dimensional aspects of the landscape are documented to the best extent possible. Tools and techniques such as infrared aerial photography should be considered to record features, such as abandoned roadbeds, that are no longer visible to the naked eye.

CLIMATE CHANGE IS THE HERITAGE OF FUTURE

Interpretation may be developed across any of the adaptation options listed above. We can tell the landscape's story, interpreting the landscape over time, to better demonstrate the impact of climate change within the context of landscape dynamics. This can teach us not only about history of the landscape and its preservation but also about climate change itself. Such interpretation can also be used to engage the public, encouraging people to care about the future of the resource and about climate change issues.

CONCLUSION

There are no easy answers or responses to the current and projected effects of climate change on our valued cultural landscapes, but we can be creative, imaginative and practical. Adhering to our

standard or established historic preservation practices, however, is no longer a viable option in a world in which drastic change seems inevitable, if not always predictable. **FJ**

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VIDEO

To watch a presentation by Robert Melnick at a February 2014 National Park Service webinar on Climate Science, Climate Change, and Cultural Resources, click here.

The National Flood Insurance Program and Historic Resources

JENIFER EGGLESTON AND JEN WELLOCK

Nearly a decade after Hurricane Katrina hit the Gulf Coast on August 29, 2005, its effects on the coastal communities in Alabama, Louisiana and Mississippi are still clearly visible. Claiming more than 1,800 lives and causing over $100 billion in property damage, Hurricane Katrina was the single most catastrophic natural disaster in our nation's history. Much of Katrina's damage, stretching 400 miles across the Gulf Coast, was due to a storm surge that reached an estimated 35 feet and to sustained winds of up to 140 miles per hour. In addition to being our nation's most costly disaster, Hurricane Katrina destroyed thousands of irreplaceable historic resources while leaving countless more severely damaged and vulnerable. In response, Congress appropriated $53 million in Historic Preservation Fund (HPF) grant funding to the state historic preservation offices (SHPOs) of Alabama, Louisiana and Mississippi to aid in the recovery and rehabilitation of historic resources on the Gulf Coast. A similar congressional appropriation of $47.5 million was made to the Northeast SHPOs and tribal historic preservation offices (THPOs) following the devastation of Superstorm Sandy, which battered the mid-Atlantic coast in late October 2012. The projects supported by these two grant programs have helped the National Park Service (NPS) recognize the vulnerability of historic resources to flooding and the challenges both of protecting them before disaster strikes and of addressing damage afterward. Specifically, we at the NPS have learned how

The interior of this historic home in Ocean Springs, Mississippi shows damage to the interior (with flood marks on the wall) following Hurricane Katrina.

PHOTO COURTESY NATIONAL PARK SERVICE

critical adjustments in federal flood insurance programs and flood mapping can significantly affect the survival of historic resources.

More than 50 percent of Americans live in coastal counties, which are increasingly vulnerable to rising sea levels, storm surges and flooding. Devastation from flooding is costly to communities and to individual taxpayers. In the years between 1980 and 2013, flooding caused $260 billion in damages. Beyond the staggering financial impacts, there is the cost to human life: according to the Federal Emergency Management Agency (FEMA), more people die annually from flooding in the United States than from any other natural hazard. As we see larger-scale flooding disasters, and as we note the ways our climate is changing and the potential for sea level rise, those of us involved in historic preservation must understand current flood insurance policy and also the implications of proposed reforms now taking shape.

A BIT OF HISTORY

It used to be that when you purchased insurance for your home or business, flood insurance was part of that policy. However, in the 1950s, after several large floods required companies to make substantial payouts to their customers, the majority of insurance firms decided to drop flood protection or to sell it as a separate policy. Over time, as the premiums customers paid for flood insurance no longer covered the amounts that companies needed to pay out for claims, providing flood insurance became unprofitable and unsustainable. By 1960, when a flood happened, it was left to the owner to recover from the damage independent of full insurance assistance. At this point the federal government entered the world of flood insurance.

In 1968 an act of Congress (42 USC 4001) created the National Flood Insurance Program (NFIP), which allowed property owners to purchase insurance from the United States government to cover the cost of losses due to certain damages caused by flooding. By broadening the pool of insured individuals, the federal government hoped to distribute the burden of flood insurance among all those protected, sharing the risk and minimizing the cost. The federal

Many homes in Ocean Springs, Mississippi, were knocked off their foundations by Hurricane Katrina and had to be reset on piers during restoration.

PHOTO COURTESY NATIONAL PARK SERVICE

government did not look at each property individually as a private insurer would do. Instead, the government identified general geographic areas at risk. At this point there was no official federal map showing various types of flood risk. It was understood that the prime objective of the flood insurance program would be to craft a unified national program for flood plain management.

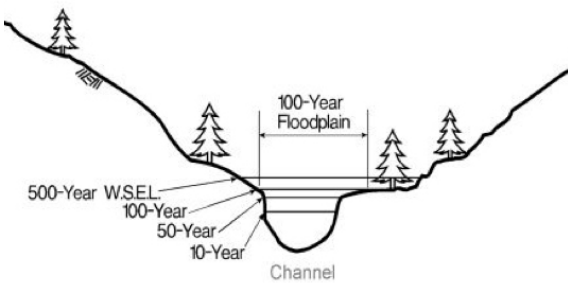
The original law had the following five goals:

1. To encourage state and local governments to craft land use laws regarding development near waterways.
2. To guide proposed future construction away from likely flood-prone areas.
3. To encourage lending and credit agencies to assist in furthering objectives of the flood insurance program.
4. To assure that any assistance provided by the government would be in keeping with the overall flood policy.
5. To authorize continuing studies of flood hazards to provide an up-to-date body of knowledge to support the effectiveness of the program. These studies began with a massive effort by all federal agencies to work together to locate and identify areas of flood risk or special hazards (such as coastal areas) in one system of Flood Insurance Risk Maps (FIRM).

In an effort to encourage better flood management practices in communities, by 1973 the government amended the NFIP with the Flood Disaster Protection Act of 1973 (P.L. 93-234), which identified Special Flood Hazard Areas (SFHAs)—areas of high risk where the NFIP's flood plain management regulations must be enforced and where the purchase of flood insurance by property owners is mandatory. States or localities that did not either participate in the NFIP or agree to adopt adequate flood plain ordinances with effective enforcement provisions would no longer be eligible for any future federal assistance, such as disaster assistance. This law also required that flood insurance be purchased by any property owner assisted by federal programs or federally insured agencies (such as banks) in the acquisition or improvement of land or facilities located or to be constructed in a flood hazard area.

Today the program also includes minimum building and development standards that communities must adopt for new and substantially improved and/or substantially damaged residential buildings. The building must be elevated so that the lowest horizontal structural member or the lowest floor (depending on what flood zone the building is located in) is at or above the Base Flood Elevation (BFE) determined for the site. This BFE is noted on the flood insurance map and is equal to the height of the 100-year flood.

The terms "100-year" and "500-year" flood can be confusing. These are not floods that can only happen once every 100 or 500 years; in fact, you can have several 100-year floods in the same year. It is simply a way to define the risk of flooding and therefore calculate the appropriate insurance rates. The NFIP uses these terms because it needs to plan for the annual chance of a flood. The Flood Insurance Rate Map (FIRM) will have zones that are based on the risk for the 1 percent



annual chance (100-year flood) and, in some cases, the .2 percent annual chance (500-year flood) of flooding. The relationship between the BFE and a structure's elevation determines the flood insurance premium.

FEMA administers the NFIP, and works with more than 80 private insurance companies to offer flood insurance to homeowners, businesses and renters. To qualify for this insurance, the home or business must be in a community that has joined the NFIP and agreed to enforce sound flood plain management standards. Rates are set nationally and do not differ from company to company or agent and agent.

THE CURRENT REGULATORY ENVIRONMENT

First Reforms: Biggert-Waters Flood Insurance Act of 2012

Faced with continued losses due to flood damage, subsidized rates (discussed next), and general insolvency, Congress sought to reform the NFIP with the Biggert-Waters Flood Insurance Act of 2012 (Biggert-Waters). This legislation was intended to raise insurance rates to reflect true flood risks, make the program financially stable, and change how updates to Flood Insurance Rate Maps (FIRM) affect policyholders.

When the Congress crafted the NFIP back in 1968, the government understood there was a value to the existing building stock located in areas near waterways or along the coast. These properties existed before the law, and are often cited as pre-FIRM, as no map was available at the time when they were built to guide their development. Those properties were "grandfathered" into the program by being allowed to obtain insurance at a subsidized rate.

The 2012 Biggert-Waters Act phased out grandfathered rates upon the adoption by a community of a new FIRM. The move to risk-based rates was to happen gradually with new rates increasing by 20 percent per year for five years. Primary residences within Special Flood Hazard Areas (SFHAs) will be able to retain the subsidized rate until the property is sold, the policy lapses, the property suffers severe and repeated flood loss, or a new policy is purchased. The rates for secondary homes, homes that have suffered damage in the past, or nonresidential properties in SFHA will

be affected more severely, with 25 percent rate increases annually until the rate reflects the true risk.

Further Reforms: The Homeowner Flood Insurance Affordability Act of 2014

The Biggert-Waters Flood Insurance Act of 2012 was tremendously controversial and considered particularly challenging to homeowners. Congress responded, and in 2014 the president signed the Homeowner Flood Insurance Affordability Act of 2014 into law (P.L. 113-89) to delay the implementation of certain provisions of the Biggert-Waters Act. The new law will not immediately remove the grandfathered rates upon adoption by a community of a new FIRM, but it will increase the rates gradually over several years to lessen the economic impact. FEMA is required to increase premiums by no less than 5 percent annually, but it cannot increase these rates more than 18 percent annually, except for non-primary residences, structures that have sustained severe and repetitive losses, and substantially damaged or improved properties built before FIRM.

The law compels FEMA to designate a flood insurance advocate to ensure fairness. This individual is intended to be the public's "one-stop-shop" for mapping and rate information and concerns. FEMA is charged with undertaking an affordability study for homeowners once Biggert-Waters is implemented, and this study is currently underway. The results will provide an affordability framework on which to base future risk cost-analysis decisions.

Of Special Note to Property Owners: Alternative Risk-Mitigation

For owners of historic properties, the best bit of news in this legislation is that the new law allows them to potentially reduce insurance costs by taking alternative risk-mitigation actions outside of those structural modifications allowed by the original legislation. Section 26 amends the NFIP to require FEMA to

1. issue guidelines for property owners that provide alternative methods of mitigation efforts to reduce flood risk to residential buildings that cannot be elevated due to their structural characteristics;

2. inform property owners about how implementation of these methods may affect NFIP risk premium rates; and
3. take into account, when calculating the risk premium rate, the implementation of any mitigation method identified in the FEMA guidelines.

Previously under the law, the option of either elevating a structure or instituting dry floodproofing to reduce insurance costs could only be used with nonresidential properties. Dry floodproofing is a means to make the building watertight for floodwaters up to the BFE. The change noted above appears to mean that FEMA may allow residential owners to dry floodproof as a means to lower rates.

SPECIAL CONSIDERATIONS FOR HISTORIC BUILDINGS

In 1989 FEMA recognized that historic buildings, landmarks and sites were unique and valuable to our national identity. The NFIP provided relief to the historic property owners in two ways.

First, historic structures did not have to meet the flood plain management rules, as long as they maintained their historic designation. They could be exempted from the new construction, substantial improvement, or substantial damage requirements of the NFIP. In this way, an owner of a historic property might suffer flood damage and get an insurance payment for the loss, but would not have to elevate the property as otherwise might be required.

Second, the historic building was eligible for subsidized flood insurance through NFIP at a grandfathered rate even if it had been substantially improved or substantially damaged, so long as it retained its historic designation. This relief provision has been lost with the Biggert-Waters Act. Under Biggert-Waters, historic structures will no longer be eligible for a subsidized rate. Primary residences will see a maximum annual increase of 16–17 percent in their flood insurance premiums.

ABBREVIATIONS

- **BFE: Base Flood Elevation**
- **FIRM: Flood Insurance Risk Maps**
- **NFIP: National Flood Insurance Program**
- **SFHA: Special Flood Hazard Area**
- **WSEL: Water Surface Elevation Level**

MORE ABOUT FEDERAL FLOOD MAPPING: WHAT PROPERTY OWNERS SHOULD KNOW

Mapping is the underlying regulatory document on which all municipal, state and federal decisions are based. One of these is insurance, along with permitting new construction and rehabilitation of existing structures in the floodway, as well as land use decisions generally. These maps provide an overlay of data that the community uses in making these decisions.

To understand where you fit within the changing flood insurance landscape, begin by finding out your flood zone on the official Flood Insurance Risk Map (FIRM) for your area. Original maps were charted in the 1970s and show the flood plain. A flood plain is an area near a river or stream that is affected when the water reaches flood stage. A floodway is the stream and channel that carries active water; the flood fringe is area that becomes inundated but does not experience strong currents during a flood. The National Flood Insurance Program (NFIP) uses zones to designate these different areas.

While the original law required that the municipality update its maps, due to funding restrictions, these maps generally remain static until a major flood. New maps may be based on new science, changes to the environment, or a natural disaster which may change the hydrology of the region.

Each municipality has a flood plain manager. The position is often in the planning department, but can reside in other agencies. Because the mapping is based on large geographical conditions, and is not site specific, FEMA allows property owners to review and appeal mapping decisions. As a property owner, if you believe that the mapping for your specific property is not correct, you have the right to have an engineer examine the individual sections of the map to see if it corresponds to the actual risk from flooding.

Another thing to be aware of is that your municipality works closely with FEMA to review and accept a new map by FEMA or to dispute it through an appeal. Any appeal is typically based on a scientific appraisal and evaluation. The mapping process is a public one, and many voices can contribute to the completed accepted map. A community cannot opt out of the mapping process without opting out of any federal assistance in the future and penalizing property owners in the process. As a property owner, you should be involved early in any map revision process to voice possible concerns.

FEMA, in concert with the National Park Service, defined a historic structure as (44 CFR Part 59):

- One that was individually listed in the National Register of Historic Places, or one that had been determined by the Secretary of the Interior to be eligible to be listed

- A building that contributed to the significance of a historic district that is listed in the National Register of Historic Places, or one that is determined by the Secretary to be eligible for listing in a historic district
- Individually listed buildings on a state inventory, in states with programs approved by the Secretary of the Interior
- Individually listed buildings on a local inventory, in communities with programs approved by the Secretary of the Interior

If your property meets the definition of historic as discussed above, you have met the minimum standard to participate in the NFIP. You can participate (buying flood insurance) and yet make no changes. However, local governments can establish stricter guidance and may choose to enact a variance procedure for historic properties. For instance, a community might adopt a rule that all properties must be at the BFE (let's say in this community that is set at four feet) plus an additional two feet for added safety. The two-feet-above standard is termed "freeboard" and is a means to further reduce risk from flood waters. But for a contributing home within a historic district, the idea of elevating it to the BFE plus two additional feet (six feet in our scenario) might make the house no longer eligible as a contributing structure and could cause a delisting. The variance would allow the permitting official to reduce the height requirement to help the property maintain its historic status.

A community can adopt either method in working with historic resources. You should check to see if your municipality allows for this exemption. FEMA is federal law, and municipalities can decide upon stricter interpretations. Communities may allow historic properties to be exempt from the normal standards, or they may require some improvements to a lesser standard that will not result in a delisting of the property. It is important to find out what your community has decided.

WHAT THE HISTORIC STRUCTURE EXEMPTION DOES AND DOES NOT DO

The exemption as part of the NFIP allows you to keep the existing historic property as is, but will not allow you to get a reduced

insurance benefit anymore if you obtain flood insurance. You do not have to make the modifications a new building would require to meet flood regulations, such as elevating the building, filling the basement, creating breakaway walls, or adding venting. However, by not making these adaptations, you are obviously still at risk, and you will not lower your flood insurance premium when you stay at or below the BFE.

It is worth investigating mitigation measures that will help preserve your property in the event of flooding. Such measures may not change your risk assessment for insurance purposes, but they can reduce the likelihood that your loss will be catastrophic. Such measures might include moving utilities to the upper levels of the home, wet floodproofing to allow water in but with minimal damage, landscaping to channel water away from vulnerable openings, elevating the property or moving it. Demolition is obviously the last resort for historic properties, but perhaps there are portions of your property, such as later or nonhistoric additions, that could be removed without affecting the property's overall historic integrity. It would be best to consult your state historic preservation office or tribal historic preservation office for advice before making any decisions regarding moving or demolishing historic structures due to flood concerns.

MORE POTENTIAL CHANGES TO FEDERAL POLICY

Understanding that the nation needs to be better prepared for the negative effects of climate change—particularly due to flooding—the Obama administration crafted a Climate Action Plan in June 2013 which directed all federal agencies to take appropriate actions to reduce risk to federal investments, and to "update their flood-risk reduction standards." The president then released Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input. The goal is to require federal agencies to consider current and future risk when taxpayer dollars are used to build or rebuild within a flood plain. The executive order proposes three potential approaches that federal agencies can use when

establishing the flood elevation and hazard area for siting, design and construction:

- Use best-available science-based data [to develop guidance specific to the area];
- Add two to three feet of elevation to the BFE; or
- Plan to the 500-year-flood level.

Some states and communities have already adopted standards that either meet or exceed this new federal standard and have begun implementing them through permitting activities. While the executive order does not affect NFIP rates or decisions, it will affect any federal investment. The comment period on the proposed federal flood risk management standard closed on May 6, 2015, but it will be important to continue to monitor developments as changes are considered, adopted and implemented.

REASONS FOR CONCERN

For those of us who work with public and private agencies to assist historic properties after a natural flooding disaster, these new federal requirements are of significant concern. It would be extremely difficult for a historic Main Street community located along a floodway to meet the 500-year-flood elevation. In some cases, this would require extreme elevations and even demolition. Even the addition of two or three feet of elevation could be a significant change to some historic properties and, depending on the alteration to the property's historic character, could cause the building to be removed from the National Register of Historic Places. As explained earlier, you must have flood insurance if you are in a SFHA and have federal involvement in your property, such as a federally insured mortgage or a grant from the federal government (such as a NPS Hurricane Sandy grant, or a hazard mitigation grant). This is not something you can ignore if the federal government is involved, or if your community has adopted strict regulatory requirements. Flood insurance regulations have a tremendous influence on the future viability of historic structures and the communities in which they are located.

For a homeowner, renter or business, the new nonsubsidized

Charnley-Norwood House in Ocean Springs, Mississippi, designed by Louis Sullivan and his draftsman Frank Lloyd Wright, was nearly destroyed by Hurricane Katrina. It has been preserved and reopened in 2013 with funding assistance from the Mississippi Hurricane Relief for Historic Preservation program administered by the Mississippi state historic preservation office and the National Park Service.

PHOTOS COURTESY NATIONAL PARK SERVICE

flood insurance rates will pose a financial challenge. Historic communities along the coast or along rivers and other floodways will likely see a significant uptick in their insurance premiums. The reality of heightened risk and heightened cost will likely lead to negative decisions regarding historic properties. We may potentially see entire neighborhoods abandoned as the cost to own and maintain a property becomes more and more prohibitive.

Going forward, risk-reduction strategies for historic properties that cannot be elevated out of a flood plain will be of particular importance. As discussed previously, part of the Homeowner Flood Insurance Affordability Act of 2014 requires that FEMA develop alternative mitigation measures for residential properties. Some additional options now being considered include using the landscape to divert flood waters, allowing water inside the building but introducing ways to avoid or reduce resulting damage (also called wet floodproofing), or using water-resistant materials such as cypress flooring. These actions may lower flood insurance rates if FEMA adopts them as allowed alternative measures. Preservationists have many reasons to get involved in the development of alternative mitigation measures, as there are limits to the extent a historic property can be altered before it loses integrity.

How do we encourage intelligent decisions about water avoidance while ensuring the preservation of historic properties? How can we move the discussion forward in a respectful way? The preservation community must understand the reasoning behind the regulatory requirements and be willing to address the issue. There

is no sense in constant reinvestment in areas of flood hazard without a rational discussion on both sides. While we as a nation may recognize that some historic sites must be retained even at great cost due to their cultural significance, we also recognize that not every historic structure will merit this level of preservation. How do we sensitively balance the need to reduce the risk and effects of flooding with the need to value and protect significant historic resources? It is hoped that this introduction to the issue will promote frank discussions with local flood managers and policy makers. **FJ**

JENIFER EGGLESTON came to the National Park Service in 2007 to serve as the primary grants manager for the Hurricane Katrina and Rita Recovery Grant Program. Her responsibilities include monitoring and providing guidance to the states that are the recipients of special emergency grant funding for disaster recovery. Since 2013 her work has been focused on Hurricane Sandy grant funding and disaster planning.

JEN WELLOCK is an architectural historian and technical reviewer with the National Park Service's State, Tribal and Local Plans & Grants branch. Jen has had the opportunity to represent the Department of the Interior under the National Response Framework, which is the nation's unified response to disasters and emergencies. In 2011 she was deployed to Birmingham, Alabama, to assist with recovery efforts after the April tornadoes. In Washington, D.C., she is responsible for reviewing NPS-funded work to ensure conformance to the Secretary of the Interior's Standards and Guidelines.

FEMA, National Flood Insurance Program (NFIP), Floodplain Management Bulletin: Historic Structures.

FEMA P-467-2 (May 2008) http://www.fema.gov/media-library-data/20130726-1628-20490-7857/tb_p_467_2_historic_structures_05_08_web.pdf

FEMA Fact Sheets on Biggert-Waters, and Homeowner Affordability Act, in particular http://www.fema.gov/media-library-data/1389204656960-d8d62a77fde51036c4a7157ec6ba1577/Historic_Structures_FS_2013_v01_08_2014.pdf

NFIP website: https://www.floodsmart.gov/floodsmart/pages/about/nfip_partnership.jsp Information about the Executive Order: https://www.whitehouse.gov/administration/eop/ceq/Press_Releases/January_30_2015

TAKEAWAY

For FEMA guidance on increases in flood insurance policy rates for non-residential buildings click here.

TAKEAWAY

Click here to find out if your neighborhood or cultural resource has been surveyed by FEMA for the National Flood Insurance Program.

Weather It Together: Annapolis' Model Planning Effort

LISA CRAIG

> *While many other communities are planning for the impacts of climate change to infrastructure, Annapolis is breaking new ground by specifically accounting for the historic places that are such an important part of [the] your city's fabric, cultural identity, and economy. By naming Annapolis a National Treasure, we are raising awareness of the threats posed by climate change to historic places nationwide.*
> *—Stephanie Meeks, President, National Trust for Historic Preservation, Oct. 23, 2014*[1]

While recognition of the historic city of Annapolis is usually welcome—certainly, the local economy is dependent on the heritage traveler—we would rather have visitors uploading digital images of our beautiful City Dock than shots of tidal flood waters circling the feet of the statue of Alex Haley as he reads to children at the Kunta Kinte Memorial. Yet Alex has become the high water mark for flooding events in Annapolis—events that have become an increasingly urgent call to action.

The Colonial Annapolis Historic District was designated one of 43 National Historic Landmark Districts in 1965 by the U.S. Department of the Interior. While Annapolis' collection of 18th- , 19th- and 20th-century architecture is important to the entire nation, the historic district is a major heritage tourism asset for the local economy.[2]

When Secretary of the Interior Stewart Udall visited Annapolis on July 7, 1965, to officially announce the designation, he warned, "Annapolis must work now to preserve its historic heritage… otherwise it will simply share the weakness of so many cities in America—sameness."[3]

Now in 2015 we are again heeding a warning, but it is not the prospect of unplanned, insensitive development that threatens destruction of our historic city, but the unpredictable, inescapable

effects of a more global concern: sea level rise. Natural forces are resulting in Annapolis experiencing the highest rate of sea level rise of any community on the Atlantic Coast. Meanwhile, tidal flooding threatens to erode the architectural integrity of our historic seaport.

Sea level at Annapolis has risen by more than a foot over the last century—more than twice the global average, according to a 2014 report by the Union of Concerned Scientists (UCS). Recent studies suggest that tidal flooding will not only continue, but increase exponentially. The UCS further estimates that by 2030—just 15 years from now—Annapolis can expect more than 180 tidal floods a year. By 2045 the frequency goes up again—to an average of more than 360 times a year.[4]

Between 1957 and 1963, Annapolis saw 3.8 days of nuisance flooding (i.e., occasional minor coastal flooding experienced during high tide) on average. Yet 50 years later, between 2007 and 2013, the city had an average of 39.3 days of nuisance flooding—a 925 percent increase.[5]

Sea level rise is a concern across the Chesapeake Bay region. With its expansive coastline, low-lying topography, and growing coastal population, this is among the most vulnerable places in the nation. The Chesapeake Bay has seen, on average, a one-foot increase in relative sea level rise during the 20th century, six inches due to global warming and another six inches due to naturally subsiding coastal lands. Already at least 13 islands in the bay have disappeared entirely, and many more are at risk of being lost soon.[6] Sea level rise in the Chesapeake Bay region could reach 17–28 inches above 1990 levels by 2095.

The City of Annapolis has seen a dramatic increase in nuisance flooding. Pictured here is the Kunta Kinte-Alex Haley Memorial, located at the City Dock in Historic Annapolis.

PHOTO BY AMY E. MCGOVERN

The Governor's Commission on Climate Change issued the

Maryland Climate Action Plan in 2008 to address sea level rise and coastal storms with the purpose of protecting the state's future economic well-being, environmental heritage and public safety through legislative and policy actions. Among those actions is promoting state- and local-level "programs and policies aimed at the avoidance and reduction of impact to the existing built environment, as well as to future growth and development in vulnerable coastal areas."

The Maryland Climate Action Plan evaluated three possible responses to sea level rise: protect, retreat/relocate, and abandon. Given the importance of the historic district and the waterfront, and the recreational and economic needs for waterfront access, the Annapolis response to sea level rise focuses on protecting existing structures and infrastructure.

So now, as Annapolis celebrates its 50th anniversary as a National Historic Landmark, our efforts are targeted toward the next 50 years, and a renewed commitment to implementing protective measures that will strengthen this National Treasure's response to climate change.

HAZARD MITIGATION PLANNING: WEATHER IT TOGETHER

Like other cities, Annapolis is responding to the threats of natural and manmade disasters by updating its citywide Natural Hazard Mitigation Plan to address various risks prevalent in the region. In addition, the accelerating rate of sea level rise and the devastation seen in the aftermath of Hurricane Sandy has created a sense of urgency in Annapolis for amending the plan to include the protection of cultural resources. The Cultural Resource Hazard Mitigation Plan (CR HMP), now in development, will identify, assess and attempt to avoid or lessen potential loss to historic resources due to natural disasters, primarily threats from sea level rise, subsidence (i.e., the lowering of the land surface), flooding and storm events.

Branded by our CR HMP team as Weather It Together: Protecting Our Historic Seaport, this hazard mitigation planning effort is engaging a variety of stakeholders at the community, state and national level. The process began in 2013 when the City of

Annapolis is experiencing the highest rate of sea level rise of any community on the Atlantic Coast, and frequent tidal flooding threatens the cultural resources of the historic seaport.

PHOTO BY AMY E. MCGOVERN

Annapolis secured funding to develop the plan from the National Trust for Historic Preservation, Preservation Maryland (the statewide preservation organization), the Maryland Historical Trust (the state historic preservation office) and the Maryland Department of Natural Resources. It follows the approach recommended by the Federal Emergency Management Agency's (FEMA's) "how-to guide" for state and local governments called Integrating Cultural Resources into Hazard Mitigation Planning.[7]

In reviewing the FEMA guidance it became clear that our city government did not have the technical expertise to complete the plan; the City's planning department had limited funding for outside consultants; with only 1.5 full-time-equivalent employees in our historic preservation division, we had insufficient staff resources to take on such an intensive planning program; and the City Council did not have climate change as a priority in its budget considerations. Nevertheless, we began.

Now, 18 months later, our historic city is successfully into the FEMA hazard mitigation planning process. As I speak with others around the country about this newly acknowledged threat to historic preservation, my purpose is clear—to protect the preservation gains of the past 50 years from the dangers now posed by climate change. So I always begin with the advice: Don't worry about funding, staffing, politics or property owner pushback… Just start!

APPLYING THE FEMA GUIDELINES

FEMA encourages communities to begin planning with the following guidance: "It is more cost-effective to assess potential effects from a disaster and to implement preventative measures than to wait for a disaster to strike and then assess actual impacts."

FEMA defines hazard mitigation planning as "the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and manmade hazards." The FEMA approach outlines four phases in the development of a comprehensive CR HMP:

1. Organize resources to develop an effective mitigation plan.
2. Identify hazards and assess losses to your community.
3. Set mitigation priorities and goals and write a mitigation plan.
4. Implement the mitigation plan and monitor progress.

While the FEMA process appears linear, in practice it requires repeated public and stakeholder engagement throughout the identification, assessment, prioritization and planning process. It starts with determining the level of awareness and support for protecting your community's historic assets. If your community has designated landmarks or a historic district, you've already started the process. But likely you'll need to survey those properties to determine their individual significance and engage the community to determine the level of public sentiment for safeguarding certain historic properties against the hazards that most make them at risk.

ORGANIZING—ESPECIALLY ENGAGING PARTNERS

The first step in the FEMA "how-to" process calls for organizing your efforts. This begins with building your core team of experts and stakeholders. In Annapolis we engaged our emergency management, planning, public works and building inspections staff. Soon we brought on board the state historic preservation office, the statewide preservation organization, the state emergency management agency, the state natural resources staff, and the state humanities council. We next added the local historic preservation nonprofit, the Main Street program, the residents association and the alderman for our historic district. Our federal partners now include agencies providing both funding and in-kind technical

support, including the U.S. Naval Academy, National Park Service, FEMA, and the U.S. Army Corps of Engineers. Representatives from all these groups meet monthly, hearing presentations from experts and our survey team.

An important benefit of engaging so many stakeholders in the development of your hazard mitigation planning effort is the exposure your project receives, not only in your community but also with potential funders. The agencies that were invited to participate brought diverse financial or technical resources to the table. We received pass-through funding via the Maryland Department of Natural Resources from the National Oceanic and Atmospheric Administration (NOAA) to support our GIS database development, complete the risk assessment survey and develop mitigation design guidelines. The Army Corps of Engineers has provided and continues to provide cultural resource survey work, flood elevation surveys and hazard mitigation modeling.

It is also essential to engage your elected officials and community leaders from the beginning of your planning process. Invite members of your city council to participate in core team meetings (especially the council member who represents your historic district), the head of your local business association or Main Street program, and your funders. In Annapolis we've conducted a work session with the City Council, given two presentations to the Public Safety Committee, and hosted a National Trust media event where our mayor, state senator and house speaker applauded the announcement of the city's designation as a National Treasure by the National Trust, showcasing our battle with climate change. By engaging community decision makers and the media in your planning effort, you will be better positioned for the public involvement work ahead.

IDENTIFYING HAZARDS AND ASSESSING LOSSES

There are four steps in the FEMA hazard inventory process:

1. Identify the hazards that can affect your community.
2. Profile hazards to determine hazard-prone areas and magnitude of each hazard.
3. Inventory historic/cultural resources to assess vulnerability and

establish preservation priorities.

4. Estimate the associated amount of potential losses.

The Hazard Impact Assessment begins with understanding which natural or manmade disaster events are most prevalent in your community. Determine what those events are (flood, earthquake, costal storm, fire, tornado) and then identify and assess the risk posed to resources by those specific hazards. FEMA provides worksheets for recording everything from building type, material, construction date, function and distance from the hazard zone to assessment of vulnerability and of potential economic loss (from loss of structure, contents, and use), displacement cost, economic importance, owner interest in mitigation, and public sentiment, for a total community value score.

In Annapolis we determined our first priority would be to complete a historic survey and risk assessment analysis on resources within the 100-year flood plain (i.e., the land that is predicted to flood during a 100-year storm, which has a 1 percent chance of occurring in any given year). Critical to this process was the development of a GIS database and risk mapping. With expertise from our information technology office and assistance from the Annapolis Historic Preservation Commission's consulting architect, we identified 184 properties for survey and assessment within the 100-year-flood plain.

Whether you use existing staff, preservation consultants or volunteers, ensure that you coordinate with your local preservation or planning agency or your state historic preservation office to conduct the survey so that it meets local, state or federal guidance for the appropriate documentation standards. While FEMA worksheets can be characterized as a "reconnaissance level" survey, this could be an opportunity to complete an intensive level survey in your community.

FEMA recommends reviewing your community's history of disasters, both to understand prior loss and disaster valuations, and also to make the case that an increase in numbers of events over the years makes it imperative to have a cultural resource disaster response plan in place. In Annapolis, documentation goes back to

1667, the "Year of the Hurricane," when "A mighty wind destroyed four-fifths of (our) tobacco and corn and blew down in two hours fifteen thousand houses in Virginia and Maryland."

SETTING MITIGATION PRIORITIES, WRITING A PLAN

In drafting the hazard mitigation plan, you'll need to consider how your priorities align with existing community planning documents. Begin with your city's primary one—the comprehensive plan. In 2009 Annapolis incorporated into its comprehensive plan the following recommendations for responding to sea level rise:

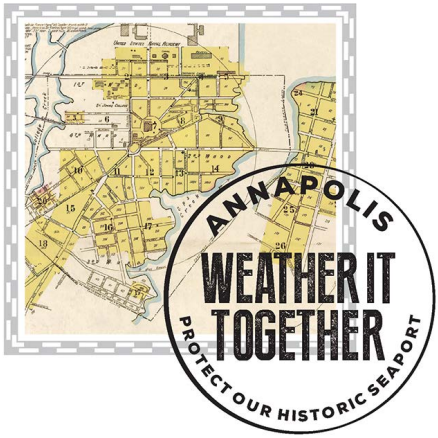
- Evaluate risks from sea level rise in decisions involving land use along the waterfront.
- Determine the costs and benefits of public decision-making in mitigating property damage.
- Evaluate the need and options for protecting historic structures and waterfront areas.
- Allow administrative review and approval or provide for an emergency meeting of the Historic Preservation Commission.
- Require floodproofing to the extent feasible while preserving the historic building exterior.

With that City Council–approved guidance in place, we began our work.

Likely, you'll need to incorporate amendments to related and established plans, including any area plans, master plans, comprehensive plans or natural hazard mitigation plans. To efficiently incorporate your cultural resource hazard mitigation strategies into existing plans, respond to the following FEMA steps in your planning document:

- Develop mitigation goals and objectives for your preservation hierarchy.
- Identify, evaluate, and prioritize actions.
- Prepare an implementation strategy.
- Document the mitigation planning process.

The development of the final Cultural Resource Hazard Mitigation Plan requires that you start the drafting amendments to the comprehensive plan,[8] revising your historic preservation ordinance,



and developing design guidelines.

Design guidelines will identify preventive mitigation actions that can be taken by property owners to reduce hazard impacts. Prevention and protection strategies include retrofitting measures that do not compromise character-defining features of the historic property. The design guidelines will also establish City procedures for immediate, short-term and long-term salvage and recovery operations. Emergency demolition procedures can be incorporated to streamline the review process. The CR HMP will establish the community-based need for investment in public improvements via the City's Capital Improvement Plan. Landmark properties that use the retrofitting strategies described in the Design Guidelines will qualify for a City Historic Property Tax Credit.

Annapolis is fortunate to have had the expertise of the U.S. Army Corps of Engineers Flood Management Team as part of our planning team. The Corps issued a report[9] providing property owners with guidance on basic minimal actions (repointing masonry foundations, creating positive drainage, and improving ventilation), dry floodproofing options (door, window and perimeter barriers; window wells; backflow preventers), wet floodproofing options (using concrete floors, placing electrical and mechanical systems placed above the base flood elevation), and more aggressive actions (such as creating berms, elevating buildings, relocating buildings) that might be appropriate for individual buildings. The report presents the pros and cons of each measure, including a cost-benefit analysis, considering such matters as the level of expertise needed, potential for addressing nuisance flooding, effect on insurance rates, and whether the work will qualify for a property tax credit.

IMPLEMENTING THE PLAN

Even before the draft plan is developed, begin the implementation process. After the first official town hall meeting, property owners in Annapolis began consulting with the historic preservation office to determine what mitigation strategies were most appropriate for their buildings. The City's Department of Public Works and the U.S. Naval Academy, two key core team participants, have begun discussions on joint storm water infrastructure replacement work with the U.S. Army Corps of Engineers, and the National Trust and the Maryland Historical Trust have brought the City of Annapolis into discussions with other communities to share the hazard mitigation planning methodology.

The Maryland Historical Trust will serve as the ultimate review authority for the CR HMP, thus providing for the State of Maryland a historic preservation–based hazard mitigation plan that can serve as a model for other communities.

SHARING WHAT WE'VE LEARNED

Two of the project's key funders—the Maryland DNR and the Maryland SHPO—both indicated that their reason for funding Weather It Together was to use the project as a model for other communities. The MDNR in its written comments evaluating the City of Annapolis' grant request, stated that it "sees the project as having potential transferability to other vulnerable, historic communities," particularly the GIS capability to assist "first responders in the field with immediate updates and damage assessment capabilities."

Responding to interest in the Annapolis model, members of our core planning team have made presentations at various state and national gatherings, including regional American Planning Association and Public Works conferences, state and national preservation conferences, the Pocantico summit on climate change and the National Adaptation Forum both held this past May. More importantly, our assessment team has conducted technical assistance site visits to communities such as Crisfield,

Maryland, which is still recovering from the damage inflicted by Hurricane Sandy. By providing to our peer communities technical assistance, a sharing of lessons learned, and an introduction to our methodology and outcomes so far, we hope to see our resiliency efforts expand into other historic coastal communities. **FJ**

LISA CRAIG is chief of historic preservation for the City of Annapolis and director of the Main-Streets Annapolis Partnership.

1. Remarks from Stephanie Meeks, Annapolis National Treasure Press Event, Annapolis City Dock, October 23, 2014.
2. News Release, United States Department of the Interior, Thirty-Three Sites Recommended for National Historic Landmark Status, June 23, 1965.
3. *Evening Capital,* "Preservation Goals Gain Zoning Victory" July 7, 1965.
4. *Encroaching Tides: How Sea Level Rise and Tidal Flooding Threaten U.S. East and Gulf Coast Communities over the Next 30 Years,* Union of Concerned Scientists, 2014
5. Ibid, UCS
6. *Maryland At Risk: Sea Level Rise Adaptation & Response, Maryland Department of Natural Resources,* September 2008.
7. *Integrating History Property and Cultural Resource Considerations into Hazard Mitigation Planning: State and Local Mitigation Planning How-To Guide,* FEMA 386-66, May, 2005.
8. Annapolis Comprehensive Plan, City of Annapolis, Maryland October 2009. Our's states: "...the historic built environment of City Dock [is] threatened by sea level rise. In conjunction with the development of a Hazard Mitigation Plan to protect historic resources within the 100year flood plain that is currently underway, the City will explore and present to the City Council for consideration several strategies for addressing the 100-year flood and sea level rise..."
9. Nonstructural Mitigation Assessment for the City of Annapolis Historic District, Annapolis Maryland, U.S. Army Corps of Engineers, Baltimore District, December 2014.

TAKEAWAY

Click here to see Story Map showing the impact of sea level rise on cultural resources in Annapolis.

The Impacts of Coastal Erosion on Tribal Cultural Heritage

PATTY FERGUSON-BOHNEE

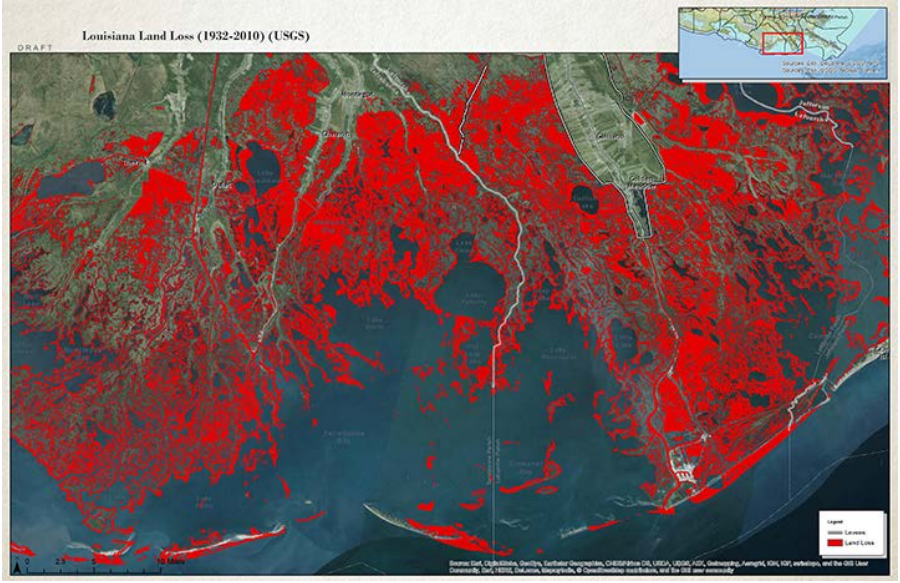
Growing up, I never thought that the community to which I belong, the Pointe-au-Chien Indian Community, would be on the verge of disappearing. Our people have occupied our traditional homelands since time immemorial and have been documented as living here since the first explorers visited Louisiana. The land on which we live was once lush and fertile.[1] We had large agricultural enterprises, domesticated animals, fresh water, and access to game and fish. We lived and continue to live a subsistence lifestyle.

Isolated in the lower bayous of Terrebonne and Lafourche Parishes, we were able to live peacefully and to prosper. Topsoil carried by the Mississippi replenished the earth and created new land. The barrier islands protected the community from flood waters. Today the barrier islands have disappeared, and salt water intrusion has ended most farming and cattle grazing.

Over the past six decades, tribal members have adapted to this changing environment. We continue to fish, hunt and trap, but our small tribe of approximately 700 members faces serious challenges trying to maintain our homelands, culture and traditions due to coastal erosion and environmental neglect. Sacred sites and cemeteries are at risk and some are already submerged. Despite the challenges, the Pointe-au-Chien people have been resilient.

COASTAL EROSION

During the past 100 years, Louisiana has lost more than one million acres of coastal land and wetlands, and is losing approximately 25–40 square miles per year.[2] Ninety percent of the coastal wetlands loss in the United States is in Louisiana. Pointe-au-Chien is located in the Terrebonne Basin, one of the fastest eroding areas in the United States.[3]



USGS map shows the extent of coastal erosion in Louisiana between 1932 and 2010. The areas in red are now underwater.

PHOTO COURTESY USGS

Four key factors have resulted in land loss affecting the Pointe-au-Chien. First, flood control measures taken to prevent flooding at the source of Bayou Lafourche have resulted in increased flooding and coastal erosion for those in the delta. Bayou Lafourche, a main artery of the Mississippi River, once deposited topsoil along the bayous to the Gulf of Mexico. Bayou Lafourche was dammed in 1903 at its source—the Mississippi River—near Donaldsonville to prevent flooding. As reported in an 1896 National Geographic article, levee development would put communities south of the levee at risk, but the author argued that levees could be built to prevent encroachment from the Gulf.

> *No doubt the great benefit to the present and two or three following generations accruing from a complete system of absolutely protective levees, excluding the flood waters entirely from the great areas of the lower delta country, far outweighs the disadvantages to future generations from the subsidence of the Gulf delta lands below the level of the sea and their gradual abandonment due to this cause.*[4]

Thus, at the time of the levee development to prevent flooding for particular inhabitants of Louisiana, this same flood prevention decision also cut off any fresh water and new topsoil from reaching Pointe-au-Chien. Unfortunately, no barriers to mitigate this have ever been erected, and over the past 100 years increased subsidence has resulted in the loss of tribal homelands.

Second, the loss of the barrier islands has resulted in increased vulnerability to storm surge. The Mississippi River Delta and the barrier islands within this delta were formed over thousands of years from fresh water flow and sediment deposits. The USGS has cited "coastal processes, such as the longshore redistribution of sediments" as the cause of barrier island erosion.[5] The processes also include increased wave attack, salt water intrusion, storm surge, and tidal range.

Third, oil and gas companies have engaged in aggressive resource exploration, haphazardly cutting canals through the land, which has led to erosion and increased salt water intrusion. The government has never required these companies to fill in the canals,[6] and cuts to the land cause even more erosion to the now fragile ecosystem.[7]

The lack of freshwater flow, the loss of the barrier islands, and the labyrinth of canals cut into the land for oil exploration have left the Pointe-au-Chien and neighboring tribes vulnerable to even small tropical disturbances. This is compounded by the fourth factor—sea level rise, which has caused increased flooding in the tribal community.[8]

Due to all these factors, this region has undergone tremendous change, notably land loss and increased vulnerability to storms and other severe weather. The most obvious examples of the harm caused by this exposure occurred in 2005 and 2008, when tribal communities were hit by back-to-back hurricanes.[9] In 2005 tribal communities received extensive wind damage from Hurricane Katrina, but the Pointe-au-Chien Indian Community and the neighboring tribal community of the Isle de Jean Charles Band of Biloxi-Chitimacha also received eight feet of flood waters from Hurricane Rita. Rita made landfall more than 100 miles to the west of these

tribal communities. Pointe-au-Chien and Isle de Jean Charles were again affected in 2008 by Hurricanes Gustav and Ike. Hurricane Gustav, a category four hurricane, passed though Terrebonne Parish, causing severe wind damage. Hurricane Ike, another category four hurricane, landed more than 150 miles to the west of these communities. While the neighboring communities have some sort of the levee protection, Pointe-au-Chien does not, and the storm surge created a funnel effect bringing over eight feet of flood waters to the community. There are plans to build a levee to protect the tribe's current village from storm surge; however, most of the tribe's traditional lands are not included in this plan. Between 2005 and 2008, a ring levee was built around the Isle de Jean Charles Indian Community; however, the water topped the levee, and was not pumped out of the community for days after the storm. The added land loss makes the tribal communities more vulnerable to hurricanes, which leads to even more land loss.[10] So with each hurricane, there is more erosion.[11]

PRESERVING A WAY OF LIFE

Pointe-au-Chien Indians lived a subsistence lifestyle—trapping, fishing, growing vegetables, and relying on "traituers," traditional medicine people, to heal the sick and deliver babies. Everything that was needed could be found in the abundant waters and fertile land. Traditional governance and kinship relationships maintained order for the community. Segregation prevented most interactions with non-Indians, including in schools, churches, and restaurants. However, many tribal members sold furs and fish to non-Indians.

This historic photo depicts the traditional palmetto houses of the Ponte-au-Chien Indians. Today, these houses are raised off the ground to avoid flood waters.

Tribal members once lived at least six miles further south "down the bayou," but have been forced to relocate north "up the bayou" for fresh water and higher ground. Pointe-au-Chien people have traditionally lived in palmetto houses with dirt floors. Today houses are raised 10–15 feet off the ground to avoid potential flood damage.

Although tribal members can no longer live on much of our traditional homelands, these lands continue to be used for traditional activities, and tribal oral histories regarding the history and importance of our homelands continue to be shared. Tribal members still hunt, trap and fish and catch shrimp, oysters and crabs in the aboriginal territory. Many tribal members are commercial fisherman, and they share these resources with tribal members and families, and donate shrimp and crab to the tribe to help raise money for special projects such as seafood plate lunch sales and social events. Some tribal members still raise livestock in the territory. But salt water intrusion, which has killed many trees in parts of the community, has limited the ability of tribal members to engage in large-scale agriculture, although some still cultivate individual gardens

Tribal members continue to take care of the land, and take measures to maintain and protect sacred and traditional sites. There are numerous cemeteries, sacred sites and historic mounds located in the traditional territory. These sites are threatened by coastal erosion, severe weather and subsidence. After the BP oil spill in 2010, tribal members rallied to enact a plan to protect and preserve the cultural sites that were at risk of being contaminated by oil.

LACK OF INTEREST OR ACTION

Although the Pointe-au-Chien Indian Tribe is on the frontline of land loss, there has been very little discussion about the people and places affected. Tribal heritage includes traditional ecological knowledge, sacred sites, cemeteries, village sites, fishing sites, waterways, and the history and culture associated with these sites. The tribe is at a crossroads of adaptation or extinction. The tribe

Two paupiere shrimp nets (also called bank nets or land nets), in the Cut-Off canal in Pointe-au-Chien, were once on the bank, but today are surrounding by water. With a few more storms, these remaining patches of land will soon be gone.

PHOTO BY PATTY FERGUSON-BOHNEE

has adapted to the changes in the land, but the projections of land loss in the tribal territory and current village site indicate that the community is on the brink of disappearing if projects are not implemented to rebuild the land, the marsh and the barrier islands.

The State of Louisiana has developed a plan for restoration projects; however, most tribal communities are excluded. Ninety percent of the residents of the Isle de Jean Charles Band of Biloxi Chitimacha Indian Community have already been forced to relocate due to land loss. Unless the state's priorities for restoration change, Pointe-au-Chien tribal residents and their historic homelands may face the same fate.

Furthermore, most of the tribe's sacred sites and traditional territory, and those of most Native American bayou communities, are excluded from the Louisiana Master Plan. Residents have complained about this,[12] but:

> *State officials argued that the science-based plan used objective tools to select the projects that would create the most lasting land for the least amount of money, and building land in eastern Terrebonne [where Pointe-au-Chien is located] was determine[d] to be too expensive and not sustainable.*

Value judgments are once again being made about which communities are most important to protect. The state's most vulnerable communities will be affected by this decision.

Under the National Historic Preservation Act (NHPA),[13] Congress sought to preserve the "historical and cultural foundations of the Nation."[14] NHPA mandates that every four years, the Secretary of the Interior, the Advisory Council on Historic Preservation, and state historic preservation officers should "review significant threats to properties included in, or eligible for inclusion on, the National Register" to ascertain threats and recommend proposed actions.[15]

The Louisiana archeological database includes numerous sites associated with the Pointe-au-Chien, and there are cemeteries, burial mounds and other places not yet identified that are potentially eligible for a National Register designation. Anthropologists working with the tribe have identified more than 20 traditional cultural properties in the Pointe-au-Chien territory, most have been deemed worthy of National Register consideration. To date, the Louisiana SHPO has not recommended any properties from Pointe-au-Chien for inclusion in the National Register despite the threatened status of sacred sites and prehistoric sites maintained by the tribe. Pointe-au-Chien is currently assessing its ability to nominate these sites, including at least seven cemeteries and numerous historic mounds. Although these sites are already "eligible for inclusion" on the National Register, the hope is that getting these sites listed on the National Register can help the tribe raise the awareness of the threats and encourage actions to protect these sites.

Getting tribal historic sites listed on the National Register can also assist in raising funds to protect these sites from eventual destruction. There is a general lack of awareness about these sites, having them listed would also trigger responsibilities when there is federal and state action. The federal government has been engaged in federal restoration and levee projects, and in 2010, through the BP oil spill response and recovery efforts. Although the United States Coast Guard worked with us to protect tribal cultural and sacred sites after the BP oil spill, many

hours were spent educating the numerous revolving-door federal workers about the importance of sacred sites and historic site protection.

Another factor working against us is that, although Pointe-au-Chien is a state-recognized tribe, the tribe does not have federal recognition. Because of this, the tribe lacks a strong voice in protecting the lands on which we live, hunt, fish and thrive. Although federal recognition should not be required to protect traditional tribal homelands, there is little support for unrecognized tribes in this effort. The United Nations Declaration on the Rights of Indigenous Peoples, adopted in 2007, recognizes that indigenous peoples such as the Pointe-au-Chien have a right to their land, territories and resources and shall have legal recognition to protect these lands, territories and resources. The Declaration also recognizes the right to protect historic sites and tribal culture. So despite federal recognition, as a tribe indigenous to Louisiana, there should be more action to preserve and maintain the tribal lands because the loss of these lands and historic sites directly impacts the ability of the tribe to maintain its culture and traditions.

TIME FOR BETTER DECISIONS

The cultural history of the Pointe-au-Chien community is rarely discussed, but as coastal erosion continues, measures need to be taken to ensure the survival of our people.

Tribal traditional cultural properties are worth saving. Although the tribe knows that there are significant limitations on land loss restoration, more should be done to help preserve what is left. Further, we should recognize that most of the land erosion is a direct result of manmade decisions which have led to the acceleration of land loss. As a result of this, tribal cultural heritage has been put at risk, and the consequences have either not been evaluated or have simply been disregarded. Decision makers need to be held accountable for the repercussions of their choices on valued and irreplaceable cultural heritage. **FJ**

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[1] M. Le Page Du Pratz, trans. Stanley Clisby Arthur, *The History of Louisiana or of the Western Parts of Virginia and Carolina* (New Orleans: Pelican Press 1947).

[2] U.S. Geological Survey, "Programs in Louisiana," http://water.usgs.gov/wid/html/la.html#18.1; Charles Groat, U.S. Geological Survey Digital Data Series DDS-79, "Coastal Erosion and Wetland Change in Louisiana: Selected USGS Products," Preface, http://pubs.usgs.gov/dds/dds79/HTMLDOCS/preface.htm.

[3] Restore or Retreat, Costal Erosion: Facts and Figures, restoreorretreat.org/la_erosion_facts.php.

[4] E.I. Cohthell, "The Delta of the Mississippi River," *National Geographic*, Dec. 1897, 354, http://www.lacoastpost.com/National_Geographic_Dec_1897.pdf.

[5] http://pubs.usgs.gov/fs/barrier-islands/

[6] Terrebonne Parish School Bd. v. Castex Energy, 893 So. 2d 789 (LA 2005) (holding that oil lessee has no implied duty to backfill oilfield access canals under La. Rev. Stat. 31:122).

[7] National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, "Deep Water: The Gulf Oil Disaster and the Future of Offshore Oil Drilling—Recommendations," 205-206 (Jan 2011). (BP Oil Spill Commission Report), http://www.gpo.gov/fdsys/pkg/GPO-OILCOMMISSION/pdf/GPO-OILCOMMISSION.pdf.

[8] BP Oil Spill Commission Report at 205.

[9] Hurricane impacts became greater starting in 1992 with Hurricane Andrew and continuing in 2002 with Hurricanes Isidore and Lili.

[10] The damage caused by these flood waters have been measured by the United States Geological Survey, http://pubs.usgs.gov/ds/2007/281/jpegs/Fig13ABayouPointeauChienTM.jpg and http://pubs.usgs.gov/ds/2007/281/jpegs/Fig13BBayouPointeauChienPhotoA.jpg.

[11] Brendan Corrigan, Julia C. Meo, Jonathon Posner, Sam Sporer, Richard Verdin Interview 6 in "BP Deepwater Horizon Oil Spill: Impact and Aftermath for the Pointe-au-Chien Indian Tribe," Tulane University Hisu-394 (Fall 2010).

[12] Nikki Buskey, "Master Plan forgets bayou communities, residents say," Houma Courier, January 25, 2012, http://www.houmatoday.com/article/20120125/ARTICLES/120129791.

[13] 16 U.S.C. § 470 et seq.

[14] NHPA, Section 1(b)(2).

[15] NHPA, Section 101(a)(8).