Fort Proctor: A Conditional Preservation

Ursula Emery McClure, Bradley Cantrell

Louisiana State University, Baton Rouge, LA

ABSTRACT: The preservation and sustainability of building cultural heritage in indeterminate landscapes and sites at extreme environmental risk raises several questions regarding methodology.

1. What are the priorities for preservation of built works where degradation is accelerated by global environmental shifts?
2. What does one preserve of past cultures when the physical ground it once occupied is gone?
3. What are the methods for Historic Preservation when to preserve means much more than stabilizing a built project in time but also includes the preservation/sustenance of the land, the environment, and the cultural relevance?
4. If one cannot physically preserve does that mean its presence and cultural significance is nullified?

To investigate these questions, the research team selected Fort Proctor, a NHRP site at extreme environmental risk. Fort Proctor is one of several forts built along Lake Borgne in Southeastern Louisiana following the War of 1812. Since then, Fort Proctor has remained in a fluctuating landscape as a static marker or datum, recording major ecological changes within the dynamic coastal environment. To understand the structure's deconstruction and degradation as well as the changing Gulf of Mexico ecologies, a rich historical context was assembled from a complex array of disparate datasets (physical site and geographical condition surveys, material analyses, photogrammetric and photographic documentation, and GIS mapping.) From the data, the researchers developed time-based animations that explore the test site in four time-scales; one day, one year, 200 years, and geologic time. The animations present perspectival visualizations that illustrate the aesthetic and atmospheric qualities for each scale while overlaying analytical data and historical facts. They create a composite temporal framework allowing the viewer to digest the disparate datasets as single narratives. These animations and the procedure for their composition present a new preservation methodology for sites where physical preservation is prohibitive and loss unavoidable: "*the conditional preservation.*"

KEYWORDS: preservation, coast, at-risk, Fort Proctor, animations

Figure 1: Fort Proctor (Fort Beauregard), Shell Beach, St. Bernard's Parish, LA. 29°52′2.3″N 89°40′41.82″W. Source: (Author 2012)

INTRODUCTION

The preservation and sustainability of building cultural heritage in indeterminate landscapes and sites at extreme environmental risk raises several questions regarding methodology.

1. What are the priorities for preservation of built works where degradation is accelerated by global environmental shifts?
2. What does one preserve of past cultures when the physical ground it once occupied is gone?
3. What are the methods for Historic Preservation when to preserve means much more than stabilizing a built project in time but also includes the preservation/sustenance of the land, the environment, and the cultural relevance?
4. If one cannot physically preserve does that mean its presence and cultural significance is nullified?
5. How does the preservation of sites influence /modify/conflict with the reconstruction of sites (particularly when a historical site requires new land to be constructed)?

To investigate these questions, we selected Fort Proctor, a NHRP site at extreme environmental risk. Fort Proctor (Fig. 1) is one of several forts built along Lake Borgne in Southeastern Louisiana following the War of 1812. The fort was designed and construction commenced in 1856 but was halted in 1859 because of a hurricane and events associated with the beginning of the US Civil War. Since then, Fort Proctor has remained in a fluctuating landscape as a static marker or datum, recording major ecological changes within the dynamic coastal environment. To begin, a multi-disciplinary team[1] assembled a rich historical context to understand Fort Proctor's deconstruction and degradation as well as the changing Gulf of Mexico ecologies. From this complex array of disparate datasets (physical site and geographical condition surveys, material analyses, photogrammetric and photographic documentation, and GIS mapping) the researchers developed time-based animations that explore the test site, Fort Proctor, in four time-scales; one day, one year, 200 years, and geologic time. The animations present perspectival visualizations[2] that show the aesthetic and atmospheric qualities of each environment while overlaying analytical data and historical facts. The animations allow the viewer to digest the disparate datasets as single narratives creating a composite temporal framework.

The research has generated a new procedural methodology for preservation of sites at extreme environmental risk. In the test site of Fort Proctor, both the building and site exist in a state of decay. To preserve the architecture requires the preservation of the environment and that is not only cost prohibitive but also disproportionately scalar. As the world's global environment continues to shift, more and more preservation sites will face similar dilemmas. We argue this does not preclude preservation however but instead changes the methodology and resultant. In museum conservation ethics there exists a precedent for our methodology; reformatting unstable media. When a media is unstable and/or threatens the existence of other media the secondary form of preservation is reformatting. The goal is to capture the information from the media but not to preserve said media. Thusly, in cultural heritage sites where physical preservation is prohibitive and loss unavoidable, we propose "*the conditional preservation*." Beginning with the traditional HABS methodology we have elaborated on that documentation procedure to create a more experiential and holistic preservation method for at-risk sites. The innovation of this research lies in the combination of addressing the sustainability of building cultural heritage in conjunction with the sustainability of a coastal ecosystem. This paper will elaborate on this procedural methodology and present via the animations, the methodology employed on the test site, Fort Proctor.

1.0. TEST SITE – FORT PROCTOR

This research project utilizes Fort Proctor as a test site for the aforementioned preservation questions the Louisiana Coast (and other world coasts in similar states of erosion) faces. Fort Proctor (also known as Fort Beauregard or Beauregard's Castle) was built in the 1850's as a fortification to protect the water routes leading to the New Orleans. Designed by the architect J.G. Totten with the most current military guidelines of the time damage from a hurricane and events associated with the commencement of the Civil War kept it from being garrisoned. It is currently listed on the National Register of Historic Places (NHRP # 78003067) because it was part of the United States' coastal fortification system prior to the Civil War and also because of certain architectural features which were unusual in the design of American forts.

In the years following the War of 1812, Congress authorized the development of a permanent national system of forts to defend routes which could be used for invasion. Regional fortifications for the defense of the city of New Orleans were conceived as integral links of this extensive national system. The board of engineers, led by Simon Bernard, recommended that a chain of forts and batteries be constructed at strategic locations around New Orleans to prohibit potential invasion routs to the city. For the approach up the Mississippi River, a fort (later named Fort Jackson) was proposed for opposite Fort St. Philip (the only

colonial fort to be utilized in the system.) To protect the northern approaches to the city through Lake Borgne and Lake Pontchartrain, forts were projected for Rigolets Pass (Fort Pike) and Chef Menteur Pass (Fort Macomb) and Lake Borgne (Fort Proctor). To protect the western approach at Barataria Bay, Fort Livingston was proposed at Grand Terre Island. Finally, to defend the pass used by the English in 1814, a battery was proposed at Bayou Bienvenue and a tower was proposed at Bayou Dupre.

It was not until the 1840's that Proctor's Landing began to garner attention as a possible invasion route. At Proctor's Landing there was Bayou Yscloskey. The bayou led inland towards the Mississippi River and besides the bayou was a shell-surfaced road. New developments in naval architecture had led to more shallow draft steam vessels and as a result, new sites previously considered too shallow for invasion routes were added to the New Orleans defense system. Fort Proctor was prioritized and the site was surveyed in 1845 by Second Lieutenant Paul O. Hebert and appropriations for the work at Proctor's landing were requested in 1847. They were not allocated however, for almost ten years due to skepticism over the strength of the overall defense system and issues concerning ownership. Finally in 1856 it was decided that the internal systems development should be continued and 100 acres adjacent to Lake Borgne were purchased from Mary Screven, Stephen R. Proctor's widow, for $10,000 and construction began.

The architecture of the fort is unique embodying two innovations in military fortification design. The first is the inclusion of living quarters for the soldiers including bathrooms and the second innovation is the use of structural iron. It is constructed in the Renaissance Revival style and was designed as a two-story square plan tower with four main guns mounted on a roof terrace. The first story was dedicated to the magazine and the soldiers living quarters. The second story, which was never constructed, would have been dedicated to military operations and the gun mounts. The foundation of the structure is a spread foot base with cisterns below. Rising from the base are sixteen brick piers which would have supported the large groin vaults required for the gun platform. This relatively typical masonry construction, used in conjunction with the cast iron beams which are I-shaped and resemble modern steel, makes this military structure unique.

The architectural significance of Fort Proctor is complimented by the historical site significance. Fort Proctor was originally located on the southern shore of Lake Borgne at the terminus of a road along Bayou Terre aux Boeufs. When construction began, the site of the fort was one hundred and fifty-feet inland with levees protecting the land from Lake Borgne's waters. The fort was designed to sit in a moat with outhouses surrounding the outer terreplain wall. When Hurricane Five crossed Louisiana's coast in 1859, construction halted. After the hurricane, changes in marsh sizes were visible, though not extreme. Before construction could resume however, confederate soldiers blew the levees allowing for water to move its way into the fort and its site. The site of the fort sat stagnant for 109 years. Even though the fort was never used for its true purpose, its origin and siting as part of the Mississippi River access and US coastal fortification system make it historically significant to the military history of Louisiana and the United States. In 1965, the U.S. Army Corps of Engineers dredged the Mississippi River Gulf Outlet between the site of the fort and Shell Beach. Since then, the salt water from the Gulf of Mexico and repeated storm action has slowly eroded away the marshy landscape. Now Fort Proctor is currently 230 feet off the coast into Lake Borgne separated from the mainland and preserved from modern development. Presently there is a rock berm in place to mitigate wave action but the future existence of the fort is clearly at peril. It is at guaranteed risk of being completely destroyed by future storms and predicted sea water rise. The integrity of the fort (structural, material, and detail) is threatened by the deteriorating conditions at the site and it is this contemporary condition that stipulated it as a perfect test site for this research project.

2.0. RESEARCH METHODOLOGY- THE CONDITIONAL PRESERVATION

The "conditional preservation" research project commenced in the fall of 2011 with one year of funding from the National Park Service and the LSU Coastal Sustainability Studio. A student research team was dedicated to each funding source but all were supervised by one principal investigator. The teams worked collaboratively throughout the grant period yet retained distinct research goals. The NPS grant had a single principal investigator, the author, while the CSS grant was supervised by the principal investigator (architect), a landscape architect, and a structural engineer. Both teams collaborated with consultants from mathematics, preservation technologies, coastal studies, and civil engineering. The "conditional preservation" was not the original goal of either grant but materialized from the discourse between the teams and the consultants. [2]

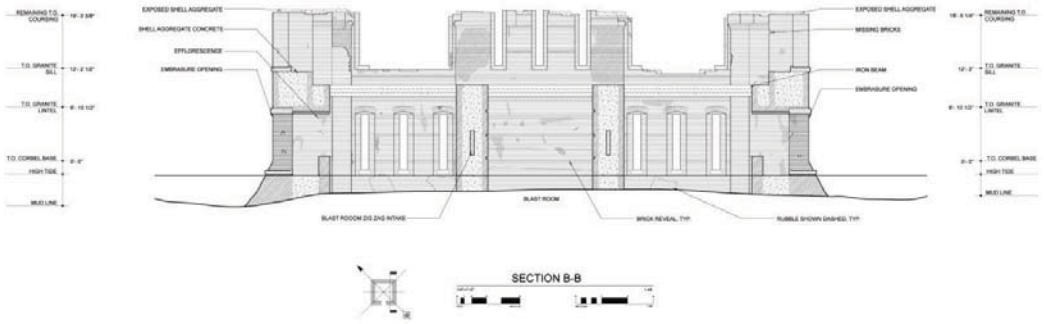

Figure 2: Fort Proctor HABS LA-199, Measured Section Drawing. Source: (LSU HABS team 2012)

The NPS sponsored research began with a Historic American Building Survey (HABS) of the test site. In 1935 the Civil Works Administration Act established a policy

> to preserve for public use historic sites, buildings and objects of significance for the inspiration and benefit of the people of the United States" (*Historic Sites Act of 1935*, 16 U.S.C. 461 to 467, Tyler 2009, 40).

To employ this policy, in an agreement between the American Institute of Architects, the Library of Congress, and the Department of the Interior's National Park Service, the HABS program was created and the NPS established rigorous documentation standards and provided administration.

> The survey shall cover structures of all types from the smallest utilitarian structures to the largest and most monumental. Buildings of every description are to be included so that a complete picture of the culture of the times as reflected in the buildings of the period may be put on record"(HABS, 1999).

The documentation for HABS includes field notes, historical narrative reports, measured drawings, and large format photographs. All documentation becomes part of the National Archives and are housed, serviced, and maintained in the Library of Congress. Over 35,000 buildings and sites have been documented since the program began and presently digital access to the archive is available.

The documentation of Fort Proctor per the NPS survey guidelines provided much of the physical measured data required for this research project (Fig. 2). The precise measure and cataloguing of the structure with drawings and photographs created a visualization of the structure's present condition while the historical narrative constructed a timeline of its existence. For the researchers' however, a substantial disconnect lay between the static and momentary visual documentation of the present and the linear and perpetual historical narrative. Not only did the data seem disjointed but it did not accurately reflect the conditional environment of the fluctuating landscape against the structure. This conditional characteristic needed to be captured so that the preservation questions could be addressed.

In collaboration with the HABS research team, the CSS research team compiled the necessary data to quantify the dynamic condition of the test site. First, they collected all quantifiable environmental data. Utilizing GIS for the contemporary data and written documents for the historical, an environmental timeline was constructed. Secondly, using Google Earth and historical maps, a coastal edge timeline was constructed. Both of these data sets the teams supplemented with "significant event" data such as storm systems and infrastructural adaptations that modified the coastline and salinity levels. To correlate the environmental and landscape fluctuations to the fort structure, multiple three-dimensional digital models were made of the fort and its landscape. To construct the building models and reflect change over time, the team used the original construction drawings by J. G. Totten, early photographs, and the present HABS documentation. This measured visual data was informed by the structural analysis of the brick and mortar: a numerical dataset produced from an investigation of the materials' strength, decay, and rate of decay relative to time, storm effect (wind, waves, dynamic pressure), and salinity exposure. All of the data the teams collected combined into multiple digital models built with Autocad, Autodesk Revit and Revit Structure, 3DStudio Max, and Adobe.

It was at this point in the research, that some of the preservation issues became clearer. The visualized models of the test site throughout time determined the unavoidable loss of both fort and landscape. They also identified the period of significance, a determination required for defining preservation requirements. The NPS defines period of significance as

> the span of time in which a property attained the significance for which it meets the National Register Criteria" (Workflows Definitions, 2013).

Although the 1978 NHRP nomination form declared the site's period of significance 1800-1899 the researchers concurred the more significant period was from the beginning of the construction period (1856)

to present. The static structure and its siting on the dynamic Louisiana coast served and perilously continue to serve as a datum to measure the fluctuating environment and major ecological changes. Simultaneously the structures deconstruction and degradation identifies issues faced by historic sites found in indeterminate landscapes and at extreme environmental risk.

Based on the aforementioned determinations, it was concluded to employ one of the typical preservation methodologies for this site was not appropriate. Protection, rehabilitation, reconstruction, restoration, or stabilization treatments (as defined by the NPS, Dickenson 1983) were deemed not only cost-prohibitive but also impossible. For any of those methods to have any preserving effect would require modifying the global environment. Thusly, the team researched other preservation methodologies outside of the stated historic building and landscape treatments. Libraries, archives, and museums are all concerned with maintaining or restoring access to artifacts, documents and records through the study, diagnosis, treatment and prevention of decay and damage. Besides preservation they also practice conservation which refers to the treatment and repair of individual items to slow decay or restore them to a usable state. For example, the Library of Congress established in 1967 the Preservation Directorate. Composed of the Office of the Director for Preservation (which includes the Mass Deacidification Program) and four divisions, the Binding and Collections Care Division, the Conservation Division, the Preservation Research and Testing Division, and the Preservation Reformatting Division, the directorate is responsible for all of the Library's holdings (over 125 million items). This vast, diverse, and unique collection (books, recordings, photographs, maps, manuscripts, etc.) requires the Library to employ all preservation methodologies, including even the process of reformatting. Reformatting is used to preserve materials that are on an unstable media and/or the material threatens the existence of other media. The goal is to capture the information from the media, through replacement or provision of surrogates, so that the content will be accessible and usable. It is often determined as the preservation method "of last resort" and "priority is given to high-value, at-risk materials of national interest" (Preservation Digital Reformatting Program 2012).

As the research project focused on the investigation of building cultural heritage in indeterminate landscapes and sites at extreme environmental risk the preservation method of reformatting seemed applicable. The material (Fort Proctor) is on an unstable media (Louisiana Coast) and the dynamic coast threatens the existence of the fort. The reformatting methodology would first dictate the provision of a replacement, an exact copy. However as a building is a unique structure found in a singular location that is not possible. Thusly, the research team decided on the provision of a surrogate, a substitute for oneself. At the Library of Congress, preservation surrogates include microfilm, paper-to-paper, and most recently digitization. Microfilm and paper would suffice if the item was two-dimensional but a building is not and as previously stated for this project, nor is it static. The fort's period of significance is its position as a datum, a marker of time. It persists, recording major ecological changes within the dynamic coastal environment and the influences of those changes on the structure. This inclusion of time in the preservation dictated digitization be the surrogate for it is the only surrogate that might be able to record time. Digitization also provides a means of capturing three-dimensional data with such modeling programs as Autocad, Revit, and 3DStudio Max. Acknowledging that actual physical preservation was not applicable for the conditions researched and two-dimensional preservation would exclude valuable information, a digital surrogate was employed

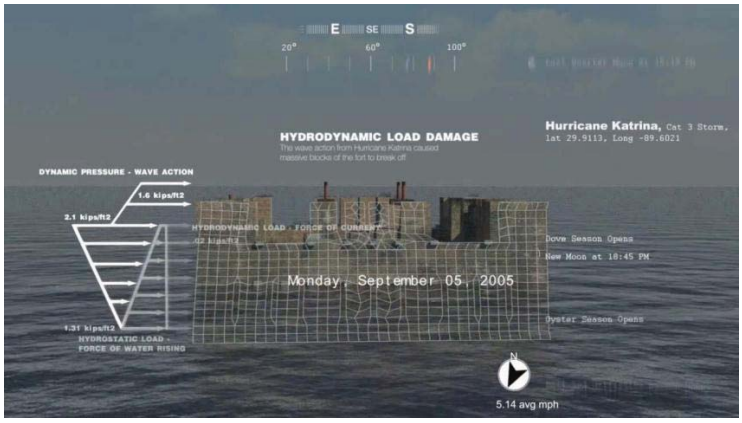

Figure 3: Single year animation still. Source: (Author 2012)

The digital surrogate was used to create the "conditional preservation" and is the determination of this research project. Assembling the complex array of data gathered by the team, including the multiple digital models constructed of the fort and landscape from its design conception in 1846 to its present day realized condition, the team developed a series of time-based animations. Utilizing historical drawings, maps, photographs (past and present) and current field surveys and GIS data, these models were constructed in a symbiotic digital environment of AutoCad, Revit and Revit Structure, and 3DStudio Max. These digital models then became the base structure for the animations. The goal of the animations is to present "a complete picture of the culture of the times as reflected in the buildings of the period" (HABS, 1999) through perspectival visualizations of the test site. To create the complete picture, the team identified four critical time-scales to animate for the fort: a single day, a single year (Fig. 3), 200 years, and geologic time. Geologic time to illustrate the dynamic condition of the Louisiana Coast, 200 years to document the full life of the building and the changes upon it and its site, a single year (2005) to capture its condition in an environment of extreme risk, and finally a single day to present its architectural condition. Each animation, through the myriad of changes they exhibit, frames each time-scale's analytical focus and also presents the aesthetic and atmospheric qualities of each environment complete with overlays of analytical data and historical facts. The animations allow for the viewer to digest the disparate data as single narratives creating a composite temporal framework. They also preserve, at a minimum, the visual experience of a building and its environment.

These animations and the procedure for their composition present a new preservation methodology for sites where physical preservation is prohibitive and loss unavoidable: "*the conditional preservation*." Historically and currently humankind has inhabited the coastal environments of the Earth (40% as of 2007). Simultaneously, sea level rise and global climate shifts continue to exert changes upon these environments.

> To preserve for public use historic sites, buildings and objects of significance for the inspiration and benefit of the people" (Tyler 2009, 40)

that are found in such dynamic, at-risk environments has become a significant concern and is somewhat contradictory. Fundamentally the preservation and sustainability of building cultural heritage advocates to keep or save from destruction and to establish a singular period of significance to be maintained. As this is not always feasible (nor completely indicative of a building's significance) we argue that similar to libraries, museums, and archives, reformatting provides a methodology for "a conditional preservation." The rigor of traditional historic preservation documentation creates a model for reformatting and the creation of a surrogate. The documentation, similar to most representational processes, is both a reformatting of current data and a heuristic process that speaks to future physical interventions.

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ENDNOTES

[1] The NPS sponsored team consisted of the principal investigator, Ursula Emery McClure and the student team of Taylor Alphonso, Annette Couvillon, Lindsay Boley, Cody Blanchard, Christopher Peoples, and Sarah Kolac. They prepared the HABS documentation and were awarded the 2012 Peterson prize for their archival work of the Library of Congress. The CSS sponsored team consisted of three principal investigators, Ursula Emery McClure, Bradley Cantrell, and Michele Barbato. The student team was Ben Buehrle, Audrey Cropp, and Claire Hu.

[2] http://vimeo.com/channels/392545