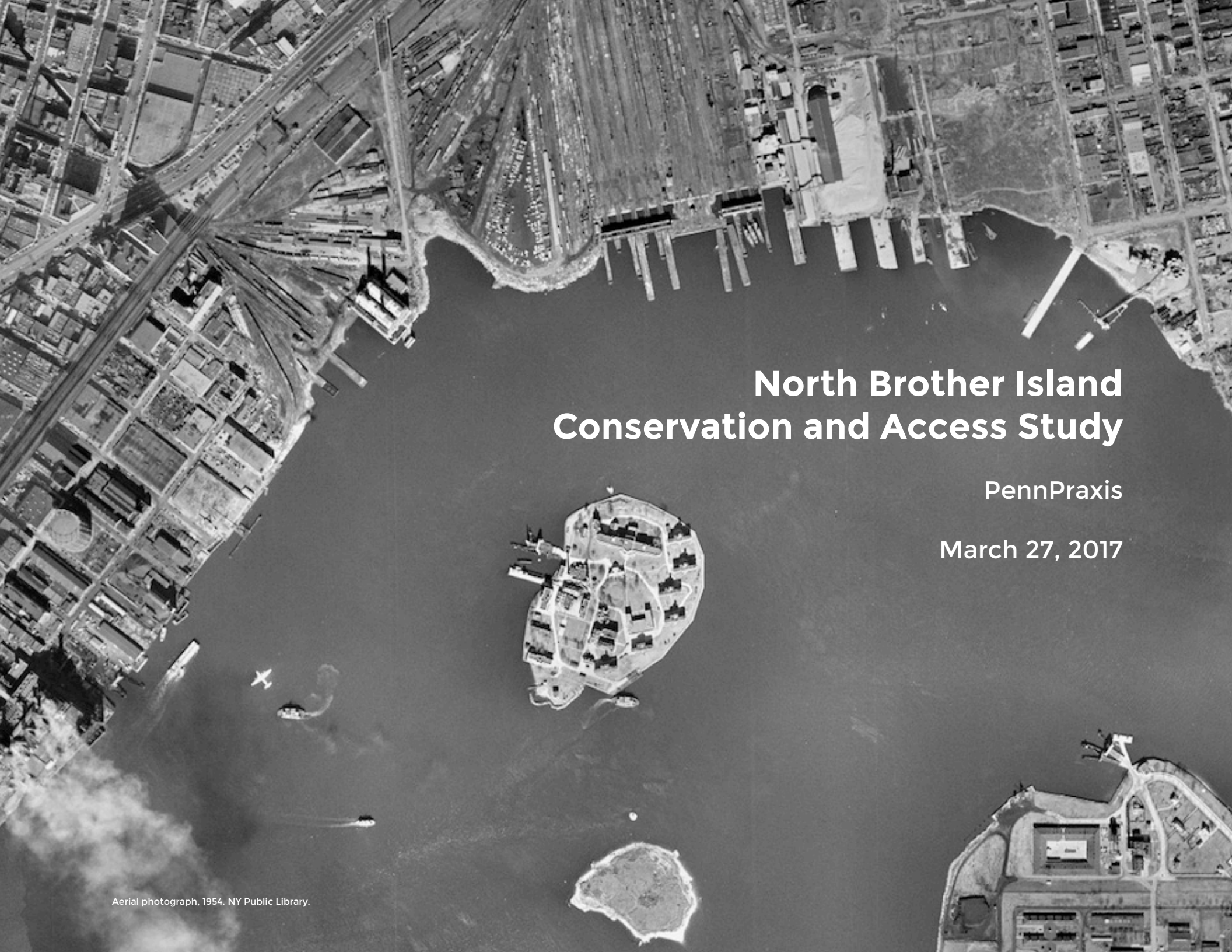
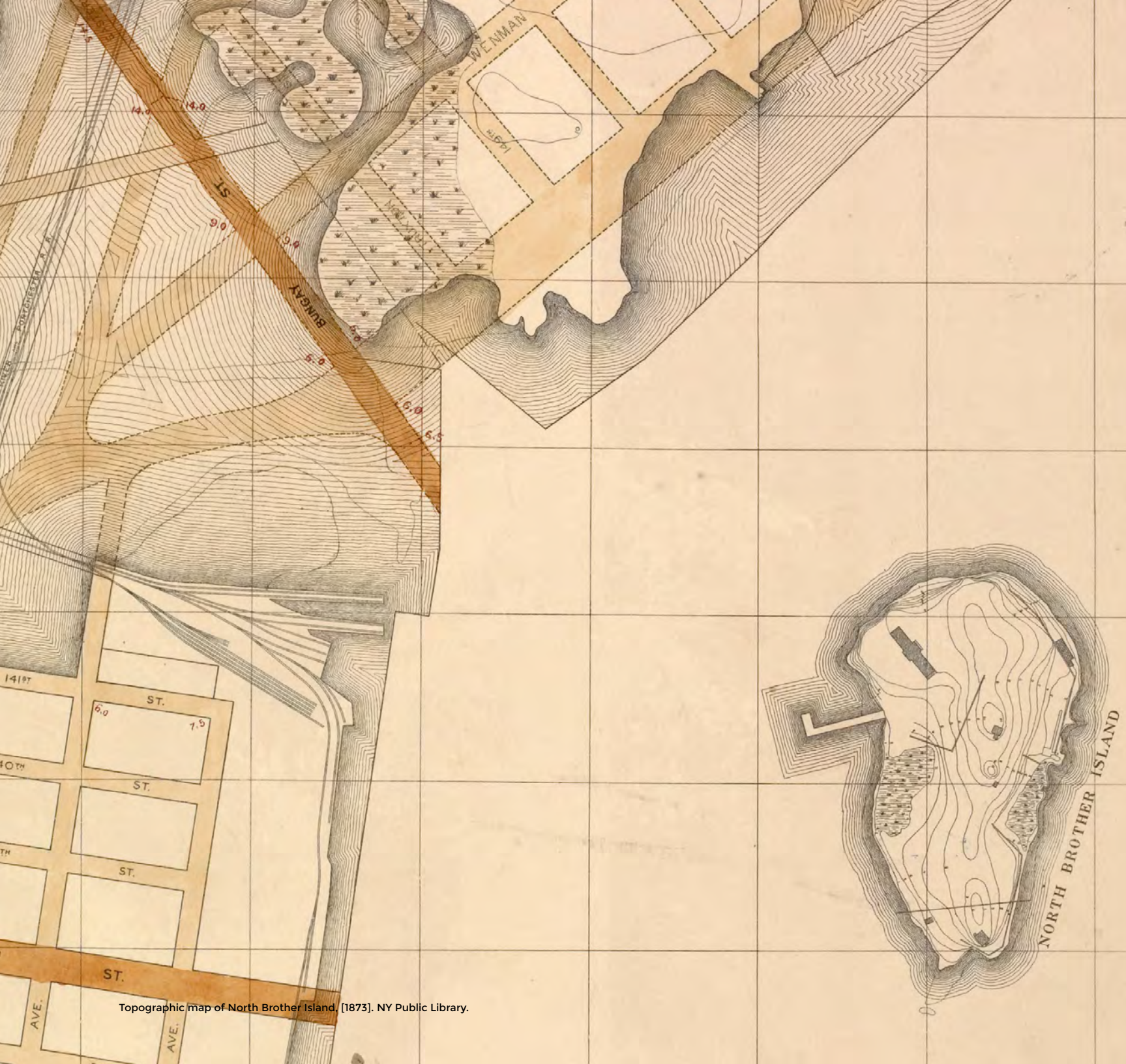


North Brother Island Conservation and Access Study

PennPraxis

March 27, 2017

Aerial photograph, 1954. NY Public Library.



Topographic map of North Brother Island, [1873]. NY Public Library.

Aerial photograph, 2015.

EXECUTIVE SUMMARY

North Brother Island is among New York City's most extraordinary and least known heritage and natural places. This 22-acre Island located in the East River near the South Bronx was formed from glacial outwash and expanded by landfill. North Brother (NBI) was used for quarantine from the 1880s through the 1960s, and has been abandoned for decades. Today, NBI is part of the City park system, and valued for multiple reasons: its ecological rarity and function as a wildlife reserve; the significance of the cultural narratives and architectural works associated with the Island's development as a quarantine site; and its potential as an open-space resource for South Bronx communities and the City at large.

Current management of the Island centers on a Forever-Wild strategy, precluding public use. Cultural resources go largely unaddressed; minimal ecological restoration has focused on strengthening the Island's highly disturbed natural environment. Questions about providing public access have been raised by advocates. The specific questions underpinning this study of North Brother Island is how strategies for more encompassing conservation (of built heritage and natural resources) and possibilities for public access might be balanced going forward. What are the conservation priorities cultural as well as natural resources? Are some forms of public access desirable and feasible? The basic findings of this study is that some measure of curated public access could significantly benefit New Yorkers' use of open space, engagement with nature, awareness and support of conservation, and memory of the City's struggles with quarantine. Conservation of ecological as well as cultural values can be balanced with limited public access.

This conservation/access study was conducted by PennPraxis, an arm of the University of Pennsylvania's School of Design, with the support of the J.M. Kaplan Fund. PennPraxis is partnering with a number of organizations, individuals, officials, and stakeholders for this study, including: NYC Department of Parks & Recreation (NYCDPR), Councilman Mark Levine, The Point CDC, Barretto Bay Partners, Rocking the Boat, additional faculty from PennDesign, and allied experts in fields ranging from urban ecology to structural engineering to public history. We have consulted with a number of experts and organizations with knowledge of and/or interests in North Brother Island.

This document is intended as a basis for further consultation and discussion, identifying areas of consensus and conflict, potential solution paths, and further research. Our work takes stock of the natural, cultural, planning and community contexts of NBI as they continue to shift and change and our concerns include both the long-term stewardship issues connected to the Island and the immediate potentials for social benefit. The balance of the report conveys the findings of our study, highlights the investigations and research we've done, describes questions we continue to explore, and outlines our provisional recommendations.

The research base for this study was built substantially by a PennDesign Historic Preservation studio course in Fall 2015, carried out by 11 Penn graduate students led by Professor Randall Mason (see Credits page for details). With guidance from faculty and experts, the graduate student team documented existing conditions, summarized the history and evolution of the Island, and carried out limited consultations with stakeholders. Students' conclusions and design interventions are not incorporated as part of this report, though they have played an important role in analyzing and challenging potential future visions for the Island. Amy Freitag, Executive Director of the J.M. Kaplan Fund, has been a constant source of support and inspiration. This work was undertaken with the gracious cooperation and support of NYCDPR, managers of both North Brother and South Brother Islands. We are grateful that Parks personnel generously lent their time and expertise to this effort.

Photo of North Brother Island Gantry. Evan Oskierko-Jeznacki. 2015.

SUMMARY FINDINGS, PRINCIPLES, POLICIES AND OUTCOMES

Findings

- North Brother Island is an ecologically complex place as well as a historically and culturally rich landscape; NBI is significant for both its cultural and natural values;
- The buildings and other cultural resources of North Brother Island are in advanced states of decay: some are beyond repair or collapsed; others are worthy of stabilization, few are potentially suitable for adaptation and reuse;
- Biophysical factors, both natural and anthropogenic, have continued to disturb and transform the ecology of NBI; among observed changes are the disappearance of Black-crowned Night Heron population from the Island (and increased population on SBI) and the persistence of numerous invasive plant species. The resilience of North Brother Island's natural resources and ecology faces further challenges with the impacts of climate change, including erosion, storm surge, and sea-level rise.;
- No public access to North Brother Island is allowed. The only access permitted is for management, stewardship, and monitoring purposes, and is tightly controlled by NYCDPR. Evidence exists of illegal visitation to the Island, by "urban explorers," vandals, et al.;
- Hazardous conditions exist on the Island, including compromised buildings, lack of emergency services, and a lack of basic amenities;
- The Island is quite close to the Bronx, yet is inaccessible; there is considerable demand for the services NBI could provide, principally for education; Bronx neighborhoods and residents are underserved in terms of open space;
- New forms of public space, and heightened expectations about the qualities of and access to public space, are part of the current era of urban innovation; this era of urban innovation is also producing new forms of stewardship.
- North Brother Island lacks all necessary infrastructure for occupation or public interpretation/access, including power, water, transportation, and communication;
- Due to these many issues, as well as legal and financial barriers, there continues to be no potential for inhabitation of North Brother Island.

As a landscape of considerable cultural and natural significance, North Brother Island offers great potential for temporary, light-imprint, public uses such as memorialization and environmental education.

Taking into account the research and consultation so far conducted, and the important questions they pose, this Conservation and Access Study proposes an initial set of principles and policies to guide future actions. Specific outcomes are also suggested for immediate action taken by the partners, led by NYCDPR.

Principles

We propose several Principles to guide future plans for North Brother Island:

- Holistic: Plans should consider all resources – cultural, social and ecological – and the dynamics linking them.
- Integrated: Plans should unite all of the Island's resources, and connect them with surrounding communities (both social and ecological); likewise, the goals of NYCDPR's proposed activities should complement those of other stakeholders.
- Balanced: Plans should give fair consideration to both natural and cultural values of the Island, and to opportunities for conservation and access, when making long- and short-term decisions pertaining to programming and development.
- Collaborative: Policies, decisions, and implementation should be collaborative across sectors and stakeholders – while respecting NYCDPR's principal responsibilities for stewardship of NBI as a civic asset.

Policies

Three broad policies should govern future decisions:

- Regarding preservation of cultural heritage: Given advanced decay, loss of integrity of most buildings, and the total lack of infrastructure and impossibility in the short- or medium- term for inhabitation or infrastructure development, preservation policy centers on triage. A few buildings should be stabilized (for possible future reuse); some should be stabilized as ruins; some should be demolished out of concern for safety (and their material should be reused on-Island). The cultural heritage of the Island should be purposefully interpreted to the public.
- Regarding ecological management: Restoration of the Island's highly disturbed ecosystem should be continued in order to protect/provide heron habitat in case they return from SBI or other sites, and to increase the resilience of the Island's ecology to storm surge, sea-level rise, and the continuing challenge of invasive species. This would be achieved by continuing the Natural Resource Group's policy of introducing native plants, removing invasive species to provide stopover and nesting habitat for landbirds, maintaining the structure and mix of the Island's existing character areas (as generated by both natural and anthropogenic forces) and monitoring for signs of habitat use by birds and other wildlife.
- Regarding access: A pilot test of very limited and highly curated access should be undertaken. The potential for realizing social values from environmental and historical education of NYC youth is substantial. Safety risks are manageable; the lack of infrastructure can be accommodated by keeping groups small, visits short, and supervision strict. Audiences from the South Bronx should take priority, but not have exclusive access. Very limited access to NBI would also advance the interpretation of the Island's history and ecology, including the challenges facing its management as a public, Forever-Wild park.

Interventions

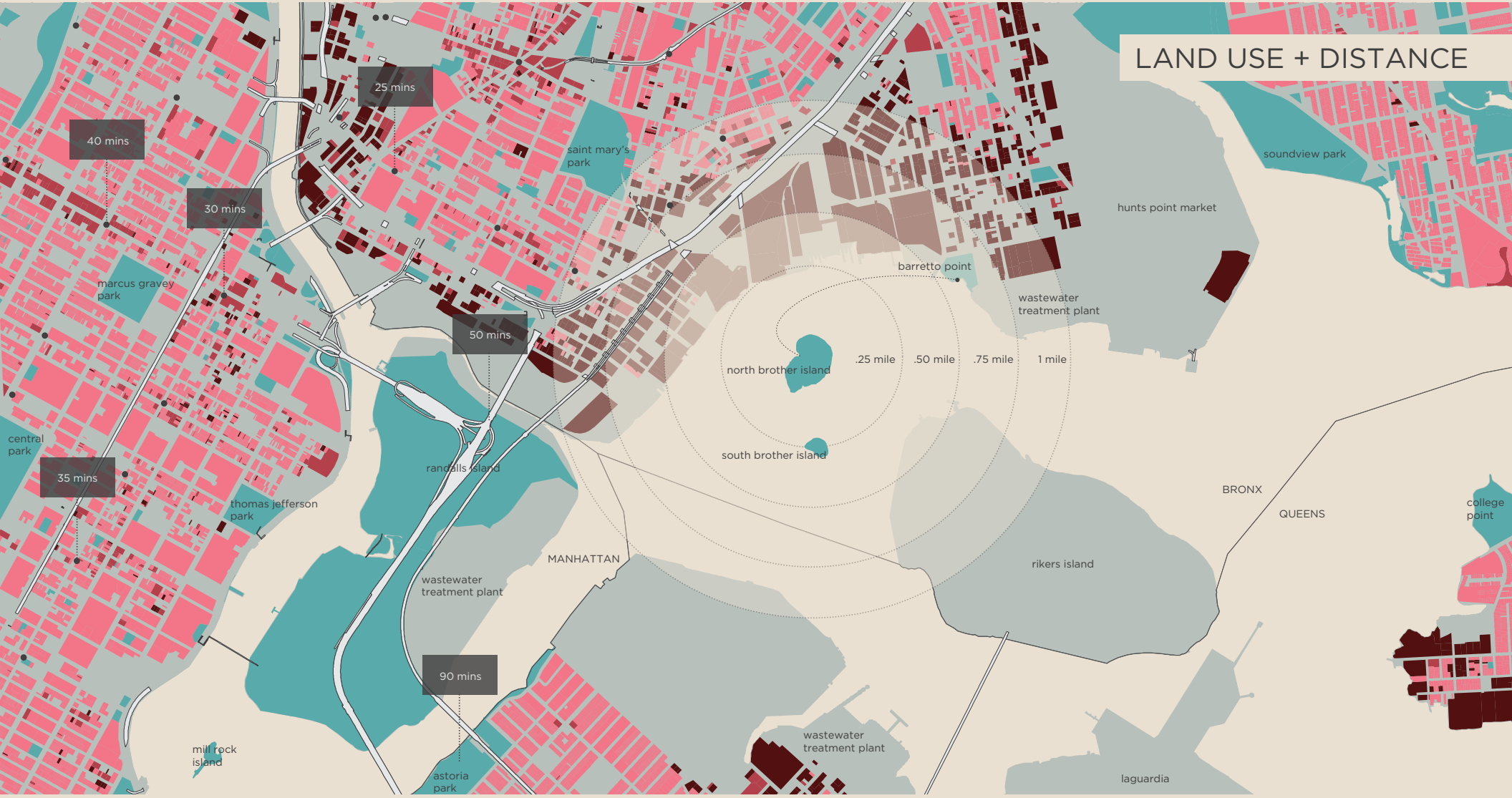
Several interventions are proposed as short-term initiatives:

- Formulating an official management plan for NBI and SBI and studying them in the context of the larger matrix of nearby islands;
- Stabilizing ruins and dismantling some buildings that are beyond repair and present imminent threats to safety; these decisions should be based on a deeper level of building assessment than has been possible thus far, carried out immediately in collaboration with NYC officials (only cursory building investigation was possible during our 2015 site visits);
- Piloting limited, curated public access; principal partners and audiences will be Bronx-serving community entrepreneurs and entrepreneurial NGOs; initial access events will provide excellent educational opportunities and very limited economic development opportunities;
- Designing an interpretation and memorialization scheme for the Island's important cultural and natural narratives; to be located on-Island and off-Island;
- Installing monitoring regimes, related to ecological as well as cultural resources; this is essential for long-term conservation and can have strong educational and community engagement components.

Issues For Continuing Discussion

We intend to continue the planning and implementation of conservation and access to NBI. As further research and conversations are undertaken with a range of stakeholders and experts, the PennPraxis team has identified a series of outstanding questions needing further consultation and discussion:

- Soliciting the views of additional and more varied stakeholders, including South Bronx residents and groups, ecological conservation and historic preservation groups, NYC agency representatives, shoreline landowners and potential partners in the interventions proposed above;
- Seeking consensus on conservation priorities regarding buildings and landscape;
- Identifying and establishing thresholds for access and conservation (both building and ecological conservation);
- Coordinating with the Harbor Herons Conservation Plan and other relevant planning efforts
- Designing potential access scenarios: determining the feasibility, location, operation and administration of different options for limited, curated public access.
- Designing an interpretive strategy.
- Addressing costs and financing (including potential sources of support), as well as other implementation issues.



HISTORICAL context


1898


1900


1947


1966

FIGURE 1.
Historic development of area around North Brother Island and modern land use categories. Angelina R. Jones. 2016.

1. INTRODUCTION

1.1 Site and Situation

North Brother Island (NBI) is a 22-acre former-quarantine Island located just south of Hunt's Point, South Bronx, in New York City's East River. Though owned and managed by the New York City Department of Parks and Recreation (NYCDPR) as a public park, no public access is permitted. South Bronx residents and community organizations, and some other city advocates, have expressed desire for access.

The Island possesses a unique historic landscape with significant cultural heritage and natural resource/ecological values. The most significant part of the Island's history was its role as a quarantine Island from the mid-1800s, through World War II. NBI was briefly inhabited in the aftermath of WWII, and was abandoned by the last health-related users in the 1960s. Despite several proposals for reuse, it has remained uninhabited since that time. Following abandonment and regrowth of a more or less wild ecosystem, several species of colonial wading birds began nesting on the Island, including the Black-crowned Night Heron (*Nycticorax nycticorax*). NYCDPR acquired North Brother Island in 2001, to be managed as a "Forever Wild" space where public access would be banned (evidence from nearby islands suggest thta any human access endangers bird populations). This designation includes regulations pertaining to landscape maintenance, but does not outline specific policy relating to buildings or cultural resources. Due to the presence of these protected birds – and the dilapidated, unsafe condition of the Island's structures – access has remained prohibited. In addition to providing habitat for Harbor Herons, NBI is valuable habitat for other bird species and contributes to the collective ecosystem services provided by the network of open space in NYC.

According to the Harbor Heron monitoring reports produced by New York City Audubon, the herons have not been nesting on the North Brother since 2008, apparently moving to nest on South Brother and other Islands in NYC. Despite this trend, it is possible that birds will return to North Brother, so maintaining the Island as a viable habitat remains important. NYCDPR has been carrying out a forest restoration campaign, strategically removing non-native, invasive plants and replanting native species in key locations to create a more hospitable nesting environment. NYCDPR also has worked towards debris elimination and stabilization, after 2012's Superstorm Sandy, yet there is no long-term plan for maintenance or access to NBI's buildings.

Due to its extraordinary story and significant values, NBI presents numerous opportunities and challenges when considering its future as a part of the greater New York City archipelago, and a valuable asset in terms of heritage and ecology.

1.2 Study Brief

This Conservation and Access Study is tasked with documenting the current conditions of North Brother Island and threats to its future; analyzing the conservation needs and priorities for both natural and cultural resources; and evaluating the possibilities for enabling and providing public access to the Island in the future. This research is aimed at generating a conversation about the Island's future as a public landscape, evaluating the possibilities for balancing conservation and public access, and offering proposals for both strategic and practical action.

The Conservation and Access Study builds directly on research conducted by two studios at the University of Pennsylvania. The first, in 2005, evaluated the Island to determine if creating access would be appropriate. At this time, they determined no access should be granted, and the Island should be managed as an ecological asset, due to the prevalence of sensitive birds on the Island.

In 2015, a second PennDesign studio focused on North Brother Island. This group re-evaluated the decisions of the 2005 group, since over the course of the last decade the birds had apparently relocated their nests to the adjacent South Brother Island, using North Brother Island for foraging and roosting.

Also, in the past decade the buildings had experienced more deterioration and weathered numerous storms, accelerating their decline. Two other, citywide contexts added field: as more people have become interested and aware of the health benefits of open space, community and city, entities in the South Bronx have expressed interest in using the Island for recreational purposes; and creative placemaking successes around the City have alerted New Yorkers to more possibilities for creatively and temporarily activating public spaces. The objective for the studio was to reevaluate the 2005 plan within the context of these new circumstances.

Goals of the study:

- Document current conditions of both natural and cultural resources, establishing a baseline
- Analyze values attributed to the Island, now and in the future; consider the perspectives of a wide spectrum of stakeholders
- Analyze the possibilities for balancing conservation and public access; explore the forms that future conservation and access activities might potentially take
- Articulate a vision for the future of NBI in light of its value as a public space and civic asset with considerable heritage and natural values. This vision will revolve around restoration/maintenance of a healthy, resilient ecosystem; public interpretation of NBI's cultural meanings and historical narratives; and realizing some of the social benefits of open space experiences for NYC, and especially South Bronx, citizens.

2. HISTORY AND EVOLUTION[1]

One of many Islands in New York City's East River, North Brother Island (NBI) has had a rich and varied history. Its clear division from, but adjacent position to the City has consistently played a role in its use, design and management and it was developed principally as an isolation hospital campus. Today, it exists as a wildlife preserve, closed to public access, overrun by invasive plant species and dotted with architectural ruins. Yet for about 100 years, it was a well-maintained institution serving the people of New York City.

2.1 Settlement

Captain Adriaen Block, a Dutch settler, first discovered North and South Brother Islands sometime between 1611 and 1614 and claimed the pair for the Dutch West India Company.[2] He named the Islands de Gessellen, translating roughly to "brethren," which was later interpreted as "brothers."[3] They were granted to Joseph Graham in 1695, as a part of Queens, and remained undeveloped for almost two centuries.[4] Morrisania, a town in the Bronx, purchased North Brother in 1871 while South Brother remained a part of Queens until 1964.[5] North and South Brother Island would continue to have divergent paths from this point forward. The division of ownership ensured divergent futures for the two islands. South Brother Island was a private residence, and then vacant, and became a part of the Bronx in 2007. It is also managed by NYCDPR.

Both North and South Brother are located at the northern entrance to the dangerous stretch of the East River known as Hell's Gate, between Wards Island and Astoria, Queens. As the shipwreck count increased in the early nineteenth century, the New York Superintendent of Lights made this area the top priority for the installation of infrastructure vital to safe ship passage. In 1868, a lighthouse was constructed on North Brother Island, including a two-story keeper's dwelling and a fifty-foot tower. This portion of the Island remained under ownership of the United States Coast Guard; the lighthouse was decommissioned in 1953.

2.2 Quarantine Island, 1880s - 1943

Due to the social stigmas of immigration, illness and the rampant spread of "communicable" diseases, North Brother was perceived as the perfect location for the sick because it was isolated from, but still in close proximity to, the city. The earliest inhabitation of North Brother Island was for a small quarantine hospital established by The Sisters of Charity in the mid-nineteenth century.[6] A map dated 1873, from a topographic survey of the Bronx [see report cover], indicates detailed topography of the Island. It also indicates the location of the lighthouse and early hospital structures. Uncertainty about the true date of this map (it could date from the 1880s) make it uncertain whether these are the first Riverside Hospital structures.

Control of the Island was transferred to Manhattan in 1881, and the Department of Health and Hospitals immediately planned to build a new, larger facility on the Island.[7] The new Riverside Hospital campus was designed by Charles C. Haight, including a two-story brick hospital for 80 patients and three additional "pavilions" for overflow.[8] Given the speed of industrialization and urban growth, along with the influx of immigrants in New York, additional space was soon planned. Five additional pavilions were built in 1886, and two buildings specifically designed for smallpox victims were completed by 1892. Later epidemics like typhus would require even more accommodations, though these were far more temporary in nature.[9]

During this quarantine era, North Brother Island was the site of a great New York City tragedy: the sinking of the steamship, General Slocum. In 1904, the ship sank in flames just off the Island, taking the lives of over 1,000 German immigrants, mainly women and children from the Lower East-Side, who were on a recreational day trip. Hospital staff members were able to rescue more than 250 passengers, but the tragedy stood as the largest loss of life in New York City until September 11th, 2001.[10]

NBI EVOLUTION AND EXISTING CONDITIONS

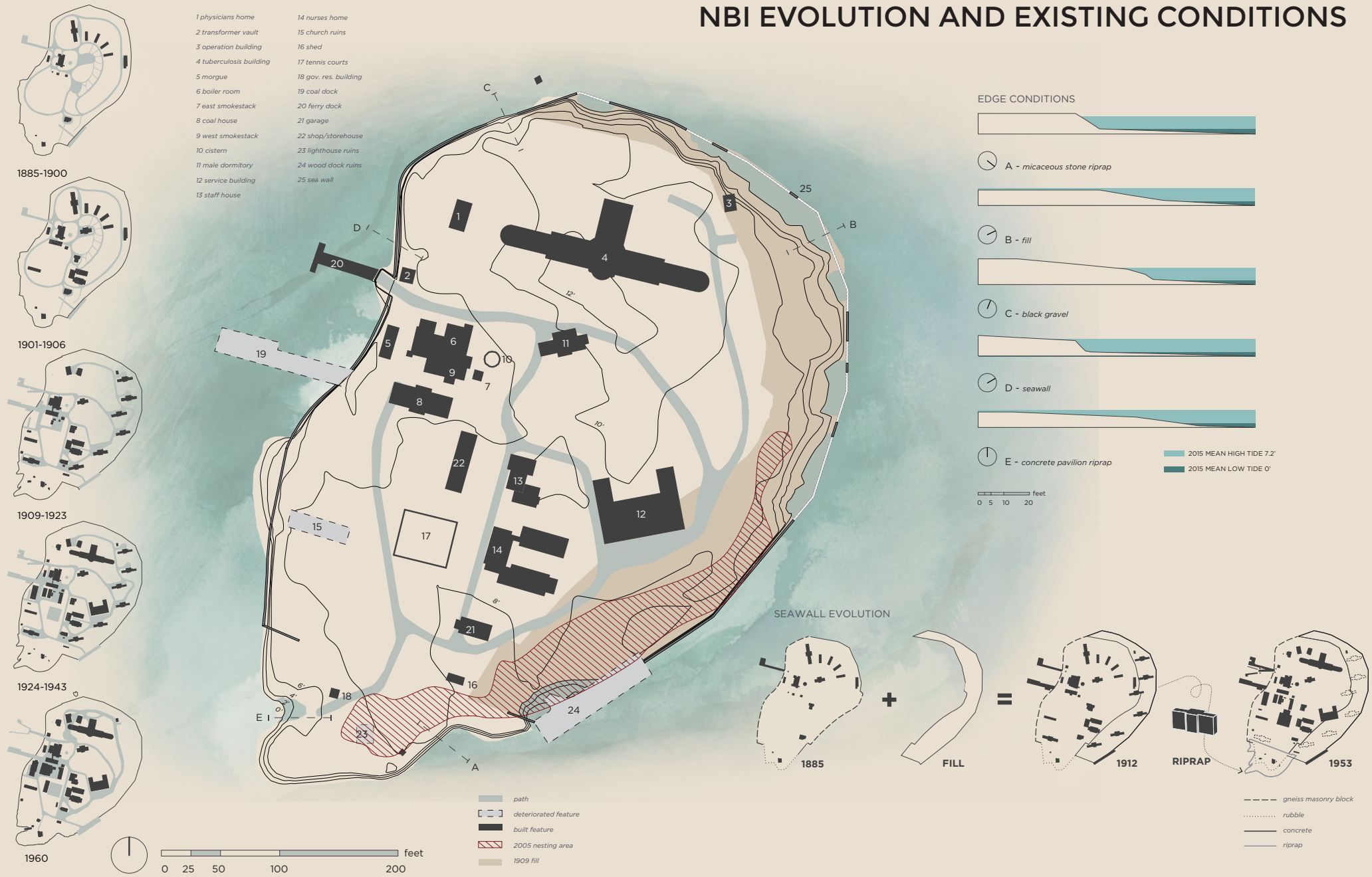


FIGURE 2.
North Brother Island evolutionary diagrams and existing conditions. Angelina R. Jones. 2016.

After the initial period of construction, the Island was steadily developed and redeveloped throughout the early 20th century. It's reputation as a quarantine hospital, notorious to some, grew with each passing epidemic and contagion scare. Each new disease brought changes, but none more than tuberculosis and polio.[11] The extreme rate of these two diseases required all quarantine centers to accommodate more patients than they could house. Eventually, a new Tuberculosis Pavilion, costing $1.2 million, was designed by Electus Litchfield and constructed on North Brother.[12] The building never served its original purpose, however, as the onset of World War II stalled the construction of the facility. The completion of the TB Pavilion was delayed until 1943, just before the Island hospital closed in 1944.[13] Even with the large construction investment and continued need, administrators found it increasingly difficult to entice competent staff to either live on the Island or commute daily by ferry. At the time of its closure, North Brother Island included 34 buildings and extensive infrastructure, much of it already experiencing decay and disuse.[14]

"Typhoid Mary" Mallon, the notorious Irish immigrant cook and asymptomatic carrier of typhoid, was the most notable and longest-tenured resident of the Island. Mallon's first quarantine lasted three years, until 1910. She was arrested again five years later and forced into exile on North Brother until she passed away in 1938. She lived out her days in a private cottage next to the Church on NBI's western edge, with a view of Manhattan.[15]

2.3 Veteran Housing, 1946-1951

Two years after the hospital closed, the Island was leased by the State of New York to serve as World War II veteran housing. Like many other cities across the nation, New York City struggled to house the great number of returning soldiers, including those taking advantage of the G.I. Bill, since many universities lacked sufficient dormitory space. The City invested over one million dollars to rehabilitate North Brother, including repair of the ferry gantry, to make the Island habitable and accessible for the students and their families. The male dormitory became the "Island Nursery School" for children living on the Island.[16] North Brother housed students from Cornell, Columbia, New York University, Julliard, Fordham and others, reaching a peak occupancy of 1,500 residents in the late 1940s.[17] Those who lived there remember it fondly, however the community was short-lived as the state's lease expired in 1951.

2.4 Juvenile Rehabilitation, 1952-1963

In 1951, New York City's Department of Health and Hospitals again took control of the Island, but this time to develop the campus to serve as a rehabilitation facility for teenagers. Several buildings were renovated to accommodate drug rehabilitation efforts, including the Tuberculosis Pavilion, male dormitory, P.S. 619, and the church, opening in 1952.[18] Teens sent to NBI submitted to detoxification, psychiatric counseling, physical rehabilitation and a regimen of school, work, and recreational activities.[19] The average stay was three to five months. Unfortunately, recidivism rates were extremely high as the program lacked aid to transition patients back to the disadvantaged neighborhoods they came from. The lack of success as well as the high cost of treatment led to the closure of facilities by 1963. Unlike the two-year vacancy from 1944-1946 when maintenance on the grounds continued, this time all inhabitants vacated the Island completely.

Also during this period, North Brother Island's lighthouse was decommissioned and replaced with an automatic light on top of the metal fog bell tower located on a buoy just off shore.[20] At this time, the lantern room and very top of the tower were removed and the rest of the building was left to deteriorate.[21] The lighthouse's fog bell was moved to the New York City Police Department Harbor Unit at College Point and installed as a memorial to those who died in the line of duty.[22] After more than half a century of neglect, the remaining structure of the lighthouse tower finally collapsed.

2.5 Abandonment / Forever Wild Park

After abandonment in the 1960s, North Brother Island was categorized as surplus property. It was placed under the jurisdiction of the Bureau of Property Management in New York City's Department of Real Estate, but none of the City Departments could identify a specific use for the buildings or grounds. Amenities such as ferry service, electricity and phone lines were cut off immediately after the Rehabilitation Center

closed and for fourteen years nothing was done to preserve the Island's buildings or grounds.[23] Vandals removed copper piping, porcelain fixtures and other elements of value leaving the buildings more vulnerable to deterioration. The Island declined quickly and by 1969, a memo to the Bureau from the Fire Department stated that all sixteen extant buildings were in hazardous condition. The Island was listed for sale by the Department of Real Estate in 1970 in order to raise money for the city. This effort to sell was eventually thwarted by the Board of Estimate, spearheaded by Bronx Borough President Abrams.[24]

The absence of human activity after the late 1960s, and consequent lack of management, led to a significant increase in plant growth making North Brother Island a prime location for bird nesting and foraging, particularly for herons and other colonial wading birds. The wildness of North and South Brother Islands welcomed these otherwise threatened birds.

Though left untouched, several potential reuse ideas were proposed for North Brother Island in the 1970s, including a waste disposal site, amusement park, drug treatment center, casino, salt storage, power plant and others. None of these schemes were implemented due to financial constraints and inhospitable conditions created by proximity to LaGuardia Airport.[25] In addition, the construction of a bridge to Riker's Island from Queens replaced the ferry service that catered to all of the islands in the area, effectively cutting off North Brother Island from public access. The air quality declined, the waters of the East River became heavily polluted, and invasive species such as Norway Maple, mile-a-minute vine, and kudzu enveloped the once manicured Island.

In 1987, the New York City Audubon Society and the NYC Department of Environmental Conservation performed nesting surveys as part of a broader campaign to investigate bird behavior in the New York Harbor. This study found the Island had become heavily populated by several different species of colonial wading birds. Overgrown and invasive vegetation, and lack of human disturbance, created an ideal nesting ground for shorebirds, including the colonization of both North and South Brother Islands by the Black-crowned Night Heron.[26]

The New York City Department of Parks and Recreation (NYCDPR) acquired North Brother Island in 2001 and decided the land would be managed as a "Forever Wild" resource without public access. NYCDPR has endeavored to foster a welcoming environment for the birds while implementing reforestation efforts. In 2003, New York Audubon's Harbor Herons Project started a monitoring program to research the herons' movement patterns from nesting to foraging sites on islands throughout New York City.[27] By 2005, New York Audubon's monitoring showed the herons' presence on North Brother had decreased 15% from the previous year, and by 2008 they had stopped nesting on North Brother. South Brother Island (acquired from private owners by the City in 2007, through a complex transaction involving Congressman Serrano representing the South Bronx, NOAA, and the Trust for Public Land) correspondingly saw a rise in Black-crowned Night Heron nesting. The latest report on bird populations is provided in NYC Audubon's 2015 Harbor Herons Program Nesting Survey Report, and indicates no heron nests on NBI.[28]

Management of NBI's resources has warranted little active intervention from NYCDPR – sensibly so, given the agency's overall "Forever Wild" strategy adopted for the Island, as well as the constrained budgets and significant management and maintenance demands of their many other park resources. Nevertheless, the efforts of NYCDPR's Natural Resources Group (NRG), in coordination with the Capital Projects personnel, have resulted in informal monitoring of Island conditions over several years. Over the past 10 years, NRG has used ecological restoration as a management strategy to improve habitat quality and ecosystem function. Forest restoration interventions have included the removal of non-native and invasive plant species, as well as the planting of native trees and shrubs. Forest restoration was first conducted approximately 10 years ago, while more recently, an intensive campaign using contractors to remove invasive species and plant native trees and shrubs was undertaken (though not completed). Management efforts have predominantly focused on the edges of the island, outside the historic core. At the same time, NYCDPR's Capital Projects group kept maintained informal inventory and monitoring of buildings and structures.

3 CURRENT CONDITIONS

3.1 Natural Resources

The New York Harbor Estuary is a particularly rich ecosystem that is inhabited by a variety of colonial wading birds, and maintenance of these populations and their habitat has influenced natural resource management greatly. Maintaining viable habitats along the migratory paths of these birds is essential to their survival. North Brother and South Brother are two important locations in the regional habitat sustaining wading bird population. Natural resources have thus dominated the recent management of NBI, owing to the significance of the Island's bird species (and the Island's ecology in supporting colonial birds) as well as the logistical and financial difficulty of accessing let alone inhabiting the Island.

The NYC Audubon conducts the Harbor Herons project to monitor wading birds including herons in the NYC area, as well as other significant birds, including gulls and cormorants, native to the area, who have appeared recently. The Project has accumulated more than 30 years of data on the nesting and foraging behavior of these birds. In 2005 the nesting surveys changed from annual to tri-annual field surveys, with interim reports in the intervening years. The studies indicate that the herons have not been nesting on NBI since 2008, yet the Island is still part of the foraging habitat of the Black-crowned Night Heron, especially those located on South Brother Island. (Figure 2 shows the nest counts from 2005 to 2014). The ecological restoration efforts by NYC Department of Parks and Recreation hope to render conditions on the Island favorable to herons' foraging and nesting, even if the birds' presence on the Island has been diminishing. The restoration strategy of removing non-native, invasive plants and replanting native species in key locations creates a more resilient ecosystem (in light of climate change) and favors conditions hospitable to the herons. Replanting has been ongoing for several years, as noted above; the most recent campaign has gained urgency by addressing ecosystem damage wrought by Superstorm Sandy in 2012. Such storm events – not to mention long-term trends of sea-level rise, greater storm intensity and frequency – can be expected to accelerate biophysical dynamics within and around the Island. These include plant species change, erosion and deposition by overwash, and shoreline erosion particularly acute on the eastern flank of the Island.

The goal of this study regarding natural resources is documenting current conditions related to plants and landforms and, to the extent possible, interpret ecological conditions in order to better understand the dynamics of the NBI ecosystem. Our methodology has been simple field recording of the location and composition of plant species, landforms and built landscape features framed by mapping of character areas according to prevailing conditions – an approach consistent with the National Park Service's Cultural Landscape Inventory/ Report methodology. The students recorded patches of vegetation on the Island, indicating the composition of the patch (open ground, grass, herbaceous, woodland, vines), the height of trees, vegetation that appears to have been planted as landscaping, soils and topography, and shrubs that could be used as habitat. Conditions recorded in fall 2015 not only directly inform our understanding of natural resources' significance and integrity, they also provide a baseline for future/periodic surveys.

A detailed landscape survey recorded existing conditions through a series of site visits.[29] Data were recorded on assessment forms and located with GPS data collectors. The data was then processed and analyzed to create an existing conditions map that illustrated vegetation patches by vegetation height (canopy, sub-canopy, vines, herbaceous, and open ground), as well as small-scale landscape features; specimen trees likely planted while the Island was human occupied; and vegetation restoration patches from 2005, 2014, and 2015. This analysis informed the tolerance for change assessment and preliminary recommendations. [Refer to Figure 3].

Before arriving on the Island, pre-existing data (maps, plans, images) were analyzed to gain a sense of the layout of the Island and the location of buildings and paths. New York City Department of Parks and Recreation (NYC Parks) information showing locations of bird nesting locations, paths in use, the boundaries of the contracted site for restoration work and restoration and work from 2014 to mid-2015 was consulted before the survey was conducted. Prior studies and Google Earth images were also consulted to observe changes in the landscape.
Preparation for fieldwork was also informed by a survey of the existing vegetation, as documented by NYC Parks in 1989.[30]

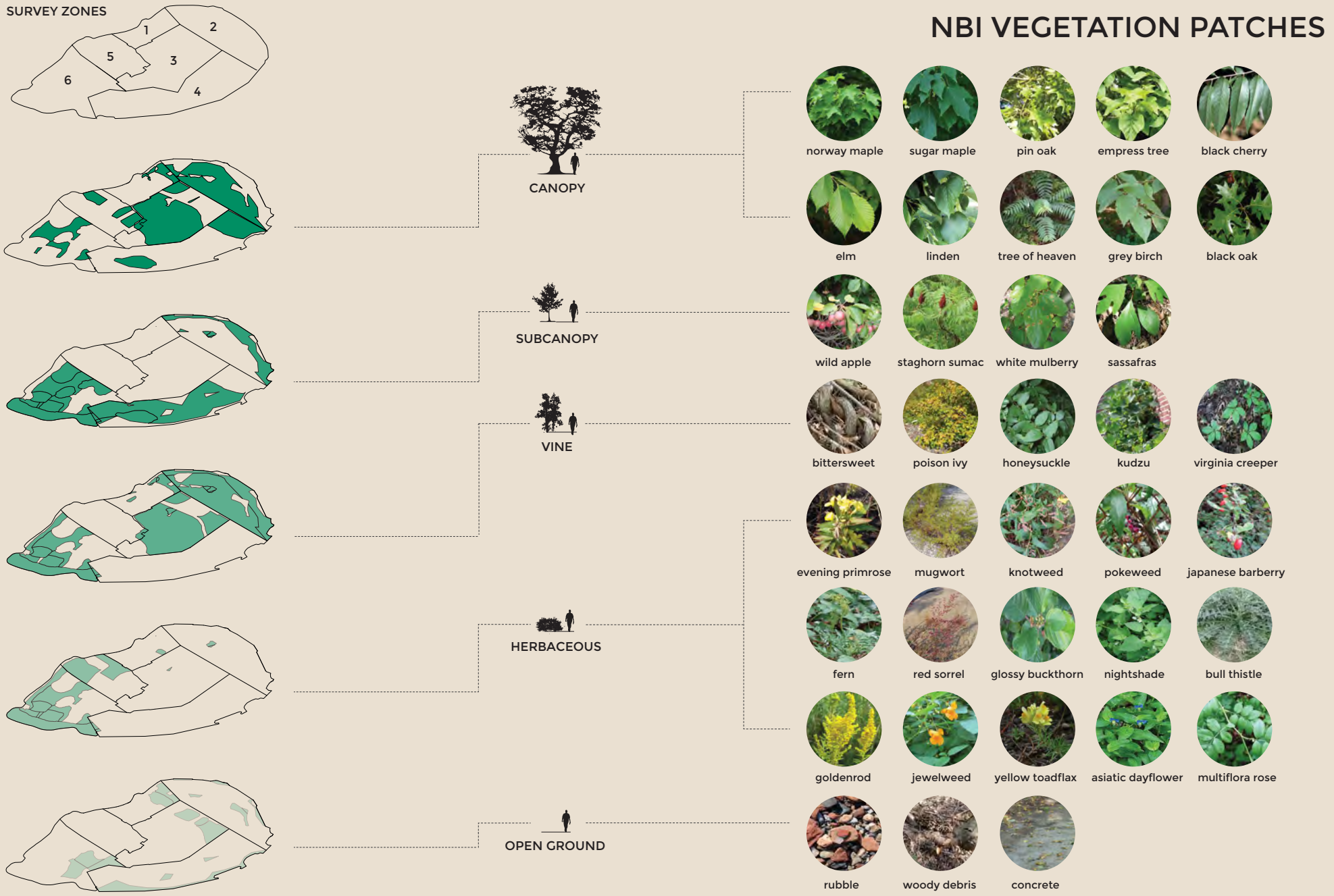


FIGURE 3.

Dominant plant species and cover types associated with North Brother Island's forest strata.
Original by Angelina R. Jones, 2015, adapted by Julia Griffith, 2016.

The 1989 Survey served as useful reference for fieldwork preparation, providing the fieldwork team with the general locations of vegetation and cultural landscape features. The 1989 Survey divides the Island into 14 study areas and records the vegetation and cultural landscape features for each of the zones. The survey was useful for determining the plant species, although locations were assumed to have shifted.

The 1989 Survey was also used to compare the current NYC Parks restoration work, and those areas that have not been replanted since 1989. The areas that have been restored since 1989 are primarily those that were recorded in 1989 to have contained invasive species, such as a patch of mugwort immediately to the west of the TB Pavilion. A historic site plan provided in Hope Winthrop and Harold Williams's 1978 study provided further information about the location of various cultural landscape features: the southeastern dock, the southwestern boat launch, and the cistern and smokestack at the center of the Island.[31]

For the purposes of the 2015 survey, the Island was divided into six zones (Figure 3). The boundaries were chosen to reflect the visible patches of vegetation in aerial views, the 1989 survey, and the NYC restoration map. The team recorded variation in vegetation density and plant species throughout the Island. Landscape plantings apparent on the Island include pin oak (*Quercus palustris*) and London plane tree (*Platanus x acerifolia*). Other individual large trees recorded for their visual impact, include Lindens (*Tilia sp.*). Street furniture was also identified on the Island, including utility poles, streetlights and fire hydrants. Historic paths, of cement, gravel and yellow brick, were revealed and mapped. Other land use traces included metal grates in the ground and two phases of seawall (stone and concrete). Figure 3 shows existing distribution of vegetation patches, small cultural landscape features, trails, seawall, and specimen trees. Broad observations of the Island plant communities include: tall canopy trees and presence of vines in the north end, herbaceous and sub-canopy cover on the east end, dense forest in the center, and herbaceous cover to the south.

A description of the landscape conditions found in each zone are described below, and illustrated on Figure 3. Vegetation Patches.

- Zone 1 includes the western entrance area. The zone mainly consists of forested area with a tall canopy, dominated by maple, and herbaceous ground cover, dominated by poison ivy, and English ivy. A patch of kudzu was located south of the entrance path beside the boiler plant and morgue until recently; NRG's recent ecological restoration project appears to have eliminated it. Cultural landscape elements include a paved trail leading from the gantry to the core of the Island and a partly paved path leading south past the boiler plant. A evergreen tree is recorded beside the Physician's House, a remnant of early landscape planting on the Island. A chain link fence is along the west edge of the Island north of the gantry. Street furniture includes three hydrants, water line cover, manhole cover and chain link fence posts.

- Zone 2 includes the northern end of the Island, surrounding the Tuberculosis Pavilion. The zone mainly consists of tall Norway maple in the canopy and low lying English ivy vines. The coastal edge of the zone is comprised of denser and lower vegetation, with herbaceous vegetation beneath the sub-canopy. Forest restoration was conducted in an area at the southwest edge of the zone, near the west end of the Pavilion. Through reforestation efforts, the area previously containing mugwort was replanted with young native tree saplings. A patch of rare orchid is located at the center of the zone, to the west of the TB Pavilion north wing, and is marked with tape. Landscape plantings recorded include pin oak and linden. A cement seawall structure traces the perimeter of the Island; three beaches visible where the seawall has been breached, with a ground cover of gravel and bricks. Cultural landscape elements include this seawall, as well as a utility pole. Site plans show a path historic path, but it is mostly concealed by vegetation. Part of this trail is visible at the east end of Zone 1, revealing a yellow brick paving.

Photo of the Garage. Andrea Haley and Yimei Zhang. 9 October 2015.

- Zone 3 includes the inner core of the Island between the buildings. The zone mainly consists of a dense multi-strata forest composed of herbaceous ground cover, shrub and sapling sub-canopy, and mature canopy trees with vines. Plant species include lindens, maples, and English ivy. An area of 2005/2006 reforestation has sustained, and represents a less-invaded forest patch with maturing sugar maples and other native tree species. Coarse woody debris, which may provide quality forest habitat, was observed throughout this area. Cultural landscape elements include a well-defined street with iron and cement curbing. The east branch of this historic path has not been completely uncovered. Other land use features include three hydrants, a utility pole that still has its components, two stumps of utility poles and a metal hatch in the ground.

- Zone 4 includes the eastern edge of the Island. This area of the Island has a different soil composition, as fill was deposited here in 1909. The zone mainly consists of sub-canopy and herbaceous vegetation, with plant species such as sumac and mulberry. The north end of the zone 4 is forested with taller canopy cover. There are fewer ailanthus trees in zone 4 than recorded in earlier surveys. The 1989 study recorded a patch of sumac at the north end of zone 4; this area is now forested with Norway maple and herbaceous species. Herbaceous vegetation in this zone includes seaside goldenrod (*Solidago sempervirens*), a salt tolerant species that can withstand the storms and seawater that likely strike this east side of the Island. Landscape plantings include a London Plane adjacent to the Nurse's Building. A mature black cherry tree is also recorded; this plant may have been planted as a landscaping tree. Cultural landscape elements include a well-defined cement paved street as in zone 3. Other land use features include two hydrants and three lampposts (one is broken in two). A beach on the south end of zone 4 contains remnants of a seawall and ruins of a large dock structure. Several sections of this area were replanted in November and October 2015 to remove invasive species.

- Zone 5 includes the region on the west coast, south of the Coal House, and northwest of the Nurse's Building. This area contains the tennis court, the remains of a church, and is mainly forested with Norway maples. The tennis court contains Norway maples and English ivy. A concrete pad is located just south of the Coal House; herbaceous vegetation such as primrose, solidago, and pokeweed grows on this concrete pad. The coastal edge of zone 5 is a dense forest of herbaceous plants and trees. Cultural landscape elements include a tennis court, two hydrants, a lamppost, utility pole and a concrete wall to the west of tennis court. Fence posts are set in the ground to the north of the tennis court.

- Zone 6 is the southernmost end of the island, south of the tennis court. The zone mainly consists of smaller trees, shrubs and herbaceous cover, with denser vegetation at the perimeters of the zone near the shore. Much of the zone has been recently reforested with small trees. The southern-most end of the Island has wild apple trees. A beach is at the southeast end of the Island, with a ground cover that includes bricks, gravel and coal. Cultural landscape features include a historic path, a newly cleared path, and the ruins of a lighthouse. A section of fence is located to the north of the lighthouse.

BUILDING BASE MAP

BUILDING KEY

1. Physician's Home
2. Transformer Vault
3. Operating Building
4. Tuberculosis Pavilion
5. Morgue
6. Boiler Room
7. East Smokestake
8. Coal House
9. West Smokestake
10. Cistern
11. Male Dormitory
12. Service Building
13. Staff House
14. Nurses' Home
15. Church
16. Shed
17. Tennis Court
18. Government Reservation Building
19. Coal Dock
20. Ferry Dock/Gantry
21. Garage
22. Shop/Storehouse/Icehouse
23. Lighthouse

standing building
partially standing building
tennis court

FIGURE 4.
North Brother Island buildings with building key. Adapted from 2015 Historic Preservation Studio by Julia Griffith in 2016.

3.2 Built Heritage Resources

The 2015 studio conducted a visual condition survey in order to assess existing building fabric, prioritize structures for further investigation, inform the conservation approach, and help evaluate the feasibility of access on the island. The team surveyed the 26 structures on the island, identifying: [refer to Figure 4. Building Base Map, which includes a building key]

1. Primary structural and building enclosure systems
2. Overall structural hazards (e.g., stability against collapse)
3. Structural element hazards (e.g., cracked or displaced masonry)
4. Geotechnical hazards (where visibly apparent)
5. Vulnerabilities based on weather exposure
6. Vegetation on and around structures

Note that this survey was severely constrained because our team was limited to exterior access. No physical access to building interiors was allowed by NYCDPR based on their consultation with the New York City Department of Buildings (DOB). The team relied on visual access from safe distances, assisted by cameras mounted on painters' poles. We were informed of a detailed assessment of NBI's structures that has been conducted by the DOB; however, the detailed results of the DOB's assessment were not available for this study. We were able to interview DOB staff expert Timothy Lynch, P.E., on the overall cast of the assessment.

Description of Structures

The structures on the island can be divided into two general categories, building-like structures and non-building structures. Building-like structures enclose occupiable space, have structural elements oriented in both horizontal and vertical planes, and have one or more defined floor levels. Non-building structures were not designed for sustained human occupancy and are primarily vertical (e.g., the two smokestacks, cistern, and seawall) and/or mostly unenclosed (e.g., the coal and wood docks). Many of the building-like structures have a Building Identification Number (BIN) assigned in the DOB's Buildings Information System (BIS), whereas none of the non-building structures appears to have a BIN assigned.

The building-like structures can be further divided into two subcategories based on their materials and dates of construction. The first subcategory includes buildings from the late nineteenth century (including the Haight era) and smaller buildings from the first decade of the twentieth century. These generally incorporate significant areas of wood-framed construction, mainly floors and roofs (which are often steeply sloped). A few buildings in this subcategory are entirely wood-framed and severely compromised, but the majority have multi-wythe brick masonry walls that support wood floor and roof framing while also depending on the framing for lateral bracing. These highly ornamented masonry structures are the more historically and architecturally significant buildings, but are also more vulnerable to continued weather exposure and moisture infiltration as discussed below.

The second subcategory includes the remainder of the twentieth-century buildings. These generally have load-bearing brick masonry walls at the exterior perimeter and reinforced concrete or concrete-encased structural steel framing at the interior, supporting a variety of floor and roof slab systems incorporating hollow clay tile and reinforced concrete. Most of the roofs in this subcategory are low-slope, although two notable instances of steeply sloped roofs are the Coal House (no. 8) and the Nurses' Residence (no. 14), both of which include severely deteriorated and partially collapsed wood framing.

BUILDING CONDITION MATRIX

ID	BUILDING	NYC DOB BIN	DATE	STORIES	FOOTPRINT (SQ FT)	VERTICAL STRUCTURE	HORIZONTAL STRUCTURE	ROOF		SIGNIFICANT THREATS			INTEGRITY			CULTURAL SIGNIFICANCE	OVERALL HERITAGE VALUE	RESILIENCE	DISJOINT
								SLOPE	CONDITION	LATERAL BRACING	VEGETATION	WEATHER	STRUCTURAL	HISTORIC	AESTHETIC				
1	PHYSICIANS HOME	2102892	1926	1.5	1,140	Load-bearing masonry	Wood joist and rafter framing	Steep	Deteriorated	At risk	Adjacent	Water infiltration	Moderate	Moderate	Moderate	High	Moderate	Low	Yes
2	TRANSFORMER VAULT	2102896	1926	1	650	Load-bearing masonry	Reinforced concrete slab	Low	Present, membrane compromised	—	Adjacent and on roof	Water infiltration	High	Moderate	Moderate	Low	High	Moderate	Yes
3	OPERATING BUILDING	—	1907	1		Load-bearing masonry	Wood joist framing	Low	Collapsed	Unbraced	Intruded	General exposure, storm surge	Low	Low	Low	Low	Low	Low	No
4	TUBERCULOSIS BUILDING	2097582	1942	4	83,050	Load-bearing masonry (?)	Reinforced concrete slabs, some with hollow clay tile fill	Low	Present, membrane compromised	—	Adjacent	Water infiltration	Moderate	Moderate	Moderate	High	Moderate	Moderate	No
5	MORGUE	2097587	1929	2	2,510	Load-bearing masonry	Reinforced concrete slab (?)	Low	Present, membrane compromised	Partially collapsed	Adjacent	Water infiltration	Low	Low	Moderate	low	Moderate	Moderate	No
6	BOILER ROOM	2097586	1887	2	12,800	Load-bearing masonry	Wrought iron or structural steel and wood rafter framing	Steep	Partially collapsed	Partially collapsed	Intruded	Water infiltration	Low	Low	Low	low	Low	Low	No
7	EAST SMOKESTACK	—	1892	—		Load-bearing masonry	—	—	—	—	Adjacent	Water infiltration, lightning	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	No
8	COAL HOUSE	2102894	1904	1	3,600	Load-bearing masonry, reinforced concrete columns	Structural steel and wood rafter framing	Steep	Partially collapsed	Localized risk at top of walls	Intruded	General exposure	High	Moderate	Moderate	Moderate	High	High	No
9	WEST SMOKESTACK	—	1892	—		Load-bearing masonry	—	—	—	—	Adjacent	Water infiltration, lightning	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	No
10	CISTERN	—	1885	—		Load-bearing masonry	—	—	—	—	Adjacent	General exposure	Moderate	Low	Low	Moderate	Moderate	Moderate	No
11	MALE DORMITORY	2102893	1885	2.5	5,625	Load-bearing masonry	Wood joist and rafter framing	Steep	Deteriorated	At risk	Adjacent to and leaning on structure	Water infiltration	Moderate	High	High	High	High	Low	Yes
12	SERVICE BUILDING	2097583	1928	2		Load-bearing masonry, structural steel	Structural steel with reinforced concrete slabs	Low	Present, membrane compromised	—	Adjacent and on roof	Water infiltration	Moderate	Moderate	Low	low	Moderate	Moderate	No
13	STAFF HOUSE	2097584/ 2097588	1885	2.5	5,915	Load-bearing masonry	Wood joist and rafter framing	Steep	Deteriorated	Partially collapsed	Adjacent to and leaning on structure	Water infiltration	Low	Low	Low	high	Low	Low	No
14	NURSES HOME	2097585	1905	3.5	40,000	Load-bearing masonry, structural steel	Structural steel with hollow clay tile flat arches, wood rafter framing	Steep	Partially collapsed	—	Adjacent and on roof	Water infiltration	Low	High	High	high	High	Moderate	Yes
15	CHURCH	—	1906	—	2,600	Wood stud framing	Wood rafter framing	Steep	Collapsed	Partially collapsed	Adjacent	General exposure	Low	Low	Low	moderate	Low	Low	No
16	SHED	—	1932	1									Low	Low	Low	low	Low	Low	No
17	TENNIS COURTS	—	1943	—		—	—	—	—	—	Adjacent	General exposure	Low	Low	Low	low	Low	Low	No
18	GOVERNMENT RESERVATION BUILDING	—	1943	1									Moderate	Low	Low	low	Low	Low	No
19	COAL DOCK	—	1892	—		Timber piles	Reinforced concrete slab	—	—	—	—	Salt water immersion, storm surge, wave action	Low	Low	Low	moderate	Low	Low	No
20	FERRY DOCK	—	1953	—		Timber piles, structural steel	Structural steel	Low	Not present	At risk due to column bases	—	Wind exposure, salt spray, storm surge, wave action	High	Moderate	Moderate	high	High	Moderate	Yes
21	GARAGE	—	1892	2	1,370	Load-bearing masonry, wood stud framing	Wood joist and rafter framing	Steep	Partially collapsed	Partially collapsed	Adjacent	Water infiltration	Low	Low	Low	low	Low	Low	No
22	SHOP STOREHOUSE	2102895	1940	2	6,000	Load-bearing masonry, reinforced concrete columns	Reinforced concrete beams and slabs	Low	Present, membrane compromised	—	Adjacent to and leaning on structure	Water infiltration	Moderate	Low	Low	low	Moderate	Moderate	No
23	LIGHTHOUSE	—	1869	—									Low	Low	Low	low	Low	Low	No
24	USCG LIGHTHOUSE	—		—									Low	Low	Low	low	Low	Low	No
25	WOOD DOCK	—		—									Low	Low	Low	low	Low	Low	No
26	SEA WALL	—		—	—	Load-bearing masonry	—	—	—	—	Adjacent	Salt water immersion, storm surge, wave action	Low	Moderate	Moderate	high	Moderate	Moderate	No

FIGURE 5.

Building Condition Matrix. Compiled by 2015 Studio members and updated by Justin Spivey, 2016.

Assessment

Based on preliminary assessments by conservation students supported by those of professional engineers and conservators, structures were ranked in terms of structural, historic, and aesthetic integrity as a means of prioritizing further investigation. The results of these assessments are presented in [Figure 5. Building Condition Matrix], along with other information about each structure's systems and current condition. All structures have compromised enclosure systems that are permitting moisture infiltration to varying degrees, and most have heavy vegetation on and/or around the structure. In some cases, vegetation has intruded to the interior and further compromised enclosure systems.

The structures on the island identified as having the greatest structural integrity were:

- Shop and Storehouse (no. 22)
- Transformer Vault (no. 2)
- Coal House (no. 8)
- Tuberculosis Pavilion (no. 4), and
- Service Building (no. 18)

Guided by our understanding of significance and values analysis, the structures with the greatest historic integrity were:

- Male Dormitory (no. 11)
- Ferry Dock gantry (no. 20)
- Nurses' Residence (no. 14)
- Tuberculosis Pavilion (no. 4), and
- Physician's Home (no. 1).

Structural Resilience

Figure 5. Building Condition Matrix also includes an assessment of each structure's resilience, which is subtly but significantly different from its current structural integrity. Whereas current structural integrity results from the cumulative effects of deterioration to date, the rate at which deterioration will continue to occur in the future varies based on structural materials and their configuration. There is a strong correlation between the two subcategories of building-like structures and their resilience, which is typically low for the late nineteenth-century structures and typically moderate for the twentieth-century ones. Only one structure, the Coal House (no. 8), can be considered to have high resilience, on account of its being designed for significantly greater lateral loading than it currently experiences.

One common vulnerability contributing to the low resilience in the first subcategory is the concealed diagonal or "herringbone" brick headers, which provide limited capacity to anchor the running bond veneer to the backup masonry, particularly after mortar has been degraded by long-term moisture infiltration. Similarly, joist-to-wall connections can be compromised by mortar degradation and by wood decay, resulting in a loss of lateral bracing and vertical load capacity. Many of the Haight-era buildings also have steeply sloped roofs that exert outward thrusts, increasing the demand on compromised lateral bracing and masonry assemblies.

Panoramic view of North Brother Island and its surroundings. Studio Members 2015.

Photo of the view from the Island towards the East. Andrea Haley and Yimei Zhang. 9 October 2015.

In the second subcategory, a common vulnerability is low-slope roof surfaces that are highly likely to have compromised membranes, blocked drainage, accumulated debris, and/or plant growth that retain water and add weight. Although the supporting reinforced concrete and structural steel elements are generally more robust than wood framing, they will nonetheless deteriorate and lose capacity as a result of long-term moisture infiltration. In addition, the expansion of corrosion product on embedded steel, also known as "rust jacking," can displace or even dislodge other structural and cladding elements.

Risk Assessment

In order to prioritize structures for further study and identify critical needs for intervention, we performed a simple analysis comparing two urgent factors in near-term decision-making: resilience (as discussed in the previous section) and overall heritage value. Where these two factors were assigned equal values in our evaluation, e.g., low resilience and low heritage value, the need for intervention is less critical. In [Figure 5. Building Condition Matrix] a "Yes" appears in the "At Risk" column where the overall heritage value is one or two levels greater than the apparent resilience. For the following five structures, this indicates a critical need for further study and near-term intervention to prevent irretrievable loss of historic fabric:

- Physician's Home (no. 1)
- Transformer Vault (no. 2)
- Male Dormitory (no. 11)
- Nurses' Home (no. 14), and
- Ferry Dock (no. 20)

Priorities for Further Study

Among the five structures identified in the risk assessment, the Male Dormitory (no. 11) and Ferry Dock (no. 20) were selected for further study because of their historical significance and strong visual presence. The Male Dormitory is the only Haight-era building on the island that could potentially be preserved. The others of this era—the Staff Housing (no. 13), Boiler Room (no. 6), and adjoining smokestacks (nos. 7 and 9)—will likely have to be demolished due to loss of structural integrity. It is essential for interpretation potential of the island to have a building from the Haight campaign of construction. Given the current visible distress in the Male Dormitory and the vulnerabilities described above, it requires urgent intervention in order to prevent collapse.

The Ferry Dock gantry is one of the most visible structures on NBI and acts as a threshold to the island, as it did historically. It played an integral part in the island's connection to New York City and is therefore a valuable interpretive asset. It is also highly exposed to environmental threats due to its location, and should be stabilized to arrest the corrosion of its superstructure and the deterioration of the supporting piles.

A condition assessment of the Ferry Dock revealed that the slip structure leading to the gantry was highly deteriorated and prohibited access; the depth of the river and poor condition of wooden dolphin piles made closer inspection impossible. Overall, key areas of concern on the Ferry Dock were corrosion of the gantry superstructure and auxiliary members, particularly at the column bases; the progressive loss of corrugated sheet metal cladding from the gantry; and the overall deterioration of the slip structure. At present, the suspended weight of the transfer bridge may be helping resist overturning of the gantry under wind loading. A limited intervention to stabilize the gantry column bases would improve overturning resistance and help reduce the risk of collapse.

If management circumstances allowed for the rehabilitation and adaptive reuse of a structure on the island at some point, further

consideration is recommended for the Shop and Storehouse (no. 22) and Coal House (no. 8). They appear to be in stable structural condition, are lower in terms of cultural significance, and warrant further investigation for reuse in the long term. Due to their greater resilience and lesser environmental exposure, the need for intervention to prevent collapse of these buildings is less urgent than that for the Male Dormitory and Ferry Dock.

Finally, the TB Pavilion (no. 4) and the Service Building (no. 12) should be assessed more thoroughly. Due to our team's limited access and their large scale, these buildings were not adequately assessed. The structure of the TB Pavilion (no. 4) seems moderately resilient; however, there is evidence that the copings on parapet walls are damaged and likely permitting water infiltration into exterior walls. The extent of the damage present in both buildings is unknown, though extensive interior damage has been reported, due to vandalism.

3.3 Access to North Brother Island

For the majority of its history, North Brother Island was accessed through a privately operated ferry, run by one of the many transportation companies during the late 19th and early 20th centuries. In 1924, the City took over the property of the New York and College Point Ferry Company, which had closed in 1919 due to a decrease in the use of ferries for more modern methods of transportation.[32] The ferry terminal at 134th Street in the Port Morris neighborhood of the South Bronx became the major launch point for the Williamsburg, Greenwich Village and Mott Haven ferries, the first diesel-powered ferries owned by the city.[33]

After Riverside Hospital closed and the Island was converted to WWII veteran housing, the ferry facilities at 134th Street were determined as inadequate and were upgraded to accommodate more frequent use.[34] Ferry service continued through 1963 when North Brother Island's final iteration, the drug rehabilitation facility, closed. At this point, transportation to the Island was no longer required and the construction of a bridge between Rikers Island and Queens removed any real need to have regular ferry transportation from the Bronx to the islands of the East River. Today, access to NBI requires permission from NYCDPR, coordination with the Police Department, and use of a NYCDPR or privately-owned boat. The South Bronx-based NGO Rocking the Boat provided boats for hire to enable our team to access NBI from Hunts Point Riverside Park on the lower Bronx River.

3.4 Stakeholders

The group of existing stakeholders directly invested in NBI is quite small – NYCDPR maintains sole ownership and nearly all management responsibilities. The group of stakeholders potentially interested and involved in NBI is expansive and holds great promise for supporting a wider range of future initiatives. There is significant interest and excitement in partnering with the City in any number of ways.

NYCDPR is of course the principal stakeholding agency on behalf of the citizens of New York City. Individuals in the Natural Resources Group and Capital Projects share direct responsibility, and have marshaled the modest level of conservation and monitoring work that has been maintained over the last 10 years or so. The Natural Areas Conservancy complements NYCDPR's efforts, raising funds and providing expertise to research and sustain natural places available to New Yorkers. NYC Audubon, as mentioned below, cooperates closely with Parks to carry out monitoring the bird populations that are at the center of NYCDPR's management strategy.

The legislative branch of the City government has also emerged as a passionate stakeholder for NBI. New York City Councilman Mark Levine chairs the Committee on Parks and Recreation, where he pushes for greater parks equity in New York's low- and moderate-income neighborhoods. Councilman Levine has advocated strongly for consideration of NBI as an accessible open space, generating a broader conversation about the benefits and costs, opportunities and limits, connected to providing a measure of public access to NBI. Generally

speaking, many of the ecological groups focused on the harbor and the region are concerned primarily with maintaining and enhancing the heron nesting habitat on North Brother Island, together with its neighbor South Brother. These groups conclude that human accessibility will degrade the ecosystem of the Islands.

Community development and human-development-focused groups look to North Brother as opportunity for expanding open space opportunities throughout the city, particularly South Bronx, where parks and open spaces are relatively limited and inaccessible. South Bronx has an extremely low amount of park space and public waterfront access per person: 6 square feet. Elsewhere in New York, access is much higher, such as 109 square feet for the rest of the Bronx, 197 square feet for Staten Island, and 53 square feet per person in Brooklyn.[35]

Numerous organizations in the Bronx and the City are working towards environmental and heritage education and awareness program, as a part of their mission and work. These groups include the Bronx Council for Environmental Quality, The Point CDC, the Sustainable South Bronx. Rocking the Boat, which also works with NYC Audubon, hosts youth development programs in which youth build wooden boats, learn water-based skills and participate in environmental education programs.

The New York Restoration Project, a non-profit dedicated to making under-resourced communities more sustainable, led the Haven Project, a master plan that mapped designs, funding, and a new network of open spaces for the South Bronx neighborhoods of Mott Haven and Port Morris – close neighbor to North Brother. Landowner/developer Steve Smith at Oak Point on the Hunts Point shore north of NBI is another close neighbor to the Island and has shown an interest in serving as a future access point. Each of these groups should be consulted to develop a collaborative approach for access to the Island.

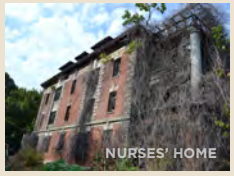
A number of Bronx-based or Bronx-focused groups with missions of community development, open space improvement, environmental awareness and ecological education constitute potential stakeholders for NBI. These include: The Point CDC, Rocking the Boat, Bronx River Alliance, Sustainable South Bronx, and some local public schools. A number of city-wide or regional environment-focused organizations have also expressed interest and concern about NBI, as a resource in itself and as part of larger complex regional ecologies. These organizations include: NYC Audubon, New York/New Jersey Harbor & Estuary Program/Hudson River Foundation, Wildlife Conservation Society, New Yorkers for Parks, and New York Restoration Project

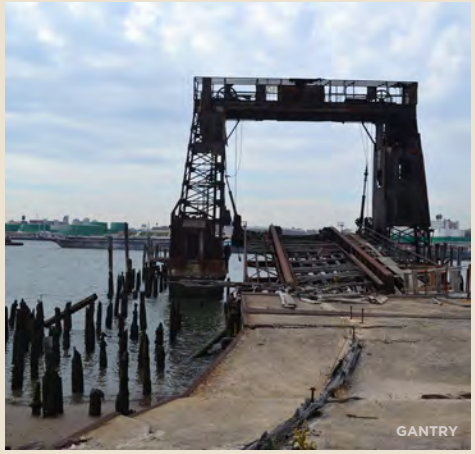
Given the intense interest expressed in NBI in our experience, we are sure the potential exists for many more Bronx, and City-focused groups to join NYCDPR and its partners in the future, if and as specific programming, research or development opportunities arise. Specifically, groups working in education, environmental awareness, parks and open space, historic preservation, and arts-and-culture sectors would readily step forward as partners.

While New York City Department of Parks and Recreation and owners and managers for the City, some other agencies have planning, regulatory on consulting responsibilities for potential changes to NBI – these are not significant in day-to-day management under the Forever Wild Program, but these agencies (EDC, DCP) could be important partners if management or development plans change in the future. These stakeholders are outlined in Section 3.5 on enabling environment.

It should be noted that one gap in the collection of stakeholder groups interested in NBI is representatives of the historic preservation or heritage conservation communities. These groups have not been aware of NBI, for the most part. They represent an important potential partner in the future – particularly in the areas of advocacy and historical interpretation.

In sum, the stakeholder situation is very clear at the moment and potentially very rich and more complex in the future. The clear ownership and stewardship responsibilities of NYCDPR are an important asset for the Island. Due to its adjacency to the South Bronx, one of the poorest congressional districts in the country and lacking significant green space, North Brother Island presents community development and





Images representing significant buildings, key vegetation and historic uses. Angelina R. Jones. 2016.

educational opportunities – the open space, ecological complexities, and cultural heritage of the Island could well be leveraged for community benefit. Potential stakeholders rooted in the South Bronx are most interested in the way NBI could engage children in environmental education, and enhance the experience of living in the city with a green space significantly closer than those accessible to them today. In addition, interest has been expressed in making connections between adults in Hunt's Point and employment opportunities connected to use of NBI. Some of these potentials are envisioned as short-term, occasional activities, thus relatively easy to implement (short, occasional educational excursions to the Island); other potentials, including those touching on economic development, are longer-term, heavier-lift possibilities that are difficult to envision at the moment.

3.5 Enabling Environment and Related Plans

The "enabling environment" sets the contexts for future interventions and management. It consists of existing legal and policy frameworks, current plans and planning activities, institutional responsibilities, and political issues – all of which shape the possibilities for future decisions. This section outlines the existing enabling environment.

The first fact of North Brother Island's enabling environment is the ownership and management by a public agency, the NYCDPR. NBI is regulated by other agencies of several levels of government: federal, regional, and local. In addition to the variety of public-sector agents involved in governance of the Island, the responsibilities of several NGOs give them strong interests and advocacy roles if not statutory responsibility. Most policies and plans currently in place are aimed primarily at protecting the Island's ecological values. In its current state of management by the New York City Department of Parks and Recreation (NYCDPR), the Island's natural resources are given precedence and its cultural resources are neither explicitly nor directly regulated.

Following is a provisional summary of varied measures contributing to the enabling environment:

- NBI is owned and managed by the New York City Department of Parks and Recreation (NYCDPR) since its acquisition in 2001, and thus subject to all Rules and Regulations of the NYCDPR. This includes "Parks Tree Preservation Protocols" which are regulations to maintain tree cover. New development that may impact a tree must be authorized by the Parks Commissioner, is subject to the Tree Valuation Protocol, and potentially subject to a restitution process for unavoidable tree removal.[36] While these protocols apparently do not affect the Island in its current state, future projects may be subject to this scrutiny.
- NBI is one of 51 sites designated under the NYCDPR Forever Wild Program. The program was created to "protect and preserve the most ecologically valuable lands within the five boroughs" of New York City.[37] It is funded by the New York State Environmental Protection Fund and managed by Parks. Unlike the state-level Forever Wild Program, the city-level program is intradepartmental and highly subjective in its designation of sites—we understand there are no standardized criteria for designation. The Forever Wild Program has yet to establish official policies and regulations and its sites are managed on a case-by-case basis according to the program's mission statement. While most of the 51 designated sites in NYC offer public access and recreational use, Parks has deemed NBI a Forever Wild site as a nesting place for the Black-crowned Night Herons, a protected and highly sensitive species. The Island thus offers no access at present.
- Harbor Herons Project is the NYC Audubon-sponsored project to monitor long-legged, colonial waterbirds and their allies (including gulls, cormorants and oystercatchers). The project conducts annual nest counts, during which staff and qualified volunteers visit every viable habitat and count the

active and inactive nests, identifying them to species and noting their contents. In the East River, North Brother Island, South Brother Island, and Mill Rock Island are surveyed; nearby Goose and Huckleberry Islands in western Long Island Sound are also part of the survey. Audubon occasionally partners with school groups from the Bronx to bring children out for surveys and invasive species removal.

- Vision 2020: New York City Comprehensive Waterfront Plan, completed in 2011, offers strategies on restoring the natural waterfront, improving water quality, and increasing climate resilience. It also aims to expand public access, enliven waterfront areas, and support the working waterfront. North and South Brother Island are specifically mentioned under this Management Plan to pursue funding to develop an Island-specific comprehensive plan to "integrate cultural, historical, and natural resource management on both islands."[38] Currently, the Island-specific plan, taken on by the NYCDPR as a part of its forest restoration efforts, lacks the "integration of cultural and historical" resources into the management plan. Instead, it has taken form of a natural resource management plan rather than a comprehensive management plan.[39]

- As a part of the Borough of the Bronx, the Island is under the jurisdiction of the NYC Department of City Planning (DCP) and its Bronx office, thus regulated by zoning. The majority of the Island surrounding the historic structures is classified a Park Zone while the rest is zoned a C8-2, a heavy commercial zone (See Fig. 3). Typically, parks are exempt from many zoning codes, however, all buildings are subject to safety codes if access is granted on the Island.[40]

- Because it is located in an estuary of national significance, NBI is subject to the Estuaries and Clean Waters Act (2000) under the local jurisdiction of the New York – New Jersey Harbor Estuary Program (HEP). The most recent Comprehensive Conservation and Management Plan was published in 1996 and updated for 2011-2015. The Plan includes provisions to improve the water quality and protect and conserve the wildlife habitats within the region. The authorization for the NEP expired in 2010 and currently waits action by the U.S. House of Representatives.

- NBI is recognized as a sensitive coastal zone federally, locally, and at the state level. It is listed as a Federal Coastal Zone regulated by the Federal Coastal Zone Management Act, and the National Oceanic and Atmospheric Administration (NOAA).[41] This legislation requires proposed federal projects to go through the Federal Consistency Provisions, to be checked for consistency with the approved state management program. In New York, projects are beholden to the policies of the state's Comprehensive Management Plan (CMP). The plan enables the creation of optional Local Waterfront Revitalization Programs (LWRP), which must be consistent with the state's policies. New York City has its own Waterfront Revitalization Program (NYC WRP). Its aim is to maximize the benefits derived from the economic development, environmental conservation, and public use of the City's waterfront areas while minimizing conflicts among environmental conservation objectives. This local plan identifies NBI as a Special Natural Waterfront Area and a Significant Coastal Fish and Wildlife Habitat. The NYC WRP is administered by the Department of City Planning and the City Planning Commission. Any undertakings on NBI are therefore subject to federal, state, and local review.

- NYC's WRP also addresses maritime and industrial developments, public use of the waterways, public access, scenic resources, and historic and cultural resources. This is the only plan affecting NBI's coastal area that specifically relates to the preservation of historical and cultural resources. Though the WRP does not explicitly address NBI, any proposal for action on the Island requires WRP review, as it lies within its jurisdiction and is controlled by public funds. Outside of the review process, interaction between the Department of City Planning and the Department of Parks and Recreation in regards to the Island seems limited.[42]

- The Federal Emergency Management Agency (FEMA)'s deems the majority of NBI as either an AE-zone or a VE-zone. AE denotes areas subject to inundation by 1% annual chance flood event, and VE signifies additional hazards due to storm-induced velocity wave action (See Fig. 4).[43] NYC's FEMA building regulations apply to the Island, so that any new construction will be held to both local building codes and FEMA regulations.[44]
- South Bronx Greenway Project is a multi-phased project begun by the New York City Economic Development Corporation (NYEDC) in 2005 to improve transportation and waterfront access, and guide interventions in the South Bronx. As a result of this project, Food Center Drive, the main point of access for the industrial areas of Hunts Point along the waterfront, has been renovated with bike lanes, a greenway, and has been changed to one-way traffic. Hunts Point Landing opened in 2012 as public space on the waterfront. It includes a fishing pier, tidal pools to manage flooding, and a kayak launch. The Randall's Island Connector, which aims to increase access to Randall's Island from the South Bronx, recently opened. Randall's Island contains over 400 acres of park and recreation land, but has been difficult for Bronx residents to access, despite the proximity. Long-terms goals of the Greenway Project include nautical transit in the area, which offer opportunities for North Brother Island.
- Closely related to the South Bronx Greenway, the Haven Project, by New York Restoration Project is designed to improve the health of residents in the South Bronx (particularly Mott Haven). The project, funded by the Knight and Doris Duke Charitable Foundations, is premised on the principle that income levels and location play a role in physical well-being, and since residents in the South Bronx have higher than average levels or asthma and obesity, improving the healthfulness of the physical environment will improve equality of life. Working with the EDC, the Haven Project is dedicated to creating more open and green space, and increasing access to recreation and healthy spaces. Open space, parks, waterfront access, and public art are all part of the implementation of the plan – a park incorporating rehabilitation of the gantry located at East 132nd Street in Mott Haven (which historically connected to the gantry on North Brother Island) is planned; some funds for implementation have already been secured.
- Hunts Point Lifelines Project, a winning submission to the post-Sandy Rebuild by Design competition, seeks to increase the social, economic, and physical resiliency in Hunts Point. The project makes use of the Food Distribution Center on the waterfront is an important economic driver in neighborhood for jobs, and regionally as the largest food distribution center in the northeast. Taking into account climate change, sea level rises, and flood vulnerability, resiliency plans include increasing flood protection, residential engagement, and emergency plans and infrastructure. The project is slated to receive $20 million in funding through HUD's Community Development Block Grant Disaster Recovery funding.
- In addition to this list of public- and NGO-sector organizations and plans with some influence or interest in NBI, private land owners, investors and developers active in the surrounding Bronx shorelines have a potential (if not actual) interest in NBI. At least one of these potential stakeholders – Steve Smith of Oak Point Properties – has expressed a deep understanding and keen interest in the value of NBI as an ecological and cultural reserve in close proximity to South Bronx communities.

Photo of the view from the Island looking Northwest towards the Bronx. Andrea Haley and Yimei Zhang.
9 October 2015.

4. PRELIMINARY ANALYSIS

4.1 Values and Statement of Significance

The first step of analysis is articulating the values of NBI – the qualities of the place that activate our interests and responsibilities – which serve as a foundation underpinning potential conservation and access measures. The individual value assessments, and the statement of significance that synthesizes them, are important statements of policy: all decisions have to be judged in terms of impact on current and future values and significance of the place. The statement of significance is particularly important concept in heritage conservation planning: it is a synthetic statement of values, actual and potential, related to the site that serve as a policy statement used to inspire and evaluate future design, conservation, development, use and management decisions. It serves as a kind of "mission statement" for the place.

North Brother Island is valuable for a variety of reasons; our assessment foregrounds existing conditions demanding responses in the short term, as well as future potentials suggesting a range of long-term possibilities. We organize the value assessments in three categories: Heritage, Ecological, and Social values. Any path forward for NBI's management must realize and balance these values in some combination. There is no a priori suggestion that all these values are equivalent, nor that one value always take precedence over others. The statement of significance is meant to inform directly how forward-looking impacts of values can be balanced and managed.

Heritage / Cultural Values

Heritage values are present in the different historical uses of the Island and its buildings, in the historical narratives associated with the Island, and through deteriorated building fabric conveying the use and abandonment of many decades. Heritage values relate to all different periods of NBI's evolution, including both inhabitation and abandonment periods.

As the geographical location of NBI allowed the Island to be used for different purposes, the buildings on NBI were repurposed several times and the configuration of the Island changed as well. Extant buildings represent different institutions, yet are related to each other as a set of buildings used throughout its inhabitation as an isolation/quarantine campus and later as a veterans "neighborhood." The chronology of NBI's use during the pre-abandonment period can be summarized as follows:

During the pre-abandonment period, NBI played an important role in the history of medical quarantine in NYC. Beginning in 1881, the Island was home to mostly poor, immigrant city residents suspected of being infected with contagious diseases.[45] People were sometimes forcibly exiled from their homes and workplaces.[46] This quarantine use was discontinued in 1943 and the Island became housing for WWII veterans attending NYC universities from 1946-1951. In 1952, the buildings on the Island were again repurposed into a rehabilitation center where juveniles were forcibly sent to recover from drug addiction.[47] These curated uses came to an end in 1963.

The architecture on NBI demonstrates the change over time as multiple construction methods and architectural styles from the late 19th to mid-20th centuries exist. In the earliest building campaign, Philadelphia's famous salmon pressed brick was chosen as a facing material and a historic unreinforced load bearing masonry construction with concealed brick headers was used in order to face the building with uninterrupted American running bond.[48] In a later building campaign, more diverse building materials and systems were introduced to the buildings. Among the remaining buildings, unreinforced masonry structure is a typical construction system found on the Island, but depending on size and purpose of the building, hollow clay tile, adopted concrete encased frame, steel frame, or wood frame structures are also found. More varied buildings are found in historic photos, though they were demolished while the Island was still in use.

NBI has associations that refer to the first period of significance. Isolation was a driving factor for the previous uses of NBI as a quarantine or a

rehabilitation center. The isolated Island enabled forceful exiles, most famously the forced quarantine of Mary Mallon, derisively known as "Typhoid Mary." These past uses have imbued the Island with a compelling inventory of buildings and associations with medical institutionalization, immigration, and the criminalization of addiction. Additionally, NBI has commemorative value as the site of the disastrous General Slocum shipwreck in 1904. The architect C. C. Haight was responsible for the earliest buildings on the Island, some of which still stand. He was a designer of a number of significant institutional buildings in New York and elsewhere (including the New York Cancer Hospital).

Other associations have developed since the Island was abandoned and contribute to its current meanings. During the post-abandonment period, little to no human intervention to the heritage on NBI has been undertaken. Hence, the buildings were left as they were in 1964. There has been no management plan for the buildings for the past 50 years, which has led to compromised structures and vegetation overgrowth. The heritage on the Island is continuous rather than momentary. Therefore, all identified pre-abandonment and post-abandonment resources should be evaluated for preservation interventions. The different periods contribute to each other, and affect the Island as it currently lives, and inform the next iteration of the Island. However, the interpretation of the diversity of the architecture will necessitate the selective demolition and rehabilitation of the buildings.

Ecological / Natural Values

NBI, along with the smaller, adjacent South Brother Island, serves as a reserve for colonial waterbirds and is particularly important as a habitat for the Black-crowned Night Heron (*Nycticorax nycticorax*). NBI is part of a system of seventeen New York Harbor islands forming a matrix of nesting habitat for NY State Species of Greatest Conservation Need.[49] The herons are closely monitored by the New York City Audubon Society as part of the Harbor Heron Preserve and their presence encouraged in NYC as an indication of the health of the larger ecological system.[50] When the environment, including the air, water, and plant life is healthier, more native species come back to NYC. A healthier ecosystem is beneficial to humans as well, thus keeping viable habitats for the herons takes on greater importance. NBI has been, and potentially will again be, heron and gull habitat, though there is no nesting activity on the Island at the moment, South Brother Island supports a large colony of herons and other birds, and NBI is believed to remain part of the habitat matrix of the herons in the East River. NBI has a dense canopy of mature trees and is classified by NYC Parks as a forest, and is actively being restored with native tree plantings and removal of non-native species.[51] The restoration is aimed at increasing ecological value and habitat quality, particularly on the southern end of the Island.[52]

Mature urban forest and "wild" landscapes are less common in cities and provide a suite of ecosystem services, including improved air quality, temperature moderation, habitat, water quality and quantity regulation, as well as numerous cultural values.[53] As a disturbed landscape, the Island embodies significant environmental-history narratives – which are rarely interpreted to the public. When the Island was fully occupied, the land was clear-cut into a manicured lawn with planting, which formed the superficial ecology. Since the Island has been abandoned, this man-made landscape has been allowed to grow wild. NBI is a testbed case study, as well as a discrete and compelling story, of urban nature.

Social / Contemporary Values

Although NBI is currently closed to visitation, one can view the Island from the Bronx coastline and the East River. The experiential qualities of the Island attract both legal observation and illegal visitation, including interest in the institutional architecture decaying, isolation, wildness, and its rugged character.[54] Kayakers and fishermen in rowboats make use of waters around NBI, while tours sponsored by the Audubon bring interested groups around the Island. There is illegal recreational use of the Island including camping, urban exploration, and geo-caching.[55] The aesthetic values of the Island draw interest from many demographics. The sense of wildness and isolation, while being in the middle of the city, is unique to the Island. With the material culture left behind from previous use, there is a strong connection and interest in the Island as an

example of landscape reclaimed by nature after human inhabitation.

NBI has potential educational value related to environmental education and urban history, relating the history of medical quarantine and its architecture, ecology, wildness, and status as a disturbed, semi-abandoned landscape. An important social value the Island can bring to the surrounding communities is the proximity to a wild, forested area. There are strong opportunities for community youth engagement, including volunteer programs to remove of invasive plants and other stewardship programs.[56] Currently some community stakeholders hope that access to the Island will create interest in Hunt's Point and the South Bronx in general, connect to other recreational and open-space assets, and provide job training and economic development.[57]

Statement of Significance

North Brother Island's significance is based on its cultural heritage, natural history, and potential to provide educational and community benefits. The Island's history is understood in terms of two periods: pre-abandonment (1881-1964) and post-abandonment (1964-present). Both periods are important for understanding the Island, as it as much a reflection of the social and institutional history of the Island, and abandonment, and disturbed landscape that followed. (Little is known specifically of the pre-hospital era or this historical landscape.)

The history of the Island reflects important developments in New York City, as well as national historical events and historical themes such as the treatment of contagious disease, public health in urban populations, and negative characterization of immigrants and "undesirables." North Brother Island, and it's "brother" to the south, serve as essential habitats for gulls and colonial wading herons, species that are indicators for the health of the larger ecosystem – which in turn relates to contemporary issues of public health and environmental justice. Thirdly, as part of the South Bronx, an area of the city which is underserved in green space, parks, and other open space, the Island offers a substantial public, open space resource in close proximity to these neighborhoods.

Managing the Island in a holistic way to maximize the heritage and social value, while preserving the ecological value is the ultimate goal of future stewardship. The next iteration of the Island should incorporate these three macro-values in order to provide opportunities to continue protecting and strengthening the significance of the Island.

4.2 Character Defining Elements and Tolerances for Change

The next stage of analysis links assessment of values and significance (the qualities, interests, narratives, symbols, etc., associated with the place) with the empirical realities on the ground: the buildings and landscapes that constitute the total environment. For clarity, the analysis is organized around three successive steps:

- Determining character-defining elements (CDEs): CDEs record how values and significance are most vividly represented in the physical environment (built fabric and natural terrain); they impose a priority on the place's resources;
- Establishing character areas consolidate and organize the CDEs in terms of the landscape as experienced; they also map out a synthesized, geographical mosaic of areas around which to organize management recommendations (instead of managing different resource types separately, one can manage them as integrated in each area);
- Analyzing Tolerances for change takes existing conditions, CDEs and Values/Significance into consideration and outlines which aspects of the site can withstand more change, and which should bear least change.

CHARACTER AREAS

Glamour images of five Character Areas, identified by the 2015 Historic Preservation Studio. Evan Oskierko-Jeznacki. 2015.

Three types of lists and corresponding maps result from this three-stage: a list of character-defined elements (aspects of the Island that bear greatest significance and important values, and require particularly careful decision-making); character areas that relate resources to experiences; and tolerances for change that inform design and management decisions directly (where to intervene, where to conserve).

Character-Defining Elements:

- Architectural remains and ruins
- Remnant landscape design features (roads, open spaces, seawalls) and organizational logic
- The palimpsest of ecologically disturbed plant communities, including extensive Norway maple forest, scattered specimen trees that marks the legacy of the hospital era, and a range of invasive species (native and non-native) that have thrived in a largely unmanaged and uninhabited place.
- Feeling of isolation from the surrounding urban context

Character Areas

As frequently used by the National Park Service, character areas provide a way to organize landscape conditions and features into areas of coherent character as the basis for managing them. Five areas are defined for NBI: the Front Door, the Spine, Trees and Ivy, the Coast, and the Meadow.

- "The Front Door" includes the Gantry and Ferry Dock, functioning as an entryway, characterized by flat surfaces, open views to the Bronx shores, and landmark structures, including the Gantry and the Smokestacks.
- The "Trees and Ivy" area was another sensory place, used to describe the cathedral-like space where light filters from the canopy above onto the ivy-covered ground near the Tuberculosis Pavilion. The ecosystem here is disturbed, consisting primarily of highly invasive plants (Norway Maple and English Ivy), yet creates a memorable space in the present-day landscape. This distinct place can be used to interpret disturbed landscapes to visitors.
- "The Spine" is the most legible path in the forest canopy, consisting primarily of a historic road/path that has been cleared by NYCDPR. The spine is framed by the Male Dormitory, Staff House, Shop/Storehouse, Tennis Courts, and Nurses' Home.
- "The Meadow," which is characterized by dense ground cover, is distinct from majority of NBI, which is heavily forested. Through its reforestation efforts, NYCDPR plans to replace the dominant species in this area with native grasses.
- "The Coast," on the eastern side of the island, is primarily coastal shrub forest, rarely reaching heights above 20 feet. The relatively patchy vegetation and amounts of open ground are most likely the result of storm damage and erosion. This area allows for open views east and south of the Island.

FIGURE 6.
Map of Character areas identified by Historic Preservation Studio 2015. Graphic, Julia Griffith, 2016.

Tolerances for Change

Our analysis suggests that the Spine, and Trees and Ivy had the lowest tolerance for change. The buildings in these areas were found to be important for interpreting the historic use of the Island, and for maintaining the Island's sense of place. The Physician's House and Tuberculosis Pavilion frame the entry into the Trees and Ivy area, and the Tuberculosis Pavilion creates its southern wall. The buildings along the Spine– the Male Dormitory, Shop/Storehouse, the Tennis Courts, and the Nurses' Home–contribute to the Island's most legible pat. The mature canopy trees in both of these areas are important to the quality of the space and should be maintained throughout the process of building stabilization. Balancing the conservation of such a cultural landscape against ecological management concerns remains a question needing to be addressed by more specific design and planning measures. For instance, retaining English ivy among the Norway maple canopy might be aesthetically and historically valuable, but remains a seed source for the rest of the Island and thus presents a problem for natural resource management.

A more fine-grained analysis of tolerances for change will be one of the more important results of a full conservation management plan for the Island. It is difficult to draw satisfactory conclusions about the tolerance for specific interventions without a deeper level of analysis – especially related to the structural integrity of the islands heritage buildings and structures.

4.3 SWOT Analysis

A SWOT analysis – evaluating strengths, weaknesses, opportunities, and threats – takes into account the complex interaction of the Island's natural environment and the built environment, as well as the enabling environment and our understanding of existing and potential stakeholder interests. In other words, the SWOT analysis is a synthesis of all we currently know about the place, filtered through the need to identify and assign priorities in order to move to implementation in the future. While strengths and weaknesses characterize the current state of the place, opportunities and threats focus on possible futures. The SWOT analysis creates a compact assessment of the current and future situation to which the final section of this report – elaborating Principles, Policies and Interventions – respond.

Strengths
North Brother Island presents a series of strengths on a variety of scales beginning with the presence of physical fabric on the Island that has historical significance. Although the buildings onsite range widely in levels of integrity, the collection of these buildings represents the different periods of significance of the Island are contribute significantly to the Island's significance as a whole. The Island also presents a series of ecological strengths. The combination of institutional and ecological history with the ruinous state of some of the buildings create a sublime atmosphere on and off the Island that in itself is significant. From beyond the geographical bounds of the Island, its strengths extend into the political sphere with support from key figures. Key strengths include:

- Island is a part of a larger ecological system
- Presence of significant physical fabric (buildings)
- Island embodies both ecological and institutional histories
- Historical significance (throughout multiple periods)
- Sublime qualities
- Presence of political support
- Material culture
- Landscape and ecological features

Weaknesses
Isolation and its related issues are the primary weaknesses of the Island (in terms of access). The Island is located in a flood zone which precludes certain governmental support as well as local political interest due to its elevated risk. Its isolation has also resulted in a general lack of resources, infrastructure, and regulation of the Island. The difficulty in reaching the Island has hampered building and ecological monitoring and regulation of the Island to discourage trespassers. As a result, the buildings have decayed to a point where many of the structures present a severe safety risk to those in close proximity. The only evidence of monitoring, carried out by various stakeholders, is the counting and documenting of the wading birds who nest and forage on North and South Brother Islands. This also presents another weakness of the Island, which is the management of North Brother as primarily a natural resource. Key weaknesses include:

- No access to Island
- Island lacks infrastructure
- Aspects of the Island are unsafe
- Island located in a flood zone

- General lack of resources (financial and human capital) to devote to management
- Little to no monitoring and regulation of the Island
- Island is managed as a natural resource only
- Buildings have deteriorated to a point that is dangerous and limits potential experiences

Opportunities
Numerous opportunities are available for North Brother Island, most significantly a collaborative management plan that incorporates the health and recreational benefits of the Island as a new public green space in New York City. Educational and interpretive opportunities include sharing the significant and fascinating history of the Island and the potential to connect it to larger stories of New York City (quarantine, institutional histories, immigrant life). The implementation of such a plan also has the potential to set a unique and practical precedent and prototype for other islands in similar situations. Key opportunities include:

- Collaborative management planning
- Educational opportunities
- Interpretive opportunities
- Recreational and health benefits from additional green space
- Prototype for other islands

Threats
The most obvious threat, present and future, is lack of financial resources combined with the high cost of making any substantial interventions on the Island. Looking forward, climate change will continue to threaten the already vulnerable Island not only with sea level rise but also increased damage from more frequent and more intense coastal storms. This will result in accelerated erosion and land loss, inundation, and conversion of plant communities as species that are not salt tolerant become increasingly exposed to coastal waters. The possible expansion of other infrastructure adjacent to the Island, like LaGuardia Airport, threatens North Brother Island in indirect ways as well. The increase in airplane activity over the island may threaten the fragile ornithological ecosystems on the and around the Island. A failure to balance the natural and cultural aspects of the Island also has the potential to jeopardize one or the other. Access to the Island presents a perilous debate: granting too much access to the Island may cause overdevelopment, irreversibly changing the Island's character (both ecologically and architecturally); while limiting access to the Island presents its own series of challenges, specifically regarding monitoring of the Island. Overall, however, lack of timely implementation of any such plan may also lead to the cause falling by the wayside and support for any intervention on the Island dwindling further.

- Cost of any potential interventions / dearth of resources
- Climate change / storm surge / sea level rise
- Airport activity increase in the future
- Failure of effective planning / implementation delay
- Potential over-development will change the Island's character
- Failure to balance ecological issues and building significance in decision making
- Too much access

5. FINDINGS, PRINCIPLES, POLICIES AND INTERVENTIONS

Taking into account the research and consultation so far conducted, and the important questions they pose, the next phase of the Conservation and Access Study frames a set of general principles, policies to guide future actions, and a few specific interventions that can immediately be pursued by NYCDPR and partners.

5.1 Findings

Through the research conducted during the 2015 Historic Preservation studio at PennDesign, and preliminary conversations with stakeholders, key insights, issues, and assumptions have been identified for consideration in this study. In summary:

- North Brother Island is an ecologically complex place as well as a historically and culturally rich landscape; NBI is significant for both its cultural and natural values;
- The buildings and cultural resources of North Brother Island are in advanced states of decay: some are beyond repair or collapsed; others are worthy of stabilization, few are potentially suitable for adaptation and reuse;
- Ecological and/or anthropocentric factors have continued to disturb and transform the ecology of NBI; among observed changes are the disappearance of Black-crowned Night Heron population from the Island (and increased population on SBI) and the persistence of numerous invasive plant species. The resilience of North Brother Island's natural resources and ecology faces further challenges with the impending impacts of climate change;
- No public access to North Brother Island is allowed. The only access allowed is for management/stewardship purposes, and is tightly controlled by NYCDPR. Evidence exists of illegal visitation to the Island, by “urban explorers,” vandals, et al.;
- Hazardous conditions exist on the Island, including compromised buildings, lack of emergency services, and a lack of basic amenities;
- The Island is quite close to the Bronx, yet is inaccessible; there is considerable demand for the services NBI could provide, principally for education;
- Bronx neighborhoods and residents are underserved in terms of open space;
- New forms of public space, and heightened expectations about the qualities of and access to public space, are part of the current era of urban innovation; this era of urban innovation is also produced new forms of stewardship.
- North Brother Island lacks all necessary infrastructure for occupation or public interpretation/access, including power, water, transportation, and communication;
- Due to these many issues, as well as legal and financial barriers, there is no real potential for inhabitation of North Brother Island;
- As a landscape of considerable cultural and ecological significance, North Brother Island offers great potential for light-imprint public uses such as memorialization and environmental education (limited to non-breeding season, September-February).

5.2 Principles

We propose several Principles to guide future plans for North Brother Island:

- Holistic: Plans should consider all resources – cultural, social and ecological – and the dynamics linking them.
- Integrated: Plans should unite all of the Island's resources, and connect them with surrounding communities (both social and ecological); likewise, the goals of NYCDPR's proposed activities should complement those of other stakeholders.
- Balanced: Plans should give fair consideration to both natural and cultural values of the Island, and to opportunities for conservation and access, when making long- and short-term decisions pertaining to programming and development.
- Collaborative: Policies, decisions, and implementation should be collaborative across sectors and stakeholders – while respecting NYCDPR's principal responsibilities for stewardship of NBI as a civic asset.

5.3 Policies

Three broad policies should govern future decisions:

- Regarding preservation of cultural heritage: Given advanced decay, loss of integrity of most buildings, and the total lack of infrastructure and impossibility in the short or medium term for inhabitation or infrastructure development, preservation policy centers on triage. A few buildings should be stabilized (for possible future reuse); some should be stabilized as ruins; some should be demolished out of concern for safety (and their material should be reused on-Island). The cultural heritage of the Island should be purposefully interpreted to the public.
- Regarding ecological management: Continued restoration of the Island's highly disturbed ecosystem, in order to protect/provide heron habitat in case they return from SBI or other sites and to increase the resilience of the Island's ecology to storm surge, sea-level rise, and the continuing challenge of invasive species. This would be achieved by continuing NRG's policy of introducing native plants, removal of invasive species, and, in general, maintaining the structure and mix of the Island's existing character areas (as generated by both natural and anthropogenic forces).
- Regarding access: A pilot test of very limited and highly curated access should be undertaken. The potential for realizing social values from environmental and historical education of NYC youth is substantial. Safety risks are manageable; the lack of infrastructure can be accommodated by keeping groups small, visits short, and supervision strict. Audiences from the South Bronx should take priority, but not have exclusive access. Very limited access to NBI would also advance the interpretation of the Island's history and ecology, including the challenges facing its management as a public, forever-wild park.

5.4 Interventions

Several interventions are proposed as short-term initiatives:

- Formulating an official management plan for NBI and SBI;
- Stabilizing ruins and dismantling some buildings that are beyond repair and present imminent threats to safety; these decisions should be based on a deeper level of building assessment than has been possible thus far, carried out immediately in collaboration with NYC officials. (Only cursory building investigation was possible during our 2015 site visits.)
- Piloting limited, curated public access; principal partners and audiences will be Bronx-serving community entrepreneurs and entrepreneurial NGOs; initial access events will provide excellent educational opportunities and very limited economic development opportunities;
- Designing an interpretation and memorialization scheme for the Island's important cultural and natural narratives; to be located on-Island and off-Island;
- Installing monitoring regimes, related to ecological as well as cultural resources; this is essential for long-term conservation and can have strong educational and community engagement components.

Photo of the Transformer Vault. Andrea Haley and Yimei Zhang. 9 October 2015.

6. CONCLUSIONS AND NEXT STEPS

North Brother Island is an extraordinary place, warranting the most careful and creative stewardship. The Island is an important lens for reflecting on significant and relevant themes in the city's history: public health, immigration, exile, the management of nature as part of city building, and the future of the city in an era of dramatic climate change. NBI should be envisioned as more than a patch of wildness, as valuable as this is.

NYCDPR, working with its current and potential partners, can seize the opportunity to protect and provide access to the cultural values and public space of NBI – which takes on urgency in light of the educational potential of the Island, the contemporary crises of public education, the relevance of urban environmental health issues, and the promise of improving access to quality public and open spaces in the Bronx.

By proposing very limited public access, this study does not open the door for uncontrolled access: full public access should be precluded on design/conservation grounds as well as cost-benefit grounds. Open access would clearly damage significant resources on the Island, preclude further conservation efforts, present significant public risks, and be extremely costly.

Given that nesting herons have been absent from NBI for 10 years, a shift in conservation priorities is warranted. As ecological and heritage conservation are re-considered and re-balanced, NBI presents an opportunity to be a testbed for cross-sector and cross-disciplinary questions facing landscape preservation in the next generation: How to weigh the benefits of public access against conservation priorities? How will climate change reshape management of island and coastal assets? How does the design of public access interact with restoration/ecological management strategies? How can restoration and planting can be used to frame experience of the Island and its evolution. How can the Island be re-imagined as a teaching/research asset to address urban habitat/ecology, restoration, and response to climate change – not to mention subjects like the cultural history of quarantine, historical interpretation of remote/unvisitable sites, "rescue preservation" of severely deteriorated buildings?

The question of who gets access to NBI is linked to the question of who "owns" NBI. Clearly, NBI is a City asset, but what opportunities and responsibilities should fall to proximal South Bronx neighborhoods as the future of NBI is contemplated? As access becomes possible, how are the benefits of that access distributed? How will very limited public access directly leverage additional conservation work for NBI as well as produce educational benefits? Conservations on these questions must be a focus of subsequent plans and strategies.

As any interventions are contemplated for NBI, the issues of financing and logistics stand front and center. If access is possible, what financing facilities may be available? Who benefits? Where do visits touch the shoreline(s)?

There is added urgency to act now in order to prevent a regrettable loss of historic resources and heritage values. The buildings and built landscape will not be recoverable in another generation. Responsible, sustainable preservation approaches applied to the Island's buildings now can retain important layers of built heritage (and provide future generations with the possibility of adaptive reuse). Implementation of prototype public access experiences and some necessary studies should be undertaken as soon as possible. Some stabilization measures must happen early, alongside the beginnings of curated public access. The momentum gained by NRG's ecological restoration work should not be lost.

This study ends by proposing next steps for implementing pilots of strictly curated access to NBI and undertaking next-level studies to frame the Island's future possibilities.

Photo of the Physician's House. Andrea Haley and Yimei Zhang. 9 October 2015.

[1] DESIGN AND PLAN A PROTOTYPE FOR PUBLIC ACCESS

A program and protocol for small-group experiences of NBI will be designed in early 2017 in collaboration with NYCDPR and ideally piloted in Fall 2017. The visiting experience would be designed by the PennPraxis team with the close collaboration of NYCDPR and other partners such as Natural Areas Conservancy and Audubon.

Initial assumptions call for 15 participants and 6 guides (two from NYCDPR, two from PennPraxis, one from The Point, one from Audubon) traveling by hired boat to NBI for a two-hour guided tour. The Island visit will be preceded by a thorough safety presentation and introductory talk about the island's history and ecology. Initially, three pilot experiences would be held, focused on distinct audiences (for instance, youth, families, donors).

[2] PLANNING FOR ACCESS: LANDING SITES, LOGISTICS AND PARTNERSHIPS

Physical, operational plans must be detailed if access to NBI is to be provided in any form. We propose a range of possibilities, implementable in the short, medium, and long term – each with different partners:

- In the short-term (immediately): departure from Hunts Point Riverside Park organized with The Point and Rocking the Boat. This was our study team's mode of access.
- In the medium-term (next few years): Departure from East 138th Street pier in Mott Haven, planned and underway by New York Restoration Project. It would be a shorter ride than the Riverside Park site on the Bronx River, and would provide excellent connectivity to South Bronx neighborhoods and elsewhere, especially as The Haven project in Mott Haven proceeds.
- In the long-term (five years): Departure could be arranged from Oak Point, in collaboration with property owner/ developer Steve Smith, who has envisioned a range of public uses of this nearby waterfront property in the future – including Hunts Point shoreline greenway connectivity.

[3] NEXT-LEVEL STUDIES

To lay the foundation for a thorough management plan, the following next-level, more detailed expert studies need to be undertaken. Discussions between PennPraxis and partners to complete these specialized studies have already begun. PennPraxis' immediate next steps include fund-raising to support the studies while consulting closely with NYCDPR:

- Economic forecasting and institutional arrangements: Lead: HR&A; partners: PennPraxis, NYCDPR. This study would clarify feasibility by estimating order-of-magnitude costs, communication strategies, and institutional models for implementation of curated visits.
- Structural engineering and building assessment: More detailed and thorough assessment of the integrity of the Island's historic structures must be complete before any implementation can be undertaken. This study will focus on the five significant structures identified as facing irretrievable loss on page 29. Lead: Justin Spivey of Wiss Janney Elsner Partners: PennPraxis, NYCDPR, Department of Buildings.

- Monitoring: Both ecological conditions and buildings conditions must be tracked with a thorough monitoring and data-collection regime. This would include means of actively monitoring island conditions and passively collecting data. Lead/coordinator: PennPraxis and NYCDPR; Partners: whole team.
- Interpretation and memorialization: The creative process of designing a compelling means of interpreting and memorializing NBI's heritage would typically be the subject of a public competition. While this would be exciting, we advise against it as the competition would immediately and sharply raise the profile of NBI and overstimulate demand for visiting the island. We suggest, as an alternative, a design process involving graduate students in preservation, landscape architecture, architecture and fine art in an "internal competition" organized by PennPraxis with partners Monument Lab (a project based in PennDesign's Department of Fine Art)

7. ENDNOTES

[1] The following summary draws on the Penn historic preservation studios from 2005 and 2015; Payne, Mason and Sullivan 2014; and other historical sources as noted.

[2] Sharon Seitz and Stuart Miller, The other islands of New York City: a Historical Companion, Woodstock, VT, Countryman Press, 1996, 190.

[3] Robert Sullivan. "Wayfarers." North Brother; the Last Unknown Place in New York City. New York, N.Y.: Fordham University Press, 2014, 2.

[4] Seitz and Miller, 190.

[5] Ibid., 190.

[6] Historic Preservation Planning Studio 2005. "North Brother Island; Balancing Ecology and Cultural Heritage." Philadelphia, P.A.: New York City Department of Parks and Recreation and University of Pennsylvania Historic Preservation Program, 2005.

[7] Randall Mason. "Wildness, Disease, and the Changing Civic Landscape: North Brother Island's History." North Brother; the Last Unknown Place in New York City. New York, N.Y.: Fordham University Press, 2014, 14.

[8] Seitz and Miller, 192.

[9] Ibid., 192.

[10] Historic Preservation Planning Studio, 21.

[11] Ibid., 192.

[12] Ibid., 193.

[13] Ibid., 193.

[14] Ibid., 193.

[15] Ibid., 29.

[16] Molly McDonald Thesis.

[17] Winthrop, 33.

[18] Ibid., 35.

[19] Ibid., 36.

[20] "North Brother Island, NY."

[21] Ibid.

[22] Jeremy D'Entremont, "Memories of North Brother Island."

[23] Ibid., 41.

[24] Ibid., 42.

[25] Winthrop, 48.

[26] "Forever Wild: North Brother/South Brother Harbor Herons Preserve." NYC Parks-Official Website of the New York City Department of Parks & Recreation. New York, N.Y.: The City of New York. Web. 15 Sept. 2015.

[27] Historic Preservation Planning Studio p. 16.

[28] Winston, T. 2015. New York City Audubon's Harbor Herons Project: 2015 Nesting Survey Report. New York City Audubon, New York, NY. [especially Table 2, Figure 2, Figure 4].

[29] While the building team conducted surveys during two site visits, the landscape team primarily conducted their survey during the first site visit. The work of the landscape team during the second site visit was to confirm what was recorded during the first visit and to work on individual projects. For this reason, results are not divided by site visit one and two as they are in the building survey.

[30] "Natural Area Mapping and Inventory of North Brother Island 1989 Survey", City of New York, Parks and Recreation, Natural Resources.

[31] Hope and Harold S. Winthrop. Corp Author Institute on Man Williams, Science, and Center Community Renewal. Toward North Brother Island. Rensselaerville, N.Y.: Center for Community Renewal Institute on Man and Science, 1978.

[32] "Port Morris Ferry Bridges," National Register of Historic Places Registration Form, completed by Jinny Kahnduja, Columbia University, May 2013, http://www.nps.gov/nr/feature/places/pdfs/13001150.pdf, 9.

[33] Ibid., 9.

[34] Ibid., 10.

[35] All numbers are approximate and calculated by the author using spatial data provided by the New York City Department of Planning for use in GIS programs and the most current population data released by the US Census Bureau. New York City Department of Planning, "Interactive Map of Publicly Accessible Waterfront Spaces,"Vision 2020: New York City Comprehensive Waterfront Plan, accessed February 12, 2016, http://www.nyc.gov/html/dcp/html/cwp/cw.shtml; New York City Department of Planning, "NYC Publicly Accessible Waterfront," Bytes of the Big Apple, accessed February 13, 2016, http://www.nyc.gov/html/dcp/html/bytes/dwnwaterfront.shtml.

[36] New York City Tree Valuation Protocol, NYC Parks and Recreation, accessed November 22, 2015, https://www.nycgovparks.org/pagefiles/52/NYC-Tree-Valuation-2010.pdf.

[37] "Forever Wild: Nature in New York City," NYC Parks and Recreation, accessed November 22, 2015, http://www.nycgovparks.org/greening/nature-preserves.

[38] Vision 2020: New York City Comprehensive Waterfront Plan, New York City Department of City Planning, p.130, accessed September 22, 2015, http://www.nyc.gov/html/dcp/pdf/cwp/vision2020nyccwp.pdf.

[39] Interview with Michael Marrella.

[40] Ibid.

[41] "Coastal Zone Management Act," Office of Coastal Management NOAA, accessed September 22, 2015, http://coast.noaa.gov/czm/act/.

[42] Interview with Michael Marrella, Director of Waterfront and Open Space Planning, DCP, October 14, 2015.

[43] "Zone AE and A1-30," Federal Emergency Management Agency, accessed September 22, 2015, http://www.fema.gov/zone-ae-and-a1-30. and "Zone VE and V1-30," Federal Emergency Management Agency, accessed November 22, 2015, http://www.fema.gov/zone-ve-and-v1-30. AE-Zones are sometimes referred to as A-Zones in documents.

[44] Interview with Michael Marrella.

[45] Sharon Seitz and Stuart Miller, The Other Islands of New York City: A History and Guide, 3rd edition (New York: Countryman Press, 2011), 213.

[46] Randall Mason, "Wildness, Disease, and the Changing Civic Landscape: North Brother Island's History," in North Brother Island, (Fordham University Press, 2014), 17.

[47] Seitz, The Other Islands of New York City, 215-18.

[48] The material and construction method are described in the specification of a hospital building, which was designed by the same architect, C.C. Haight, but demolished circa 1934. "To face all outside walls, chimneys, piers, etc., above water table with the best quality light red Philadelphia pressed brick. (...) To bond face work every fifth course by cutting in diagonal headers. To bond all other work every fifth course."

[49] "Species of Greatest Conservation Need (SGCN)," New York State Department of Environmental Conservation, Accessed March 25, 2016, http://www.dec.ny.gov/animals/9406.html.

[50] "Harbor Herons," New York City Audubon, Accessed September 8, 2015, http://www.nycaudubon.org/issues-of-concern/harbor-herons.

[51] In an urban system trees will not regenerate as readily.

[52] "North Brother Island," New York City Department of Parks and Recreation, Accessed September 8, 2015, http://www.nycgovparks.org/parks/north-brother-island/map.

[53] Hasse et al. 2014; NYC Parks Guidelines for Urban Forest Restoration.

[54] Howard Silver, "The Jinx Project: Exploring North Brother Island," YouTube Video, Accessed September 8, 2015, https://www.youtube.com/watch?v=AIE1AS09UwY.

[55] Sean Cole, "How to Get to North Brother Island," Radiolab, Accessed September 12, 2015, http://www.radiolab.org/story/170476-how-get-north-brother-island/

[56] "ACTION visits North Brother Island," YouTube Video, Accessed September 8, 2015, https://www.youtube.com/watch?v=Xi9MlOWJ3o.

[57] Paul Lipson, personal communication, September 2015.

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9. CREDITS

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Randall Mason, principal investigator

Angelina Jones, researcher and Julia Griffith, graphics.

PennDesign faculty consultants: Andrew Fearon; Nick Pevzner; Ellen Neises

External consultants: Justin Spivey, WJE; Max Piana, Rutgers University; Paul Lipson, Barretto Bay Partners; Maria Torres and Danny Peralta, The Point CDC

Members of the 2015 PennDesign Historic Preservation studio:

Sang Bae; Alice Gilmore; Julia Griffith; Andrea Haley; Madeleine Helmer; Jean Jang; Angelina Jones; Evan Oskierko-Jeznacki; Haoyu Wang; Casey Weisdock; Yimei Zhang

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Michael Marella, New York City Department of City Planning

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Aerial photograph, 1950.
Department of Corrections