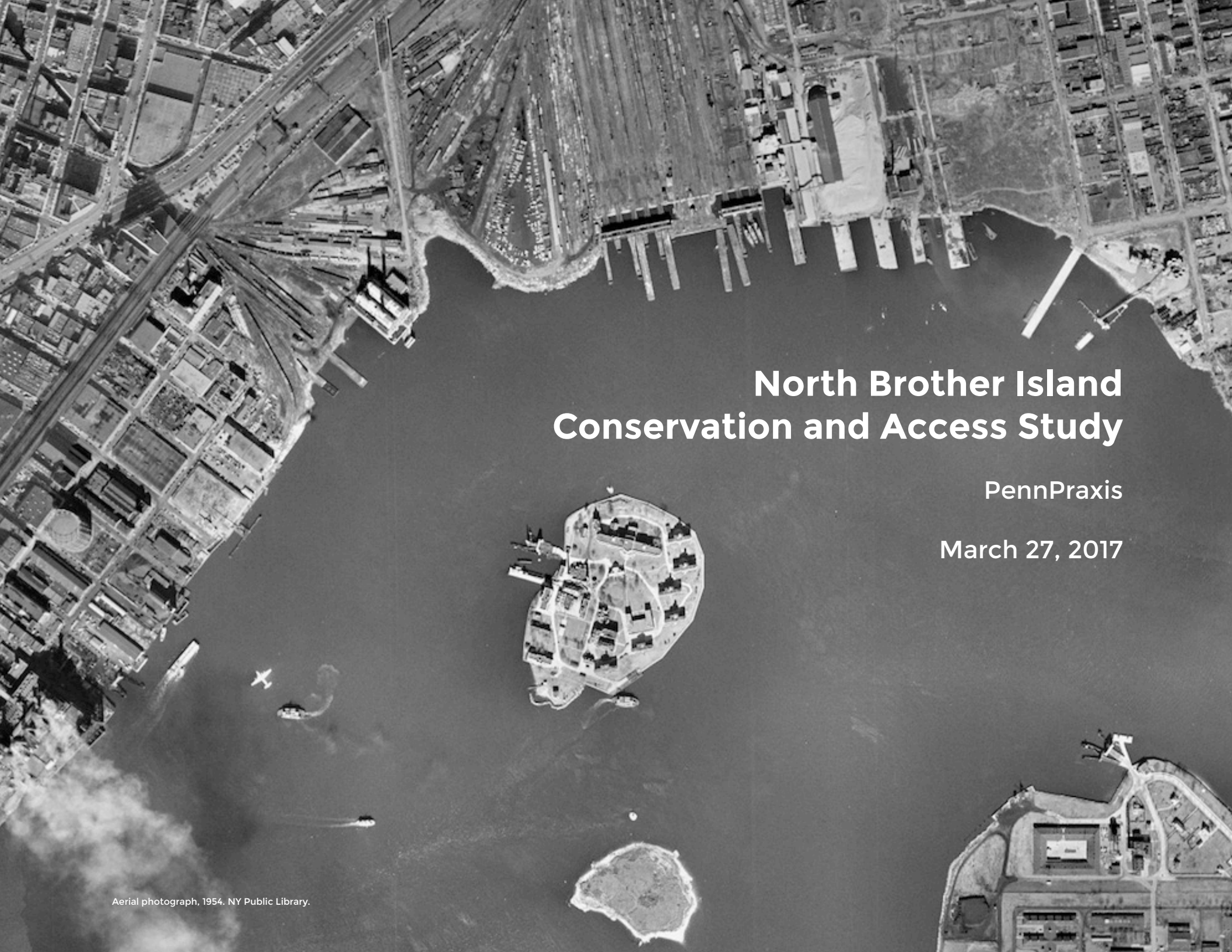
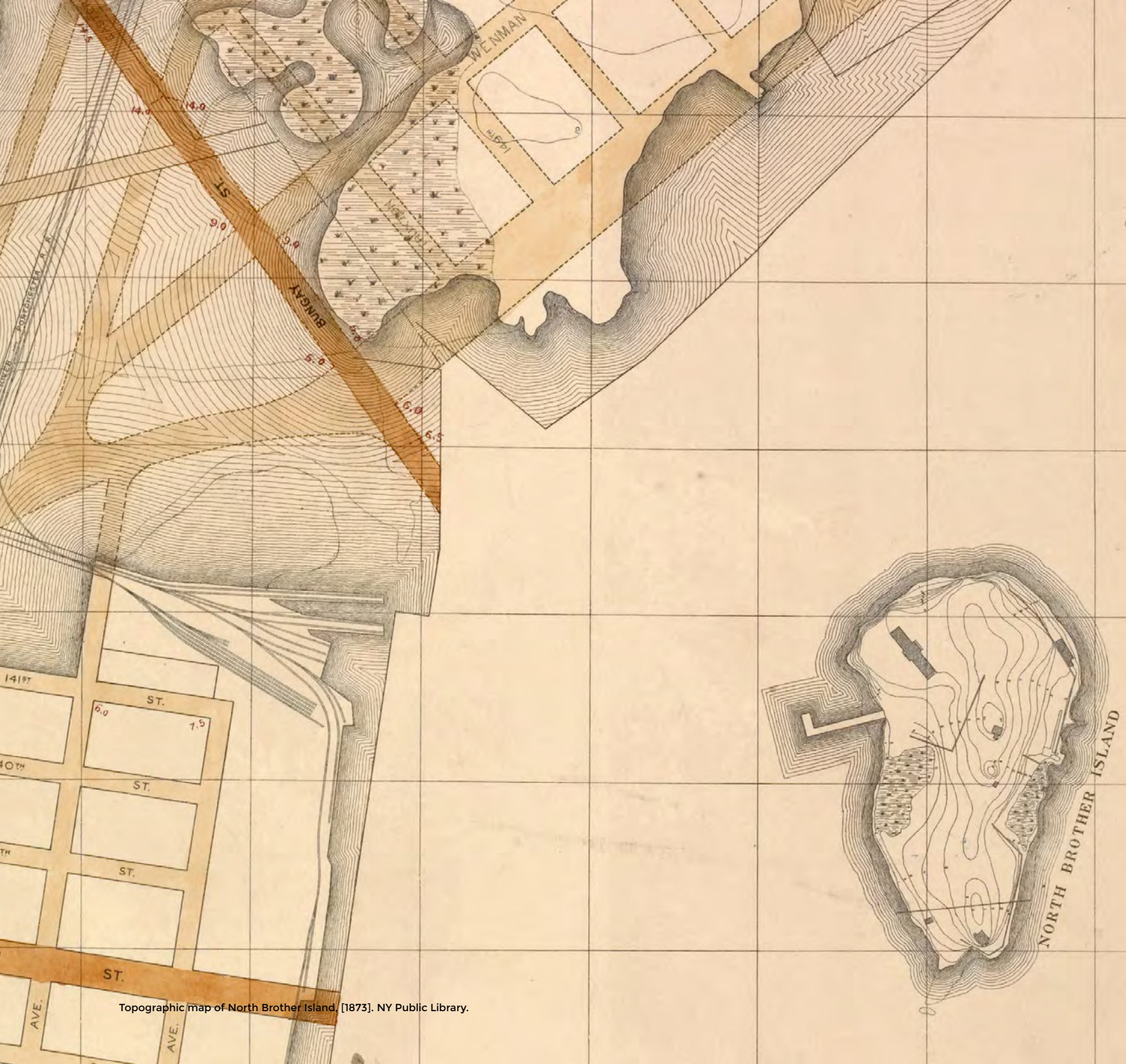


North Brother Island Conservation and Access Study

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

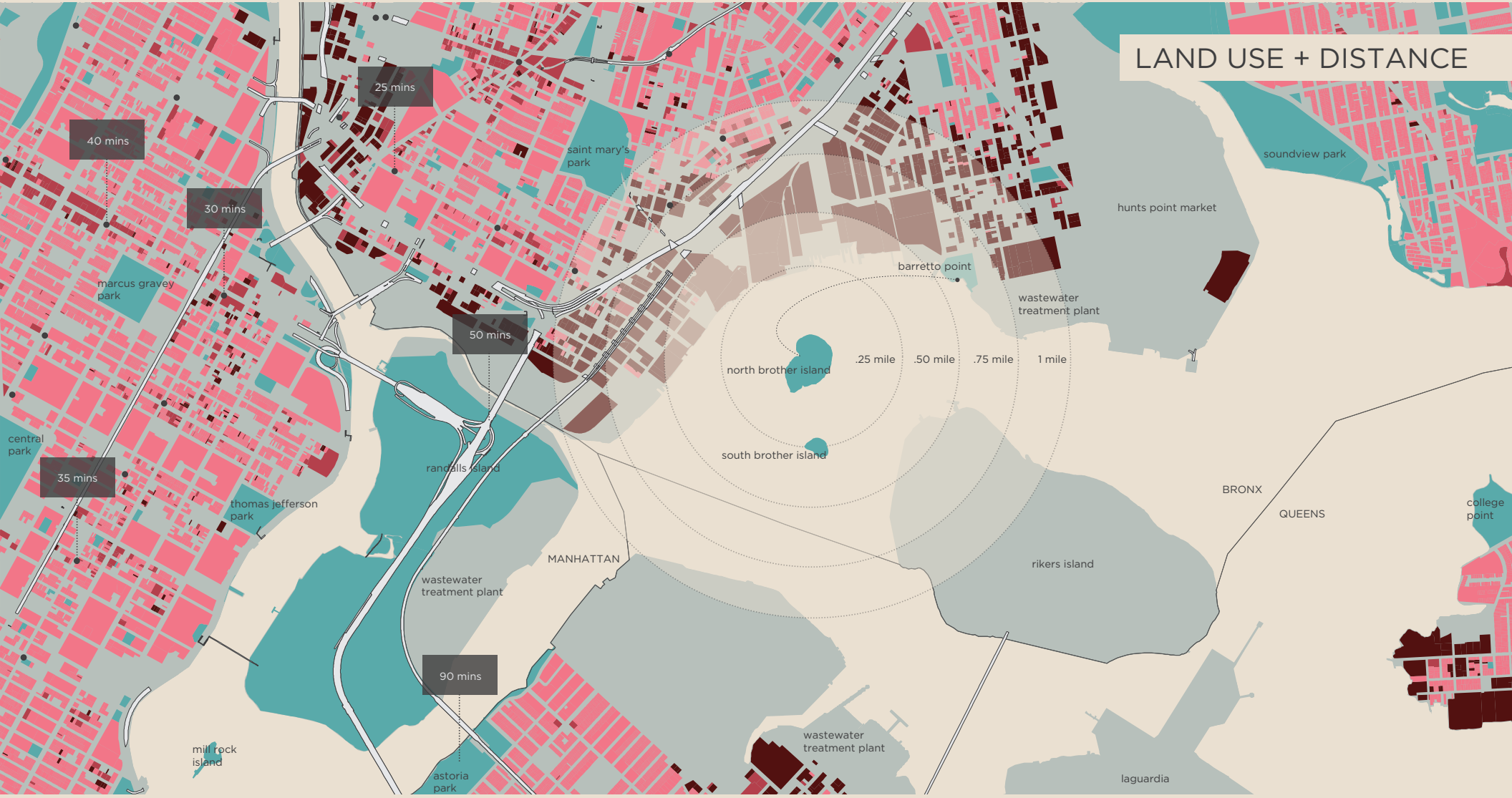
Several interventions are proposed as short-term initiatives:

- 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

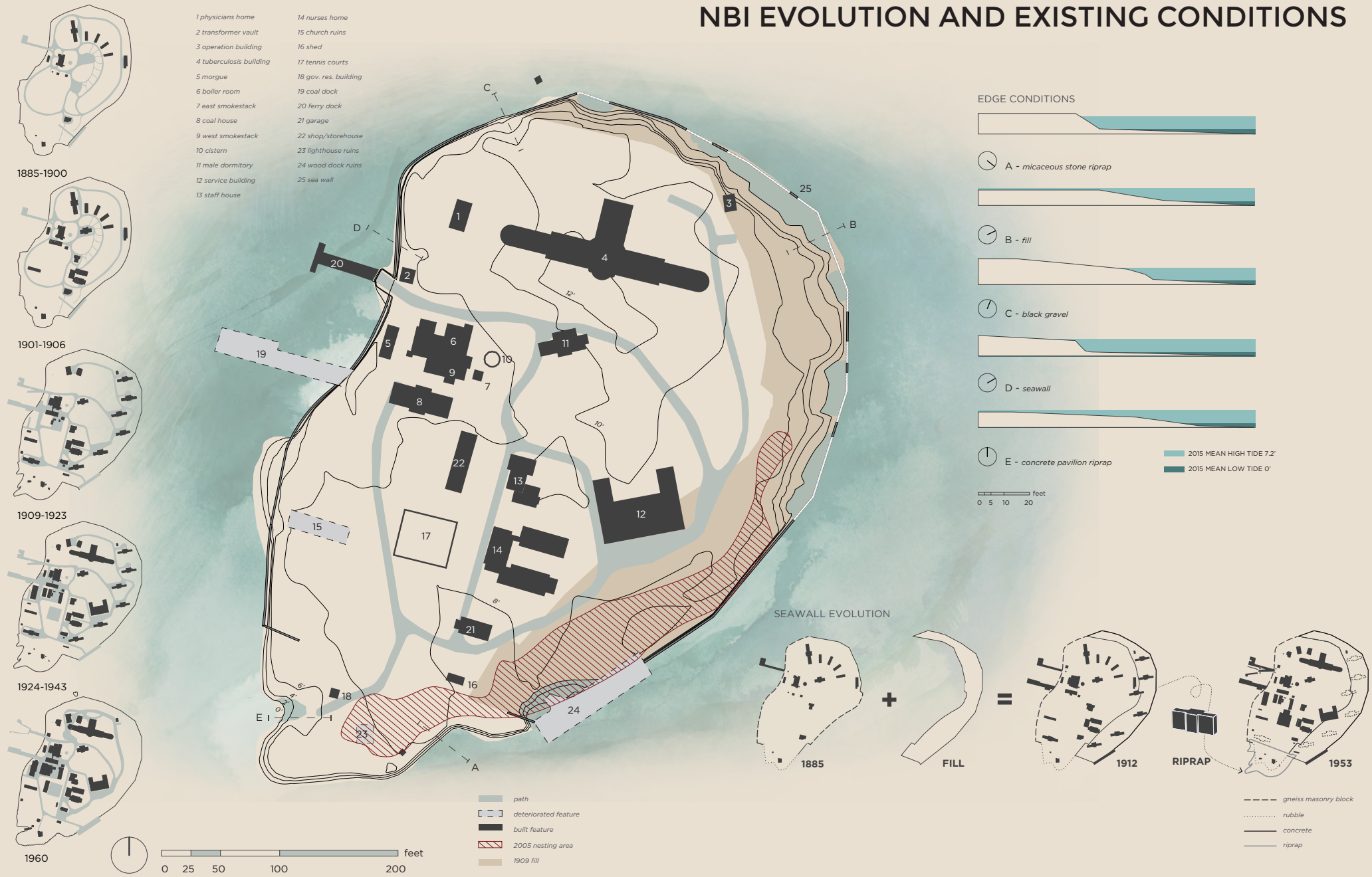


FIGURE 2.
North Brother Island evolutionary diagrams and existing conditions. Angelina R. Jones. 2016.

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]

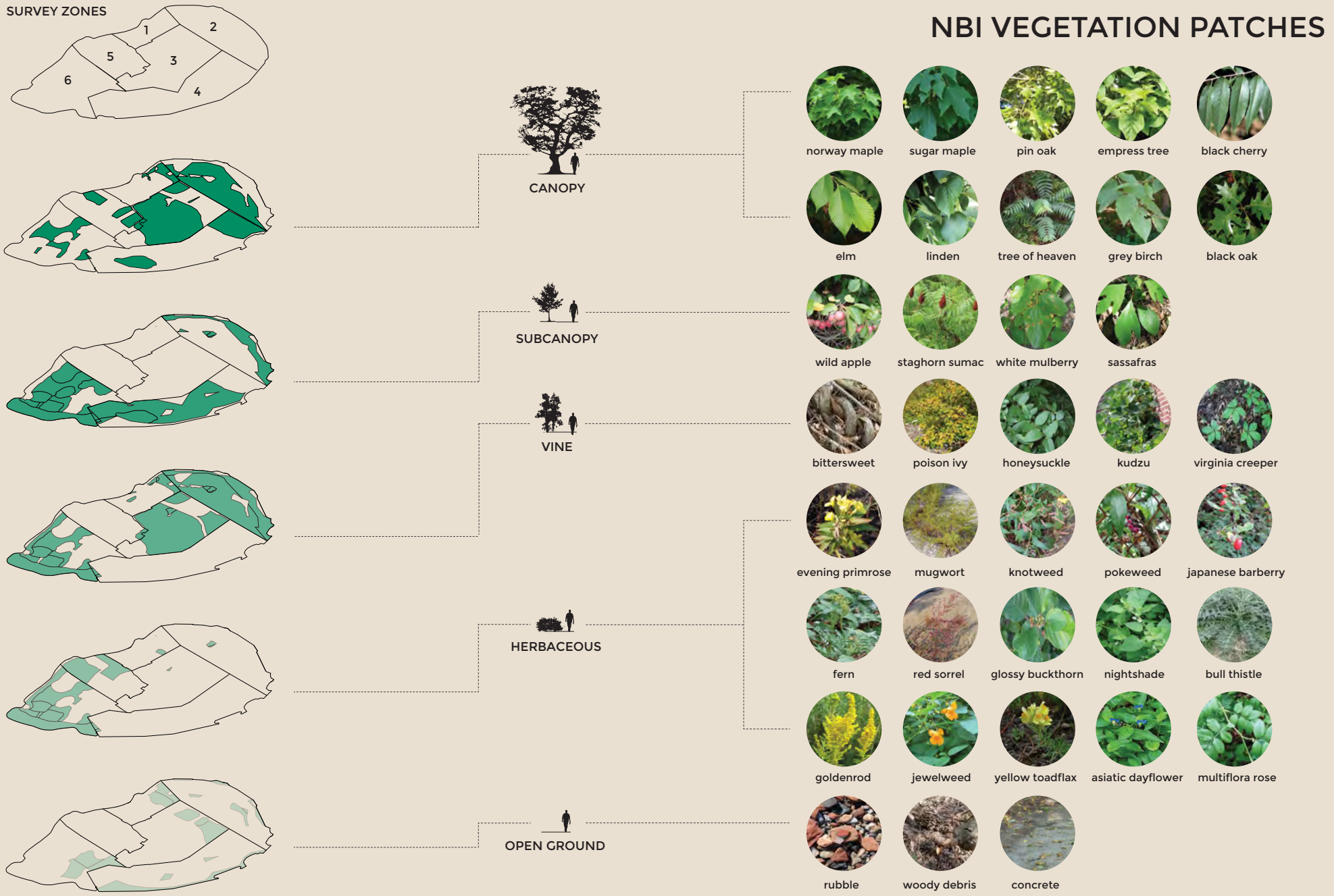


FIGURE 3.

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