Entangled Culture and Nature: Toward a Sustainable Jackson Park in the Twenty-First Century

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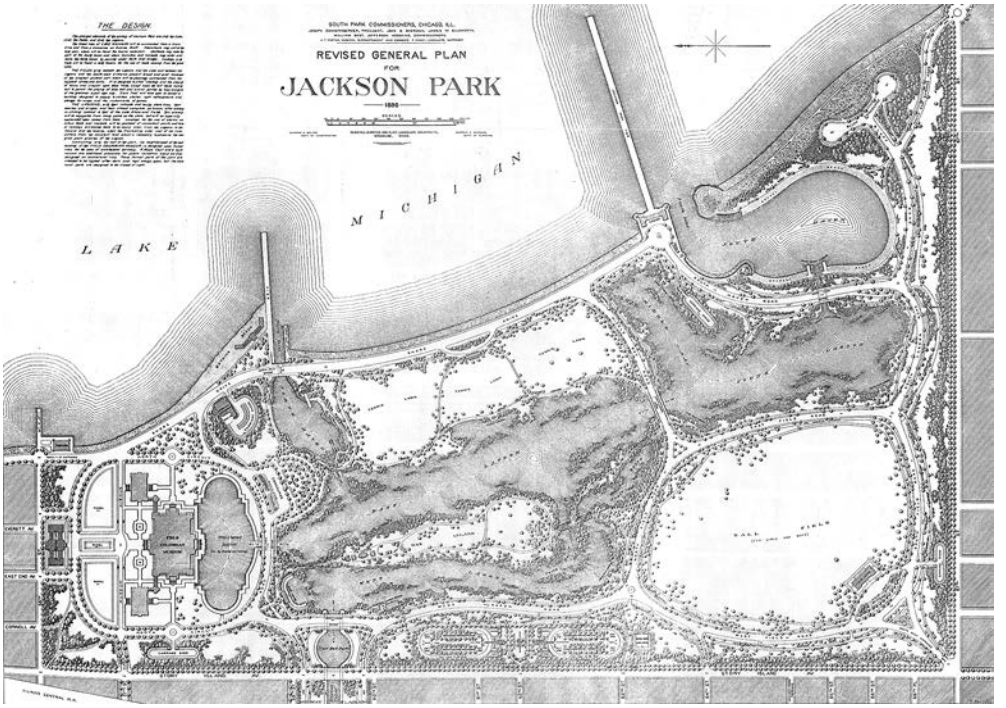

ENTANGLED CULTURE AND NATURE

Toward a Sustainable Jackson Park in the Twenty-First Century

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Figure 1. Jackson Park Revised General Plan. Olmsted, Olmsted & Eliot, 1895. Park landscape characterized by fields, lagoons, and lakeshore, as described in the design statement included on the plan. (Courtesy of Chicago Parks District)

To address Jackson Park, site of the 1893 World's Columbian Exposition on the shores of Lake Michigan, a talented interdisciplinary team interweaves biodiversity and cultural authenticity in this Great Lakes Fisheries and Ecosystem Restoration (GLFER) funded project.[1] Enabled through a private-public-civic partnership, the ecological health, historic integrity, and performance of this public landscape are improved. Climate change amelioration aspects will enhance resilience. As landscape functions and scenic qualities improve, upgraded perceptions and uses will foster positive effects within adjacent urban neighborhoods.

Introduction

The Jackson Park GLFER project seeks to advance park landscape adaptation and resilience to the anticipated regional effects of climate change, the most common being increased temperatures and drought, while supporting a full range of urban life—human, flora, and fauna. The objectives of the project were the simultaneous rehabilitation of the historic park and the ecological restoration of habitat. Terminology describing this project presents a challenge, as disciplinary boundaries of historic preservation and ecological restoration overlap. In previous projects addressing historically valuable landscapes, the tension between values of nature/ecology and those of cultural/historic assets often yields an unbalanced outcome, with one aspect dominant over another. The collaboration forged in the Jackson Park project, funded by Great Lakes Fisheries and Ecosystem Restoration (GLFER), sought to recalibrate this elusive balance by valuing historic and environmental legacies and their potentials, and acting on a shared belief that culture and nature are interdependent and evolving.

Jackson Park, Chicago, is the celebrated site of the 1893 World's Columbian Exposition, the fair that launched the City Beautiful movement. The landscape, designed by F. L. & J. C. Olmsted, Landscape Architects, combined naturalistic and formal styles to showcase the nearly six hundred–acre grounds to twenty-eight million visitors between April and October, 1893.[2] In 1895, two years after the event and the demolition of over two hundred temporary structures, the visionary South Park Commissioners called upon the Olmsted firm to reshape the landscape as a public park. The current project, a partnership to simultaneously revitalize cultural heritage, ecological health, and contemporary use and management, researched those park rebuilding documents as the basis for an unusual but fruitful collaboration. The technical project team of landscape architects, planners, ecologists, engineers, and construction specialists developed construction documents that

rehabilitate the landscape's Olmstedian character, improve habitat for a range of diverse species, welcome a broad range of daily park uses by people, and address management needs for a sustainable twenty-first-century urban park.[3]

Situated on over one mile of Lake Michigan waterfront, seven miles south of downtown Chicago, the park is located within an urban mosaic that includes the University of Chicago and diverse, generally underprivileged South Side neighborhoods. Project work in this urban context can recognize the three pillars of sustainability—economy, environment, and society—acknowledging that achieving sustainable objectives engages each of these aspects.[4] The Jackson Park GLFER project, subtitled An Ecological Restoration Designed in the Olmsted Style, addresses about one hundred forty acres of terrestrial and marine resources, as a partnership of the Chicago Park District (CPD), the Army Corps of Engineers (ACE), and Project 120 (P120), with preservation landscape architects Heritage Landscapes (Heritage). In northeastern Illinois, the climate is controlled by four factors: the sun, weather systems, urban areas, and Lake Michigan, which provides a moderating and cooling effect.[5] Noting the important position of this park between the lake and dense urban areas to the north, east, and west, the project has the potential to positively impact the climate of the South Side of Chicago.

According to the United States Environmental Protection Agency (EPA), climate change "refers to any significant change in the measures of climate lasting for an extended period of time . . . [including] major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer."[6] Climate change predictions for the Midwest anticipate increased temperatures and drought in the Great Lakes region. As summer temperatures increase, air quality can degrade, and heat waves can challenge both human health and economic activity. As proposed by the GLFER project, improvements in air and water quality and the increased density of park vegetation will act to counterinfluence these projected effects.

What is the relationship between these potential changes in Midwestern climate and the work currently underway at Jackson Park? The rebuilding of ecosystems with native terrestrial and aquatic plantings improves water quality and reduces the urban heat island effect. The park will be a cool refuge that will aid in moderating temperatures in the dense surrounding neighborhoods. Records indicate that in January 2013, Lake Michigan's "water levels were at an all-time low, some six feet lower than the record high set in 1986."[7] The water levels of the lagoons are controlled by a weir and an area of fill, making it possible to maintain a higher water level than the lake. In addition, the forbs, grasses, ephemerals, parasitic companions, shrubs, and trees specified in the project are generally broad in range. This diversity provides a safeguard for some plants to fail while others thrive. The use of native plants focuses on resilience by virtue of this variety. While invasive plants may thrive as well under climate change conditions in the future, their habitat value is lacking.

The application of GLFER funds for the project at Jackson Park originated as a restoration of ecological systems, recognizing that pressures of climate change increase the importance of this park as a place of year-round habitat and as a migratory haven. In

response to public comment addressing the historic significance of this Olmsted park, CPD, P120, and the Illinois Historic Preservation Agency tasked Heritage to develop a design solution reconciling historic preservation and ecological restoration imperatives. This interdisciplinary and multisectoral collaboration melded the expertise of a state agency, municipal government departments, a nongovernmental organization, and a private sector firm to fundamentally shift the project scope and objectives toward integration. The project team expanded opportunities by envisioning Jackson Park as an entangled human habitat in which nature and human use were balanced and inseparable. The approach led to a scheme where the park reaps (1) societal benefits as a healthy, scenic open space; (2) environmental benefits of native plant communities, habitat upgrades, and improved resilience to severe weather; (3) heritage benefits of Olmsted character recapture; and (4) durability benefits of construction techniques and materials.

This collaborative work valuing heritage and habitat together was guided by the project concepts of entanglement, compatibility, resilience, and sustainability. First, entanglement refers to the myriad ways that the complex and interacting systems of nature and culture are inextricably intertwined in a landscape. For this project, the application of evolving scholarship on entanglement draws on the integration of experts in both preservation and ecology fields in order to achieve native biodiversity and historic cultural diversity.[8] Second, compatibility is the expectation that systems and organisms can sustain individual and collective tensions to thrive in a shared habitat. Through creativity and innovation, historic designed-landscape character and native plant communities can work together to renew the Olmsted vision while achieving habitat objectives. Third, resilience is the ongoing capacity for renewal and self-preservation in a dynamic environment.[9] Once established, native plant communities of the region will effectively stabilize the aquatic and terrestrial landscape, providing fruitful habitat for resident and migratory species and adapting the landscape to endure climate change. Fourth, sustainability means balance across the sectors of economy, environment, and society. Through preservation and ecological restoration, revitalizing this historic park will uplift both the park and its adjacent neighborhoods, addressing all three pillars of sustainability.

These baseline concepts directed project design and construction to rehabilitate and restore this diverse biocultural landscape. Developed as an effort to better describe relational complexities within systems of culture and nature, entanglement implies the interwoven, co-constructed, and constantly-becoming nature of things.[10] It is an appropriate term for the park landscape as a combined work of humanity and nature that contains inseparable cultural and natural assets, which are intermingled and evolving. Degraded over time by multiple forces, the park needs significant interventions to add value and upgrade its functions. In the face of climate change, embracing the entangled reality offers greater likelihood of positive change than a simplification of the issues at hand.[11]

Accomplished in a matter of weeks due to strict funding milestones, the project required ACE, CPD, and Heritage to closely collaborate, synchronize project plans, and achieve the often-incompatible objectives of historic character, habitat diversity, ease of management, and varied uses. Based on years of experience with over fifty Olmstead legacy

landscapes, Heritage brought to the project an extensive knowledge of Olmsted design and techniques. Driven by the need to bring the work into compliance with state and federal historic preservation guidance and receive approval from the Illinois Historic Preservation Agency, the collaborative approach and interdisciplinary methods stressing Olmstedian character are the subject of this paper.

Historic Research on Olmsted Design and Principles

Primary document research is at the core of this work. Heritage began by obtaining original documents by Olmsted from Olmsted and Eliot, Landscape Architects (1893–97), F. L. and J. C. Olmsted, Landscape Architects (1897+), and the Frederick Law Olmsted National Historic Site archives. The documents included design concepts, grading, soils, planting plans and sections, and plant lists. The Jackson Park Revised General Plan of 1895 captures the design intent and intricacy of the composition (Fig. 1). These documents were corroborated by a collection of historic images from the CPD archives and local collections, dating from the 1890s to the 1950s. The Olmstedian typology of lake, field, and lagoon scenery is expressed in the 1895 to 1897 construction of the park, and is documented through historic photographs and original planting plans, lists, and receipts of the landscape architecture firms led by Frederick Law Olmsted, Sr., and his partners, John Charles Olmsted, Charles Eliot, and Frederick Law Olmsted, Jr., as well as his collaborators, Warren Henry Manning and Edward D. Bolton.[12]

The research proved to be enlightening in understanding the overall character embodied in the features, details, and intended functions of the design. Faced with a massive demolition site, the Olmsted firm innovated to address the brownfield conditions. For example, the firm created soils plans specifying considerable depth of good topsoil in specific areas of trees and shrub planting.[13] As modern-day professionals on the forefront of best practices, we found it astounding to discover that one hundred twenty-year-old soils plans, which note two-foot-deep planting areas, guided rebuilding in this brownfield demolition site (Fig. 2).

Heritage studied a breadth of original Olmsted documents, concentrating on park composition in terms of the landscape's character-defining features, which shaped the park choreography. For Jackson Park, three aspects of landscape character and scenery are central to the original design: Lake Michigan's expanse to the east, which offers views and contact; a great lawn of fields along Lake Shore Drive; and the lagoons edged "with their intricate bushy shorelines, their beaches and bridges . . . [to] offer scenery in striking contrast to the Lake Shore and Fields."[14] Reflecting this diversity of character, two naturalistic terrestrial landscape vocabularies were employed to rebuild the 1890s park: the pastoral and the picturesque. First, the pastoral scenery of open expansive fields, trees, and lawn extending along gracefully curving paths. The second, a picturesque vocabulary, composed a lush, bountiful landscape of woodland and borders that employs layers of varied green-toned plants, which provide contrasts of light and openness. Pastoral and picturesque vocabularies shaped the landscape's depth of views and visual interest. Both styles contribute to the park scenery and are adaptable to a native plant palette.

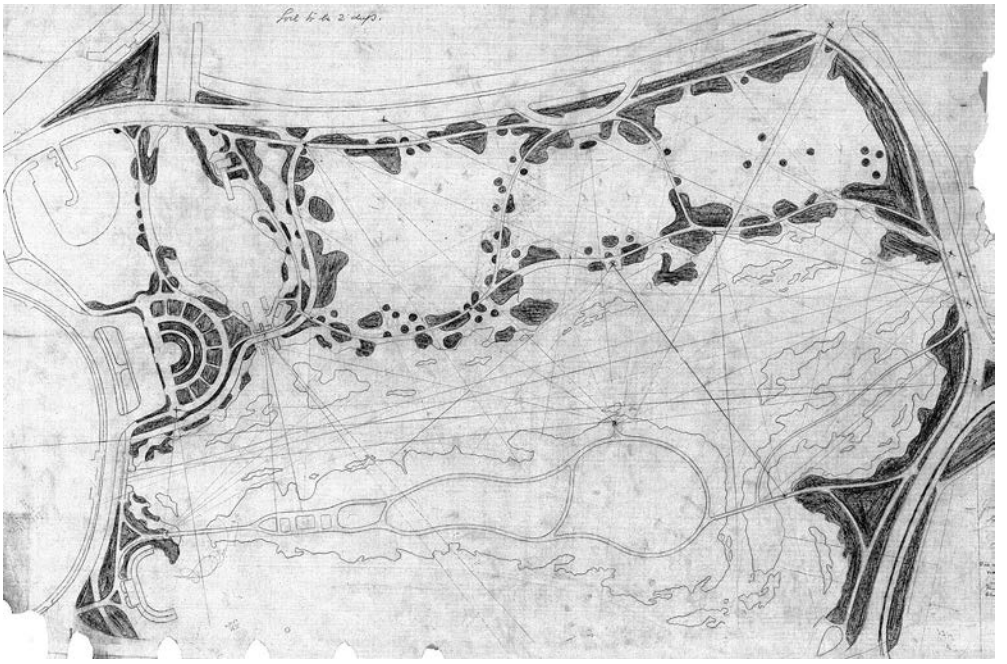

Figure 2. Jackson Park Soils Plan 93. Olmsted, Olmsted & Eliot, Landscape Architects, 1896. Addresses the Music Court and Tennis Lawn, showing shaded areas requiring topsoil additions, which are noted as two feet in depth. (Courtesy of FLONHS archive, National Park Service)

Understanding Park Evolution

The study of over one hundred historic plans communicated and crystallized these landscape-shaping concepts, deepening the team's understanding of the 1890s park reconstruction that healed the demolition of the exposition. Noting the remnants of historic features, field reconnaissance built up an understanding of the existing landscape and served as the platform for the recapture of park character through the Jackson Park GLFER project. Exploration of landscape continuity and change revealed general stability with limited degradation in the first half of the twentieth century. The relatively intact Olmstedian park is visible in a 1930s oblique aerial view from the south (Fig. 3). From the 1930s to the 1950s, however, the landscape saw a series of widespread and degrading changes: lagoons were filled for an antiaircraft missile base installation; lawns were repurposed to serve as a Cold War response site with missile emplacements; other fields were paved with large parking lots; single-purpose recreation facilities were constructed, displacing many trees that were not replanted; park roads were widened to accommodate through traffic; a large area was fenced in for exclusive use as a golf driving range, etc.[15] These changes privatized different zones of the parks and damaged circulation and scenery. Moreover, for several decades, park staffing levels spiraled downward, resulting in very low numbers today. Parallel shifts in community demographics saw increased crime, with related antisocial and illegal uses near and within the park during the late twentieth century. This embattled, historically significant park needed an integrated project to restore

Figure 3. This 1938 aerial photograph documents the modestly evolved Olmsted firm landscape some forty years after the post-exposition park redesign. This image depicts the scenic relationships of open fields, lagoons, woodland, and adjacent Lake Michigan. (Courtesy of Chicago Park District)

its functions and reinforce its values. Prior undertakings had failed to aid the South Side, and the Jackson Park GLFER project posed the opportunity to draw attention to this landscape and improve adjacent neighborhoods.

Achieving Olmstedian Character for Proposed Paths, Overlooks, Shorelines, and Grading

Jackson Park's spatial and visual design framework is addressed through a renewal of the path system. This particular emphasis was designed to restore scenery and meet access and recreational needs. Thus, the project reconstructs the fractured path system and extends it to areas of changed landscape, applying Olmstedian design criteria to reassert paths as an organizing system for movement through the park landscape and to achieve important views at overlooks.

The path system is a choreographic thread that shapes park experience. In their current state, paths are degraded and segmented, blocking effective use and enjoyment. All new paths are proposed to meet universal access guidelines. Designed to capture the grace and beauty of the original alignments with spiral curves, these paths also draw park visitors along, while gentle grades secure ease of movement. To provide a sense of personal safety, relative openness and views in all directions are necessary. For environmental quality, paths are either concrete or compacted stone fines, as asphalt pollutes the area around it and compromises habitat goals. Path widths of eight and twelve feet provide sufficient

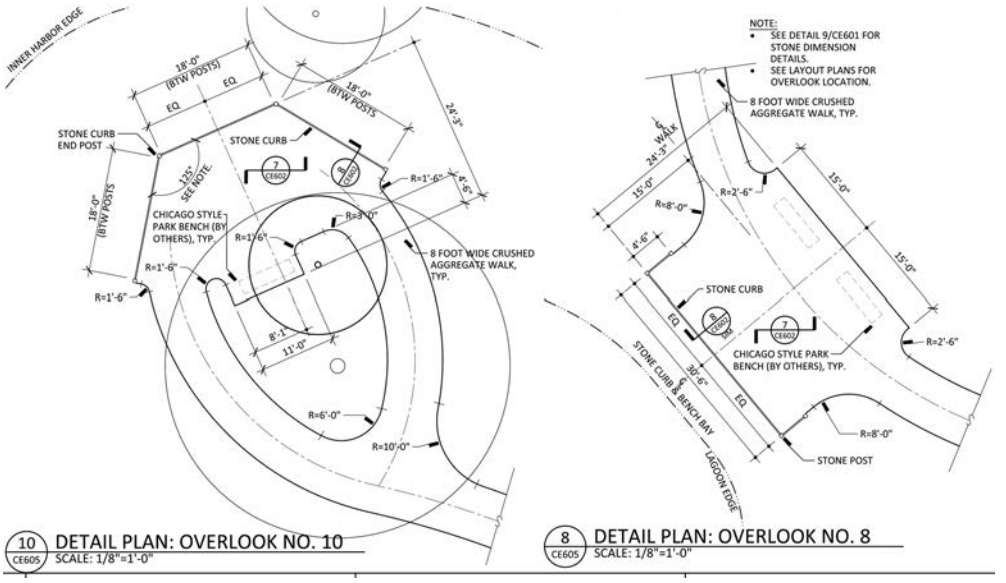

Figure 4. Overlook example showing configuration of Overlooks 8 and 10, located in the Inner Harbor. (Courtesy of Heritage Landscapes LLC)

room for pedestrians, bicyclists, and maintenance vehicles. At the same time, they provide road service during the construction phase to enable historic and ecological restoration. The project knits together the broken path system, shaping an accessible, restored choreography of movement in the Olmstedian character through a varied park landscape that is dominated by native plants.

In the proposed plan for the park, twelve historic and new overlooks are positioned around the lagoons and the Inner Harbor, responding to both original and changed landforms. These overlooks are completely missing from the park today and must be reinstated in order to achieve critical landscape character for park experience. The design interprets Olmsted's "beaches," while addressing ease of constructability by employing simple forms at smaller sizes than the historic features. These overlooks are positioned at various levels above the water, ranging from eighteen inches to some ten feet, to allow anticipated fluctuations from the heat and drought of climate change. In order to reduce cost, the paving material is a stabilized CPD-stone and stone-fines mix; however, these paths will require annual maintenance, which increases future costs. Overlook margins are defined by a six-inch stone edge facing the view, detailed with two-inch-thick pieces of buff Indiana limestone, measuring eighteen inches by twenty-four inches, for ease of transport and installation (Fig. 4). Overlooks provide places to enjoy water scenery and views of nesting and migrating birds, fish, turtles, mudpuppies, butterflies, dragonflies, and the full array of creatures that will inhabit the restored land and aquatic habitats.

The grading design of the lagoon and island sought to bring the shorelines closer to the articulated character that Olmsted patterned on natural water bodies. In an effort to minimize disturbance and contain costs, radical reshaping was not an option. Grading

plans and section drawings targeted modifications to the terrain using the curvature and variability of Olmsted shorelines as the model. Lagoon-edge character displayed variety and sinuosity, remnants of which remain and serve as references. The process of achieving a graceful shoreline through this work was opportunistic, with existing grades generally accepted while targeted new grading cut inlets in specific areas. Bank stability was achieved not only with herbaceous tree and shrub plantings, but also with construction techniques that modify the shoreline through incision into the bank, rather than pushing loose soils into the water. Small island edges did not require grading, as Olmstedian forms generally remain; however, edges needed redefinition with the removal of unsightly posts, low fences, and much of the deadwood along the shoreline. The intent of the island planting design was to improve habitat and stability while providing a scenic silhouette with diverse foliage and plant density. Island work addressed the removal of some standing deadwood, the suppression of invasive species, bank stabilization, and the insertion of native plantings that need limited maintenance (given the difficulty of access on the island).

There was an integral relationship between the planting layout and the proposed paths, overlooks, shoreline margins, and slopes. The team studied the shoreline edges in the historic Olmsted plans and, to the fullest feasible extent, restored the shoreline character in altered zones of the East and West Lagoons and the Inner Harbor. With Olmstedian character as a driver, the shoreline configuration took on historical design dimensions, which were generally harmonious with habitat, slope stability, park user, and universal access imperatives. Because the original design approach was naturalistic, grading within the historic idiom also achieved habitat objectives along water margins, paths, and slopes. Dimensions of features simultaneously addressed historic intent, stability, habitat, and access.

Integrating Olmsted Historic Design with Native Plantings

The Jackson Park GLFER project unites historic preservation and ecological restoration, applying the teachings, skills, and approaches of two important professional fields. The ACE funding source classifies this project as a restoration of native habitat, while from a preservation perspective, the project employs both preservation and rehabilitation treatments to address a historic property.[16] Both disciplines frame the past through distinct lenses and employ it to guide constructive action in a specific locale. This project exemplifies how bridging disciplinary boundaries at the onset can result in successful heterodox praxis that initiates a process to improve a deteriorated landscape and its ecological and social contexts.

While the Olmsted firm appreciated wildlife in park landscapes, as of the 1890s, the ecological sciences were yet to be developed or considered for enhancing public open spaces. In contrast, this 2014–19 design and construction project offered a unique opportunity to fully integrate historic character and ecological richness. As required by project funding, the design uses aquatic and terrestrial plant species native within five hundred miles of Jackson Park. A regional plant palette responds to the stated priorities to foster habitat diversity, resiliency, and adaptability. Native plants in ecological groupings support

a plethora of biota, including insects, birds, amphibians, and reptiles. By addressing multiple values, this project seeks to uplift both the park and the urban ecosystem of both the park and its adjacent neighborhoods. In fact, the diversity of vegetation increases the potential for success, as promoted in climate change literature. As part of the Chicago Wilderness region, the Jackson Park wetland plant palette is particularly rich. It has "one of the most diverse and highest quality collections of wetlands in North America":

> [The wetlands] have great capacity to store excess water and can reduce flooding damage. Wetlands also can filter pollutants from water, which improves our water quality. Yet, as a result of climate change, increased storm intensity and flooding may increase the pollution that flows into our wetlands from agricultural and urban areas, threatening water quality. Additionally, there is a possibility that some wetlands may begin to dry out as temperatures rise, evaporation rates increase, and there is more pressure on groundwater resources; this could create a negative cycle that further fragments and stresses the remaining wetland habitats.[17]

At Jackson Park, Olmsted's exotic and primarily woody plant-based palette is largely replanted with a greater diversity of native trees, shrubs, forbs, and grasses in a manner that represents his intent. The palette uses native plant materials ranging in height from six inches to four feet, with occasionally larger shrubs. The plant palette, variety, and scenery respond to several factors:

- Diverse aquatic and terrestrial plant species
- Large number of shrubs historically used
- Limited native shrub palette available
- Prohibitive cost of thousands of shrubs
- Desire to achieve form of mounded shrubs in various areas
- Necessity of burn management to sustain native communities while limiting landscape maintenance

The limitations of these factors required an innovative approach. Heritage defined the form, texture, and scale of the planting by area, while native plant experts from the CPD and the ACE adapted plant groupings in an iterative process to achieve the identified characteristics. To mimic the trees and deciduous shrubs of the Olmsted planting palette, the team created masses of low shrubs and forbs that achieve good visibility throughout the park, as required for a sense of personal security and comfort. Applying both design and habitat intent, the arrangement of the plantings harmonizes with historic park choreography in diversity of form and character while shaping the plant matrix for high habitat values. The widespread use of mown turf by the Olmsted firm was replaced under light tree-canopy coverage with a short Pennsylvania sedge (*Carex pennsylvanica*) and accompanied by low ephemeral plants that bloom through the sedge in the spring. In full sun, a ten-inch-high mixture of grasses and forbs was developed to provide a short grassy, open

appearance, mimicking shaggy turfgrass. To augment the restrained use of shrubs, a group of forbs with rounded billowing forms was selected to approximate shrub-like qualities during the growing season, without spiky grasses above the rounded forms. To address limited human resources for maintenance, more than 90 percent of the proposed non-aquatic plant coverage is receptive to prescribed burning at regular intervals. Fundamental to the approach is reconciliation of historical precedents and ecological vitality.

The intensity of the project work and budget is directed toward planting, coupled with grading, new and historic path construction, and scenic overlooks. The team kept costs and constructability in the forefront, with construction details targeting a strong landscape for resilience to human abuse, extreme weather events, and partial inundation.

In order to restore the character of the Olmsted planting for Jackson Park, Heritage followed a process that related the designated plant groups to the existing landscape through a direct application of the original planting design. Review of historic plans included sheets on grading, planting, and special soils for trees and shrubs. Planting plans were scrutinized in tandem with over one hundred five pages of original planting lists and related invoices. Many of the lists corresponded to specific plans, which allowed a one-to-one comparison to the existing park in terms of design effects, plant density, and planting character. Study of historic intent also included reports by the original design team, such as the "Report of Visit July 21st, 1896" that was penned by Manning, which detailed the conditions and planting intent at the Wooded Island, park border, and dunes.[18] In its study of the original plans, Heritage focused on these questions:

- How do aspect, exposure, and other climactic factors affect the original planting?
- How are specific views framed and directed in the original planting design?
- How does the design draw the eye, shaping visual spaces?
- What are the forms, scales, textures, and diversity of planting swaths and shapes in terms of design character?
- What is the rhythm of transitions between planted areas, and how are they blended together?
- What is the expression of landform within and around the planting areas?

Heritage's comparative study of planting plans at Jackson Park and other landscapes designed by the Olmsted firm revealed the design approach, patterns, and principles of the original planting design. Two of the foremost principles are balance and informal symmetry. There is a degree of repetition within a view or landscape sequence for choreography. Variations are highlighted within this pattern. At Jackson Park, aerial images from the 1930s reveal deliberate applications of certain plants to achieve balance and informal symmetry; for example, evergreen trees and shrubs provide highlights along Lakeshore Drive. Other signature elements of the Olmsted firm's design include taking advantage of the unique characteristics of the site; creating a unified composition with subordinate complexities; orchestrating movement and use; pairing environmental sensitivity with

long-term maintenance; and comprehensively integrating the community.[19] Olmstedian landscape principles were applied throughout the development of construction documents for the Jackson Park GLFER project.

In order to fit Olmstedian forms to current park configurations, one design technique used overlays of raster and vector drawing files. Aligning the 1890s planting plans with the proposed planting areas allowed for precision in the refinement of bed shapes and plant groupings. Many land areas vary from their original form due to modifications in circulation, use, or shoreline configuration; however, these are addressed with design intent by applying planting patterns found in parallel situations within Jackson Park. For example, the planting of a nonhistoric three-way triangular intersection can draw on the planting plan for a missing triangular intersection. The shapes of historic planting beds were extrapolated to the existing landscape and were tailored to meet the needs of specific locations based on soils, aspect, and intent. In the overall composition, the role of plantings was key within large planted areas, at specific viewpoints and overlooks, around particular water bodies with aquatic and terrestrial plants, at path intersections and along walks, at drive intersections and along drive margins, adjacent to bridges and buildings, and at the park perimeter. Thus, patterns and forms were repeated using corollary plant groups, with the composition of the groups shifting—from the historic tree, shrub, and turf palette of the original planting plans to a native palette that supports habitat and resilience—while reflecting historic design principles and site-specific objectives, and responding to current and future park composition, use, and maintenance.

The team collaborated to retain existing native trees and suppress invasive trees and shrubs. Planted or volunteered over time, park trees represent a diverse mixture that generally thrives but deviates from the historic tree collection. The Army Corps of Engineers and community volunteer groups surveyed park trees and some shrubs to identify retentions or removals based on health, invasiveness, and proposed grading for improved access and shorelines. Survey findings were analyzed and integrated into the proposed plans. Several grand trees dating to the 1890s remain. Dominant species include native hackberry (*Celtis occidentalis*), northern catalpa (*Catalpa speciose*), bur oak (*Quercus macrocarpa*), American linden (*Tilia americana*), and some grand old bigtooth aspen (*Populus grandidentata*), white oak (*Quercus alba*), and honey locust (*Gleditsia triacanthos*). To meet the native landscape and habitat objectives, some one thousand three hundred invasive exotic trees are being removed from the park, particularly large numbers of red mulberry (*Morus rubra*) and Norway maple (*Acer platanoides*). Extirpating these seed sources from the park will limit regeneration of invasive species and benefit new plantings. Overall project efforts protect and retain hundreds of existing trees, incorporating them into the revitalized park landscape with some one thousand four hundred new regionally native trees to augment diversity and foster habitat.

A process of collaborative exchanges served to refine the native plant palette. Heritage, the ACE, and the CPD created and advanced planting lists by formulating groups and subgroups, bearing in mind the multiple factors. In general, plant groups broadly corresponded to ecological zones, microclimatic conditions, soils, and moisture within the

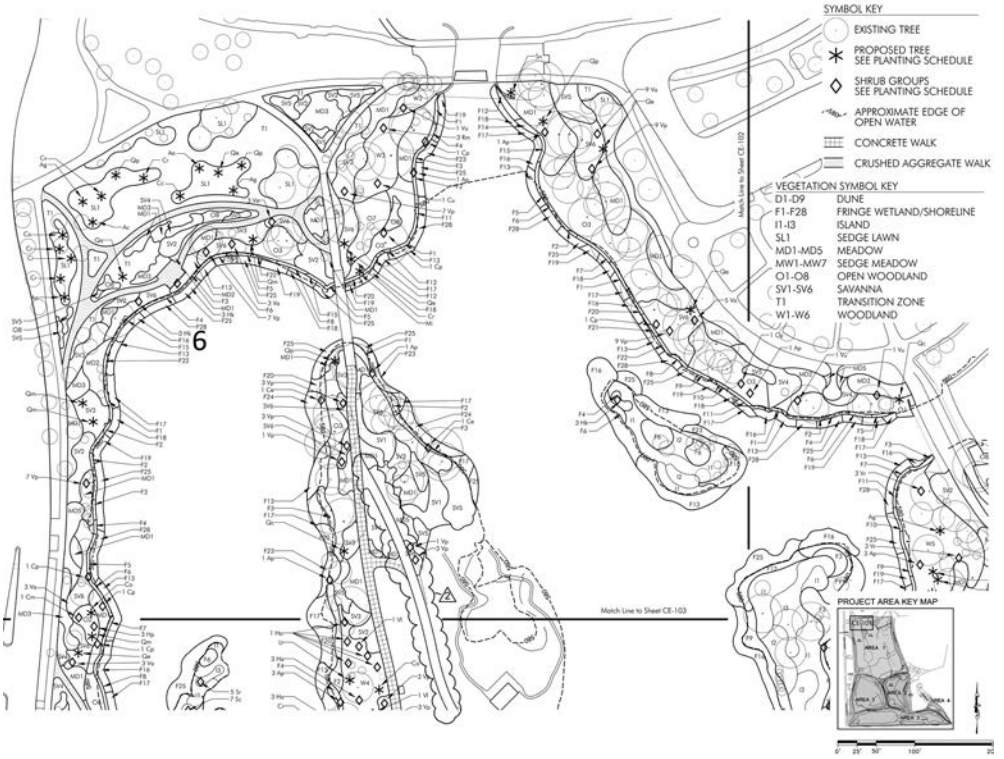

Figure 5. Sample of the planting plan showing the north end of the Lagoons with land and water plantings, from the August 2014 set of construction documents. (Courtesy of Heritage Landscapes LLC)

park. Within each group, codes were assigned to subgroups for placement on the proposed planting plans, replicating the shapes designed for the original planting plans or employing Olmstedian principles in areas with no direct precedent from the original plans. As lists were refined, the character of individual groups remained intact to achieve habitat objectives and Olmstedian character (Fig. 5).

Consideration of species for selection within subgroups began with the study of the original planting plans and lists. From these lists, suitable native plants were retained, and exotic, invasive, or otherwise unsuitable plants were eliminated. Remaining Olmsted plants and compatible native species were assembled into broad groups based on ecological function and general location, such as "Dune" or "Fringe Wetland/Shoreline." The design of plant groups reproduced the aesthetic characteristics of historic design, including color, shape, texture, and form. To create the desired effect, forbs with rounded forms were selected to provide a shrub-like appearance that was present on original plant lists. The planting groups, with eighty-one subgroups, included Savanna, Open Woodland, Woodland, Island, Fringe Wetland/Shoreline, Sedge Meadow Dry, Sedge Meadow Wet, Dune, Sedge Lawn, and Transition (Table 1).

In addition to the historical, aesthetic, and ecological bases for plant selection, the acquisition, installation, and maintenance of plants were considered. From potential lists

Table 1. Sample from the planting lists provides details of herbaceous plugs used in specific plant groupings. (Courtesy of Corps, CPD, and Heritage project team)

SEDGE LAWN: L1			
Scientific Name	Common Name	Wetland Indicator	Plant/Seed
Antennaria neglecta	Cat's-Foot	UPL	Plug
Antennaria plantaginifolia	Pussy-Toes	UPL	Plug
Carex pensylvanica	Pennsylvania Sedge	UPL	Plug
Comandra umbellata	Bastard-Toadflax	FACU	Plug
Pedicularis canadensis	Canadian Lousewort	FACU	Plug
Ranunculus fascicularis	Early Buttercup	FACU	Plug
DUNE: D7			
Artemisia caudata	Beach Wormwood	UPL	Plug
Lupinus perennis var. occidentalis	Wild Lupine	UPL	Plug
Oenothera clelandii	Sand Evening-Primrose	UPL	Plug
Rosa carolina	Carolina Rose	FACU	Plug
Schizachyrium scoparium	Little False Bluestem	FACU	Plug
DUNE: D8			
Erigeron pulchellus	Robin's-Plantain	FACU	Plug
Maianthemum stellatum	Starry False Solomon's-Seal	FAC	Plug
Rosa carolina	Carolina Rose	FACU	Plug
Carex aurea	Golden-Fruit Sedge	FACW	Plug
Ceanothus herbaceus	Inland New Jersey Tea	UPL	Plug

of native species, plants were excluded if they were not likely to thrive at this site or not available commercially, or if seed collection source-plant communities were rare. Plants were also selected based on their installation costs, survivability for container, plug, or seed planting, and the future management of the landscape by controlled burning.

In order to understand the relationships among groups of plants, the team conducted a comparative study of the Olmsted and Manning plant lists as applied to the patterns of the original plans. In relatively few instances, proposed planting groups replicated the 1890s Olmsted selections. However, Olmsted lists contained a high number of exotic woody plants with little historic use of forbs and grasses. For proposed planting groups and subgroups, general characteristics (e.g., height, shape, habit, color, seasonality, texture, etc.) were identified and considered with faunal habitat preferences. The placement, form, and composition of the historic intent for a given area was replicated on the proposed plans using the current plant groups determined by the team. As an example, original plans often used a repeating pattern of two irregularly shaped groups of low shrubs that straddled another group of tall shrubs or tree clusters. Both groups shared several plants in common. Applied to a Dune plant group, the replication of the pattern included paired bounding groups of lower forbs and grasses, and a central group containing shrubs and distinctive flowering forbs. All groups shared plants, such as beach wormwood (*Artemisia campestris*), or plants of parallel character or stature. In this manner, the Olmsted harmony was achieved.

Figure 6. Simulation of Inner Harbor Overlook 11 with new path and planting for sitting and fishing, designed in the Olmsted style using a native plant palette. (Courtesy of Heritage Landscapes LLC)

Moving Toward Climate Change Resilience, Vitality, and Relevance for Jackson Park and Beyond

Resilience for Jackson Park means the ability to "resist, absorb, accommodate to, and recover from" climate change events and processes while maintaining core landscape integrity.[20] The Jackson Park GLFER project benefited from the collaboration of historic preservation and ecological restoration professionals and the support of civil engineers. In order to restore and revitalize an iconic but degraded urban park, this project balances the values of nature and culture by conceiving these values as inseparable. Rather than favoring the objectives and frames of reference for either discipline, both are fully engaged in an integrated manner. This collaborative work is founded on concepts that recognize an entangled reality in which nature and culture are inseparable and mutually influential. Through repurposing historic park character, the looming climate change challenges of increased temperatures and drought can be somewhat ameliorated and adapted within Jackson Park, as durable plant communities create cooling effects and provide refuge for diverse species. With the project's completion, the park will become more resilient for life in the urban ecosystem of South Side Chicago.

The Jackson Park GLFER project began construction in the fall of 2014. Simulations of Overlook 11, the Inner Harbor fishing area (Fig. 6), and other parts of the park were developed to portray the proposed project outcomes to the professional team, community

members, and other stakeholders. Through this project and others spawned by its successful process, human and capital resources are flowing to this valued landscape, directly contributing to a sustainable environment and society by revitalizing a public park asset. To be built within two years and maintained for three more, project results should be fully revealed in 2019. By this time, the economic values of park revitalization will become apparent, as local universities and the project team track the metrics and effects on surrounding neighborhoods of the park's revitalization. In terms of societal effects, the study of outcomes is parallel to the observations of what the project specifications yield. The landscape's ecological resilience and the adaptability of the design need to be tracked based on performance measures. For example, how do locations and densities of plants, insects, amphibians, reptiles, and birds shift over time? How does management maintain the coherency of Olmstedian design into the future?[21] Has renewal altered the park's use by the community? Has revitalizing the park brought greater sustainability to the community? Both Jackson Park and its neighborhood are expected to serve as valuable laboratories for future research and reporting.

Jackson Park, a locus of entangled culture and nature, is positioned on a future trajectory for a communally valued urban environment—a trajectory that merges sustainability with the rehabilitation of a historically significant place. The type of collaboration that brought this project to fruition should become more widespread at multiple scales; the hope is that future cooperative undertakings will be shared broadly. Guided by the stated concepts of entanglement and compatible resilience, as well as the three aspects of sustainability, the project aims to revitalize the park as a place teeming with life, and to uplift the surrounding neighborhood and broader city. Projects of this complexity can serve as effective laboratories to study and unravel the ways that economic, environmental, and societal effects ripple into the adjacent community.[22]

The Jackson Park GLFER project offers practical lessons about its distinctive approach. By addressing the cultural and natural resources of Jackson Park in an integrated and collaborative manner, the project responded to multiple pressures, including a site-specific answer to climate change challenges. Beyond the technical and logistical challenges of project tasks, the collaborative project process required the cultivation of a particular attitude toward the resource and project goals. An overall tone of mutual respect for different professional backgrounds pairs well with clarity in individual skills and limitations. In the GLFER project, a healthy degree of shared understanding and mutual respect allowed for constructive negotiation, even with a fast-paced delivery schedule, although more could have been accomplished if time allowed. The intensive teamwork required for coordination in interdisciplinary and cross-sectoral efforts can be reduced through transparency in the division of tasks, the frequency of reviews, and the openness of communication, all of which were largely successful.

Reflecting on the project work, it is clear that team members' differing definitions of overlapping concepts were initially problematic. Recognizing this hurdle and responding with conceptual clarity and active listening created a platform for the necessary exchanges

to reframe and refine a shared conceptual approach, in order to dissipate confusion and embrace cross-disciplinary competencies. Furthermore, with these skills, balancing diverse and sometimes conflicting objectives can be successful with agreement on the primary project goals. For example, negotiation led to the retention of large fallen trees around island shorelines as crucial habitat; however, this natural debris was not tolerated in prominent locations where it conflicted with aesthetics of the park's historically authentic character. The process worked well for the team's preservation landscape architects and ecological restoration experts, the primary voices of the project effort, while civil engineers followed that lead.

The complexity of responding effectively to climate change demands an integrated approach, wherein a broad pool of talent and skill sets are applied to develop shared concepts and seek effective solutions. Future work must address the unsustainable tendency to work with guarded boundaries in our own disciplines. Our local and global challenges present opportunities to achieve lasting impact through collaboration and innovation on behalf of precious, beleaguered resources. Applying diverse approaches and skills can effectively sustain valued places and foster harmony, meeting the multiple challenges of these times.

References

1. The United States Environmental Protection Agency defines resilience as "the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to, and recover from the effects of the hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions," U. S. Environmental Protection Agency, "Climate Impacts in the Midwest," www.epa.gov/climatechange/impacts-adaptation/midwest.html (accessed March 2015). The International Council for Local Environmental Initiatives (ICLEI) Local Governments for Sustainability notes that a resilient society "focuses investment on increasing a city area's overall ability to support a vibrant, healthy society and economy under a wide range of circumstances." Jeb Brugmann, *Financing the Resilient City: A Demand-Driven Approach to Development, Disaster, Risk Reduction, and Climate Adaptation, An ICLEI White Paper, ICLEI Global Report,* ICLEI-Local Governments for Sustainability (2011).
2. The Brookline, Massachusetts-based firm of F. L. & J. C. Olmsted, Landscape Architects (1884 to 1893) was led by Frederick Law Olmsted, Sr., and his nephew and adopted son, John Charles Olmsted; Norman Bolotin and Christine Laing, *The World's Columbian Exposition: The Chicago World's Fair of 1893* (Chicago: University of Illinois Press, 2002).
3. The term "Olmstedian" refers to the characteristic style of landscape designs in projects attributed to Olmsted Sr. and his associated firms.
4. The publication *Our Common Future,* also known as the Brundtland Report, coined the term "sustainable development" and popularized three elements of sustainability: economy, environment, and society. World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987).
5. See Chicago Metropolitan Agency for Planning, "Appendix A: Primary Impacts of Climate Change in the Chicago Region," in *Climate Adaptation Guidebook for Municipalities in the Chicago Region* (June 2013); and Chicago Wilderness, "Climate Change Impacts on Regional Biodiversity for Chicago," www.chicagowilderness.org/what-we-do/climate-action/climate-change-and-regional-biodiversity/ (accessed March 2015).
6. U. S. Environmental Protection Agency, "Climate Impacts in the Midwest," www.epa.gov/climate change/impacts-adaptation/midwest.html (accessed March 2015).

7. Army Corps of Engineers cited in Dan Egan, "Lakes Michigan, Huron Hit Record Low Water Level," *Milwaukee Journal Sentinel*, February 5, 2013.
8. Contemporary scholarship in the social sciences on the concept of entanglement highlights the necessity of interdisciplinary approaches, as exemplified in the diverse contributions to Stephan Harrison, Steve Pile, and Nigel Thrift, eds., *Patterned Ground: Entanglements of Nature and Culture* (London: Reaktion Books, 2004); and expanded on with archaeological implications in Ian Hodder, *Entangled: An Archaeology of the Relationships Between Humans and Things* (New York: Wiley-Blackwell, 2012).
9. Lance Gunderson, "Ecological Resilience—In Theory and Application," *Annual Review of Ecology, Evolution, and Systematics* 31 (2000): 425–39. Also see note 1.
10. Term applied to Steve Brown, "International Council on Monuments and Sites (ICOMOS)/International Union for the Conservation of Nature (IUCN) Connecting Practices" (presentation to the ICOMOS General Assembly, International Scientific Committee on Cultural Landscapes, and International Federation of Landscape Architects, Florence, Italy, November 6, 2014).
11. Applications of entanglement theory, including to climate change, are noted in Brad Weiss and Marisol de la Cadena, "Natureculture: Entangled Relations of Multiplicity," Fieldsights–SCA Meetings, *Cultural Anthropology Online* (May 1, 2010), www.culanth.org/fieldsights/123-natureculture-entangled-relations-of-multiplicity-2010.
12. While the original firm of F. L. & J. C. Olmsted, Landscape Architects, designed the 1893 World's Columbian Exposition, the post-fair park was designed by the firm of Olmsted, Olmsted and Eliot, Landscape Architects. Frederick Law Olmsted, Jr., briefly assumed his father's position in 1897, and some plans in this year were signed by F. L. & J. C. Olmsted, Landscape Architects and directed by the younger Frederick Law Olmsted and John Charles Olmsted. For Jackson Park and other Olmsted firm commissions, Warren Henry Manning and Edward D. Bolton filled the roles of Superintendent of Planting and Superintendent of Construction, respectively. For brevity, attribution of the design references "Olmsted" or the "Olmsted firm" unless greater specificity is required.
13. Olmsted, Olmsted & Eliot's soil plans address all areas of the park where soil depth is required for plants to thrive.
14. Olmsted General Plan notes, 1895.
15. The antiaircraft missile system known as Project Nike was a Cold War effort led by the Army Air Defense Command and Bell Laboratories; it created Nike Missile Site C-41 in Jackson Park, Chicago, from 1955 to 1971.
16. Jackson Park Ecosystem Restoration, Army Corps of Engineers Contract, funded by Great Lakes Fisheries and Ecosystem Restoration.
17. Chicago Wilderness, "Climate Change Impacts."
18. Warren Manning, "Report of Visit July 21st, 1896," Olmsted, Olmsted & Eliot, Landscape Architects.
19. National Association for Olmsted Parks, "The Design Principles of Frederick Law Olmsted," http://www.olmsted.org/the-olmsted-legacy/olmsted-theory-and-design-principles/design-principles.
20. See note 1.
21. For comparison, see Jessica M. DiCicco, "Long-Term Urban Park Ecological Restoration: A Case Study of Prospect Park, Brooklyn, New York," *Ecological Restoration* 32, no. 3 (September 1, 2014): 314–26.
22. The lasting impact of historic park renewal is not straightforward. Parks can create a range of benefits; however, calls have been made for empirical research to link preservation and urban renewal. See Vadim Saraev, *Economic Benefits of Greenspace: A Critical Assessment of Evidence of Net Economic Benefits*, Forestry Commission Research Report (Edinburgh: Forestry Commission, 2012); and Stephanie R. Ryberg-Webster and Kelly Kinahan, "Historic Preservation and Urban Revitalization in the Twenty-First Century," *Journal of Planning Literature* 29, no. 2 (May 1, 2014): 119–39.