

Multiscale approach to biodiversity conservation: Chicago as a case study

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Scales of Change

Conference Proceedings

*Commemorating 50 years of
Landscape Architecture study programme at
University of Ljubljana*

University of Ljubljana



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Scales of Change

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Multiscale approach to biodiversity conservation: Chicago as a case study

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Abstract

Biodiversity loss is a major global concern, strictly connected to heterogeneous phenomena occurring at various spatial and temporal levels. A multiscale approach to biodiversity conservation is therefore crucial to better understand and manage ecological dynamics and processes.

Among the many cities that are worldwide adopting biodiversity-aimed policies, Chicago stands for its forward-looking approach to environmental conservation, whose antecedents can be found at the turn of the 20th century, when the Forest Preserves of Cook County were established.

The institution of this system of protected sites became the framework for the foundation of the regional alliance Chicago Wilderness in 1996, aimed at implementing the quality of delicate ecosystems and conservation areas. In 1999 the alliance produced an innovative document for that time: the Biodiversity Recovery Plan (BRP) for the greater Chicago region. It was followed in 2004 by its spatial representation, the Green Infrastructure Vision, that identified priority areas to be protected, restored, and connected.

In order to translate the BRP regional goals at the urban level, in 2006 the City of Chicago developed its first Nature and Wildlife plan (updated in 2011) to preserve and restore habitats within the city.

Proposing the experience of Chicago as a best practice, the paper addresses the complex system of tools adopted to tackle the loss of biological diversity from regional to municipal level. Through the analysis of three contemporary landscape architecture projects implemented in Chicago, the paper intends to highlight the productive and mutual influence of landscape planning and design in biodiversity conservation.

Keywords

Urban biodiversity, ecosystem restoration, environmental planning, ecological design, Chicago Wilderness

Introduction

Since the Rio Convention on Biological Diversity (CBD) in 1992, biodiversity – understood as genetic, species and ecosystem variety – has increasingly entered the global consciousness as a value to be preserved, since its alteration can produce closely interconnected impacts that inter-

act with the ecological balance of the planet (Rockström et al., 2009). In this sense, scholars agree that urban environments are the decisive arena to address this global challenge (Prominski, 2019; Tan, 2019; Kowarik, 2011; Müller and Werner, 2010). Indeed, cities host the majority of the world's population and are the setting for manifold anthropogenic activities that are major causes of habitat and species depletion.

Considering that biodiversity loss is strictly connected to heterogeneous phenomena occurring at various spatial and temporal levels, a multiscale approach to biodiversity conservation is crucial to better understand and manage ecological dynamics and processes. Therefore, a joint effort of decision-makers, planners, and designers is pivotal to successfully integrate the conservation of biological diversity into sustainable development strategies from the national to the local scale.

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Environmental awareness and planning tradition in Chicago

Over the last three decades, several international strategies have followed to promote the integration of biodiversity conservation into local policies. Among the many cities that are worldwide producing biodiversity-aimed policies and planning documents, Chicago deserves to be highlighted as a virtuous example due to its forward-looking approach. Although USA did not ratify the CBD, the city had already long developed a strong environmental awareness. Sensitivity towards the natural environment rose between the 19th and early 20th century, when population growth in Chicago made it evident to scientists, architects, and planners that vast portions

of the land should have been preserved from urban development (Gobster, 2012; Tate, 2015).

Following a visionary proposal (1905) for the creation of an extensive park system for the Chicago metropolitan area by architect Dwight H. Perkins and landscape architect Jens Jensen, in 1910, the city adopted the Plan of Chicago. The plan, developed by architects and urban planners Daniel H. Burnham and Edward H. Bennett, aimed at configuring a continuous system of tree-lined boulevards, parks, and protected forests: 'a park area entirely surrounding the city' (Burnham and Bennett, 1909, 55). This intention was initially prompted by public health reasons, in line with a widespread attitude observed in many European and US cities, such as Paris, London, and New York.

Forest Preserve District of Cook County
Gradually, this attitude turned into the recognition of the value of nature *per se* and thus the desire to preserve a public asset. In 1913 the approval of the Illinois Forest Preserve District Act led, two years later, to the establishment of the Forest Preserve District of Cook County. The early activity of the Forest Preserve District was marked by the purchase of thousand hectares of forest in the Chicago Metropolitan Region and its environs and the application of a pioneering active-conservation regime, able to reconcile environmental conservation with the provision of recreational spaces for people.

The system of preserves was soon provided with plans for the spread of vegetation and fauna as well as strict regulations for the use of space and the protection of

trees and wildlife, as the importance of educating and inspiring the local community was soon understood as crucial.

Chicago Wilderness

The Forest Preserve District was progressively developed for decades, becoming the framework for the foundation, in 1996, of the regional alliance Chicago Wilderness. The alliance manages over three million hectares of public and private woodlands, wetlands, marshes, and prairies, between Illinois, Indiana, Wisconsin, and Michigan.

Coordinating different stakeholders, Chicago Wilderness is constantly concerned with the dissemination of scientific knowledge, as shown by the rich production of documents, maps, and educational events. Among the publications, *An Atlas of Biodiversity* was defined in 1997 to promote public awareness of the regional habitats that are main drivers of biodiversity, with an emphasis on rare and threatened communities.

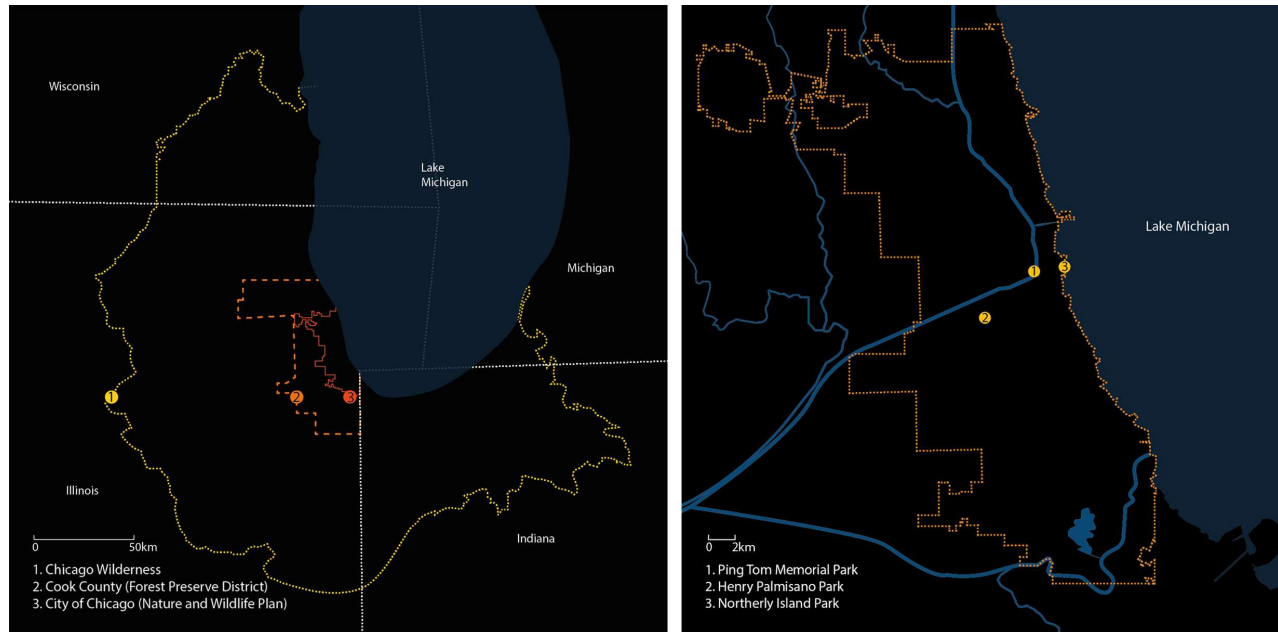
In 1999 Chicago Wilderness published a ground-breaking, practical guide for environmental management and restoration. The *Biodiversity Recovery Plan* (BRP) is an evolving tool providing an assessment of the environmental heritage and a set of measures to restore species and habitats. In 2004, the BRP has been translated into a spatial representation on a regional scale, the *Green Infrastructure Vision*. The vision contains various maps that identify priority sites to be preserved, restored, and connected, and a list of specific recommendations for each location.

Chicago Nature and Wildlife Plan

As a local response to the regional BRP, in 2006, the City of Chicago produced the *Chicago Nature and Wildlife Plan* (CNWP). Due to the emergence of new topics related to climate change, ecological connections, and evolving scientific knowledge, a second version was released in 2011 defining four updated goals:

- 'Protect and Expand Natural Areas' broadens the essential aim related to conservation, promoting the enhancement of the green infrastructure and the mitigation of climate change effects;
- 'Manage Existing Natural Areas' refers to management actions aimed at reinforcing natural systems, including environmental restoration, shelter supply for wildlife, and development of specific plans for natural areas;
- 'Foster Stewardship' aims at involving local communities in the management of natural areas, to foster people's sense of belonging and interest in maintaining the environmental quality of the open spaces;
- 'Monitor Sites and Conduct Research' is crucial to evaluate the efforts put in natural resource management and environmental restoration, also supporting citizen science activities.

Neither edition of the CNWP introduces detailed indications for the design of new urban spaces, although promoting the expansion of protected areas and nature parks. Nevertheless, the plan has contributed to the enhancement of the ecological quality of riparian sites, the establishment of new natural areas along the lakeside, and the extension of nature reserves and wildlife sites.



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Biodiversity-aimed landscape design in Chicago

Ranging from the vast scale to the municipal scale (Figure 1), the experiences examined demonstrate a recurring approach, permeated with the constant effort to balance environmental protection and recreational use of the space.

Following, design scale will be addressed through the analysis of three contemporary landscape architecture projects implemented in Chicago (Figure 1) and selected for their focus on the reconstruction of biotopes and preservation of biodiversity. The design of the parks will be related to the strategic and planning tools described so far, with the intention of highlighting the productive and mutual influence of landscape planning and design in biodiversity conservation.

Ping Tom Memorial Park

Ping Tom Memorial Park runs along the east bank of the Chicago River, in the southern Chinatown district. In the late 1960s, the construction of the Dan Ryan Expressway deprived the neighbourhood of its only green spaces. This event triggered a long campaign of protests, guided by civic leader Ping Tom, which supported the idea of developing a new park on a former railroad site. In the '90s the brownfield was finally acquired by the Chicago Park District and the project was entrusted to Site design group (Site design group, 2015; Chicago Park District, 2002).

The realisation of the park took place in two phases: the first phase (2.8 hectares) consists of a linear park, mainly designed with the intention of paying homage to Chinese aesthetics, represented in several ornamental gardens, a pagoda pavilion,

Figure 1

From left to right: spatialisation of the scales of action covered by the management and planning documents analysed; location of the three landscape architecture projects within the City of Chicago (author's elaboration)

2. RELATION BETWEEN DESIGN AND PLANNING

and a playground. After the completion of the project in 1999, the community enthusiastically requested further expansion to the north and northeast.

The second phase (4.9 hectares), implemented between 2009 and 2013, focussed instead on the re-naturalisation of the riverfront through several shoreline treatments and reconstruction of aquatic habitats, while including also recreational spaces and facilities. A mixture of domestic aquatic grasses was selected to restore the river habitats, with the dual objective of housing wildlife and purifying the river water. A zigzagging walkway allows the public to observe and cross the renewed river landscape (Figure 2), while limiting disturbance to the reconstructed biotopes.

Next to the wetland habitat, a system of gentle hills, densely covered with native grassland species, increases the spatial and ecological complexity of the park. Further east, an oak savannah environment has been configured at the edge of the railway, serving as both a noise buffer and a refuge for wildlife.

Ping Tom Park reconciles active and passive recreation with ecological conservation, following an attitude systematically found in Chicago's history, from the foundation of the Forest Preserve District to the establishment of Chicago Wilderness. While the project was conceived prior to the publication of the 2006 CNWP, the realisation of the second phase is in line with the interest in urban habitats promoted in both editions of the plan. The park is mentioned in the 2011 update among the accomplishments achieved within the pri-



ority action 'Promote riparian areas along the Chicago River through shoreline enhancements'. Ping Tom Park embodies many objectives expressed in the plan, especially with regards to strengthening ecological connections and environmental restoration.

Henry Palmisano (Stearns Quarry) Park
Henry Palmisano Park covers an area of 10.8 hectares in the southwestern Bridgeport neighbourhood. The site, an ancient coral reef, was converted into a limestone quarry in the late 1830s and then used as a landfill for construction debris since 1970. In the late 1990s, the area was acquired by the Chicago Park District to transform it into a public open space. Also this project (inaugurated in 2009) was entrusted to Site design group, in collaboration with DIRT Studio, and the overall design intention focused on eco-sustainability.

The capping of the landfill created the opportunity to define a 10-metre-high landform, covered with native prairie species and serving as a central viewpoint.

Figure 2

Ping Tom Park (photo: Site design group)

In the northern portion of the park, the cavities and walls of the quarry proved inspiring for the design of a catch-and-release fishing pond, equipped with a fishing pier, which also serves as a birdwatching post. The reservoir is overlooked by a terraced sequence of wetland plots (Figure 3), which form part of a recirculating water system and provide the park with the opportunity to host habitats with variable moisture conditions, contributing to the overall ecosystem diversity.

As far as the choice of vegetation is concerned, wetlands and prairies were designed using eight plant associations typical of the Mid-Western Region, which provide food and resources for a rich local fauna, mainly resident and migratory birds, but also insects and mammals.

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Also in this project, the search for a calibrated coexistence of recreational activities and nature conservation is evident, although 'a lot of the park is fenced off, putting humans in their place' (Marshall, 2020, 64). Recreational possibilities are countless although the space has not been over-designed with features for outdoor activities, suggesting activities based on nature experience, which also helps facing human-wildlife conflicts (an issues considered in CNWP update).

Thanks to the heterogeneous habitats hosted, Henry Palmisano Park fits in with the goals shared by the founders of the Forest Preserve of Cook County, the Chicago Wilderness alliance, and the City of Chicago in relation to increasing space for wildlife conservation. Furthermore, its water management system is also in line with the concern towards the effects of cli-

**Figure 3**

Henry Palmisano Park
(photo: Site design group)

mate change expressed in the 2011 CNWP. With respect to the goals of education and public involvement, the park proves to be a successful setting for multiple activities to bring urbanites closer to nature.

Northerly Island Park

The third project involves the transformation of Northerly Island, the only artificial peninsula built off Chicago's coast as part of the archipelago proposed in the 1910 Plan of Chicago. The peninsula was used as a public open space until 1947, when the small Meigs Field airport opened. The airport was dismantled in 2003 by order of then-Mayor Daley, laying the foundation for its transformation into park land (Kamin, 2015).

The framework plan for Northerly Island - a collaboration between Studio Gang and SmithGroup - divided the area into two portions. The naturalistic atmosphere of the southern section (completed in 2015) is a counterpoint to the urban character of the north, given by the underway inclusion of facilities and services. An eastern reef is also envisaged as part of a long-term vision.

2. RELATION BETWEEN DESIGN AND PLANNING

The realised portion (16 hectares) hosts an articulate landscape composed of softly sculpted topography and a collection of habitats, with the dual intent of providing resources for wildlife and an immersive nature experience for users (Figure 4). The hills act as a windbreak and embrace a two-hectare wetland environment fed by Lake Michigan, providing a valuable habitat for insects, fish, amphibians, and migratory birds.

The reserve is dotted with more than 20,000 trees and shrubs belonging to over 150 native species, grouped to form a collection of woodland, savannah, wetland, and prairie habitats winding through the southern portion of the island, which provides an immersive experience of the biological communities that would potentially develop spontaneously on the site. A system of thin trails branch off from the main, looped cycle and pedestrian path surrounding the wetland, allowing the different biotopes to be observed. Throughout the year, Northerly Island hosts events, guided tours, and programmes to boost public knowledge and appreciation of the local environment.

The project evokes the intentions expressed in Chicago's planning tradition, not only realising a part of Burnham's vision towards a lush lakefront park, but also embodying the intentions of the CNWP. Indeed, the park contributes to increasing the urban green infrastructure for both wildlife development and the well-being of citizens, who are brought closer to local ecosystems.



Figure 4
Northerly Island Park
(photo: Steve Hall,
Hedrich Blessing)

Furthermore, Northerly Island participates in the series of transformations that provide disused infrastructures with a new, sustainable vocation. The inclusion of decommissioned sites and vacant lots in the broadened scopes of the 2011 CNWP update demonstrates how the plan has been influenced by the progressive application of ecologically oriented design in neglected, ordinary urban landscapes capable of becoming nature parks.

Conclusion

Despite the massive urban development occurred over time, the planning and design history of Chicago reveals a peculiar concern about environmental conservation since the 19th century. Progressively striving for ecosystem conservation, the city has produced its own holistic, systemic approach, also applied at the scale of landscape design (Table 1).

This attitude led designers to focus on recurring themes, such as ecological restoration and enhancement of plant diversity, as drivers for the development of rich living communities. While initially planning had

to focus on the imposition of protection regimes on areas of recognised natural value, it is now clear that even disturbed urban ecosystems offer possibilities for habitat development. The re-functionalisation of spaces stemming from the city's industrial and infrastructural heritage provides robust occasions to preserve biodiversity and strengthen ecological connections.

The case of Chicago shows how a systemic, multi-scale effort can foster the development of biological diversity in a vibrant urban context. Public open spaces are often the main opportunity for urbanites to experience ecological dynamics and heterogeneity. This role is not played only by areas protected for their natural value, but also by newly designed spaces in which the calibrated distribution of different

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Planning/Management Documents		Ping Tom Memorial Park	Henry Palmisano Park	Northerly Island Park
Forest Preserve District of Cook County	Plans for vegetation and fauna	Environmental restoration	Increased space for wildlife conservation	Strengthened urban green infrastructure
	Regulations for using and protecting the space		Activities based on nature experience	Events, guided tours, and programmes
Chicago Wilderness	An Atlas of Biodiversity (knowledge)		Improved public knowledge	Improved public knowledge
	Biodiversity Recovery Plan (restoration measures)	Environmental restoration	Increased space for wildlife conservation	Increased space for wildlife conservation
	Green Infrastructure Vision (preservation, restoration, and connection measures)	Reinforcement of ecological connections		Strengthened urban green infrastructure
Chicago Nature and Wildlife Plan 2011	'Protect and Expand Natural Areas'	Promotion of riparian areas along the Chicago River	Increased space for wildlife conservation	Strengthened urban green infrastructure
	'Manage Existing Natural Areas'	Reinforcement of ecological connections; environmental restoration	Water management system as a tool to address climate change	Sustainable refunctionalisation of a decommissioned infrastructure
	'Foster Stewardship'	Enhancement of the sense of belonging felt by the Chinatown community	Activities based on nature experience	Events, guided tours, and programmes to boost public awareness
	'Monitor Sites and Conduct Research'		Improved public knowledge; Reduced human-wildlife conflicts	Improved public knowledge; Reduced human-wildlife conflicts

Table 1
Overview of the main relationships between the contents of the planning/management documents and the design outcomes (author's elaboration)

space typologies and intensities of use allows for new possibilities of coexistence between humans and other-than-humans.

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