

# Overview of Urban Landscape Rewilding Research

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**Abstract:** Urban wildscape refers to landscape units within or surrounding urban areas that are primarily shaped by natural processes, exhibiting high ecological value and diversity. Due to urbanization, urban wildscapes are at risk of disappearing or degrading, but they also present opportunities for the protection and restoration of urban ecosystems. The purpose of this article is to systematically review and analyze the concepts, classifications, values, threats, and conservation strategies of urban wildscapes, in order to provide references for urban planning and wildscape design.

**Keywords:** Wildscapes; Landscape rewilding; Urban renewal; Rewilding

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## 1. Concept of urban wildscapes

Urban wildscapes are a unique type of urban space characterized by being primarily shaped by natural processes and possessing wild characteristics and functions similar to natural wilderness<sup>[1]</sup>. The concept and development of urban wildscapes are closely related to processes such as urban expansion, transformation, and contraction. It is based on the continuous expansion and in-depth exploration of the concept of wilderness, and has gained attention and recognition from multiple disciplines. It reflects changes in urban structure, such as the relocation of industries, decentralization, and the development of new areas. Additionally, it is also influenced by factors like social culture, economic policies, and environmental awareness, exhibiting varying degrees of “wildness.” This concept also reflects people’s increasing demands for urban ecosystems and prompts a reevaluation of the relationship between nature and humans<sup>[2]</sup>.

According to different perspectives and purposes, urban wildscapes are named and defined in various ways, such as urban nature, urban wilderness, urban and wildness<sup>[3]</sup>. The development of urban wildscapes can be divided into three stages: exclusion, acceptance, and utilization. In the exclusion stage, wilderness is seen as an uninhabited and inaccessible place, standing in contrast to human society. In the acceptance stage, wilderness is recognized as an important and endangered natural resource with ecosystem services and aesthetic value, requiring protection and respect. In the utilization stage, wilderness is seen as a landscape type that can provide habitat resources for cities, support human habitats, and ensure the health and stability of ecosystems, requiring rational planning and design<sup>[4–7]</sup>.

At the 11th Global Wilderness Congress held in 2020, the “Global Charter for Rewilding the Earth” was introduced for the first time. The most notable principle of this charter is “rewilding means helping nature heal.” Everything we do is to assist in the healing of nature, rather than expecting nature to heal

itself although nature inherently possesses the ability and potential for self-restoration.

Urban wildscape is not only a natural phenomenon but also a cultural phenomenon, reflecting the changing awareness and attitudes towards nature<sup>[8]</sup>. It is also a design phenomenon that presents new challenges and opportunities for landscape theory and practice. This article proposes a comprehensive and systematic definition by integrating various theories and practices, stating that urban wildscape refers to urban spaces where ecological processes are primarily guided by nature and exhibit characteristics and functional types similar to natural wilderness.

## **2. Classification of urban wildscapes**

Urban wildscapes are mainly categorized based on their forms and spatial scales. Diemer *et al.* divided them into five levels based on the area of urban wildscapes<sup>[9]</sup>. Kovári divided urban wildscapes into ancient wildscapes and newly formed wildscapes according to their timeline of formation<sup>[10]</sup>. Wang *et al.* classified urban wildscapes into primary-, secondary-, gap-, and pseudo-wilderness types based on their space and distinct features<sup>[11]</sup>. In this article, urban wildscapes are comprehensively classified into four categories based on their mechanism of formation, spatial distribution, species composition, and structural characteristics.

### **2.1. Human-abandoned type**

The human-abandoned type of urban wildscapes is a space of natural recovery resulting from the interruption or abandonment of human activities. These spaces are typically found at the edges or centers of cities, such as abandoned factories, warehouses, railways, docks, etc<sup>[12]</sup>. They bear significant human traces but also exhibit natural vitality and diversity. These spaces not only provide ecological services to the city, such as air purification, climate regulation, and water protection but also offer opportunities for leisure, education, and exploration for urban residents. For example, Beijing's 798 Art District is a typical human-abandoned urban wildscape. It was once a military factory area but later occupied by artists and cultural institutions, forming a unique combination of industrial heritage and artistic creativity. This landscape preserves the historical imprint of the industrial era while showcasing the vibrancy and innovation of contemporary culture.

### **2.2. Natural-degradation type**

The natural-degradation type of urban wildscapes is formed due to natural factors such as geology, climate, and hydrology, resulting in land degradation or desertification, such as exposed slopes, riverbanks, and sand dunes. These landscapes typically exhibit lower biodiversity and ecological functions, often appearing incongruous within the urban context and contrasting sharply with the surrounding architecture and human environment. However, they also possess a certain natural beauty and sense of intrigue. They reflect the power and changes of nature and can inspire awe and a sense of conservation. For example, the Binjiang Park in Shanghai is a typical natural-degradation type urban wildscape. Located along the Huangpu River, it was originally a beach and salt field. It was later developed into a park, preserving some of the characteristics of sand dunes and salt fields, creating a leisure space with a desert-like ambiance.

### **2.3. Natural-preservation type**

The natural-preservation type of urban wildscapes is characterized by a higher degree of naturalness and is formed with minimal human interference or conservatory efforts. Examples include forests, wetlands, grasslands, and so on. These landscapes typically exhibit higher biodiversity and ecological functions, as well as aesthetic appeal. For instance, Baiyun Mountain in Guangzhou is a typical example of a natural-

preservation type of urban wildscape. It serves as an important recreational, fitness, and viewing area for the citizens of Guangzhou, while also functioning as an ecological barrier and climate regulator for the city. When planning and designing natural-preservation type urban wildscapes, priority should be given to the protection and restoration of nature. This involves minimizing human disturbance and destruction, while also providing suitable facilities and services to fulfill people's needs and enhance their appreciation of nature.

#### **2. 4. Man-made type**

Man-made type of urban wildscapes is formed through human activities, either by creation or imitation. Examples include artificial lakes, wetland parks, theme parks, and so on. These landscapes typically exhibit a strong artificial character in terms of design forms, functions, materials, etc., while also incorporating certain elements of nature, such as vegetation and water circulation. For instance, the Shanghai Native Ecological Science Popularization Demonstration Base is an artificially created urban rewilding project with the goal of biodiversity restoration. The project is divided into seven different ecological functional zones, utilizing native species to construct a balanced biological community that can undergo spontaneous succession and gradually become wilder. This project not only enriches the biodiversity within the city but also provides the public with a science popularization platform to get closer to nature and understand native ecosystems.

### **3. Value and functions of urban wildscapes**

#### **3. 1. Ecological dimension**

Urban wildscapes are an important means of urban greening, providing diverse habitats for organisms, protecting urban biodiversity, and maintaining the stability and health of ecosystems. These organisms not only promote soil fertility and water conservation but also control the spread of pests and diseases<sup>[13]</sup>. Urban wildscapes can also regulate urban climate, reduce the urban heat island effect, improve urban air quality, reduce noise pollution, increase green space in cities, and enhance the quality of life for urban residents. Urban wildscapes are beneficial not only for environmental protection but also for social and economic development. They enhance the aesthetics and attractiveness of cities, provide places for recreation and education, and promote the physical and mental well-being of urban residents and social cohesion.

#### **3. 2. Social dimension**

Urban wildscapes offer ample opportunities for recreation and education. They enhance environmental awareness and a sense of responsibility among urban residents, while also promoting their physical and mental well-being and fostering social cohesion. Urban wildscapes also contribute to the aesthetics and attractiveness of cities, elevating their image and prestige, and fostering a sense of belonging and pride among urban residents. These positive contributions of urban wildscapes to social development warrant our utmost attention and protection. To better utilize and manage urban wildscapes, it is necessary to strengthen relevant planning and policies, encourage public participation and support, establish effective monitoring and evaluation mechanisms, and promote the sustainable development of urban wildscapes.

#### **3. 3. Cultural dimension**

Urban wildscapes represent a distinctive form of urban landscape that preserves the pristine state of nature while embodying traces of human history, holding significant meaning and value. Firstly, urban wildscapes can preserve and inherit the historical and cultural heritage of cities, such as ancient sites,

industrial remnants, folk customs, etc. These serve as carriers of urban memory and symbols of urban identity. Secondly, urban wildscapes can reflect the characteristics and style of cities, such as landscapes, vegetation, architecture, etc. These embody the uniqueness of cities and serve as sources of urban charm. Furthermore, urban wildscapes can inspire the creativity and imagination of urban residents, such as in the fields of art, design, education, etc. These drive urban innovation and represent the potential for urban development. Lastly, urban wildscapes can foster communication and mutual understanding among individuals from diverse cultures and backgrounds, primarily through avenues like tourism, communal activities, and shared communities. These aspects showcase the diversity and inclusivity of cities, while also enriching the cultural significance and value of urban environments.

### **3. 4. Economic dimension**

Urban wildscapes can enhance the ecological service value of cities, providing more natural resources and ecosystem services, which helps cities conserve resource consumption and reduce cost expenditures, thereby increasing economic benefits and competitiveness. Wildscapes have a certain therapeutic effect on the physical and mental well-being of the public, especially in the post-pandemic era. Healing landscapes are increasingly applied in the field of medicine to address social health issues among sub-healthy populations<sup>[14]</sup>. Additionally, urban wildscapes can promote the development of the tourism industry and related sectors. They offer unique tourist destinations, attracting more visitors and stimulating the growth of local tourism and associated industries. This creates more job opportunities and sources of income, enhancing the economic vitality and sustainability of the city.

## **4. Challenges in conserving urban wildscapes**

### **4. 1. Urban expansion**

Urban expansion leads to the reduction and fragmentation of urban wildscapes. The rapid growth of urban construction land results in the continuous encroachment, filling, and development of existing natural spaces, significantly decreasing the area and quantity of urban wildscapes. Additionally, urban expansion reduces the connectivity of urban wildscapes, creating phenomena such as isolation, marginalization, and segregation, which affect biodiversity and ecosystem functions. Urban expansion also results in the decline of quality and functionality of urban wildscapes. For example, it increases the urban heat island effect, causing issues such as elevated temperatures, reduced water availability, and vegetation degradation.

### **4. 2. Change of land use**

The change of land use is one of the most significant impacts of human activities on the natural environment. It alters the type, structures, and functions of urban wildscapes, posing threats and influences on the stability and sustainability of urban ecosystems. The diverse land use patterns in cities, including residential, commercial, industrial, transportation, and public facilities, have varying degrees of impact on urban wildscapes. On one hand, the change of land use modifies the physical conditions of urban wildscapes, such as temperature, humidity, light, and wind speed, affecting plant growth and animal distribution. On the other hand, it also alters the chemical conditions of urban wildscapes, such as soil fertility, pH value, and organic matter content, which affects plant nutrition and animal food sources.

### **4. 3. Human disturbance**

Humans are the most active factor in urban wildscapes, directly or indirectly disturbing these landscapes through their activities. Direct disturbances include logging, excavation, landfilling, burning, hunting, grazing, and many more. These disturbances disrupt the structure and functionality of urban wildscapes,

leading to species loss or the invasion of alien species. Indirect disturbances include the introduction of foreign substances, alteration of hydrological conditions, and modification of climate conditions. These disturbances change the environmental quality and stability of urban wildscapes, causing species adaptation or migration.

#### **4. 4. Introduction of invasive species**

Invasive species refer to species that enter non-native areas due to human or natural reasons, and these species can establish populations and negatively impact local ecosystems. Invasive species often possess strong competitive advantages and adaptability in urban wildscapes, allowing them to reproduce rapidly, occupy resources, and displace or hybridize with native species, disrupting the existing ecological balance and evolutionary processes.

### **5. Strategies and recommendations for urban wildscape conservation**

#### **5. 1. Identifying and assessing urban wildscape resources**

By using multiple data sources and methods, urban wildscapes can be systematically identified and classified, including assessing their ecological functions, service values, and conservation status, and establishing a database of urban wildscape resources. This information will provide a scientific basis for conservation planning and management, assisting decision-makers in formulating appropriate conservation measures and promoting the sustainable development of urban wildscapes.

#### **5. 2. Establishing a network for urban wildscape conservation**

Based on the distribution characteristics and ecological connections of urban wildscapes, reasonable zoning and connectivity can be designed to establish a network for urban wildscape conservation. This will enhance the integrity and connectivity of urban wildscapes, improving their ability to resist disturbances and adapt to changes. By establishing a network for urban wildscape conservation, urban wildscapes can be better protected, promoting their sustainable development.

#### **5. 3. Developing effective management measures and standards**

According to the characteristics and requirements of different types and grades of urban wildscapes, corresponding management objectives, measures, and standards should be formulated. This may include limiting or prohibiting unsuitable development activities, controlling human disturbances, restoring damaged ecosystems, preventing or eliminating invasive species, ensuring the ecological integrity and functional completeness of urban wildscapes. Besides, the monitoring and evaluation of urban wildscapes should also be strengthened. A scientific data management system that regularly analyzes trends and influencing factors of urban wildscapes should be established, and management measures and standards should be modified according to different situations to improve the effectiveness and quality of management.

#### **5. 4. Enhancing public participation and education**

By conducting various forms of promotion, education, volunteer activities, community involvement, and other initiatives, public awareness and attention towards urban wildscapes can be increased. This will cultivate respect and care for urban wildscapes among the public, creating a social atmosphere of collective participation in conservation. This approach not only enhances the ecological and aesthetic values of urban wildscapes but also strengthens public environmental awareness and a sense of responsibility, driving the sustainable development of cities.

## 6. Conclusion

Urban wildscapes are natural landscapes that exist within urban environments. They possess nativeness, diversity, openness, and unpredictability, beyond human control and constraints. Urban wildscapes not only hold significant ecological value, such as biodiversity conservation and the provision of ecosystem services but also possess social, economic, and aesthetic value. They contribute to the well-being, happiness, and cultural identity of urban residents. Therefore, urban wildscapes should receive more attention and protection in current urban development and planning.

## Disclosure statement

The author declares no conflict of interests

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