

Urban Wilderness Protection and Creation in China

Senmeng Hao, Taoling Li, Chunhui Zhang, Yanyan Xia, Zhaokui Wu
Hebei Oriental University
smhao825@gmail.com

Abstract

Urban wilderness areas—natural spaces minimally impacted by human activity—are increasingly vital in China's rapidly urbanising cities. They offer key ecosystem services such as air and water purification, carbon sequestration, and urban cooling, while supporting biodiversity and providing public recreation. This study explores how integrating urban wilderness into Chinese urban planning can balance development and ecological preservation. Using interdisciplinary methods to assess wilderness contributions to resilience and livability. Case studies from Hangzhou, Shanghai, Lanzhou, and Yueyang illustrate effective strategies including native vegetation restoration, sustainable recreation infrastructure, and environmental education. Public accessibility and awareness are emphasised to foster environmental stewardship. Aligning wilderness conservation with China's urban planning goals supports ecological health and long-term sustainability, offering insights for policymakers, planners, and communities seeking greener, more resilient urban futures.

Keywords: Urban wilderness; ecological resilience; sustainable urban development

1. Introduction

Urbanisation has become a defining characteristic of the 21st century, with cities expanding at unprecedented rates. This rapid urban growth often leads to the degradation of natural environments, resulting in diminished biodiversity, increased pollution, and reduced quality of life for urban residents. In response to these challenges, the concept of urban wilderness has emerged as a vital component in urban planning and environmental conservation.

Urban wilderness refers to natural areas within or adjacent to urban environments that remain relatively undisturbed by human activity. These spaces, which can include forests, wetlands, grasslands, and other ecosystems, serve as critical habitats for wildlife and offer numerous ecosystem services. They play a significant role in air and water purification, carbon sequestration, climate regulation, and provide recreational and psychological benefits to urban dwellers. Moreover, urban wilderness areas contribute to the ecological resilience of cities, enabling them to better withstand environmental stresses such as climate change and natural disasters (Emily P. Zefferman, 2018).

In the context of China, the importance of urban wilderness is increasingly recognised. Rapid industrialisation and urban expansion have led to significant environmental challenges, including habitat loss and fragmentation. However, initiatives such as the National Forest City program demonstrate a growing commitment to integrating green spaces into urban development. These efforts aim to enhance biodiversity, improve air quality, and provide residents with accessible natural areas, thereby promoting sustainable urban living (Xiaoqin Xie, 2023).

2. The Primary Objectives

This study aims to explore the role of urban wilderness in promoting sustainable urban development in China (Table 1).

Table 1: The Primary Objectives

The Primary Objectives				
To define and contextualise urban wilderness	To examine the historical evolution of urban wilderness in China	To assess global perspectives on urban wilderness protection and creation	To identify strategies for integrating urban wilderness into city planning	To evaluate the benefits of urban wilderness
Understanding the characteristics and significance of urban wilderness within the framework of urban ecology and planning.	Analysing how urban wilderness areas have developed over time and their current status in Chinese cities.	Reviewing international practices and policies that can inform China's approach to urban wilderness management.	Proposing methods for the protection and creation of urban wilderness areas, considering ecological, social, and economic factors.	Investigating the ecological services provided by urban wilderness and their impact on urban resilience and residents' well-being.

The scope of this study encompasses a comprehensive analysis of urban wilderness in China, drawing comparisons with international examples to identify best practices. It involves an interdisciplinary approach, incorporating ecological analysis, urban planning methodologies, and community engagement strategies. The research aims to provide actionable insights for policymakers, urban planners, and environmental advocates to effectively integrate urban wilderness into the fabric of Chinese cities.

3. Research approach

3.1 Interdisciplinary Approaches: Case Study; Literature Review

To effectively address the complexities of urban wilderness protection and creation, an interdisciplinary approach is essential. This involves combining insights from ecology, urban planning, sociology, and cultural studies to understand the dynamics of urban ecosystems (Table 1).

Table 2: Research approach

Research approach	
Case study	Research progress review
Case studies serve as critical tools for examining real-world examples of urban rewilding and ecological restoration. By selecting representative sites and analysing them through field observations, spatial analysis, and policy review, case studies reveal the interactions between natural systems and human interventions.	Research progress reviews synthesise existing theoretical and empirical research, identifying key themes, gaps, and debates within the field. A systematic review of scholarly articles, policy documents, and technical reports enables researchers to contextualise case findings within broader academic and practical discourses.

By integrating case study and literature review, these methods provide a robust framework for investigating the ecological, social, and planning dimensions of urban wilderness initiatives, ensuring a holistic and sustainable understanding of urban nature.

3.2 Case Studies

3.2.1 The display of cases in different parts of China

The selected case studies are geographically distributed across diverse ecological and cultural regions of China, offering a comprehensive view of urban wilderness practices in varying urban contexts (Table 3).

In Hangzhou, located in the Yangtze River Delta of southeastern China, Jiangyangfan Ecological Park showcases a low-intervention model of natural succession, where wetland habitats have been restored with minimal human alteration, emphasising biodiversity and public education.

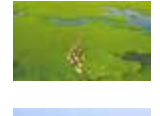
Shanghai, as a leading coastal metropolis, showcases ecological planning at scale through Heqing Country Park, where rewilding strategies are applied within a high-density urban environment to balance biodiversity, recreation, and spatial equity.

Moving westward, Lanzhou's Yellow River riverside rewilding project addresses the ecological degradation caused by urban and industrial pressures, combining habitat restoration, community engagement, and sustainable tourism to reestablish both environmental function and cultural identity.

Meanwhile, Yueyang, located in southern China near Dongting Lake, highlights species reintroduction efforts, particularly the rewilding of Père David's deer in Junshan Houhu, contributing to both biodiversity restoration and wetland conservation.

Collectively, these geographically dispersed cases illustrate how urban wilderness practices are shaped by differing environmental conditions, cultural values, and planning frameworks across southern and northwestern China.

Table 3: Recreation of Urban Wilderness Cases in China

Case studies					
Project	Study Area	Rewilding Strategies	Outcomes and Significance	Conclusion	Visual Representation
Jiangyangfan Ecological Park	Hangzhou, Zhejiang province, Southern China,	a. Embracing Natural Succession b. Ecological Environment Construction	a. Ecological Restoration b. Public Education	Jiangyangfan Ecological Park demonstrates how urban rewilding and ecological restoration can transform degraded areas into biodiverse, educational natural spaces.	  
Shanghai Heqing Country Park	Shanghai, Southern China	a. Minimising Human Intervention b. Habitat Restoration	a. Biodiversity Enhancement b. Ecotourism Development	Shanghai Heqing Country Park exemplifies urban rewilding by integrating ecological restoration into urban planning, enhancing biodiversity, and offering educational and recreational opportunities.	  
Lanzhou's Yellow River Riverside	Lanzhou, Gansu Province, Northwestern China	a. Habitat Restoration b. Community Engagement c. Sustainable Financing	a. Ecological Improvement b. Cultural Heritage Preservation	Lanzhou's Yellow River rewilding integrates habitat restoration, community engagement, and sustainable financing, transforming degraded urban riverfronts into vibrant ecological and cultural corridors.	  
Rewilding of Père David's Deer in Junshan Houhu, East Dongting Lake National Nature Reserve	Yueyang, Hunan Province, Southern China	a. Habitat Assessment and Selection b. Monitoring and Adaptive Management	The reintroduced Père David's deer population shows adaptation and growth, but faces challenges from human disturbance and disease outbreaks.	Père David's deer rewilding in Junshan Houhu exemplifies effective habitat restoration and adaptive management, though challenges like human disturbance and disease persist.	  

3.2.2 Strategies for Urban Wilderness Protection and Creation in China

Urban wilderness areas—natural or semi-natural spaces within or adjacent to urban environments—are vital for ecological balance, biodiversity conservation, and the well-being of urban residents. In China, rapid urbanisation has posed significant challenges to the preservation and creation of such spaces. However, various strategies have been implemented to address these challenges, focusing on native vegetation restoration, integration of sustainable recreational facilities, promotion of environmental education and public awareness, and the establishment of robust policy frameworks and governance structures (Figure 1).

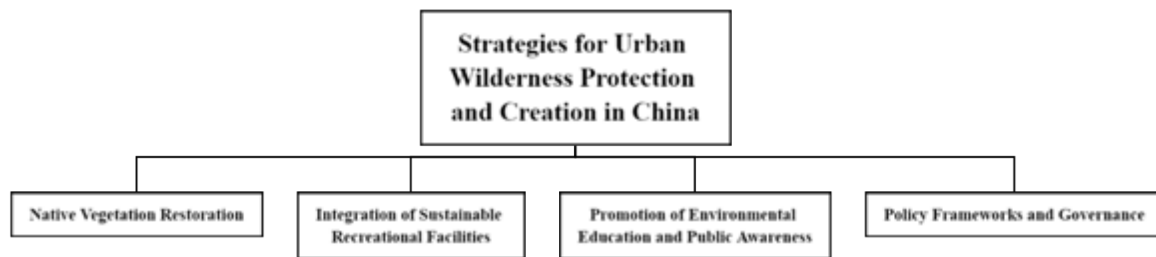


Figure 1: Strategies for Urban Wilderness Protection and Creation in China

Native Vegetation Restoration

Restoring native vegetation is a cornerstone of urban wilderness conservation in China. Programs like the “Grain for Green” initiative, launched in 1999, have converted over 15 million hectares of farmland and 17 million hectares of barren mountainous wasteland back to natural vegetation, aiming to mitigate soil erosion and flooding (Claudio O. Delang, 2015).

Similarly, the “Three-North Shelterbelt Program,” also known as the “Great Green Wall,” has been instrumental in combating desertification by planting over 30 million hectares of trees, increasing national forest coverage to over 25% (Reuters, 2024).

While these large-scale afforestation efforts have expanded green cover, challenges remain regarding biodiversity. The proliferation of monoculture plantations, often comprising fast-growing non-native species, has led to a decline in native forests, which have decreased by 6% due to the replacement of diverse ecosystems with single-species plantations (Kelly, 2018). To enhance ecological resilience, future restoration efforts should prioritise the use of native species and promote mixed-species plantings that support a broader range of wildlife.

Integration of Sustainable Recreational Facilities

Integrating sustainable recreational facilities within urban wilderness areas enhances their accessibility and utility for urban residents while preserving ecological integrity. Designing trails, observation decks, and educational signage using eco-friendly materials minimises environmental impact and encourages public engagement with nature. For instance, the Kubuqi Desert restoration project in Inner Mongolia transformed a barren landscape into a green area with tourism and agriculture industries, demonstrating the potential for ecological restoration to support sustainable economic development.

Moreover, incorporating green infrastructure such as eco-roofs and community herb gardens, as implemented by Future Generations China in Beijing, combines recreational and educational functions, fostering community involvement and environmental awareness. These initiatives exemplify how urban wilderness areas can serve multiple purposes, including recreation, education, and biodiversity conservation.

Promotion of Environmental Education and Public Awareness

Environmental education and public awareness are critical for the long-term success of urban wilderness initiatives. China has made significant strides in this area, establishing formal environmental education systems and integrating environmental topics into primary education curricula. Organisations like the China Environmental Education Centre (CEEC) have been pivotal in conducting environmental education and publicity activities, serving government departments, the public, enterprises, and media (Mee Young Choi, 2008).

Additionally, non-governmental organisations (NGOs) such as “Friends of Nature” and “Global Village of Beijing” have played a vital role in raising environmental awareness and promoting hands-on environmental activism since the mid-1990s. These organisations focus on education, awareness-raising, and community engagement, contributing to a more environmentally conscious society.

Despite these efforts, challenges persist, including a lack of motivation to incorporate environmental education in teaching and a contradiction between economic growth and environmental protection (Youyi Tian, 2016). Addressing these issues requires a concerted effort to enhance the quality and reach of environmental education programs, ensuring that they effectively foster environmental stewardship among the public.

Policy Frameworks and Governance

Robust policy frameworks and effective governance are essential for the protection and creation of urban wilderness areas. China has implemented various ecological restoration policies that have significantly impacted the country's terrestrial carbon balance, demonstrating the effectiveness of policy-driven environmental initiatives (Chao Yue, 2024). These policies include land management changes aimed at enhancing carbon sequestration and promoting sustainable development.

Furthermore, integrating nature-based solutions (NbS) into ecosystem restoration efforts provides both theoretical foundations and practical guidance for enhancing conservation efforts and promoting sustainable development. By incorporating NbS into policy frameworks, China can address environmental challenges more holistically, ensuring that urban wilderness areas are preserved and enhanced in the face of ongoing urbanisation.

Public participation and NGO activity are also crucial components of effective governance. Analysing the degree and types of public participation in NbS projects in China reveals the importance of engaging communities in environmental initiatives. Encouraging public involvement ensures that urban wilderness projects align with community needs and values, fostering a sense of ownership and responsibility among residents.

3.3 Research Progress Review

3.3.1 Definitions and Concepts of Urban Wilderness

The term “urban wilderness” refers to natural areas within or adjacent to urban environments that remain relatively undisturbed by human activity. These spaces, which can include forests, wetlands, grasslands, and other ecosystems, serve as critical habitats for wildlife and offer numerous ecosystem services. They play a significant role in air and water purification, carbon sequestration, climate regulation, and provide recreational and psychological benefits to urban dwellers. Moreover, urban wilderness areas contribute to the ecological resilience of cities, enabling them to better withstand environmental stresses such as climate change and natural disasters.

In the context of China, the importance of urban wilderness is increasingly recognised. Rapid industrialisation and urban expansion have led to significant environmental challenges, including habitat loss and fragmentation. However, initiatives such as the National Forest City program demonstrate a growing commitment to integrating green spaces into urban development. These efforts aim to enhance biodiversity, improve air quality, and provide residents with accessible natural areas, thereby promoting sustainable urban living.

3.3.2 Historical Evolution of Urban Wilderness in China

The development of wilderness aesthetics in China has undergone a profound and evolving cognitive process shaped by philosophical, religious, and cultural influences throughout different historical periods (Table 4).

Table 4: The Development of the Cognitive Process of Chinese Wilderness Aesthetics

The Development of the Cognitive Process of Chinese Wilderness Aesthetics		
Dynasty	Characteristics of the Era	Description
Pre-Qin Dynasty	Deification of nature; reverence for wilderness	During the pre-Qin Dynasty, the wilderness was regarded as a mysterious space associated with divine spirits. People revered and feared it. Aesthetics of wilderness focused on nature and mysticism. Thinkers described it as "nameless Dao," "non-being," "formless," and "silent."
Han Dynasty	Emphasis on forest grace and wilderness rhythms; new harmony	In the Han Dynasty, wilderness became important in Confucian moral practice. Confucian wilderness aesthetics emphasised rational beauty and ordered qualities, highlighting how wild landscapes could inspire moral reflection, e.g., the "Dao of governance" in The Analects.
Wei-Jin Dynasty	Emphasis on mountain tranquillity; wilderness as Zen transcendence	In the Wei-Jin Dynasty, wilderness aesthetics greatly influenced poetry and landscape painting. The appreciation of wilderness became more refined and integrated with natural emotions.
Sui Dynasty and Tang Dynasty	Pursuit of wild beauty and mystery; wilderness as sublime and fantastic	After the Wei-Jin Dynasty, wilderness aesthetics merged with religious and metaphysical beliefs. Mountains and waters represented the divine. Aesthetics were infused with Buddhist, Taoist meditation, focusing on quiet contemplation and transcendence.
Song Dynasty	Emphasis on mountain and water landscapes; wilderness as serene and deep	In the Song dynasty, wilderness began to be seen as shaped by human emotion and thought. It became central to poetic and landscape painting creation. Aesthetic focus shifted to secluded, elegant scenes.
Ming Dynasty and Qing Dynasty	Emphasis on mountain spirit and naturalness; wilderness as pure and natural	During the Ming and Qing periods, wilderness aesthetics spread to the public and became symbolic in literati sentiment and self-identity. Aesthetics turned toward individuality.

Together, these stages illustrate a continuous redefinition of wilderness aesthetics in Chinese thought, moving from divine reverence to humanistic integration, from metaphysical abstraction to personal expression.

China's relationship with wilderness has been shaped by a complex interplay of cultural, historical, and political factors. Traditional Chinese philosophy, particularly Taoism and Confucianism, emphasises harmony between humans and nature. The concept of "Unity of Man and Heaven" reflects an intrinsic value placed on natural landscapes (Mark, 2006). However, the 20th century witnessed significant shifts in this perspective. The rapid industrialisation and urbanisation during the mid-20th century led to extensive environmental degradation, with natural areas being converted for agricultural and industrial use (Weller, 2006).

In response to growing environmental concerns, the Chinese government initiated several conservation efforts. The establishment of National Forest Parks (NFPs) in the 1980s marked a significant step towards preserving natural landscapes. The first NFP was created in Zhangjiajie, Hunan Province, in 1982, and by 2009, China had established over 2,400 NFPs (National Forest Parks in China, 2013). These parks aimed to protect biodiversity, promote tourism, and enhance public awareness of environmental issues.

In recent years, urban wilderness has gained prominence in China's urban planning discourse. Cities like Shanghai and Chengdu have implemented initiatives to integrate natural spaces within urban environments. For instance, Shanghai's Heqing Country Park and Chengdu's "Garden City" initiative exemplify efforts to create urban wilderness areas that serve both ecological and recreational functions. These projects reflect a growing recognition of the importance of urban wilderness in enhancing urban livability and sustainability.

3.3.3 Global Perspectives on Urban Wilderness Protection and Creation

Globally, urban wilderness has been recognised for its multifaceted benefits, including biodiversity conservation, climate regulation, and human well-being. Cities worldwide have implemented various strategies to protect and create urban wilderness areas, often tailored to their unique ecological and socio-cultural contexts.

In Singapore, the "Garden City" vision has guided urban development since the 1960s, emphasising the integration of green spaces throughout the city. The establishment of nature reserves, park connectors, and rooftop gardens has transformed Singapore into a model for urban greening. These efforts have enhanced biodiversity, improved air quality, and provided residents with accessible natural spaces.

In the United States, the concept of urban wilderness has been explored through initiatives like the Urban Wilds Program in Boston. This program identifies and protects remnant natural areas within the city, recognising their ecological and cultural significance. Similarly, cities like Portland and Seattle have implemented green infrastructure projects that incorporate urban wilderness elements to manage stormwater, reduce urban heat islands, and enhance biodiversity.

European cities have also embraced urban wilderness as a component of sustainable urban planning. In Berlin, the concept of "urban wildness" has been promoted to preserve spontaneous vegetation and wildlife habitats within the city. These areas, often located on abandoned industrial sites, provide opportunities for ecological succession and community engagement (Kowarik, 2011). Such initiatives highlight the potential of urban wilderness to contribute to urban resilience and cultural identity.

These global examples demonstrate the diverse approaches to urban wilderness protection and creation, underscoring the importance of context-specific strategies. They also illustrate the potential of urban wilderness to address pressing urban challenges, including climate change, biodiversity loss, and social well-being.

3.3.4 The Role of Urban Wilderness in Sustainable Urban Development

Urban wilderness areas—natural or semi-natural spaces within or adjacent to urban environments—play a pivotal role in promoting sustainable urban development. These areas provide a multitude of ecosystem services that contribute to environmental health, biodiversity conservation, climate regulation, and the well-being of urban residents.

Ecosystem Services Provided by Urban Wilderness

Ecosystem services are the benefits that humans derive from natural ecosystems. Urban wilderness areas offer a range of these services, which are crucial for maintaining ecological balance and enhancing the quality of urban life.

Air and Water Purification

Urban vegetation, including trees and shrubs, plays a significant role in improving air quality by filtering pollutants such as particulate matter, nitrogen dioxide, and ozone. Through processes like deposition and absorption, plants remove harmful substances from the atmosphere, thereby reducing respiratory ailments among urban populations (David J. Nowak, 2006).

In terms of water purification, urban wilderness areas contribute to the filtration of stormwater runoff. Vegetated surfaces absorb and slow down rainwater, allowing for the removal of pollutants before they reach water bodies. This natural filtration process mitigates the risk of waterborne diseases and protects aquatic ecosystems (Davis AP, 2006).

Carbon Sequestration

Urban forests and green spaces act as carbon sinks by absorbing carbon dioxide during photosynthesis and storing it in biomass and soil. This process helps offset greenhouse gas emissions from urban activities, contributing to climate change mitigation. Although the carbon sequestration capacity of urban vegetation is lower compared to large natural forests, it still represents a valuable component of urban climate strategies (Churkina, 2010).

Climate Regulation

Urban wilderness areas influence local microclimates by providing shade, releasing moisture through evapotranspiration, and reducing surface temperatures. These effects help combat the urban heat island phenomenon, where urban areas experience higher temperatures than surrounding rural regions due to heat-absorbing surfaces like concrete and asphalt (Bowler, 2010). By moderating temperatures, urban green spaces reduce energy consumption for cooling and enhance thermal comfort for residents.

Enhancement of Biodiversity

Urban wilderness areas serve as habitats for a diverse array of flora and fauna, supporting biodiversity within city landscapes. These green spaces provide food, shelter, and breeding grounds for various species, including birds, insects, and small mammals. Maintaining biodiversity in urban environments is essential for ecosystem resilience, as it ensures the continuation of ecological processes and services (Goddard, 2010).

Moreover, urban biodiversity has educational and recreational value, fostering a connection between residents and nature. Exposure to diverse species can enhance environmental awareness and promote conservation efforts within communities.

Recreational and Psychological Benefits for Urban Residents

Access to urban wilderness areas offers significant recreational opportunities, encouraging physical activity such as walking, jogging, and cycling. Engagement in these activities contributes to improved physical health and reduces the risk of chronic diseases.

Beyond physical benefits, urban green spaces have profound psychological impacts. Exposure to natural environments has been linked to reduced stress, anxiety, and depression levels among urban dwellers. Studies indicate that individuals living near green spaces experience greater well-being and healthier cortisol profiles, highlighting the mental health benefits of urban nature (Maas, 2006).

Furthermore, urban wilderness areas promote social cohesion by serving as communal spaces where people can interact and engage in collective activities. This social interaction fosters a sense of community and belonging, which are vital components of mental health and societal well-being.

4. Results

China's rapid urbanisation has led to significant challenges in balancing urban development with ecological preservation. The expansion of urban areas often encroaches upon natural habitats, leading to biodiversity loss and environmental degradation. For instance, studies indicate that urban expansion in China is likely to affect habitats and biodiversity by 2030, with most provinces expected to experience urban growth near protected areas or biodiversity hotspots (Seto, 2012).

To address these challenges, China has introduced the concept of "Ecological Civilisation," aiming to integrate ecological considerations into economic and social development. This policy framework promotes sustainable urban planning practices that prioritise ecological preservation alongside urban growth (Meng, 2021).

Climate change poses additional challenges to urban wilderness areas in China. Rising temperatures, altered precipitation patterns, and increased frequency of extreme weather events threaten the integrity of urban ecosystems. Urban areas contribute significantly to greenhouse gas emissions, exacerbating climate change impacts (Maizland, 2021).

In response, China has implemented initiatives such as the "Sponge City" program, which aims to enhance urban resilience to climate change by improving water management and reducing flood risks through the integration of green infrastructure (Li, 2017). These efforts demonstrate China's commitment to mitigating climate change impacts on urban environments.

Effective urban wilderness conservation requires active community involvement and stakeholder engagement. Public participation in environmental decision-making processes enhances the legitimacy and effectiveness of conservation initiatives. However, challenges persist in engaging diverse stakeholders and ensuring equitable participation (Chen, 2015).

To foster community engagement, educational programs and awareness campaigns are essential. For example, environmental education initiatives in urban areas have been shown to increase public awareness and support for conservation efforts (Tian, 2016). Additionally, involving local communities in the planning and management of urban green spaces can lead to more sustainable and inclusive outcomes.

5. Discussion of Results

China has implemented various policies aimed at promoting sustainable urban development and ecological preservation. The "Ecological Civilisation" framework serves as a guiding principle for integrating environmental considerations into urban planning. Additionally, initiatives like the "Sponge City" program and the establishment of national parks reflect efforts to enhance urban resilience and conserve biodiversity (Li, 2017).

While these policies demonstrate progress, challenges remain in their implementation and effectiveness. For instance, inconsistencies in policy enforcement and limited coordination among governmental agencies can hinder the success of conservation initiatives (Chen, 2015). Moreover, balancing economic development goals with ecological preservation continues to be a complex issue.

Comparing China's urban wilderness conservation efforts with international practices reveals both similarities and differences. For example, the concept of integrating green infrastructure into urban planning is common in countries like Germany and the Netherlands, where policies emphasise the multifunctionality of urban green spaces (Kabisch, 2015). Similarly, China's "Sponge City" program aligns with global trends in nature-based solutions for urban resilience.

However, China's rapid urbanisation and unique socio-political context present distinct challenges. The scale and pace of urban development in China necessitate tailored approaches to urban wilderness conservation that consider local conditions and governance structures. Learning from international experiences while adapting strategies to the Chinese context is crucial for effective conservation outcomes.

Based on the analysis of challenges and current practices, the following recommendations are proposed for enhancing urban wilderness conservation in China:

Enhance inter-agency collaboration and ensure consistent enforcement of environmental policies to improve their effectiveness.

Develop participatory planning processes that involve local communities in decision-making and management of urban green spaces.

Incorporate climate adaptation strategies into urban planning to mitigate the impacts of climate change on urban ecosystems.

Implement educational programs to raise public awareness and foster a culture of environmental stewardship.

6. Conclusion

This study has examined the multifaceted role of urban wilderness in China's sustainable urban development. Urban wilderness areas provide critical ecosystem services, including air and water purification, carbon sequestration, climate regulation, and biodiversity enhancement (Xie, 2019). Case studies from cities like Hangzhou, Shanghai, Lanzhou, and Yueyang illustrate successful integration of green spaces into urban planning, demonstrating the potential for ecological preservation alongside urban growth. However, challenges persist, such as balancing rapid urbanisation with ecological conservation, addressing climate change impacts, and ensuring equitable access to green spaces (Seto, 2012).

The findings underscore the necessity for urban planning policies that prioritise ecological considerations. Integrating green infrastructure into urban development plans can mitigate environmental degradation and enhance urban resilience (Li, 2017). Policies should promote community involvement in the planning and management of urban green spaces to ensure that these areas meet the needs of diverse populations (Youyi Tian, 2016). Furthermore, adopting adaptive management approaches can enable cities to respond effectively to the dynamic challenges posed by climate change and urbanisation.

Future research should focus on evaluating the long-term effectiveness of urban wilderness initiatives in China. Comparative studies between Chinese cities and international counterparts can provide insights into best practices and innovative strategies for urban ecological conservation. Additionally, interdisciplinary research combining ecological science, urban planning, and social sciences can inform more holistic approaches to urban wilderness management. Emphasis should also be placed on developing metrics to assess the social and health benefits of urban green spaces, ensuring that these areas contribute to the well-being of all urban residents.

References

- Bowler, D. B.-A. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and urban planning*, 97(3), pp.147-155.
- Chao Yue, M. X. (2024). Contributions of ecological restoration policies to China's land carbon balance. *Nature communications*, (2024) 15:9708.
- Chen, M. Q. (2015). Public participation in environmental management in China: status quo and mode innovation. *Environmental management*, 55, pp.523-535.
- Churkina, G. B. (2010). Carbon stored in human settlements: the conterminous United States. *Global Change Biology*, 16(1), pp.135-143.
- Claudio O. Delang, Z. Y. (2015). *China's grain for green program. A review of the largest ecological restoration and rural development program in the world*. Switzerland: Springer International Publishing.

David J. Nowak, D. E. (2006). Air pollution removal by urban trees and shrubs in the United States. *Urban Forestry & Urban Greening*, 4(3-4), pp.115-123.

Davis AP, S. M. (2006). Water quality improvement through bioretention media: nitrogen and phosphorus removal. *Water Environment Research*, 78(3), pp.284-293.

Ecosystems, S. F. (n.d.). *Urban Environmental Education*. Retrieved from <https://china.future.org/urban-education/>
Emily P. Zefferman, M. L. (2018). Knoxville's urban wilderness: Moving toward sustainable multifunctional management. *Urban Forestry & Urban Greening*, 29, 357-366.

Goddard, M. D. (2010). Scaling up from gardens: biodiversity conservation in urban environments. *Trends in ecology & evolution*, 25(2), pp.90-98.

Kabisch, N. Q. (2015). Human-environment interactions in urban green spaces—A systematic review of contemporary issues and prospects for future research. *Environmental Impact assessment review*, 50, pp.25-34.

Kelly, B. R. (2018, 5 2). *Survival and restoration of China's native forests imperiled by proliferating tree plantations*. Retrieved from <https://www.princeton.edu/news/2018/05/02/survival-and-restoration-chinas-native-forests-imperiled-proliferating-tree>

Kowarik, I. (2011). Novel urban ecosystems, biodiversity, and conservation. *Environmental Pollution*, 1974-1983.
Li, H. D. (2017). Sponge city construction in China: A survey of the challenges and opportunities. *Water*, 9(9), p.594.

Maas, J. V. (2006). Green space, urbanity, and health: how strong is the relation? *Journal of epidemiology & community health*, 60(7), pp.587-592.

Maizland, L. (2021, 5 19). *China's Fight Against Climate Change and Environmental Degradation*. Retrieved from <https://www.cfr.org/background/china-climate-change-policies-environmental-degradation>

Mark, E. (2006). *The Retreat of the Elephants*. Yale University Press.

Mee Young Choi, J. D. (2008). *Education for Sustainable Development Practice in China*. Institute for Global Environmental Strategies (IGES).

Meng, F. G. (2021). Urban ecological transition: The practice of ecological civilization construction in China. *Science of the Total Environment*, 755, p.142633.

National Forest Parks in China. (2013). Retrieved from <https://chinaenv.colgate.edu/wilderness/wilderness-protection/>

Reuters. (2024, 11 29). *China completes 3,000-km green belt around its biggest desert, state media says*. Retrieved from <https://www.reuters.com/world/china/china-completes-3000-km-green-belt-around-its-biggest-desert-state-media-says-2024-11-29/>

Seto, K. G. (2012). Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences*, 109(40), pp.16083-16088.

Tian, Y. W. (2016). Environmental education in China: Development, difficulties and recommendations. *Journal of social science studies*, 3(1), pp.31-43.

Weller, R. (2006). *Discovering nature: Globalization and environmental culture in China and Taiwan*. Cambridge University Press.

Xiaoqin Xie, X. G. (2023). Research on the construction path of the megacity from the perspective of Nudge Theory: Empirical evidence of the "Park City" construction in Chengdu Tianfu New Area. *Chinese Journal of Population, Resources and Environment*, 21(3), 163-171.

Xie, J. W. (2019). Overview of urban planning policy and urban green space system at a national level in China. (pp. Vol. 349, No. 1, p. 012021). IOP Publishing.

Yuyi Tian, C. W. (2016). Environmental Education in China: Development, Difficulties and Recommendations. *Journal of Social Science Studies*, 31-43.