

MINI REVIEW

Restoring urban biodiversity: Cities as ecosystem stewards

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As global urbanization continues to rise, cities are facing numerous environmental challenges. Urban sprawl, pollution, and habitat destruction have led to a decline in biodiversity within urban areas. However, cities are not merely centers of human activity; they can also play a vital role in conserving and restoring biodiversity. In this article, we explore the importance of urban biodiversity, the challenges it faces, and innovative strategies that cities can adopt to become stewards of their local ecosystems.

Keywords: Urban vegetation phenology, Urbanization, Local climate zone.

Introduction

Urban biodiversity provides essential ecosystem services. Trees and plants improve air quality, reduce the urban heat island effect, and mitigate the impacts of climate change by sequestering carbon dioxide. Urban green spaces can support pollinators such as bees and butterflies, which play a critical role in food production by aiding in the pollination of fruits and vegetables. Biodiverse urban parks and green spaces offer recreational opportunities and enhance the quality of life for residents. They provide settings for relaxation, exercise, and cultural activities. Access to green spaces in cities has been linked to improved mental and physical health, reduced stress, and increased community cohesion.

Urban development often leads to the destruction of natural habitats, which can fragment ecosystems and disrupt wildlife corridors. Urban areas are sources of pollution, including air and water pollution, which can harm biodiversity. Non-native, invasive species can outcompete native flora and fauna, further threatening urban biodiversity. Rising temperatures and altered precipitation patterns can affect the distribution and behavior of urban wildlife.

Cities can prioritize urban greening initiatives by planting trees, creating green roofs and walls, and establishing urban forests. These efforts enhance local biodiversity while improving air quality and urban aesthetics. Community gardens provide opportunities for residents to grow their food, support pollinators, and foster a sense of community. Promoting the use of native plants in landscaping reduces water consumption, supports local wildlife, and requires less maintenance. Designing urban spaces with wildlife corridors in mind allows animals to move freely through the city, reducing the risk of isolation and inbreeding. Restoring or creating urban wetlands can filter pollutants from stormwater, provide habitat for aquatic species, and reduce flood risk. Cities can designate and protect urban parks and natural areas to preserve critical habitats and biodiversity hotspots. Public awareness and education programs can engage residents in biodiversity conservation efforts and encourage responsible urban behavior.

Singapore has implemented an ambitious green roof program, covering buildings with lush vegetation, which not only cools the city but also provides habitat for birds and insects. Barcelona's superblocks concept aims to create car-free zones with green spaces that prioritize pedestrians and promote biodiversity. Berlin has developed a comprehensive strategy to enhance urban biodiversity, including the creation of green corridors and increased green space within the city.

Cities have a unique opportunity to serve as leaders in biodiversity conservation and restoration. By implementing innovative strategies and engaging with their communities, urban areas can not only enhance the quality of life for their residents but also contribute to global biodiversity conservation efforts. Restoring urban biodiversity is not just a matter of ecological importance; it is

also a path toward creating more sustainable, resilient, and livable cities for generations to come. Embracing the role of ecosystem stewards, cities can lead the way in building a harmonious relationship between urban life and the natural world.

Literature Review

Sustainability partnerships and collaboration

To effectively restore and maintain urban biodiversity, cities can benefit from partnerships and collaboration with various stakeholders, including local communities, non-profit organizations, academic institutions, and businesses: Engaging residents in biodiversity restoration projects empowers them to take ownership of their local ecosystems. Citizen science initiatives, volunteer programs, and community-led conservation efforts can all contribute to urban biodiversity restoration. Non-profit organizations dedicated to conservation and environmental stewardship often have valuable expertise and resources to offer cities. Collaborations with these organizations can amplify the impact of urban biodiversity restoration efforts. Collaborations with universities and research institutions can facilitate data collection, scientific studies, and monitoring programs that help cities better understand their local ecosystems and make informed decisions. Many businesses are increasingly recognizing the importance of sustainability and biodiversity conservation. Partnering with businesses on green initiatives, such as urban greening projects and habitat restoration, can provide financial and logistical support.

Discussion

Ongoing monitoring and assessment are critical components of successful urban biodiversity restoration. By regularly evaluating the effectiveness of their efforts, cities can make necessary adjustments and ensure that their initiatives are achieving the desired outcomes. Key aspects of monitoring and assessment include: Conducting regular surveys of local flora and fauna to track changes in species diversity and abundance. Assessing the health and condition of urban green spaces, wetlands, and other natural areas. Monitoring the quality of water bodies within the city to ensure that they remain suitable habitats for aquatic species. Tracking air quality and pollution levels to identify potential threats to urban biodiversity. Gathering feedback from residents and stakeholders to gauge public satisfaction with urban biodiversity restoration efforts and identify areas for improvement.

Policy and Planning for the Future

To ensure the long-term success of urban biodiversity restoration, cities should incorporate biodiversity considerations into their urban planning and policy decisions: Developing comprehensive action plans that outline specific goals, targets, and strategies for urban biodiversity restoration. Integrating green infrastructure elements, such as parks, greenways, and wildlife corridors, into city planning and design. Implementing zoning regulations and land use policies that prioritize green spaces and biodiversity-friendly development practices. Continuously educating city officials, planners, and residents about the importance of urban biodiversity and the role they can play in its conservation. Embracing adaptive management principles that allow cities to adjust their biodiversity restoration strategies based on monitoring data and changing circumstances.

Conclusion

Restoring urban biodiversity is not only a moral imperative but also a practical necessity as more people around the world continue to live in cities. By viewing urban areas as opportunities for conservation rather than obstacles to it, cities can foster healthier ecosystems, improve the quality of life for their residents, and contribute to global biodiversity conservation efforts. As cities grow and evolve, their commitment to becoming stewards of urban ecosystems will be a defining factor in whether we can strike a harmonious balance between urban development and the preservation of nature. With innovative strategies, community engagement, and a long-term vision, cities can play a crucial role in reversing the decline of biodiversity and creating sustainable urban environments for generations to come.

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