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STRATEGIES FOR TRANSFORMING URBAN ENVIRONMENTS INTO WILDLIFE ECO-FRIENDLY AREAS.

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ABSTRACT

Urbanization is rapidly expanding across the globe, leading to increasing threats to wildlife in and around cities. As urbanization continues to expand, it is crucial to find ways to create cities that are not only livable for humans but also supportive of animal and wildlife populations. By incorporating thoughtful design, conservation efforts, and community engagement, cities can become havens for biodiversity, promoting coexistence and enhancing the overall well-being of both humans and animals. We review several strategies to transform cities into animal and wildlife-friendly environments. These include Encourage the use of native plants in urban landscaping, Protecting existing green spaces like parks and gardens, Design and implement wildlife corridors that connect different natural areas within the city, Implement bird-friendly building standards to reduce hicollisions with glass windows, Design infrastructure with animal-friendly features in mind. Educate residents about the importance of wildlife Conservation and the role they can play in creating animal-friendly cities. Collaborate with various stakeholders, such as local governments, businesses, NGOs, and community groups, to develop and implement animal and wildlife-friendly policies, Develop and enforce responsible waste management practices to reduce the attraction of wildlife to urban areas, Promote community gardens and allotments to provide additional green spaces and food sources for wildlife and work with local Conservation organizations to establish wildlife conservation programs such as habitat restoration projects

Key Words: wildlife, urban environment, Eco-friendly areas

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CHAPTER ONE: INTRODUCTION

1.1 Overview of Urbanization and its impact on wildlife

Urban areas are rapidly expanding, causing extensive habitat modifications that have significant consequences for the environment and wildlife. Understanding how wildlife communities respond to urbanisation has been a central goal for urban ecologists for the last few decades.

Marzluff (1997) provides an overview of the impact urbanization can have on wildlife. While he was thinking about birds, the processes in place would trigger reactions from any group of organisms. Urbanization alters the ecosystem processes, habitats, food sources, predator and competitor populations, and disease dynamics (Marzluff, 1997). Many studies have used these extensive effects as a starting point and delved deeper into them to determine their significance in influencing urban biological communities. Evans et al. (2011) offer additional understanding of the potential impact of urbanization on biodiversity. Three key areas are emphasized, and although they were originally developed with birds in focus, similar to Marzluff's methods, they can also be applied to other species. Evans et al. (2011) propose that urbanization typically takes place in areas with already high levels of human population density. This statement holds true for urban sprawl, as well as for the expansion of settlement. Urbanization impacts biodiversity by influencing the variety of species present in a particular area, as research suggests a clear link between the concentration of human populations and species diversity (Evans et al., 2011). Luke (2007) provides evidence for this idea by suggesting that areas with higher human population density tend to have increased species diversity, as a result of the availability of resources and the presence of lower elevations that are preferred habitats for humans and other species. In addition, urbanization tends to occur in areas that are typically more ecologically important than undeveloped areas, as stated by Evans et al. (2011). These two points emphasize the common needs of both humans and animals for suitable habitats. However, cohabitation becomes challenging for animals when humans significantly modify the environment to accommodate their own needs. 'Thirdly, “highly developed urban areas support fewer native species than the rural habitats which they replace” (Evans et al., 2011). This seemingly negative impact can be linked to Marzluff’s (1997) processes. However, any organism that can beneficially exploit the unnatural changes brought into a natural system by urbanization will succeed in that environment. It is a minority group that is capable of such exploitation which has consequences for a region’s biodiversity. Nonetheless, those individuals that survive, do very well in the urban setting.

In order to understand why certain species thrive in urban settings, we need to have a deeper understanding of the specific habitats they occupy. This involves recognizing the impact of buildings on the environment and identifying the remaining habitats available for organisms to establish themselves in.

The initial impact of habitat effects is fragmentation, which intensifies with urbanization and leads to the isolation and deterioration of habitats, resulting in less hospitable environments for

numerous native species. However, certain species may thrive in isolation. Marzluff (2001) suggests that species well-adapted to habitat fragmentation will thrive in these conditions. Species requiring vast and stable habitats struggle to thrive in urban environments due to the destruction of climax community ecosystems. These species are often the first to disappear as urbanization progresses, leading to a decrease in biodiversity. Urbanization has a negative impact on wildlife, contrasting with its posptive effects on human populations. As new habitats are developed for humans, the habitats of numerous species are destroyed and the organisms are forced away or the population faces extinction. The latter is the most likely option.

Another aspect of urbanization involves the converting of natural habitats into artificial environments that better suit human requirements, departing from their original state. This from natural to exotic settings is known as a city's ecological footprint (Rees and Wackernagel, 2008). One reason for the lower number of species thriving in urban areas is the limited availability of exotic habitats. Johnston's (2001) study on urban bird populations found that as cities grew, the most common species were those that had developed a symbiotic relationship with humans, known as synanthropic species. These species make up only a small portion of the overall biodiversity in urban areas, resulting in a decline in regional diversity. As urbanization continues to spread, it is expected that both the presence of synanthropic species and the idea of synanthropy will become more common.

In addition to habitat fragmentation and the creation of artificial habitats, human activities have a profound impact on ecosystems, a fundamental concept in ecology. The primary source of energy for life is sunlight, which is converted into stored energy through photosynthesis in plants. This energy is then transferred through food chains, from herbivores to carnivores, with energy being lost at each trophic level. This results in less energy being available at higher levels of the food chain (Arim, 2007).

One challenge for wildlife is that humans consume a significant amount of energy as a species. Wright (1990) estimated that humans utilize 20-30% of the total energy available in ecosystems, a figure expected to increase to nearly 40%. This means that there will be less energy available for other species as the human population grows. For a species to survive, its source of energy (i.e., food) must remain accessible; otherwise, the species cannot persist. Human activities exert pressure on plant populations, which in turn affects higher trophic levels in the food chain. With diminished primary producers, the outlook for secondary and tertiary consumers is bleak. These factors contribute to a decrease in species diversity in urban areas.

One significant consequence of urbanization is that, despite the apparent distinctions between different cities, they appear strikingly similar to wildlife. From the perspective of animals, a city is perceived as a concrete jungle characterized by extensive impermeable surfaces and tall brick structures, interspersed with small pockets of greenery. Blair (2001) emphasizes how humans have

the capacity to manipulate the environment to align with their preferences, adjusting plant life to mimic familiar surroundings and introducing known songbirds to create a sense of familiarity. Essentially, urban areas are deliberately structured to have consistent habitats, a pattern mirrored in the wildlife populations within cities. Blair's (2001) study on urban bird communities revealed that cities display a high level of ecosystem uniformity, leading to a substantial overlap in species composition. Specifically, a 19% similarity in species was observed in urban settings, in contrast to a mere 7% overlap in rural areas of North America. The presence of shared species in geographically distant cities elegantly illustrates the standardizing influence of urbanization on the altered landscape.

Blair (2001) provides further insights into the impact of urbanization on avian community composition. Urbanization affects birds across different environmental scales, including territories, populations, and landscapes. Urban development can disrupt the distribution of resources within territories due to fragmentation and isolation, potentially reducing the carrying capacity for birds. The longevity of bird populations is also influenced by the spread and isolation of habitats. On a broader scale, urbanization changes the size, connectivity, and edge characteristics of habitats in the landscape. Despite the negative consequences of urbanization, it can also create more favorable habitats for certain species that thrive in edge environments. Animals have demonstrated their ability to adapt to changing urban landscapes, with many species flourishing in urban settings. Research has investigated the patterns of species diversity and abundance in urban environments.

1.2 Importance of creating wildlife-friendly environments in cities

There are a number of justifications for merging human environments with wildlife. For one, many cities are located in biodiversity “hotspots”, or areas of high concentrations of species diversity, so balancing human and wildlife needs could help preserve the unique ecosystems and species found in these areas. Conservation in cities could also bring opportunities for environmental education, and in turn inspire stewardship actions, to those who would otherwise be excluded from experiences in traditional, remote conservation spaces, such as preserves and wilderness areas. Research has even linked green spaces with higher psychological well-being in humans. And, some species offer valuable ecosystem services to society; take, for instance, a coyote’s appetite for rodents or a brown bat’s ability to devour large quantities of pesky bugs.

CHAPTER TWO: STRATEGIES FOR TRANSFORMING URBAN ENVIRONMENTS INTO WILDLIFE ECO-FRIENDLY AREAS

As urban areas grow, it is important to develop cities that are suitable for both humans and wildlife. Through careful planning, conservation initiatives, and community involvement, cities can become thriving ecosystems that benefit biodiversity and improve the quality of life for all inhabitants. This article delves into ten innovative approaches to turning cities into habitats that support a diverse range of animal and wildlife species.

1. Preserve and Create Green Spaces

Preserving current green spaces such as parks and gardens is crucial, but it is also vital to establish new green areas. Integrating features like green roofs, vertical gardens, and pocket parks into urban design creates habitats for various wildlife species like birds, insects, and small mammals, while also offering residents the chance to reconnect with nature. Paris, a city historically lacking in green space, is undergoing a transformation driven by incremental efforts from its residents. By planting gardens in available spaces, Paris is progressively becoming greener, showcasing the power of community action in urban greening initiatives.

This could be accomplished by creating a database that ranks green spaces based on their landscape and ecological value, which would aid in developing a management plan. Protected sites should be safeguarded from both on-site and nearby off-site events by collaborating with developers early on, as seen in the recent practices in Seattle, WA (Ames and Dewald, 2003). If green spaces are unavoidably damaged during construction, they can be restored. Tree protection laws should be established to empower urban tree authorities to meet specific objectives, as demonstrated in the case of Guangzhou, China (Jim and Liu, 2000). Instead of excessive use of artificial paving, preserving pervious soil and vegetation can encourage infiltration, ground-water replenishment, flood alleviation, and evapotranspiration for summer cooling (Svensson and Eliasson, 2002). Trenching should be avoided near green spaces with significant trees, and if necessary, less intrusive methods should be considered to minimize root damage (Jim, 2017). A comprehensive database of heritage trees and tree conservation areas is crucial for effective tree protection. Trees should be considered essential urban infrastructure in developments, and a statutory green-space zone can be designated during land-use zoning. Implementing a green building code with green-space standards can encourage private-sector involvement in urban greening. Requiring a portion of lots to be designated as green space can enhance urban planning in new and renewal areas. Incentives such as bonus plot ratios, reduced land premiums, and flexibility in building design can promote participation. Development rights could be transferred to strategic locations to enhance green spaces, and a road code, like the one in Singapore, can ensure trees are incorporated into new and renovated roads.

2. Implement Wildlife Corridors

Develop and build wildlife corridors connecting different natural areas within the city to enable animals to move freely, reducing the risk of isolation and promoting genetic diversity. Incorporating animal-friendly structures like tunnels, bridges, and underpasses ensures safe passage for wildlife in urban settings. The Burnham Wildlife Corridor, which spans 100 acres of urban wilderness and includes three unique natural zones that provide a diverse habitat for migratory birds and other wildlife is an example.

Urban ecological corridors can be categorized into different types based on their characteristics. The river corridor focuses on water bodies like rivers, wetlands, and lakes, with surrounding

buffers to support the ecosystem (Jiang et al., 2009). Green transportation corridors consist of green belts along roads and railways to mitigate the impact of transportation on natural habitats and provide ecological benefits like air purification and climate regulation (Zong et al. 2003). Biodiversity conservation corridors serve as wildlife migration routes, connecting fragmented habitats to preserve biological diversity (Zhou and Fu, 1998; Li et al., 2009). Heritage corridors highlight historical and cultural landmarks, such as the Silk Road or ancient trade routes, to protect urban heritage and natural environments while offering recreational and educational opportunities (Yu et al., 2005). Recreation corridors, like green spaces and parks, cater to local customs and provide leisure opportunities for residents (Yu et al. 2009), enhancing the overall urban ecological corridor (Kent and Elliott, 1995).

3. Promote Native Planting

Promote the utilization of indigenous flora in urban landscaping. Native plants offer nourishment and refuge for native wildlife, aid pollinators, and demand lower upkeep compared to non-native species. Partner with community organizations, nurseries, and landscape designers to inform residents about the advantages of using native plants and offer support for their incorporation. Kansas City's local authorities and environmental advocates have highlighted the negative effects of European lawns and are now raising awareness among residents about the benefits of native planting.

The use of native plants on green roofs has attracted considerable attention in recent years. Landscaping with native plants enhances the environment as these plants are resilient due to their adaptation to local conditions (Kiers, 2004). Once established, native plants require minimal maintenance as they do not rely on pesticides, fertilizers, or excessive watering (Kephart, 2005). Additionally, native plants serve as a natural habitat for local wildlife, promoting biodiversity. By incorporating native plants into green roofs, we can help restore habitats lost to urban development, support biodiversity, and create ecological niches for various arthropod and avian species (Bousselot et al., 2009) . The visual appeal of native wildflowers and grasses adds to the overall aesthetic of the landscape, blending seamlessly with the natural surroundings (Macdonagh et al., 2000). Furthermore, native plants are less likely to become invasive compared to non-native species, making them a preferred choice for landscaping projects (Simmons and Gardiner, 2007).

4. Adopt Bird-Friendly Building Standards

Bird-Friendly Building Standards in urban areas would involve implementing strategies to prevent bird collisions with windows, such as using fritted glass, screens, or decals to increase visibility. Additionally, reducing light pollution at night through the use of motion sensor lighting and timers can help migrating birds navigate more effectively (Bowes, 2020). Providing green spaces for birds, like green roofs, vertical gardens, and bird-friendly landscaping, can offer habitat and food sources. Using non-toxic building materials and avoiding harmful chemicals like pesticides and

herbicides is also important. Creating bird-friendly structures, such as bird boxes, nesting platforms, and bird baths, can offer shelter, nesting sites, and water sources for birds in urban environments (Hooke, 2021). New York City has introduced the most extensive bird-friendly building regulations worldwide. Three years ago, they made it a requirement for all new buildings to incorporate bird-friendly glass.

5. Establish Wildlife Conservation Programs

Collaborate with local conservation organization to create wildlife conservation initiatives, such as habitat restoration projects, citizen science programs, and educational campaigns to promote the preservation and coexistence of urban wildlife. In Phoenix, Arizona, residents are welcomed to participate in yearly urban wildlife conservation events. (Davies and Webber, 2004).

6. Encourage Community Gardens and Allotments

Encourage the development of community gardens and allotments to offer more green areas and food sources for wildlife. These spaces also promote a sense of community and enable residents to engage with nature, enhancing the relationship between humans and animals. In Pittsburgh, PA, a remarkable garden not only supplies fresh produce but also supports individuals with mental health challenges. This community garden addresses various concerns and provides assistance for multiple issues.

Community gardens are shared spaces where individuals or groups come together to grow fruits, vegetables, flowers, and herbs. These gardens are typically located in urban or suburban areas and are maintained by community members who share the responsibility for planting, watering, weeding, and harvesting the produce. Allotments, on the other hand, are individual plots of land that are rented or leased to individuals for the purpose of growing their own produce. Both community gardens and allotments provide numerous benefits, including access to fresh, locally grown produce, opportunities for physical activity and social interaction, and the promotion of environmental sustainability and biodiversity. These spaces also serve as valuable habitats for wildlife, providing food, shelter, and nesting sites for a variety of species (Anita, and Gabriela, 2023)

7. Implement Responsible Waste Management

Develop and enforce responsible waste management practices to reduce the attraction of wildlife to urban areas. Encourage proper waste disposal, create wildlife-proof trash cans, and implement composting programs. By minimizing the availability of food sources, conflicts between humans and wildlife can be reduced (Krystosik, 2020). The city of San Francisco launched a green waste initiative in October of 2023. They encouraged residents to compost through free green waste bins! These bins offer a way to keep wildlife out of garbage and away from harmful items

8. Educate and Engage the Community

Educate the local community on the importance of conserving wildlife and ways they can help create cities that are welcoming to animals. Organize workshops, seminars, and educational programs to raise awareness about living harmoniously with wildlife and the advantages of having urban wildlife.

Education is a conflict mitigation approach that aims to modify human behaviour by reducing risk factors. This can be accomplished by increasing ecological knowledge surrounding conflict-causing or "nuisance" species and the most effective ways to reduce conflict (Dickman, 2010). Using education and awareness, the goal is to reduce the prevalence of human-wildlife conflicts in urban areas and foster more positive relationships between people and the wild species we share our spaces with. Improving wildlife literacy can help to lessen hostility and reduce antagonism towards certain species, while liberating individuals to know how to appropriately respond when encountering wildlife. (Dickman, 2010a). This enables people to better protect themselves, their pets and wildlife species. Many people have irrational fears of relatively harmless species, which often stems from a lack of understanding and fosters a poor relationship dynamic. Further, it can foster adjustments to common behaviours such as allowing domestic cats to roam free which has grave impacts on wildlife that many are unaware of (Leong, 2009). Some scholars even speak of "the tragedy of becoming common" that occurs in urban ecosystems where wild animals are often categorized as pets or pests as opposed to being seen as wildlife (Leong, 2009).

9. Collaborate with Stakeholders

Collaborate with various partners such as local governments, businesses, NGOs, and community groups to create and implement policies that support the welfare of animals and wildlife. By working together, cities can come together to achieve a common objective and develop environmentally sustainable, inclusive, and animal-friendly urban areas.

Raising public awareness to boost conservation efforts by informing and involving managers, stakeholders, and the public in creating and improving management and conservation programs is a key component of sustainable wildlife management. Raising public awareness and knowledge of the environment promotes the adoption of sustainable use of natural resources. Persuading decision-makers and the worldwide public to adopt conservation action requires communication, education, and public awareness (Doley and Barman, 2023).

CHAPTER THREE: CONCLUSION AND RECOMMENDATION

In conclusion, transforming urban environments into wildlife eco-friendly areas is crucial for promoting biodiversity, improving air quality, and enhancing the overall quality of life for both humans and animals. By implementing strategies such as creating green spaces, planting native

vegetation, and reducing pollution, cities can become more sustainable and resilient to the impacts of climate change.

To achieve this goal, it is important for city planners, policymakers, and residents to work together to prioritize the protection and conservation of wildlife habitats within urban areas. Education and awareness campaigns can also help to promote the importance of wildlife conservation and encourage sustainable practices among urban residents.

In addition, investing in green infrastructure and sustainable urban design can help to create a more harmonious relationship between humans and wildlife in urban environments. By incorporating wildlife-friendly features into urban planning and development, cities can become healthier, more vibrant, and more resilient to the challenges of the 21st century.

Overall, transforming urban environments into wildlife eco-friendly areas requires a holistic and collaborative approach that considers the needs of both humans and wildlife. By working together to implement sustainable strategies, we can create a more sustainable and biodiverse urban environment for generations to come.

Recommendation:

1. Encourage the creation of green spaces and wildlife corridors within urban areas to provide habitats for wildlife and promote biodiversity.

2. Plant native vegetation and reduce the use of pesticides and herbicides to support local wildlife populations.

3. Implement policies and regulations that promote sustainable urban development and protect wildlife habitats within cities.

4. Educate and engage residents in wildlife conservation efforts through community outreach programs and awareness campaigns.

5. Invest in green infrastructure and sustainable urban design to create a more wildlife-friendly environment in urban areas.

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