

The Role of Architecture in Bird Conservation: A Comprehensive Review

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Abstract. Biodiversity and especially avian diversity, plays a significant role in both ecosystem health and resilience. This commentary reviews the complex interrelationship between biodiversity conservation and architectural practice, specifically hospitality-related infrastructure such as hotels and museums. With urbanization endangering numerous species and environments, it's important to know how architectural design can both inhibit or spur bird populations. This review presents an overview of existing literature about Biodiversity Inclusive Design (BID) and its implications in the built environment on avian species. It points out gaps in current research, stressing the call for interdisciplinary, ecological, and architectural integration. This review analyses both case studies the theoretical frameworks in order to provide recommendations for emerging best practice in the areas of urban development and biodiversity conservation.

Keywords: Design for Biodiversity (DfB): avian biodiversity, architecture, hospitality, sustainable architecture, Biodiversity Inclusive Design (BID)

1. Introduction

It supports human well-being, keeps the ecosystem healthy and resilient, and is key to the ecological balance. As species and habitats continue to fall victim to urbanization and human activities, biodiversity conservation in built environments—buildings, hotels, museums—has come under increasing fire and debate in the last few years. Specifically, we address the relationship between flora, fauna and structure in the context of the hospitality industry with a view thematically and investigating the reciprocal relationship between the built environment and biodiversity, considering hospitality through the lens of the hotel.

The research is important because it could provide a link between urbanisation and ecological sustainability. But as cities have grown, they have often encroached on biodiversity hotspots, and they have generally been associated with declines in biodiversity — especially among birds, which are key indicators of environmental health. Our understanding of how architectural designs can promote or inhibit avian diversity can inform urban planners and architects interested in sustainable, biodiversity-friendly building design.

Some recent research has drawn attention to the role of built environments on birds and how deliberate design elements may promote biodiversity, improve connectivity among habitats, and help buffer the negative effects of urbanization. Specific initiatives such as Biodiversity Inclusive Design (BID) have also emerged with the goal of creating urban areas that support ongoing ecological functionality and species persistence (Hernandez-Santin et al., 2022)[1]. -LTP) Finally, such approaches, such as the one presented in this paper, challenge traditional design practices and promote a important change in sustainable urban development, treating biodiversity as a fundamental element.

Furthermore, as more hospitality businesses attempt to attract environmental aware tourists, it is essential to recognize how these establishments can play a role in the conservation of biodiversity. As hotels and museums increasingly not only want to create guest experiences through utilizing and

implementing nature-based services as well as environmental practices into their daily operations, they can play a crucial role in mitigating the effects of restoration and preservation in habitats (Omole et al., 2024)[2]. The identification of plants with diverse properties that fit daily requirements marks a step towards the sustainable replacement of endangered species with native varieties, achieving a double win outcome of promoting biodiversity in consumer choices.

“Bird conservation progress would be possible through the collaboration between architects and hoteliers—field of architecture often disregards the birds in this fact. To promote greater cognizance of these interactions, the results are intended to inform best practice on the incorporation of biodiversity conservation into the planning and design of urban environments, in order to help achieve a more sustainable future for both humans and birds.

2. Theoretical Framework and Concepts

In recent years, the relationship between biodiversity conservation and the practices of architecture has noticed growing interest. The intersecting domains of urbanization and landscape poses conditions for their intersection. The theoretical frameworks that inform this relationship include ecology theory, urban design strategies, and sustainability models. This section seeks to clarify these frameworks, in order to highlight their relevance to biodiversity conservation and architecture, and, importantly, their interrelation.

2.1 Biodiversity and Its Importance

Biodiversity covers different types of life on Earth, including species variety, ecosystem variety, and genetic diversity. It is essential for ecological balance, ecosystem services, and human well-being (Kabir et al., 2024)[3]. It acts as an alarm bell about the biodiversity decline of which more and more species are disappearing, especially birds, and the role of various anthropogenic factors in habitat loss and degradation. Exploring how biodiversity changes can assist us in creating successful conservation strategies that can work with architecture.

2.2 The Role of Architecture in Biodiversity Conservation

Architecture has a big impact on biodiversity—through land use, building materials, and design decisions. Biodiversity Inclusive Design (BID) highlights the importance of addressing biodiversity during a design project as all projects will impact the natural world and, in doing so, will need to create systems in the built environment that allow ecological function (Hernandez-Santin et al., 2022)[1]. This perspective promotes making places that accommodate human activity while allowing space for other species to thrive, restoring (where possible) a human connection to the natural world.

2.2.1 Sustainable Urban Design

The need for sustainable urban design is more pronounced than ever with the growing crises of urbanization and degradation of natural resources. Integrating renewable energy sources and green building materials to lower carbon footprints is an example of such eco-friendly building practices that complement sustainable urban design while improving community resilience (Omole et al., 2024)[2]. Not only do these practices reduce environmental impacts, but they also promote social equity and enhance residents' quality of life.

2.3 Theoretical Models and Frameworks

Various conceptual models and frameworks have been suggested to help with the design and formulation of biodiversity-related architectural practices. These include:

2.3.1 Ecological Network Theory

According to the Ecological Network Theory, landscapes are a network of ecological patches connected to networks via corridors and stepping stones in which the movement of species and

ecological processes can be supported. The Urban Biodiversity Framework²⁷⁹ also highlights the preservation and enhancement of connectivity across urban areas as being key to support biodiversity (Schigel, 2024)[4].

2.3.2 Adaptive Management Framework

Adaptive Management Framework Adaptive Management Framework is relatively new in the management of biodiversity, and proposes the adjustment of management practices based on new information gained from monitoring and evaluation. This approach is of paramount importance in contexts characterized by large levels of anthropogenic pressure with clear threats for biodiversity, such as climate change or invasive species (Kabir et al., 2024)[3].

2.3.3 Human-Centric Design Principles

The use of nature-centric design principles in architecture can promote community engagement with biodiversity conservation. Local communities, by virtue of their collaborative efforts, can lead to longer-lasting impacts as their participation adds a sense of ownership to the decisions made (Omole et al., 2024)[2].

2.4 Interplay Between Architecture and Biodiversity

Architecture and biodiversity are intrinsically linked as the decisions that architects make can either harm or enable protection of biodiversity. However, the modernization and improvement of rural areas may have adverse consequences on the species that rely on specific habitats for nesting (Rosin et al., 2020)[5] On the other hand, building and urban design in alignment with biodiversity can develop habitats that will provide for local wildlife, namely birds and fauna.

2.4.1 Case Studies and Practical Applications

A few case studies show successful integration of biodiversity considerations in architectural projects. Regional distinctiveness is illustrated through the implementation of green roofs and walls in urban settings, which also contribute to the key aspect of urban biodiversity; an important concept as countries transition into cities (Hernandez-Santin et al., 2022)[1]. Efforts to involve local residents in adopting wildlife-friendly gardening activity in their plots with the support of community are also being undertaken and, with promising results in terms of local biodiversity conservation (Van Helden et al., 2024)[6].

2.5 Conclusion

The theories and concepts presented in this section emphasize the importance of architecture for biodiversity conservation. The need for urban development to be sustainable and integrate biodiversity has brought an inactivity of the need for an attention-based world in field of architecture and planning. It is essential for future studies to continue exploring novel mechanisms that can reconcile architectural practices with ceasing biodiversity loss and protect natural ecosystems.

3. Classification of Studies on Biodiversity and Architecture

3.1 Influence of Building Design on Biodiversity

Recent ecological studies have documented the relationship between architectural design and biodiversity, in particular that of aviary populations. Recent studies have shown that the renovation of villages or old villages in the countryside can have a remarkable effect on bird diversity. For instance, Rosin et al. (2020) carried out an investigation in Poland and showed that the avifauna varied depending on the level of modernization visible in the degree of renovation of the façades according to the presence of new houses in 104 villages. They found that between highly modernized such villages and more traditional structures the abundance of building-nesting species of birds had sharply declined with up to a 50% reduction in the numbers. Notably, this

decline was attributed equally to both new constructions and renovations, showing that modern design choices may inadvertently degrade important nesting and foraging habitats (Rosin et al., 2020)[5].

Furthermore, design is not just important for humans but for behaviours of many species of animals. Tello-Ramos et al. noted that social groups of white-browed sparrow weavers build nests that exhibit distinct architectural patterns depending on the group's culture. This demonstrates the robustness, irrespective of environmental factors, of these differences in nest architecture between different cultural groups through time, suggesting a strong connection between culture and architecture in animal behavior (Tello-Ramos et al.) [7]. Such as birds, that traditional building features can support biodiversity!

The challenge is, therefore, to design modern buildings that are energy-efficient and friendly to biodiversity. However, features like nesting sites incorporated into new and renovated buildings will help offset the adverse effects of modernization on birds. Sustainability goals intertwined with the preservation of biodiversity is vital for creating healthy ecosystems — in both urban and rural environments, requiring innovative architectural responses that prioritize human habitation and ecological integrity simultaneously.

3.2 Role of Hospitality in Biodiversity Conservation

With research showing the growing demand for sustainable travel, the hospitality sector faces increasing scrutiny around the impact of its operations on biodiversity. In order to provide them without going to extremes, Szajewska et al. These findings indicate that hotels and other forms of accommodation have the potential to offer nature-based services that support not only guest experiences but also local biodiversity conservation efforts, particularly if located in natural areas. However, if not managed properly these sign oh dear establishments are also likely to exacerbate threats to the natural environment (Stolyarchuk, 2023)[8].

The findings highlight the need for hospitality providers to both cater to nature-based guest expectations, and ensure that their operations do not negatively impact local ecosystems. In other cases, a hotel located in a natural environment can develop sustainable activities that encourage conservation; however, they need to be careful not to spoil the experience of nature because of overcrowded tourists. On the other hand, alternative providers that are not based within natural environments may still demonstrate biodiversity-friendly practices through the inclusion of nature-based services within their vector, which reflect changing consumer values and provide a net positive contribution towards conservation initiatives.

To summarize, architecture and hospitality significantly impact biodiversity outcomes. By recognizing and responding to the complex interactions between human infrastructures and habitats, practitioners in these domains may play an integral role in biodiversity conservation, especially in urbanized and built environments.

4. Major Findings in Biodiversity and Built Environment

4.1 Birds as Indicators of Biodiversity

Results have important implications of biodiversity assessment in a variety of landscapes, as birds are key fauna for biodiversity assessments in urban and rural environments. They are useful as indicators because they respond to environmental changes, and researchers use bird population dynamics as well as species diversity to extrapolate the health of ecosystems. For instance, Kabir et al. (c) wild and migratory birds in South Asia due to its varied landscapes which house hundreds of species. This includes the assessment and restoration of habitats and involving communities in conservation processes, which are critical for ensuring and delivering birds – and therefore biodiversity[3].

Additionally, when it comes to their responses of birds to human activities, their role as bioindicators extends to this area as well. According to Rosin et al. (2020), rural development can

have a pronounced effect on diversity of birds, with a particular effect on building-nesting species. Indeed, their study shows that there is a decrease in building-nesting bird species in more urbanized villages, and that the architectural characteristics of traditional architecture and traditional urban forms are significant in providing buildings that support birds[5]. This connection between birds and their low-impact habitats is a reminder of the insidious impact of biodiversity assessments in climate mitigation strategies.

Farmland birds are especially vulnerable to habitat loss and fragmentation in agricultural landscapes. Šálek et al. (2023) show that the greatest diversity of farmland birds occurs on farmsteads with active animal production and that management practices on these farms can have a significant impact on birds. Their results imply that bird conservation needs to take place not only in places set aside from development, but that it needs to happen by improving habitat within agricultural areas[9]. Moreover, Blösch et al. (2023) find that, in Europe, the majority of declining farmland species of birds that nest on the ground are found to be particularly negatively affected by agricultural intensification, mainly via the loss of appropriate nesting sites. They promote in-field practices to alter crop architecture, which may supply requisite nesting sites and stave off declining birds. They highlight great need to know more about these efforts' effectiveness and stress that more research on a holistic scale, is very much needed[10].

4.2 Impact of Urbanization on Bird Populations

Urbanization is another major threat to birds and delay of or damage to ecosystem services. Hernandez-Santin et al. (2022), talk about how habitat loss and fragmentation due to urban development are both bad for many birds. Based on their findings, they advocate for Biodiversity Inclusive Design (BID) — an approach that introduces diversity and ecological thinking into city planning to promote relevant ecosystems that support birds while reconnecting people to nature. The authors outline BID as an approach that has clear potential for urban areas,[1] but note that such initiatives are still relatively rare and rely on individual champions, rather than becoming industry standard enough to be put into practice in all cities.

Furthermore, the consequences of urbanization are evident in the alteration of avian communities. Rosin et al. The abundance of building-nesting birds was significantly lower in modernized than traditional villages (Santos et al. This decline emphasizes the need for urban planners and architects to integrate biodiversity in their designs including nesting sites and green spaces to reduce the negative impact of urbanization on birds[5].

In addition, Omole et al. (2024) emphasizes the essential role sustainable urban design practices can play in promoting community well-being while also tackling the environmental challenges we face. Innovative projects and green sustainable building practices implemented in cities will significantly improve the quality of life of residents, while also improving the overall health of the ecological systems in the area and enhancing bird populations and overall biodiversity[2] Furthermore, Martin et al. (2010) demonstrate that habitat loss and fragmentation are associated with reductions in forest and woodland birds, and herbivores may also have an effect on the abundance of bird species by modifying vegetation structure. The interplay of urbanization and biodiversity is complex in nature, demanding adaptive urban policies that align with the needs of avian populations amid ever-changing ecosystems[11].

To conclude, urbanization has a significant impact on bird populations and biodiversity, and there is a pressing need to incorporate ecological factors into the design of urban habitats. TAKEAWAY: By prioritizing the needs of birds and their habitats, urban areas can become space for biodiversity while reinforcing the resilience of both natural and human communities.

5. Consistency and Discrepancies in Findings

5.1 Agreement on Key Issues

An increasing number of literature highlights the importance of architectural characteristics for biodiversity, especially among birds. For instance, Kabir et al. (2024)[3] point out that design elements in habitats make important breeding and stopover sites for migratory birds in South Asia. The authors underscore the complex interplay between the architecture of suitable habitats and the population dynamics of birds, urging that there is a pressing need to protect and restore such habitats to preserve biodiversity.

Additionally, the role of agricultural landscapes is central in this regard. Blösch et al. (2023)[10] consider how changes to crop architecture might increase nesting opportunities for ground-breeding birds, arguing that interventions to alter crop density and height are important in stabilising bird populations. They found an emerging consensus that strategic architectural changes can be made to help protect bird species negatively impacted by agricultural intensification.

Additionally, Rosin et al. (2020)[5] show that traditional village architectures can be biodiversity hotspots for building nesting birds. Pittman and Moore said that their research shows that modernization efforts can negatively impact the structural integrity of these habitats, which results in significantly reduced bird abundance. This is consistent with other research that calls for an integrated approach to rural development, and recommends that the prevailing forms of architecture should cohabit with conservation practices to address the loss of biodiversity.

In conclusion, these studies represent a holistic overview of the necessity of thoughtful architectural design that prioritizes the conservation of local biodiversity, particularly in the case of avifauna, and establish preliminary management techniques for ecological planning.

5.2 Divergent Perspectives

However, while there is some convergence around the potential role of architecture in mitigating biodiversity loss, there are notable discrepancies between the literature regarding specific conservation strategies and their effectiveness. For instance, though Kabir et al. (2024)[3] promote community engagement as a critical element of conservation strategies, the outcome of such methodologies is contested elsewhere. Critics say while community participation is a good thing, it won't lead to the desired results without appropriate resources and training.

In contrast, Blösch et al. This latter article [10] showcases a more technical view, arguing for the importance of targeted evidence-based interventions (e.g., crop architecture manipulation) to meet the needs of particular species. This highlights a division in priorities, where several scientists are asking for additional empiricism to corroborate whether such in-field interventions really act in practice, and claiming that the current measures come short of reversing the losses for populations of farmland birds.

Moreover, Rosin et al. (2020)[5], argues that modernization has a broader impact on bird habitats, as energy efficiency measures tend to undermine biodiversity goals. Their results suggest that while modernization improves human living conditions, it potentially reduces the ecological values of rural landscapes and highlight a trade-off between conservation and development priorities.

The diversity of interpretations is a reminder of the nuances in conservation strategies and the importance of approaching the problem from multiple angles to better integrate the diverse perspectives around biodiversity conservation that exist and be more effective at ensuring its stability.

6. Research Trends and Gaps

6.1 Emerging Trends in Biodiversity Research

According to recent conservation trends studies, need for a shift on integration appears significant, especially in the context of biodiversity research studies directly related to the built environment that has call to action for such integration with a paradigm shift in architectural practice. A recent top-down approach known as Biodiversity Inclusive Design (BID) incorporates principles of urban ecology to allow the persistence of species in urban systems and improve the relationship of humans with nature. This is further accentuated by the fact that conventional design practices tend to overlook the detrimental impact of built interventions on the local biodiversity (Hernandez-Santin et al., 2022)[1].

Such as the Biodiversity Digital twin using next-generation simulation and modeling techniques in biological governance (Schigel, 2024)[4]. As such, this project brings together different sources of data — from citizen science to environmental monitoring — and uses these data in dynamic models that may better reflect real-time changes to biodiversity and environmental conditions. Digital twin technologies are leading-edge technologies that can help in decision-making for conservation and urban planning as applied to biodiversity research.

A third trend emerging focuses on the socio-ecological consequences of urbanization on bird populations. It has been shown that a considerable amount of attention is given to the conservation of wild and migratory bird habitats which are facing alarming threats from anthropogenic activities and climate change (Kabir et al., 2024)[3]. This response highlights the importance of habitat assessment, restoration strategies, and community engagement to promote resilience and adaptability of these ecosystems. Additionally, Turnbull et al. (2023)[12] examined the reshaping of human-environment interactions resulting from the COVID-19 lockdowns and explored how community engagement can help build meaningful relationships with nature that could facilitate biodiversity conservation.

Moreover, an increasing acknowledgment of the connection between urban design practices and social equity. Sustainable urban design is now presented to audiences as a matter of not only environmental markets, but also community well-being and resilience (Omole et al., 2024)[2]. This approach aspires to foster sustainable urban environments where ecological health is complementary to societal wellbeing.

6.2 Identified Research Gaps

While efforts have been made to explore ways to embed biodiversity in architectural and urban design tools, there are still substantial gaps in the literature. That being said, another important problematic is that there are no systematic frameworks that allow for the consistent implementation of BID principles in architectural practice. Although multiple frameworks have been proposed, these are typically underutilised and/or difficult for practitioners to work with (Hernandez-Santin et al., 2022)[1]. There is a need for more accessible, standardized guidelines to help different professionals bridge the gap between theory and practice in biodiversity design.

Furthermore, the relationship between architectural design and biodiversity, especially in urban contexts, is understudied. Meanwhile, the bulk of existing studies are based on individual case studies or isolated design interventions, which do not capture the cumulative effects of architectural practices on local ecologies (Omole et al., 2024)[2]. This calls for innovative interdisciplinary research that quantitatively analyzes the long-term effects of built environments on biodiversity and the quantitative impacts — on ecosystem functions — of bird species, which play important roles in ecosystems.

Finally, though community engagement is recognized as a mechanism to achieve biodiversity conservation, the literature is often lacking in strong programming models for integrating local knowledge and practices with the design process. Community participation is one of the tools through which stewardship can be developed that would ensure the sustainability of biodiversity

activities and outcomes (Kabir et al., 2024)[3]. Future research should continue to develop models that allow designers, ecologists, and local communities to work together towards ensuring outcomes that are favorable for biodiversity at the urban scale. Turnbull et al.'s insights are particularly relevant to COVID-19 vigilance. (2023)[12] discussing the role of connection and community during COVID-19 could provide valuable insights regarding the integration of local knowledge into the design process—this would also contribute to greater success in biodiversity conservation strategies.

7. Limitations of Current Research

7.1 Methodological Limitations

Several methodological limitations currently surround studies addressing the intersection between biodiversity and architecture. One major problem is the narrow range of research methods used, which often fail to adequately address the nuances of ecological relationships shaped by spatial configurations. As an example, the effect of agricultural practices on birds have been studied to a degree, but the methods are limited and do not adequately address the multi-faceted impacts of biodiversity conservation in urban and rural settings. This is most apparent in the work of Blösch et al. [10]) or as part of a systematic review that revealed a shortage of studies assessing in-field measures that modify crop structure to benefit ground-breeding lawful farmland birds (2023 PPB 213859. "Researchers investigating the effectiveness of these measures based on species and ecological contexts had considerable gaps in both knowledge and regional representation," the authors explained, highlighting the need for more integrative research approaches.

Moreover, Rosin et al. (2020)[5], stressing that architectural changes are often made in the name of energy-efficiency and comfortable living in rural modernization, and have largely failed to include biodiversity considerations. They found that bird populations on buildings are plummeting, but the methodologies of this research did not include long-term ecological monitoring or consider cumulative impacts of multiple factors of modernization. We believe that this limitation highlights the need for integrative methodologies able to capture the long-term effects of architectural changes on biodiversity.

Moreover, the study by Kabir et al. (2024)[3] on migratory bird habitats in South Asia exhibits similar deficiencies. There has been a lack of urgency in the literature, the authors noted, because previous studies have seldom considered the synergistic effects of climate change, habitat degradation and human activities on bird populations. Lack of a coherent methodological agenda impedes the fostering of conservation strategies from isolated studies. Therefore, there is an urgent need for interdisciplinary approaches that integrate ecological, social, and building elements, in order to fully comprehend and address the effects of human activities on biodiversity.

7.2 Contextual Limitations

Most of the contextual limitations of current research on biodiversity and architecture are associated with geography and ecology. There are many studies which investigate local areas, particular landscapes or habitats, without considering more aesthetic implications of the architectural practices they have taken. For instance, Schigel[4] research from 2024 emphasizes biodiversity data through the lens of digital twin concepts, yet it restricts itself to issues of data standardization and management, devoid of any geographical variability of biodiversity data across ecosystems. This absence of contextualization constrains the relevance of outcomes to varied ecological contexts, all the while threatening the building of universal conservation frameworks.

Additionally, Kabir et al. (2024)[3] highlight yet unaddressed climate and habitat declines for birds in South Asia, but their results cannot be immediately extrapolated to other geographies with distinct ecological backdrops. This focus on localized studies can lead to a piecemeal approach

to understanding biodiversity conservation, complicating the development of coherent policies that are globally relevant in response to biodiversity concerns.

Moreover, Blösch et al. (Davies et al. 2023)[10] also noted that many conservation measures are poorly studied in terms of whether or not they are effective due to contextual influences of landscape and local ecological conditions. Well, there is not a single way you can help; all depends on species that you will help or local ecologists because the site (each location) will be different and birds will have different needs depending on their habitat.

This is due to the fact that while much has been done to advance transdisciplinary collaborations, current researches fall short in structuring and developing more integrative methodological frameworks as well as wider contextual considerations on the effect of biodiversity connected to architecture. Future research shall promote successful biodiversity conservation policies by broadening geographic and ecological dimensions, in addition to integrating comprehensive methods.

8. Future Research Directions

8.1 Interdisciplinary Approaches

With the growth of urban environments and the steady decline of biodiversity, the intersection of architecture and biology opens a doorway to ample interdisciplinary research. In this regard, one avenue worth exploring is the creation of design frameworks that support and embody ecological principles in architectural practice. It suggests that the thriving of species across urban environments requires not only human-centric designs, but biodiversity inclusive design (BID). Hernandez-Santin et al. (2022)[1] undertook a systematic analysis of 15 BID-compatible design frameworks, suggesting the essential inclusion of biodiversity as a client throughout the planning and design processes. That such frameworks are supportive of architects and urban planners working with ecologists and conservationists in a way which is respectful and integrated with ecological systems.

Also the role of traditional architecture in relation to local biodiversity can be explored further. Through the lens of local ecological knowledge, the collective narratives of a community can offer possible sustainable design directions that are relevant in both cultural and environmental contexts. Researchers could study how vernacular architecture has previously bolstered biodiversity at the local level and suggestions for modernizing these practices without losing their ecological benefits. Bridging these fields can yield new design strategies that foster resurgent urban biodiversity, making both human and ecological communities more resilient.

8.2 Policy Implications for Design

Biodiversity considerations integrated into urban design of urban environmental for reducing greenhouse effects, urban environmental for human health were erected not only in the fold of urban architectural practice but also in the pattern of urban policy-making. The next step is to find policies that promote biodiversity-inclusive design. As noted by Omole et al. (2024)[2] requested linking urban design for sustainability to the community, because we argue that urban design for sustainability must transcend sustainability itself. This leads to a real understanding for policymakers about how to establish frameworks that drive uptake of environmentally-friendly building practices like use of renewable energy and green building materials, all of which can promote biodiversity as well.

Moreover, the consequences of modernization on rural biodiversity need to be critically evaluated. Research by Rosin et al. (2020)[5] explained how rural modernization efforts, though implemented to promote better living conditions for the people, can contribute to the declines of birds as a result of habitat alterations. This emphasizes the necessity for policies which are able to balance modernization with conservation initiatives. Further research should consider the efficacy of using existing urban and rural development policies to promote biodiversity conservation

measures—including provisions within newly constructed environments to provide local wildlife with e.g. nesting sites and additional green space.

However, future research can bring together architects, urban planners, ecologists, and policymakers to help design inclusivity that harmonizes urban wildlife, biodiversity, and human communities. This collaboration is vital in creating sustainable urban areas that will truly mitigate environmental impact while also improving residents' quality of life.

9. Conclusion

Why preserve biodiversity in the architecture? Building hospitality — a deep-rooted and exciting topic related to its preservation has been growing on each small scale up to the global level of study in the last few-years span. The literature clearly shows the complex relationship between built environments and biodiversity and lends great urgency to the need for designs that accommodate human activities while also providing for ecological health.

This part of the reviewed literature highlights one the important discoveries which is, architectural decisions have a substantial effects on the avian population. For example, studies proved that an increase in rural development has a direct negative effect on building-nesting bird species[5], in which it showed that the social construction of modernized rural area included the landscape as part of the architectural style. It also includes designing for the needs of local wildlife, with elements like nesting boxes and green roofs that help our fine-feathered friends.

In addition, Biodiversity Inclusive Design (BID) is born as a significant framework for architects and urban planners. BID seeks to develop quasihabitats in the urban landscape where functioning ecological systems have the potential for species to persist and for humannature connections to occur (Hernandez-Santin et al., 2022)[1]. A systematic look at current design frameworks that can incorporate BID shows there is increased understanding of biodiversity as a client in the process of designing for the future, shifting away from ad hoc programs to more systematic approaches.

The execution of biodiversity enhancing measures within architectural projects relies heavily on community engagement and education methods to have a successful internalisation of biodiversity. Local communities could be included in decision making processes if they do participate in conservation making it more effective as repeatedly mentioned in the studies (Kabir et al., 2024)[3]. Involving local communities in the design and implementation of conservation initiatives promotes a sense of ownership and stewardship within the community, adding an additional layer of effectiveness to the initiatives.

The recent trend among travelers has been towards sustainable practices making nature-based accommodations in high demand within the hospitality industry. According to the literature, hospitality services located in natural areas can provide eco-friendly activities while also minimizing their environmental effects (Stolyarchuk, 2023)[8]. The duality of hospitality and conservation can lead to outcomes that are mutually beneficial between businesses and biodiversity.

At its core, the integration of architecture, the hospitality sector & biodiversity conservation, is not only an imperative for our planet, but a way to improve individual well being. By recognizing the complex relationships and interdependencies between human-built spaces and natural ecosystems, architects, urban planners, and hospitality designers can work toward creating environments that are not only conducive to human activity and enjoyment but to biodiversity as well. Such integrated holistic approach is crucial to the sustainability of resilient ecosystems while enhancing the experiences of people who reside in and visitors to these areas.

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