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A Review of Biodiversity in Glenfield, Leicester

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ABSTRACT

Urban biodiversity in Glenfield, Leicester reflects a rich mosaic of woodlands, grasslands, parks, and riparian habitats that sustain diverse plant and bird communities. These interconnected green spaces support ecological resilience, species dispersal, and essential ecosystem services such as climate regulation, air purification, and flood mitigation. The River Soar acts as a key ecological corridor, enhancing habitat connectivity. Recorded flora contain bioactive compounds with medicinal value, while avifauna represent varied ecological guilds, all listed as Least Concern. Overall, Glenfield demonstrates how urban landscapes can maintain significant biodiversity and contribute to human well-being.

Keywords: Urban biodiversity, Glenfield, Riparian corridor Plant, phytochemicals, Avian diversity.

1. INTRODUCTION

Urban biodiversity refers to the richness and variety of living organisms—plants, animals, fungi, and microorganisms—that inhabit urban landscapes (Faith et.al.,2011). As cities expand and intensify, these ecological communities are increasingly shaped by human activity, yet they remain essential components of urban systems (Faith et.al.,2011). Far from being isolated pockets of greenery, urban biodiversity forms interconnected networks across parks, rivers, brownfields, gardens, street trees, and even small microhabitats such as rooftops and building facades (Dover, 2015). These networks support ecological processes that continue to function despite the pressures of urbanisation, including habitat fragmentation, pollution, and climate stress (Dover, 2015).

The importance of urban biodiversity extends beyond ecological value; it plays a critical role in sustaining healthy, resilient, and liveable cities (Jansson, 2013). Diverse urban ecosystems contribute to climate regulation by mitigating the urban heat island effect, improving air quality, and enhancing stormwater management through natural filtration and absorption (Pandey et.al.,2023). They also strengthen climate adaptation by buffering cities against extreme weather events such as heatwaves and flooding (Pandey et.al.,2023). Equally significant are the social and psychological benefits: access to biodiverse green spaces supports mental well-being, encourages physical activity, and fosters stronger community connections (Pandey et.al.,2023). In an era where more than half of the global population resides in urban areas, conserving and enhancing biodiversity within cities is fundamental to achieving sustainable development and improving quality of life (Pandey et.al.,2023).

Urban biodiversity therefore represents a vital intersection between ecological integrity and human well-being (Wang et.al.,2024). Understanding its dynamics and promoting its conservation is essential for designing cities that are not only environmentally robust but also socially inclusive and resilient (Wang et.al.,2024)

2. STUDY AREA

Glenfield is a suburban settlement situated on the north-western fringe of the City of Leicester, Leicestershire, England (approximately **52.647° N, 1.176° W**) (Shiple, 2011). Historically, a rural village, Glenfield has undergone substantial urban expansion and now forms part of the wider Leicester urban conurbation (Shiple, 2011). Despite increasing residential, commercial, and transport development, the area retains a diverse mosaic of semi-natural and managed habitats, making it an important location for investigating urban biodiversity and ecological connectivity (Kodym et.al.,2025)



Figure 1. Land use status of Glenfield study Area.

The study area encompasses a heterogeneous landscape composed of residential neighbourhoods, urban infrastructure, public parks, amenity grasslands, mature woodlands, hedgerows, agricultural fields, and freshwater habitats (Shiple, 2011). Based on interpretation of the study-area map (Figure 1), approximately **35–45% of the landscape remains as green infrastructure**, consisting of woodland patches, public open spaces, grasslands, playing fields, agricultural land, and riparian vegetation. The remaining **55–65%** is dominated by built-up urban environments, including housing estates, roads, industrial areas, and commercial developments. This close juxtaposition of developed land with extensive green spaces provides an excellent opportunity to investigate the interactions between anthropogenic activities and ecological processes (Shiple, 2011).

A defining geographical characteristic of Glenfield is its close association with the **River Soar**, which flows immediately to the east and south-east of the study area (Scott et.al,2012). The river and its associated floodplain habitats, drainage channels, and riparian vegetation constitute an important ecological corridor that facilitates species dispersal, genetic exchange, and habitat connectivity across the wider Leicester landscape (Ward et.al.,2002). Riparian ecosystems adjacent to the River Soar support a wide range of aquatic and terrestrial organisms, including fish, amphibians, aquatic invertebrates, waterfowl, bats, and mammals, while simultaneously functioning as natural flood-storage systems, sediment traps, and water-quality regulators (Hill, 2015). These habitats therefore play a significant role in maintaining ecosystem resilience within an increasingly urbanised environment (Hill, 2015).

The distribution of green infrastructure throughout Glenfield creates a network of interconnected habitats that support high levels of ecological heterogeneity (Sinnott, 2015). Woodland blocks provide nesting, foraging, and shelter opportunities for woodland birds, small mammals, and numerous invertebrate taxa (Steele, 1975). Grasslands and meadow habitats contribute valuable nectar resources for pollinating insects while also supporting herbaceous plant diversity (Steele, 1975). Urban parks and recreational open spaces act as secondary habitats for adaptable wildlife species, whereas hedgerows and tree-lined streets function as ecological corridors linking otherwise fragmented habitat patches (Steele, 1975).

Such structural diversity enhances habitat complexity, one of the principal drivers of species richness within urban ecosystems (Steele, 1975).

From an urban ecological perspective, Glenfield represents an ideal case study because it lies along a pronounced urban–rural gradient (Ruan et.al,2025). The coexistence of densely developed residential areas alongside extensive green infrastructure allows examination of how urbanisation influences biodiversity, habitat fragmentation, species composition, and ecosystem functioning (Ruan et.al,2025). The area also provides opportunities to assess the contribution of urban green spaces toward ecosystem services such as carbon sequestration, climate regulation, stormwater management, air-quality improvement, recreational value, and human well-being (Ruan et.al,2025).

The habitat mosaic illustrated in **Figure 1** demonstrates that biodiversity within Glenfield is not confined to isolated nature reserves but is distributed across a complex network of natural, semi-natural and anthropogenic habitats. This spatial arrangement highlights the importance of maintaining habitat connectivity and protecting urban green infrastructure to ensure the long-term persistence of native flora and fauna (Ruan et.al,2025). Consequently, Glenfield provides an ecologically significant landscape for evaluating patterns of urban biodiversity, assessing conservation priorities, and understanding the ecological role of green infrastructure within one of the United Kingdom's rapidly expanding urban environments (Jerome et.al.,2019).

The following review is based on published results and reports, and no independent study was conducted .

3. RESULTS

The review identified a diverse assemblage of plant and bird species distributed across the urban green spaces, woodlands, grasslands, and riparian habitats of Glenfield, Leicester (Gilbert, 2012) in Table 1 and Table 2. The floristic survey revealed the presence of herbaceous species, shrubs, and mature tree species, reflecting a heterogeneous habitat structure capable of supporting a wide range of ecological communities (Naveh et.al,1980). Many of the recorded plant species possess bioactive phytochemical compounds with recognised medicinal properties, highlighting the ecological as well as ethnobotanical significance of the local flora (Dean, 2024).

The avifaunal assessment recorded **12 bird species** representing a variety of ecological guilds, including passerines, raptors, and woodland specialists. According to the IUCN Red List, all recorded species are currently classified as **Least Concern (LC)** at the global level. Overall, the findings demonstrate that Glenfield supports a relatively rich urban biodiversity, with its interconnected network of woodlands, grasslands, and the adjacent River Soar contributing significantly to habitat availability, species diversity, and ecological resilience (Council, 2024).

Table 1. Taxonomic Classification, Major Phytochemical Constituents, and Reported Medicinal Properties of Selected Plant Species Recorded in Glenfield, Leicester.

Common Name	Scientific Name	Major Phytochemical Compounds	Medicinal Value
Giant Willowherb	<i>Epilobium hirsutum</i>	Flavonoids (quercetin, kaempferol), ellagitannins, phenolic acids	Anti-inflammatory, antioxidant, traditionally used for urinary disorders and wound healing

Common Selfheal	<i>Prunella vulgaris</i>	Rosmarinic acid, ursolic acid, oleanolic acid, flavonoids	Antiviral, antimicrobial, anti-inflammatory, antioxidant, wound healing
Creeping Thistle	<i>Cirsium arvense</i>	Flavonoids, taraxasterol, triterpenes, phenolic acids	Anti-inflammatory, diuretic, antioxidant, traditional liver remedy
Common Yarrow	<i>Achillea millefolium</i>	Chamazulene, apigenin, luteolin, sesquiterpene lactones	Wound healing, antimicrobial, digestive aid, anti-inflammatory
Common Ragwort	<i>Jacobaea vulgaris</i> (formerly <i>Senecio jacobaea</i>)	Pyrrolizidine alkaloids (senecionine, jacobine)	Historically used medicinally, but now avoided because of severe liver toxicity
Common Hogweed	<i>Heracleum sphondylium</i>	Furanocoumarins, flavonoids, essential oils	Traditionally used as a digestive stimulant; sap may cause skin photosensitivity
Bull Thistle	<i>Cirsium vulgare</i>	Flavonoids, tannins, triterpenoids	Antioxidant, anti-inflammatory, traditional herbal applications
Cherry Plum	<i>Prunus cerasifera</i>	Anthocyanins, chlorogenic acid, quercetin, vitamin C	Antioxidant, supports cardiovascular health, edible fruits rich in nutrients
Yew	<i>Taxus baccata</i>	Taxanes (taxol, baccatin III), diterpenoids	Source of anticancer compounds (paclitaxel); all plant parts except the fleshy aril are highly toxic
Scots Pine	<i>Pinus sylvestris</i>	α -Pinene, β -pinene, limonene, resin acids	Antimicrobial, expectorant, anti-inflammatory, respiratory support
European Ash	<i>Fraxinus excelsior</i>	Coumarins, secoiridoids, flavonoids	Traditionally used as an anti-inflammatory, mild diuretic and for rheumatic conditions
European Beech	<i>Fagus sylvatica</i>	Tannins, flavonoids, phenolic compounds	Astringent properties; bark traditionally used for inflammation and skin conditions
European Aspen	<i>Populus tremula</i>	Salicin, salicortin, flavonoids, phenolic glycosides	Analgesic, anti-inflammatory, antipyretic; source of salicylate-like compounds
Betony	<i>Stachys officinalis</i>	Verbascoside, betonicine, tannins, iridoids	Traditionally used for headaches, anxiety, digestive disorders, and wound healing

Blackthorn	<i>Prunus spinosa</i>	Anthocyanins, flavonoids, tannins, vitamin C	Antioxidant, mild laxative, digestive aid, immune support
English Bluebell	<i>Hyacinthoides non-scripta</i>	Glycosides, saponins, lectins	Historically used in folk medicine; limited modern medicinal use due to toxicity
Crab Apple	<i>Malus sylvestris</i>	Quercetin, catechins, chlorogenic acid, pectin, vitamin C	Antioxidant, supports digestive health, potential cardiovascular benefits

Table 2. Avian Species Recorded in Glenfield, Leicester, with Scientific Nomenclature and Conservation Status According to the IUCN Red List and UK Birds of Conservation Concern (BoCC).

Common Name	Scientific Name	IUCN Red List Status	UK BoCC Status
Blackbird	<i>Turdus merula</i>	Least Concern (LC)	Green
Blackcap	<i>Sylvia atricapilla</i>	Least Concern (LC)	Green
Blue Tit	<i>Cyanistes caeruleus</i>	Least Concern (LC)	Green
Common Buzzard	<i>Buteo buteo</i>	Least Concern (LC)	Green
Carrion Crow	<i>Corvus corone</i>	Least Concern (LC)	Green
Chaffinch	<i>Fringilla coelebs</i>	Least Concern (LC)	Green
Common Chiffchaff	<i>Phylloscopus collybita</i>	Least Concern (LC)	Green
Collared Dove	<i>Streptopelia decaocto</i>	Least Concern (LC)	Green
Dunnock	<i>Prunella modularis</i>	Least Concern (LC)	Green
Goldcrest	<i>Regulus regulus</i>	Least Concern (LC)	Green
Goldfinch	<i>Carduelis carduelis</i>	Least Concern (LC)	Green
Great Tit	<i>Parus major</i>	Least Concern (LC)	Green

4. DISCUSSION

The present review demonstrates that Glenfield, Leicester, supports a diverse assemblage of vascular plant and avian species despite being embedded within a highly urbanised landscape (Gilbert, 2012). The coexistence of residential developments, woodland patches, amenity grasslands, and the riparian corridor of the River Soar creates a heterogeneous habitat mosaic that enhances ecological resilience and promotes species persistence (Samways et.al.,2025). Habitat heterogeneity is widely recognised as one of the primary determinants of biodiversity, as structurally diverse environments provide a greater variety of ecological niches, food resources, breeding habitats, and refugia for flora and fauna (Stein et.al.,2014).

Consequently, the spatial distribution of interconnected green spaces throughout Glenfield contributes significantly to maintaining ecosystem stability within an increasingly fragmented urban environment (Li et.al.,2025).

The recorded plant species represent an ecologically valuable component of the urban ecosystem by providing a range of ecosystem functions that extend beyond primary productivity (Toscano et.al.,2025). Herbaceous flowering species such as *Prunella vulgaris*, *Achillea millefolium*, and *Epilobium hirsutum* constitute important nectar and pollen resources for pollinating insects, including bees, hoverflies, and butterflies, thereby supporting pollination networks essential for maintaining plant reproductive success and urban ecosystem functioning (Nylund, 2023). Woody species including *Taxus baccata*, *Fraxinus excelsior*, *Fagus sylvatica*, and *Prunus spinosa* provide nesting sites, shelter, and seasonal food resources for numerous vertebrate and invertebrate species while contributing substantially to carbon sequestration, microclimate regulation, and atmospheric pollutant removal (Packham et.al.,2012). The diversity of phytochemically active compounds identified among the recorded flora further highlights the ecological and pharmacological significance of urban vegetation (Packham et.al.,2012). Bioactive metabolites including flavonoids, phenolic acids, terpenoids, tannins, and alkaloids exhibit antioxidant, antimicrobial, anti-inflammatory, and anticancer properties, demonstrating that urban green spaces also represent reservoirs of valuable natural products with potential pharmaceutical applications (Bhattarai et.al.,2026).

The avian community observed within Glenfield reflects the availability of multiple habitat types capable of supporting both generalist and habitat-associated bird species. Woodland specialists such as the Goldcrest (*Regulus regulus*) and Great Tit (*Parus major*), alongside urban-adapted species including Blackbird (*Turdus merula*) and Carrion Crow (*Corvus corone*), indicate that the existing vegetation structure is sufficiently complex to accommodate species with differing ecological requirements. Furthermore, the presence of the Common Buzzard (*Buteo buteo*), a higher trophic level predator, suggests the existence of relatively intact food webs capable of sustaining predatory birds, while the occurrence of water-associated species reflects the ecological influence of the adjacent River Soar and associated riparian habitats (Thompson et.al.,2025). Although all recorded species are currently classified as Least Concern on the global IUCN Red List, the identification of several Amber-listed species under the UK Birds of Conservation Concern emphasises the continued importance of conserving urban habitats to prevent regional population declines (Akçakaya et.al.,2026).

The River Soar constitutes a critical ecological corridor within the study area by enhancing landscape connectivity between fragmented habitat patches (Gilbert, 2012). Riparian vegetation facilitates the movement of birds, mammals, amphibians, and invertebrates while simultaneously supporting aquatic biodiversity and improving ecosystem resilience (Toscano et.al.,2025). Such ecological corridors reduce the negative impacts of habitat fragmentation by promoting gene flow, recolonisation following local disturbances, and seasonal migration (Toscano et.al.,2025). The conservation of riverine habitats is therefore essential for maintaining ecological integrity across the wider Leicester urban landscape (Toscano et.al.,2025).

Urban green infrastructure also provides substantial ecosystem services that directly benefit human populations (Nylund, 2023). Trees and vegetation remove atmospheric pollutants through particulate interception and gaseous absorption, thereby contributing to improved air quality (Nylund, 2023). Vegetation additionally sequesters atmospheric carbon dioxide, mitigating greenhouse gas accumulation and supporting climate change adaptation (Stein et.al.,2014).

Extensive root systems stabilise soils, reduce erosion and enhance rainwater infiltration, decreasing surface runoff and lowering the risk of urban flooding (Stein et.al.,2014). These ecosystem services are particularly important in rapidly expanding urban environments where impermeable surfaces increasingly dominate the landscape(Stein et.al.,2014).

Beyond environmental regulation, biodiversity contributes significantly to public health and human well-being(Haines, 2010). Access to biodiverse green spaces has been consistently associated with improved psychological health, reduced physiological stress, enhanced cognitive performance, and increased opportunities for physical activity (Haines, 2010). Urban woodlands and riverside habitats provide recreational spaces that promote social interaction, environmental education, and greater public awareness of conservation issues (Haines, 2010). Simultaneously, many of the plant species documented within Glenfield possess pharmacologically important phytochemicals that have historically contributed to the development of modern medicines, illustrating the continued importance of conserving botanical diversity as a source of future therapeutic compounds(Haines, 2010).

Despite its ecological value, Glenfield's biodiversity remains vulnerable to the cumulative effects of urban expansion, habitat fragmentation, invasive species, pollution, and climate change (Ruan et.al,2025). Continued residential development may reduce habitat connectivity and diminish the availability of breeding and foraging habitats for wildlife (Ruan et.al,2025). Consequently, future conservation strategies should prioritise the protection and restoration of woodland patches, species-rich grasslands, hedgerows, and riparian vegetation, while promoting the establishment of ecological corridors linking fragmented green spaces (Toscano et.al.,2025). Habitat management practices such as native tree planting, invasive species control, pollinator-friendly landscaping and long-term biodiversity monitoring would further strengthen ecosystem resilience (Toscano et.al.,2025).

5. CONCLUSION

Overall, the findings indicate that Glenfield represents an ecologically important suburban landscape where urban development coexists with diverse natural habitats (Toscano et.al.,2025). The area's green infrastructure and its close association with the River Soar sustain a wide range of plant and bird species while delivering essential ecosystem services that support both environmental quality and human health. Conserving and enhancing these habitats will be fundamental to maintaining biodiversity, strengthening ecological resilience, and promoting sustainable urban development within Leicester and comparable urban landscapes (Toscano et.al.,2025).

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