



ORIGINAL ARTICLE

Urban Avifaunal Diversity: An Indicator of Anthropogenic Pressures in Southern Ridge of Delhi

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ABSTRACT

South Ridge of Delhi is a flagship ecosystem of Delhi and is an important natural heritage of our country. The Ridge has witnessed countless disturbances due to excessive anthropogenic pressures. The capital has suffered many interruptions in the form of land overuse, habitat fragmentation, deforestation, mining, landscape alteration, Habitat destruction, encroachment, predation and invasion. The capital is a proof of rapid urbanization and developmental activities which has posed a severe threat on city's biodiversity. The study is restricted to birds because birds are the best indicator of a healthy ecosystem and they quickly react to the changing environmental and ecological conditions. City's expansion and boost in the urban sprawl are major threats to the avian biodiversity of the South Ridge of Delhi. The study identified 40 families of native and migratory birds with 81 species in monsoon followed by 44 families with 122 species. There are also presence of around 130 plant species belonging to Fabaceae, Verbenaceae, Apocyanaceae, Meliaceae, Rubiaceae, Moraceae, Myrtaceae, Bignoniaceae and many other families. Though the Ridge provides a variety of habitat to the birds and also attracts migratory species yet there are also problems of suitable habitat and environmental conditions.

Key Words: Urban Biodiversity, Anthropogenic pressure, Avifauna, Migration, Conservation, Ecosystem, Ecological change

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INTRODUCTION

Birds are not the only group facing problems due to environmental and ecological changes but they are highly distributed and easily visible and most evocative to us. Moreover they are the most important indicator of alterations in ecosystem balance in nature because they have highly specific habitat requirements [1]. Bird species richness is influenced by the urban environment, landscape, floral diversity, degree of anthropogenic disturbances, invasion as well as predation yet they are the major part of urban biodiversity. Resident birds can be seen frequently whole year and the migratory birds arrive annually during winter and summer.

Process of urbanization is increasing day by day resulting in shrinkage of natural habitats. It has been estimated that till 2025, 61% of human population will reside in urban areas [2]. According to a recent study 70% of overall human population will be urbanized by 2050, expecting the rise of the use of urban natural resources. Urbanization causes enhancement in the reduction of the quality of the habitable area. Increased disturbance caused by urban sprawl and the simplification of land by removal of woody tress, leaf litter and other microhabitats of natural communities is directly linked with the urban biodiversity loss [3]. It is linked with intense human settlement and land use. [4]. Urbanization not only causes heterogeneity of landscape but also alters the distribution, abundance and the resources [5]. These factors results in decline of the population of birds and affects the services provided by ecosystem.

The field of this study is restricted to Southern Ridge of Delhi which is a part of Aravalli with rocky and undulating landscape. The Ridge is regarded as 'Green Lungs of Delhi'. This area is representative of city's expansion and developmental activities and is adjacent to other urban big cities like Gurgaon, Faridabad and Noida. The study was done in natural ecosystems (Sanjay Van, Aravalli Biodiversity Park, Asola Bhatti Wildlife Sanctuary), in gardens (Lodhi Garden, Deer Park), in institutional areas (JNU, IIT) and aquatic ecosystems (Shankar Vihar Wetland, Hauz khas Lake and Neela Hauz).

METHODOLOGY

The survey was being conducted in different study sites of Southern Ridge of Delhi in monsoon from April, 2011 to August 2011 (Summer & Monsoon) followed by winter from October 2011 to February 2012 between 6 am to 10 am in the morning and 4pm to 7pm in the evening .The survey was restricted only to count the different bird species and to record various anthropogenic disturbances at different study sites that the birds faced. The birds were observed through naked eyes and binocular and photographed individually & in groups. Some birds were also recorded after being listened. Previous data and the background information were obtained through various articles in newspapers, journals, books [6], publications and government reviews.

RESULTS AND DISCUSSIONS

The study was done to gain a baseline data for further research, to identify the present anthropogenic burden on avian diversity and to prepare a checklist of monsoon and winter season in the southern ridge of capital. Survey of birds was conducted during two seasons to ascertain the migration in the different sites too. The habitat of the birds was also considered and the data obtained were converted into checklists and tables.

Anthropogenic Pressures on Urban Biodiversity

India is a country where 2094 forms belonging to 1200 species are residing [7].India is country of diversity. The different natural habitats of our country also invite various foreign birds here. The population of birds and their abundance greatly depends upon the climatic conditions like rainfall, temperature, humidity as well as manual factors. Illegal land use, deforestation activities, mining (ABP & Bhatti Mines), wetland shrinkage, encroachment, invasion, cultural pollution (Changed Lifestyle) etc. are some detrimental reasons responsible for the contraction of habitat used by the birds as their home [8]. Habitat destruction is the master factor for dip in the number of species of birds. The grass lands and forests of Delhi are under the pressure of infrastructure developmental projects. Construction work in IIT and JNU has been the resultant of loss of natural habitat of birds [9]. Wetlands are the important ecosystem for residential as well as refugees (migrants).



Fig 1. Gradual Death of Shankar Vihar wetland due to anthropogenic pressure

Due to Urbanization and global warming, the wetlands are losing their identity in the capital. Metropolitan mobility is also causing havoc for the survival of urban avifaunal diversity in the capital. The acoustic pressure and the emissions from the vehicles are the threats to which urban dwellers care least. Behavioral disturbances have been investigated due to the vehicular pollution in the city. The propounding population of crows was observed as the threat to the defenseless birds like parakeets, bulbuls, sunbirds, prinias, tailorbirds, Eurasian Golden Orioles, Paradise flycatchers, Oriental White eyes, and sparrows. The expanding number of these *urban scavengers* and *human commensals* rely on eggs of the birds and young ones. House crow was observed at every study site easily and in large population. The other predator recorded were the stray animals like stray dogs, pigs and monkeys.



Fig. 2. Pressure caused by human commensals and stray animals on urban avifaunal diversity

A large number of stray dogs have been seen in the JNU campus alone. Presence of communication tower in the city generating high frequency electromagnetic waves also causes behavioral and developmental anomalies in the birds. Incubation period of birds and the fertility also get affected. Aggressive behavior and loss of coordination was also observed. The degree of anthropogenic pressures varies in different study sites resulting in loss of habitat for birds. The number of birds and species varies depending upon the extent of man driven pressure in different study sites. During the study 132 total species of birds were recorded belonging to 50 different families. Winter migratory birds started arriving from the month of October e.g. Common Teal, Gadwall, Pied Avocet, and many other. The recorded summer migrants were Bittern species & Golden Oriole. The total number of recorded bird species in monsoon season was 81 belonging to 40 different families and during winter season was 121 species of 47 families.

Table1. Bird Diversity in Southern Ridge recorded in both monsoon and winter season during the study

| Season | No. of Species | No. of Families |
|-----------------|----------------|-----------------|
| Summer +Monsoon | 81 | 40 |
| Winter | 122 | 44 |

The common urban birds those were abundant in number were Red wattled Lapwing, Common Tailorbird, Blue Rock Pigeon, Common Myna, House Crow, Asian Koel, Black Drongo, Oriental Magpie Robin, Red vented Bulbul, Common Babbler, Jungle Babbler and Peacock. These birds are considered as *urban adapters* as they dwell around human habitation [10]. They consume garbage as well as human spit and insects [11]. These species can change their habitation accordingly and live commensally with human. Some recorded birds were very rare to see and are their presence was accidental. Red Headed Vulture and Black Necked Storks are listed endangered species. Painted Stork, Black Headed Ibises is near threatened in Bhatti Mines and Sanjay Van. The Decline in the number of painted storks is due to unavailability of food or partners for mating [12]. Eurasian Wryneck in the shrubs of JNU the multi-ecosystem of JNU campus is suitable to many rare birds like Yellow crowned Woodpecker, Coppersmith Barbet, Indian Eagle Owl and Eurasian Thick Knee. The manicured gardens of the campus also, carrying several fruits and flowering plants, invite large number of bird species. The ridge ecosystem of JNU also has various native plant species. Aravalli Biodiversity Park, Sanjay Van (Reserved Forest) and Asola Bhatti Wildlife Sanctuary were also recorded with fair number of Bird species. Asola Bhatti Mines was found to boast of raptors species like Egyptian Vulture, Booted Eagle, Common Kestrel, Red necked Vulture etc. due to forest ecosystem. They can easily find faecal matter, carrion, birds, insects, rodents, lizards etc. for their survival and plays a major role in wood web of forest ecosystem.

Table2. Abundance of various bird species in the study area

| Abundance | No. of Species |
|--------------|----------------|
| A | 11 |
| C | 21 |
| F | 29 |
| U | 48 |
| R | 21 |
| X | 2 |
| Total | 132 |

#A-Abundant,C-Common,F-Fairly Common,U-Uncommon,R-Rare,X-Accidental

On the contrast, due to the construction of flyover and vehicular mobility, the water body of Neela Hauz was investigated with poor quality of water. The hauz was totally a bird less ecosystem due to its degraded condition. The heritage gardens of city (Deer Park, Lodhi Garden) had also good avifaunal diversity due to presence of water body and rich flora. Water bodies serve as a breeding ground for many birds species. Even the migratory birds get attracted towards wetlands and lakes for food and breeding cycle. Presence of various residential and migratory bird species is indication of sound health of the ecosystem. Still presence of weed (*Eichornia crassipes*), succession of the plant species, domestic

pollution, sewer flow and use of wetland ground as cricket pitch are some of the negligible factors which have resulted in shrinkage of wetland.

Table3. Checklist of Bird Species found in different study sites of Southern Ridge of Delhi in Summer and Monsoon Season

| Family | Common Name | Scientific Name | Habitat |
|---------------------|-------------------------------------|-------------------------------------|------------------|
| Accipitridae | Oriental Honey Buzzard | <i>Pernis ptilorhynchus</i> | FOR |
| | Black-shouldered Kite | <i>Elanus caeruleus</i> | FOR |
| | Black Kite | <i>Milvus migrans</i> | FOR,MM,L,W,GL |
| | Shikra | <i>Accipiter badius</i> | FOR,MM,SH,W |
| Anatidae | Gadwall | <i>Anas strepera</i> | L,W |
| | Spot-billed Duck | <i>Anas poecilorhyncha</i> | MM,L,W |
| Apodidae | House Swift | <i>Apus nipalensis</i> | W |
| Ardeidae | Little Egret | <i>Egretta garzetta</i> | FOR,MM,L,W,SH,GL |
| | Grey Heron | <i>Ardea cinerea</i> | W |
| | Purple Heron | <i>Ardea purpurea</i> | W |
| | Intermediate Egret | <i>Mesophoyx intermedia</i> | W |
| | Cattle Egret | <i>Bubulcus ibis</i> | FOR,MM,L,W,SH,GL |
| | Indian Pond Heron | <i>Ardeola grayii</i> | MM,L,W |
| | Black-crowned Night Heron | <i>Nycticorax nycticorax</i> | W |
| | Yellow Bittern | <i>Ixobrychus sinensis</i> | W |
| Bucerotidae | Indian Grey Hornbill | <i>Ocyrceros birostris</i> | FOR,MM |
| Burhinidae | Eurasian Thick Knee | <i>Burhinus oedicnemus</i> | SH |
| Charadiidae | Yellow-wattled Lapwing | <i>Vanellus malabaricus</i> | GL |
| | Red-wattled Lapwing | <i>Vanellus indicus</i> | FOR,MM,L,W,SH,GL |
| Ciconiidae | Painted Stork(Near Threatened) | <i>Mycteria leucocephala</i> | W |
| | Black-necked Stork(Near Threatened) | <i>Ephippiorhynchus asiaticus</i> | W |
| Cistocolidae | Ashy Prinia | <i>Prinia inornata</i> | FOR,SH |
| | Plain Prinia | <i>Prinia socialis</i> | FOR,SH |
| | Common Tailor Bird | <i>Orthotomus sutorius</i> | FOR,MM,SH,GL,L |
| Columbidae | Blue Rock Pigeon | <i>Columba livia</i> | FOR,MM,L,W,SH,GL |
| | Laughing Dove | <i>Streptopelia senegalensis</i> | FOR,MM |
| | Spotted Dove | <i>Streptopelia chinensis</i> | MM |
| | Eurasian Collared Dove | <i>Streptopelia decaocto</i> | FOR,MM,L,W,SH,GL |
| | Yellow-footed Green Pigeon | <i>treron phoenicoptera</i> | MM |
| Coraciidae | Indian Roller | <i>Coracias benghalensis</i> | FOR |
| Corvidae | Rofous Treepie | <i>Dendrocitta vagabunda</i> | FOR,MM,SH |
| | House Crow | <i>Corvus splendens</i> | FOR,MM,L,W,SH,GL |
| | Large-billed Crow | <i>Corvus macrorhynchys</i> | FOR |
| Cuculidae | Pied Cuckoo | <i>Clamator jacobinus</i> | MM |
| | Common Hawk Cuckoo | <i>Hierococcyx varius</i> | FOR |
| | Asian Koel | <i>Eudyamys scolopacea</i> | FOR,MM,SH,L,W |
| | Sirkeer Malkoha | <i>Phaenicophaeus leschenaultii</i> | FOR |
| | Greater Coucal | <i>Centropus sinensis</i> | FOR,MM,L,W,SH,GL |
| Dicruridae | Black Drongo | <i>Dicrurus macrocercus</i> | FOR,MM,SH,W,L,GL |
| Estrildidae | Red Avadavat | <i>Amandava amandava</i> | FOR |

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|--------------------------|---------------------------|----------------------------------|-------------------|
| | Indian Silverbill | <i>Lonchura malabarica</i> | FOR |
| Falconidae | Common Kestrel | <i>Falco naumanni</i> | FOR |
| Halcyonidae | White-throated Kingfisher | <i>Halcyon smyrensis</i> | FOR,MM,L,W,SH,GL |
| Hirundinidae | Plain Martin | <i>Riparia paludicola</i> | W |
| | Barn Swallow | <i>Hirundo rustica</i> | W |
| | Wire-tailed Swallow | <i>Hirundo smithii</i> | W |
| Megalaimidae | Brown-headed Barbet | <i>Megalaima zeylanica</i> | FOR,MM |
| | Coppersmith Barbet | <i>Megalaima haemacephala</i> | FOR |
| Meropidae | Green Bee-eater | <i>Merops orientalis</i> | FOR,MM |
| Monarchidae | Asian Paradise Flycatcher | <i>Terpsiphone paradisi</i> | FOR,MM |
| Muscicapidae | Oriental Magpie Robin | <i>Copsychus saularis</i> | MM,SH,GL |
| | Indian Robin | <i>Saxicoloides fulicata</i> | FOR,MM,SH,GL |
| Nectarinidae | Purple Sunbird | <i>Nectarinia asiatica</i> | FOR,MM,SH |
| Oriolidae | Eurasian Golden Oriole | <i>Oriolus oriolus</i> | MM |
| Passeridae | House Sparrow | <i>Passer domesticus</i> | MM |
| Phalacrocoracidae | Little Cormorant | <i>Phalacrocorax niger</i> | MM,L,W |
| Phasianidae | Grey Francolin | <i>Francolinus pondicerianus</i> | FOR,MM |
| | Indian Peafowl | <i>Pavo cristatus</i> | FOR,MM,SH,GL,W,L |
| Phylloscopidae | Common Chiffchaff | <i>Phylloscopus collybita</i> | W,SH |
| Picidae | Yellow-crowned Woodpecker | <i>Dendrocopos mahrattensis</i> | FOR |
| | Black-rumped Woodpecker | <i>Dinopium benghalense</i> | FOR,MM |
| Ploceidae | Baya Weaver | <i>Ploceus philippinus</i> | FOR,MM |
| Podicipedidae | Little Grebe | <i>Tachybaptus ruficollis</i> | MM,L,W |
| Psittacidae | Alexandrine Parakeet | <i>Psittacula eupataria</i> | FOR,MM,SH |
| | Rose-ringed Parakeet | <i>Psittacula krameri</i> | FOR,MM,SH,L |
| | Plum-headed Parakeet | <i>Psittacula cyanocephala</i> | FOR,MM,SH |
| Pycnonotidae | Red-whiskered Bulbul | <i>Pycnonotus jocosus</i> | FOR,MM,SH |
| | White-eared Bulbul | <i>Pycnonotus leucotis</i> | FOR,W,SH |
| | Red-vented Bulbul | <i>Pycnonotus cafer</i> | FOR,MM,L,W,SH,GL |
| Rallidae | White-breasted Waterhen | <i>Amaurornis phoenicurus</i> | MM,W,L |
| | Common Moorhen | <i>Gallinula chloropus</i> | MM,W,L |
| Strigidae | Collared Scops Owl | <i>Otus bakkamoena</i> | MM |
| | Spotted Owl | <i>Athene brama</i> | FOR,MM,SH |
| Strudinae | Common Myna | <i>Acridotheres tristis</i> | FOR,MM,W,L,SH,GL |
| | Bank Myna | <i>Acridotheres ginginianus</i> | W |
| Sylviidae | Yellow-eyed Babbler | <i>Chrysomma sinense</i> | SH |
| Timallidae | Common Babbler | <i>Turdoides caudatus</i> | FOR |
| | Large Grey Babbler | <i>Turdoides malcolmi</i> | FOR,MM,SH,GL |
| | Jungle Babbler | <i>Turdoides striatus</i> | FOR, MM,L,W,SH,GL |
| Upupidae | Common Hoopoe | <i>Upupa epops</i> | FOR,MM,SH,GL,W |
| Zosteropidae | Oriental White Eye | <i>Zosterops palpebrosus</i> | FOR |
| Total Families-40 | Total Sp.-82 | | |

Table4. Checklist of Bird Species found in different study sites of Southern Ridge of Delhi in Winter Season

| Family | Common Name | Scientific Name | Habitat |
|-----------------------|---|-----------------------------------|------------------|
| Accipitridae | Oriental Honey Buzzard | <i>Pernis ptilorynchus</i> | FOR |
| | Black-shouldered Kite | <i>Elanus caeruleus</i> | FOR |
| | Black Kite | <i>Milvus migrans</i> | FOR,MM,L,W,GL |
| | Egyptian Vulture(Endangered) | <i>Neophron percopterus</i> | FOR |
| | Red-headed Vulture(Critically Endangered) | <i>Sarcogyps calvus</i> | FOR |
| | Shikra | <i>Accipiter badius</i> | FOR,MM,SH,W |
| | Booted Eagle | <i>Hieraetus pennatus</i> | FOR |
| Acrocephalidae | Booted Warbler | <i>Hippolais caligata</i> | FOR,SH |
| Alcedinidae | Common Kingfisher | <i>Alcedo atthis</i> | L |
| Alaudidae | Indian Bushlark | <i>Mirafra erythroptera</i> | FOR |
| Anatidae | Gadwall | <i>Anas strepera</i> | L,W |
| | Spot-billed Duck | <i>Anas poecilorhyncha</i> | MM,L,W |
| | Common Teal | <i>Anas crecca</i> | W |
| | Northern Pintail | <i>Anas acuta</i> | L,W |
| | Northern Shoveler | <i>Anas clypeata</i> | L,W |
| | Common Pochard | <i>Aythya ferina</i> | W |
| Apodidae | House Swift | <i>Apus nipalensis</i> | W |
| Ardeidae | Little Egret | <i>Egretta garzetta</i> | FOR,MM,L,W,SH,GL |
| | Grey Heron | <i>Ardea cinerea</i> | W |
| | Purple Heron | <i>Ardea purpurea</i> | W |
| | Great Egret | <i>Casmerodius albus</i> | W |
| | Intermediate Egret | <i>Mesophoyx intermedia</i> | W |
| | Cattle Egret | <i>Bubulcus ibis</i> | FOR,MM,L,W,SH,GL |
| | Indian Pond Heron | <i>Ardeola grayii</i> | MM,L,W |
| Bucerotidae | Indian Grey Hornbill | <i>Ocyrceros birostris</i> | FOR,MM |
| Burhinidae | Eurasian Thick Knee | <i>Burhinus oedicnemus</i> | SH |
| Charadiidae | Yellow-wattled Lapwing | <i>Vanellus malabaricus</i> | GL |
| | Red-wattled Lapwing | <i>Vanellus indicus</i> | FOR,MM,L,W,SH,GL |
| | White-tailed Lapwing | <i>Vanellus leucurus</i> | GL |
| Ciconiidae | Painted Stork(Near Threatened) | <i>Mycteria leucocephala</i> | W |
| | Black-necked Stork(Near Threatened) | <i>Ephippiorhynchus asiaticus</i> | W |
| Cistocolidae | Ashy Prinia | <i>Prinia inornata</i> | FOR,SH |
| | Plain Prinia | <i>Prinia socialis</i> | FOR,SH |
| | Common Tailor Bird | <i>Orthotomus sutorius</i> | FOR,MM,SH,GL,L |
| Columbidae | Blue Rock Pigeon | <i>Columba livia</i> | FOR,MM,L,W,SH,GL |
| | Laughing Dove | <i>Streptopelia senegalensis</i> | FOR,MM |
| | Spotted Dove | <i>Streptopelia chinensis</i> | MM |
| | Eurasian Collared Dove | <i>Streptopelia decaocto</i> | FOR,MM,L,W,SH,GL |
| | Yellow-footed Green Pigeon | <i>treron phoenicoptera</i> | MM |
| Corvidae | Rofous Treepie | <i>Dendrocitta vagabunda</i> | FOR,MM,SH |
| | House Crow | <i>Corvus splendens</i> | FOR,MM,L,W,SH,GL |
| | Large-billed Crow | <i>Corvus macrorhynchys</i> | FOR |
| Cuculidae | Pied Cuckoo | <i>Clamator jacobinus</i> | MM |
| | Grey-bellied Cuckoo | <i>Cacomantis passerinus</i> | FOR |
| | Asian Koel | <i>Eudynamis scolopacea</i> | FOR,MM,SH,L,W |

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|--------------------------|---------------------------|-------------------------------------|------------------|
| | Sirkeer Malkoha | <i>Phaenicophaeus leschenaultii</i> | FOR |
| | Greater Coucal | <i>Centropus sinensis</i> | FOR,MM,L,W,SH,GL |
| Dicruridae | Black Drongo | <i>Dicrurus macrocercus</i> | FOR,MM,SH,W,L,GL |
| Falconidae | Common Kestrel | <i>Falco naumanni</i> | FOR |
| Halcyonidae | White-throated Kingfisher | <i>Halcyon smyrensis</i> | FOR,MM,L,W,SH,GL |
| Hirundinidae | Plain Martin | <i>Riparia paludicola</i> | W |
| | Barn Swallow | <i>Hirundo rustica</i> | W |
| | Wire-tailed Swallow | <i>Hirundo smithii</i> | W |
| Laniidae | Bay-backed Shrike | <i>Lanius vittatus</i> | FOR,SH |
| | Long-tailed Shrike | <i>Lanius schach</i> | FOR,SH |
| Megalaimidae | Brown-headed Barbet | <i>Megalaima zeylanica</i> | FOR,MM |
| | Coppersmith Barbet | <i>Megalaima haemacephala</i> | FOR |
| Meropidae | Green Bee-eater | <i>Merops orientalis</i> | FOR,MM |
| Motacillidae | White Wagtail | <i>Motacilla alba</i> | GL |
| | White-browed Wagtail | <i>Motacilla maderaspatensis</i> | GL |
| | Citrine Wagtail | <i>Motacilla citreola</i> | GL |
| | Long-billed Pipit | <i>Anthus similis</i> | FOR |
| Muscicapidae | Blue Rockthrush | <i>Monticola solitarius</i> | FOR,SH |
| | Red-breasted Flycatcher | <i>Ficedula parva</i> | SH |
| | Red-throated Flycatcher | <i>Ficedula albicilla</i> | SH |
| | Blue throat | <i>Cyornis rubeculoides</i> | SH |
| | Oriental Magpie Robin | <i>Copsychus saularis</i> | MM,SH,GL |
| | Indian Robin | <i>Saxicoloides fulicata</i> | FOR,MM,SH,GL |
| | Black Redstart | <i>Phoenicurus ochruros</i> | FOR |
| | Siberian Stonechat | <i>Saxicola maura</i> | FOR,SH |
| | Pied Bushchat | <i>Saxicola caprata</i> | FOR,SH,W |
| | Brown Rockchat | <i>Cercomela fusca</i> | FOR,SH |
| Nectarinidae | Purple Sunbird | <i>Nectarinia asiatica</i> | FOR,MM,SH |
| Passeridae | House Sparrow | <i>Passer domesticus</i> | MM |
| Phalacrocoracidae | Little Cormorant | <i>Phalacrocorax niger</i> | MM,L,W |
| | Indian Cormorant | <i>Phalacrocorax fuscicollis</i> | W |
| Phasianidae | Grey Francolin | <i>Francolinus pondicerianus</i> | FOR,MM |
| | Indian Peafowl | <i>Pavo cristatus</i> | FOR,MM,SH,GL,W,L |
| Phylloscopidae | Common Chiffchaff | <i>Phylloscopus collybita</i> | W,SH |
| | Greenish Warbler | <i>Phylloscopus trochiloides</i> | SH |
| Picidae | Eurasian Wryneck | <i>Jynx torquilla</i> | SH |
| | Yellow-crowned Woodpecker | <i>Dendrocopos mahrattensis</i> | FOR |
| | Black-rumped Woodpecker | <i>Dinopium benghalense</i> | FOR,MM |
| Podicipedidae | Little Grebe | <i>Tachybaptus ruficollis</i> | MM,L,W |
| Psittacidae | Alexandrine Parakeet | <i>Psittacula eupataria</i> | FOR,MM,SH |
| | Rose-ringed Parakeet | <i>Psittacula krameri</i> | FOR,MM,SH,L |
| | Plum-headed Parakeet | <i>Psittacula cyanocephala</i> | FOR,MM,SH |
| Pycnonotidae | Red-whiskered Bulbul | <i>Pycnonotus jocosus</i> | FOR,MM,SH |
| | White-eared Bulbul | <i>Pycnonotus leucotis</i> | FOR,W,SH |
| | Red-vented Bulbul | <i>Pycnonotus cafer</i> | FOR,MM,L,W,SH,GL |
| Rallidae | White-breasted Waterhen | <i>Amaurornis phoenicurus</i> | MM,W,L |
| | Common Moorhen | <i>Gallinula chloropus</i> | MM,W,L |

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|--------------------------|--------------------------|-----------------------------------|-------------------|
| | Common Coot | <i>Fulica atra</i> | L,W |
| Rostratulidae | Painted Snipe | <i>Rostratula benghalensis</i> | W |
| Recurvirostridae | Black-winged Stilt | <i>Himantopus himantopus</i> | W |
| | Pied Avocet | <i>Recurvirostra avosetta</i> | W |
| Scolopacidae | Common Snipe | <i>Gallinago gallinago</i> | W |
| | Black-tailed Godwit | <i>Limosa limosa</i> | W |
| | Spotted Redshank | <i>Tringa erythropus</i> | W |
| | Common Redshank | <i>Tringa totanus</i> | W |
| | Marsh Sandpiper | <i>Tringa stagnatilis</i> | W |
| | Common Greenshank | <i>Tringa nebularia</i> | W |
| | Green Sandpiper | <i>Tringa ochropus</i> | W |
| | Wood Sandpiper | <i>Tringa glareola</i> | W |
| | Common Sandpiper | <i>Actitis hypoleucos</i> | W |
| | Ruff | <i>Philomachus pugnax</i> | W |
| Strigidae | Collared Scops Owl | <i>Otus bakkamoena</i> | MM |
| | Indian Eagle Owl | <i>Bubo bengalensis</i> | FOR |
| | Spotted Owl | <i>Athene brama</i> | FOR,MM,SH |
| Strudinae | Brahminy Starling | <i>Sturnus pagodarum</i> | FOR,MM,SH,GL |
| | Asain Pied Starling | <i>Sturnus contra</i> | FOR,MM,SH |
| | Common Myna | <i>Acridotheres tristis</i> | FOR,MM,W,L,SH,GL |
| | Bank Myna | <i>Acridotheres ginginianus</i> | W |
| Syllividae | Yellow-eyed Babbler | <i>Chrysomma sinense</i> | SH |
| | Lesser Whitethroat | <i>Sylvia curruca</i> | SH |
| Tephrodornithidae | Wood Shrike | <i>Tephrodornis pondicerianus</i> | FOR |
| Threskiornithidae | Glossy Ibis | <i>Plegadis falcinellus</i> | W |
| | Black Ibis | <i>Pseudibis papillosa</i> | W |
| Timallidae | Common Babbler | <i>Turdoides caudatus</i> | FOR |
| | Large Grey Babbler | <i>Turdoides malcolmi</i> | FOR,MM,SH,GL |
| | Jungle Babbler | <i>Turdoides striatus</i> | FOR, MM,L,W,SH,GL |
| Upupidae | Common Hoopoe | <i>Upupa epops</i> | FOR,MM,SH,GL,W |
| Total Families-44 | Total Species-122 | | |

#FOR-Forest, MM-Man Made, SH-Scrubland, GL-Grassland, W-Wetland, L-Lake
Plate 1.



Eurasian Thick Knee



Black Drongo



Painted Stork



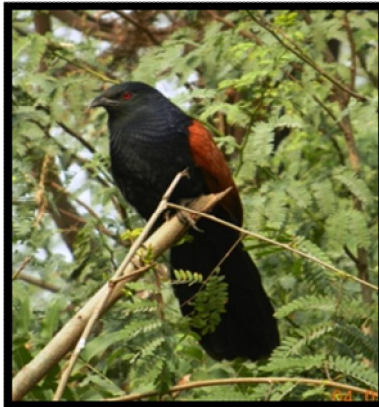
Large Egret



Black-winged Stilt



Ruff



Greater Coucal



Indian Silverbill



Shikra

CONCLUSION

Urban sprawl and the resultant anthropogenic pressure is a burden on the survival of bird diversity in the capital. The ever increasing urbanization and the various developmental activities have taken a toll on the natural heritage of Delhi. The city expansion has caused migration of people of rural and suburban areas in the capital which has led to more pressure on the urban biodiversity. The migratory human population also needs settlements to live, so they rubbeded of the natural areas of the capital. Even the expansion of urban areas has been in a lot of cases unplanned and haphazard. Urban areas of Delhi exhibit extreme changes e.g.-cities have become hotter and the natural habitat has been fragmented. Habitat destruction of South Central Ridge of Delhi is the result of encroachment, deforestation, construction work and illegal land use and led to the formation of three different green patches of JNU, SanjayVan and Aravalli Biodiversity Park. The mining practices in Aravalli Biodiversity Park had a heavy toll on environment and the natural habitat. Tough the practice have been banned still the marks of destruction are still left. The automobiles also affect the avifauna diversity due to mobility, acoustic pressure and exhausts. Human race is heading towards modernization in a very fast pace which have been caused unfriendly with the natural processes.

To confront the ecological problems associated with above said problems different conservation practices should be used to make the area more green and species rich. Corridor connectivity to connect the different green landscapes of Delhi and the improvement in the green buffers proved to be promising in many countries for the free movement and spread of animals between two regions. It can help as a tool for restoring and maintaining the urban biodiversity by avoiding predation and human caused death. Urban agriculture and urban gardening should be enhanced to provide food and shelters to the bird diversity. Healthy ecosystem and biodiversity is the two sides of the same coin. To increase the biodiversity of a place formation, conservation and perseverance of a healthy ecosystem should be the starting.

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