



## AN ASSESSMENT OF AVIAN DIVERSITY PRESENT WITH IN 2KM RADIUS OF BANNERGHATTA NATIONAL PARK, KARNATAKA, INDIA

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### ABSTRACT

The survey was carried out by following the transect method. A total of seven transects each one measuring two km in distance end to end were laid evenly within 2km area surrounding the park excluding the northern part which is more or less residential. At 250m point interval of each transect, four nearest trees were pointed for enumerating bird species name, distance of the transect line. The survey results suggest that the region is of high avian diversity with a minimum of 139 birds with more number of juveniles present in it were identified during the survey period.

**KEYWORDS:** Avian, density, National park, Bannerghatta.

### INTRODUCTION

Bannerghatta National Park (BNP) is one of the smallest National parks of Karnataka state which was started in the year 1971 and declared as a National park in the year 1974 by declaring its intentions to constitute such area as a national park by Government of Karnataka vide Notification No.AFD.61 fwl 74, 74 published in the Karnataka Gazette dated 9-1-1975 in exercise of the powers conferred by sub-section(1) of section 35 of the wild life (protection) Act, 1972 (Central Act 53 of 1972). It encompasses an area of 102.74 Sq. Km. comprising of 10 reserve forests spread over the districts of Bangalore urban and Ramanagara district situated nearest to Bangalore the capital of Karnataka. This park was started with the primary objectives of bio-conservation and also to provide bio-recreation to the visiting tourists with nature-education facilities to students and researchers. Geographically the park is contiguous in the south with the last largest remaining scrub forest of the country and has been a variety of wild life (Gopalakrishna *et al.*, 2011). The terrain of the park is highly undulating in nature with pronounced mountains and valleys and it is roughly linear and highly irregular in shape. The parks landscape is surrounded by a high density of human settlements including five settlements and agricultural lands situated within the park (Singh, 2008). Agriculture is the major activity carried out by the local community in this landscape which is changing gradually as a result of urbanization, especially in the northern and eastern parts of the park. Further, many developmental projects are coming up around the park such as construction, road widening, repair and maintenance of roads passing through the park (Singh, 2008). All these factors are likely to have an influence on the type and magnitude of various landscape elements in the area. The study of forest cover, type, its spread and other aspects associated within, play a critical role in long term conservation of a large mammal such as the Asian elephant. Habitat utilization also depends on the composition of food species and shade

species in a forest like BNP. Thus, understanding of the species composition, diversity, richness, abundance, size distributions, canopy cover and ground cover are crucial in developing a management policy related to conservation of species like elephants. Invasion of exotic species is among the most important global scale problems experienced by natural ecosystems and Bannerghatta National Park is not an exception to it. Today, invasion of alien species is second only to habitat loss as a cause of species endangerment and extinction (Schei, 1996). Forest and shrub lands are often invaded by the short invasive species (Wiser *et al.*, 1998). Bird diversity has direct relation with the forest diversity. Birds are playing important role as bio indicators, consumers, and pollinators, disperse of seeds. At present 21.5% of birds species are considered extinction a category that includes extinction (1.4%), threatened (12.1%) and near threatened (8.0%) (Cody, 1978).

Growing human population and improved trans-continental transport have increased the degree of movement of non-indigenous organisms and the current enhanced rate of invasion constitutes one of the most important effects that humans have had on the earth (Sharma *et al.*, 2005). Each year millions of birds die due to anthropogenic causes in the United States alone with motor vehicles accounting for approximately 8.5% (Erickson *et al.*, 2005). As part of understanding the status of avian diversity in and around BNP with 2km radius the survey was conducted.

### MATERIALS & METHODS

#### Study Area

The BNP is one of the smallest National Parks in the country measuring about 103 km<sup>2</sup> (Singh, 2008) in area. The park is highly uneven in shape and measures a maximum of 26 km in length from North to South and varies between 0.3 and 5 km in width from East to West. The park lies between 12° 34' and 12° 50' N latitudes and between 77° 31' and 77° 38' E longitudes (Rajeev, 2002).

Though a small National Park, geographically the park is contiguous in the south with the last largest remaining scrub forest of the country- the Hosur forest division of the Tamil Nadu state to the South- East and the Kanakapura forest division of the Karnataka state to the South-West. These two further connects to bigger forest tracks of the Cauvery Wildlife Sanctuary (Figure-1) ultimately joining the Nilgiri Biosphere Reserve of Western Ghats forest at Nilgiris stretching through Malaimaha deshwara hills, BiligiriRangana Temple Sanctuary, Kollegal Forest Division and Sathyamangala Forests (Singh, 2008). The park is further divided into three forest ranges namely the Bannerghatta Range, Harohalli Range and Anekal Range for executive purpose. The territory of the park is highly

undulating with a mean altitude of 865m and ranges between 700 and 1035m above mean sea level. The park receives an average annual rainfall of 937mm ranging between 728mm and 1352mm. The park experiences rainfall spread across 8 months (April-November). The maximum rainfall (50%) is received between August and October. January, February and March are the peak arid months and the rainfall ranges from 0.3 to 46mm in these months. A 2 km buffer area from the park periphery was demarked on a topographic map and a total of 77 revenue villages located within this area were listed. Of this 21 villages scattered evenly around the park representing the three forest ranges were selected for sampling (Fig.1b).

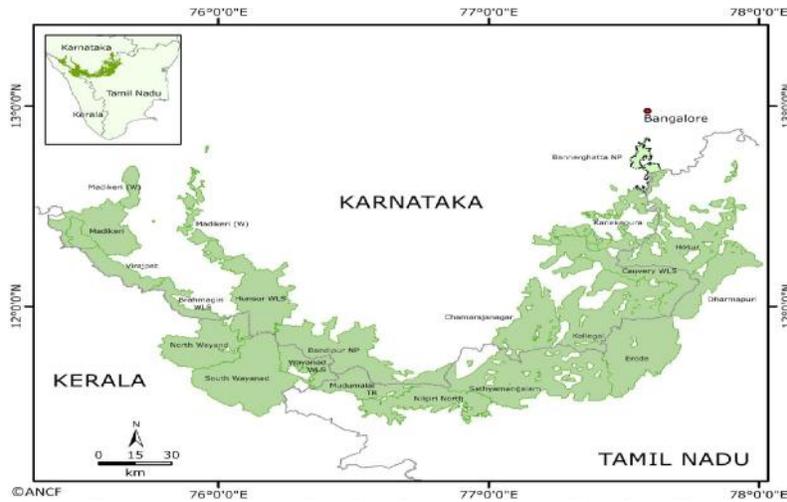


FIGURE 1A: Showing Bannerghatta National Park (BNP) along with other adjacent forest divisions

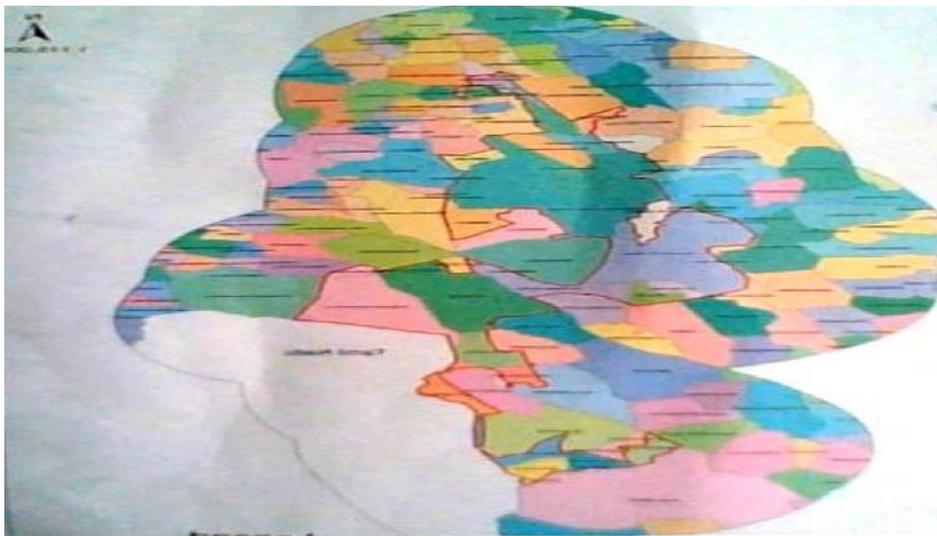


FIGURE 1b: Villages in around Bannerghatta National park

#### Description of Boundaries

All around borders of Bannerghatta National Park to the radius of 2 km as marked on toposheet and also extends to the enclosures situated within BNP. The boundaries adjoining Ragihalli south block and gullahatti Kaval on their eastern would be as shown on toposheet extended homogeneously to the radius of 2km as shown in toposheet.

#### Field survey and data collection

The relevant information and data for preparation of the paper were collected mainly from secondary sources available in publication and reports of government departments and academic institutions. However some information pertaining to avian diversity status was also collected by conducting personal interviewed at state forest department (BNP). An extensive survey of the available literature on avian diversity of BNP was carried

out by visiting different government forest zonal offices, academic institutions and various libraries, published and unpublished data pertaining to avian diversity were collected from technical reports and personal interviews. The field surveys were conducted during the month of June 2015 visiting all the 21 villages by vehicle. A special data collection field sheet was designed to collect information on these villages such as soil type, crops cultivated, including the avian diversity (Fig. 2). The relevant information and data for preparation of this paper were collected and obtained from secondary sources available in publications technical reports of forest department (BNP), journals. The interview of the selected institutions and officials, bird specialists, naturalists, wild life NGO'S (Rocha, India) were done by personal visits.

#### Assessment of Avian diversity within 2 km radius of the BNP

The study was carried out by following the transect method. The forest guards who are the staff of Karnataka Forest Department were utilized for this activity. A total of seven transects each one measuring two km in length were laid and distributed evenly within two km area surrounding the park except the northern part which is residential to the maximum extent. At 250m point interval of each transect, four nearest trees were pointed for enumerating bird species name, distance of the transect line.

## RESULTS & DISCUSSION

The survey results show that about 43% of the villages are located on undulating terrain followed by about 33% on slopes and 5% in villages. Only 19% of the villages in the region were situated on flat terrain lands. This clearly suggests that the lands of these are highly undulating and less suitable for human habitations. The major soil type in the region is found to be red soil (50%) followed by clay soil (31%), sandy soil (24%), loamy soil (19%), gravelly soil (19%), Alluvial soil (14%) and black soil (10%). The region also falls under the catchment area of Arkavathi River (A tributary of river Cauvery) and has given birth to two major streams viz. Antharagange hole and Rayatmale hole both in the Western part of the BNP. The survey results showed that agricultural farming is the major land use in the study area (86%) followed by urban development (19%), industrial development (5%) and stone quarry (5%) and sand mining (5%) (Fig. 2).

#### Avian diversity

The findings of the survey suggest that the region is rich in bird diversity (Table-1) with a minimum of 139 birds identified during the survey period. The area is also a habitat for important IUCN red list species viz. Forest Owlet (*Heteroglaux blewitti*), Red headed vulture (*Sarcogyps calvus*), Indian, White Backed vulture (*Gyps bengalensis*), Egyptian vulture (*Neophron percnopterus*).

TABLE 1. Shows the bird diversity of the villages in the region

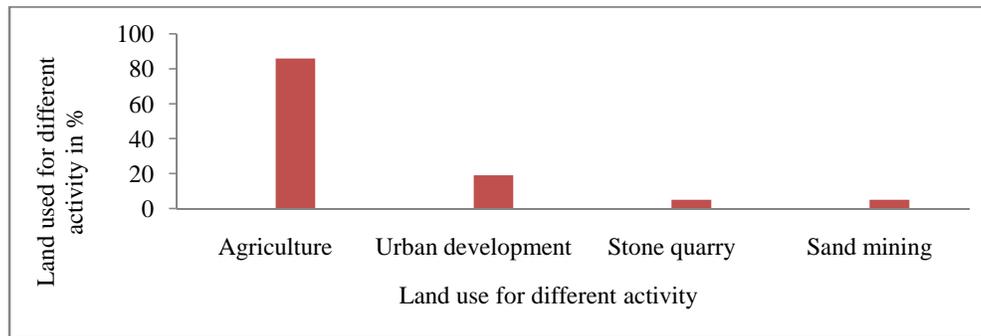
Sl.No.	Name of the bird	Scientific Name	Proportion of villages sighted	Conservation Status
1	House sparrow	<i>Passer domesticus</i>	95.24	
2	House crow	<i>Corvus splendens</i>	90.48	
3	Common myna	<i>Acridotheres tristis</i>	76.19	
4	Brahminy Kite	<i>Haliastur indus</i>	71.43	
5	Blue Rock pigeon	<i>Columba livia</i>	66.67	
6	Ashy Prinia	<i>Prinia socialis</i>	52.38	
7	Cattle Egret	<i>Passer domesticus</i>	52.38	
8	Jungle crow	<i>Corvus leucorhynchus</i>	52.38	
9	Asian koel	<i>Eudynamis scolopacea</i>	47.62	
10	Red vented bulbul	<i>Pycnonotus cafer</i>	47.62	
11	Rose ringed parakeet	<i>Psittacula krameri</i>	47.62	
12	Black kite	<i>Milvus migrans</i>	42.86	
13	Indian robin	<i>Saxicoloides fulicantus</i>	42.86	
14	Jungle myna	<i>Acridotheres fuscus</i>	42.86	
15	Oriental magpie robin	<i>Copsychus saularis</i>	42.86	
16	Red whiskered bulbul	<i>Pycnonotus jocosus</i>	42.86	
17	Spotted dove	<i>Streptopelia chinensis</i>	42.86	
18	Ashy Drongo	<i>Dicrurus leucophaeus</i>	38.10	
19	Barn Owl	<i>Tyto alba</i>	38.10	
20	Baya weaver	<i>Ploceus philippinus</i>	38.10	
21	Common quail	<i>Coturnix coturnix</i>	38.10	
22	Blue winged parakeet	<i>Psittacula columboides</i>	33.33	
23	Common button quail	<i>Turnus sutor</i>	33.33	
24	Coppersmith barbet	<i>Megalaima haemacephala</i>	33.33	
25	Red collared dove	<i>Streptopelia tranquebarica</i>	33.33	
26	Red wattled lapwing	<i>Vanellus indicus</i>	33.33	
27	Small green bee eater	<i>Merops orientalis</i>	33.33	
28	White checked barbet	<i>Megalaima viridis</i>	33.33	
29	Black drongo	<i>Dicrurus macrocercus</i>	28.57	
30	Black eagle	<i>Ictinaetus malayensis</i>	28.57	
31	Indian roller	<i>Coracias benghalensis</i>	28.57	
32	White bellied drongo	<i>Dicrurus caeruleus</i>	28.57	
33	Forest Owlet	<i>Heteroglaux blewini</i>	23.81	
34	Oriental turtle dove	<i>Streptopelia orientalis</i>	23.81	Critically endangered
35	Small sun bird	<i>Nectarinia minima</i>	23.81	
36	Tickell's flower pecker	<i>Dicaeum erythrorhynchos</i>	23.81	

Avian diversity present with in 2 km radius of Bannerghatta National Park

37	White throated fantail flycatcher	<i>Rhipiduraalbicollis</i>	23.81	
38	Black Shouldered kite	<i>Elanusaxillaris</i>	19.05	
39	Common cuckoo	<i>cuculuscanorus</i>	19.05	
40	Rufous Wood pecker	<i>Celeusbrachyurus</i>	19.05	
41	Eurasain collard dove	<i>Streptipeliadecaecto</i>	19.05	
42	Marshel'siora	<i>Aegithinanigrolutea</i>	4.76	
43	Northern shoveller	<i>Anasclypeata</i>	4.76	
44	Orphean warbler	<i>Sylvia hortensis</i>	4.76	
45	Paddy field pipit	<i>Anthusrufulus</i>	4.76	
46	Purple rumped sun bird	<i>Neectariniazeylonica</i>	4.76	
47	Red rumped swallow	<i>Hirundodaurica</i>	4.76	
48	Tickell's fly catcher	<i>Cyornistickelliae</i>	4.76	
49	White bellied tree pie	<i>Dendrocittaleucogastra</i>	4.76	
50	White bellied minivet	<i>Pericrocotuserythropygius</i>	4.76	
51	White browed fantail flycatcher	<i>Rhipiduraaureola</i>	4.76	
52	White throated munia	<i>Lonchuramalabarica</i>	4.76	
53	Lesser coucal	<i>Centropusbengalensis</i>	19.05	
54	Purple sunbird	<i>Nectariniaasiatica</i>	19.05	
55	White wagtail	<i>Motacilla alba</i>	19.05	
56	Blue checked bee eater	<i>Merops persicus</i>	14.29	
57	Common babble	<i>Turdoidescaudata</i>	14.29	
58	Egyptian vulture	<i>Neophronpercnopterus</i>	14.29	Endangered
59	Greater caucal	<i>Centropussinensis</i>	14.29	
60	Loten's sunbird	<i>Nectarinialotenia</i>	14.29	
61	Assian brown fly catcher	<i>Muscicapadaaurica</i>	9.52	
62	Assian paradise flycatcher	<i>Terpsiphoneparadi</i>	9.52	
63	Goldfronted chloropsis	<i>Chloropsisaurifrons</i>	9.52	
64	Greenish leaf warbler	<i>Phylloscopustrochiloides</i>	9.52	
65	Indian cuckoo	<i>Cuculusmicropterus</i>	9.52	
66	Large grey babbler	<i>Turdoidesmalcolm</i>	9.52	
67	Pied bush chat	<i>Saxicolacaprata</i>	9.52	
68	Red minia	<i>Amandavaamandava</i>	9.52	
69	Rosy minivet	<i>Pericrotusroseus</i>	9.52	
70	Shikra	<i>Accipiter badius</i>	9.52	
71	Spotted owl	<i>Athenebrama</i>	9.52	
72	White browed bulbul	<i>Pycnonotusluteolus</i>	9.52	
73	Tailor bird	<i>Orthomussutorius</i>	9.52	
74	Bay backed shrike	<i>Laniusvittatus</i>	4.76	
75	Black headed munia	<i>Lonchuramalacca</i>	4.76	
76	Black napped Oriole	<i>Orioluschinensis</i>	4.76	
77	Black shouldered wood pecker	<i>Chryscolaptesfestivus</i>	4.76	
78	Brown shrinke	<i>Laniuscristatus</i>	4.76	
79	Common Iora	<i>Aegithinatiphia</i>	4.76	
80	Crested serpent eagle	<i>Spilornischeela</i>	4.76	
81	Grey francolin	<i>Francolinuspondicerianus</i>	4.76	
82	Indian great reed warbler	<i>Acrocephalusstentoreus</i>	4.76	
83	Indian white backed vulture	<i>Gyps bengalensis</i>	4.76	Critically endangered
84	Jerdon'sbaza	<i>Avicedajerdoni</i>	4.76	
85	Jerdon'sChloropsis	<i>Chloropsisjerdoni</i>	4.76	
86	Large pied wagtail	<i>Motacillamderaspatensis</i>	4.76	
87	Little brown dove	<i>Streptopeliasenegalnsis</i>	4.76	
	<b>Water birds</b>			
88	Pied kingfisher	<i>Cerylerudis</i>	42.86	
89	Pond heron	<i>Ardeolagrayii</i>	42.86	
90	Small blue king fisher	<i>Alcedocoeruleus</i>	42.86	
91	Common moorhen	<i>Gallinulachloropus</i>	28.57	
92	Little egret	<i>Egretta garzetta</i>	28.57	
93	Common coot	<i>Fulicaatra</i>	23.81	
94	Median egret	<i>Mesophoysintermedia</i>	23.81	
95	Purple moorhen	<i>Porphyrioporphyrus</i>	23.81	
96	Alpine swift	<i>Tachymartus melba</i>	19.05	
97	Grey Heron	<i>Ardeacinerea</i>	19.05	
98	White breasted king fisher	<i>Halcyon smyrnensis</i>	19.05	
99	Common swallow	<i>Hirundorustica</i>	9.52	
100	Little cormorant	<i>Phalacrocoraxniger</i>	9.52	

101	White breasted water hen	<i>AmaurornisPhoenicurus</i>	9.52	
102	Wire tailed swallow	<i>Hirundosmithii</i>	9.52	
103	Black Ibis	<i>Pseudibispapillosa</i>	4.76	
104	Common river tern	<i>Sterna aurantia</i>	4.76	
105	Glossy ibis	<i>Plegadisfalcinellus</i>	4.76	
106	Little grebe	<i>Tachybaptusruficollis</i>	4.76	
107	Purple heron	<i>Ardeapurpurea</i>	4.76	
108	White bellied heron	<i>Ardeainsignis</i>	4.76	Critically endangered
109	Great cormorant	<i>Phalacrocorax carb</i>	4.76	

Endangered, Critically Endangered, (IUCN, 2009 and Ali, 2002)



**FIGURE 2.** Land Use for different activity

## CONCLUSION

The proposed 2km radius of the BNP has more undulating topography which is a distinctive of forest land. The region also falls under the catchment area of the Arkavathi River which is the tributary of Cauvery. The region is more or less developed in terms of connectivity. Agriculture is mostly seasonal but thorough. The economy of the area is agriculture based with a recent addition of stone quarrying and illegal sand mining. The study area appears to be a region of high avian diversity and has a high conservation value. The avian diversity, vegetation in the region appears to have a greater species diversity and high species rarity. The avian diversity is more stable and growing forest type with more number of juveniles present in it. However, there is a shortage in the findings in terms of density values for the region due to the limitation of time.

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