

Recommendation for a Greater Hesaraghatta Conservation Reserve (GHCR) in Bangalore

Including an Assessment of the Biodiversity and Conservation Value of the Hesaraghatta Grasslands & nearby Lakes



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Summary

The Hesaraghatta Lakebed area and Grasslands in the surrounding catchment area in the north-west of Bangalore are an important reservoir of biodiversity that includes scheduled 1 species like the Lesser Florican and the Indian Leopard. Yet, such areas remain outside of the protected area network of Karnataka and face severe threats to its biodiversity.

Hesaraghatta Lake was an important source of drinking water to the city of Bangalore till about 1994 and could be revived as a catchment area. The landscape surrounding the lakebed is the last remaining grassland habitat in the Bangalore region and supports unique biodiversity.

Unfortunately, in recent times, the grasslands have been degraded due to numerous commercial and other human-induced pressures. Lack of protection adds to these pressures. The grasslands have also been severely dissected by planting trees in unprecedentedly high densities by the Bangalore Development Authority (BDA).

This adversely impacted biodiversity, by disrupting large populations of migratory birds that inhabit the area during winter. India has ratified the Ramsar Convention and Convention on Migratory species (CMS) and it is imperative for upholding the commitments by providing necessary protection to the migratory birds and their habitat.

The grasslands have other vital benefits to citizens of Bangalore like outdoor recreation and nature education.

As per the Animal Husbandry department any development of the grasslands could pose a bio-security hazard to the various animal farms in the area and have strongly recommended protection of the grasslands. The High Court of Karnataka has declared a **Status Quo** in a response to a public interest litigation (PIL).

This proposal provides important information and strategies for successfully conserving the region as a critical and sensitive ecological zone.

We hereby request it be declared a **Conservation Reserve**, under section 36A of the Wildlife Protection Act 1972.

Introduction to the Proposal

The city of Bangalore is one of the fastest growing cities in Asia. With increasing urbanization, biodiversity in natural areas have been facing an onslaught. Wildlife and their habitat are facing the onslaught due to rapidly shrinking habitats, disturbance and destruction of habitat, fragmentation and persecution from various quarters. The Hesaraghatta Lake and its immediate surrounding areas are no exception. This proposal is a plea making a case for conservation of the fragile grasslands around Hesaraghatta Lake and to prevent any further destruction.

In this direction, it presents the sources of threats and disturbances the area is currently facing, the uniqueness of the area with respect to biodiversity conservation and presents the options for conservation.



Why This Proposal?

According to a report released by the Planning Commission (attached #1), Government of India, grasslands and deserts are among the most neglected and yet important ecosystems supporting rich biodiversity in India (Planning Commission 2013). This neglect is evident is obvious in grasslands across India and the Hesaraghatta area is no exception. Like much of the country's grasslands (and forests), this area faces severe pressures from human activities, such as unregulated vehicular movement, sand mining, hunting and tree plantations.

Hesaraghatta Lake, located about 18 km. from Bangalore once supplied drinking water to the city of Bangalore and reached its full capacity for the last time in 1994 (Wikipedia 2013). Since then, the lake and its surrounding areas have undergone tremendous change. The drying of the lake bed has set in motion an ecological succession on a massive scale. As a consequence, most of the area surrounding the lake bed, that forms the immediate catchment area around the lake, looks like a tree savanna. More recently, the Hesaraghatta area has been subjected to intense tree planting to an unprecedented scale, which has totally desecrated its unique grassland habitat (Lakshman 2012, Sreenivasan 2011, Subramanya 2013; figures 1, 2, 3, 4). Besides, the unrestricted and heightened human activity (Seshadri *et al.* 2013) in the area has been impacting the habitat and the biodiversity it supports.



Figure 1: JCB dug pits used for high-density tree planting by BDA in 2011



Figure 2: High intensity tree planting in the tree-savanna type of grassland ecosystem at Hesaraghatta



Figure 3: High intensity of tree planting in the open grassland ecosystem



Figure 4: Google Earth imagery (white areas) showing the extent of tree planting in Hesaraghatta

This is apart from the direct anthropogenic disturbances caused by the numerous establishments of hospitality and entertainment industry that have been set up in the region (Bhat, 2013). Considering

these threats and disturbance that the Hesaraghatta grasslands are subjected to, it is proposed that the grassland that thus exists and supports a rich biodiversity (Subramanya 2012b, attached #2) is worth preserving. Otherwise, due to the present apathy, lacking any conservation intervention, hundreds of species of flora and fauna will be at risk at Hesaraghatta and its catchment. Here, we propose to declare the Hesaraghatta lakebed, surrounding grassland/woodland and conserve the water catchment area from further degradation by proposing to declare it as a Conservation Reserve.

Rejuvenation of the Water Catchment Area - A Case for Bangalore's Water Security

If one draws a an arc with a radius of 3 km from east to west via north, keeping the south end of Hesaraghatta lake as the centre, that would be one of the largest single and prime catchment of Hesaraghatta reservoir and the (now extinct) Arkavathy river as well. On the northern side, it extends to over 10-11 Km all the way to Kakolu tank. As the government owns over 4000 acres of this catchment, and even though intensive agriculture has taken place, it is not built up. There is almost no toxic effluents or large amounts of sewage.

The ground water levels in and around Hesaraghatta have plummeted and continues to do so. What was 70 ft in the 1980s is now between 600 to over 1000 ft. The land use pattern around is rapidly changing; unused agricultural lands are legally and illegally are being sold as 'residential plots'. To feed into this development water is being farmed from deep bore wells. Cropping patterns have changed and farmers are growing water intensive crops such as corn in large scale, which is further depleting the water table.

There is no sewage and garbage management plan here and the increasing population is increasing this problem every day. Garbage will soon find its way to the dry lake bed. The drinking water supply is in an alarming situation right now in Hesaraghatta and surrounding villages. Severe granite quarrying around Hesaraghatta is also degrading the catchment area.

To add to all this, the city of Bangalore is inching north like a giant amoeba and its just a matter of a couple of years before this place gets totally built up. Hence it is important to preserve the 5000 acre lake bed, catchment and surrounding grasslands keeping the water security of Bangalore and surrounding areas in mind. By preserving the thousands of acres of land around Hesaraghatta reservoir, Byatha, Kakolu tanks and the Hesaraghatta Lake bed itself as part of the Greater Hesaraghatta Reserve, we will be making a large contribution to the future generations. Any large scale commercial activity in this area will spell doom to the already precarious water situation.

Public Interest Litigation (PIL) in Karnataka High Court

In September 2012, a group of concerned citizens led by photographer Mahesh Bhat, who lives near the Hesaraghatta grasslands in Bangalore, had initiated an online petition campaign to save the Hesaraghatta grasslands from getting converted into a film city as proposed in the annual 2012 Karnataka budget. Earlier, in August 2011, the Bangalore Development Authority (BDA) had planted several thousand saplings in almost half of the grassland. The misguided seemingly good-intentioned

approach was stopped thanks to an outcry from conservationists in the city but not before considerable damage was done.

Subsequently Mahesh and his colleagues from Arkavathy and Kumudvathy River Rejuvenation Trust had met the then chief minister, the chief secretary, and other senior officials on this subject too. The department of Information who is responsible to build the film city on this land had even sent our petition to the government. But there was no response. Hence the trust filed a PIL in the high court of Karnataka (WP45759/2012) in December 2012.

*The PIL came up for hearing before the division bench of the acting Chief Justice and Justice Nagarathna on 4th January 2013. The Hon'ble court has admitted the petition and issued notices to the govt. The bench has also asked **status quo** (order attached #3) to be maintained till further orders.*

We hope that the final verdict will favour the environment, and not mindless and insensitive development in a fragile ecosystem.

Other Considerations – Animal Husbandry & Bio-security

In addition to the rationale provided about protecting the grasslands, there are other important reasons that necessitate the area is left undisturbed.

The Principal Secretary to the Government, Animal Husbandry & Fisheries Department, in a letter to Chief Secretary (attached #4) has clearly recommended NOT subjecting the Hesaraghatta Grasslands to any development for several reasons.

Here is the summary / opinion in the last part of her letter:

On the above grounds, this department is of the opinion that it is not advisable to develop this land on the lines suggested by the Tourism Department. This department is also of the considered view that this particular piece of land be left as grassland and returned to the Animal Husbandry Department for protecting and preserving it as such.

Additionally, as per the instructions of the Principal Secretary, Dept. of Animal Husbandry and Fisheries, a meeting of Heads of various farms at Hesaraghatta under the Chairmanship of Dr. S Yathiraj, Dean, Veterinary College, KVAFSU, Hebbal, Bangalore was held on 5th May 2012. Subsequently, the Dean visited Hesaraghatta Farm and had discussions with the Heads of various centres / farms to discuss about the bio-security threats to the animal husbandry activities in and around Hesaraghatta in view of establishment of Theme Park related to Film Industry.

Here is the opinion of the Dean (full report attached #5):

Any form of increased human activity in this area will be a great threat to the breeding activities which are the primary source of breeding material to the state and country which has a direct impact on the milk production of state in turn gravely effects the economy and livelihood security of farmers.

In order to maintain highest order of bio-security in terms of maintaining disease free animals in the zone, sustainable livestock, poultry and fish production, rural economy, any enterprising activity, which enhances human movement around the existing farms, should not be encouraged.

These considerations suggest, in no uncertain terms, that the Hesaraghatta grasslands should be left undisturbed.

Proposed Conservation Reserve Area

The proposed Hesaraghatta Conservation Reserve is about 5000 acres in and around Hesaraghatta Lake (Figure 1). It includes the larger water catchment of Byatha and Kakolu Lakes. Though these lakes do not cater to the water needs of Bangalore today, they possess immense potential in doing so in the near future. The existence of these lakes also has significant effects on the ground water table as well. A detailed description and justifications for this proposition is provided below.

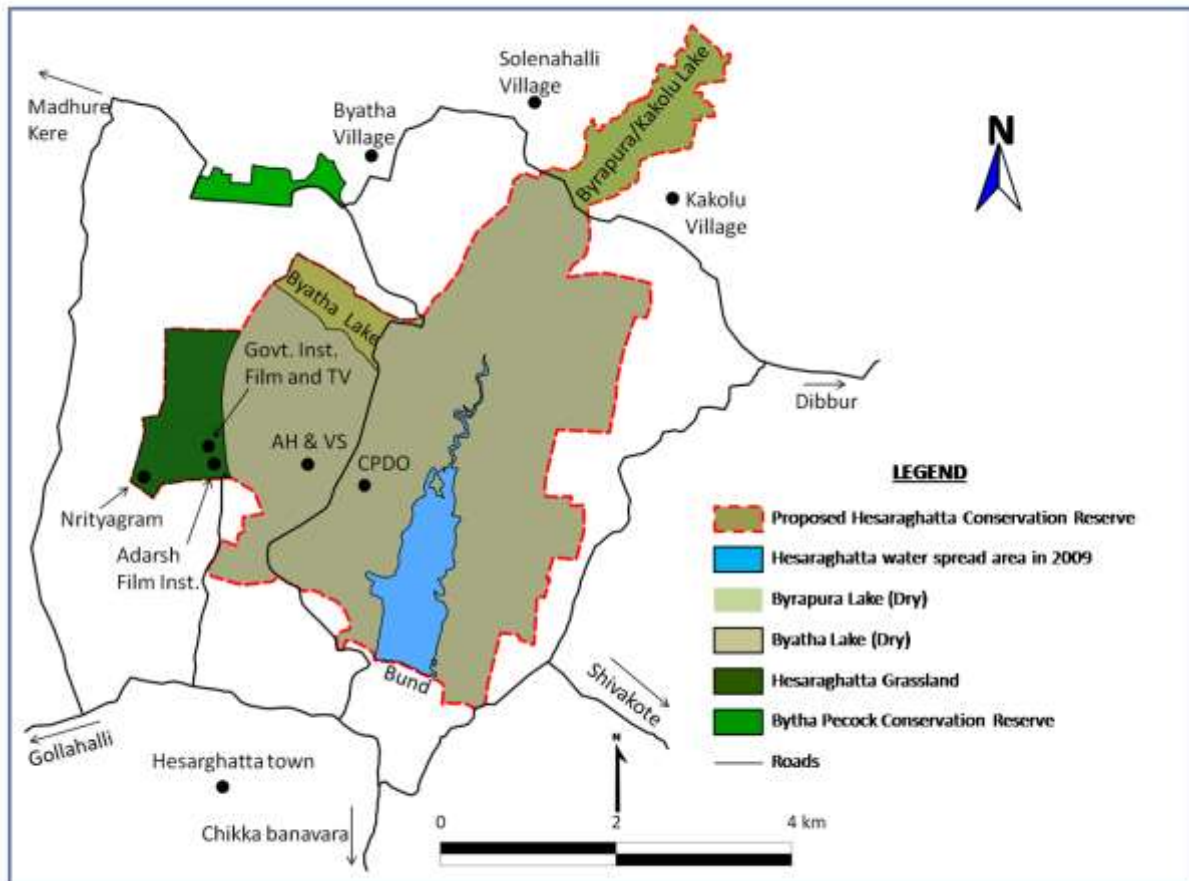


Figure 5: Thematic plan depicting the proposed Hesaraghatta Conservation Reserve

The proposed area includes:

- Hesaraghatta Grassland (356 acres)
- Byrapura Lake (Dry – 383 acres)
- Byatha Lake (Dry – 165 acres)
- Water spread area in Hesaraghatta lake (1356 acres (2009))

Justification for selecting the aforementioned areas:

- The proposed Reserve is home to hundreds of species of flora and fauna, including plants, mammals, reptiles, amphibians, birds, spiders, butterflies and more (Subramanya 2012b).
- The place has about forty native and naturalized plant species belonging to the grassland ecosystem, apart from a few invasive species that have made their home here.
- There are also about a dozen species of trees have been planted in large numbers here recently.
- The area supports a unique diversity of avifauna in this area (Subramanya 2012b). About 133 species of birds across more than 40 families are seen here, accounting for a third of the species recorded for Bangalore. Quails, peafowl, egrets, harriers, kites, eagles, vultures, falcons, doves, cuckoos, lapwings, owls and more reside in the area of the proposed Conservation Reserve.
- Some of the rare and significant species found in the proposed Reserve area include:
 - The Indian Leopard (*Panthera pardus*) has been intermittently spotted on the grasslands. Recently a forest department project camera-trapped a leopard in the grasslands. The leopard is listed under Schedule I of the Wildlife Conservation Act (1972), according them the highest level of legal protection in the country.
 - The Lesser Florican (*Sypheotides indicus*), an endangered endemic bustard that is listed under Schedule I of the Wildlife Conservation Act (1972) which has been sighted in Hesaraghatta after 100 years (Raghavendra 2012, Subramanya 2012a attachment #6).
 - The Slender Loris (*Loris tardigradus*) is a small, nocturnal primate that prefers thorny bushes that dot the grasslands. They are also listed under the Schedule I of the Wildlife (Protection) Act of India, 1972.
 - European Roller (*Coracias garrulous*), a bird listed as 'Vulnerable' in the Red List of the International Union for Conservation of Nature (IUCN), and
 - The Lilac Silverline (*Apharitis lilacinus*) butterfly, sighted after 103 years in Bangalore, and only at Hesaraghatta.
- The area is also home to thousands of migratory birds that arrive here every winter from the Palearctic and from as close as Arctic Circle.



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Figure 6: Clockwise from bottom right – Lilac Silverline Butterfly, Slender Loris, Common Leopard and Lesser Florican



Figure 7: Clockwise from bottom right – Pallid Harrier, Marsh Harrier, Short-toed Snake-eagle, Red-necked Falcon

Richness of Flora and Fauna

The following table summarizes the flora and fauna recorded at the Hesaraghatta lake and grassland area. More details can be found in Appendix and Subramanya (2012b, attachment #2).

Group		Number of species
A.	Plants (including grasses)	
a.	Native and Naturalized Plant Species in Hesaraghatta Grasslands and Grassland Scrub	39
b.	Invasive Plant species in Grassland	4
c.	Trees species planted recently in the Grassland and Grassland Scrub	12
B	Mammals	10
C.	Reptiles	5

D.	Birds	133
E.	Amphibians	1
G.	Spiders	3
F.	Butterflies	14

Conservation Issues: Commercial & Other Activities

- **Unregulated vehicular movement:** In recent years, nature, more specifically, wildlife photographers have been a source of great disturbance to the birds and other fauna that inhabit the Hesaraghatta area. These photographers, pursue birds in their vehicles continuously, which besides a source of disturbance, would cause damage to the habitat (see, Seshadri *et al.* 2013). This activity has been facilitated by the drying of lakebed and causes damage by destroying vegetation.
- **Sand mining:** Owing to the drying-up of the lake, sand mining in the lakebed area by villagers from the surrounding area has resulted in the formation of large pits damaging the lakebed area. Unchecked sand-mining would alter the lake structure and thus the biota that inhabit the lake.
- **Tree plantations:** In the recent years, tree planting activity has been wide spread with pits dug using JCB and most of the grassland area was intensely planted with saplings with the inter-plant distance being anywhere between 6-8feet. Majority of the sapling species planted belonged to Pongamia, Bamboo, Neem, Simarouba, Jamun, Rose-apple and a few others. The high intensity tree planting at Hessarghatta has completely desecrated the grassland ecosystem due to the planting sapling of trees that are not native to the open and tree-savanna grassland habitats. This desecration and the scale at which tree-planting has been carried out has destroyed the last remaining unique grassland ecosystem in the outskirts of Bangalore. Close examination of the tree planting activity on Google Earth clearly shows that an enormous area has been covered under the tree-planting activity and destruction of the habitat has been of unprecedented scale and has caused an irreparable damage to the unique grassland ecosystem (Subramanya 2013).
- **Hunting:** It has been observed that hunting of birds and other animals that inhabit the grassland area by the people from the surrounding area has been of regular occurrence. As area is not being patrolled by the staff of the State Wildlife Department of KFD, this activity has shaped up without any control.
- **Commercial establishments:** The setting up of various commercial units related to the hospitality and entertainment industries has worsened the situation: As can be seen in Figure 1, many establishments both private and State owned have built their establishments and facilities within the immediate surroundings of the lake.

Solutions: Conservation Strategy

- The proposal in being fully aware of the unique habitat and the accompanying biodiversity that the Hesaraghatta Area supports, strongly campaigns for declaration of the area as a Conservation Reserve.

- Considering the disturbance and damage caused to the grassland habitat and its inhabiting biota and more particularly the unprecedented desecration of grassland habitat due to mindless, large-scale tree-planting activity, would call for an end to these activities and that these habitat destructive and biodiversity un-friendly activities can only be stopped when the area is declared as a Protected/Conservation area.
- As India has ratified the Convention on Migratory Species, it has become necessary to accord protection to a host of migratory species that frequent Hesaraghatta area and the habitat that they inhabit in the area.
- ***Digging of trenches to restrict vehicular movement:*** In an effort to reduce vehicular movements with the Hesaraghatta grassland area, it is recommended to dig trenches along trails, entry points and at key access points.
- ***Policing by forest department against illegal activities:*** As hunting of birds and other animals has been unchecked besides other forms of disturbance to the habitat and fauna, it is strongly recommended to post regular watch and ward at Hesaraghatta area, more particularly during winter (October – April) months, with permanent staff of the State Forest Department deployed in the area.
- Encouraging low-impact recreation activities like bird watching and nature appreciation, cycling, walking and running in demarcated trails. Such citizens would also serve the role of watchdogs for the ecosystem. The Karnataka Forest department has already developed several such “Urban Forests” across the state.
- A year-round multi-year ecology and biodiversity monitoring programme in collaboration with a leading Bangalore-based educational institution like NCBS or IISc.

Thus, both habitat protection and biodiversity conservation needs at Hesaraghatta can be only be addressed by declaration of the area as a ***Conservation Reserve***.

Attachments

1. Planning Commission. Report of the Task Force on Grasslands and Deserts. Government of India (undated).
2. Status Survey of Hesaraghatta Grasslands by S. Subramanya as requested by Karnataka Biodiversity Board (KBB).
3. Karnataka High Court Order in response to Writ Petition WP45759/2012.
4. Letter from Principal Secretary to the Government, Animal Husbandry & Fisheries Department to Chief Secretary.
5. Letter from Dr. S Yathiraj, Dean, Veterinary College, KVAFSU, Bangalore, in view of establishment of Theme Park related to Film Industry.
6. Raghavendra, M., 2011. Occurrence of Lesser Floricorn *Sypheotides indicus* in Bangalore, Karnataka, India. Indian BIRDS.

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13. <http://www.conservationindia.org/gallery/kannada-film-industry-continues-to-destroy-hesaraghatta-grassland>

Appendix A: Species

Plants (including grasses)

Native and Naturalized Plant Species in Hesaraghatta Grasslands and Grassland Scrub

Family: Acanthaceae

1. *Andrographis serpyllifolia* (Vahl) Wight
2. *Barleria buxifolia* L.
3. *Lepidagathis cristata* Willd.
4. *Agave sisalana* Perrine ex Engelm.

Family: Apocynaceae

5. *Carissa paucinerva* A. DC.
6. *Ichnocarpus frutescens* (L.) R.Br.

Family: Arecaceae

7. *Phoenix sylvestris* (L.) Roxb.

Family: Asclepiadaceae

8. *Calotropis gigantea* (L.) R. Br.

Family: Asteraceae

9. *Chromolaena odorata* (L.) King & Robinson
10. *Launaea acaulis* (Roxb.) Babc. ex Kerr
11. *Vicoa indica* (L.) DC.

Family: Celastraceae

12. *Celastrus paniculatus* Willd.

Family: Convolvulaceae

13. *Evolvulus alsinoides* (L.) L.

Family: Cucurbitaceae

14. *Diplocyclos palmatus* (L.) Jeffrey

Family: Ebenaceae

15. *Diospyros melanoxylon* Roxb.

Family: Erythroxylaceae

16. *Erythroxylum monogynum* Roxb.

Family: Euphorbiaceae

17. *Euphorbia laeta* Heyne ex Roth
18. *Securinega leucopyrus* (Willd.) Muell.-Arg.

19. *Tragia involucrata* L.

Family: Fabaceae

Sub-family: Caesalpinioideae

20. *Cassia auriculata* L.

Sub-family: Faboideae

21. *Abrus precatorius* L.

22. *Butea monosperma* (Lam.) Taub.

23. *Crotalaria* sp.

Sub-family: Mimosoideae

24. *Acacia nilotica* ssp. *indica* (Bentham) Brenan

25. *Acacia* sp.

26. *Pithecellobium dulce* (Roxb.) Bentham

Family: Flacourtiaceae

27. *Flacourtia indica* (N. Burman) Merrill

Family: Lamiaceae

28. *Leucas hirta* (Roth) Sprengel

Family: Meliaceae

29. *Cipadessa baccifera* (Roth) Miquel

Family: Menispermaceae

30. *Cocculus hirsutus* (L.) Diels

Family: Poaceae

31. *Heteropogon contortus* (L.) Pal.-Beauv. ex Roemer & Schultes

32. *Aristida hystrix* L. f.

33. *Cymbopogon citratus* (DC.) Stapf

34. *Digitaria ciliaris* (Retz.) Koeler

35. *Themeda triandra* Forskal

Family: Rubiaceae

36. *Canthium parviflorum* Lam.

Family: Rutaceae

37. *Toddalia asiatica* var. *floribunda* Gamble

Family: Scrophulariaceae

38. *Striga asiatica* (L.) Kuntze

39. *Tridax procumbans*

Invasive Plant species in Grassland

Family:

1. Mesquite *Prosopis juliflora*

Family:

2. Lantana *Lantana camara*

Family:

3. Eupatorium *Eupatorium perfoliatum*

Family:

4. *Stachytarpheta indica*

Trees species planted recently in the Grassland and Grassland Scrub

Family: Moraceae

1. *Artocarpus heterophyllus* Lam.

2. *Ficus religiosa* L.

Family: Proteaceae

3. *Grevillea robusta* A.Cunn. ex R.Br.

Family: Anacardiaceae

4. *Mangifera indica* L.

Family: Muntingiaceae

5. *Muntingia calabura* L.

Family: Fabaceae

Sub-family: Faboideae

6. *Pongamia pinnata* (L.) Pierre

7. *Tamarindus indica* L.

Family: Myrtaceae

8. *Psidium guajava* L.

9. *Syzygium cumini* (L.) Skeels

Family: Meliaceae

10. *Swietenia mahagoni* (L.) Jacq.

Family: Combretaceae

11. *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.

Family: Malvaceae

12. *Thespesia populnea* (L.) Sol. ex Correa

Mammals

1. Slender Loris *Loris lydekkerianus*
2. Common Mongoose *Herpestes edwardsii*
3. Jackal *Canis aureus naria*
4. Indian Fox *Vulpes bengalensis*
5. Palm squirrel *Funambulus palmarum*
6. Indian Mole rat *Bandicota bengalensis*
7. House Mouse *Mus musculus*
8. Indian Field Mouse *Mus booduga*
9. Black-naped Hare *Lepus nigricollis*
10. Wild Boar *Sus scrofa*
11. Common Leopard *Panthera pardus*

Reptiles

1. Garden Lizard, *Calotes versicolor*
2. Peninsular Rock Agama *Psammophilus dorsalis*
3. Ratsnake *Ptyas mucosus*
4. Common Cobra *Naja naja*
5. Russell's Viper *Daboia russelii*

Birds

Order: Galliformes

Family: Phasianidae

1. Grey Francolin *Francolinus pondicerianus*
2. Common Quail *Coturnix coturnix*
3. Rain Quail
4. Jungle Bush Quail *Perdica asiatica*
5. Grey Junglefowl *Gallus sonneratii*
6. Indian Peafowl *Pavo cristatus*

Order: Pelecaniformes

Family: Ardeidae

7. Cattle Egret *Bubulcus ibis*
8. Indian Pond Heron *Ardeola grayii*

Order: Falconiformes

Family: Accipitridae

9. Crested Honey Buzzard *Pernis ptilorhyncus*

10. Black-winged Kite *Elanus caeruleus*
11. Black Kite *Milvus migrans*
12. Brahminy Kite *Haliastur indus*
13. Egyptian Vulture *Neophron percnopterus*
14. Short-toed Snake Eagle *Circaetus gallicus*
15. Marsh Harrier *Circus aeruginosus*
16. Hen Harrier *Circus cyaneus*
17. Pallid Harrier *Circus macrourus*
18. Pied Harrier *Circus melanoleucos*
19. Montagu's Harrier *Circus pygargus*
20. Shikra *Accipiter badius*
21. Eurasian Sparrowhawk *Accipiter nisus*
22. White-eyed Buzzard *Butastur teesa*
23. Indian Spotted Eagle *Aquila hastata*
24. Greater Spotted Eagle *Aquila clanga*
25. Tawny Eagle *Aquila rapax*
26. Steppe Eagle *Aquila nipalensis*
27. Booted Eagle *Aquila pennata*
28. Common Buzzard *Buteo buteo*

Family: Falconidae

29. Common Kestrel *Falco tinnunculus*
30. Red-necked Falcon *Falco chicquera*
31. Peregrine Falcon - *Falco peregrinus*

Order: Otidiformes

Family: Otididae

32. Lesser Florican *Sypheotides indicus*

Order: Charadriiformes

Family: Turnicidae

33. Barred Buttonquail *Turnix suscitator*

Family Charadriidae

34. Yellow-wattled Lapwing *Vanellus malabaricus*
35. Grey-headed Lapwing *Vanellus cinereus*

Order: Columbiformes

Family: Columbidae

36. Rock Pigeon *Columba livia*
37. Laughing Dove *Streptopelia senegalensis*
38. Spotted Dove *Streptopelia chinensis*
39. Eurasian Collared Dove *Streptopelia decaocto*

Order: Psittaciformes

Family: Psittacidae

40. Rose-ringed Parakeet *Psittacula krameri*

Order: Cuculiformes

Family: Cuculidae

41. Pied Cuckoo *Clamator jacobinus*

42. Common Hawk-Cuckoo *Hierococcyx varius*

43. Indian Cuckoo *Cuculus micropterus*

44. Common Cuckoo *Cuculus canorus*

45. Asian Koel *Eudynamys scolopacea*

46. Blue-faced Malkoha *Phaenicophaeus viridirostris*

47. Greater Coucal *Centropus sinensis*

Order: Strigiformes

Family: Tytonidae

48. Barn Owl *Tyto alba*

Family: Strigidae

49. Short-eared Owl *Asio flammeus*

50. Oriental Scops Owl *Otus sunia*

51. Indian Scops Owl *Otus bakkamoena*

52. Indian Eagle-Owl *Bubo bengalensis*

53. Brown Fish Owl *Ketupa zeylonensis*

54. Mottled Wood Owl *Strix ocellata*

55. Jungle Owlet *Glaucidium radiatum*

56. Spotted Owlet *Athene brama*

57. Brown Hawk Owl *Ninox scutulata*

Order: Caprimulgiformes

Family: Caprimulgidae

58. Indian Jungle Nightjar *Caprimulgus indicus*

59. Sykes's Nightjar *Caprimulgus mahrattensis*

60. Indian Nightjar *Caprimulgus asiaticus*

61. Savanna Nightjar *Caprimulgus affinis*

Order: Apodiformes

Family: Apodidae

62. House Swift *Apus affinis*

63. Alpine Swift *Apus melba*

Order: Coraciiformes

Family: Coraciidae

64. Indian Roller *Coracias benghalensis*

Family: Alcedinidae

65. White-throated Kingfisher *Halcyon smyrnensis* (Breeding resident)

Family: Meropidae

66. Green Bee-eater *Merops orientalis*

Order: Bucerotiformes

Family: Upupidae

67. Hoopoe *Upupa epops*

Order: Passeriformes

Family: Pittidae

68. Indian Pitta *Pitta brachyura*

Family: Aegithinidae

69. Common Iora *Aegithina tiphia*

Family: Campephagidae

70. Black-headed Cuckoo-shrike *Coracina melanoptera*

Family: Laniidae

71. Brown Shrike *Lanius cristatus* (Regular winter visitor)

72. Bay-backed Shrike *Lanius vittatus*

73. Long-tailed Shrike *Lanius schach*

Family: Oriolidae

74. Indian Golden Oriole *Oriolus kundoo*

Family: Dicruridae

75. Black Drongo *Dicrurus macrocercus*

76. White-bellied Drongo *Dicrurus caerulescens*

77. Ashy Drongo *Dicrurus leucophaeus*

Family: Corvidae

78. House Crow *Corvus splendens*

79. Jungle Crow *Corvus macrorhynchos*

Family: Paridae

80. Cinereous Tit *Parus cinereus*

Family: Alaudidae

- 81. Jerdon's Bushlark *Mirafra affinis*
- 82. Ashy-crowned Sparrow-Lark *Eremopterix griseus*
- 83. Rufous-tailed Lark *Ammomanes phoenicura*
- 84. Greater Short-toed Lark *Calandrella brachydactyla*
- 85. Oriental Skylark *Alauda gulgula*

Family: Pycnonotidae

- 86. Red-whiskered Bulbul *Pycnonotus jocosus*
- 87. Red-vented Bulbul *Pycnonotus cafer*
- 88. White-browed Bulbul *Pycnonotus luteolus* [34]

Family: Hirundinidae

- 89. Sand Martin *Riparia riparia* (Vagrant)
- 90. Plain Martin *Riparia paludicola* (Vagrant)
- 91. Barn Swallow *Hirundo rustica*
- 92. Pacific Swallow *Hirundo tahitica*
- 93. Red-rumped Swallow *Cecropis daurica*
- 94. Streak-throated Swallow *Hirundo fluvicola*

Family: Phylloscopidae

- 95. Greenish Warbler *Phylloscopus trochiloides*

Family: Acrocephalidae

- 96. Blyth's Reed Warbler *Acrocephalus dumetorum*
- 97. Sykes' Warbler *Iduna rama*

Family: Cisticolidae

- 99. Zitting Cisticola *Cisticola juncidis*

- 100. Jungle Prinia *Prinia sylvatica*
- 101. Ashy Prinia *Prinia socialis*
- 102. Plain Prinia *Prinia inornata*
- 103. Common Tailorbird *Orthotomus sutorius*

Family: Timaliidae

- 104. Tawny-bellied Babbler *Dumetia hyperythra*

Family: Leiothrichidae

- 105. Large Grey Babbler *Turdoides malcolmi*
- 106. Yellow-billed Babbler *Turdoides affinis*

Family: Sylviidae

- 107. Lesser Whitethroat *Sylvia curruca blythi*
- 108. Yellow-eyed Babbler *Chrysomma sinense*

Family: Zosteropidae

109. Oriental White-eye *Zosterops palpebrosus*

Family: Sturnidae

110. Grey-headed Starling *Sturnia malabarica*

111. Brahminy Starling *Sturnia pagodarum*

112. Rose-coloured Starling *Sturnus roseus*

113. Common Myna *Acridotheres tristis*

114. Jungle Myna *Acridotheres fuscus*

Family: Turdidae

115. Indian Robin *Saxicoloides fulicatus*

116. Siberian Stonechat *Saxicola maura*

117. Pied Bushchat *Saxicola caprata*

Family: Dicaeidae

118. Pale-billed Flowerpecker *Dicaeum erythrorhynchos*

Family: Nectariniidae

119. Purple-rumped Sunbird *Nectarinia zeylonica*

120. Purple Sunbird *Cinnyris asiaticus*

Family: Ploceidae

121. Baya Weaver *Ploceus philippinus*

Family: Estrildidae

122. Red Munia *Amandava amandava*

123. Indian Silverbill *Euodice malabarica*

124. White-rumped Munia *Lonchura striata*

125. Scaly-breasted Munia *Lonchura punctulata*

126. Black-headed Munia *Lochura malacca*

Family: Motacillidae

127. White-browed Wagtail *Motacilla maderaspatensis*

128. Grey Wagtail *Motacilla cinerea*

129. Richard's Pipit *Anthus richardi*

130. Red-throated Pipit *Anthus cervinus*

131. Paddyfield Pipit *Anthus rufulus*

132. Blyth's Pipit *Anthus godlewskii*

133. Tree Pipit *Anthus trivialis*

Amphibians

1. Common Toad *Duttaphrynus melanostictus*

Spiders

1. Erisid Spider *Stegodyphus sarasinorum*
2. Signature Spider *Argiope argentata*
3. Giant Wood Spider *Nephila maculate*

Butterflies

Family: Papilionidae

1. Common Rose *Pachliopta aristolochiae*

Family: Nymphalidae

2. Blue Pansy *Junonia orithya*
3. Chocolate Pansy *Junonia iphita*
4. Common Furring *Ypthima huebneri*
5. Lemon Pansy *Junonia lemonias*
6. Plain Tiger *Danaus chrysippus*
7. Striped Or Common Tiger *Danaus genutia*
8. Yellow Pansy *Junonia hierta*

Family: Lycaenidae

9. Dark Grass Blue *Zizeeria karsandra*
10. Lesser Grass Blue *Zizina otis*
11. Tiny Grass Blue *Zizula hylax*
12. Slate Flash *Rapala schistacea*

Family: Hesperidae

13. Indian Grizzled/Indian Skipper *Spialia galba*
14. Pale Palm Dart *Telicota colon*

Source of Information

Plants: Dr. A. N. Sringswara & Dr. Sahana Vishwanath

Mammals, Reptiles and Amphibians: Arun Nadavar & Vinay Kumar Thimmappa

Birds: Dr. S. Subramanya

Spiders: Vinay Kumar Thimmappa

Butterflies: Rohit Girotra & Vinay Kumar Thimmappa