

# Biodiversity Assessment Report

Christian Medical College, Chittoor Campus

**FIRST SEASON INTERIM REPORT 1**

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Prepared for Christian Medical College, Chittoor Campus.  
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Revision History: Draft 1 First season interim report.

# 1 *ECOLOGY SECTION*

## 1.1 *INTRODUCTION*

Team surveyed the designated study area around the Christian Medical College, Chittoor Campus; 21<sup>st</sup> – 24<sup>th</sup> January 2018 and 10<sup>th</sup> – 11<sup>th</sup> Feb 2018. The survey was undertaken in the marked boundary of the campus with occasional visits outside the boundary to gain perspective of the larger landscape. Survey was undertaken to establish the ecological baseline of the study area and to assess species diversity and habitats in the study area. The ecological surveys were conducted with following objectives:

### **Fauna**

- Identification of fauna (specifically amphibians, birds, butterflies, mammals, and reptiles) based on direct sightings, calls, pug marks, droppings, nests, etc. with photographic evidence wherever possible;
- Identification and classification of any species recognized as threatened (in accordance with the IUCN Red List V 2016.2 and according to the schedules of the Indian Wildlife (Protection) Act 1972 and amendments) or endemism;
- Identification of areas which are important or sensitive for ecological reasons including their breeding, nesting, foraging, resting, over wintering areas including wildlife migratory corridors / avian migratory routes;
- Identification and assessment of aquatic and ecological resources within the study areas as hubs that support wildlife.
- Basic sensitivity assessment, potential impact on biodiversity, its significance and potential mitigation measures.

### **Flora**

- Identification of flora (plants) and documentation across the campus.
- Status of Flora on campus based on local abundance or rarity, endemism and identification of threatened status; if recognised by national or international research bodies or law.
- Identification of areas which are important or sensitive for ecological reasons based on occurrence of rare species.
- Preliminary sensitivity assessment, potential impact on biodiversity, its significance and potential mitigation measures.

### 1.1.1 Approach and Methodology

### 1.1.2 Study Area

Christian Medical College (CMC), Chittoor campus is situated in Chittoor district, Andhra Pradesh. The Christian Medical College, Chittoor Campus falls as a fragment, an off shoot of Eastern Ghats being situated in the border of Tamil Nadu and Andhra Pradesh. It is an undulating terrain with diverse vegetation types. It includes a predominant native vegetation called the Tropical Dry Evergreen forest or Scrub jungle. This 800 acre campus encompasses social forestry land (scrub and grassland mosaic), agricultural fields and Mango grooves.

**Table 1.1 Classification of the Region**

Classification Scheme	Classification
Biogeographic Province of India <sup>(1)</sup>	6E: Deccan Peninsula-Deccan South
Agro Ecological Sub Region <sup>1</sup> (Indian Council of Agricultural Research)	Deccan Plateau, hot arid eco region (8.3)
Agro-Climatic Region <sup>1</sup> (Planning Commission)	Southern Plateau and Hills Region (X)
Agro Climatic Zone <sup>1</sup> (National Agricultural Research Project)	Southern zone of Andhra Pradesh (AP-3)

Source: <sup>1</sup> www.crida.in/CP-2012/statewiseplans/.../ANGRAU.../AP2-Chittoor%2031.1.2011.pdf

### Rainfall of the Region

Rainfall	Average (mm)	Normal Onset (specify week and month)	Normal Cessation (specify week and month)
SW monsoon (June-Sep):	438	1st week of June	3rd week September
NE Monsoon(Oct-Dec):	396	1st week of October	Last week of December
Winter (Jan- Feb)	12		
Summer (March-May)	88		
<b>Annual</b>	<b>934</b>		

Source: <sup>1</sup> www.crida.in/CP-2012/statewiseplans/.../ANGRAU.../AP2-Chittoor%2031.1.2011.pdf

### Land use pattern of the Region

Land use pattern of the district (latest statistics)	Geographical area	Forest area	Land under non-agricultural use	Permanent pastures	Cultivable wasteland	Land under Misc. tree crops and groves	Barren and uncultivable land	Current fallows	Other fallows
Area ('000 ha)	1515.1	452	146.4	33.9	42.1	28.6	154.4	174.3	118.2

Source: <sup>1</sup> www.crida.in/CP-2012/statewiseplans/.../ANGRAU.../AP2-Chittoor%2031.1.2011.pdf

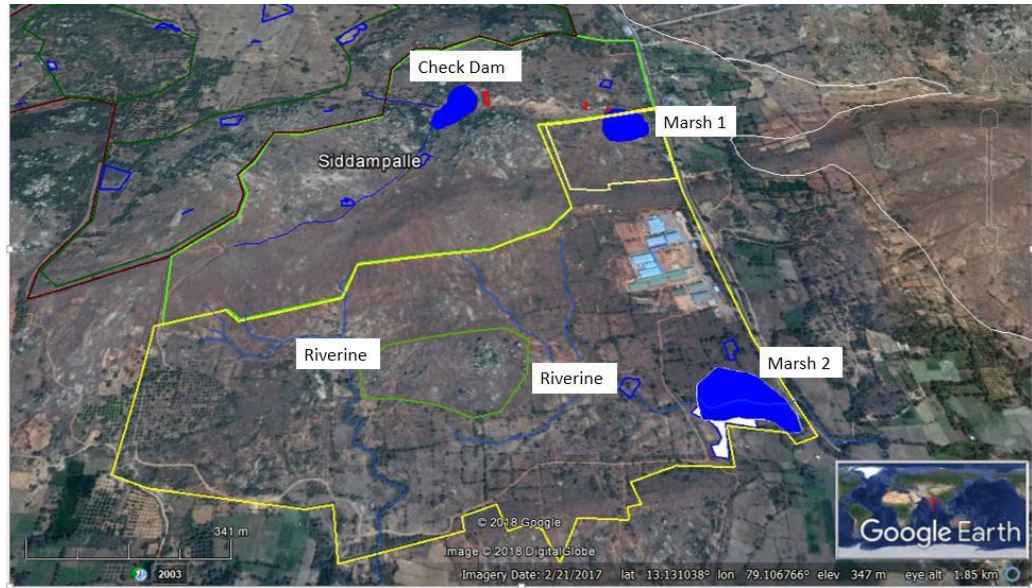
(1) Rodgers, W.A., Panwar, H.S. and Mathur, V. B. (2002). Wildlife Protected Area Network in India: A Review (Executive summary). Wildlife Institute of India. Dehradun.

### *Floristic analysis*

A stratified random sampling method was followed where the whole campus was traversed with special investigation based on habitats. The social forest land is a habitat mosaic of low altitudes (Dry Savannah), rocky hillocks, and tropical dry evergreen forests (scrub jungle). The grasslands on these rocky hillocks act as an excellent water catchment area for several small streams and rivulets that are flowing along the valleys. The undulating landscape thus creates several habitats and microhabitats. Element that shape the vegetation in this landscape include wind, fire and landscape (e.g rock formations). Based on such factors the crests of the rocky hillocks are occupied with scrub jungles and rock faces have many lithophytes (rock dwelling plants). The stature of the vegetation and positioning of the vegetation is on the north face of the mountains based on the wind direction as seen below.



The campus further has some prominent water bodies that are home to many aquatic and riparian flora. The aquatic habitats are shaped by predominant landscape elements like slope - angle, depth and substrates - soil, rock. Based on such factors notable ones include positioning of the marshes in the eastern edges of the campus before it flows out to join the river Ponnai. Official records note CMC Chittoor campus as source for tributary of River Ponnai. Images and locations of the marsh are provided below.



Remnants of agriculture activities in the pasts is now witnessed as fallow lands, grasslands or early successor species dominated or invasive species dominated areas.

### *Faunal Analysis*

Sampling was conducted in the mosaic of habitats present in the study area. All categories of habitats were sampled opportunistically to accurately assess the extent of potential butterfly and bird diversity in the study area.

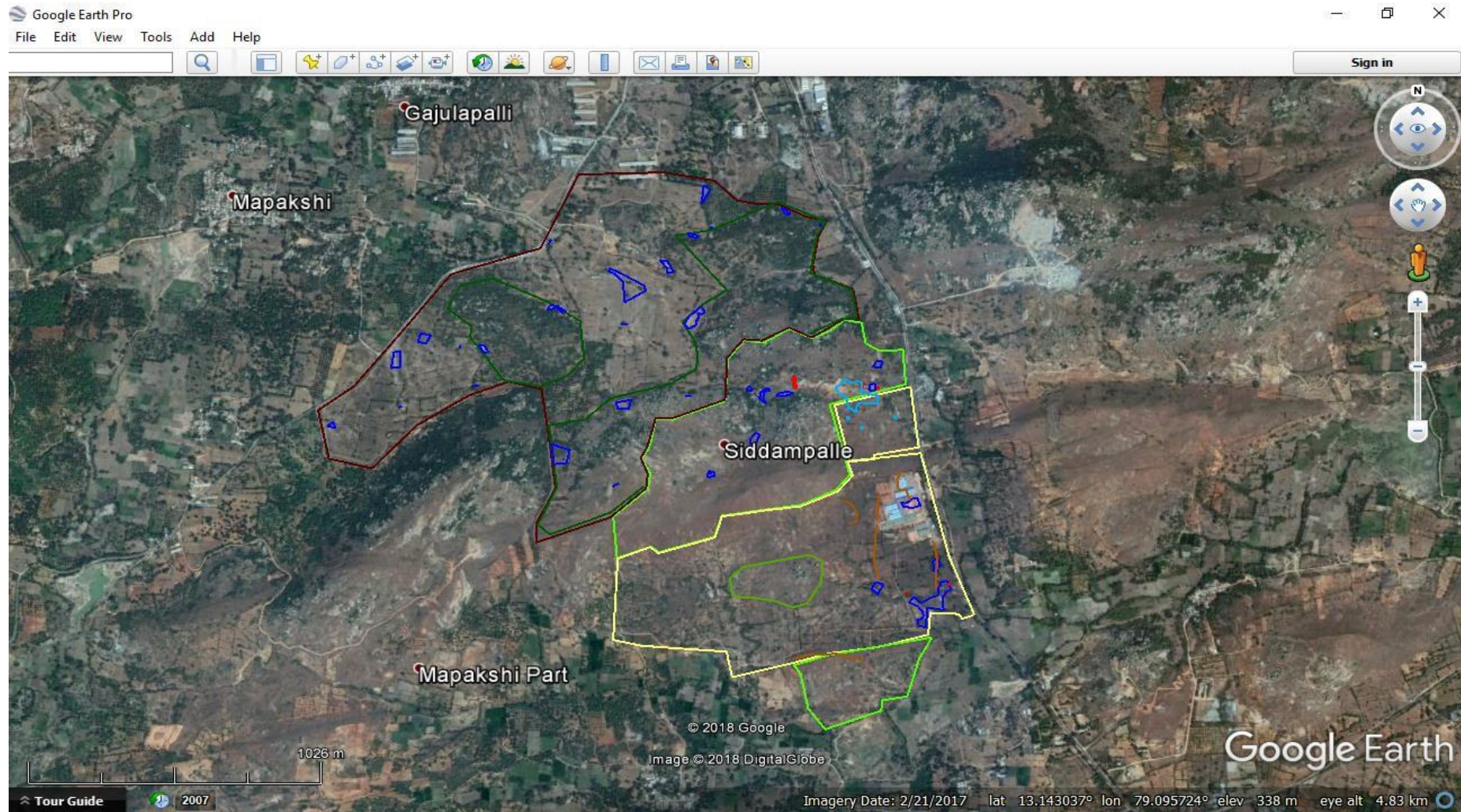
Sampling for reptiles was conducted during early morning hours and at night. Night walks were undertaken in search of reptiles and amphibians on the road and waterbodies within the campus. Sampling was conducted along edges of water bodies primarily in the dusk hours.

Using both direct and indirect (pellets, tracks and scats) sources of evidence. Standard literature was used to identify the mammals. Community members were also questioned about occurrence of mammals in the area.

Binoculars and standard, updated literature was used to identify all species in the field. Photographs were taken using Nikon P900 and Canon 5D and 400mm lens to record and aid identification of all species.

Secondary sources such as published books and research publications were also consulted for the flora and fauna of the study area.

Figure 1.1 Map showing the study area



Source: Google Earth Pro.

The habitats in any given region determine the diversity and abundance of species they can support. The study area is noted to have the following habitats scrub forest, riparian, grasslands, waterbodies and agricultural fields-fallow and mango groves. The habitats in the study area are shown in *Fig 1.2*

**Figure 1.2** *Habitats in the Study Area*



Source: CMC Chittoor Campus during survey carried out in January 21-24th and February 10 & 11<sup>th</sup> February 2018.



## 1.3

## VEGETATION ASSOCIATED WITH HABITATS

## 1.3.1

*Floral diversity*

During the floristic survey, 128 species of plants were observed from the Ramapuram, Mapakshi and south campus of which 100 species were identified while the remaining require literature and herbarium scrutiny. The plants recorded are listed in Table 1.2 and plates of 57 species are shown in *Figure 1.3*.

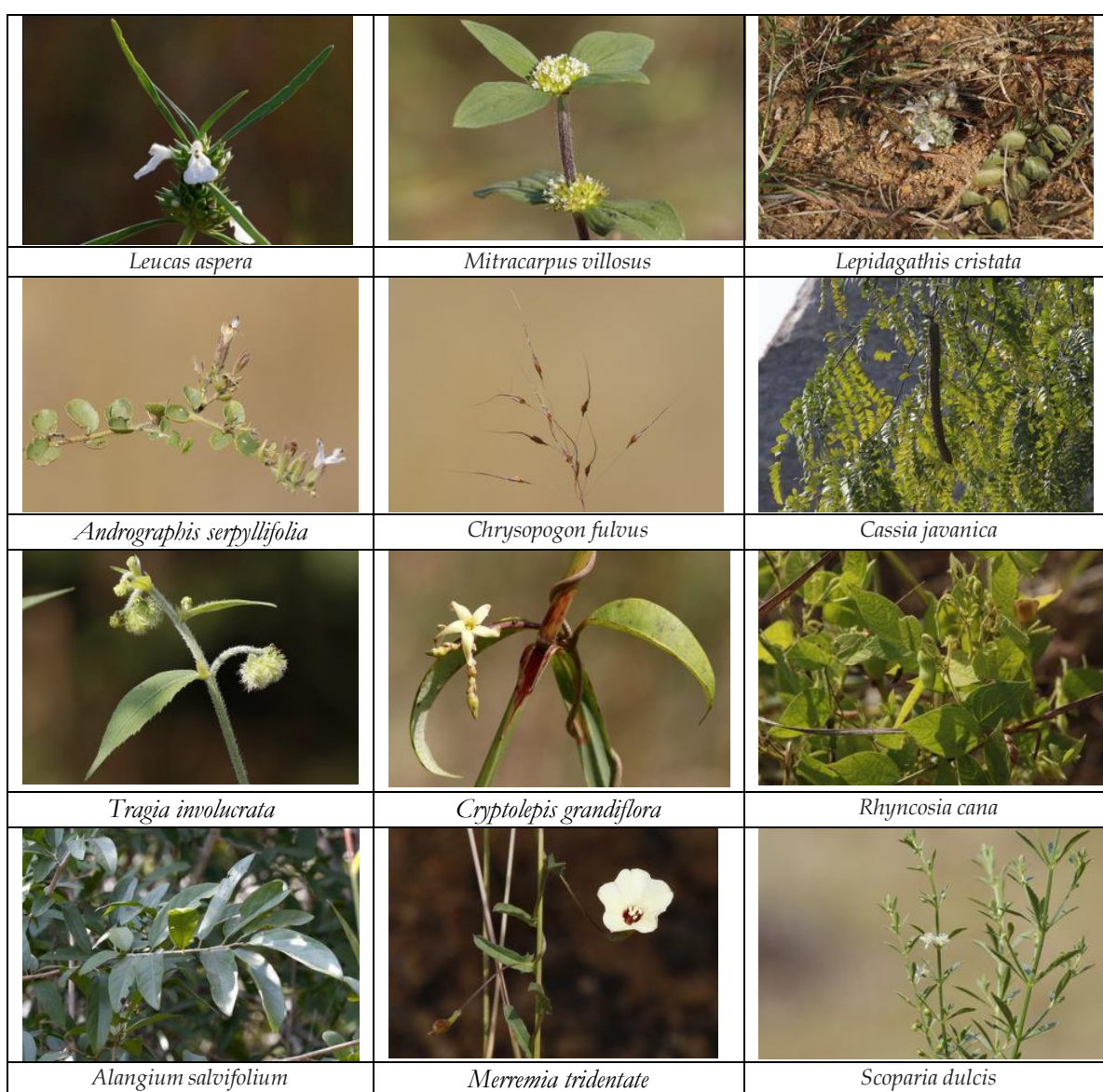
**Table 1.2** *Plants recorded in the study area*




















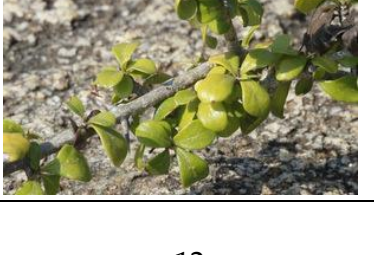

Family	Plant Name	Phenology	Habit	Ramapuram	Mapakshi	South Campus
Acanthaceae	<i>Andrographis serpyllifolia</i> (Vahl) Wight	Fl	Herb	*	*	*
Acanthaceae	<i>Barleria prionitis</i> L.	Fl & Fr	Herb		*	*
Acanthaceae	<i>Hygrophila auriculata</i> (Schumach.) Heine	Fl & Fr	Herb		*	
Acanthaceae	<i>Lepidagathis cristata</i> Willd.	Fl	Herb	*	*	*
Acanthaceae	<i>Peristrophe bicalyculata</i> (Retz.) Nees	Fl & Fr	Herb		*	
Amaranthaceae	<i>Achyranthes aspera</i> L.	Fl	Herb		*	*
Amaranthaceae	<i>Gomphrena serrata</i> L.	Fl	Herb		*	
Apocynaceae	<i>Cryptolepis grandiflora</i> Wight	Fl & Fr	Climber	*	*	
Apocynaceae	<i>Dregea volubilis</i> (L.f.) Benth. ex Hook.f.		Climber		*	
Apocynaceae	<i>Hemidesmus indicus</i> (L.) R. Br. ex Schult.	Fl	Climber	*	*	*
Apocynaceae	<i>Sarcostemma acidum</i> (Roxb.) Voigt	Fl	Climber		*	
Apocynaceae	<i>Wrightia tinctoria</i> R. Br.	Fr	Tree		*	*
Arecaceae	<i>Borassus flabellifer</i> L.	Fl	Tree	*	*	
Arecaceae	<i>Phoenix loureiroi</i> Kunth	Fl	Tree		*	*
Asteraceae	<i>Blumea axillaris</i> (Lam.) DC.	Fl & Fr	Herb	*	*	
Asteraceae	<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	Fl	Shrub	*		
Asteraceae	<i>Emilia sonchifolia</i> (L.) DC. ex DC.	Fl & Fr	Herb		*	
Asteraceae	<i>Epaltes divaricata</i> (L.) Cass.	Fl & Fr	Herb		*	
Asteraceae	<i>Parthenium hysterophorus</i> L.	Fl	Herb	*	*	
Asteraceae	<i>Pentanema indicum</i> (L.) Ling	Fl	Herb	*	*	*
Asteraceae	<i>Pentanema indicum</i> (L.) Ling	Fl & Fr	Herb	*	*	
Boraginaceae	<i>Coldenia procumbens</i> L.		Herb		*	*
Cactaceae	<i>Opuntia dillenii</i> (Ker Gawl.) Haw.		Shrub	*	*	
Capparaceae	<i>Cleome viscosa</i> L.	Fl & Fr	Herb	*	*	*
Caryophyllaceae	<i>Polycarpha corymbosa</i> (L.) Lam.	Fl & Fr	Herb	*	*	*
Convolvulaceae	<i>Evolvulus alsinoides</i> (L.) L.	Fl	Herb	*	*	*
Convolvulaceae	<i>Ipomoea carnea</i> Jacq.	Fl & Fr	Shrub		*	
Convolvulaceae	<i>Merremia tridentata</i> (L.) Hallier f.	Fl & Fr	Herb	*	*	*
Cyperaceae	<i>Fimbristylis ovata</i> (Burm.f.) J.Kern	Fl & Fr	Herb	*	*	*
Eriocaulaceae	<i>Eriocaulon cinereum</i> R. Br.	Fl & Fr	Herb	*	*	
Euphorbiaceae	<i>Jatropha gossypifolia</i> L.	Fl & Fr	Shrub	*	*	
Euphorbiaceae	<i>Phyllanthus virgatus</i> J. G. Forst.	Fl & Fr	Herb		*	*
Euphorbiaceae	<i>Phyllanthus reticulatus</i> Poir.	Fl & Fr	Shrub		*	*
Euphorbiaceae	<i>Ricinus communis</i> L.	Fl & Fr	Shrub	*	*	*
Euphorbiaceae	<i>Tragia involucrata</i> L.	Fl	Twiner	*	*	

Fabaceae - Caesalpiinoideae	<i>Cassia fistula</i> L.	Fr	Tree	*	*	*
Fabaceae - Caesalpiinoideae	<i>Pterolobium hexapetalum</i> (Roth) Santapau & Wagh	Fr	Climber	*	*	
Fabaceae - Caesalpiinoideae	<i>Senna alexandrina</i> Mill.	Fl & Fr	Shrub		*	
Fabaceae - Caesalpiinoideae	<i>Senna auriculata</i> (L.) Roxb.	Fl	Shrub	*	*	
Fabaceae - Faboideae	<i>Aeschynomene indica</i> L.	Fl & Fr	Herb		*	
Fabaceae - Faboideae	<i>Alysicarpus monilifer</i> DC.	Fl & Fr	Herb		*	*
Fabaceae - Faboideae	<i>Bauhinia racemosa</i> Lam.		Tree		*	
Fabaceae - Faboideae	<i>Desmodium triflorum</i> (L.) DC.	Fl & Fr	Herb	*	*	
Fabaceae - Faboideae	<i>Indigofera tinctoria</i> L.	Fl & Fr	Under shrub	*	*	*
Fabaceae - Faboideae	<i>Pseudarthria viscida</i> (L.) Wight & Arn.	Fl & Fr	Herb		*	
Fabaceae - Faboideae	<i>Rhynchosia aurea</i> (Willd.) DC.	Fl & Fr	Herb	*	*	*
Fabaceae - Faboideae	<i>Rhynchosia cana</i> DC.	Fl & Fr	Shrub	*	*	*
Fabaceae - Mimosoideae	<i>Albizia amara</i> (Roxb.) B. Bovin	Fr	Tree	*	*	
Fabaceae - Mimosoideae	<i>Albizia lebbeck</i> (L.) Benth.	Fr	Tree	*	*	
Fabaceae - Mimosoideae	<i>Dichrostachys cinerea</i> (L.) Wight & Arn.	Fl & Fr	Tree	*	*	*
Gentianaceae	<i>Canscora heteroclita</i> (L.) Gilg	Fl & Fr	Herb		*	
Hernandiaceae	<i>Gyrocarpus americanus</i> Jacq.	Fl	Tree		*	
Hydrocharitaceae	<i>Ottelia alismoides</i> (L.) Pers.	Fl	Aquatic herb		*	
Lamiaceae	<i>Anisochilus carnosus</i> (L.f.) Wall.	Fr	Herb		*	
Lamiaceae	<i>Anisomeles indica</i> (L.) Kuntze.	Fl	Herb	*	*	*
Lamiaceae	<i>Gmelina asiatica</i> L.	Fl	Tree		*	
Lamiaceae	<i>Leucas aspera</i> (Willd.) Link	Fl	Herb	*	*	*
Lamiaceae	<i>Leucas longifolia</i> Benth.	Fl & Fr	Herb		*	
Lamiaceae	<i>Ocimum americanum</i> L.	Fl & Fr	Under shrub	*	*	*
Meliaceae	<i>Azadirachta indica</i> A.Juss.		Tree	*	*	*
Menispermaceae	<i>Pachygone ovata</i> (Poir.) Diels	Fl	Climber	*		
Myrtaceae	<i>Syzygium cumini</i> (L.) Skeels		Tree		*	
Nyctaginaceae	<i>Boerhavia diffusa</i> L.	Fl	Herb		*	*
Onagraceae	<i>Ludwigia perennis</i> L.	Fl & Fr	Herb		*	
Orobanchaceae	<i>Sopubia delphinifolia</i> G.Don	Fl & Fr	Herb	*	*	
Orobanchaceae	<i>Striga densiflora</i> (Benth.) Benth.	Fl & Fr	Herb	*	*	*
Plantaginaceae	<i>Scoparia dulcis</i> L.	Fl	Herb	*	*	
Poaceae	<i>Apluda mutica</i> L.	Fl	Herb	*	*	*
Poaceae	<i>Aristida hystrix</i> L.f.	Fl & Fr	Herb	*	*	*
Poaceae	<i>Aristida setacea</i> Retz.	Fl & Fr	Herb	*	*	*
Poaceae	<i>Bambusa bambos</i> (L.) Voss	Fl	Tree	*		
Poaceae	<i>Chloris barbata</i> Sw.	Fl	Herb	*	*	*
Poaceae	<i>Eragrostiella bifaria</i> (Vahl) Bor	Fr	Herb	*	*	*
Poaceae	<i>Eragrostis viscosa</i> (Retz.) Trin.	Fl & Fr	Herb	*	*	*
Poaceae	<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	Fl	Herb	*	*	*
Poaceae	<i>Saccharum spontaneum</i> L.	Fl	Shrub	*		*
Polygalaceae	<i>Polygala arvensis</i> Willd.	Fl & Fr	Herb	*	*	*
Rhamnaceae	<i>Ventilago maderaspatana</i> Gaertn.	Fl.	Climber		*	
Rhamnaceae	<i>Zizyphus oenoplia</i> (L.) Mill.	Fr	Shrub	*	*	*













Rubiaceae	<i>Catunaregam spinosa</i> (Thunb.) Tirveng.		Shrub	*	*	
Rubiaceae	<i>Mitracarpus villosus</i> (Sw.) DC.	Fl & Fr	Herb	*	*	*
Rubiaceae	<i>Morinda coreia</i> Buch.-Ham.	Fl	Tree	*	*	*
Rubiaceae	<i>Pydrax dicoccos</i> Gaertn.	Fl & Fr	Tree	*	*	
Rubiaceae	<i>Spermacoce hispida</i> L.	Fl & Fr	Herb		*	
Rubiaceae	<i>Tarenna asiatica</i> (L.) Kuntze ex K.Schum.	Fl	Shrub	*	*	
Sapindaceae	<i>Cardiospermum canescens</i> Wall.	Fl & Fr	Climber		*	*
Sapindaceae	<i>Dodonaea viscosa</i> (L.) Jacq.	Fr	Shrub	*	*	*
Verbenaceae	<i>Lantana camara</i> L.	Fl & Fr	Shrub	*	*	*
Verbenaceae	<i>Stachytarpheta jamaicensis</i> (L.) Vahl	Fl & Fr	Herb	*	*	*
Violaceae	<i>Hybanthus enneaspermus</i> (L.) F.Muell.	Fl & Fr	Herb	*	*	*
Vitaceae	<i>Cissus quadrangularis</i> L.		Climber		*	*












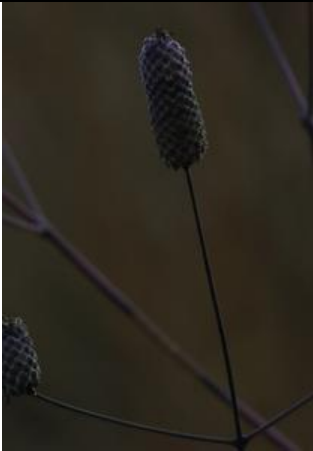
Figure 1.3 Some of the plants recorded from the Study Area



		
<i>Hemidesmus indicus</i>	<i>Phyllanthus reticulatus</i>	<i>Ottelia alismoides</i>
		
<i>Coldenia procumbens</i>	<i>Pterolobium hexapetalum</i>	<i>Lantana camara</i>
		
<i>Justicia prostrata</i>	<i>Calotropis gigantean</i>	<i>Eucalyptus tereticornis</i>
		
<i>Euphorbia hirta</i>	<i>Ficus religiosa</i>	<i>Ficus bengalensis</i>
		
<i>Tectona grandis</i>	<i>Abrus precatorius</i>	<i>Epaltes divaricate</i>
		
<i>Eragrostis viscosa</i>	<i>Psydrax dicoccos</i>	<i>Ipomoea carnea</i>
		

<i>Canscora heteroclita</i>	<i>Carmona retusa</i>	<i>Cassia auriculata</i>
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<i>Cymbopogon flexuosus</i>	<i>Celosia argentia</i>	<i>Eragrostriella bifaria</i>
		
<i>Albizia amara</i>	<i>Pachygone ovate</i>	<i>Striga densiflora</i>
		
<i>Fimbristylis ovata</i>	<i>Ludwigia perennis</i>	<i>Saccharum spontaneum</i>
		
<i>Peristrophe bicalyculata</i>	<i>Aristida hystrix</i>	<i>Boerhavia diffusa</i>

		
<i>Achyranthes aspera</i>	<i>Barleria prionitis</i>	<i>Rhynchosia sp</i>
		
<i>Apluda mutica</i>	<i>Phoenix loureiroi</i>	<i>Morinda coreia</i>
		
<i>Sarcostemma acidum</i>	<i>Sopubia delphinifolia</i>	<i>Bambusa bambos</i>
		
<i>Asystasia gangetica</i>	<i>Pentanema indicum</i>	<i>Anisochilus carnosus</i>

Source: Site and surrounding areas survey during 20<sup>th</sup> – 22<sup>nd</sup> January 2018 & 1<sup>st</sup> February 2018

### 1.3.2 *Agricultural Land*

Irrigation is primarily dependent on monsoon and the waterbodies in the study area. Most of the agricultural fields were fallow. Mango orchards were common in the study area. The palm, *Borassus flabellifer* was common and used as bund trees in the study area.

### 1.3.3 *Waterbodies*

The CMC Chitoor campus is marked as one of the sources of the river Ponnai. Within the campus, it has three riverine belts, 4 check dams, 2 marshes, 3 ponds. Riverine patches extend into the campus and outside. Waterbodies ranging in size from small to large are present in the vicinity of the campus and most had very little water during the survey except the large ones.

## 1.4 *FAUNA IN STUDY AREA*

Butterflies, Herpetofauna (reptiles and amphibians), avifauna and mammals were recorded in the study area. These species were observed/reported from the study area and their presence was confirmed during the field survey and from local consultations by using field guides as visual aids. The detailed list of the fauna from the study area is given in the sections below.

### *Butterflies*

A total of 40 species were recorded in the study area. The diversity of butterflies is directly linked to the diverse habitats and associated nectar plant and host plant diversity. The diverse lycaenids reveal the diversity of herbs and grasses while Nymphalids represent 'modified habitats' and large flora like trees or large/spread out climbers that flower abundantly acting as high nectar providing species. In this regard, some species were found only in modified habitats and either did not occur or were less abundant in natural scrub or grassland. However, the effect is also true of otherwise dependent only on native species and this is directly influences diversity of butterflies.

**Table 1.3** *Butterflies recorded in the study area*


















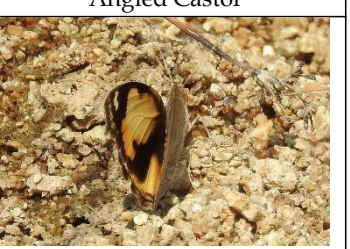



S.NO	Common Name	Scientific Name	Family	Season 1	South Campus
1	Common Banded Awl	<i>Hasora chromus</i>	Hesperiidae	Y	
2	Indian Bush Hopper	<i>Ampittia dioscorides</i>	Hesperiidae	Y	
3	Common Pierott	<i>Castalius rosimon</i>	Lycaenidae	Y	
4	Gram Blue	<i>Euchrysops cnejus</i>	Lycaenidae	Y	
5	Lesser Grass Blue	<i>Zizina otis</i>	Lycaenidae	Y	
6	Oriental Forget Me Not	<i>Catochrysops strabo</i>	Lycaenidae	Y	
7	Oriental Grass Jewel	<i>Freyeria putli</i>	Lycaenidae	Y	
8	Pea Blue	<i>Lampides boeticus</i>	Lycaenidae	Y	
9	Zebra Blue	<i>Leptotes plinius</i>	Lycaenidae	Y	

10	Angled Castor	<i>Ariadne ariadne</i>	Nymphalidae		
11	Blue Pansy	<i>Junonia orithya</i>	Nymphalidae	Y	
12	Blue Tiger	<i>Tirumala limniace</i>	Nymphalidae	Y	
13	Chocolate Pansy	<i>Junonia iphita</i>	Nymphalidae	Y	
14	Common Bushbrown	<i>Mycalesis perseus</i>	Nymphalidae	?	
15	Common Crow	<i>Euploea core</i>	Nymphalidae	Y	
16	Common Eveningbrown	<i>Melanitis leda</i>	Nymphalidae		Y
17	Common Sailor	<i>Neptis hylas</i>	Nymphalidae	Y	
18	Common Three-ring	<i>Ypthima asterope</i>	Nymphalidae		
19	Danaid Eggfly	<i>Hypolimnas misippus</i>	Nymphalidae	Y	
20	Grey Pansy	<i>Junonia atlites</i>	Nymphalidae	Y	
21	Lemon Pansy	<i>Junonia lemonias</i>	Nymphalidae	Y	
22	Leopard	<i>Phalanta phalantha</i>	Nymphalidae	Y	
23	Peacock Pansy	<i>Junonia almana</i>	Nymphalidae	Y	
24	Plain Tiger	<i>Danaus chrysippus</i>	Nymphalidae	Y	
25	Tawny Castor	<i>Acraea violae</i>	Nymphalidae	Y	Y
26	Yellow Pansy	<i>Junonia hierta</i>	Nymphalidae	Y	
27	Common Lime	<i>Papilio demoleus</i>	Papilionidae		Y
28	Common Mormon	<i>Papilio polytes</i>	Papilionidae		Y
29	Common Rose	<i>Pachliopta aristolochiae</i>	Papilionidae	Y	
30	Crimson Rose	<i>Pachliopta hector</i>	Papilionidae	Y	
31	Common Emigrant	<i>Catopsilia pomona</i>	Pieridae	Y?	Y?
32	Common Grass Yellow	<i>Eurema hecabe</i>	Pieridae	Y	
33	Common Jezebel	<i>Delias eucharis</i>	Pieridae	Y	
34	Common Wanderer	<i>Pareronia hippia</i>	Pieridae	Y	
35	Crimson Tip	<i>Colotis danae</i>	Pieridae		Y
36	Little Orange-tip	<i>Colotis etrida</i>	Pieridae		Y
37	Mottled Emigrant	<i>Catopsilia pyranthe</i>	Pieridae	Y	
38	Oriental Psyche	<i>Leptosia nina</i>	Pieridae	Y	
39	Plain Orange-tip	<i>Colotis aurora</i>	Pieridae	Y	Y
40	Yellow Orange-tip	<i>Ixias pyrene</i>	Pieridae	Y	

**Figure 1.4** Some of the butterflies recorded from the Study Area





		
Lesser Grass Blue	Common Three-ring	Common Grass Yellow
		
Common Bushbrown	Indian Bush Hopper	Common Pierrot
		
Mottled Emigrant	Common Sailor	Yellow Orange-tip
		
Peacock Pansy	Common Jezebel	Pea blue
		
Oriental Grass Jewel	Zebra Blue	Angled Castor
		
Gram Blue	Crimson Tip	Yellow Pansy
		

Psyche	Oriental Forget Me Not	Plain Orange tip
		

Source:CMC Chittoor Campus during survey carried out in January21-24th and February 10 - 11<sup>th</sup> February 2018.

## Herpetofauna

### Reptiles

A total of 9 reptile species were observed/ reported from the study area. Four species of snakes, including the highly venomous Spectacled Cobra recognised as ‘big four’ – top common occurring snakes in India known to cause deaths. The Spectacled Cobra and Common Sandboa were among stacked construction material- a matter of caution in future housekeeping as these are snake prone areas in general.

Two species of Skinks, one species of Gecko and one species of Lacertid were also recorded. The reptiles found are typical of the arid and scrubby coastal landscape of the study area. More are likely to occur and will be added over future course of survey. The details of the species recorded are provided in **Table 1.4** and some of the observed reptiles are shown in **Figure 1.5**. Atleast 3 more species are left as unidentified.

**Table 1.4** Reptiles recorded in the study area

S.No.	Common Name	Scientific Name	Family	Main campus	South campus
1	Fan Throated Lizard	<i>Sitana ponticeriana</i>	Agamidae	Y	Y
2	Garden Lizard	<i>Calotes cf versicolor</i>	Agamidae	Y	
3	Termite hill gecko	<i>Hemidactylus cf triedrus</i>	Gekkonidae	Y	
4	Leschenault’s Lacerta	<i>Ophisops leschenaultii</i>	Lacertidae	Y	Y
5	Bronze Grass Skink	<i>Eutropis macularia</i>	Scincidae		Y
1	Common Sand Boa	<i>Eryx conicus</i>	Boidae	Y	
2	Olive Keelback	<i>Atretium schistosum</i>	Colubridae	Y	
3	Oriental Rat Snake	<i>Ptyas mucosa</i>	Colubridae	Y	
4	Spectacled Cobra	<i>Naja naja</i>	Elapidae	Y	

**Figure 1.5** Some of the reptiles recorded from the Study Area



Safe capture release protocol by Bag and pipe method: a case of Cobra capture from the Hospital area  
 Source: CMC Chittoor Campus during survey carried out in January 21-24th and February 10 - 11th February 2018.

*Amphibians*

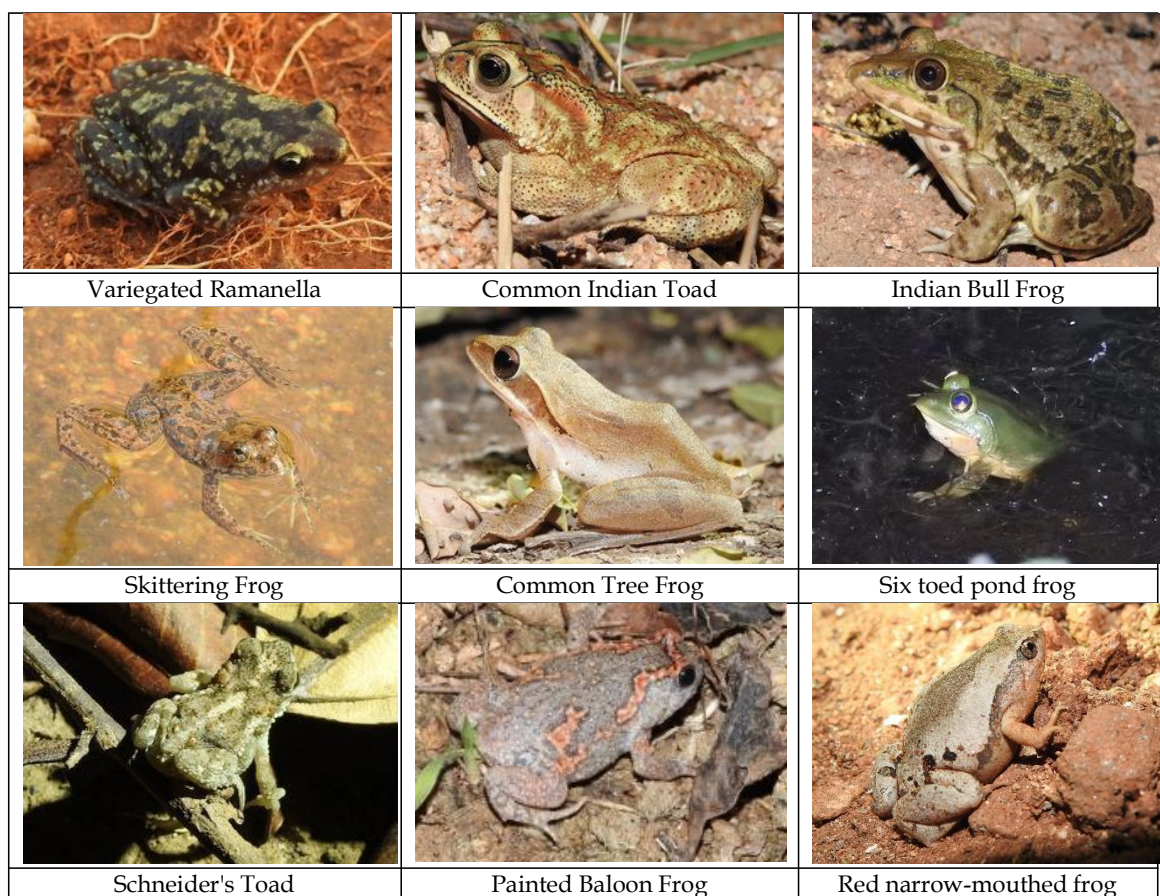
A total of 9 amphibian species were observed/reported from the study area. The anuran population in the study area were primarily from 4 different families. At least five more species were found but are not included in the list due to nature of amphibian taxonomy understanding prevailing at the moment. The amphibian diversity and abundance is noted to be healthy suggesting least disturbance. It also further suggests healthy and high invertebrate diversity. At least 4 species are left unidentified in this survey due to unverifiable taxonomic keys. The details of the species recorded and are provided in **Table 1.5** and some of the observed reptiles are shown in Figure 1.6

**Table 1.5** Amphibians recorded in the study area

S.No.	Common Name	Scientific Name	Family	Main campus	South campus
1	Common Indian Toad	<i>Duttaphrynus</i>	Bufoidea	Y	

		<i>melanostictus</i>			
2	Schneider's Toad	<i>Duttaphrynus scaber</i>	Bufonidae	Y	
3	Skittering frog	<i>Euphlyctis cf cyanophlyctis</i>	Dicroglossidae	Y	Y
4	Six toed pond frog	<i>Euphlyctis hexadactylus</i>	Dicroglossidae	Y	
5	Indian Bull Frog	<i>Hoplobatrachus tigerinus</i>	Dicroglossidae	Y	
6	Variegated Balloon Frog	<i>Uperodon variegatus</i>	Microhylidae	Y	
7	Red narrow-mouthed frog	<i>Microhyla rubra</i>	Microhylidae	Y	
8	Painted Baloon Frog	<i>Uperodon taprobanicus</i>	Microhylidae	Y	
9	Common Tree Frog	<i>Polypedates cf maculatus</i>	Rhacophoridae	Y	

Figure 1.6 Some of the amphibians recorded from the Study Area



Source: CMC Chittoor Campus during survey carried out in January 21-24th and February 10 - 11<sup>th</sup> February 2018.

#### Avifauna (Terrestrial and Aquatic)

A total of 74 species of birds were recorded in the study area. Majority of them were insectivores with a few grainivores dependent on fallow land within the campus and the grasslands. Largest congregations and breeding signs were seen near the waterbodies where environment was safe. In this regard, largest scrub dependent birds were recorded breeding and roosting near the Check dam in the central eastern part of the campus or in dense scrub occurring in the central western part of the campus. While the grassland dependent birds were recorded in dense fallow land with tall primary successor species of grass or short native grassland. A flock (10-20 individuals) of roosting

passerines (possibly pipits) were recorded in the dusk hours in the native grassland bordering riverine habitat in the open scrub grassland mosaic in short grassy patches. The details of birds are provided in *Table 1.6* and some of the birds are shown in *Figure 1.7*.

*Table 1.6 Avifaunal Species observed in the Study Area*

S.No.	Common Name	Scientific Name	Main campus	South campus
	<b>Galliformes</b>			
	<b>Phasianidae (partridges, pheasants, grouse)</b>			
1	Grey Francolin	Francolinus pondicerianus (J.F. Gmelin, 1789)	Y	Y
2	Painted Spurfowl	Galloperdix lunulata (Valenciennes, 1825)	Y	
	<b>Podicipedidae (grebes)</b>			
3	Little Grebe	Tachybaptus ruficollis (Pallas, 1764)	Y	
	<b>Columbiformes</b>			
	<b>Columbidae (pigeons)</b>			
4	Spotted Dove	Streptopelia chinensis (Scopoli, 1786)	Y	Y
5	Laughing Dove	Streptopelia senegalensis (Linnaeus, 1766)	Y	Y
	<b>Caprimulgiformes</b>			
	<b>Caprimulgidae (nightjars)</b>			
6	Indian Nightjar	Caprimulgus asiaticus Latham, 1790	Y	Y
	<b>Apodidae (swifts)</b>			
7	Asian Palm Swift	Cypsiurus balasiensis (J.E. Gray, 1829)	Y	Y
	<b>Cuculiformes</b>			
	<b>Cuculidae (cuckoos)</b>			
8	Sirkeer Malkoha	Taccocua leschenaultii Lesson, 1830	Y	Y
9	Blue-faced Malkoha	Phaenicophaeus viridirostris (Jerdon, 1840)	Y	
10	Pied Cuckoo	Clamator jacobinus (Boddaert, 1783)	Y	
11	Asian Koel	Eudynamis scolopaceus (Linnaeus, 1758)	Y	
12	Common Hawk Cuckoo	Hierococcyx varius (Vahl, 1797)	Y	
	<b>Gruiformes</b>			
	<b>Rallidae (rails and coots)</b>			
13	White-breasted Waterhen	Amaurornis phoenicurus (Pennant, 1769)	Y	
14	Common Coot	Fulica atra Linnaeus, 1758	Y	
	<b>Ardeidae (herons)</b>			
15	Indian Pond Heron	Ardeola grayii (Sykes, 1832)	Y	




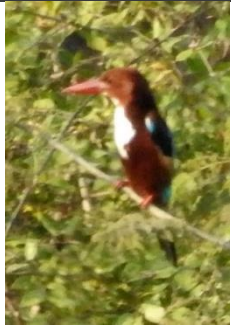











	<b>Charadriidae (plovers &amp; lapwings)</b>			
16	Yellow-wattled Lapwing	Vanellus malabaricus (Boddaert, 1783)		Y
17	Red-wattled Lapwing	Vanellus indicus (Boddaert, 1783)	Y	Y
	<b>Scolopacidae (sandpipers)</b>			
18	Green Sandpiper	Tringa ochropus Linnaeus, 1758	Y	
	<b>Turnicidae (buttonquails)</b>			
19	Barred Buttonquail	Turnix suscitator (J.F. Gmelin, 1789)	Y	Y
	<b>Accipitridae (kites, hawks and eagles)</b>			
20	Black-winged Kite	Elanus caeruleus (Desfontaines, 1789)	Y	
21	Bonelli's Eagle	Aquila fasciata Vieillot, 1822	Y	
22	Shikra	Accipiter badius (J.F. Gmelin, 1788)	Y	
23	Black Kite	Milvus migrans (Boddaert, 1783)		Y
	<b>XIX. Piciformes</b>			
	<b>Ramphastidae (toucans and barbets)</b>			
24	Coppersmith Barbet	Psilopogon haemacephalus (Stadius Muller, 1776)	Y	Y
	<b>Coraciiformes</b>			
	<b>Meropidae (bee-eaters)</b>			
25	Green Bee-eater	Merops orientalis Latham, 1801	Y	Y
	<b>Coraciidae (rollers)</b>			
26	Indian Roller	Coracias benghalensis (Linnaeus, 1758)		Y
	<b>Alcedinidae (kingfishers)</b>			
27	White-throated Kingfisher	Halcyon smyrnensis (Linnaeus, 1758)	Y	
	<b>Falconiformes</b>			
	<b>Falconidae (falcons and caracaras)</b>			
28	Common Kestrel	Falco tinnunculus Linnaeus, 1758	Y	
	<b>Psittaciformes</b>			
	<b>Psittaculidae (old world parrots)</b>			
29	Rose-ringed Parakeet	Psittacula krameri (Scopoli, 1769)	Y	
	<b>Passeriformes</b>			
	<b>Pittidae (pittas)</b>			
30	Indian Pitta	Pitta brachyura (Linnaeus, 1766)	Y	

	<b>Campephagidae (minivets and cuckooshrikes)</b>			
31	Small Minivet	Pericrocotus cinnamomeus (Linnaeus, 1766)	Y	
	<b>Artamidae (woodswallows,australian magpies and allies)</b>			
32	Ashy Woodswallow	Artamus fuscus Vieillot, 1817	Y	
	<b>Aegithinidae (loras)</b>			
33	Common lora	Aegithina tiphia (Linnaeus, 1758)	Y	
	<b>Dicruridae (drongos)</b>			
34	Black Drongo	Dicrurus macrocercus Vieillot, 1817	Y	Y
	<b>Laniidae (shrikes)</b>			
35	Long-tailed Shrike	Lanius schach Linnaeus, 1758	Y	Y
	<b>Corvidae (crows and jays)</b>			
36	Rufous Treepie	Dendrocitta vagabunda (Latham, 1790)	Y	
37	Large-billed Crow	Corvus macrorhynchos Wagler, 1827	Y	
	<b>Dicaeidae (flowerpeckers)</b>			
38	Pale-billed Flowerpecker	Dicaeum erythrorhynchos (Latham, 1790)	Y	Y
	<b>Nectariniidae (sunbirds)</b>			
39	Purple-rumped Sunbird	Leptocoma zeylonica (Linnaeus, 1766)	Y	
40	Purple Sunbird	Cinnyris asiaticus (Latham, 1790)	Y	
	<b>Ploceidae (weavers)</b>			
41	Baya Weaver	Ploceus philippinus (Linnaeus, 1766)	Y	
	<b>Estrildidae (waxbills)</b>			
42	Red Munia	Amandava amandava (Linnaeus, 1758)	Y	
43	Indian Silverbill	Euodice malabarica (Linnaeus, 1758)	Y	
44	White-rumped Munia	Lonchura striata (Linnaeus, 1766)	Y	
45	Scaly-breasted Munia	Lonchura punctulata (Linnaeus, 1758)	Y	
	<b>Motacillidae (wagtails and pipits)</b>			
46	Paddyfield Pipit	Anthus rufulus Vieillot, 1818		Y
47	Blyth's Pipit	Anthus godlewskii (Taczanowski, 1876)		
48	White-browed Wagtail	Motacilla maderaspatensis J.F. Gmelin, 1789	Y	
	<b>Alaudidae (larks)</b>			
49	Rufous-tailed Lark	Ammomanes phoenicura (Franklin, 1831)	Y	












50	Jerdon's Bushlark	Mirafra affinis Blyth, 1845	Y	Y
	<b>Cisticolidae (cisticolas)</b>			
51	Zitting Cisticola	Cisticola juncidis (Rafinesque, 1810)		Y
52	Grey-breasted Prinia	Prinia hodgsonii Blyth, 1844	Y	
53	Jungle Prinia	Prinia sylvatica Jerdon, 1840	Y	Y
54	Common Tailorbird	Orthotomus sutorius (Pennant, 1769)	Y	
	<b>Acrocephalidae (brush, reed and swamp warblers)</b>			
55	Booted Warbler	Iduna caligata (M.H.C. Lichtenstein, 1823)	Y	
56	Blyth's Reed Warbler	Acrocephalus dumetorum Blyth, 1849	Y	
57	Clamorous Reed Warbler	Acrocephalus stentoreus (Hemprich & Ehrenberg, 1833)		
	<b>Hirundinidae (swallows)</b>			
58	Red-rumped Swallow	Cecropis daurica (Laxmann, 1769)	Y	
59	Barn Swallow	Hirundo rustica Linnaeus, 1758	Y	
60	Dusky Crag Martin	Ptyonoprogne concolor (Sykes, 1832)	Y	
	<b>Pycnonotidae (bulbuls)</b>			
61	Red-whiskered Bulbul	Pycnonotus jocosus (Linnaeus, 1758)	Y	Y
62	Red-vented Bulbul	Pycnonotus cafer (Linnaeus, 1766)	Y	Y
63	White-browed Bulbul	Pycnonotus luteolus (Lesson, 1841)	Y	
	<b>Sylviidae (sylvia warblers, parrotbills and allies)</b>			
64	Yellow-eyed Babbler	Chrysomma sinense (J.F. Gmelin, 1789)	Y	Y
	<b>Timaliidae (scimitar babblers and allies)</b>			
67	Tawny-bellied Babbler	Dumetia hyperythra (Franklin, 1831)	Y	
	<b>Leiothrichidae (babblers, laughingthrushes and allies)</b>			
68	Common Babbler	Argya caudata (Dumont, 1823)	Y	
69	Yellow-billed Babbler	Turdoides affinis (Jerdon, 1845)	Y	Y
	<b>Sturnidae (starlings)</b>			
70	Brahminy Starling	Sturnia pagodarum (J.F. Gmelin, 1789)	Y	
71	Common Myna	Acridotheres tristis (Linnaeus, 1766)	Y	Y
	<b>Muscicapidae (chats and flycatchers)</b>			
72	Indian Robin	Saxicoloides fulicatus (Linnaeus, 1766)	Y	Y
73	Oriental Magpie Robin	Copsychus saularis (Linnaeus, 1758)	Y	
74	Pied Bushchat	Saxicola caprata (Linnaeus, 1766)	Y	



Figure 1.7 Some of the birds observed in the Study Area

		
Black-headed Munia	Common Hawk-Cuckoo	Scaly-breasted Munia
		
White-throated Kingfisher	Red-vented Bulbul	Asian Koel
		
Pied Cuckoo	Black Kite	Zitting cisticola
		
Red-rumped Swallow	White-browed Wagtail	Pied Bushchat
		
Laughing Dove	Red-wattled Lapwing	Red Munia

		
Black-shouldered Kite	Rufous-winged Lark	Green Sandpiper
		
Purple Sunbird	Shikra	Booted Warbler
		
Asian Palm Swift	Blyth's Pipit	Indian Robin
		
Common Babbler	Blyth's Reed Warbler	Dusky-crag Martin
		
Small Minivet	Bonelli's Eagle	White-rumped Munia
		
Brahminy Myna	Laughing Dove	Yellow-eyed Babbler

		
Baya Weaver	Long-tailed Shrike	Common Iora
		
Purple Sunbird	Jungle Prinia	Barn Swallow
		
Plain Flowerpecker	Grey-breasted Prinia	Shikra
		
Jerdon's Bushlark	Common Kestrel	Yellow-wattled Lapwing
		
Indian Roller	Purple-rumped Sunbird	Little Grebe

Source: CMC Chittoor Campus during survey carried out in January 21-24th and February 10 - 11<sup>th</sup> February 2018.



### ***Bird Congregations, Breeding and Roosting***

The breeding peak of species in the region is not known. However, the study area is rich in avian diversity and activity, and provides habitat for roosting and breeding. A total of more than 10 breeding signs like nests or chicks were recorded. The largest congregation of breeding signs was in the main Check Dam area with the next being dense scrub in the western end located centrally between Mapakshi and Ramapuram. Others were recorded in the riverine

habitat in the Ramapuram campus and South-eastern marsh/pond. Roosting birds were recorded mainly in the Central main Check Dam and riverine areas of Ramapuram Campus. Refer Avifauna section for details. Some images are presented as can be seen from *Figure 1.8* below.

**Figure 1.8** *Bird Congregations, Breeding and Roosting recorded from the Study Area*

	
<p>Little Grebe with Chicks at main Check Dam.</p>	<p>Unid nest near main Check Dam</p>
	
<p>Unid nest near main Check Dam</p>	<p>Unid nest near main Check Dam</p>
	
<p>Unid nest near Scrub forest in Mapakshi Campus</p>	<p>Unid nest near main Check Dam</p>

	
Baya Weaver nest in a Scrub Forest edge in Mapakshi Campus	Sunbird nest in south-eastern pond/marsh

Source: Site and surrounding areas survey during 23<sup>rd</sup> – 26<sup>th</sup> May 2015, 14<sup>th</sup> – 17<sup>th</sup> December 2015 & 15<sup>th</sup> – 19<sup>th</sup> Feb 2016.

### Mammals

A total of 6 mammal species are reported from the study area. A few bat species were also recorded but not identified. Interviews revealed historic presence of several large mammals reported from the general locality with potential likelihood of occurrence sporadically in time. Further details will be added based on full-fledged social survey and literature review. Further specialised survey for bats will also be conducted in the due course of the work to gain better understanding. The details of the species recorded and confirmed are provided in *Error! Reference source not found.* and some of the observed mammals are shown in **Figure 1.9**.

**Table 1.7** *Mammals reported from the study area*

S.No	Common Name	Scientific Name	Family	Main campus	South campus
1	Bonnet Macaque	<i>Macaca radiata</i>	Cercopithecidae	Y	
2	Indian Grey Mongoose	<i>Herpestes edwardsii</i>	Herpestidae	Y	
3	Indian Porcupine	<i>Hystrix indica</i>	Hystricidae	Y	
4	Black-naped Hare	<i>Lepus nigricollis</i>	Leporidae	Y	
5	Flying Fox	<i>Pteropus giganteus</i>	Pteropodidae	Y	
6	Three-Striped Palm Squirrel	<i>Funambulus palmarum</i>	Sciuridae	Y	

**Figure 1.9** *Some of the mammals recorded from the Study Area*



Source: CMC Chittoor Campus during survey carried out in January 21-24th and February 10 - 11<sup>th</sup> February 2018.

### 1.4.2

#### *Protected Areas*

There are no National Parks or Wildlife Sanctuaries in the immediate vicinity of the CMC Chittoor campus. However, Social forestry are located within the premise of the Hospital and Reserve Forests, a category of forests protected under the Indian Forest Rights Act occur in a ten kilometre radius of the campus. Several other protected areas of varying protection levels are present in the vicinity of the campus. Figure shown below.



Impacts on biodiversity and habitats are likely to occur when caution is not exercised in certain regards. Some general project activities and mitigation are suggested to exercise caution which otherwise may result in the following changes that in turn could result in adverse impacts:

- Contamination of habitats and resources used by flora and fauna
  - Improper storage and disposal of hazardous/medical wastes
  - Release of untreated hospital process effluents or residual sludge that have direct impact on biology of fauna.
  - Discharge of domestic waste water and sewage.
  - Usage of safe pest repellents or control measures are suggested due to high sensitivity in this regard on the immediate environment.
  - Caution is to be exercised in the commissioning of construction near riverine habitats particularly as any form of alteration renders the ecosystem functioning and ecosystem services that potentially benefit CMC in the long run useless.

**Conclusion:**

The CMC Chittoor campuses- Ramapuram, Mapakshi and South Campus are highly biodiverse and host several flora and fauna. Invertebrate diversity is recognised to be very high and directly linked to presence of about 70% fauna that directly depend on them like insectivore birds, frogs and lizards. The presence of protected areas of varying categories located in and in the vicinity of the campus and connectivity to Eastern Ghats imply the role of CMC Chittoor campus as a part of larger corridor for various species of fauna. For successful survival and due to sensitive nature of fauna and flora in this region caution is to be exercised. It is imperative that conservation measures adhered by CMC integrate measures based on the findings of the study for better ecological and social responsibility. It includes the choice of species to be used in landscaping and gardening. Further, any tree planting practises be restricted to areas of human intervened areas with direct benefits to its residents. Afforestation of natural vegetation types - scrub and grassland is not advised to maintain ecological balance and ecological functions. Intervention is advised to be kept to the minimum and findings of the study be integrated in the planning so CMC benefits most from natural ecosystem functioning and services in the years to come.