



**BIODIVERSITY STUDIES IN WILDLIFE PATCH  
IN DALMA FOREST, JHARKHAND**

**(In respect of 400 KV D/C Durgapore – Jamshedpur  
Transmission Line of Power Grid Corporation of  
India Ltd.)**

*Report Prepared by*  
**Department of Environmental Science,  
Kalyani University, Nadia, West Bengal**

*For*  
**Power Grid Corporation of India Limited  
Eastern Region Transmission System II  
JI-15 Block, EP Sector – V, Bidhannagar, Salt Lake,  
Kolkata - 700 091**



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## **1.0. Background:**

Power Grid Corporation of India Ltd. (Eastern region) proposed to undertake extension of transmission system by erection of additional transmission line from Durgapur to Jamshedpur. Thus the present study was undertaken for impact assessment of Biodiversity status on forest and wildlife in Dalma Forest, Jharkhand in respect to augmentation of 400 KV D/C Durgapur – Jamshedpur Transmission line (Vide reference: ER-11/KOK/C & M/I – 228/P-267/351/2344 dt. 22/08/08/). The principal aim of the study is to assist the Power Grid Corporation of India Ltd. POWERGRID to address any impacts related to flora and fauna due to the project and to recommend the required management measures to protect the biodiversity in the influenced area of the Durgapur – Jamshedpur 400 KV D/C transmission line. This study report reveals the status of forest and wildlife condition along the transmission line corridor (46 meter ROW) and surrounding 5kms area. The study also reveals the potential impacts and risk due to project activities on the terrestrial flora, fauna & wildlife habitats.

## **2.0. Scope of the work**

The following scope of work was underlined in this study –

- To carry out the field survey to generate the necessary data and information and to prepare report of biodiversity of the study area (with audio records).
- To prepare a management plan for mitigation of problem, if any, from the above project activities.

## **3.0 Project Description**

The Durgapur (PG) – Jamshedpur 400 kV D/c line is part of System strengthening in ERSS-I, which is being implemented with the funding assistance of The World Bank. The length of transmission line is 176 Kms. Out of total transmission line length of about 176 Kms, about 9.70 Kms length of the line shall pass through total forest land consisting of 44.619 Ha forest area, of which 6.64 Kms (30.547 Ha) is in West Bengal, 2.47 Kms ( 11.376 Ha) is in Jharkhand and 0.600 kms (2.696 Ha) in Dalma Wildlife Sanctuary, Jharkhand. Durgapur-jamshedpur transmission line shall pass (about 0.600 kms) through dalma Wildlife Sanctuary.

### **3.1 Project details:**

The project is an inter-state one and is spread/located in the States of West Bengal and Jharkhand. The basic details of the transmission line as follows.

**Salient features of transmission lines**

1	<b>Line Voltage</b>	:	<b>400 KV</b>
2	<b>Type of Circuit</b>		<b>Double Circuit</b>
3	<b>Line Capacity</b>	:	<b>500MW x 2</b>
4	<b>Route Length</b>	:	<b>176 KM</b>
5	<b>Type of Towers</b>	:	<b>This is a Double Circuit Transmissio Line</b>
		a)	<b>Double Circuit Towers :</b>
			Around 95% towers are D/C type.
		b)	<b>Multi-Circuit Towers :-</b>
			02 Nos. M/C towers are being used for crossing Dalma Wildlife Sanctuary in order to aviod fresh diversion of forest land in WLS.
		c)	<b>Single Circuit Towers :</b>
			12 Nos. S/C Towers are being used at Jamshedpur gantry end.
6	<b>Inter-State Line</b>	:	It is an Inter- State Transmission Line connecting Transmission Networks of West Bengal and Jharkhand states. This line connects two major industrial hubs ie. Durgapur (West Bengal) & Jamshedpur (Jharkhand) in eastern India.
7	<b>Part of Inter-Regional Corridor</b>	:	This line is a part of vital East-West and East-South corridor which plays an important role for transmission of surplus power of Eastern Region to power defficit regions like WR & SR.

## **4.0 Approach of the present study**

Before field study the consultant reviewed the biodiversity and wildlife related informations from District gazetteers, records of Dalma Forest Department of Jharkhand State (Dalma WLS range, Mango, Jamshedpur), reports of Botanical Survey of India and Zoological Survey of India.

During the field survey, primary data along the corridor of transmission line (1.2 kms in Dalma Wildlife sanctuary) with 46 meter ROW) was assessed. The following key parameters are considered during survey –

- Forest cover analysis
- Assessment of flora and fauna (Qualitative and quantitative)
- Assessment of rare and endangered plants and animal's distribution in the area.
- Assessment of threats of biodiversity
- Consultation with local communities, experts and forest officials and so on.

There are three distinct parts in the report

Part – I Biodiversity Assessment report

Part – II Impact identification and Impact mitigation

Part – III Environmental Management Plan

### **4.1 Study Area:**

The entire surveyed area includes existing transmission line corridor from Durgapur to Jamshedpur. It passes through agricultural land, some forest area in West Bengal and some forest and wildlife habitats of Jharkhand. The most significant part of the study area lies in Dalma hill range. The Dalma Hill range only at a distance of 16 kms from Jamshedpur Steel City. This region is declared as Wildlife sanctuary on 19.12.1976. Its main aim to bring fresh life to the forest and its inhabitants by providing protection. The sanctuary spread over 193.22 Sq Km area with a part of Subernarekha river Catchment. Within Dalma Wildlife Sanctuary 35 Sq Kms constitute the core area and the remaining 158.22 Sq Km is the buffer zone. The sanctuary is surrounded by more than 85 villages. This sanctuary is called the “heaven of the elephants in which above 40 – 45 elephants have a permanent above, however the number going up to 80 – 95 in the summer seasons. For manipulating the habitat condition, there are 66 water holes, six glasslands, and six hide outs, natural and artificial salt – licks etc were maintained the local forest department (wildlife division).

## **4.2 Study methodology:**

A four members study team visited the entire study area during the September 2008 and more specifically surveyed the flora, fauna of Dalma hill ranges. Both qualitative and quantitative analysis of flora was done by the survey team. The survey was done along the existing transmission line corridor (with 46 meter row) and surrounding 5kms area in the Dalma hill ranges. 20m X 20m quadrat analysis was made for plant population study (phytosociological study) in Dalma wildlife sanctuary area and its buffer existing transmission line through which proposed new lines will be constructed. Existing wildlife informations were collected from Forest Range office (Dalma Wildlife sanctuary), Jamshedpur and also interaction with local villagers. During the field survey observation of major flora and fauna were made in the entire area.

## **5.0. Biodiversity status of the study area**

### **5.1. Introduction:**

The Dalma hill forest is primarily tropical dry and moist deciduous forest with scattered patches semievergreen or evergreen vegetation cover. The open areas having grassland cover too. The predominant forest trees are Sal (*Shorea robusta*), Asan (*Terminalia tomentosa*), Mahua (*Bassia latifolia*), Kusum (*Selichera oleosa*), Dhaura (*Anogeissum latifolia*), Bhela (*Semicarpus anacardium*), and Palas (*Butea monosperma*). In the past decades, vegetation of this forest areas of Jharkhand were extensively studied by Haines (1910 – 1925), Mooney (1938 – 1950), Champion and Seth (1968, and Srivastava (1955, 1958). During the present survey, intensive field study were made during post-monsoon (Sept. 2008) in Dalma pahar (710m) and its food hill regions in and around Dimna reservoir. Due to extensive deforestation over the year, the foothill forest transformed to mixed jungle. The canopy cover of the forest area ranges from 10 to 30% in an average. Only on few hill slopes, there is dense forest canopy cover >40%. (closed type)

### **5.2. Forest type and Forest cover:**

There are altogether seven forest types were observed in Dalma hill ranges. These are as follows:

- **Dry deciduous forest: Sal dominated**

On dry, exposed and shallow soiled ridges showed Sal dominated forest. This is equivalent to the Tropical dry deciduous forest Sal type. (Puri et. al.;1989).

- **Moist deciduous forest: Sal dominated:**

Areas of hills lower than 300 – 400 m above sea level, mainly near the streams and other water bodies showed such sal dominated forest. This forest is identical to tropical moist deciduous forest (Puri et. al.;1989).

- **Moist deciduous forest, Sal – Anogeissus mixed type:**

This kind of forest patches are found as intermediate band between lower sal forests and higher semi-deciduous/semi-evergreen forest.

- **Moist semideciduous/semievergreen forest: mixed species:**

This forest patches only localized along the streams/nalas or shade side of hill slope. This is a mixed forest.

- **Moist evergreen forest: mixed type**

There are small scattered areas of evergreen forest in the survey area.

- **Degraded shrub land: mixed species**

In the foot hills there are many patches of degraded shrub land noticed during field visit, where isolated trees and tall strobles are noticed in general.

- **Grassland patch:**

Open forest areas are noticed in the foot hills and valleys where grass land patches were often noticed.

In addition the existing line already passes through some forest area of Bankura, Burdwan and Purulia district of West Bengal, where Sal-dominated dry and moist deciduous forests are predominant. Except Dalma hill forest cover along the corridor of transmission line is less than <10% i.e. open type.

In addition, there are a number of plantation forest in degraded forest patch. The predominant species are Akasmoni (*Acacia auriculiformis*), Chakunda (*Cassia siamea*), Radhachura (*Peltaphorum inerme*), Sisso (*Dalbergia sisso*), Neem (*Azadiracta indica*), Karang (*Pongamia pinnata*), and Eucalyptus (*Eucalyptus globosus*).





**Fig. 1: Map showing the sites of terrestrial ecological survey sites (as TE- 1 to TE - 6)**

### **5.3. Floral account:**

A detailed account of the flora of the natural forest of the Dalma hill (Dalma pahar) is given in the Table – 1. This checklist of plants includes the area of existing/proposed transmission line corridor (i.e. 46 meter ROW)

**Table - 1**

## Checklist of Vascular plant species recorded in survey

(Taxonomy, largely follows previous records, Hindi common names given in bold type wherever available)

### Pteridophytes

*Adiantum sp.*

*Dryopteris flinmids*

*Lygodium sp*

*Pteris sp*

### Angiosperms (arranged alphabetically by family)

#### ACANTHACEAE

*Diclipterd verticillata* (Forst.) C. Christensen

*Justicia simplex* D.Don

*Perilepta sp*

*Rungia pectinata* Nees

#### AMARANTHACEAE

*Allmania nodiflora* R.Br. ex Wt.

*Celosia argentea* L.

#### ANACARDIACEAE

*Buchanania lanzan* Spreng. Achar

*Lannea coromandelica* (Houtt) Merrill. Jhingan

*Mangifera indica* L. Am (mango)

*Semecarpus andcardium* L. Bhelwa. BhilaMa. BhilMan

#### APOCYNACEAE

*Alstonia scholaris* R.Br. Chatian

#### APOCYNACEAE

*Holarrhena antidysenterica* A.DC. Kurchi. Dudhi

*Ichnocarpus frutescens* (L.) R.Br . Cherising. Khapribela

#### ARACEAE

*Colocasia esculenta* Schott.

ASCLEPIADACEAE

*Asclepias* sp.

*Calotropis procera* R.Br.

ASPIDIACEAE

*Aspidium* sp

ASTERACEAE

*Ageratum conyzoides* L.

*Eupatorium odoratum*

*Sonchus arvensis* auct. Hook.(=*S. wightiana*)

*Tridax procumbens* L. Khal muriya, Tal muriya

*Vernonia cinerea* (L.) Less.

BIGNONIACEAE

*Bignonia* sp (= *Stereospermum* sp.) Padar

*Spathodia campanulata* P. Beauv.

BOMBACACEAE

*Salmalia malabarica* Schott & Endf. (= *S. ceiba*)

Semar kanda, Semul

BORAGINACEAE

*Cynoglossum* sp.

BURSERACEAE

*Boswellia serrata* Roxb. ex Colebr. Salai

CAESALPINIACEAE

*Bauhinia vahlii* Wt. & Arn. Mahul

*Bauhinia variegata* Kachnar

*Caesalpinia* sp.

*Cassia fistula* L. Dhanbuhar, Amaltas

*Cassia occidentalis* L. Ban chironta

*Cassia sophora* L.

*Cassia tora* L. Chekor

#### COCHLOSPERMACEAE

*Cochlospermum gossypium* DC. Gengal

*Cochlospermum religiosum* Alston Gengal

#### COMBRETACEAE

*Anogeissus latifolius* (Roxb. ex DC.) Wall. ex Bedd.

*Barringtonia acutangula*

*Combretum decandrum* Roxb.(=C. roxburghi i) Belora, Medila,

*Terminalia arjuna* C Roxb. ex DC.) Wt. & Arn. Kahu, Kohwa

*Terminalia bellerica* Roxb. Bahera

*Terminalia chebula* Retz. Harra

*Terminalia tomentosa* Wt. & Arn. (=T. alata) Asan

#### COMMELINACEAE

*Murdania elata*

#### CONVOLVULACEAE

*Eyolyulus alsinoides* L.

#### CUCURBITACEAE

*Cucurbita* sp. Khumra

#### DILLENACEAE

*Dillenia aurea* J.E.Smith Kala karmath

#### DIOSCOREACEAE

*Dioscorea* sp. Kanda

#### DJPTEROCARPACEAE

*Shorea robusta* Gaertn. f. Sal

## EBENACEAE

*Diospyros melanoxylon* Roxb. Tendu

## EUPHORBIACEAE

*Antidesma acidum* Retz. Amoori

*Bridelia retusa* Muell. Kasali

*Croton bonplandianum* Baillon

*Croton oblongifolius*

*Euphorbia hirta* L.

*Jatropha gossypifolia* L.

*Mallotus philippensis* (Lamk.) Huell .-Arg. Sindoori, Kamala

*Phyllanthus urinaria* L.

## FABACEAE

*Atylosia villosa*

*Butea monosperma* Taub. Dhak, Palas

*Butea superba* Roxb. Bela palas, Bodla

*Dalbergia latifolia* Roxb. Shisham

*Dalbergia sissoo* Roxb. Shisham

*Desmodium gangeticum* DC.

*Desmodium triflorum* DC.

*Erythrina suberosa* Roxb. Mandara (?)

*Indigoferd -cdssioides* RattI. ex DC. Ghirghol

*Milletia extensa* Baker(=H: auriculata) Patani Moghania chappar

*Pterocarpus mdrsupium* Roxb. Bijasal, Pharri

*Tephrosia purpurea* Pers.

## FLACOURTIACEAE

*Casearia elliptica* Willd. Bhairon

## GERANIACEAE

*Geranium sp*

## LAMIACEAE

*Hyptis suaveolens* Poit.



*Leonotis nepetifolia* R.Br.

*Leucas* sp.

*Plectranthus mollis* Sprengl

#### LAURACEAE

*Litsea polyantha* Juss.(=*L. monopetala*)

#### LILIACEAE

*Asparagus racemosus* Willd. Dnsmoor. Dnshmool. Siltmulu

#### LOGANIACEAE

*Cynoctonum* sp. (= *Ophiorhiza* sp.)

#### LYTHRACEAE

*Lagerstroemia paryiflora* 'Roxb. Landin, Senhn

*Woodfordia fruticosa* (L.) Kurz Dhanwai

#### MALVACEAE

*Kydia calycina* Roxb. Baranga

*Malachra capitata* L.

*Sida cordata* (Hook. f.) Bors

*Urena lobata* L.

#### MELIACEAE

*Azadirachta indica* Juss. Neem

*Melia azedarach* L. Bakain

*Swietenia macrophylla*

*Toona ciliata* Roem.

#### MENISPERHACEAE

*Cocculus villosus* DC.(= *C. hirsutus*)

#### MIMOSACEAE

*Acacia duriculiiformis* A. Cunn. ex Benth.

*Acacia torta* Craib

*Mimosa sp.*

#### MORACEAE

*Ficus virens* Ait. Gasti

*Ficus benghalensis* L. Bar, Banyan

*Ficus benamina*

*Ficus cunia* Buch. ex Roxb. (= *F. semicordata*) Doomar

*Ficus hispida* L. Katgular, Bhuin gular

*Ficus racemosa* L. Gular

*Ficus religiosa* L. Peepul

*Streblus asper* Lour. Sahara

#### MYRTACEAE

*Psidium guajava* L.

*Syzygium cumini* Skeels Jamun

#### OLEACEAE

*Nyctanthes arbortristis* L. Harsingar

#### ORCHIDACEAE

*Vanda tessellata* (Roxb.) Hook. ex G. Don Badang

#### OXALIDACEAE

*Oxalis corniculata* L.

#### PAPAVERACEAE

*Argemone mexicana* L. Tal makhar

#### PASSIFLORACEAE.

*Passiflora sp.*

#### POACEAE

*Andropogon sp.*

*Aristida* sp.

*Chrysopogon monticola* Trin.

*Cynodon dactylon* L. Doob

*Dendrocalamus strictus* Nees Bans

*Eragrostis* sp.

*Panicum* sp.

*Paspalum paspalodes* Scribner

*Setaria* sp.

*Themeda quadrivalvis*

*Thysanolaena maxima*

#### RHAMNACEAE

*Ziziphus nummularia* Lamk.(*Z. mauritiana*) Ber

*Ziziphus xylopyra* Willd. Ghontol, Ghont

#### RUBIACEAE

*Adina cordifolia* Hook. f. Haldu

*Anthocephalus cadamba* Miq. Radam, Chulai

*Dentella* sp.

*Gardenia latifolia* Ait. Safed panpra

*Hymenodictyon orixense* Mabb.(=*H. excelsum*) Kuthan

*Mitragyna parvifolia* Korth. Kaim, Kalmi

*Morinda citrifolia*

*Pavetta indica* Roxb.

*Spermacoe stricta* L.(=*S. pusilla*)

#### RUTACEAE

*Aegle maermelos* (L.) Correa Bel

#### SAPINDACEAE

*Schleichera oleosa* Oken Kusum

#### SAPOTACEAE

*Madhuca indica* Hahua. Hohwa

SMILACACEAE

*Smilax zeylanicum* L. Ram datoon

STERCULIACEAE

*Sterculia urens* Roxb. Kulu, Karaya

*Sterculia villosa* Roxb.

SYHPLOCACEAE

*Symplocus racemosa*

TILIACEAE

*Grewia asiatica* Falsa

*Grewia liliacea*

*Grewia tiliifolia* Vahl. Dhaman

*Triumfetta rhomboidea* Jacq.

URTICACEAE

*Trema orientalls* Gio

VERBENACEAE

*Gmelina arborea* Roxb. Gumbari, Kamhar, SeMan, Gumhar

*Lantana camara* L. Rai-munia

*Tectona grandis* L.f. Sagan (Teak)

*Vitex negundo* L.

VITACEAE

*Vitis barbata*

In the forest, there are a good number tree species found in the upper storey; and shrubs and small trees in middle storey, ground cover herbs and forbs are also fairly dominant. Creepers, climbers and Lianes (woody climber) and epiphytes are also fairly common (Table – 2).

**Table - 2: Dominated plant Species in survey area arranged by growth form**

<b>I. UPPER STOREY:</b>	
<b>Trees</b>	
<i>Adina cordifolia</i>	<i>Gmelina arborea</i>
<i>Aegle maermelos</i>	<i>Hymenodictyon orixense</i>
<i>Alstonia scholaris</i>	<i>Kydia calycina</i>
<i>Anogeissus latifolius</i>	<i>Lagerstroemia parviflora</i>
<i>Anthocephalus cadamba</i>	<i>Lannea coromandelica</i>
<i>Azadirachta indica</i>	<i>Madhuca indica</i>
<i>Barringtonia acutangula</i>	<i>Mallotus philippensis</i>
<i>Bauhinia variegata</i>	<i>Mangifera indica</i>
<i>Boswellia serrata</i>	<i>Melia azedarach</i>
<i>Bridelia retusa</i>	<i>Mitragyna parvifolia</i>
<i>Bucbanania lanzan</i>	<i>Morinda citrifolia</i>
<i>Butea monosperma</i>	<i>Pterocarpus marsupium</i>
<i>Caesalpinia sp.</i>	<i>Salmalia malabarica</i>
<i>Casearia elliptica</i>	<i>Schleichera oleosa</i>
<i>Cassia fistula</i>	<i>Semecarpus anacardum</i>
<i>Cochlospermum gossypium</i>	<i>Shorea robusta</i>
<i>Cochlospermum religiosum</i>	<i>Spathodia campanulata</i>
<i>Croton oblongifolius</i>	<i>Sterculia urens /villosa</i>
<i>Dalbergid sissoo</i>	<i>Sireblus asper</i>
<i>Dillenia aurea</i>	<i>Stymenodictum excel sum</i>
<i>Diospyros melanoxylon</i>	<i>Swietenia macrophylla</i>
<i>Erythrina suberosa</i>	<i>Symplocus racemosa</i>
<i>Ficus hispida</i>	<i>Syzygium cumini</i>
<i>Ficus benghalensis</i>	<i>Terminalia arjuna</i>



<i>Ficus racemosa</i>	<i>Terminalia chebula</i>
<i>Ficus benjamina</i>	<i>Terminalia bellerica</i>
<i>Ficus cunia</i>	<i>Terminalia tomentosa</i>
<i>Ficus religiosa</i>	<i>Toona ciliata</i>
<i>Ficus virens</i>	<i>Trichilia sp.</i>
<b>II. MIDDLE STOREY:</b>	
<b>Small trees:</b>	
<i>Gardenia latifolia</i>	<i>Acacia auriculiformis</i>
<i>Acacia torta</i>	<i>Nyctanthes arbor</i>
<i>Mimosa sp</i>	<i>Pavetta indica</i>
<i>Xanthoxylum alatum</i>	
<b>Shrubs</b>	
<i>Antidesma acidum</i>	<i>Litsea polyantha</i>
<i>Bignonia sp</i>	<i>Moghania chappar</i>
<i>Calotropis procera</i>	<i>Perilepta sp</i>
<i>Cassia sophora</i>	<i>Trema orientalis</i>
<i>Cassia occidentalis</i>	<i>Urena lobata</i>
<i>Cassia tora</i>	<i>Vitex negundo</i>
<i>Grewia liliacea</i>	<i>Woodfordia fruticosa</i>
<i>Grewia tiliifolia</i>	<i>Ziziphus xylopyra</i>
<i>Grewia asiatica</i>	<i>Holarrhena antidysenteric</i>
<i>Jatropha gossypifolia</i>	<i>Lantana camara</i>
<b>III. Ground flora:</b>	
<b>Herbs and Forbs</b>	
<i>Ageratum conyzoides</i>	<i>Leucas sp.</i>
<i>Allmania nodiflora</i>	<i>Majus pumillus</i>

<i>Argemone mexicana</i>	<i>Malachra capitata</i>
<i>Asparagus racemosus</i>	<i>Mazus pumillus</i>
<i>Atylosia villosa</i>	<i>Murdania elata</i>
<i>Celosia argentea</i>	<i>Ophizhia sp.</i>
<i>Colocasia esculenta</i>	<i>Oxalis corniculata</i>
<i>Croton bonplandianum</i>	<i>Phyllanthus urinaria</i>
<i>Cynoglossum sp</i>	<i>Plectranthus mollis</i>
<i>Dicliptera verticillata</i>	<i>Rungia pectinata</i>
<i>Dentella sp.</i>	<i>Sida cordata</i>
<i>Desmodium gangeticum</i>	<i>Sonchus arvensis</i>
<i>Desmodium triflorum</i>	<i>Spermacoe stricta</i>
<i>Echlnocarpus frutescens</i>	<i>Tephrosta purpurea</i>
<i>Eupatorium odoratum</i>	<i>Tridax procumbens</i>
<i>Euphorbia hirta</i>	<i>Triumfetta rhomboidea</i>
<i>Evolvulus alsinoides</i>	<i>Unidentified</i>
<i>Geranium sp.</i>	<i>Vernonia cinerea</i>
<i>Hyptis suaveolens</i>	<i>Leonotis nepetifolia</i>
<i>Indigofera cassioides</i>	<i>Justicia simplex</i>
<b>Graminoids (grasses and grass-like species)</b>	
<i>Andropogon sp.</i>	<i>Panicum sp.</i>
<i>Aristida sp.</i>	<i>Paspalum paspalodes</i>
<i>Arundonaria mollu</i>	<i>Pseudophoenix</i>
<i>Chrysopogon monticola</i>	<i>Setaria sp.</i>
<i>Cynodon dactylon</i>	<i>Themeda quadrivalvis</i>
<i>Dendrocalamus strictus</i>	<i>Thysanolaena maxima</i>
<i>Eragrostis sp.</i>	

<b>Ferns</b>	
<i>Adiantum sp.</i>	<i>Lygodium sp.</i>
<i>Aspidium sp.</i>	<i>Pteris sp.</i>
<i>Dryopteris flinmas</i>	
<b>IV. Others (Lianes and Creepers)</b>	
<i>Asclepias sp.</i>	<i>Dioscorea sp.</i>
<i>Bauhinia vahlii</i>	<i>Millettia extensa</i>
<i>Butea superba</i>	<i>Passiflora sp.</i>
<i>Cocculus villosus</i>	<i>Smilax zeylanicum</i>
<i>Combretum decandrum</i>	<i>Vitis barbata</i>
<i>Cucurbita sp.</i>	
<b>Epiphyte</b>	
<i>Vandal tessellata</i>	<i>Loranthus racemosus</i>

Many plant species are economically very much useful as per the records available (Tale – 3).

**Table - 3 : Economically important plants of the area (As per survey)**

Sl. No.	Species	Use
1.	<i>Acacia auriculiformis</i>	Fuel
2.	<i>Aegle maermelos</i> (Bel)	Food (Pulp of fruit), Medicinal
3.	<i>Alstonia scholaris</i> (Chatian)	Medicinal
4.	<i>Anthocephalus cadamba</i> (Kadam, Chulai)	Food (Leaves and seeds)
5.	<i>Asparagus racemosus</i> (Dasmool, Dashmool, Satmuli)	Food (Root tubers) Medicinal
6.	<i>Azadirachta indica</i> (Neern)	Food (Immature pods)
7.	<i>Bauhinia variegata</i> (Kachnar)	Food (Fruit)
8.	<i>Bridelia retusa</i> (Kasa1i)	Food (Fruit and seed)

9.	<i>Buchanania lanzan</i> (Achar)	Food (fruit)
10.	<i>Psidium</i> sp. (Guava, Behi)	Food (fruit)
11.	<i>Cucurbita</i> sp.(Khumra)	Food (Suckers), Housing materials
12.	<i>Dendrocalamus strictus</i> (Bans)	Food (Swollen root)
13.	<i>Dioscorea</i> sp.(Kanda)	Food (fruit)
14.	<i>Diospyros melanoxylon</i> (Tendu).	Food (fruit), Religious
15.	<i>Ficus benghalensis</i> (Bar, Banyan)	Food (Fruit)
16.	<i>Ficus cunia</i> (Bhuin gular, Doomar)	Religious
17.	<i>Ficus religiosa</i> (Peepul)	Food (Fruit), Housing timber & small timber, Medicinal
18.	<i>Gmelina arborea</i> (Gumbari, Kamhar, Sewan, Gumhar)	Food (Fruit)
19.	<i>Ichnocarpus frutescens</i> (Cheri sing, Khapribela)	Food (Fruit)
20.	<i>Lantana camara</i> (Rai -munia)	Fuel
21.	<i>Mangifera indica</i> (Am (mango)	Food (Seed oil). Medicinal
22.	<i>Schleichera oleosa</i> (Kusum)	Food(Thalamus)
23.	<i>Shorea robusta</i> (Sal)	Food (Seed oil, seed after boiling), Fuel & structural timber, Medicinal, Religious, Fodder
24.	<i>Smilax zeylanicum</i> (Ram datoon)	Food (Roots)
25.	<i>Syzygium cumini</i> (Jamun)	Food (Fruit), Medicinal
26.	<i>Tectona grandis</i> (Sagon (Teak) )	Fuel. structural timber
27.	<i>Terminalia arjuna</i> (Kahu. Kohwa)	Food (Roasted fruits), Housing timber , medicinal
28.	<i>Terminalia bellerica</i> (Bahera)	Food (Roasted fruits), medicinal
29.	<i>Terminalia chebula</i> (Harra)	Food (Roasted fruits), medicinal
30.	<i>Terminalia tomentosa</i> (Asan)	Food (Roasted fruits), Small timber
31.	<i>Ziziphus nummularia</i> (Ber)	Food (Fruit)

**Phytosociological analysis of vegetation cover was attempted:**

Along the existing power grid lines between Katjor village and Benadih village. Identically similar study were also made in the adjoining core and buffer region of Dalma wildlife sanctuary. This survey include the quadrat study (20 m x 20 m) along the Grid of 46 meter ROW of the existing power line and also identical survey was made in Dalma wildlife sanctuary. The details of analysis is given in Table - 4. From this study it appears that in forest Sal, Palas, Asan, Dhaura, and Bhela are quite prominent.



**Table 4: Phytosociological analysis of plant population (Trees only)**

Site TE 1: Hil top of power grid towers (N 22° 55' 49.3" &amp; E 86° 7' 43.6")

	Species	Frequency	Density	Relative frequency	Relative density	Relative dominance	Importance value index (IVI)
01	Sal ( <i>Shorea robusta</i> )	100	11.3	15.384	42.322	55.97	113.68
02	Asan ( <i>Terminalis tomentosa</i> )	100	2.1	15.384	7.865	8.818	31.214
03	Mahua ( <i>Bassia latifolia</i> )	50	0.6	7.692	2.247	2.769	14.583
04	Kusum ( <i>Schelichesa oleosa</i> )	10	0.1	1.538	0.374	9.681	2.292
05	Bhela ( <i>Semicarpus anacardium</i> )	100	2.5	15.384	9.363	48.374	40.420
06	Kurchi ( <i>Holarhhena antidysentrica</i> )	100	4.5	15.384	16.853	1.846	33.632
07	Jamun ( <i>Syzizium cumini</i> )	80	2.3	12.307	8.614	1.526	25.372
08	Siris ( <i>Albizzia procera</i> )	10	0.1	1.538	0.374	4.711	2.036
09	Kumbhi ( <i>Carya arborea</i> )	10	0.1	1.538	0.374	0.942	2.106
10	Palas ( <i>Butea monosperma</i> )	90	3.1	13.846	11.610	3.618	34.094

Site: TE – 2: Foot hill Power grid Towers near Benadih Village (N 22° 55' 57.4" E 86° 7' 47.7")

	Species	Frequency	Density	Relative frequency	Relative density	Relative dominance	Importance value index (IVI)
1	Sal ( <i>Shorea robusta</i> )	100	13.4	21.739	68.020	77.835	167.594
2	Asan ( <i>Terminalis tomentosa</i> )	50	0.8	10.869	4.060	3.557	18.488
3	Mahua ( <i>Bassia latifolia</i> )	40	0.2	8.695	1.015	1.815	11.526
4	Kusum ( <i>Schelichesa oleosa</i> )	10	0.1	2.173	0.507	0.444	3.126
5	Bhela ( <i>Semicarpus anacardium</i> )	90	1.4	19.565	7.106	10.292	36.963

6	Kurchi ( <i>Holarhena antidysentrica</i> )	90	2.9	19.565	14.720	1.052	35.338
7	Jamun ( <i>Syzizium cumini</i> )	10	0.1	2.173	0.507	0.226	2.908
8	Palas ( <i>Butea monosperma</i> )	50	0.5	10.869	2.538	1.134	14.542
9	Bander Lathi ( <i>Cassia fistula</i> )	10	0.1	2.173	0.507	0.145	2.826
10	Bel ( <i>Aegle marmalos</i> )	10	0.2	2.173	1.015	0.290	3.479

Site TE 3: Near Ketjor village (N 22° 55' 40.5" E 86° 7' 40.0")

	Species	Frequency	Density	Relative frequency	Relative density	Relative dominance	Importance value index (IVI)
1	Siris ( <i>Albizzia lebbek</i> )	30	0.3	9.375	5.263	3.599	18.237
2	Pipul ( <i>Ficus racemosa</i> )	30	0.6	9.375	10.526	16.198	36.099
3	Choto Kadam ( <i>Mitrygyna parviflora</i> )	30	0.3	9.375	5.263	3.968	18.606
4	Aam ( <i>Mangifera indica</i> )	30	0.3	9.375	5.263	3.599	18.237
5	Jamun ( <i>Syzizium cumini</i> )	30	0.4	9.375	7.017	7.499	23.891
6	( <i>Adina cordifolia</i> )	30	0.3	9.375	5.263	5.624	20.262
7	Sisso ( <i>Delbergia sisso</i> )	20	0.3	6.25	5.263	11.024	22.537
8	Assan ( <i>Terminalia tomentosa</i> )	30	0.3	9.375	5.263	11.024	25.662
9	Palas ( <i>Butea monosperma</i> )	30	1.2	9.375	21.052	32.397	62.824
10	Kurchi ( <i>Hollarrhena antidysentrica</i> )	60	1.7	18.75	29.824	5.099	53.674

Site TE 4: Buffer Dalma Wild Life Sanctuary (N 22° 54' 55.9" E 86° 09' 45.02")

	Species	Frequency	Density	Relative frequency	Relative density	Relative dominance	Importance value index (IVI)
1.	( <i>Anogesus</i> )	60	1.7	10.344	10.119	1.963	22.427
2.	Kurchi ( <i>Hollarrhena antidysentrica</i> )	50	2.4	8.620	14.285	1.925	24.831
3.	Aasan ( <i>Terminalia tomentosa</i> )	40	0.7	6.896	4.166	8.985	20.048

4.	Palas ( <i>Butea monosperma</i> )	30	1.2	5.172	7.142	6.016	18.332
5.	Haldu( <i>Adina cordifolia</i> )	40	0.7	6.896	4.166	3.509	14.573
6.	( <i>Lawnia</i> )	40	0.9	6.896	5.357	3.184	15.437
7.	Sisso( <i>Dalbergia latifolia</i> )	20	0.5	3.448	2.976	4.913	11.338
8.	Sal ( <i>Shorea robusta</i> )	40	3.8	6.896	22.619	53.775	83.291
9.	Kanchan( <i>Bauhinia vaki</i> )	50	1.5	8.620	8.928	2.707	20.256
10.	( <i>Bauhinia variagata</i> )	10	0.2	1.724	1.190	0.641	3.556
11.	Siris ( <i>Albizzia lebbek</i> )	50	0.6	8.620	3.571	2.329	14.521
12.	Bel ( <i>Aegle marmalos</i> )	10	0.1	1.724	0.595	0.353	2.673
13.	Arjuna ( <i>Terminalia arjuna</i> )	40	0.6	6.896	3.571	4.625	15.093
14.	Piyal ( <i>Bucchanina alba</i> )	30	0.5	5.172	2.976	0.902	9.0511

Site TE 5: Top Dalma Wild Life Sanctuary, near Railway Microwave Station (The Peak Hanuman Temple) (N 22<sup>0</sup> 53' 22.3'' E86<sup>0</sup> 13' 17.3'')

	Species	Frequency	Density	Relative frequency	Relative density	Relative dominance	Importance value index (IVI)
1.	Kanchan( <i>Bauhinia valli</i> )	60	2.1	9.375	17.073	8.369	34.818
2.	Chalta ( <i>Dilena pentaphylla</i> )	30	0.4	4.687	3.252	5.165	13.105
3.	Teak ( <i>Tectona grandis</i> )	40	0.5	6.25	4.065	3.905	14.221
4.	Kumbhi ( <i>Carya arborea</i> )	30	0.3	4.687	2.439	3.321	10.447
5.	Choto Kadam ( <i>Mitrygyna parviflora</i> )	30	0.3	4.687	2.439	1.195	8.322
6.	Piyal ( <i>Bucchanina alba</i> )	40	0.5	6.25	4.065	1.992	12.307
7.	Jamun ( <i>Syzizium cumini</i> )	50	0.7	7.812	5.691	9.039	22.543
8.	Kanchan ( <i>Bauhinia variagata</i> )	40	0.6	6.25	4.878	6.122	17.250
9.	Aam ( <i>Mangifera indica</i> )	30	0.4	4.687	3.252	2.834	10.773
10.	Haldu ( <i>Adina cordifolia</i> )	40	0.8	6.25	6.504	8.857	21.611
11.	Banderlathi ( <i>Cassia</i> )	40	0.8	6.25	6.504	12.754	25.508

	<i>fistula</i> )						
12.	Pipul ( <i>Ficus religiosa</i> )	30	0.4	4.687	3.252	8.679	16.619
13.	Kurchi ( <i>Hollarrhena antidysentrica</i> )	70	2.3	10.937	18.699	4.074	33.710
14.	Simul ( <i>Bombax malabarica</i> )	30	0.3	4.687	2.439	1.721	8.848
15.	Sal ( <i>Shorea robusta</i> )	30	0.7	4.687	5.691	19.839	30.218

Site TE 6: Core Dalma Wild Life Sanctuary (N 22° 53' 34.1'' E 86° 12' 48.4'')

	Species	Frequency	Density	Relative frequency	Relative density	Relative dominance	Importance value index (IVI)
1	Dhaura( <i>Arogesus latifolia</i> )	50	1.2	7.692	8.163	1.809	17.664
2	Kanchan ( <i>Bauhinia valli</i> )	80	2.6	12.307	17.687	8.818	38.813
3	Kusum ( <i>Carya arborea</i> )	30	0.5	4.615	3.401	2.769	10.785
4	Haritaki ( <i>Terminalia chebulla</i> )	50	0.8	7.692	5.442	9.681	22.816
5	Sal ( <i>Shorea robusta</i> )	80	3.2	12.307	21.768	48.374	82.451
6	Chalta ( <i>Dilenia pentaphylla</i> )	40	0.4	6.153	2.721	1.846	10.721
7	Kanthal ( <i>Artocarpus integrifolia</i> )	20	0.2	3.076	1.360	1.526	5.963
8	Kurchi ( <i>Hollarrhena antidysentrica</i> )	50	2	7.692	13.605	4.711	26.008
9	Sodal ( <i>Sterculia villosa</i> )	10	0.1	1.538	0.680	0.942	3.160
10	Baanderlathi ( <i>Cassia fistula</i> )	40	0.6	6.153	4.081	3.618	13.853
11	Simul ( <i>Bombax malabarica</i> )	20	0.2	3.076	1.360	0.471	4.908
12	Piyal ( <i>Buchania alba</i> )	30	0.3	4.615	2.040	0.615	7.271
13	Jamun ( <i>Syzizium cumini</i> )	20	0.3	3.076	2.040	1.962	7.080
14	Bahera ( <i>Terminallia belerica</i> )	30	0.5	4.615	3.401	5.030	13.047
15	Kusum ( <i>Schelichesa oleosa</i> )	10	0.1	1.538	0.680	0.418	2.637

## Summary of trees along route and wild life area

### Distribution of Dominant trees in Studied location of Dalma Wildlife Sanctuary

	Species	Existing power grid corridor	Wildlife sanctuary area			
			Buffer 1	Buffer II	Core I	Core II
01	Sal ( <i>Shorea robusta</i> )	+	-	+	+	+
02	Asan ( <i>Terminalis tomentosa</i> )	+	+	+	-	-
03	Mahua ( <i>Bassia latifolia</i> )	+	-	+	-	-
04	Kusum ( <i>Schelichesa oleosa</i> )	+	-	-	-	+
05	Bhela ( <i>Semicarpus anacardium</i> )	+	-	-	-	+
06	Kurchi ( <i>Holarhhena antidysentrica</i> )	+	+	+	+	+
07	Jamun ( <i>Syzizium cumini</i> )	+	+	-	+	+
08	Siris ( <i>Albizzia procera</i> )	+	+	+	-	-
09	Kumbhi ( <i>Carya arborea</i> )	+	-	-	+	+
10	Palas ( <i>Butea monosperma</i> )	+	+	+	-	-
11	Bander lathi ( <i>Cassia fistula</i> )	+	-	-	+	+
12	Pipul ( <i>Ficus religiosa</i> )	-	+	-	+	-
13	Choto Kadam ( <i>Mitrygyna parviflora</i> )	-	+	-	+	-
14	Aam ( <i>Mangifera Indica</i> )	-	+	-	-	-
15	Halud ( <i>Adina cordifolia</i> )	-	+	+	-	-
16	Sisso (( <i>Dalbergia sisso</i> )	-	+	+	-	-
17	Dharua ( <i>Anigesus latifolia</i> )	-	-	+	-	+
18	Bel ( <i>Aegle marmalos</i> )	-	-	+	-	-
19	Arjun ( <i>Terminalia arjuna</i> )	-	-	+	-	-
20	Piyal ( <i>Bucchania alba</i> )	-	-	+	+	+
21	Kanchan ( <i>Bauhinia valli</i> )	-	-	+	+	+
22	Chalta ( <i>Dilenia pentaphyla</i> )	-	-	-	+	+
23	Teal ( <i>Tectona grandis</i> )	-	-	-	+	-
24	Haritaki ( <i>Terminalia chebula</i> )	-	-	-	-	+
25	Simul ( <i>Bombax malabarica</i> )	-	-	-	+	+

On the basis of our detailed qualitative and quantitative plant survey it appears that the distribution of plants along the existing Powergrid corridor and its surrounding area are not differ substantially. However a littale variation of species and more trees are found in surrounding area than the ROW due to local relief features, microclimate and anthropogenic activities. No rare and threatened plant species are found in the existing ROW or its neighbourhood area. More tall trees are noticed in the wildlife area than ROW area due to periodic clearing of hedges along the transmission line for maintenance.

#### 5.4. Faunal account:

For faunal assessment, during the present study we conducted extensive surveys along the existing/proposed transmission line between Katjor and Benadih villages, which occur within the Dalma Hill Range and areas in the vicinity of the Dalma Wildlife Sanctuary. We conducted our study from the early hours of the day through to the late afternoons and also collected information regarding the fauna through direct observations and poster survey.

- **Invertebrates**

During the present survey approximately 41 species of butterflies were recorded within the study locality among the transmission line and the Dalma Wildlife Sanctuary. Along the transmission line(existing), which falls in the buffer zone of the Dalma WLS, we recorded about 32 species of butterflies. These species are mixture of both scrubland as well as forest dwelling forms. This is suggestive of the fact that a good mixture of these two types of vegetation is present in these localities that can support a good diversity of the butterflies. The forest dwelling forms increase in frequency along the slope of the hill where the vegetation is denser. (Table – 5)

**Table - 5: Checklist of butterflies recorded within project area**

Sl.no.	English Name	Latin Name	Position in Wildlife Schedule
	<b>FAMILY - PAPILIONIDAE</b>		
1	Lime Butterfly	<i>Papilio demoleus</i>	IV
2	Common Mime	<i>Papilio clytia</i>	IV
3	Common Mormone	<i>Papilio polytes</i>	IV
4	Common Rose	<i>Pachliopta aristolochia</i>	IV
5	Crimson Rose	<i>Pachliopta hector</i>	I
6	Blue Mormone	<i>Papilio polymnestor</i>	IV
	<b>FAMILY - PIERIDAE</b>		
7	Plain Puffin	<i>Appias indra</i>	IV
8	Common Emigrant	<i>Catopsilia pomona</i>	IV
9	Mottled Emigrant	<i>Catopsilia pyranthe</i>	IV

10	Common Wanderer	<i>Pareronia valeria</i>	IV
11	Common Grass Yellow	<i>Eurema hecabe</i>	IV
	<b>FAMILY - LYCAENIDAE</b>		
12	Common Pierrot	<i>Castalius rosimon</i>	IV
13	Lime Blue	<i>Chilades laius</i>	IV
	<b>FAMILY - NYMPHALIDAE</b>		
14	Common Four-ring	<i>Ypthima hiiebneri</i>	IV
15	Lemon Pansy	<i>Lunonia lemonias</i>	IV
16	Chocolate Pansy	<i>Precis iphita</i>	IV
17	Peacock Pansy	<i>Junonia almana</i>	IV
18	Grey Pansy	<i>Junonia atlites</i>	IV
19	Common Castor	<i>Ariadne merione</i>	IV
20	Angled Castor	<i>Ariadne ariadne</i>	IV
21	Tawny Coster	<i>Acraea violae</i>	IV
22	Common Leopard	<i>Phalanta phalantha</i>	IV
23	Striped Tiger	<i>Danaus genutia</i>	IV
24	Plain Tiger	<i>Danaus chrysippus</i>	IV
25	Common Palmfly	<i>Elymnias hypermenstra</i>	IV
26	Great Eggfly	<i>Hypolimnas bolina</i>	IV
27	Danaid Eggfly	<i>Hypolimnas misippus</i>	I
28	Common Sailor	<i>Neptis hylas</i>	IV
29	Baronet	<i>Euthalia nais</i>	IV
30	Blue Tiger	<i>Tirumala limniace</i>	IV
	<b>FAMILY - HESPERIIDAE</b>		
31	Tamil Grass-dart	<i>Taractrocera ceramas</i>	IV
32	Rice Swift	<i>Borbo cinnara</i>	IV

Butterfly study at the Dalma Wildlife Sanctuary also shows a mixture of forest and scrub dwelling forms. However, forest dwelling species dominate, especially at patches where the tree density is maximum. The scrub dwelling species were usually present along the fairly open areas that interrupt the dense forest covers along the slopes. Within the Dalma Wildlife Sanctuary we recorded approximately 41 species of butterflies. Among the species that were recorded during the present study two species are included in the schedule I of the Indian Wildlife (Protection) Act 1972. (Table – 6)

**Table – 6: Checklist of butterflies recorded within core areas of the Dalma Wildlife Sanctuary**

Sl.no.	English Name	Latin Name	Position in Wildlife Schedule
	<b>FAMILY - PAPILIONIDAE</b>		
1	Lime Butterfly	<i>Papilio demoleus</i>	IV
2	Common Mime	<i>Papilio clytia</i>	IV
3	Common Mormone	<i>Papilio polytes</i>	IV
4	Common Rose	<i>Pachliopta aristolochia</i>	IV
5	Crimson Rose	<i>Pachliopta hector</i>	I
6	Blue Mormone	<i>Papilio polymnestor</i>	IV
7	Malabar Banded Peacock	<i>Papilio buddha</i>	IV
	<b>FAMILY - PIERIDAE</b>		
8	Plain Puffin	<i>Appias indra</i>	IV
9	Common Emigrant	<i>Catopsilia pomona</i>	IV
10	Mottled Emigrant	<i>Catopsilia pyranthe</i>	IV
11	Common Wanderer	<i>Pareronia valeria</i>	IV
12	Common Grass Yellow	<i>Eurema hecabe</i>	IV
13	Small Grass Yellow	<i>Eurema brigitta</i>	IV
14	Spotless Grass Yellow	<i>Eurema laeta</i>	IV



	<b>FAMILY - LYCAENIDAE</b>		
15	Common Pierrot	<i>Castalius rosimon</i>	IV
16	Angled Pierrot	<i>Caleta caleta</i>	IV
17	Lime Blue	<i>Chilades laius</i>	IV
	<b>FAMILY - NYMPHALIDAE</b>		
18	Common Three-ring	<i>Ypthima asterope</i>	IV
19	Common Four-ring	<i>Ypthima hiiebneri</i>	IV
20	Orange Oakleaf		IV
21	Lemon Pansy	<i>Lunonia lemonias</i>	IV
22	Chocolate Pansy	<i>Precis iphita</i>	IV
23	Peacock Pansy	<i>Junonia almana</i>	IV
24	Grey Pansy	<i>Junonia atlites</i>	IV
25	Common Castor	<i>Ariadne merione</i>	IV
26	Angled Castor	<i>Ariadne ariadne</i>	IV
27	Tawny Coster	<i>Acraea violae</i>	IV
28	Tawny Rajah		IV
29	Common Nawab	<i>Polyura athamus</i>	IV
30	Common Leopard	<i>Phalanta phalantha</i>	IV
31	Striped Tiger	<i>Danaus genutia</i>	IV
32	Plain Tiger	<i>Danaus chrysippus</i>	IV
33	Common Palmfly	<i>Elymnias hypermenstra</i>	IV
34	Great Eggfly	<i>Hypolimnas bolina</i>	IV
35	Danaid Eggfly	<i>Hypolimnas misippus</i>	I
36	Common Sailor	<i>Neptis hylas</i>	IV
37	Baronet	<i>Euthalia nais</i>	IV
38	Blue Tiger	<i>Tirumala limniace</i>	IV

39	Common Indian Crow	<i>Euploea core</i>	IV
	<b>FAMILY - HESPERIIDAE</b>		
40	Tamil Grass-dart	<i>Taractrocera ceramas</i>	IV
41	Rice Swift	<i>Borbo cinnara</i>	IV

- **Vertebrates**

We collected information about five vertebrate groups that include reptiles, birds and mammals from local villagers along with the direct field observations.

(a) **Reptiles**

Direct observations and poster survey helped us to record 6 species of reptiles belonging to five families. Among the 6 species recorded one species was a lizard while the rest are snakes. Three lizard species included Indian house gecko. Of the seven species of snakes four species are included in the schedule II of the Indian Wildlife (Protection) Act 1972. These are common rat snake, Indian cobra and Russell's viper. These species are usually cosmopolitan in distribution with exception of Indian rock python. (Table – 7 and Table – 8)

**Table – 7: Checklist of reptiles recorded within core areas of the Dalma Wildlife Sanctuary**

	Common Names	Scientific Names	Occurrence	Position in Wildlife Schedule
	<b>FAMILY - GECKONIDAE</b>			
2	Gecko, Indian House	<i>Hemidactylus flaviviridus</i>	Common	IV
	<b>FAMILY - BOIDAE</b>			
1	Boa, Red Sand	<i>Eryx johnii</i>	Occasional	IV
	<b>FAMILY - ELAPIDAE</b>			
2	Cobra, Indian	<i>Naja naja naja</i>	Rare	II
5	Karait, Common	<i>Bungarus caeruleus</i>	Rare	II

	<b>FAMILY - COLUBRIDAE</b>			
7	Snake, Rat	<i>Ptyas mucosus</i>	Common	II
	<b>FAMILY - VIPERIDAE</b>			
8	Viper, Russel	<i>Vipera russelli</i>	Occasional	II

**Table - 8: Checklist of reptiles recorded along the existing transmission line**

	<b>Common Names</b>	<b>Scientific Names</b>	<b>Occurrence</b>	<b>Position in Wildlife Schedule</b>
	<b>FAMILY - GECKONIDAE</b>			
2	Gecko, Indian House	<i>Hemidactylus flaviviridus</i>	Common	IV
	<b>FAMILY - BOIDAE</b>			
1	Boa, Red Sand	<i>Eryx johnii</i>	Occasional	IV
	<b>FAMILY - ELAPIDAE</b>			
2	Cobra, Indian	<i>Naja naja naja</i>	Rare	II
5	Karait, Common	<i>Bungarus caeruleus</i>	Rare	II
	<b>FAMILY - COLUBRIDAE</b>			
7	Snake, Rat	<i>Ptyas mucosus</i>	Common	II
	<b>FAMILY - VIPERIDAE</b>			
8	Viper, Russel	<i>Vipera russelli</i>	Occasional	II

**(b) Birds**

During the present survey we recorded 66 species of birds belonging to 28 families. The avian species that were recorded were a mixture of both aquatic as well as terrestrial ones and were cosmopolitan in distribution. The aquatic species were primarily recorded along the foothills and around the villages where cultivation is practiced, both near the proposed project site as well as around the Dalma Wildlife Sanctuary. While all the 66 species of birds were

recorded at the Dalma Wildlife Sanctuary; around the project site we could record only 53 species. None of these species that were recorded during the present study are included in the threatened list of the IWPA. (Table – 9 and Table – 10)

**Table – 9: Checklist of birds recorded within core areas of the Dalma Wildlife Sanctuary**

Sl.no.	English Name	Latin Name	Occurrence	Position in Wildlife Schedule
	<b>FAMILY - PHALACROCORACIDAE</b>			
1	Cormorant, Little	<i>Phalacrocorax niger</i>	Common	IV
	<b>FAMILY - ARDEIDAE</b>			
2	Heron, Grey	<i>Ardea cinerea</i>	Common	IV
3	Egret, Cattle	<i>Bubulcus ibis</i>	Common	IV
4	Egret, Little	<i>Egretta garzetta</i>	Common	IV
5	Heron, Pond or Paddy Bird	<i>Ardeola grayii</i>	Common	IV
6	Heron, Night	<i>Nycticorax nycticorax</i>	Common	IV
7	Bittern, Chestnut	<i>Ixobrychus cinnamomeus</i>	Common	IV
	<b>FAMILY - ACCIPITRIDAE</b>			
8	Eagle, Crested Serpent	<i>Spilornis cheela</i>	Common	IV
9	Kite, Blackwinged	<i>Elanus caeruleus</i>	Common	IV
10	Kite, Common Pariah	<i>Milvus migrans</i>	Common	IV
11	Shikra	<i>Accipiter badius</i>	Common	IV
	<b>FAMILY - CHARADRIIDAE</b>			
12	Lapwing, Redwattled	<i>Vanellus indicus</i>	Common	IV
13	Lapwing, Yellow-wattled	<i>Vanellus malabaricus</i>	Common	IV
	<b>FAMILY - PHASIANIDAE</b>			
14	Fowl, Red Jungle	<i>Gallus gallus</i>	Common	IV
	<b>FAMILY - COLUMBIDAE</b>			
15	Dove, Little Brown	<i>Streptopelia senegalensis</i>	Common	IV

16	Dove, Ring	<i>Streptopelia decaocto</i>	Common	IV
17	Dove, Spotted	<i>Streptopelia chinensis</i>	Common	IV
	<b>FAMILY - CUCULIDAE</b>			
18	Cuckoo, Common Hawk or Brainfever Bird	<i>Cuculus varius</i>	Common	IV
19	Koel	<i>Eudynamys scolopacea</i>	Common	IV
20	Pheasant, Crow or Coucal	<i>Centropus siensis</i>	Common	IV
	<b>FAMILY - PSITTACIDAE</b>			
21	Parakeet, Alexandrine or Large Indian	<i>Psittacula eupatria</i>	Common	IV
22	Parakeet, Blossom-headed	<i>Psittacula cyanocephala</i>	Common	IV
23	Parakeet, Roseringed	<i>Psittacula krameri</i>	Common	IV
	<b>FAMILY - BUCEROTIDAE</b>			
24	Hornbill, Common Grey	<i>Tockus birostris</i>	Common	IV
25	Hornbill, Malabar Pied	<i>Authracoceros coronatus</i>	Common	IV
	<b>FAMILY - CAPITONIDAE</b>			
26	Barbet, Blue-throated	<i>Megalaima asiatica</i>	Common	IV
27	Barbet, Crimson-breasted or Coppersmith	<i>Megalaima haemacephala</i>	Common	IV
	<b>FAMILY - PICIDAE</b>			
28	Woodpecker, Golden-backed	<i>Dinopium benghalense</i>	Common	IV
	<b>FAMILY - ALCEDINIDAE</b>			
29	Kingfisher, Small Blue	<i>Alcedo atthis</i>	Common	IV
30	Kingfisher, White-breasted	<i>Halcyon smyrnensis</i>	Common	IV
	<b>FAMILY - MEROPIDAE</b>			
31	Bee-eater, Small Green	<i>Merops orientalis</i>	Common	IV
	<b>FAMILY - APODIDAE</b>			
32	Swift, Palm	<i>Cypsiurus parvus</i>	Common	IV
	<b>FAMILY - UPUIDAE</b>			
33	Hoopoe	<i>Upupa epops</i>	Common	IV

	<b>FAMILY - ORIOLIDAE</b>			
34	Oriole, Black-headed	<i>Oriolus xanthornus</i>	Common	IV
	<b>FAMILY - STURNIDAE</b>			
35	Myna, Bank	<i>Acridotheres ginginianus</i>	Common	IV
36	Myna, Grey-headed	<i>Sturnus malabaricus</i>	Common	IV
37	Myna, Indian	<i>Acridotheres tristis</i>	Common	IV
38	Myna, Pied	<i>Sturnus contra</i>	Common	IV
	<b>FAMILY - DICRURIDAE</b>			
39	Drongo, Black or Kind Crow	<i>Dicrurus adsimilis</i>	Common	IV
	<b>FAMILY - CORVIDAE</b>			
40	Crow, House	<i>Corvus splendens</i>	Common	IV
41	Crow, Jungle	<i>Corvus macrorhynchos</i>	Common	IV
42	Pie, Tree	<i>Dendrocitta vagabunda</i>	Common	IV
	<b>FAMILY - PYCNONOTIDAE</b>			
43	Bulbul, Red-vented	<i>Pycnonotus cafer</i>	Common	IV
44	Bulbul, Red-whiskered	<i>Pycnonotus jocosus</i>	Common	IV
	<b>FAMILY - IRENIDAE</b>			
45	Iora	<i>Aegithina tiphia</i>	Common	IV
46	Chloropsis, Goldfronted or Green Bulbul.	<i>Chloropsis aurifrons</i>	Common	IV
	<b>FAMILY - CAMPEPHAGIDAE</b>			
47	Minivet, Small	<i>Pericrocotus cinmamomeus</i>	Common	IV
	<b>FAMILY - MUCICAPIDAE</b>			
48	Babbler, Jungle	<i>Turdoides striatus</i>	Common	IV
49	Bird, Tailor	<i>Orthotomus sutorius</i>	Common	IV
50	Warbler, Greenish	<i>Phylloscopus trochiloides</i>	Common	IV
51	Chiffchaff, Common	<i>Phylloscopus collybita</i>	Common	IV
52	Robin, Indian	<i>Saxicoloides fulicata</i>	Common	IV
53	Robin, Magpie	<i>Copsychus saularis</i>	Common	IV

54	Shama	<i>Copsychus malabaricus</i>	Common	IV
	<b>FAMILY - MOTACILLIDAE</b>			
55	Forest Wagtail	<i>Dendronanthus indicus</i>	Common	IV
	<b>FAMILY - ZOSTEROPIDAE</b>			
56	White- eye	<i>Zosterops palpebrosa</i>	Common	IV
	<b>FAMILY - DICAERIDAE</b>			
57	Flowerpecker, Thick-billed	<i>Dicaeum agile</i>	Common	IV
58	Flowerpecker, Tickell's	<i>Dicaeum erythrorhynchos</i>	Common	IV
	<b>FAMILY NECTARINIIDAE</b>			
59	Sunbird, Purple	<i>Nectarinia asiatica</i>	Common	IV
60	Sunbird, Purple-rumped	<i>Nectarinia zeylonica</i>	Common	IV
	<b>FAMILY - ESTRILDIDAE</b>			
61	Sparrow, House	<i>Passer domesticus</i>	Common	IV
62	Munia, Black-headed	<i>Lonchura malacca</i>	Common	IV
63	Munia, Spotted	<i>Lonchura punctulata</i>	Common	IV
64	Munia, White-backed	<i>Lonchura striata</i>	Common	IV
65	Munia, White-throated	<i>Lonchura malabarica</i>	Common	IV
66	Weaver Bird, Baya	<i>Ploceus philippinus</i>	Common	IV

**Table – 10: Checklist of birds recorded along the existing transmission line**

Sl.no.	English Name	Latin Name	Occurrence	Position in Wildlife Schedule
	<b>FAMILY - PHALACROCORACIDAE</b>			
1	Cormorant, Little	<i>Phalacrocorax niger</i>	Common	IV
	<b>FAMILY - ARDEIDAE</b>			
2	Egret, Cattle	<i>Bubulcus ibis</i>	Common	IV
3	Egret, Little	<i>Egretta garzetta</i>	Common	IV
4	Heron, Pond or Paddy Bird	<i>Ardeola grayii</i>	Common	IV

5	Heron, Night	<i>Nycticorax nycticorax</i>	Common	IV
6	Bittern, Chestnut	<i>Ixobrychus cinnamomeus</i>	Common	IV
	<b>FAMILY - ACCIPITRIDAE</b>			
7	Eagle, Crested Serpent	<i>Spilornis cheela</i>	Common	IV
8	Kite, Common Pariah	<i>Milvus migrans</i>	Common	IV
9	<b>FAMILY - PHASIANIDAE</b>			
10	Fowl, Red Jungle	<i>Gallus gallus</i>	Common	IV
	<b>FAMILY - COLUMBIDAE</b>			
11	Dove, Ring	<i>Streptopelia decaocto</i>	Common	IV
12	Dove, Spotted	<i>Streptopelia chinensis</i>	Common	IV
	<b>FAMILY - CUCULIDAE</b>			
13	Cuckoo, Common Hawk or Brainfever Bird	<i>Cuculus varius</i>	Common	IV
14	Koel	<i>Eudynamys scolopacea</i>	Common	IV
15	Pheasant, Crow or Coucal	<i>Centropus siensis</i>	Common	IV
16	<b>FAMILY - PSITTACIDAE</b>			
17	Parakeet, Alexandrine or Large Indian	<i>Psittacula eupatria</i>	Common	IV
18	Parakeet, Roseringed	<i>Psittacula krameri</i>	Common	IV
	<b>FAMILY - CAPITONIDAE</b>			
19	Barbet, Blue-throated	<i>Megalaima asiatica</i>	Common	IV
20	Barbet, Crimson-breasted or Coppersmith	<i>Megalaima haemacephala</i>	Common	IV
	<b>FAMILY - PICIDAE</b>			
21	Woodpecker, Golden-backed	<i>Dinopium benghalense</i>	Common	IV
	<b>FAMILY - ALCEDINIDAE</b>			
22	Kingfisher, Small Blue	<i>Alcedo atthis</i>	Common	IV
23	Kingfisher, White-breasted	<i>Halcyon smyrnensis</i>	Common	IV
	<b>FAMILY - MEROPIIDAE</b>			
24	Bee-eater, Small Green	<i>Merops orientalis</i>	Common	IV
	<b>FAMILY - APODIDAE</b>			



25	Swift, Palm	<i>Cypsiurus parvus</i>	Common	IV
	<b>FAMILY - ORIOLIDAE</b>			
26	Oriole, Black-headed	<i>Oriolus xanthornus</i>	Common	IV
	<b>FAMILY - STURNIDAE</b>			
27	Myna, Bank	<i>Acridotheres ginginianus</i>	Common	IV
28	Myna, Indian	<i>Acridotheres tristis</i>	Common	IV
29	Myna, Pied	<i>Sturnus contra</i>	Common	IV
	<b>FAMILY - DICRURIDAE</b>			
30	Drongo, Black or Kind Crow	<i>Dicrurus adsimilis</i>	Common	IV
	<b>FAMILY - CORVIDAE</b>			
31	Crow, House	<i>Corvus splendens</i>	Common	IV
32	Crow, Jungle	<i>Corvus macrorhynchos</i>	Common	IV
33	Pie, Tree	<i>Dendrocitta vagabunda</i>	Common	IV
	<b>FAMILY - PYCNONOTIDAE</b>			
34	Bulbul, Red-vented	<i>Pycnonotus cafer</i>	Common	IV
35	Bulbul, Red-whiskered	<i>Pycnonotus jocosus</i>	Common	IV
	<b>FAMILY - IRENIDAE</b>			
36	Iora	<i>Aegithina tiphia</i>	Common	IV
37	Chloropsis, Goldfronted or Green Bulbul.	<i>Chloropsis aurifrons</i>	Common	IV
	<b>FAMILY - CAMPEPHAGIDAE</b>			
38	Minivet, Small	<i>Pericrocotus cinnamomeus</i>	Common	IV
	<b>FAMILY - MUCICAPIDAE</b>			
39	Babbler, Jungle	<i>Turdoides striatus</i>	Common	IV
40	Bird, Tailor	<i>Orthotomus sutorius</i>	Common	IV
41	Warbler, Greenish	<i>Phylloscopus trochiloides</i>	Common	IV
42	Chiffchaff, Common	<i>Phylloscopus collybita</i>	Common	IV
43	Robin, Indian	<i>Saxicoloides fulicata</i>	Common	IV
44	Robin, Magpie	<i>Copsychus saularis</i>	Common	IV

	<b>FAMILY - MOTACILLIDAE</b>			
45	Forest Wagtail	<i>Dendronanthus indicus</i>	Common	IV
	<b>FAMILY - ZOSTEROPIDAE</b>			
46	White- eye	<i>Zosterops palpebrosa</i>	Common	IV
	<b>FAMILY - DICAEDAE</b>			
47	Flowerpecker, Tickell's	<i>Dicaeum erythrorhynchos</i>	Common	IV
	<b>FAMILY NECTARINIIDAE</b>			
48	Sunbird, Purple	<i>Nectarinia asiatica</i>	Common	IV
49	Sunbird, Purple-rumped	<i>Nectarinia zeylonica</i>	Common	IV
	<b>FAMILY - ESTRILDIDAE</b>			
50	Sparrow, House	<i>Passer domesticus</i>	Common	IV
51	Munia, Black-headed	<i>Lonchura malacca</i>	Common	IV
52	Munia, Spotted	<i>Lonchura punctulata</i>	Common	IV
53	Weaver Bird, Baya	<i>Ploceus philippinus</i>	Common	IV

During the field study two transect studies were made – one along the existing transmission line and the other within the Dalma Wildlife Sanctuary – for assessment of avian populations. In the transect along the existing transmission lines, through the disturbances are there yet bird population frequency does not altered significant with respect to second one i.e. Dalma wildlife sanctuary (undisturbed area). The details of bird population frequency in both the transect area is given in the Table – 11 and Table – 12.

**Table – 11: Frequency of birds for the transect along the existing transmission line**

Sl.No.	English Name	Latin Name	Number	Frequency
1	Cormorant, Little	<i>Phalacrocorax niger</i>	3	1.149
2	Egret, Cattle	<i>Bubulcus ibis</i>	6	2.299
3	Egret, Little	<i>Egretta garzetta</i>	2	0.766
4	Heron, Pond or Paddy Bird	<i>Ardeola grayii</i>	4	1.533
5	Kite, Common Pariah	<i>Milvus migrans</i>	2	0.766

6	Dove, Ring	<i>Streptopelia decaocto</i>	5	1.916
7	Dove, Spotted	<i>Streptopelia chinensis</i>	8	3.065
8	Cuckoo, Common Hawk or Brainfever Bird	<i>Cuculus varius</i>	2	0.766
9	Koel	<i>Eudynamys scolopacea</i>	1	0.383
10	Pheasant, Crow or Coucal	<i>Centropus siensis</i>	3	1.149
11	Parakeet, Alexandrine or Large Indian	<i>Psittacula eupatria</i>	12	4.598
12	Parakeet, Roseringed	<i>Psittacula krameri</i>	18	6.897
14	Barbet, Crimson-breasted or Coppersmith	<i>Megalaima haemacephala</i>	8	3.065
15	Woodpecker, Golden-backed	<i>Dinopium benghalense</i>	1	0.383
16	Kingfisher, Small Blue	<i>Alcedo atthis</i>	2	0.766
17	Kingfisher, White-breasted	<i>Halcyon smyrnensis</i>	1	0.383
18	Bee-eater, Small Green	<i>Merops orientalis</i>	9	3.448
19	Swift, Palm	<i>Cypsiurus parvus</i>	13	4.981
20	Myna, Indian	<i>Acridotheres tristis</i>	12	4.598
21	Myna, Pied	<i>Sturnus contra</i>	9	3.448
22	Drongo, Black or Kind Crow	<i>Dicrurus adsimilis</i>	5	1.916
23	Crow, House	<i>Corvus splendens</i>	8	3.065
24	Crow, Jungle	<i>Corvus macrorhynchos</i>	2	0.766
25	Pie, Tree	<i>Dendrocitta vagabunda</i>	4	1.533
26	Bulbul, Red-vented	<i>Pycnonotus cafer</i>	12	4.598
27	Bulbul, Red-whiskered	<i>Pycnonotus jocosus</i>	15	5.747
28	Iora	<i>Aegithina tiphia</i>	5	1.916
30	Bird, Tailor	<i>Orthotomus sutorius</i>	12	4.598
31	Chiffchaff, Common	<i>Phylloscopus collybita</i>	12	4.598

32	Robin, Indian	<i>Saxicoloides fulicata</i>	1	0.383
33	Robin, Magpie	<i>Copsychus saularis</i>	5	1.916
34	Flowerpecker, Tickell's	<i>Dicaeum erythrorhynchos</i>	6	2.299
35	Sunbird, Purple-rumped	<i>Nectarinia zeylonica</i>	11	4.215
36	Sparrow, House	<i>Passer domesticus</i>	29	11.111
37	Munia, Spotted	<i>Lonchura punctulata</i>	8	3.065
38	Weaver Bird, Baya	<i>Ploceus philippinus</i>	5	1.916

**Table – 12: Frequency of birds for the transect within the Dalma Wildlife Sanctuary**

Sl.No.	English Name	Latin Name	Number	Frequency
1	Dove, Ring	<i>Streptopelia decaocto</i>	3	1.045
2	Dove, Spotted	<i>Streptopelia chinensis</i>	6	2.091
3	Cuckoo, Common Hawk or Brainfever Bird	<i>Cuculus varius</i>	2	0.697
4	Koel	<i>Eudynamys scolopacea</i>	6	2.091
5	Pheasant, Crow or Coucal	<i>Centropus siensis</i>	2	0.697
6	Parakeet, Alexandrine or Large Indian	<i>Psittacula eupatria</i>	11	3.833
7	Parakeet, Roseringed	<i>Psittacula krameri</i>	17	5.923
8	Barbet, Blue-throated	<i>Megalaima asiatica</i>	5	1.742
9	Barbet, Crimson-breasted or Coppermith	<i>Megalaima haemacephala</i>	23	8.014
10	Woodpecker, Golden-backed	<i>Dinopium benghalense</i>	2	0.697
11	Oriole, Black-headed	<i>Oriolus xanthornus</i>	5	1.742
12	Crow, Jungle	<i>Corvus macrorhynchos</i>	3	1.045
13	Pie, Tree	<i>Dendrocitta vagabunda</i>	8	2.787
14	Bulbul, Red-vented	<i>Pycnonotus cafer</i>	13	4.530

15	Bulbul, Red-whiskered	<i>Pycnonotus jocosus</i>	16	5.575
16	Iora	<i>Aegithina tiphia</i>	11	3.833
17	Minivet, Small	<i>Pericrocotus cinmamomeus</i>	6	2.091
18	Babbler, Jungle	<i>Turdoides striatus</i>	21	7.317
19	Bird, Tailor	<i>Orthotomus sutorius</i>	22	7.666
20	Warbler, Greenish	<i>Phylloscopus trochiloides</i>	18	6.272
21	Chiffchaff, Common	<i>Phylloscopus collybita</i>	12	4.181
22	Robin, Magpie	<i>Copsychus saularis</i>	2	0.697
23	Forest Wagtail	<i>Dendronanthus indicus</i>	3	1.045
24	White- eye	<i>Zosterops palpebrosa</i>	25	8.711
25	Flowerpecker, Tickell's	<i>Dicaeum erythrorhynchos</i>	11	3.833
26	Sunbird, Purple	<i>Nectarinia asiatica</i>	8	2.787
27	Sunbird, Purple-rumped	<i>Nectarinia zeylonica</i>	3	1.045
28	Sparrow, House	<i>Passer domesticus</i>	13	4.530
29	Munia, Black-headed	<i>Lonchura malacca</i>	4	1.394
30	Munia, Spotted	<i>Lonchura punctulata</i>	6	2.091

### (C) Mammals

Poster survey and direct observations helped us to record 31 species of mammals from the Dalma WLS. Among these 25 species were also found along the existing transmission line. Among these species seven belong to the highly threatened category and are included in the schedule I of the Wildlife (Protection) Act, 1972. These are wolf, leopard, ratel, Indian pangolin, Indian elephant, mouse deer and four horned antelope. Among these seven species occurrence of leopard needs further confirmation. Another eight species are included under schedule II while six species are included in the schedule III of the act. These are common langur, jackal, Bengal fox, palm civet, jungle cat and striped hyena respectively. Others are

not included under the threatened category and are cosmopolitan in distribution. (Table – 13 and Table – 14)

**Table – 13: Checklist of mammals recorded within core areas of the Dalma Wildlife Sanctuary**

Sl.no	English Name	Scientific Names	Occurrence	Position in Wildlife Schedule
	<b>ORDER - INSECTIVORA</b>			
1	Shrew, Grey Musk	<i>Suncus murinus</i>	Common	IV
	<b>ORDER - CHIROPTERA</b>			
2	Bat, Fulvous Fruit	<i>Rousettus leschenaulti</i>	Common	IV
3	Bat, Indian Flying Fox	<i>Pteropus giganteus</i>	Common	IV
4	Bat, Short-nosed Fruit	<i>Cynopterus sphinx</i>	Common	IV
	<b>ORDER - PRIMATES</b>			
5	Langur, Common	<i>Presbytis entellus</i>	Occasional	II
6	Macaque, Rhesus	<i>Macaca mulatta</i>	Common	II
	<b>ORDER - CARNIVORA</b>			
7	Civet, Common Palm	<i>Paradoxurus hermaphroditus</i>	Common	II
8	Civet, Small India	<i>Viverricula indica</i>	Common	II
9	Dog, Indian Wild	<i>Cuon alpinus</i>	Rare	III
10	Jackal	<i>Canis aureus</i>	Rare	II
11	Wolf	<i>Canis lupus</i>	Rare	II
12	Hyena, Striped	<i>Hyaena hyaena</i>	Vagrant	III
13	Cat, Jungle	<i>Felis chaus</i>	Common	II
14	Leopard or Panther	<i>Panthera pardus</i>	?	I
15	Mongoose, Common	<i>Herpestes edwardsi</i>	Common	II
16	Mongoose, Small Indian	<i>Herpestes javanicus</i>	Common	II

17	Badger, Honey or Ratel	<i>Mellivora capensis</i>	Rare	I
	<b>ORDER - PROBOSCIDEA</b>			
18	Elephant	<i>Elephas maximus</i>	Common	I
	<b>ORDER - PHOLIDOTA</b>			
19	Pangolin, Indian	<i>Manis crassicaudata</i>	Occasional	I
	<b>ORDER - ARTIODACTYLA</b>			
20	Deer, Barking or Muntjac	<i>Muntiacus muntjak</i>	Occasional	III
21	Deer, Mouse or Indian Chevrotain	<i>Tragulus meminna</i>	Rare	I
22	Deer, Spotted or Chital	<i>Axis axis</i>	Occasional	III
23	Sambhar	<i>Cervus unicolor</i>	Occasional	III
24	Antelope, Four-horned	<i>Tetraceros quadricornis</i>	Rare	I
25	Boar, Indian Wild	<i>Sus scrofa</i>	Common	III
	<b>ORDER - LAGOMORPHA</b>			
26	Hare, Indian	<i>Lepus nigricollis</i>	Common	IV
	<b>ORDER - INSECTIVORA</b>			
27	Porcupine, Indian	<i>Hystrix indica</i>	Rare	IV
28	Squirrel, Indian Giant	<i>Ratufa indica</i>	Rare	?
29	Squirrel, Three-striped Palm	<i>Funambulus palmarum</i>	Common	IV
30	Mouse, Indian Field	<i>Mus booduga</i>	?	IV
31	Rat, Bandicoot	<i>Bandicota indica</i>	?	IV

**Table – 14: Checklist of mammals recorded along the existing transmission line**

Sl.no	English Name	Scientific Names	Occurrence	Position in Wildlife Schedule
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	<b>ORDER - INSECTIVORA</b>			
1	Shrew, Grey Musk	<i>Suncus murinus</i>	Common	IV
	<b>ORDER - CHIROPTERA</b>			
2	Bat, Fulvous Fruit	<i>Rousettus leschenaulti</i>	Common	IV
3	Bat, Indian Flying Fox	<i>Pteropus giganteus</i>	Common	IV
4	Bat, Short-nosed Fruit	<i>Cynopterus sphinx</i>	Common	IV
	<b>ORDER - PRIMATES</b>			
5	Langur, Common	<i>Presbytis entellus</i>	Occasional	II
6	Macaque, Rhesus	<i>Macaca mulatta</i>	Common	II
	<b>ORDER - CARNIVORA</b>			
7	Civet, Common Palm	<i>Paradoxurus hermaphroditus</i>	Common	II
8	Civet, Small India	<i>Viverricula indica</i>	Common	II
9	Dog, Indian Wild	<i>Cuon alpinus</i>	Rare	III
10	Jackal	<i>Canis aureus</i>	Rare	II
11	Wolf	<i>Canis lupus</i>	Rare	II
12	Hyena, Striped	<i>Hyaena hyaena</i>	Vagrant	III
13	Cat, Jungle	<i>Felis chaus</i>	Common	II
14	Mongoose, Common	<i>Herpestes edwardsi</i>	Common	II
15	Mongoose, Small Indian	<i>Herpestes javanicus</i>	Common	II
	<b>ORDER - PROBOSCIDEA</b>			
16	Elephant	<i>Elephas maximus</i>	Common	I
	<b>ORDER - ARTIODACTYLA</b>			
17	Deer, Barking or Muntjac	<i>Muntiacus muntjak</i>	Occasional	III
18	Deer, Mouse or Indian Chevrotain	<i>Tragulus meminna</i>	Rare	I
19	Deer, Spotted or Chital	<i>Axis axis</i>	Occasional	III



21	Boar, Indian Wild	<i>Sus scrofa</i>	Common	III
	<b>ORDER - LAGOMORPHA</b>			
22	Hare, Indian	<i>Lepus nigricollis</i>	Common	IV
	<b>ORDER - INSECTIVORA</b>			
23	Porcupine, Indian	<i>Hystrix indica</i>	Rare	IV
24	Squirrel, Three-striped Palm	<i>Funambulus palmarum</i>	Common	IV
25	Rat, Bandicoot	<i>Bandicota indica</i>	?	IV

### 5.5 Endangered Plants and Animals

From the records of Botanical Survey of India, it appears that non of the plants of this area are said to be endemic or endangered categories.

Incontary, we recorded 41 butterflies, 6 reptiles, 66 species birds and 31 species mammals. Among these species 2 butterflies and seven species of mammals belong to the schedules I of the Wildlife (Protection) Act 1972. In addition, 4 reptiles and 8 mammal species are included in the schedule II of the Act; and another 6 species of mammal is included in the schedule III. These species are highly endangered and usually affect the area in small numbers. Interviews with local people also suggest that though the leopard had been seen earlier in these areas its present in recent times may be highly questionable. The threats to the faunal life is probably associated with progressive expansion of the human activities across the area. These activities include expansion of human habitations, agricultural activities and other practices of such nature.



Plate - 1: Forest Treak during field survey



Plate - 2: Power Grid Line along forest area



Plate- 3: Canal with dams nears the foothills of Dalma Wild Life Sanctuary



Plate – 4: Degraded forest area near foothill of Dalma Wild Life Sanctuary



Plate – 5: Butterfly in natural habitat



Plate – 6: Cattels in the forest area showing grading pressure

## 5.6 Animal Census records:

The recent census records of Dalma wildlife sanctuary authority were examined and analysed. It appears that there are about sixteen major animals are spotted in this area of which elephant, wildbore, monkey, giant squirell, wild fowl and pea fowl are predominant. The details are given in table-15.

**Table – 15: Animal Census record, (May 2008)**

Sl. No.	Common name of Animal	Total number			
		Male	Female	Calves	Total
	Elephant	30	36	14	96
	Sloth Bear	--	--	--	36
	Wild Boar	--	--	--	204
	Barking Deer	--	--	--	29
	Langur	--	--	--	31
	Monkey	--	--	--	639
	Wild Dog	--	--	--	01
	Leopard	--	--	--	Not seen
	Ratel	--	--	--	01
	Giant squirell	--	--	--	56
	Hyena	--	--	--	09
	Wild fowl	--	--	--	269
	Mongoose	--	--	--	19
	Pea fowl	--	--	--	71
	Horn bill	--	--	--	02
	Mouse Deer	--	--	--	01

Source: Office of Range Officer (Dalma WLS, Jamshedpur, Jharkhand)

## 5.7 Man-Animal Conflict

There are often report of rampage made by elephant herds in village area and crop fields. Occasionally wolf and jackels entered in village area too. This is one of the major conflict.

## 5.8 Elephant corridor

Dalma and its adjacent localities are noted for intensive elephant activities. This is associated with the fact that it is an important elephant corridor. There are three important elephant routes exist over here. The existing corridors follow the mentioned routes:

1. Purulia – Duradi – Gobadhusi – Pagda – Dalma – Kanakdaga.
2. Jamadih – Kurku – Lailin.
3. Jamadih – Bankura – Nulandi – Punsu – Bhadudi – Dalma.

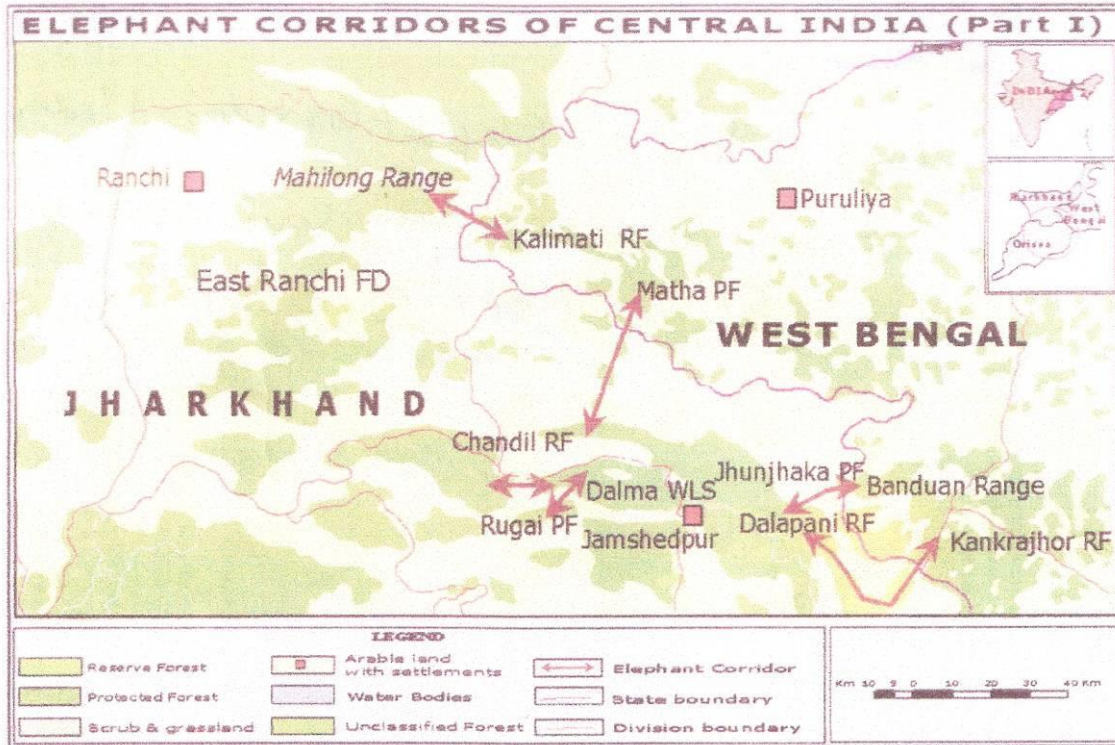
The elephant activities intensify during the early to late winter seasons when the harvest ripens. During these periods the agricultural fields often experience extensive devastations by the herds of elephants often leading to a situation of confrontation between the animals and the human settlers in these region. Interview with the local residents of the Benadih and Tengadih villages reveal that the herds doesn't exceed 10-14.

Elephant population in Dalma hills increased over the years. The details of year wise census data is shown below: in Table 16.

**Tabel – 16: Year wise elephant census data**

Year of census	Total number
1992	68
1993	61
1994	70
1995	75
1996	76
1997	79
1998 - 2000	No Census
2001	82
2002	89

2003	96
2004 – 2007	No Census
2008	96



### 5.8 Biodiversity Threat in Dalma hill range:

There are a number of threats for biodiversity loss in this regions(Plate 7 – 10). These are as follows:

- Timber and fuel wood extraction
- Grazing of domesticated animals
- Animal hunting (illegal way)
- Encroachment of agricultural land and settlement areas
- Fire incidence
- Stone quarry & crushing

➤ **Timbers and Fuel woods**

Due to extensive population risk over the years around the hill range, the inhabitants often entered the hill forest for collection of Timbers and fuel woods. The level of poverty is very severe, they can not go for any other energy alternative for their daily livelihood. As such forest cover is denuded day by day. Of course there was no real estimate for quantum extraction of timber and fuel wood from Dalma hills on annual basis, but the forest became thinner and degraded over time especially around the village areas.

➤ **Grazing of domesticated animals**

It is often seen that forest villagers have a good number of cattle and goat. They often graze in the forest area. The grazing pressure of domesticated animals poses threat to wild animals of the forest.

➤ **Illegal animal hunting:**

The pressure of illegal animal hunting is substantial specially wild boars and barking deers. In fact regular monitoring of such wild animals were not done in this area, but it is true that many wild animal population decreased day to day.

➤ **Encroachment of forest land**

Due to population pressure around forest area, villagers often cleared the forest land for agriculture, check dam creation and even new settlements. It is quite difficult to restrict such encroachment in a formal way.

➤ **Forest fire**

Incidence of natural forest fire in this region is very low, but often villagers make fire during summer months as a ritual. As such tree sapling, ground flora, and animal life is threatened significantly.

➤ **Stone quarry and crushing**

Stone quarry and crushing in the adjoining hill areas are also very common

In addition, various developmental activities around the hills like road/canal construction, tourism promotion, electric transmission line and similar activities pose threat to biodiversity directly or indirectly (Plate 7 – 10).





Plate – 9: Stone crushing activity in foothills of Dalma Wild Life Sanctuary



Plate – 10: Fire wood collection by villagers adjoining Dalma Wild Life Sanctuary



Photographs of Entry point of Dalma Wild Life Sanctuary

## 6.0. Impacts and Management

From the detail field observation it can be concluded that the proposed expansion of towers does not have any major vegetational loss along the ROW and its surrounding region. Regarding the distribution of about 25 common trees of the region it appears about 12 species found in ROW region. There is no significant variability in the plant biodiversity existed between ROW and surrounding area. The little difference in diversity is mainly due to the relief feature, microclimatic condition and anthropogenic activities of this region. Most of the species available in this region are quite common types. So the biodiversity loss due to such activity can be overruled particularly from the standpoint of vegetation cover. POWEGRID (Earlier NTPC) has already deposited cost of plantation of trees to Forest deptt. to plant trees 10 times the no. of trees that were felled. Forest deptt has planted 10 times of trees felled during construction of the line which have improved the tree density. trees in near by area, which have improved the density forest.

All precautions have been taken to avoid routing of line through ecological sensitive areas and National park/Sanctuaries. In the proposed augmentation of PowerGrid line from Durgapur to Jamshedpur, there are three alternatives suggested viz alternative route I, II, & III (as per the site map). Alternative-I require fresh diversion of additional 9.36 Ha Wild life area and Alternative-II involve diversion of 22.356 Ha Wild life area . Alternative-III involve no fresh diversion of area in Wild life sanctuary as new line is being accommodated in existing corridoe on multi ckt tower.

Durgapur–Jamshedpur transmission line shall pass (about 1.25 Kms) through Dalma Wild life Sanctuary. In this portion this line would be accommodated on multi ckt. Tower in the existing Right of Way (52 mtr, ROW) of Maithan –Jamshedpur line. As existing tower of Maithan-Jamshedpur line would be replaced by multi circuit tower and no fresh land would be required in the wild life area. The ROW for Multi ckt. Line in wild life area will be 46 Mtr. Construction of multi ckt tower will reduce 0.31 Ha.wild life area from already diverted area ( Due to reduction of ROW from 52 mtrs to 46 mtrs). Thus it will save 0.31 Ha. wild life area ,which was already diverted to POWERGRID for Mainthan-Jamshedpur line. Sufficient tower height with safe ground clearance are being maintained and will not affect wild life movement. . As such no additional tower shall be constructed/ installed in this portion of wildlife sanctuary except changing of existing tower in to Multi ckt. tower.



There are couple of villages located around the Dalma wildlife sanctuary, whose livelihood depends on forest resources. As such forest is degraded day by day in the hill range by their activities alone. Joint forest management activities along with microplanning adoption are highly essential for better management of wildlife sanctuary.

**Accordingly to our survey and survey done in earlier, no rare, threatened or endemic plants are noted in this region, through there are a good number wildlife found in the sanctuary area and in the proposed route.**

All possible threats of biodiversity damages needs to be addressed handed by the Forest Department in future. No further encroachment in forest areas should be implemented. Prohibition illegal hunting, cattle grazing, fire wood collection, mining of rocks should be implemented at all costs. Man-animal conflicts should be avoided through appropriate participatory management. Non-timer forest produce collection by local villagers can be allowed with proper regulatory means.

There is no hinderance of wildlife movement through forest corridor below the transmission line. Large number of butterflies, birds and even reports of elephant migration takes place in the existing transmission corridor area of Maithan-Jamshedpur transmission line ,which was constructed in 1991-1992. Moreover, the proposed Durgapur-Jamshedpur transmission line will be laid down in the same existing ROW. There could be some temporary disturbances during construction phase only. During construction of multi ckt. Tower in wild life area POWERGRID should take following measures to minimise impacts in wild life sanctuary.

1. No labour camp should be established in Wild life area. And all the project work with in the sanctuary should be undertaken with the approval of Forest deptt./ Wild life deptt.
2. The construction Work should be done in day time and no labour/any other person should be allowed to stay in night in Wild life without permission from forest deptt.
3. Sufficient ground clearance should be maintained to avoid electricution of wild life or forest fire.
4. No fresh felling of trees should be done during construction.
5. All Statutory / safety conditions should be complied.
6. POWERGRID to deposit 5% of cost of transmission line to forest deptt. for management of Wild life

7. Labour should be provided free of cost.fuel wood / kerosene oil/ cooking gas/ any other available facilities during construction for cooking
8. All precautions should be taken to avoid disturbance to wild life during construction of transmission line.

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