

Ornithological Survey of Lower Mai-Valley

Ilam, Eastern Nepal

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A Report Submitted to
OBC, UK

Bird Conservation Nepal - 2006

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SUMMARY

Lower Mai Valley is a part of the Mai Valley which is one of the unprotected Important Bird Areas (IBA) in Nepal. The area is mainly located at Siwalik Hills of the Ilam district. The forest is mixed type dominated by Sal Shorea robusta. An exploration of bird diversity was done in the area from January 2006 to May 2006. Total of 11 community forests were surveyed during the study period. Species discovery curve was calculated using Mackinnon list, with twenty species in each list. Altogether 36 lists were prepared, 18 in each survey. A total two visits were made, once in each season (i.e. winter and pre-monsoon).

*A total of 152 bird species were recorded from the area. Hundred and twenty nine were resident, eighteen were winter visitors and five were summer visitors. Among the observed species 13 were new for this locality. Fourteen were nationally threatened species including one globally threatened species, i.e. Lesser Adjutant *Leptoptilos javanicus*. A total of 25 bird species were biome restricted species.*

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INTRODUCTION

Background

Nepal has an exceptionally rich and diverse avifauna. An important factor determining such diverse avifauna is Nepal's varied topography and climate. The varied physiographic zones of Nepal have facilitated the country's high diversity of fauna and flora. In Nepal 862 species of birds are recorded (Bird Conservation Nepal 2006). A total of 31 species is considered globally threatened (BirdLife International 2001, 2004) and 133 species (15%) have been identified as nationally threatened. Furthermore, 72 species are thought to be nationally critically threatened or endangered (Baral and Inskipp 2004). In addition 11 species are considered extinct in Nepal (Inskipp and Inskipp 1991). As many as 78 species (59% of the total threatened) depend on forests (Baral and Inskipp 2004). Considering the situation Bird Conservation Nepal has identified 27 Important Bird Areas (IBA) in Nepal. The Mai Valley is one of 12 IBAs that are unprotected (Baral and Inskipp 2005). Inskipp (1989) earlier identified the Mai Valley as an important unprotected forest of Nepal.

Among the six biomes found in Nepal, the Mai Valley IBA possesses four biomes. These are the Eurasian High Montane, Sino-Himalayan Subtropical Forest, Indo-Chinese Tropical Moist Forest and Indo-Malayan Tropical Dry Zone. The lower Mai Valley area is a part of the lower region of the Mai Valley IBA in eastern Nepal (Baral and Inskipp 2005), which supports three globally threatened, one globally near-threatened and one restricted range species (Baral and Inskipp 2001). Furthermore, it supports more than 27 nationally threatened species (Inskipp 1989, Baral and Inskipp 2004); also it lies in the Eastern Himalayas Endemic Bird Area identified by BirdLife International and is recognized as a biodiversity hotspot for birds (Stattersfield *et al.* 1998). Forests of the lower Mai Valley area are currently unprotected, but local users now manage all the forests as community forest. Forests of the lower Mai Valley comprise tropical and subtropical forests and they include a small but important remnant of tropical evergreen forest (Inskipp 1989). The forest is mainly Sal *Shorea robusta* with mixed hardwoods. Most of the forest areas of the lower Mai Valley are situated in the Churia (Siwalik) range of Ilam district.

The globally threatened White-rumped Vulture *Gyps bengalensis*, Slender-billed Vulture *G. tenuirostris* and Lesser Adjutant *Leptoptilus javanicus* were reported to breed in the area (Inskipp 1989, Baral and Inskipp 2005, BirdLife International 2001). The nationally endangered Asian Fairy Bluebird *Irena puella* and Pale-headed Woodpecker *Gecinulus grantia* have also been recorded from here. Both the species are very rare in Nepal; the lower Mai Valley is the only known Nepal locality for Pale-headed Woodpecker. Forest areas of the lower Mai Valley are contiguously surrounded by village areas inhabited by caste groups such as Rai, Limbu, Chhetri, Brahman and Tamang. Thus, the forest areas of the lower Mai Valley are highly fragmented. The forest users of the Mahamai and Danabari VDCs are dependent on forest resources for fuelwood, fodder, timber etc. The main occupations of the local people are agriculture, animal husbandry and harvesting of forest products (Oli 1998).

Objectives

The main aim of this study was to obtain the scientific data from the lower Mai Valley area, which supports large avian diversity. The broad objective of this study is to make an inventory of avian diversity in the lower Mai Valley Forest.

The specific objectives are:

1. to determine the avian diversity in lower Mai Valley; and
2. to assess the richness of birds in the area.

STUDY AREA

Location

The lower Mai Valley area lies in southern Ilam district and northern Jhapa district under the Mechi administrative zone and the north-east of Morang district under Koshi administrative zone in east Nepal. Though the lower Mai Valley area is not properly delineated, it is considered as the valley made by the Mai River and its tributaries at altitudes ranging from 78m to 1800m asl (Baral and Inskipp 2001). The area lies between 87°38'E and 87°59' E longitude and 26°39' N and 26°52' N latitude. The forest areas of the lower region of Ilam district cover approximately 20,000 hectares.

This study was conducted in the lower Mai Valley forests under the Mahamai and Danabari VDCs of Ilam district and Surunga and Khudunabari VDCs of Jhapa district at altitudes 78m-825m, with an area covering approximately 12,000 hectares. Forests of the lower Mai Valley have been recently developed as community forest. Community forests are the forest areas which have been given to local users for management and utilization of the forest resources for the benefit of users as well as nation. Forest User Groups (FUGs) are given the rights to the forests but not to the land. The rural people are dependent on forest for various products to fulfill their basic needs such as fuel wood, pole, fodder, leaf litter, fruit and medicinal plants (Roy 2004). More than 30 forest user groups are benefiting from forest resources in the lower Mai Valley. During the survey period, a total of eleven community forests were surveyed. These were considered the most important as they were contiguous with other forest and comprised comparatively large areas. Forests covering small areas or forests that were highly fragmented and located in the vicinity of villages were excluded. Due to the security situation that existed during the survey period, some forest areas could not be safely covered during the first survey. Only seven community forests areas were surveyed on the first visit, but in the second survey all the eleven community forests were surveyed. The name of the community forests are given in table 1.

In addition to the forest areas, agricultural areas located between the forests and the Mai River were surveyed.

Table 1. Community forests in the Lower Mai Valley

SN	Name of the community forest	Location	Area (hectares)
1	Pathivara community forest	Mahamai, Ilam	609
2	Gaide community forest	Mahamai, Ilam	867
3	Shrijana community forest	Mahamai, Ilam	844
4	Laxmi community forest	Mahamai, Ilam	400
5	Namuna community forest	Danabari, Ilam	597
6	Sukhani community forest	Danabari, Ilam and Khudunabari, Jhapa	400
7	Jukekhadi community forest	Khudunabari, Jhapa	669
8	Shiva Pokhari community forest*	Danabari, Ilam	700
9	Dahijhoda community forest*	Khudunabari, Jhapa	674
10	Sukedagi community forest*	Surunga, Jhapa	749
11	Kankai community forest*	Surunga, Jhapa	270

* visited only in 2nd survey

Climate

The lower Mai valley area has both tropical and sub-tropical climates. There are four seasons: pre-monsoon (March-May), monsoon (June-September), post-monsoon (October) and winter (November-February) (Oli 1999). The total mean annual precipitation was estimated to be about 2665 mm from 1967 to 1996 at Soktim Tea Estate, the nearest Meteorological station from the study area. The average monthly rainfall of 747 mm was recorded in July, while the lowest monthly rainfall of 11.1 mm was recorded in December. Due to the insurgency at the time of the survey we could not obtain recent meteorological records.

The temperature variation in the Ilam Siwalik area depends on altitude and aspect. It is relatively low on the northern slopes and at higher elevations compared to the southern slopes and lower altitudes. The annual mean temperature recorded at Soktim tea estate is 20.7°C with an annual range of mean monthly temperature of 16.6°C in January and 25.8°C in July and August. However, the daily maximum temperature ranges from 21.5°C in January to 30.5°C in April. The monthly minimum temperature ranges from 11.2°C in January to 21.9°C in August.

The mean monthly relative humidity varies from 69% in April to 90% in July and August, indicating a dry atmosphere in the pre-monsoon season and a moist atmosphere during the monsoon season (Oli, 1998).

Biological diversity

Flora

The principal vegetation of the area comprises tropical and sub-tropical evergreen forest. The tropical evergreen forest is characterized by dense vegetation with large sized trees and comparatively warm and heavy rainfall during summer. The Community forests are mainly dominated by matured Sal *Shorea robusta* forest. The associated species with Sal are Karma *Adina cardifolia*, Amla *Emblica officinalis*, Hade *Lagerstroemia parviflora*, Bel *Aegle marmelos*, Rajbrikshya *Cassia fistula* and Sahaj *Terminalia alata*. The major woody vegetation of the area is shown in Annex 1.

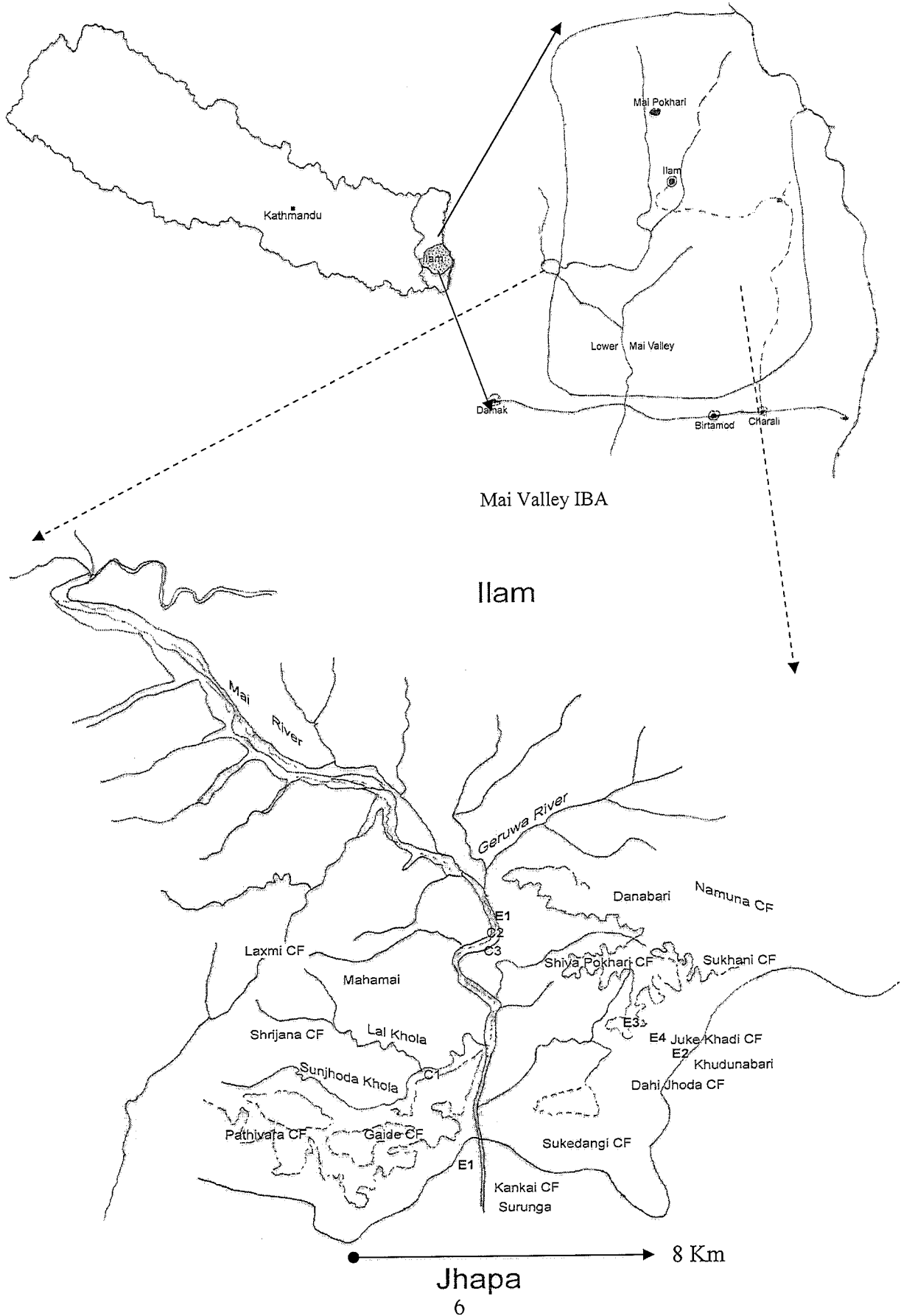
Fauna

Wild mammals found in the area are Wild Boar *Sus scrofa*, Jungle Cat *Felis chaus*, Clouded Leopard *Pardofelis nebulosa*, Common Langur *Semnopithecus entellus*, Hare *Lepus nigricolis*, Rhesus Monkey *Macaca mulata*, Black Giant Squirrel *Ratufa bicolor* and Indian Palm Squirrel *Funambulus palmarum*. According to local people, Asiatic Wild Elephant *Elephas maximus* regularly visits the southern part of the area.

Socio-economic aspect

Rice *Oryza sativa*, wheat, corn and millet are the major crops in the area, whereas mustard *Brassica campestris*, potato *Solanum tuberosum*, legumes and sugarcane *Saccharum spp.* are grown as minor crops. Livestock is a major component of the agricultural system in the area. The main livestock are cattle, goat, buffalo, pig and poultry. In addition to farming, harvesting of forest products is the main occupation in Shrijana and Gaide community forests. Sukrabare of the Danabari VDC is the area's local market and is accessible by road from Birtamod, Jhapa.

Map of the Study Area



MATERIAL AND METHODS

Bird Survey

Extensive bird surveys in forest areas of Danabari and Mahamai VDCs in the lower Mai Valley were carried out twice, one survey in the winter season (January 2006) and another in the pre-monsoon season (May 2006). Observations were made with the help of two local assistants in different community forests of the Mahamai and Danabari VDCs. All types of habitat including Sal forest, mixed forest, Bushes, Bamboo clumps, streams, river (Mai) were covered during the survey. Calls were noted of certain species such as Blue-throated Barbet, Lineated Barbet, Common Hawk Cuckoo, Indian Cuckoo, Koel, Puff-throated Babbler and Red Jungle Fowl. Bird sounds were also used to detect or identify bird species. Date, time, weather, group size and habitat type were recorded for each observation. Mackinnon's species richness counting method (Mackinnon and Phillips, 1993) was followed to determine the species-richness of the area.

Species richness counting method was as follows:

1. Each new species was recorded until a list of 20 was reached.
2. Then a new list (number 2) was started and another 20 species was recorded. Each list contained 20 different species, but subsequent lists could include species previously listed. During the survey much care was taken not to repeat same species in the same list, but it was listed in subsequent lists.
3. Then list number 3 was recorded.
4. Ideally 18 lists were repeatedly recorded in each season.
5. A final running species total was obtained by extracting the number of species in list 2 that were not in list 1 and so on throughout all the recorded for that area.

The observed birds were identified following handbooks Grimmett *et al.* (1998, 2000). Finally a bird list was compiled by careful recording of all the birds observed. The bird list was followed the systematic order as 'An annotated checklist of the Birds of the Oriental region (Inskipp *et al.* 1996)'.

First field survey

A total of eight days was spent in the study area from 11th January to 18th January 2006 for the first phase of the study. A total of 18 lists was made during the period. Six community forests of

Maha-mai and Danabari VDCs of Ilam district and one community forest of Khudunabari VDC, Jhapa district were visited during this survey period. Birds were also recorded on the river, and in agricultural areas and open fields. Two local people were hired for our safety and convenience.

Second field survey

A total of seven days was spent in the study area from 13th May to 19th May 2006 for the second phase of the study. A total of 18 new lists was made. These are considered list number 19 to 36. Six community forests of Maha-mai and Danabari VDCs of Ilam district and five community forest of Surunga and Khudunabari VDC, Jhapa district were visited during the survey period. Furthermore, birds were also recorded in river, agricultural area and open field.

Data analysis

A species discovery curve was plotted using Mackinnon's species-richness counting method (Bibby *et al.* 2000). The species were classified taxonomically. The threatened status of the observed birds were identified with the help of key books, i.e. The State of Nepal's birds 2004 (Baral and Inskipp 2004) and the Red List of Threatened Species (IUCN 2004).

RESULT AND DISCUSSION

Bird Survey

The total of 36 bird lists was prepared between January 2006 and May 2006. Species were recorded according to Mackinnon's list. The first survey was made in winter. A total of 118 bird species belonging to 41 families and 15 orders was recorded in 18 bird lists from 11-18, January 2006. The second survey was made in the pre-monsoon season. A total of 105 bird species belonging to 32 families and 11 orders was recorded in 18 bird lists from 13-19, May, 2006. The number of running species according to list number and the species discovery curve are shown in table 2 and figure 1 respectively.

Table 2: List number and running species

First survey		Second survey	
List number	Running species	List number	Running species
1	20	19	119
2	32	20	121
3	43	21	126
4	55	22	128
5	63	23	128
6	74	24	132
7	76	25	135
8	81	26	138
9	84	27	139
10	87	28	139
11	96	29	139
12	97	30	144
13	99	31	145
14	103	32	145
15	107	33	146
16	109	34	151
17	114	35	152
18	118	36	152

Among the 105 bird species 34 species were not recorded in first field visit. Again, 48 species were recorded only in first survey and 70 species were observed in both first and second visit.

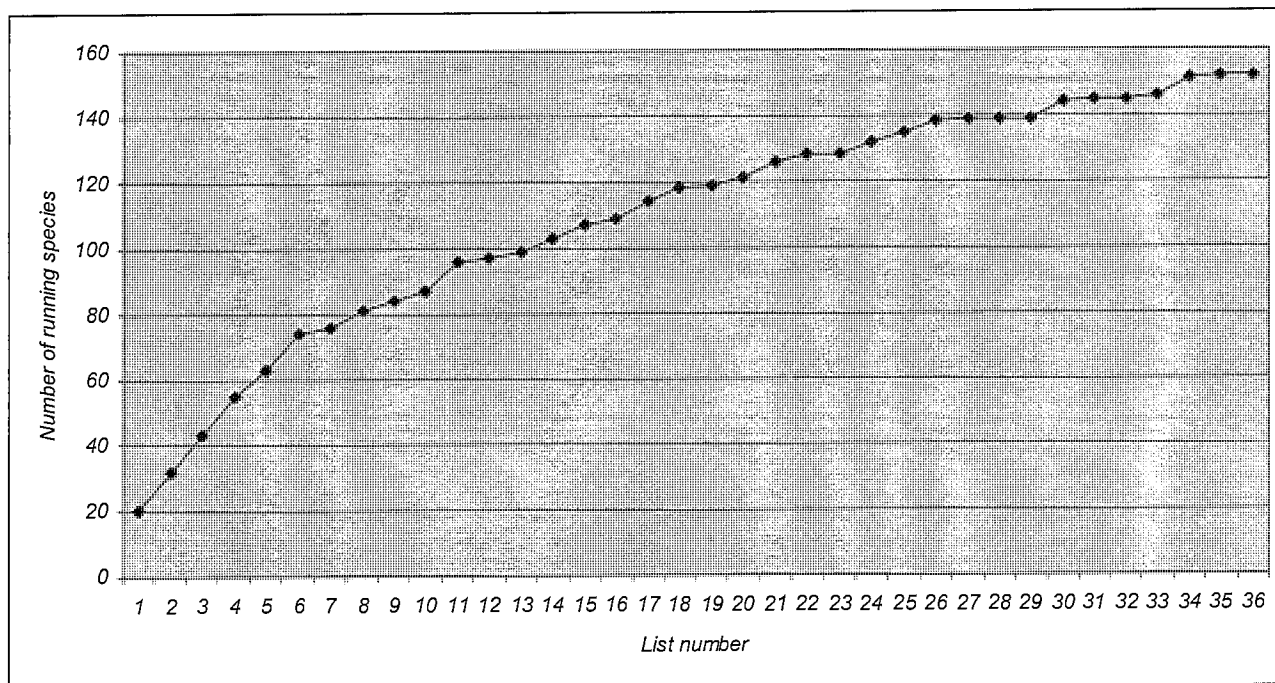


Figure 1 Species discovery curve

Bird diversity

Thus, a total of 152 species belonging to 15 orders and 42 families was recorded from the lower Mai Valley area. Among them 129 species were residents, 18 species were winter visitors and 5 were summer visitors. The list of birds according to species occurrence in each survey is shown in table 3 along with order and family.

Table 3 List of birds according to field survey

S.N	Common Name	Scientific Name	1 st Survey	2 nd Survey
	Order: GALLIFORMES			
	Family: Phasianidae			
1	Red Junglefowl	<i>Gallus gallus</i>	+	+
2	Indian Peafowl	<i>Pavo cristatus</i>		+
	ANSERIFORMES			
	Anatidae			
3	Common Merganser	<i>Mergus merganser</i>	+	

	TURNICIFORMES			
	Turnicidae			
4	Barred Buttonquail	<i>Turnix suscitator</i>	+	
	PICIFORMES			
	Picidae			
5	Grey-capped Pygmy Woodpecker	<i>Dendrocopos canicapillus</i>	+	+
6	Fulvous-breasted Woodpecker	<i>Dendrocopos macei</i>	+	+
7	Rufous Woodpecker	<i>Celeus brachyurus</i>		+
8	Greater Yellownape	<i>Picus flavinucha</i>	+	+
9	Grey-headed Woodpecker	<i>Picus canus</i>	+	
10	Himalayan Flameback	<i>Dinopium shorii</i>	+	+
11	Greater Flameback	<i>Chrysocolaptes lucidus</i>	+	+
	Megalaimidae			
12	Lineated Barbet	<i>Megalaima lineata</i>	+	+
13	Blue-throated Barbet	<i>Megalaima asiatica</i>	+	+
14	Blue-eared Barbet	<i>Megalaima australis</i>	+	
	BUCEROTIFORMES			
	Bucerotidae			
15	Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>	+	+
	UPUPIFORMES			
	Upupidae			
16	Common Hoopoe	<i>Upupa epops</i>	+	
	CORACIIFORMES			
	Coraciidae			
17	Indian Roller	<i>Coracias benghalensis</i>	+	+
18	Dollarbird	<i>Eurystomus orientalis</i>		+
	Dacelonidae			
19	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	+	+
	Meropidae			
20	Green Bee-eater	<i>Merops orientalis</i>	+	+
21	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>		+
	CUCULIFORMES			
	Cuculidae			
22	Chestnut-winged Cuckoo	<i>Clamator coromandus</i>		+
23	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	+	+
24	Indian Cuckoo	<i>Cuculus micropterus</i>		+
25	Asian Koel	<i>Eudynamis scolopacea</i>	+	+
26	Green-billed Malkoha	<i>Phaenicophaeus tristis</i>		+

	Centropodidae			
27	Greater Coucal	<i>Centropus sinensis</i>	+	+
	PSITTACIFORMES			
	Psittacidae			
28	Alexandrine Parakeet	<i>Psittacula eupatria</i>	+	+
29	Rose-ringed Parakeet	<i>Psittacula krameri</i>	+	+
30	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	+	+
31	Red-breasted Parakeet	<i>Psittacula alexandri</i>		+
	APODIFORMES			
	Apodidae			
32	Asian Palm Swift	<i>Cypsiurus balasiensis</i>		+
33	House Swift	<i>Apus affinis</i>	+	
	Hemiprocnidae			
34	Crested Treeswift	<i>Hemiprocne coronata</i>	+	
	STRIGIFORMES			
	Strigidae			
35	Asian Barred Owlet	<i>Glaucidium cuculoides</i>	+	
36	Jungle Owlet	<i>Glaucidium radiatum</i>		+
37	Spotted Owlet	<i>Athene brama</i>	+	+
38	Brown Hawk Owl	<i>Ninox scutulata</i>		+
	COLUMBIFORMES			
	Columbidae			
39	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	+	+
40	Spotted Dove	<i>Streptopelia chinensis</i>	+	+
41	Red Collared Dove	<i>Streptopelia tranquebarica</i>		+
42	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	+	+
43	Emerald Dove	<i>Chalcophaps indica</i>	+	
44	Orange-breasted Green Pigeon	<i>Treron bicincta</i>	+	
45	Thick-billed Green Pigeon	<i>Treron curvirostra</i>		+
46	Yellow-footed Green Pigeon	<i>Treron phoenicoptera</i>		+
	GRUIFORMES			
	Rallidae			
47	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	+	
	CICONIFORMES			
	Scolopacidae			
48	Common Sandpiper	<i>Actitis hypoleucos</i>	+	
	Burhinidae			
49	Great Thick-knee	<i>Burhinus recurvirostris</i>		+

	Charadriidae			
50	Ibisbill	<i>Ibidorhyncha struthersii</i>	+	
51	Little Ringed Plover	<i>Charadrius dubius</i>	+	
52	River Lapwing	<i>Vanellus duvaucelii</i>	+	+
53	Red-wattled Lapwing	<i>Vanellus indicus</i>	+	+
	Accipitridae			
54	Black Baza	<i>Aviceda leuphotes</i>		+
55	Black Kite	<i>Milvus migrans</i>		+
56	Brahminy Kite	<i>Haliastur indus</i>		+
57	Crested Serpent Eagle	<i>Spilornis cheela</i>	+	+
58	Crested Goshawk	<i>Accipiter trivirgatus</i>		+
59	Shikra	<i>Accipiter badius</i>	+	+
60	Common Buzzard	<i>Buteo buteo</i>	+	
	Falconidae			
61	Collared Falconet	<i>Microhierax caerulescens</i>	+	
62	Common Kestrel	<i>Falco tinnunculus</i>	+	+
	Phalacrocoracidae			
63	Little Cormorant	<i>Phalacrocorax niger</i>	+	+
	Ardeidae			
64	Little Egret	<i>Egretta garzetta</i>	+	+
65	Cattle Egret	<i>Bubulcus ibis</i>	+	+
66	Indian Pond Heron	<i>Ardeola grayii</i>	+	+
67	Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>		+
	Threskiornithidae			
68	Black Ibis	<i>Pseudibis papillosa</i>	+	+
	Ciconiidae			
69	Asian Openbill	<i>Anastomus oscitans</i>		+
70	Woolly-necked Stork	<i>Ciconia episcopus</i>		+
71	White Stork	<i>Ciconia ciconia</i>	+	
72	Lesser Adjutant	<i>Leptoptilos javanicus</i>	+	+
	PASSERIFORMES			
	Eurylaimidae			
73	Long-tailed Broadbill	<i>Psarisomus dalhousiae</i>		+
	Irenidae			
74	Golden-fronted Leafbird	<i>Chloropsis aurifrons</i>	+	+
	Laniidae			
75	Brown Shrike	<i>Lanius cristatus</i>	+	
76	Long-tailed Shrike	<i>Lanius schach</i>	+	

77	Grey-backed Shrike	<i>Lanius tephronotus</i>	+	
	Corvidae			
78	Red-billed Blue Magpie	<i>Urocissa erythrorhyncha</i>		+
79	Rufous Treepie	<i>Dendrocitta vagabunda</i>	+	+
80	House Crow	<i>Corvus splendens</i>		+
81	Large-billed Crow	<i>Corvus macrorhynchos</i>	+	+
82	Ashy Woodswallow	<i>Artamus fuscus</i>	+	+
83	Black-hooded Oriole	<i>Oriolus xanthornus</i>	+	+
84	Maroon Oriole	<i>Oriolus traillii</i>	+	
85	Large Cuckooshrike	<i>Coracina macei</i>	+	+
86	Rosy Minivet	<i>Pericrocotus roseus</i>	+	+
87	Long-tailed Minivet	<i>Pericrocotus ethologus</i>	+	
88	Scarlet Minivet	<i>Pericrocotus flammeus</i>	+	+
89	Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	+	+
90	Black Drongo	<i>Dicrurus macrocercus</i>	+	+
91	Ashy Drongo	<i>Dicrurus leucophaeus</i>	+	+
92	White-bellied Drongo	<i>Dicrurus caerulescens</i>	+	
93	Bronzed Drongo	<i>Dicrurus aeneus</i>	+	+
94	Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i>	+	+
95	Spangled Drongo	<i>Dicrurus hottentottus</i>	+	+
96	Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	+	+
97	Black-naped Monarch	<i>Hypothymis azurea</i>		+
98	Asian Paradise-flycatcher	<i>Terpsiphone paradisi</i>		+
99	Common Iora	<i>Aegithina tiphia</i>	+	+
100	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	+	+
	Muscipapidae			
101	Blue-capped Rock Thrush	<i>Monticola cinclorhynchus</i>	+	
102	Blue Rock Thrush	<i>Monticola solitarius</i>	+	
103	Blue Whistling Thrush	<i>Myophonus caeruleus</i>	+	
104	Dark-sided Thrush	<i>Zoothera marginata</i>	+	
105	Dark-throated Thrush	<i>Turdus ruficollis</i>	+	
106	Red-throated Flycatcher	<i>Ficedula (parva) albicilla</i>	+	
107	Snowy-browed Flycatcher	<i>Ficedula hyperythra</i>	+	
108	Verditer Flycatcher	<i>Eumyias thalassina</i>	+	
109	Small Niltava	<i>Niltava macgrigoriae</i>	+	
110	Pale-chinned Flycatcher	<i>Cyornis poliogenys</i>		+
111	Grey-headed Canary Flycatcher	<i>Culicicapa ceylonensis</i>	+	
112	Oriental Magpie Robin	<i>Copsychus saularis</i>	+	+

113	White-rumped Shama	<i>Copsychus malabaricus</i>	+	+
114	White-capped Water Redstart	<i>Chaimarrornis leucocephalus</i>	+	
115	Black-backed Forktail	<i>Enicurus immaculatus</i>	+	+
116	Common Stonechat	<i>Saxicola torquata</i>	+	
	Sturnidae			
117	Chestnut-tailed Starling	<i>Sturnus malabaricus</i>	+	+
118	Asian Pied Starling	<i>Sturnus contra</i>	+	+
119	Common Myna	<i>Acridotheres tristis</i>	+	+
120	Jungle Myna	<i>Acridotheres fuscus</i>	+	+
121	Hill Myna	<i>Gracula religiosa</i>	+	+
	Sittidae			
122	Chestnut-bellied Nuthatch	<i>Sitta castanea</i>	+	+
123	Velvet-fronted Nuthatch	<i>Sitta frontalis</i>	+	+
	Paridae			
124	Great Tit	<i>Parus major</i>	+	+
	Hirundinidae			
125	Red-rumped Swallow	<i>Hirundo daurica</i>	+	
	Pycnonotidae			
126	Black-crested Bulbul	<i>Pycnonotus melanicterus</i>	+	+
127	Himalayan Bulbul	<i>Pycnonotus leucogenys</i>	+	+
128	Red-vented Bulbul	<i>Pycnonotus cafer</i>	+	+
129	White-throated Bulbul	<i>Alophoixus flaveolus</i>		+
	Zosteropidae			
130	Oriental White-eye	<i>Zosterops palpebrosus</i>	+	
	Sylviidae			
131	Common Tailorbird	<i>Orthotomus sutorius</i>	+	+
132	Greenish Warbler	<i>Phylloscopus trochiloides</i>	+	
133	Dusky Warbler	<i>Phylloscopus fuscatus</i>	+	
134	Yellow-vented Warbler	<i>Phylloscopus cantator</i>	+	
135	Grey-hooded Warbler	<i>Seicercus xanthoschistos</i>	+	
136	Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	+	+
137	Puff-throated Babbler	<i>Pellorneum ruficeps</i>		+
138	White-browed Scimitar Babbler	<i>Pomatorhinus schisticeps</i>	+	
139	Striped Tit Babbler	<i>Macronous gularis</i>	+	+
140	Jungle Babbler	<i>Turdoides striatus</i>	+	+
141	Nepal Fulvetta	<i>Alcippe nipalensis</i>	+	
	Alaudidae			
142	Sand Lark	<i>Calandrella raytal</i>	+	

	Nectariniidae			
143	Ruby-cheeked Sunbird	<i>Anthreptes singalensis</i>		+
144	Crimson Sunbird	<i>Aethopyga siparaja</i>	+	+
145	Streaked Spiderhunter	<i>Arachnothera magna</i>	+	
	Passeridae			
146	House Sparrow	<i>Passer domesticus</i>	+	+
147	White Wagtail	<i>Motacilla alba</i>	+	
148	Yellow Wagtail	<i>Motacilla flava</i>	+	
149	Paddyfield Pipit	<i>Anthus rufulus</i>		+
150	Olive-backed Pipit	<i>Anthus hodgsoni</i>	+	
151	Baya Weaver	<i>Ploceus philippinus</i>		+
152	White-rumped Munia	<i>Lonchura striata</i>		+

+ Present

Among the observed species 73 species were already listed in the Mai Valley checklist in the book 'Nepal's forest Birds (Inskipp 1989)' and 79 species were not documented before from that area. Among them, 66 species were recorded by Chaudhary (1999). Thus, 13 species were probably new record from the area. These are Indian Peafowl, Common Merganser, Rufous Woodpecker, Blue-eared Barbet, Chestnut-winged Cuckoo, Thick-billed Green Pigeon, Common Sandpiper, Great Thick-knee, Brahminy Kite, White Stork, Dark-sided Thrush, Yellow-vented Warbler and Sand Lark. Among them six species are considered nationally threatened (Table 4).

Threatened Species

Seven nationally threatened species were observed during first survey including one globally threatened Lesser Adjutant. Similarly, ten nationally threatened species were observed during the second survey including the same globally threatened species. Among them three species were observed during both seasons. Thus, a total of 14 nationally threatened species (three critical, four endangered and seven vulnerable) were observed from the area (Baral and Inskipp 2004). This constitutes 9.2% of the species observed during the survey and 10.5% of Nepal's nationally threatened birds. The list of threatened species recorded during the survey is shown in table 4.

Table 4 List of threatened birds recorded in the study area

No	Common name	Categories	Location	Habitat
1	Blue-eared Barbet	Critical	Shrijana CF	Dense mixed forest

2	Great Thick-knee	Critical	Mai River, Danabari	Riverine area
3	Brahminy Kite	Critical	Mai River, Danabari	Riverine area
4	Lesser Adjutant Stork*	Endangered	Domukha, Jhapa; Mai River, Danabari	Agricultural area
5	Yellow-vented Warbler+	Endangered	Juke Khadi CF	Sal dominated forest
6	White-throated Bulbul	Endangered	Juke Khadi CF	Sal dominated forest
7	Ruby-cheeked Sunbird	Endangered	Juke Khadi CF	Sal dominated forest
8	Red Junglefowl	Vulnerable	Pathivara CF, Namuna CF	Sal Forest
9	Ibisbill	Vulnerable	Mai river, Danabari	Wetland
10	Dark-sided Thrush	Vulnerable	Pathivara CF	Mixed Forest
11	Asian Openbill	Vulnerable	Mai river, Danabari	Agricultural area
12	Thick-billed Green Pigeon	Vulnerable	Juke Khadi CF	Mixed Forest
13	Long-tailed Broadbill	Vulnerable	Pathivara CF, Jukekhadi CF	Mixed Forest
14	Hill Myna	Vulnerable	Pathivara, Juke Khadi, Namuna, Shiva Pokhari and Sukhani CF	Agricultural area/ Mixed Forest

* Globally threatened species

+ Restricted range species

CF - Community forest

Among the nationally threatened species a single Blue-eared Barbet was observed in Gaide community forest near Lal Khola at 300m altitude on 12th January. The bird is critically endangered in the nationally threatened category, which is shown in map as C1.

Another nationally threatened critically endangered species Great Thick-knee was observed on the Mai River near Danabari VDC on 18th May. As far as, can be ascertained this is a new locality for the species. Great Thick-knee is usually found on large rivers and was considered fairly common in Koshi in 1990 (Inskipp and Inskipp 1991), which is shown in map as C2.

A pair of immature Brahminy Kite was seen over the Mai River near Danabari VDC on 18th May. Once, the species was very common in the plains and terai (Scully 1879, cited in Baral and Inskipp 2004). One of the very few recent records of this nationally critically endangered bird was from Jumka near Koshi in December 1993 (Chaudhary 1994) shown in map as C3, which is the nearest record from the area.

The globally threatened species Lesser Adjutant was observed in both seasons. During the first survey one was soaring over Domukha of Gaide Community forest. A total of six individuals were feeding in agricultural fields along with two Asian Openbills near the Mai River at Danabari VDC during the second survey, which is shown in map as E1.

A very rare winter visitor, the Yellow-vented Warbler, was observed in Juke Khadi community forest on 18th January, which is shown in map as E2. The species is a restricted range species of the eastern Himalaya, as well as a nationally endangered species. There are no other known Nepal records of this species since 1996 (Baral and Inskipp 2004).

Other nationally endangered species, the White-throated Bulbul and Ruby-cheeked Sunbird were observed from mixed forest of Juke Khadi community forest on 16th May, which are shown in map as E3 and E4 respectively. Chaudhary (1999) also recorded both species from the area.

Calls of Red Junglefowl were frequently noted in both seasons from Pathivara and Namuna community forests of Ilam district.

Eleven individuals of Ibisbill were observed from Mai River near Danabari area on 15th January. The last record of the species was April 1999 (Chaudhary 1999).

Another very rare species in Nepal, Dark-sided Thrush was observed on 11th January from Pathivara Community forest.

A pair of Thick-billed Green Pigeon was carrying nest material in Juke khadi Community forest on 16th May.

Long-tailed Broadbill was recorded from Pathivara Community forest and Juke Khadi community forest during the second survey. Bhujy (2000) also reported the bird from the area.

Many Hill Mynas were recorded in both seasons frequently from different community forests of the area (Table 4).

Furthermore, two River Lapwings were observed from riverine area of Mai River near Sukrabare on 15th January (First survey). Again, eight individuals were recorded in the same area on 18th May (Second survey). The species is rapidly declining from South East Asia (David Buckingham *Press. Comm.* 2006).

Biome restricted species

Mai Valley IBA supports more than 150 biome-restricted species, out of these, more than 85 species are found in tropical and sub-tropical region of the area (Baral and Inskipp 2005). Among the observed species twenty five species (16.45% of the total species) recorded were biome-restricted species. Among them, two were Eurasian high montane biome species, ten were Sino-Himalayan Subtropical forest biome species, four were Indo-Chinese Topical moist forest

biome species, and nine were Indo-Malayan Tropical Dry zone biome species. Bird species according to the biome where they were recorded are shown in table 5.

Table 5 Bird species according to biome

S N	Name of Species	Biome
1	Ibisbill	Eurasian high montane
2	Grey-backed Shrike	Eurasian high montane
3	Blue-throated Barbet	Sino-Himalayan Subtropical forest
4	Maroon Oriole	Sino-Himalayan Subtropical forest
5	Rosy Minivet	Sino-Himalayan Subtropical forest
6	Blue-capped Rock Thrush	Sino-Himalayan Subtropical forest
7	Small Niltava	Sino-Himalayan Subtropical forest
8	Himalayan Bulbul	Sino-Himalayan Subtropical forest
9	White-throated Bulbul	Sino-Himalayan Subtropical forest
10	Grey-hooded Warbler	Sino-Himalayan Subtropical forest
11	Nepal Fulvetta	Sino-Himalayan Subtropical forest
12	Streaked Spiderhunter	Sino-Himalayan Subtropical forest
13	Himalayan Flameback	Indo-Chinese Topical moist forest
14	Pale-chinned Flycatcher	Indo-Chinese Topical moist forest
15	Black-backed Forktail	Indo-Chinese Topical moist forest
16	Lesser Necklaced Laughingthrush	Indo-Chinese Topical moist forest
17	Indian Peafowl	Indo-Malayan Tropical Dry zone
18	Lineated Barbet	Indo-Malayan Tropical Dry zone
19	Plum-headed parakeet	Indo-Malayan Tropical Dry zone
20	Yellow-footed Green pigeon	Indo-Malayan Tropical Dry zone
21	Ashy Woodswallow	Indo-Malayan Tropical Dry zone
22	White-bellied Drongo	Indo-Malayan Tropical Dry zone
23	Common Woodshrike	Indo-Malayan Tropical Dry zone
24	Chestnut-tailed starling	Indo-Malayan Tropical Dry zone
25	Jungle Babbler	Indo-Malayan Tropical Dry zone

Although Pale-headed Woodpecker could not be observed during the survey period, Lower Mai Valley is especially important for that Indo-Chinese Tropical moist forest biome species and only reported in the area from Nepal (Baral and Inskipp 2004). Furthermore, White-throated Bulbul and Ibisbill are the other important biome restricted birds of the lower Mai Valley.

Species-richness was calculated using Mackinnon's species list. The species discovery curve is still going upwards that more bird species are likely to be found in the lower Mai valley with further survey work as there were still finding new species right to the end of each survey period. Black Drongo was observed most frequently from the area. Similarly, Spotted Dove, Large-billed Crow and Red-vented Bulbul were recorded highly.

According to local people most of the forest areas of the Maha-mai vdc of lower Mai Valley is converted into settlement since 1990. All the remaining forests are now managed as community forest. Due to lack of awareness about the importance of avian diversity, local people are using forest resources randomly. In two community forest, we noticed forest users groups have saved only Sal tree due to high timber value and they heavily cut other tree species for fuel and housing.

Breeding Birds

Tropical evergreen forests are particularly important to threatened species in the Mai Valley with 23 bird species confined to this forest type (Inskipp 1989). Although second survey was done very late breeding season due to insurgency, breeding status of some birds is conformed in the area. Nest of Rufous Woodpecker was recorded in Pathivara Community forest. Similarly, an active nest of White-rumped Munia was recorded on 16th May in Juke Khadi Community forest. On the same day Pale-chinned Flycatcher and Thick-billed Green Pigeon were observed carrying nest material. Bar-winged Flycatchershrike and Common Woodshrike were observed feeding to their chicks. Three active nesting colony of Baya Weaver were recorded in the vicinity of the village of FUGs of the Pathivara Community forest.

In addition, a pair of immature Brahminy Kite and a flock of eight individuals of the Black Ibis along with its two immature were recorded in the riverine habitat of Mai River. These species are succeeding with breeding somewhere in the reason.

Halliday and McKnight (1993) have identified Mai Valley as important breeding grounds of the forest birds. It has 88 species of the 115 breeding forest bird species for which Nepal may hold internationally significant populations and 21 species of 34 forest species for which Nepal may be especially important.

Threats

- The forest areas of Ilam district have been handed to the local community. However, due to lack of education about the importance of forest resources and management skills; Forest User Groups (FUGs) of some community forests, such as Shrijana Community forest of Mahamai are using forest resources randomly. FUGs are cutting large trees for money in the name of community development, such as road construction, for drinking water and for salary of community schoolteachers. During the first survey we observed many dead trees were not cut down but villagers were cutting down some large sized green trees especially of Sal. This was only for money, not for fuel wood.
- Random settlement in Lal khola may also disturb the wildlife which lies inside the Shrijana Community forest where we had observed critically endangered Blue-eared Barbet.
- Nest hunting of hornbills was found to be commonly carried out by villagers. Only Oriental Pied Hornbill was recorded from the area although Khanal and Yonzon (2000) reported Great Hornbill *Buceros bicornis* from the area.
- FUGs of some community forests such as Juke Khadi have valued only Sal trees due to its high timber value. Thus, they were cutting indiscriminately other tree species for fuel wood which would have serious impacts on bird diversity.
- Use of chemical fertilizers and pesticides in agricultural areas is widely observed at Danabari, Mahamai and Khudunabari area. Birds are susceptible to insecticide damage (Baral, 2000). Ingesting pesticides directly or indirectly by eating pesticide-contaminated grains, fruits, worms and insects may adversely affect them.
- A road was under construction inside Gaide Community forest near the Mai River west bank which will link Mahamai VDC of Ilam district to the East-west highway and may adversely affect biodiversity of the area.

CONCLUSION

A total of 152 bird species was recorded from the lower Mai Valley area. Among them 129 species were residents, 18 species were winter visitors and 5 were summer visitors. A total of 13 species were new records for this area. Among these species six were nationally threatened category. A total of 14 nationally threatened species including one globally threatened Lesser Adjutant and 25 species were biome restricted species. Furthermore, seven species were confirmed breeding.

RECOMMENDATION

- Most of the forest users and community forest management committee are unaware about importance of birds and biodiversity. Conservation awareness programme should help them to understand the birds and biodiversity, its importance and need of future generation.
- Local people of Mahamai VDC are heavily dependent on forest resources due to their very low economic status. Thus, an income generation programme for local forest users will help to conserve the birds and biodiversity.
- This study was confined to the lower region of the Mai Valley IBA and so could not give a picture of the current situation of birds of whole Mai Valley IBA as the upper region has a mainly temperate climatic condition and vegetation structure including temperate, moist broadleaved forests. Thus, a study of upper Mai Valley is recommended.

References

- Baral, H. S. 2000. *Bird Conservation*. In Grimmett, R.; Inskipp, C. and Inskipp, T. 2000. Birds of Nepal. Prakash Book Depot. New Delhi, India. 22-27pp
- Baral, H.S. and Inskipp, C. 2001. Important Bird Areas in Nepal. A report submitted to the Royal Society for the Protection of Birds (RSPB), UK.
- Baral, H.S. and Inskipp, C. 2004; *The State of Nepal's Birds 2004*. Department of National Parks and Wildlife Conservation, Bird Conservation Nepal and IUCN-Nepal. Kathmandu.
- Baral, H.S. and Inskipp, C. 2005. *Important Bird Areas in Nepal: key sites for conservation*. Bird Conservation Nepal and BirdLife International, Kathmandu and Cambridge.
- Bhujju, D.R. 2000. *Nepal's last hope for landscape level conservation*. Habitat Himalaya. A resources himalaya factfile, Volume VII, No. III.
- Bibby, C.; Jones, M. and Marsden, S. 2000. *Expedition Field Techniques: Bird Surveys*. BirdLife International.
- Bird Conservation Nepal. 2006. Birds of Nepal: an official checklist. Department of National Parks and Wildlife Conservation and Bird Conservation Nepal. Kathmandu.
- BirdLife International 2001. *Threatened birds of Asia*. BirdLife International, Cambridge, UK.
- BirdLife International 2004. *Threatened birds of the world 2004*. CD ROM. BirdLife International, Cambridge, UK
- Chaudhary, H. 1994. A checklist of birds recorded at Koshi between October 1993 - February 1994. Unpublished.
- Chaudhary, H. 1999. Birds recorded at Shanischare, Garuwa and Khudunabari in April 1999. Unpublished.
- Grimmett, R.; Inskipp, C. and Inskipp, T. 2000. Birds of Nepal. Prakash Book Depot. New Delhi, India.
- Grimmett, R.; Inskipp, C. and Inskipp, T. 1998. Birds of the Indian Subcontinent. Christopher Helm, London.
- Halliday, J. and McKnight, G. 1993. Disappearing forests endanger birdlife. *Nepal Bird Watching Club Bulletin* 2(2):1-2
- Inskipp, C. and Inskipp, T.P. 1991. A Guide to the Birds of Nepal. Second edition. Christopher Helm, London.

- Inskipp, C. 1989. *Nepal's Forest Birds: Their Status and Conservation*. International Council for Bird Preservation, Monograph No. 4, Cambridge.
- Inskipp, T., Lindsey, N. and Duckworth, W. 1996. *An annotated checklist of the Birds of the Oriental region*. Oriental Bird Club. UK.
- IUCN 2004. *2004 IUCN Red List of Threatened Species*. <<http://www.redlist.org/>>. Downloaded on 23 April 2006.
- Khanal, G. and Yonzon, P.B. 2000. *Baseline information on the birds of the Churiya*, Eastern Nepal Ecology Of Nepal Himalaya. Part I: Mechi-Saptakoshi. A report submitted to Nature Conservation Society, Japan. Resources Himalaya, Kathmandu, Nepal. 87-94pp.
- Mackinnon, J. and K. Phillips, 1993. *A Field Guide to the Birds of Sumatra, Java and Bali*. Oxford University Press.
- Oli, P. 1999. The Conservation Status of the Siwalik area of Ilam district Kathmandu: IUCN Nepal.
- Roy, R. 2004. Rural Livelihood, Time Saved and Community Forestry. *Community Forest Bulletin* 9:29-35
- Scully, J. 1879. A contribution to the ornithology of Nepal. *Stray Feathers* 8: 204-368.
- Stattersfield, A.J., Crosby, M.J., Long, A.J. and Wege, D.C. 1998. *Endemic Bird Areas of the world: priorities for biodiversity conservation*. BirdLife International, Cambridge, UK.

Appendix-I Trees and woody vegetation of study area.

Local Name	Scientific Name	Family
Amala	<i>Phyllanthus emblica</i>	Euphorbiaceae
Amp	<i>Magnifera indica</i>	Anacardiaceae
Arari	<i>Acacia pennata</i>	Leguminosae
Archal	<i>Antidesma acidum</i>	Euphorbiaceae
Arharikanda	<i>Mimosa rubicaulis</i>	Leguminosae
Badhar	<i>Artocarpus lakoocha</i>	Moraceae
Bains	<i>Salix tetrasperma</i>	Salicaceae
Bar	<i>Ficus benghalensis</i>	Moraceae
Barro	<i>Terminalia bellirica</i>	Combretaceae
Bayar	<i>Zizypus mauritiana</i>	Rhamnaceae
Bel	<i>Aegle marmelos</i>	Rutaceae
Bhalayo	<i>Semecarpus anacardium</i>	Anacardiaceae
Bhorla	<i>Bauhinia vahlii</i>	Leguminosae
Bhuletro	<i>Butea minor</i>	Leguminosae
Bilaune	<i>Maesa chisia</i>	Myrsinaceae
Bimiro	<i>Citrus medica</i>	Rutaceae
Bot dhayaro	<i>Lagerstroemia parviflora</i>	Lythraceae
Chhatiwan	<i>Asltonia scholaris</i>	Apocynaceae
Dabdabe	<i>Garuga pinnata</i>	Burseraceae
Debrelahara	<i>Spatholobus parviflorus</i>	Leguminosae
Dhanero	<i>Woodfordia fruticosa</i>	Lythraceae
Dhasure	<i>Colebrookea oppositifolia</i>	Labiatae
Dudhilo	<i>Ficus neriifolia</i>	Moraceae
Dumri	<i>Ficus racemosa</i>	Moraceae
Galeni	<i>Leea macrophylla</i>	Leeaceae
Gidari	<i>Premna integrifolia</i>	Verbenaceae
Hallunde	<i>Lannea coromendelica</i>	Anacardiaceae
Harro	<i>Terminalia chebula</i>	Combretaceae
Imli	<i>Tamarindus indica</i>	Leguminosae
Jamun	<i>Syzygium cumini</i>	Myrtaceae
Kabhro	<i>Ficus lacor</i>	Moraceae
Kadam	<i>Anthocephalus chinensis</i>	Rubiaceae

Kamle	<i>Pilea symmeria</i>	Urticaceae
Karma	<i>Adina cardifolia</i>	Rubiaceae
Khamari	<i>Gmelina arborea</i>	Verbenaceae
Khanyu	<i>Ficus semicordata</i>	Moraceae
Kharane	<i>Callicarpa arborea</i>	Verbenaceae
Khari	<i>Celtis australis</i>	Ulmaceae
Khasre	<i>Ficus hispida</i>	Moraceae
Khayar	<i>Acacia catechu</i>	Leguminosae
Khirro	<i>Sapium insigne</i>	Euphorbiaceae
Kimbu	<i>Morus rubra</i>	Moraceae
Kumbhi	<i>Careya arborea</i>	Lecythidaceae
Kumbi	<i>Dillenia indica</i>	Dilleniaceae
Lampate	<i>Duabanga grandiflora</i>	Lythraceae
Latikath	<i>Cornus oblonga</i>	Cornaceae
Nebaro	<i>Ficus carica</i>	Moraceae
Nim	<i>Azadirachta indica</i>	Meliaceae
Palas	<i>Butea monosperma</i>	Leguminosae
Parijat	<i>Nyctanthes arbor-tristis</i>	Oleaceae
Pipal	<i>Ficus religiosa</i>	Moraceae
Pithari	<i>Trewia nudiflora</i>	Euphorbiaceae
Rajbrikshya	<i>Cassia fistula</i>	Leguminosae
Rittha	<i>Sapindus mukorossi</i>	Sapindaceae
Sahaj	<i>Terminalia alata</i>	Combretaceae
Sajwan	<i>Origanum vulgare</i>	Labiatae
Sal	<i>Shorea robusta</i>	Dipterocarpaceae
Sallo	<i>Pinus roxburghi</i>	Gymnosperm
Satisal	<i>Dalbergia latifolia</i>	Leguminosae
Shylphushre	<i>Grewia elastica</i>	Tilaceae
Simal	<i>Bombax ceiba</i>	Bombacaceae
Simali	<i>Vitex negundo</i>	Verbenaceae
Sindhure	<i>Mallotus philippensis</i>	Euphorbiaceae
Sisaw	<i>Dalbergia sissoo</i>	Leguminosae
Tanki	<i>Bauhinia purpurea</i>	Leguminosae
Tatari	<i>Dillenia pentagyna</i>	Dilleniaceae