Study on Avian Biodiversity of North-east India with Special Reference to the Conservation of Threatened Species

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Article History

Manuscript No. c182
Received in 8th September, 2012
Received in revised form 2nd May, 2013
Accepted in final form 5th June, 2013

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Keywords

Biodiversity, endangered, endemic, threatened

Abstract

The North-Eastern Region of India, comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim is renowned for its immense biodiversity which has made it a priority area for investment by the leading conservation agencies of the world. Most of the north-eastern states have more than 60% of their geographic area under forest cover, a minimum suggested coverage for the hill states in the country. The region which is only 7.76% of the geographic area of the country accounts for nearly 25% of its forest cover. North-East India supports one of the highest bird diversities in the Orient. Of the 1,232 species of avifauna recorded from India, more than 850 bird species record their presence in the north-eastern region of India. The eastern Himalaya and the Assam plains have been identified as an Endemic Bird Area by the Royal Society for the Protection of Birds. The global distribution of 24 restricted-range species is limited to the region. The present paper is an attempt to review the threatened species of birds found in the states of N.E. India and analyze their conservation status *vis a vis* the recent IUCN Red List, Wildlife Protection Act, CITES and CMS. Efforts taken for conservation of the threatened species of birds in the region are analyzed.

1. Introduction

For those who want to meet Mother Nature in her pristine glory replete with rich bio-diversity, the North East India is the destination of choice. Situated at the confluence of the Indo-Malayan, Indo-Chinese and Indian bio-geographical realms, the NE region is unique in providing a profusion of habitats, which features diverse biota with a high level of endemism. The NE region of India has been in focus for its high biodiversity and this region has been a priority for leading conservation agencies of the world. Indian Council of Agricultural Research (ICAR) has identified the region as a centre of rice germplasm. National Bureau of Plant Genetic Resources (NBPGR), India, has highlighted the region as being rich in wild relatives of crop plants. It is the centre of origin of citrus fruits. WWF has identified the entire Eastern Himalayas as a priority Global 200 Ecoregion. Conservation International has subsumed its eastern Himalaya "hotspot" into a wider Himalaya Hotspot, which now includes all the eight states of northeast India along with the neighboring territories of Bhutan, southern China, and Myanmar (Myers, 1988 & 1990). The International Council for Bird Preservation, UK identified the Assam plains and the Eastern Himalaya as an Endemic Bird Area (Islam and Rahmani, 2004).

The richness in the wide diversity of habitats associated with a wide altitudinal range in NE India is appropriately reflected in the region's avifauna diversity. The Eastern Himalayas and Assam plains are newly recognized as an Endemic Bird Areas within Indian Sub-continent and owing to the presence of large numbers of natural water bodies, *viz*. rivers, beels or wetlands and ponds as well as the forest ecosystem (Choudhury, 2000), the state of Assam within the North-East Region (NER) of India, is in the characteristics position in Key Wetland Regions for Threatened Birds in Asia (Bird Life International, 2002).

Northeast India in fact supports one of the highest bird diversities in the Orient. While the Indian subcontinent shares 13.66% of the world avifaunal diversity (1,232 bird species being recorded in India of the 9,026 species known throughout the world), in the North-eastern region of India which is just 7.76% of the geographic area of the country, 950 bird species have been recorded (Saikia and Bhattacharjee, 1990a; Birand

and Pawar, 2004) which is around 77% of the avifauna recorded from India. Assam alone represents 850 spp. (68.99%) of the total (Choudhury, 2000) known Indian species. The present paper is an attempt to review the studies of avian diversity in the North-eastern region of India with special emphasis on the endangered species of the region.

2. Materials and Methods

An exhaustive study of literature was undertaken to find out the information about- (i) the biodiversity importance of North East India, (ii) Studies on avifaunal diversity undertaken in the region, (iii) Checklists of avifaunal diversity of selected areas, and (iv) conservation status of threatened avifauna known from the region. The data are collected from the previous literatures *viz*. Stevens (1915), Barua and Sharma (1999 and 2005), Singh (1991 and 1994), Choudhury (1985-1990a, 1990b, 1990c), Crosby (2004), Islam and Rahmani (2004) and Talukdar and Das (1997). The so collected data, from these studies, are compiled and analyzed to draw a conclusion.

3. Results and Discussion

For convenience, the study was divided into three sections: Biodiversity profile of North-East India, Studies on avifaunal diversity in North East India and Threatened avifauna of the region and their conservation status.

3.1. Biodiversity profile of north-east india

The North-eastern Region of India, comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim can be physiographically divided into the eastern Himalaya, the northeastern hills (Patkai-Naga Hills and Lushai Hills), and the Brahmaputra and Barak valley plains.

The region's lowland and montane moist to wet tropical evergreen forests are considered to be the northernmost limit of true tropical rainforests in the world (Proctor, et al. 1998). In a recent study carried out by Gillison (2004) for the WWF, wherein he compared the richness of plant species and plant functional types in 21 countries, it was found that the Pakke Tiger Reserve in Arunachal Pradesh as well as the Nameri National Park in Assam stand third among all the sites compared. Fifty one forest types are found in the region (Champion and Seth, 1964). Again, out of the 9 important vegetation types of India, 6 are found in the North-eastern region. These forests harbor 80,000 out of 15,000 species of flowering plants. These include 40 out of 54 species of gymnosperms, 500 out of 1,012 species of pteridophytes, 825 out of 1,145 species of orchids, 80 out of 90 species of rhododendrons, 60 out of 110 species of bamboo, 25 out of 56 species of canes. About one-third of the flora of northeast India is endemic to this region. Some of the important gene pools of citrus, banana, and rice are reported to have originated from this region. Nearly 50% of the total flowering plants recorded from India are found in the North-eastern Region of India. Takhtajan (1969) terms this region the "cradle of flowering plants". The World Conservation Union (IUCN) in 1995 identified Namdapha in Arunachal Pradesh as a center of plant diversity. The diversity of flowering plants is particularly striking, especially in the gymnosperm, pteridophytes, orchid, rhododendron, bamboo, and cane families (Hegde, 2000). According to the Indian Red Data Books published by the Botanical Survey of India, 10% of the total flowering plants in the country are endangered. Of the 1,500 endangered floral species, 800 are reported from northeast India (Nayar and Shastri 1987, 1988, 1990).

High biological diversity is often related to the forest cover of a region. Most of the North-eastern states have more than 60% of their geographic area under forest cover, a minimum suggested coverage for the hill states in the country. The region accounts for nearly one fourth of its forest cover. The percentage of forest cover recorded during the assessment 2007 by the Forest Survey of India is shown in Table 1.

The region is equally rich in faunal diversity. The amount of diversity found in some major groups of animals as compared with the species known on all India basis is given in Table 2.

3.2. Studies on avifaunal diversity in N.E.India

Avi-faunal surveys in the region go back to the end of the 19th century. Three distinct era's can be distinguished in the study of avifauna of the region- Pre-independence, Post-independence upto 1982 and Post 1982 era. In pre-independence era exhaustive surveys were taken in different parts of the erstwhile

Table 1: Showing the forest cover in the North-eastern states of India

North-eastern States	Geographical Area (km^2)	Forest cover in 2007 (Total, in km^2)	% of forest cover
Arunachal Pradesh	83,743	67,353	80.43
Assam	78,438	27,692	35.30
Manipur	22,327	17,280	77.40
Meghalaya	22,429	17,321	77.23
Mizoram	21,081	19,240	91.27
Nagaland	16,579	13,464	81.21
Tripura	10,486	8,073	76.95
Sikkim	7,096	3,357	47.31
Grand Total	262.179	173,780	70.88

Source: India State of Forest report 2009

Table 2: Showing the faunal diversity within select groups as found in N.E.India

Taxonomic Group	Total species in India	Species recorded from N.E.India	N.E. species as% of Indian total
Insecta	53,400	3,624	6.78
Amphibia	286	105	36.71
Lizards	201	44	21.89
Snakes	275	102	37.09
Fresh water Turtles	29	21	72.41
Aves	1,232	950	77.11
Mammals	397	160	40.30

undivided Assam by the British which laid a solid foundation for further studies in the region. But after independence probably due to lack of interest and the popularity of bird watching the interest seemed to have waned out and observations of the avian diversity was restricted mostly to naturalists and forest department officials which could be evinced by the occasional newspaper articles on birds. All this was about to change with the introduction of Ecology special paper in the M.Sc course in Gauhati University in 1982. The course led to a revival of interest in the study of birds and more importantly laid the scientific foundation for the study of avifauna of the region. This is evident from the spurt of research papers after 1982 as is evident from the works of Choudhury (1985-1990a, 1990b, 1990c, 1991a, 1991b, 1991c, 1992a, 1992b, 1993a, 1993b., 1993c, 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2009), Raman et al. (1998), Saikia and Kalita (1987), Raj et al. (1987), Saikia et al. (1987), Saikia et al. (1988), Saikia and Bhattacharjee (1989, 1990a, 1990b, 1990c, 1990d, 1990e, 1990f, 1990g, 1990h, 1990i, 1991, 1993, 1995, 1996), Katti et al. (1992), Barman et al. (1995), Saikia et al. (1996), Saikia and Kakati (2000), Saikia and Saikia (2000), Kakati and Saikia (2000), Saikia (2004), Singh (1991 and 1994), Singha et al. (2003), Dewan and Saikia (2004), Saikia and Rabha (2006), Upadhyaya and Saikia (2011) etc.

This period also saw increased participation in the IWRB annual waterfowl census which led to many areas like Deepor Beel, Kaziranga National Park, Orang National Park, Nameri National Park, D'Ering Memorial Wildlife Sanctuary etc. being brought into the fold and the revealing of many interesting records *viz*. in 1992 in one single site at Jhaoni near Burachapori WLS more than 27,000 waterfowl were counted on a single day during the Mid Winter Waterfowl Census. The present era has also been marked by the completion of several thesis works on birds among which Kakati and Saikia (2000), Singha et al. (2003), Dewan and Saikia (2004), Das and Saikia (2011), Upadhyaya and Saikia (2011) etc. are worth mentioning.

The total avifaunal diversity of certain important areas within North East India for which records are available is shown in the following Table 3. Recently ENVIS has listed separately the total avian diversity of the North-eastern States of India as shown in Figure 1.

3.3. Threatened avifauna of the region and their conservation status

The North-East Region of India is renowned globally for harboring several threatened and restricted range (endemic) species. The global distribution of 24 restricted-range species is limited to the region. A comprehensive account of the threatened birds found in N.E. India as per IUCN Red List and Wildlife Protection Act 2002 is shown in Table 4.

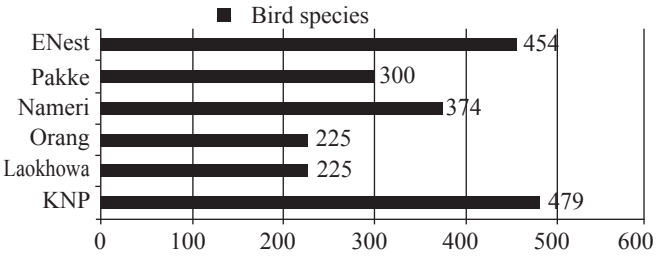

Figure 1: Avian diversity in NE states based on ENVIS data base

Table 3: Avifauna of certain important areas of North-east India with threatened species (in brackets)

	Name of the PA (State)	Coordinates	Area (km^2)	No. of sp.(Th. Sp.)
1	Kaziranga National Park (Assam)	26°35'-26°45'N 93°05'-93°40'E	882	479 (25)
2	Manas National Park (Assam)	26°30'-26°50'N 91°51'-91°81'E	950	380 (15)
3	Orang National Park (Assam)	26°48'N-93°26'E	78.81	222 (5)
4	Dibru-Soikhowa National Park (Assam)	27°30'-27°45'N 95°10'-95°45'E	350	219 (7)
5	Nameri National Park (Assam)	26°50'-27°02'N 92°38'-93°00/E	200	374 (13)
6	Deepor Beel Ramsar site	26°03'-26°09'N 90°36'-90°41'E	4.14	232 (7)
7	Behali Reserve Forest	26°55'N-93°23'E	140.14	124 (5)
8	*Loktak* Lake	24°33′-24°55'N 93°47′- 93°78'E	286	101 (3)

Table 4: Threatened Birds of North-east India

Sl. No	Common Name	Scientific name	IUCN 2011	WL(P) Act	CITES 2002	CMS 2012
1	Family: Pelecanidae : Pelicans Dalmatian Pelecan	*Pelecanus crispus*	VU	Schedule IV	Appendix I	Appendix I
2	Family: Ardeidae : Herons, Egrets, Bitterns White-bellied Heron	*Ardea insignis*	CR	Schedule I		
	Family: Anatidae: Ducks, Geese, Swans					
3	Pink-headed Duck	*Rhodonessa caryophyllacea*	EX	Schedule I	Appendix I	
4	White-winged Duck	*Cairina scutulata*	EN	Schedule I		
5	Baer's Pochard	*Aythya baeri*	EN	Schedule IV		
6	Large Whistling Teal	*Dendrocygna bicolor*	LC	Schedule I		
7	Marbled Teal	*Marmaronetta angustirostris*	VU	Schedule IV		Appendix I
8	Lesser White-fronted Goose	*Anser erythropus*	VU	Schedule IV		Appendix I
9	Red Breasted goose	*Branta ruficolis*	EN	Schedule IV	Appendix II	Appendix I
	Family Ciconiidae: Storks					
10	Eastern White Stork	*Ciconia ciconia boyciana*	EN	Schedule I	Appendix I	Appendix I
11	Greater Adjutant	*Leptoptilos dubius*	EN			
12	Lesser Adjutant	*Leptoptilos javanicus*	VU			
	Family: Accipitridae: Hawks, Vultures etc					
13	Pallas's Fish-eagle	*Haliaeetus leucoryphus*	VU	Schedule IV	Appendix II	Appendix I
14	Greater Spotted Eagle	*Aquila clanga*	VU	Schedule IV	Appendix II	Appendix I
15	Imperial Eagle	*Aquila heliaca*	VU	Schedule IV	Appendix I	Appendix I
16	Osprey	*Pandion haliaetus*	LC	Schedule I	Appendix II	Appendix II
17	White-backed Vulture	*Gyps bengalensis*	CR	Schedule I	Appendix II	
18	Slender billed Vulture	*Gyps tenuirostris*	CR	Schedule I	Appendix II	
19	Long-billed Vulture	*Gyps indicus*	CR	Schedule I	Appendix II	
	Family Falconidae: Falcons, Kestrels					
20	Lesser Kestrel	*Falco naumanni*	VU	Schedule IV	Appendix II	Appendix II
	Family Phasianidae: Pheasants, Patridges,Quails					
21	Assam Bamboo Patridge	*Bambusicola fytchii*	LC	Schedule I		
22	Swamp Francolin	*Francolinus gularis*	VU			
23	Manipur Bush-quail	*Perdicula manipurensis*	VU			
24	Red-breasted Hill Partridge	*Arborophila mandellii*	VU			
25	Blyth's Tragopan	*Tragopan blythii*	VU	Schedule I	Appendix I	
26	Satyr Tragopan	*Tragopan satyra*	NT	Schedule I	Appendix III	
27	Temminck's Tragopan	*Tragopan temminckii*	LC	Schedule I		
28	Kalij Pheasant	*Lophura leucomelanos*	LC	Schedule I		
29	Peacock Pheasant	*Polyplectron bicalcaratum*	LC	Schedule I		

Continue

30	Green Peafowl	*Pavo muticus*	EN		Appendix II	
31	Peafowl	*Pavo cristatus*	LC	Schedule I		
32	Bengal Florican	*Houbaropsis bengalensis*	CR	Schedule I	Appendix I	Appendix I
33	Spoon-billed Sandpiper	*Eurynorhynchus pygmeus*	CR			
	Family Gruidae: Cranes					
34	Hooded Crane	*Grus monacha*	VU	Schedule I	Appendix I	
35	Sarus Crane	*Grus antigone*	VU	Schedule IV	Appendix II	
	Family Heliornithidae: Finfoots					
36	Masked Finfoot	*Heliopais personata*	EN	Schedule IV		
	Family Otididae: Bustard, Florican					
37	Bengal Florican	*Houbaropsis bengalensis*	CR	Schedule I	Appendix I	
	Family Charadriidae: Sandpipers, Snipes					
38	Spotted Greenshank	*Tringa guttifer*	EN	Schedule IV	Appendix I	
39	Spoon-billed Sandpiper	*Eurynorhynchus pygmeus*	CR	Schedule IV		
40	Wood Snipe	*Gallinago nemoricola*	VU	Schedule IV		
	Family Laridae: Gulls, Terns					
41	Indian Skimmer	*Rynchops albicollis*	VU			
	Family Columbidae: Pigeons, Doves					
42	Purple Wood-pigeon	*Columba punicea*	VU	Schedule IV		
	Family Sturnidae: Mynas					
43	Hill myna	*Gracula religiosa*	LC	Schedule I	Appendix II	
	Family Bucerotidae: Hornbills					
44	Rufous necked Hornbill	*Aceros nipalensis*	VU	Schedule I	Appendix I	
45	Great indian Hornbill	*Buceros bicornis*	NT	Schedule I	Appendix I	
	Family Muscicapidae: Babblers, Thrushes, Warblersetc.					
46	Marsh Babbler	*Pellorneum palustre*	VU	Schedule IV		
47	Rusty-throated Wren-babbler	*Spelaeornis badeigularis*	VU	Schedule IV		
48	Tawny-breasted Wren-babbler	*Spelaeornis longicaudatus*	VU	Schedule IV		
49	Snowy-throated Babbler	*Stachyris oglei*	VU	Schedule IV		
50	Jerdon's Babbler	*Chrysomma altirostre*	VU	Schedule IV		
51	Slender-billed Babbler	*Turdoides longirostris*	VU	Schedule IV		
52	Black-breasted Parrotbill	*Paradoxornis flavirostris*	VU			
53	Bristled Grass-warbler or Bristled Grassbird	*Chaetornis striatus*	VU			
	Family Sittidae: Nuthatches, Creepers					
54	Beautiful Nuthatch	*Sitta formosa*	VU			
	Family Ploceidae: Weaver birds					
55	Finn's or Yellow Weaver	*Ploceus megarhynchus*	VU	Schedule IV		
	Family Cisticolidae					
56	Grey-crowned Prinia	*Prinia cinereocapilla*	VU			

4. Conclusion

Across most of the Northeast, extensive conversion of natural habitat has been a real threat in recent times. While factors such as a rapidly changing demography and changes in traditional natural resource management practices have been areas of concern, large-scale development projects are a major emerging threat to biodiversity in the region. The exact intervention necessary to deal with or mitigate the threat in each scenario will have to be worked out on a case-to-case basis. The most important opportunities for conservation identified include community-based conservation, participation of active NGOs, local groups and individuals etc. without ignoring site-based or ecosystem-based conservation strategies.

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