



Full Length Article

Avian Diversity in Central Karakoram National Park, Gilgit-Baltistan

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Abstract

Avian diversity was studied for the period of two years from January 2011 to December 2012, within and around the Central Karakoram National Park including Nagar (Hisper, Hoper, Nagar-Khas, Askurdas, Summair and Shahyar valleys), Skardu (Shigar valley) and Ghanche (Mashabrum valley). A total of 108 species belonging to 75 genera, 38 families and 16 orders were identified in the study areas. Order Passeriformes was dominating with 57% species followed by Anseriformes (7%), Charadriiformes and Accipitriformes (6%) each, Columbiformes (5%), Galliformes and Falconiformes (4%) each, Pelecaniformes (3%), Coraciiformes and Gruiformes (2%) each, and Bucerotiformes, Apodiformes, Caprimulgiformes, Piciformes, Suliformes and Strigiformes (1%) each. Residential status indicated that 57 species were residents (including birds with winter and summer influx), 26 species were summer visitors and 25 were winter visitors. Relative abundance revealed that 38 species were uncommon, 37 were common, 17 were very common and 16 species were rare. The main threats to the avian diversity in the study area were degradation of habitat due to anthropogenic activities like shooting, trapping, poaching and use of pesticides on fruit orchards and vegetable fields. © 2014 Friends Science Publishers

Keywords: CKNP; Avian Diversity; Species; Birds; Trapping; Poaching; Pesticides

Introduction

Avian diversity is a term used for the variety of birds living on this planet. Birds are the only animals with feathers, which belong to the Phylum Chordata. There are some other animals like insects and bats that also have wings. Birds are distributed throughout the world in a variety of habitats. They can fly over the highest mountains on earth in addition to both of the earth's poles, dive into water to depths of more than 250 m (850 ft), and can live in habitats with the most extreme climates on earth, including the coldest like Arctic Tundra and the warmest like Sahara (Sato *et al.*, 2002). Birds are useful indicators to assess the quality of the environment, because the health of bird populations reflects the health of environment (Bennun and Fanshawe 1997; Donald *et al.*, 2001; Gregory *et al.*, 2003).

According to Birdlife International (BLI, 2012) 10,064 species of birds are found globally; including 130 extinct species. In Pakistan, 670 species have been reported (Grimmett *et al.*, 2008), while in Gilgit-Baltistan Roberts (1991-1992) has estimated a total of 230 species including passage migrants, vagrants, residents, breeding and irregular visitors. Studies indicate that Gilgit-Baltistan provides a variety of habitats possessing numerous species of birds (Khan and Rafique 1998; Sheikh, 2001; Qureshi *et al.*, 2011; Khan *et al.*, 2012). The most diverse group of birds in

Gilgit-Baltistan is order Passeriformes and there are some rare species, which not only occur in the area but also breed here such as Lammergeier, Golden Eagle, Peregrine Falcon and Lesser Kestrel (Sheikh, 2001). BLI (2001) reported 27 internationally threatened species from Pakistan of which several species are found in Gilgit-Baltistan. There may be several more species such as Snow Partridge and Himalayan Monal Pheasant, which are threatened nationally and or face local extinction from several valleys of Gilgit-Baltistan owing to fragmentation of their habitats (Virk *et al.*, 1999). According to Blumstein (1995) globally important birds like Snow Partridge (*Lerwa lerwa*), Himalayan Snow Cock (*Tetraogallus himalayensis*), Chukar Partridge (*Alectoris chukar*), Snow Pigeon (*Columbia leuconota*), Pintail (*Anas acuta*), Common Teal (*Anas crecca*) and many others are found in the different areas of Gilgit-Baltistan.

The Central Karakoram National Park (CKNP) is the largest Protected Area of Pakistan spanning over 10,000 km² containing 230 villages within its buffer zone covering more than 7000 km² (Anonymous, 2007). With K-2 (8611 meters) as its center piece, the Park is famous for its world-class mountaineering and trekking opportunities. Its boundaries fall within four of the seven Districts of Gilgit-Baltistan including Gilgit, Hunza-Nagar, Skardu and Ghanche. It was officially notified in 1993 to protect the fragile ecosystem amidst one of the world's most rugged mountainous landscapes. CKNP harbors rich and unique

wildlife biodiversity of global importance such as Snow Leopard (*Panthera uncia*), Ladakh Urial (*Ovis orientalis*), Astore Markhor (*Capra falconeri*), Musk Deer (*Moschus chrysogaster*), Himalayan lynx (*Lynx lynx*), Brown Bear (*Ursus arctos*) and Himalayan Ibex (*Capra ibex siberica*) *etc.*, whereas floral diversity include Blue Pine, Spruce, Birch, Juniper and variety of medicinally important shrubs and herbs (Bailly, 2005; Khan, 2012). Several other important peaks like Rakaposhi, Dubani, Golden Peak *etc.*, which host the largest concentration of glaciers outside polar region. Our study area for avian diversity in and around CKNP spans over 4400 km² comprising selected valleys including Hisper, Hoper, Nagar Khas, Summair, Askurdas and Shahyar in District Hunza-Nagar; Shigar valley in District Skardu and Mashabrum valley in District Ghanche (Fig. 1).

In the areas within and around the Central Karakoram National Park (CKNP) in Gilgit-Baltistan, the bird diversity is yet to be documented as stated by IUCN (2009), non-availability of quantitative data on species status and distribution is the key challenge for conservation and management of birdlife diversity of the Park. Therefore, we conducted a study on avifauna in some selected areas of CKNP with a view to explore species diversity and status of all identified species including key threats to the birds of the Park and distribution of rare species in various areas of the Park.

Materials and Methods

Intensive field surveys were conducted for the period of two years between January 2011 and December 2012. The survey methodologies mainly included by foot method *i.e.*, road side count (Simpson, 1949; Burnham *et al.*, 1980) and line transect method (Verner, 1985). The classification system of Gill (2003) was followed. The surveys were conducted during early morning till dusk keeping in mind the active period. Garmin Global Positioning System (GPS) was used to record some of the points. Species observed were noted and analysed for relative abundance on the basis of frequency of sightings and different categories were assigned such as very common (recorded > 65%), common (40-64%), un- common (10-39%) and rare (< 10%) (McKinnon and Philips, 1993). Residential status with respect to the study area was calculated on the basis of presence or absence method (Thakur *et al.*, 2002; 2010). A binocular (10 x 50 mm Nikon) and spotting scope Swarovski (20 x 60 mm) was used to observe birds while they were photographed with the camera (Canon EOS7) and Sony (SONEY DSLR A 200), where possible. Three field guides viz. "Pocket Guide to the Indian subcontinent" by (Grimmett, 2001), "The Book of Indian Birds" by Ali (2002) and "A field guide to the Birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and the Maldives" by Kazmierczak (2006) were used for identification of species in the field.

Results

Species Diversity

In the present study a total of (n=108) species of birds belonging to 16 orders, 38 families and 75 genera were identified from the study area. Of these 57% species belong to order Passeriformes, 7% to Anseriformes, 6% each to Charadriiformes and Accipitriformes, 5% to Columbiformes, 4% each to Galliformes and Falconiformes, 3% each to Coraciiformes and Ciconiiformes, 2% to Gruiformes and 1% each to Apodiformes, Caprimulgiformes, Piciformes, Suliformes and Strigiformes. A systematic detailed account of birds observed in the study area is given in the Table 1.

Occurrence and Status

Analyses of data on residential status indicated that of the total bird's species (N=108) found in in the study area 48% (57) were residents (including birds with winter and summer influx), whereas 24% (26) were summer visitors and 23% (25) were winter visitors. Relative abundance of species was recorded as (35%) 38 uncommon (N=108), 37 (34%) common, 17 (16%) very common and 16 (15%) species were rare in the study area. The rare birds have very fragmented distribution except Hoper where most of the rare species were observed during field surveys (Fig. 2).

Discussion

CKNP is the largest National Park of Pakistan containing a variety of habitats like lofty peaks, glaciated landscapes and permanent snow fields, alpine meadows, sub-alpine scrub, dry-temperate forests, rivers, marshlands, agro-forestry and cultivated lands. Avian diversity may be more than what we have identified so far from the selected study area within CKNP as it was not possible to cover all the areas within and adjoining the Park in just two years. Therefore, extensive and continuous efforts are needed to enlist the avifauna of this vast and important Protected Area. Intensive surveys in smaller areas in Gilgit-Baltistan has shown greater diversity of birds as 109 species were found in the Deosai plateau (Khan and Rafiq, 1998), 46 species in Khunjerab National Park (Qureshi *et al.*, 2011), 48 species in Shimshal valley (Khan *et al.*, 2012) and 110 species in Naltar and lower valleys of Hunza, Gilgit and Astore (Sheikh, 2001). All these areas comprise of only few habitats and possess such a great variety of birds; therefore, we can assume that CKNP being home to a variety of habitats may contain a great deal of avian diversity much more what we have documented in only two years' time.

All valleys in the study area have almost same climatic conditions as most of the valleys fall in high altitude mountainous region with an arid climate. Still there is a lot more latitudinal difference in habitat as some areas with patches of forests, while the others with grasslands and barren-rocky-mountains.

Table 1: Systematic List of Avifauna around CKNP

Order	Family	English Name	Scientific Name	Rel. Abd.	Res. St.
Galliformes	Phasianidae	Snow partridge	<i>Lerwa lerwa</i>	Ra	R
		Himalayan snow cock	<i>Tetraogallus himalayensis</i>	C	R
		Chukar partridge	<i>Alectoris chukar</i>	VC	R
		Common Quail	<i>Coturnix coturnix</i>	Ra	SV
		Greylag Goose	<i>Anser anser</i>	Ra	WV
		Mallard	<i>Anas platyrhynchos</i>	UC	WV
Anseriformes	Anatidae	Ruddy shelduck	<i>Tadorna ferruginea</i>	Ra	WV
		Common pochard	<i>Aythya ferina</i>	UC	WV
		Gadwall	<i>Anas strepera</i>	UC	WV
		Northern shoveller	<i>Anas clypeata</i>	C	WV
		Common teal	<i>Anas crecca</i>	UC	WV
		Northern pin tail	<i>Anas acuta</i>	UC	WV
Gruiformes	Rallidae	Common coot	<i>Fulica atra</i>	UC	R/WV
		Common moorhen	<i>Gallinula chloropus</i>	UC	WV
Bucerotiformes	Upupidae	Common hoopoe	<i>Upupa epops</i>	C	SV
Coraciiformes	Meropidae	Blue-cheeked bee-eater	<i>Merops persicus</i>	Ra	SV
		European bee-eater	<i>Merops apiaster</i>	Ra	SV
Apodiformes	Apodidae	Common swift	<i>Apus apus</i>	C	R
Caprimulgiformes	Caprimulgidae	Eurasian nightjar	<i>Caprimulgus indicus</i>	Ra	R
		Rock pigeon	<i>Columba livia</i>	VC	R
Columbiformes	Columbidae	Snow peogon	<i>Columba leuconota</i>	Ra	R/WV
		Oriental turtle dove	<i>Streptopelia orientalis</i>	C	SV
		Spotted Dove	<i>Spilopelia chinensis</i>	C	SV
		Little brown Dove	<i>Spilopelia senegalensis</i>	UC	SV
		Common redshank	<i>Tringa totanus</i>	UC	WV
Charadriiformes	Scolopacidae	Green sandpiper	<i>Tringa ochropus</i>	C	WV
		Eurasian woodcock	<i>Scolopax rusticola</i>	C	WV
		Lesser sand plover	<i>Charadrius mongolus</i>	UC	WV
	Sternidae	Common tern	<i>Sterna hirundo</i>	UC	WV
	Recurvirostridae	Black wing stilt	<i>Himantopus himantopus</i>	C	WV
Accipitriformes	Accipitridae	Eurasian Sparrow hawk	<i>Accipiter nisus</i>	UC	SV
		Hen harrier	<i>Circus cyaneus</i>	UC	R
		Lammergeier	<i>Gyps barbatus</i>	Ra	R
		Himalayan Griffon Vulture	<i>Gyps himalayensis</i>	Ra	R
		Golden eagle	<i>Aquila chrysaetos</i>	UC	R
Falconiformes	Falconidae	Booted eagle	<i>Hieraaetus pennatus</i>	UC	R
		Amur falcon	<i>Falco amurensis</i>	UC	R
		Common kestrel	<i>Falco tinnunculus</i>	C	R
		Lesser kestrel	<i>Falco naumani</i>	Ra	R
		Peregrine falcon	<i>Falco peregrinus</i>	UC	R
Piciformes	Picidae	Scaly bellied woodpecker	<i>Picus squamatus</i>	C	R
Suliformes	Phalacrocoracidae	Great cormorant	<i>Phalacrocorax carbo</i>	Ra	WV
Pelecaniformes	Ardeidae	Night heron	<i>Nycticorax nycticorax</i>	Ra	WV
		Grey heron	<i>Ardea cinerea</i>	Ra	WV
		Chinese pond heron	<i>Ardeola bacchus</i>	Ra	WV
Strigiformes	Strigidae	Indian eagle owl	<i>Bubo bengalensis</i>	UC	R
Passeriformes	Muscicapidae	Blue rock thrush	<i>Monticola solitarius</i>	VC	R
		Streaked laughing thrush	<i>Garrulax lineatus</i>	VC	R
		Himalayan Blue whistling thrush	<i>Myiophoneus caeruleus</i>	VC	R
		Dark throated thrush	<i>Turdus ruficollis</i>	C	R
		Himalayan laughing thrush	<i>Garrulax lineatus</i>	VC	R
		White-winged ruby throat	<i>Luscinia pectoralis</i>	UC	R
		Blue throat	<i>Luscinia svecica</i>	UC	R
		Orange flanked Bush robin	<i>Tarsiger cyanurus</i>	UC	R/SV
		Black headed redstart	<i>Phoenicurus ochruros</i>	VC	R
		Blue caped redstart	<i>Phoenicurus caeruleocephala</i>	C	R
		White winged redstart	<i>Phoenicurus erythrogaster</i>	VC	R
		Guldenstadt's redstart	<i>Phoenicurus erythrogaster</i>	UC	R
		Common stonechat	<i>Saxicola torquata</i>	C	R
		Pied bushchat	<i>Saxicola caprata</i>	C	R
		Red flanked bluetail	<i>Tarsiger cyanurus</i>	UC	SV
		Hume's wheatear	<i>Oenanthe albonigera</i>	C	SV
		Pied wheatear	<i>Oenanthe pleschanka</i>	C	SV
		Eastern pied wheatear	<i>Oenanthe picata</i>	C	SV
		White-browed tit warbler	<i>Leptopoecile sophiae</i>	UC	R/WV
		Greenish warbler	<i>Phylloscopus trochiloides</i>	C	R/SV

Table 1: Continued

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Tichodromadidae	Wall creeper	<i>Tichodroma muraria</i>	UC	R
Certhiidae	Himalayan tree creeper	<i>Certhia himalayana</i>	C	SV
Oriolidae	Golden oriole	<i>Oriolus oriolus</i>	C	SV
Hirundinidae	Crag martin	<i>Ptyonoprogne rupestris</i>	UC	R
Phylloscopidae	Mountain chiffchaff	<i>Phylloscopus sindianus</i>	C	R
Sylviidae	Lesser whitethroat	<i>Sylvia curruca</i>	UC	R
Alaudidae	Small lark	<i>Alauda gulgula</i>	UC	SV
	Horned lark	<i>Eremophila alpestris</i>	UC	SV
	Eurasian skylark	<i>Alauda arvensis</i>	UC	R
Passeridae	House sparrow	<i>Passer domesticus</i>	VC	SV
	Spanish sparrow	<i>Passer hispaniolensis</i>	UC	SV
Motacillidae	White wagtail	<i>Motacilla alba</i>	VC	WV
	Grey wagtail	<i>Motacilla cinerea</i>	VC	WV
	Yellow headed wagtail	<i>Motacilla citreola</i>	C	WV
	Rosy pipit	<i>Anthus roseatus</i>	C	WV
Trogloditidae	Winter Wren	<i>Troglodytes troglodytes</i>	C	R
Prunellidae	Rufous breasted accentor	<i>Prunella strophiata</i>	UC	R
	Brown accentor	<i>Prunella fulvescens</i>	C	R
	Robin accentor	<i>Prunella rubiculoides</i>	UC	R
	Black throated accentor		C	R
	Himalayan accentor	<i>Prunella himalayana</i>	C	R
	Alpine accentor	<i>Prunella collaris</i>	C	R
Cinclidae	Brown dipper	<i>Cinclus cinclus</i>	VC	R
Fringillidae	Common rosefinch	<i>Carpodacus erythrinus</i>	UC	SV
	Eurasian goldfinch	<i>Carduelis carduelis</i>	UC	SV
	Mountain finch	<i>Leucosticte brandti</i>	C	R
	Red mantled rose finch	<i>Carpodacus grandis</i>	UC	SV
	Great rose finch	<i>Carpodacus rubicilla</i>	Ra	SV
	Red fronted siren	<i>Serinus rubicilla</i>	C	SV
Cardinalidae	White winged grosbeak	<i>Mycerobas camipes</i>	C	SV
Emberizidae	Pine bunting	<i>Emberiza leucocephalos</i>	C	R
	Rock bunting	<i>Emberiza cia</i>	VC	R
	White caped bunting	<i>Emberiza stewarti</i>	C	R
Laniidae	Long-tailed shrike	<i>Lanius schach</i>	C	SV
	Great grey shrike	<i>Lanius excubitor</i>	C	SV
Corvidae	Black billed magpie	<i>Pica hudsonia</i>	VC	R
	Alpine chough	<i>Pyrrhocorax graculus</i>	VC	R
	Red billed chough	<i>Pyrrhocorax pyrrhocorax</i>	VC	R
	Jungle crow	<i>Corvus culminatus</i>	C	R
Sturnidae	Common starling	<i>Sturnus vulgaris</i>	C	WV

Res. St. = Residential status R=Resident, R/ WV=Resident with winter influx, R/SV=Resident with summer Influx, WV=Winter visitors, SV=Summer visitors, (Thakur *et al.*, 2002 and 2010), Rel. Abd. = Relative abundance, VC= Very common means recorded > 65% visits, C=Common means recorded between 40-64%, UC= Uncommon means between 10-39%, Ra=Rare means recorded < 10% (McKinnon and Philips, 1993)

Table 2: Total Study area covered within and around CKNP

Study Area	Area (km ²)	rea(ha)
Nagar Valley	1863	186363
Shiger Valley	1610	161021
Mashabrum Valley	927	92709
Total Area scanned	4,400	440,093

The valley with most of the identified species (95 plus species) is Hoper followed by Shiger valley (80 plus species), SAS Valley, Nagar proper (70 plus Species each), Mashabrum and Hisper valley with 60 plus species each out of the total (N=108 species). Hoper valley having variety of habitats ranks highest in bird diversity. It was noted that the Eurasian Gold Finch is present only in the Shiger and Mashabrum valley in Baltistan region, similarly Black billed Magpie was found relatively in large populations in Hoper, Nagar and SAS valleys in District Hunza-Nagar (Gilgit region) while in scattered populations in Shiger and Mashabrum valleys (Baltistan region). Golden Oriole was

found to be frequent in numbers in Nagar Proper and SAS valley where summer season is relatively warmer than rest of the study areas. Most of the identified species were found around the settlements, agricultural fields and vegetative areas while the threatened and rare species like Vultures, Lesser Kestrels, Snowcocks, and Snow Partridges were found far away from the human settlements and at higher elevations. Waterfowls were found comparatively in greater diversity in Nagar, Summair, Askurdas and Shahyar (SAS valley), Gilgit region. The increased number of waterfowl in Hunza-Nagar region can be attributed to the recently formed Attabad Lake.

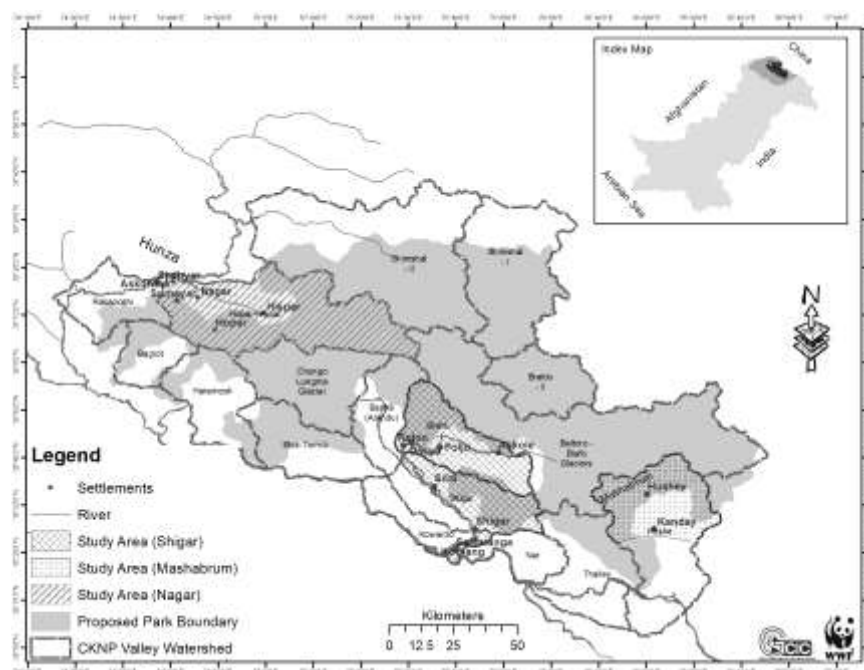


Fig. 1: Map of CKNP and adjacent valleys showing study area

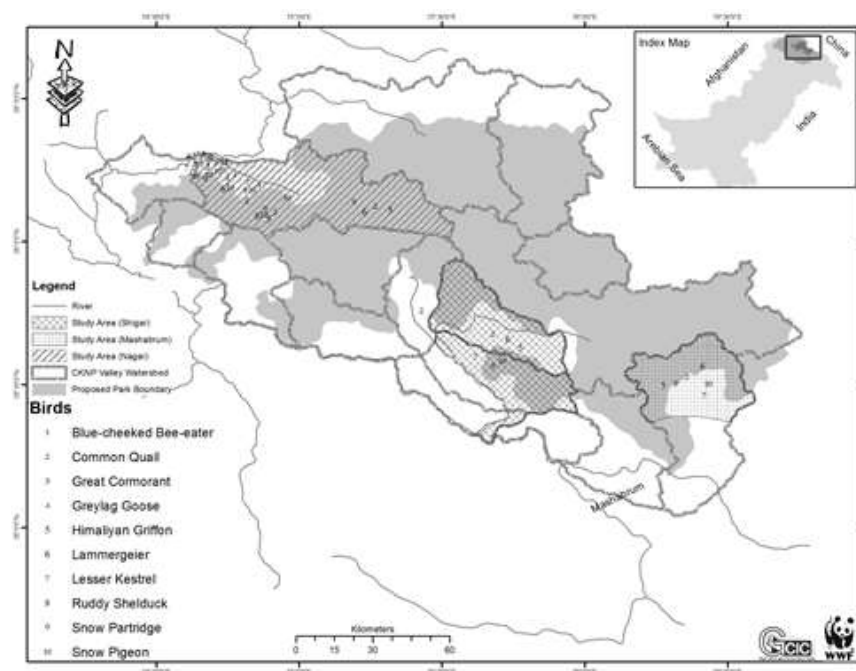


Fig. 2: Map of CKNP and adjacent valleys showing study area with distribution of rare species

According to personal communication with village elders (Ghulam Nabi, Aman Ali Shah, Muhammad Ibrahim Shah, Alam Khan and Haji Sultan) flocks of numerous species like Chukar partridges, Starlings, Finches, Larks, Wheatears and number of waterfowls were frequently seen in the villages in the past which have now been reduced to

few scanted individuals seen occasionally. In addition, scavengers like magpies, crows and vultures have also reduced numbers.

Birds found in the study area face a number of threats like habitat loss and fragmentation due to development and changing land use patterns, excessive shooting (especially

the water fowls and game birds), trapping, poaching, use of pesticides in fruit orchards and use of chemical fertilizers in the agricultural fields etc.

In conclusion, being environment cleaner, wild birds are an essential part of the ecosystem and serve many important purposes such as insect and rodent population control, seed dispersal leading to forest conservation and source of food for bird predators. Therefore, concrete actions should be part of CKNP management plan to conserve avian diversity in the Park. Some important measures in this regards could be (a) declaring the key birds areas like forest patches and wetlands around the Park as no-hunting zones; (b) setting up bird-refuge at some selected sites; (c) reducing bag limit and time duration of shooting license, (d) strengthening community-based watch and ward mechanism to reduce shooting, trapping and poaching; (e) by revising the law banning on shooting of rare and endangered species and (f) regulating use of pesticides. In addition, Environmental Impact Assessment (EIA) should be made before any large infrastructure schemes like roads, dams, building, etc. Furthermore, students can be engaged in creating awareness among the local communities through research and bird watching campaigns.

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