



## Raptors of Bundelkhand Region, India

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### Publication History

Received: 2 April 2016

Accepted: 22 April 2016

Published: 29 April 2016

### Citation

Kumar Adesh, Kanaujia Amita. Raptors of Bundelkhand Region, India. *Species*, 2016, 17(55), 94-108

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### ABSTRACT

People have attributed cultural significance to birds of prey for millennia. Despite this, it is likely that predatory birds have been victimized at least since people began rearing livestock and managing game. When people kill birds of prey, they cannot always breed fast enough to make up the losses and populations can decline rapidly. The declining raptors population from last few decades has attracted many biologists to find out the exact reason of sudden decline of their population. There is no single reason

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which can be claimed as the foremost reason for their decline. Loss of habitat, deforestation, urbanization and use of medicine (diclofenec in case of vulture) has been claimed by most of the ecologists as the major cause but actually there are other local reasons which have inflicted the raptors population in their respective areas. The most alarming example is the Bundelkhand region which constitutes some of the districts of both Madhya Pradesh and Uttar Pradesh, within the boundaries of India. The present study was performed to assess the distribution and status of raptors in Bundelkhand region of India from January 2013 to June 2015. Survey is being carried out on foot or vehicle according to the area. Observations are being carried out using 'encounter transect' and 'roost count' method with the aid of 10x50 binoculars and data is supported with photography using Canon EOS 70 D SLR camera. The study revealed that raptors distributed throughout the bundelkhand region are influenced by food availability and habitat. In the present investigation, 42 species of the Raptors were recorded from the Bundelkhand region of India. Out of 42 family Accipitridae has 31 species, Tytonidae has 2 species and Strigidae has 9 species of raptors. According to IUCN status 27 species were Least Concern (LC), 5 species were Not Accessed (NA), and 4 species were Critically Endangered (CE), 3 species were Near Threatened (NT), 2 species were Vulnerable (V) and 1 was Endangered (E). A variety of threats like sporadic fire, cattle grazing, mining and illegal Non Timber Forest Product collection by local communities affecting the safe nesting, roosting sites and prey base and eventually the population size. The protection of breeding, roosting and feeding sites to help in the conservation of raptors, awareness and education programmes for people that contribute in raptors conservation. Identification is one key to understanding the biology of a species, it might then be possible to develop conservation strategies to ensure the future of the raptors.

Keywords: Raptors, Bundelkhand Region, Mining, Population

## 1. INTRODUCTION

People have attributed cultural significance to birds of prey for millennia. Birds of prey or commonly known as Raptors are found all over the world and in all types of habitats, which are considered as the sign of strength of the forest (Ali & Ripley, 1987). In Indian culture raptors always have a special position as Garuda, usually the mount "*Vahanam*" of the God Vishnu and also mentioned in the great Hindu epic Ramayana as Jatayu and Sampathi which were mainly the vultures.

### Raptors:

Raptors are birds of prey. The word raptor has a Latin origin meaning "to grasp or seize". This is attributed to the claws on their feet also known as talons. Their sharp talons and strong feet capture and secure their prey. The hooked upper beak allows them to break into their prey and tear off small, bite sized pieces.

Despite this, it is likely that predatory birds have been victimized at least since people began rearing livestock and managing game. When people kill birds of prey, they cannot always breed fast enough to make up the losses and populations can decline rapidly. The declining raptors population from last few decades has attracted many biologists to find out the exact reason of sudden decline of their population. There is no single reason which can be claimed as the foremost reason for their decline. Loss of habitat is considered to be the most serious threat to raptor survival (Newton, 1990), deforestation, urbanization and use of medicine (diclofenec in case of vulture) has been claimed by most of the ecologists as the major cause but actually there are other local reasons which have inflicted the raptors population in their respective areas. Besides being toxic, organochlorines persist in environment and can bio-accumulate through the food chain to ultimately disrupt the reproduction of raptors (Mc Clelland, 1990). The most alarming example is the Bundelkhand region which constitutes some of the districts of both Madhya Pradesh and Uttar Pradesh, within the boundaries of India. Raptors face increased risk from climate change due to extreme weather conditions during migration, unpredictable food sources in the breeding and wintering areas, and altered habitats due to changes in sea-level, vegetation, and human land-use.

## 2. MATERIALS AND METHODS

The present study was performed to assess the distribution and status of raptors in Bundelkhand region of India from January 2013 to June 2015 (Fig. 1). Bundelkhand lies between 23° 35' -26' N and 78° 82'E bounded by the Yamuna in the North, the Chambal in the North-west, the erupted ranges of the Vindhya plateau in the south and, the Panna and Ajay Garh ranges in the south east. The region stretches over districts of southern Uttar Pradesh and northern Madhya Pradesh. It comprises of Jhansi, Lalitpur, Hamirpur, Jalaun, Banda and Mahoba in Uttar Pradesh and Sagar, Chattarpur, Tikamgarh, Damoh and Panna in Madhya Pradesh including parts of Gwalior, Datia, Shivpuri and Chanderi. The principal rivers are the Sindh, Betwa, Ken, Bagahin, Tons, Pahuj, Dhasan, and Chambal.

Secondary data were collected to identify the possible raptors occurrence spots within the districts of Bundelkhand. Regular visits were made in the selected regions. Road surveys were conducted to count the number of vultures while driving along the roads or counts at carcasses seen beside roads. Survey is being carried out on foot or vehicle according to the area. Observations are being carried out using 'encounter transect' and 'roost count' method with the aid of 10x50 binoculars and data is supported

**Accipitridae:**

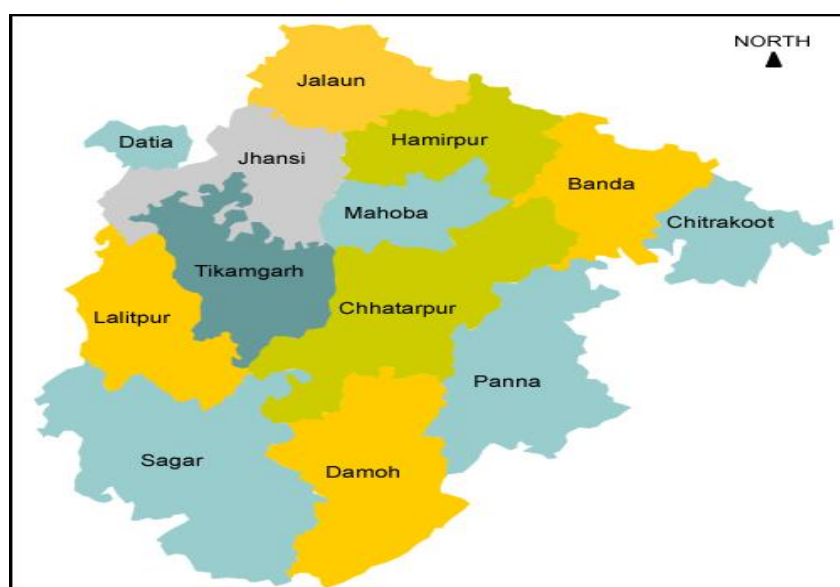
The family Accipitridae encompasses many of the diurnal birds of prey, including the familiar hawks and eagles. There are 233 species in 67 genera in this family worldwide. Twenty-four of these species and 14 genera are native to North America. Many of the species in this family also include multiple subspecies. Accipitrids are found worldwide. They live on every continent except Antarctica, and on most oceanic islands. They reside in every major habitat type except the northernmost arctic tundra and the driest deserts. Members of this family span the globe, living in habitats as wide ranging as tundra, alpine meadows and rainforests. They eat fish, mammals, birds, bats, invertebrates, carrion and some fruit. They nest on cliffs, in trees or sometimes on the ground and lay between one and nine eggs. Physical size is also quite variable within this group, with wingspans ranging from 50 cm to 3 m.

with photography using Canon EOS 70 D SLR camera. Species were identified with use of field guide of Grimmett, 1998; Naoroji R., 2008 and Yamazaki T., 2012.

**3. RESULT AND DISCUSSION**

The study revealed that raptors distributed throughout the Bundelkhand region are influenced by food availability and habitat. In the present investigation, 42 species of Raptors were identified belonging to 3

families from the Bundelkhand region of India. 27 species 9 are considered as common, 6 occasional, 5 winter visitor and 7 as rare species of raptors were reported in Rajaji National Park (Das *et al.*, 2011).



**Figure 1** Map of study area

**Table 1** List of Raptors reported from Bundelkhand Region

S.N.	Family	Common Name	Scientific Name	IUCN Status	Population Trend	Habit and Habitat
1	<b>Accipitridae</b>	Black Kite	<i>Milvus migrans</i>	LC	Unknown	It is a terrestrial diurnal raptor and found in temperate and tropical habitat.
2		Black-winged Kite	<i>Elanus caeruleus</i>	LC	Stable	Diurnal in habit and hovering over open grasslands, resident of open land and semi-desert areas.
3		Brahminy Kite	<i>Haliastur indus</i>	LC	Decreasing	It is primarily a scavenger, feeding mainly on dead fish and crabs, especially in wetlands and

					marshland.
4	Oriental Honey Buzzard	<i>Pernis ptilorhyncus</i>	LC	Stable	This migratory race occurs in lowland and montane deciduous broad leaved/ coniferous forests and feeding on the larvae and honey of bees and wasps.
5	Common Buzzard	<i>Buteo buteo</i>	LC	Increasing	Lives in tall forest, grassy habitats usually near the forest edge and preys mainly on small-to medium-sized mammals.
6	Crested Serpent Eagle	<i>Spilornis cheela</i>	LC	Stable	Breeds in deciduous, mixes deciduous and moist evergreen forests and hunts by swooping from tree branches along the streams or forest road to catch prey.
7	Bonellies Eagle	<i>Hieraaetus fasciatus</i>	LC	Unknown	Lives in mountains and woodland often at high elevations. Feeds on small mammals, many birds, insects and uses a combination of sit-and-wait and pursuit hunting.
8	Short-toed Snake Eagle	<i>Circaetus gallicus</i>	LC	Stable	Prey is predominantly non-venomous snakes and resides in open cultivated plains, thorn forest, deciduous forest, and semi-desert.
9	Lesser Spotted Eagle	<i>Aquila pomarina</i>	LC	Unknown	It breeds near forest edges, preferring moist woodland; most nest in lowlands. Mammals, birds, reptiles and amphibians are all taken as prey.
10	Changeable Hawk Eagle	<i>Spizaetus cirrhatus</i>	NA	Decreasing	Breeds in forested foothills, wooded wetlands to fairly open or sparse evergreen or deciduous forests and perch-hunts from high vantage point/ canopy for terrestrial mammals, birds and reptiles.
11	Long-billed Vulture	<i>Gyps indicus</i>	CE	Decreasing	Feeds exclusively on carrion. Prefers softer tissues of carcasses and live in mountains with cliffs, valleys, gorges, and rocky outcrops.
12	White-rumped Vulture	<i>Gyps bengalensis</i>	CE	Decreasing	The preferred habitats of the Vulture are deserts, savannas and grassland near a water source. They are carnivores and scavengers and feed mainly on carrion of freshly killed animals.
13	King Vulture	<i>Sarcogyps calvus</i>	CE	Decreasing	It is usually in deciduous forests and in cultivated and semi-desert areas.
14	Egyptian Vulture	<i>Neophron percnopterus</i>	E	Decreasing	A scavenger with a beak suitable for picking up food items rather than tearing flesh. Found mainly around rubbish dumps and slaughter houses

					near towns, villages, and outskirts of cities.
15	Eurasian Griffon	<i>Gyps fulvus</i>	LC	Increasing	Feeds exclusively on carrion. Prefers softer tissues of carcasses and live in mountains with cliffs, valleys, gorges, and rocky outcrops.
16	Cinereous Vulture	<i>Aegypius monachus</i>	NT	Decreasing	Feeds mainly on carrion: occasionally preys on small mammal. Habitat open savannah and semi-desert.
17	Slender Billed Vulture	<i>Gyps tenuirostris</i>	NT	Decreasing	It was found in open and partly wooded country, generally in the lowlands. This species feeds almost entirely on carrion, scavenging at rubbish dumps and slaughterhouses, and at carcasses dumped in the fields and along rivers.
18	Shikra	<i>Accipiter badius</i>	LC	Stable	Lives in savannah, desert fringes, dry woodlands, forest edges, gardens, town and cultivated areas. Still-hunts from cover and dashes out to catch prey on the ground; occasionally chases prey.
19	Imperial Eagle	<i>Aquila heliaca</i>	V	Decreasing	Prefer open cultivated fields and open lowland near wooded areas and preys on medium-sized reptiles, birds, mammals, occasionally fish and amphibians.
20	Steppe Eagle	<i>Aquila nipalensis</i>	NA	Decreasing	Feeds on small- to medium-sized mammals, birds, reptiles and insects on the ground. Lives in dry open habitats.
21	Indian spotted Eagle	<i>Clanga hastata</i>	V	Decreasing	It prefers subtropical and tropical dry forests to plantations and arable land. Feeds mainly on mammals which it captures on the ground.
22	Pallas fish Eagle	<i>Haliaeetus leucoryphus</i>	NA	Unknown	Prime habitats are large rivers, along lakes and tidal creeks and mangroves. Preys upon predominantly fish, rodents, small birds, frogs and reptiles.
23	Grey-headed Fish Eagle	<i>Ichthyophaga ichthyaetus</i>	NT	Decreasing	The grey-headed fish eagle is a fish-eating bird of prey. Their nests are close to bodies of water such as slow-moving rivers and streams, lakes, lagoons, reservoirs, marshes, swamps and coastal lagoons and estuaries.
24	Besra	<i>Accipiter virgatus</i>	LC	Decreasing	Preys mainly on birds: warblers and thrushes, insects, lizards and small mammals.

25		Mountain hawk Eagle	<i>Nisaetus nipalensis</i>	LC	Decreasing	Lives in dense forest and Feeds on small- to medium-sized mammals, birds, reptiles and insects on the ground.
26		Black-eared Kite	<i>Milvus migrans lineatus</i>	NA	Unknown	This whistling raptor can be seen circling in skies of cities, town and general human habitats looking for small prey.
27		White-eyed Buzzard	<i>Butastur teesa</i>	LC	Stable	They sit upright on perches for prolonged periods and soar on thermals in search of insect and small vertebrate prey.
28		Eurasian Sparrow Hawk	<i>Accipiter nisus</i>	NA	Unknown	Preys mainly on small-and medium-sized birds and, occasionally small mammals. Lives in coniferous, mixed denser forest.
29		Tawny Eagle	<i>Aquila rapax</i>	LC	Stable	The tawny eagle's diet is largely fresh carrion of all kinds. It will also steal food from other raptors.
30		Black Eagle	<i>Lctinaetus malaiensis</i>	LC	Decreasing	They soar over forests in the hilly regions of tropical Asia and hunt mammals and birds, particularly at their nests.
31		Western marsh Harrier	<i>Circus aeruginosus</i>	LC	Increasing	It is wetland species and breeds in open wetlands with dense grasses. Feeds mainly rodents and birds, as well as lizards, snakes, frogs, fish and insects.
32	<b>Tytonidae</b>	Grass Owl	<i>Tyto longimembris</i>	LC	Decreasing	Nocturnal, but will sometimes fly during the day. This species is adapted for life on the ground, and normally hides in long grass.
33		Barn Owl	<i>Tyto alba</i>	LC	Stable	Generally nocturnal, although it is not uncommon to see species emerge at dusk or be active at dawn, Flight is noiseless. Barn Owls specialise in hunting small ground mammals, and the vast majority of their food consists of small rodents.
34	<b>Strigidae</b>	Jungle Owlet	<i>Glaucidium radiatum</i>	LC	Stable	The Jungle Owlet is a generally crepuscular owl most active an hour or so before dusk and a similar time before sunrise. Resides in Himalayan foothills, submontane moist deciduous forest and secondary jungle with bamboos.
35		Forest Owlet	<i>Athene blewitti</i>	CE	Decreasing	It appears to be fairly strongly diurnal and easy to detect, habitually perching on high-flying bare branches. Lizards, small rodents, nestlings of other birds,

					grasshoppers, frogs and caterpillars are all prey items.
36	Spotted Owlet	<i>Athene brama</i>	LC	Stable	Lives outskirts of villages and cultivation, groves with old trees, and ruins. Crepuscular and nocturnal, roosts by day in tree hole or on a branch. Flight is deeply undulating.
37	Brown fish Owl	<i>Bubo zeylonensis</i>	LC	Decreasing	The Brown Fish Owl is semi-diurnal, roosting in large trees during the daytime and leaving well before sunset. Generally found in thick lowland forest and open but well-wooded areas, always near water.
38	Brown Hawk Owl	<i>Ninox scutulata</i>	LC	Decreasing	The Brown Hawk Owl is a Crepuscular and nocturnal bird. Flight is with speedy wing beats and glides. Occurs particularly in broadleaved deciduous and broadleaved evergreen woodland, diverse with conifer plantations, and tends to frequent forest edges.
39	Short-eared Owl	<i>Asio flammeus</i>	LC	Decreasing	Nocturnal, but often become active 30-60 minutes before sunset. Short-eared Owls dwell in wide open spaces such as grasslands, prairie, agricultural fields, salt marshes, estuaries.
40	Eagle Owl	<i>Bubo bengalensis</i>	LC	Stable	Nocturnal, inhabits in rocky hills with bushes, earth banks, wooded area with ravines, semi-deserts with rocks and bushes.
41	Dusky eagle Owl	<i>Bubo coromandus</i>	LC	Decreasing	Nests on mango tree groves, and old tamarind and other densely foliated trees are preferred.
42	Scoop Owlet	<i>Otus bakkamoena</i>	LC	Stable	Nocturnal bird and Indian Scops owl lives in forest and secondary woodland, desert vegetation, and groups of densely foliated trees in gardens, mango orchards and other fruit trees around villages and cultivations.

(Legends: CE= Critically Endangered, E= Endangered, V= Vulnerable, NT= Near Threatened, LC= Least Concern, NA= Not Assessed)

**Table 2** Some of photographs of Raptors reported from Bundelkhand Region**Black Kite****Jungle Owlet****Changeable Hawk Eagle****Imperial Eagle**





**Shikra**



**Black Shouldered Kite**



**King Vulture**



**Long-billed Vulture**



**Egyptian Vulture**



**Brahminy Kite**



**Brown Fish Owl**



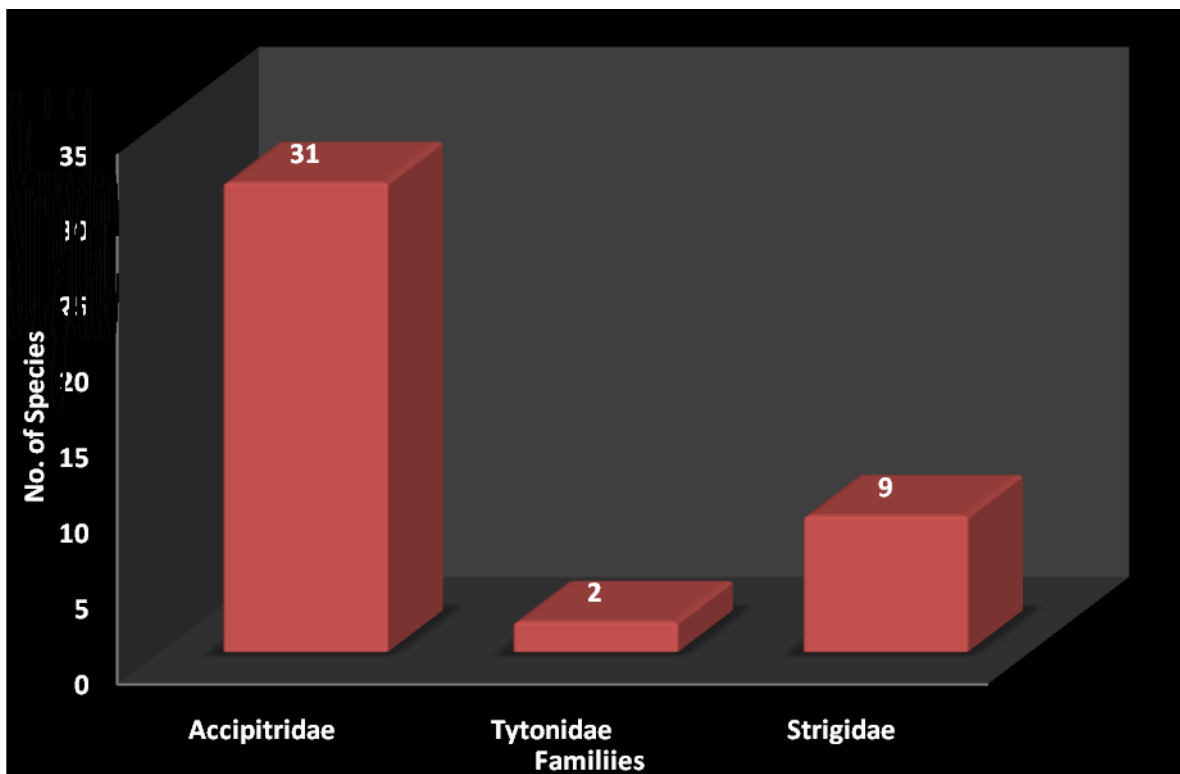
**Crested Serpent Eagle**



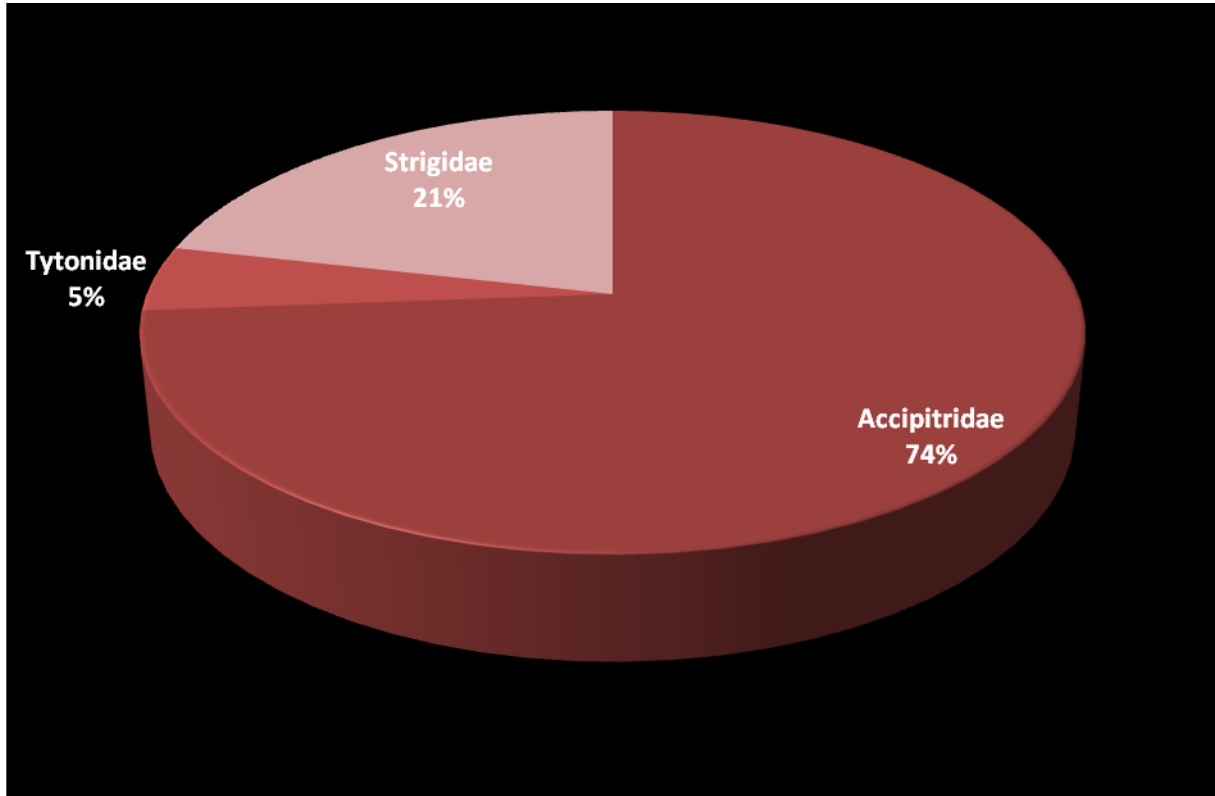
Steppe Eagle



Eagle Owl



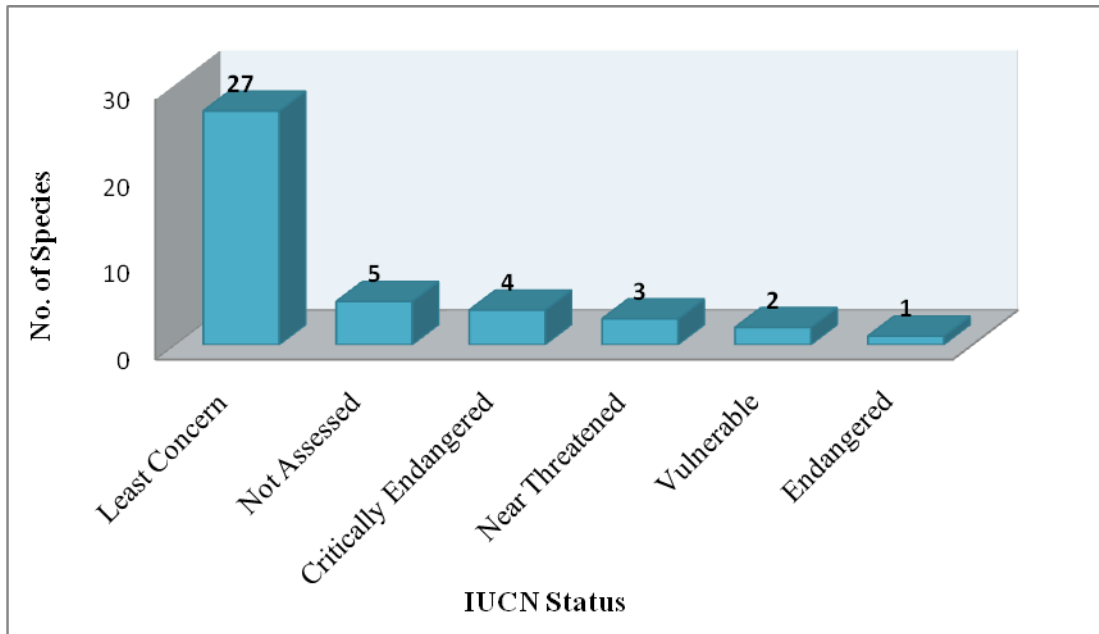
**Figure 2** Species composition of raptors in Bundelkhand according family



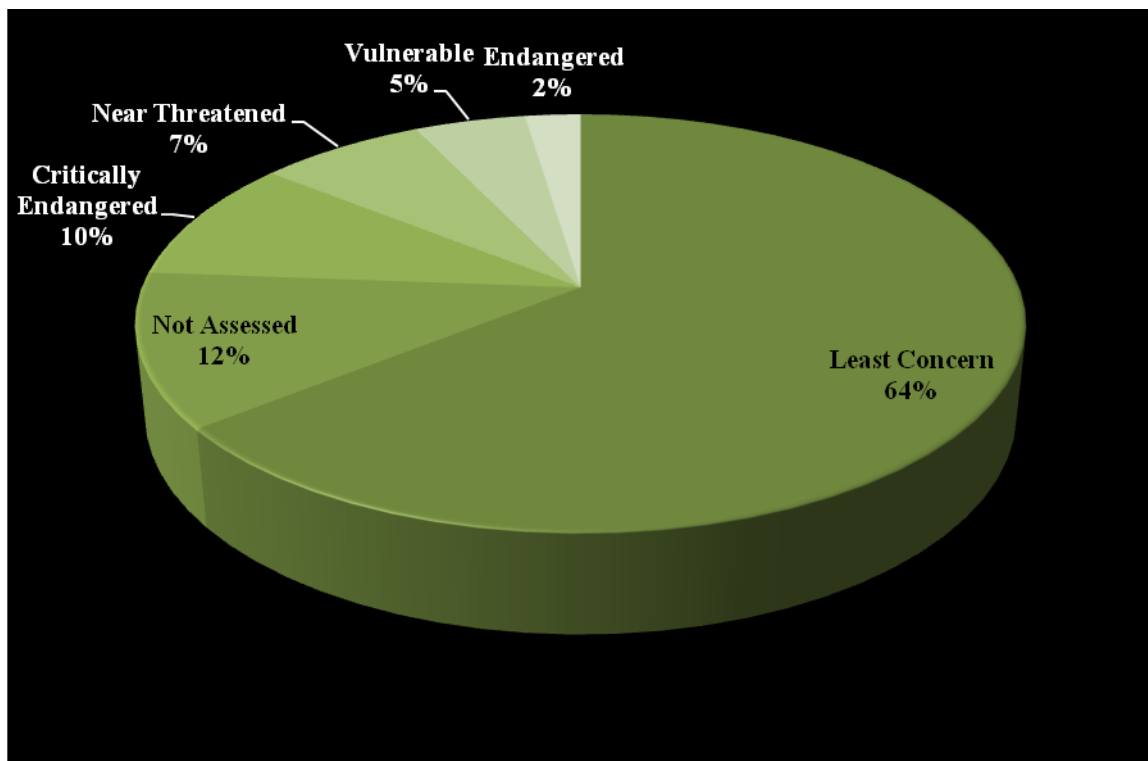
**Figure 3** Family wise % composition of raptors species in Bundelkhand

**Table 3** Raptors of Bundelkhand Region According to IUCN Status

S.N.	IUCN Status	No. of species	% composition
1	Least Concern	27	64%
2	Not Assessed	05	12%
3	Critically Endangered	04	10%
4	Near Threatened	03	7%
5	Vulnerable	02	5%
6	Endangered	01	2%



**Figure 4** Species composition of raptors in Bundelkhand according to IUCN Status



**Figure 5** % composition of raptors in Bundelkhand according to IUCN Status

**Critically Endangered:**

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

- An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer?
- A reduction of at least 80% projected or suspected to be met within the next 10 years or three generations.

B) Extent of occurrence estimated to be less than 100 km<sup>2</sup> or area of occupancy estimated to be less than 10 km<sup>2</sup>

C) Population estimated to number less than 250 mature individuals.

D) Population estimated to number less than 50 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer.

Out of 42 species, family Accipitridae has 31 species i.e. 74%, Tytonidae has 2 species i.e. 5% and Strigidae has 9 species i.e. 21% of raptors (Table 1 & 2 and Fig. 2 & 3). According to IUCN status 27 species were Least Concern (LC), 5 species were Not Accessed (NA), and 4 species were Critically Endangered (CE), 3 species were Near Threatened (NT), 2 species were Vulnerable (V) and 1 was Endangered (E) (Table 3 and Fig. 4 & 5). A similar result with species of critically endangered, Endangered, vulnerable category, Near Threatened and Least Concerned species has been previously reported from Navegaon National Park Maharashtra India (Paliwal and Bhandarker, 2014).

**Deforestation:**

Deforestation is defined as the destruction of forested land. It has proved to be a major problem all over world. However, the rates of destruction of forests are particularly high in the tropics. The causes of deforestation vary from place to place. The most common causes, however, are logging, agricultural expansion, wars, and mining. Deforestation has been the cause of many problems facing the world today such as erosions, loss of biodiversity through extinction of plant and animal species, and increased atmospheric carbon dioxide.

A variety of threats like sporadic fire, cattle grazing, mining and illegal Non Timber Forest Product collection by local communities affecting the safe nesting, roosting sites and prey base and eventually the population size. The protection of breeding, roosting and feeding sites to help in the conservation of raptors, awareness and education programmes for people that contribute in raptors conservation. Identification is one key to understanding the biology of a species, it might then be possible to develop conservation strategies to ensure the future of the raptors. Disturbances, habitat loss and decrease in food availability present serious threats for the raptors (vulture) in the studied Bundelkhand region (S. Kushwaha and A. Kanaujia, 2009, 2013).

**4. CONCLUSION**

The raptors of bundelkhand region are significant as it vital that native and endemic species of raptors are conserved. The Biodiversity of wetlands hold a lot of potential in terms of conservation. This is a preliminary and basic effort to bring out the absurd raptors fauna being maintained in the bundelkhand region of a mining zone. The present observational study on raptors diversity of bundelkhand region is an endeavour to draw the contemplation of all connected with the mining Industry. The bundelkhand region is already providing the favourable environmental conditions that support the residing raptors. However an additional study on the feeding habits, nesting and breeding patterns of the raptors will enhance the fauna.

**SUMMARY OF RESEARCH**

1. Birds of prey or commonly known as Raptors are found all over the world and in all types of habitats, which are considered as the sign of strength of the forest. The present study was performed to assess the distribution and status of raptors in Bundelkhand region of India.
2. In the present investigation, 42 species of Raptors were identified belonging to 3 families from the Bundelkhand region of India. Out of 42 species, family Accipitridae has 31 species i.e. 74%, Tytonidae has 2 species i.e. 5% and Strigidae has 9 species i.e. 21% of raptors.
3. The study reveals that loss of habitat is considered to be the most serious threat to raptor survival (Newton, 1990), deforestation, urbanization and use of medicine (diclofenec in case of vulture) has been claimed by most of the ecologists as the major cause but actually there are other local reasons which have inflicted the raptors population in their respective areas.
4. The study recommend that protection of breeding, roosting and feeding sites to help in the conservation of raptors, awareness and education programmes for people that contribute in raptors conservation.

**FUTURE ISSUES**

Bundelkhand region has a rich raptors diversity including much number of critically endangered Long-billed vultures, endangered Egyptian vulture and many Near Threatened Slender Billed Vulture and Grey-headed Fish Eagle. To documents exact population status, other behavioural aspects of raptors and the major threats to these magnificent raptors diversity should be removed so as to maintain the healthy ecosystem for the future.

## ACKNOWLEDGEMENT

Thanks are due to Head of Department of Zoology for providing necessary facilities to perform this work. Author thanks to State Forests Department of UP and MP for providing the permission to carry out the study and all volunteers and local peoples. Special thanks to Mr. Arindam Aditya, BNHS, Mr. Ashish Dewedi, IBCN for their contribution of some of the photographs of raptors.

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