Localized Population, Habitat Predictors, and Threats of Cheer Pheasant, in Pyuthan District, Nepal

Suwash Yogi[1*], Narayan Prasad Gautam[1]

[1] Tribhuvan University, Institute of Forestry, Pokhara Campus, Pokhara, Nepal

**Corresponding author: yogi.suwash39@gmail.com*

ABSTRACT

This study assessed the population density, habitat preferences, and conservation threats to the globally vulnerable Cheer Pheasant (Catreus wallichii) in the Pyuthan District. Dawn Call Count surveys were conducted at 16 stations. Habitat variables were measured within 300-meter radii of each station. A Generalized Linear Model analyzed habitat preferences, while semi-structured questionnaires assessed conservation threats and local perceptions. The study recorded a population density of 6 birds/km² with a detection rate of 1.12 birds per station, concentrated in the Lahare Vir block. Habitat analysis revealed significant preferences for areas with moderate fire damage (p=0.032), proximity to settlements (p=0.025), and low shrub density (p=0.009). Hunting emerged as the primary threat (44%), followed by forest fires (18%), habitat degradation from overgrazing (12%), lack of awareness (12%), and predators (14%). While 94% of locals were unaware of the species' protected status, 78% expressed support for its conservation. This study establishes baseline population data for Cheer Pheasant in Pyuthan district and identifies critical habitat preferences, contributing to our understanding of the species' ecology in non-protected areas. The findings suggest the need for integrated conservation strategies that combine habitat management through controlled burning, community-based conservation initiatives, and enhanced law enforcement against hunting.

Keywords : *Conservation, dawn call count, habitat preference, population density, vulnerable species*

INTRODUCTION

Nepal supports a high avifaunal diversity with documented records ranging from 892 to 902 species, making up about 9% of the world's avifaunal population (DNPWC & BCN, 2022). According to recent records, there are currently 904 species from the nation, indicating that this number is continually rising (The Diplomat Nepal, 2025). Among them, the Cheer Pheasant (*Catreus wallichii*) is classified as vulnerable and largely depleted species (IUCN, 2025) and nationally endangered as well as one of the nine nationally protected species in Nepal (NPWCA, 1973). The global population is estimated at 2,000–2,700

mature individuals, with fewer than 1,000 in Nepal (Bird Life International, 2017; Inskipp *et al.*, 2016). Found across a narrow range extending from northern Pakistan through India to western Nepal, this pheasant inhabits steep, rugged terrain, avoiding dense forests and preferring areas with tall grasses, scrub, and stunted trees interspersed with rocky crags (Ali & Marshall, 1884; Ripley, 1998). In Nepal, its distribution includes areas west of the Kaligandaki River, such as the Dhorpatan Hunting Reserve, Rara National Park, Annapurna conservation area, Apinampa conservation area, and districts include Achham, Baglung, Baitaidi, Bajura, Dadeldhura, Darchula, Doti, Humla, Jajarkot, Jumla, Mugu, Mustang, Rukum (DNPWC & DFSC, 2018) Gulmi, Myagdi, Pyuthan, Parbat and Arghakhachi (Thakuri *et al.*, 2018; Chokhal *et al.*, 2020; Khanal *et al.*, 2020; eBird 2021, 2022).

Despite its ecological and conservation importance, Cheer Pheasant faces an uncertain future. Habitat degradation, hunting, and human disturbance have contributed significantly to its population decline (Garson *et al.,* 1992; Kasli, 1999). Hunting and trapping have been identified as major threats affecting Galliformes globally, driving them towards extinction (McGowan *et al.,* 2012) The species is on the verge of local extinction from many known location, for example Salkhala Game Reserve in Pakistan (Awan *et al.*, 2012), and Kaksthal, tundah, Bhatal and Thathana in Chamba, Himanchal India (BirdLife International, 2021), as well as significantly declined in Rara National Park, Annapurna Conservation Area and Dhorpatan Hunting Reserver, Nepal (Acharya *et al.*, 2006; Basnet *et al.*, 2020; Inskipp *et al*., 2016; Singh 2009).

Cheer Pheasant habitats face numerous challenges. Habitat destruction, primarily due to overgrazing, illegal hunting, and forest fires, is especially prevalent outside protected areas (Garson *et al.*, 1992; Subedi, 2003). Pheasant populations inhabiting the Himalayan region have experienced significant declines in Arunachal Pradesh, India, primarily due to hunting for meat and cultural practices, which have negatively impacted their numbers (Kaul *et al.*, 2004; Selvan *et al.*, 2013).

In Nepal, hunting and snaring, live trapping for meat or use them in luring, egg collection, overgrazing, nest destruction by domesticated dogs, deforestation and uncontrolled forest fires to promote grazing have been identified as the main threat to Cheer Pheasant (Basnet *et al.*, 2020; Inskipp *et al.*, 2016; Singh *et al.*, 2011; Subedi *et al.*, 2017). Superstitious beliefs drive its use in traditional medicine for asthma, body pain and fever making it one of the most frequently illegally hunted pheasant species in Nepal (Budha, 2006; DNPWC & DFSC, 2018).

Limited studies on Cheer Pheasant habitats and their distribution patterns outside protected zones hinder the formulation of effective conservation strategies

(Basnet, 2016). Important habitat outside protected areas (PAs), which are highly susceptible to anthropogenic threats have not been given priority in terms of research or conservation efforts. Even though information on the presence of Cheer Pheasant from the Pyuthan district of Nepal (Khanal *et al.*, 2020), scientific surveys are lacking from there region despite the species global and national significance. Therefore, this study was conducted to provide baseline data about the status, distribution and major conservation threat of Cheer Pheasant in Pyuthan district of Nepal.

MATERIALS AND METHODS

Study area

Pyuthan District is located in the western mid-hills of Nepal (27°52'to 28°21' N

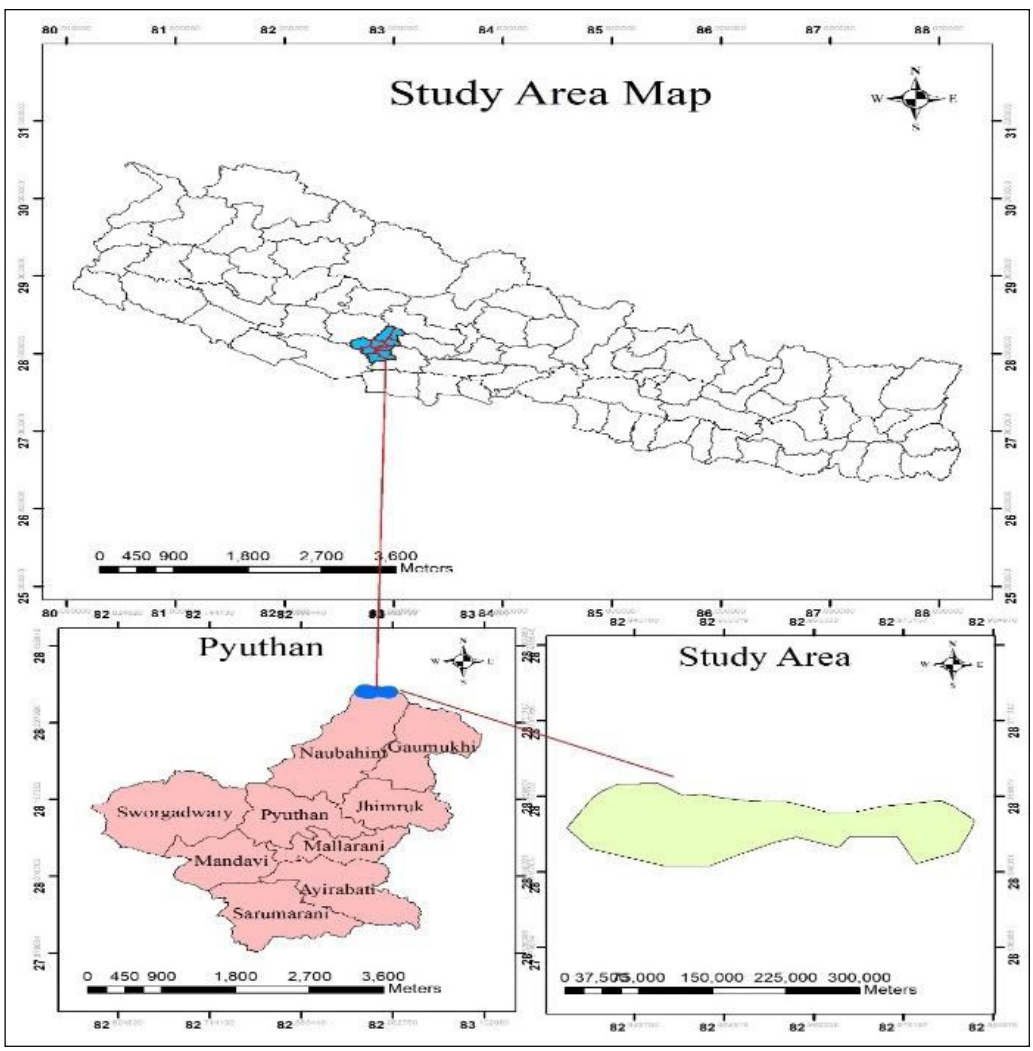


Figure 1: *Study area map*

and 82°36' to 83°36' E), with an area of 132890 ha and the elevation ranges from 305 m to 3,659 m (Thapa, 2019). This survey included major parts of Kothilek of Syauliwang (now Naubahini Rural Muncipality, ward no 1). Study area comprises a forest area and pasture land in and around KothiBhir area, the area with highest altitude in Pyuthan. The study area was divided into four blocks based on probable habitat and local knowledge (Lahare block, Banchare block, Kothi block, and Mirchaula Ghati). The study area includes diverse habitats such as pasturelands and forests dominated by Pine (*Pinus* spp.), Juniper (*Juniperus* spp.), and Rhododendron (*Rhododendron* spp.). The area has steep rocky slopes and open canopy forests, make it an ideal habitat for the Cheer Pheasant (*Catreus wallichii*).

Data collection and analysis

The field survey was conducted during the Cheer Pheasant's breeding season, from May 22 to June 9, 2024. The study area was differentiated into four blocks where, four call station were placed in each block, with a total of 16 call stations, each with a 300-meter radii placed at least 600m apart radii of 300 m is widely used for studying Himalayan pheasant (Garson, 1983; Duke, 1990; Khaling *et al.*, 1998, Miller, 2010) and distance of 600m between the stations were set to prevent the double counting of individuals (Chhetri *et al.*, 2020, Gaston & Singh, 1980; Subedi, 2003). These call count stations were placed covering various habitat types and elevation in the study area

The Dawn Call Count method was applied for cheer pheasant presence evidence and the calls were used to estimate the population size of the Cheer Pheasant (Gaston, 1980; Subedi, 2003). Call counts were conducted for three consecutive mornings at each station, starting 30 minutes before sunrise and continuing for 60 minutes.

The detection rate or encounter rate was calculated to quantify the relative abundance of Cheer Pheasants across the study area using the following formula1, e.g., (Subedi 2003).

$$\text{Detection rate} = \sum x/n$$

where:

- $\sum x$ = Total number of Cheer Pheasants recorded during the survey,
- n = Total number of call count stations.

This provided a standardized measure of the average number of birds per station, facilitating comparisons across different habitats.

Habitat variables were recorded within a 300-meter radius included aspect, elevation, slope, canopy cover, ground cover, shrub, herb, tree density, rock cover, fire evidence, and distance to water, cultivated land, and settlement (Chokhal,

2020). Coordinates and elevation were recorded using a handheld GPS (Garmin GPSMAP65s), and distance measurements were verified using Google Earth Pro, Fire impact was visually categorized as absent, low (10–30%), or high (>30%) following Poudyal (2008), aspect (North East-NE and other aspect. NE is regarded as 1 and other aspect as 0) for statistical analysis to analyse habitat use.

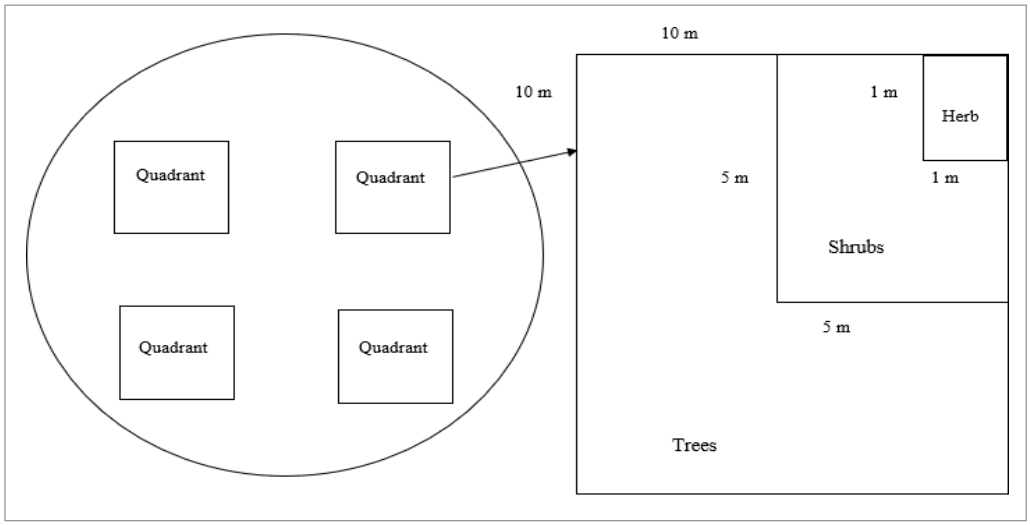


Figure 2: *Sample plot design for vegetation*

A household survey using semi-structured schedule was administered to 50 purposively selected households located within 500 to 3500 m of the call count stations based on the household distance at the proximity from the count station. The schedule aimed to understand household level knowledge regarding the Cheer Pheasant, their habitat and associated threats.

Presence/absence data from the call count stations were used to generate a spatial distribution map of the Cheer Pheasant across the study area. The map was prepared using ArcGIS 10.8, allowing for a visual representation of the bird's distribution in relation to habitat features such as elevation, slope, and human proximity. The detection rate helps quantify the relative abundance of the species across different stations and habitats.

A Generalized Linear Model (GLM) was used to know the factors related to habitat parameters responsible for the presence of cheer in the study area. The presence/absence data from the call count stations served as the dependent, while habitat variables such as fire incidence, distance to human settlements, and shrub density were the independent variables. The GLM assumed a binomial error distribution with a logit link function, formulated as:

$$logit\ (Pi) = \beta 0 + \beta 1X1 + \beta 2X2 + \ldots + \beta nXn$$

where:

Pi = Probability of presence of Cheer Pheasant at station iii,

$\beta 0$ = Intercept,

$\beta 1, \beta 2, \ldots, \beta n$ = Coefficients for predictor variables X1,X2,…,Xn.

X1,X2,…,Xn: Habitat variables such as fire incidence, distance to human settlements, and shrub density.

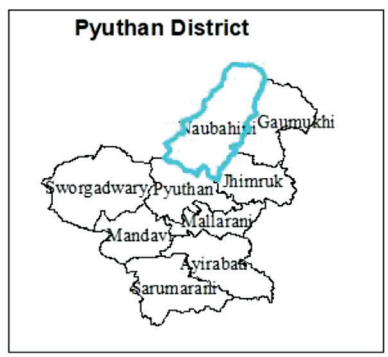
Statistical tests for the GLM were performed using strata with the significance of predictor variables evaluated using Wald Chi-Square statistics. Variables with a p-value of less than 0.05 were considered statistically significant. The Akaike Information Criterion (AIC) was used to assess model fit.

Perceptions of people and conservation threats were interpreted through simple descriptive statistics, i.e. mean, and median and presented using different charts and graphs with the help of MS Excel.

RESULTS

Population distribution and status

Among all the blocks, Cheer Pheasants were reported only from Lahare block. Cheer Pheasants were recorded at all four stations of Lahare block. A total of 18 Cheer Pheasants calls were recorded. The population density was estimated to be 6 birds/km², with a detection rate of 1.12 birds per station. No Cheer Pheasants were detected in other blocks, indicating a localized distribution pattern in Lahare block. By this, we can say that Lahare block has a more suitable habitat for Cheer.



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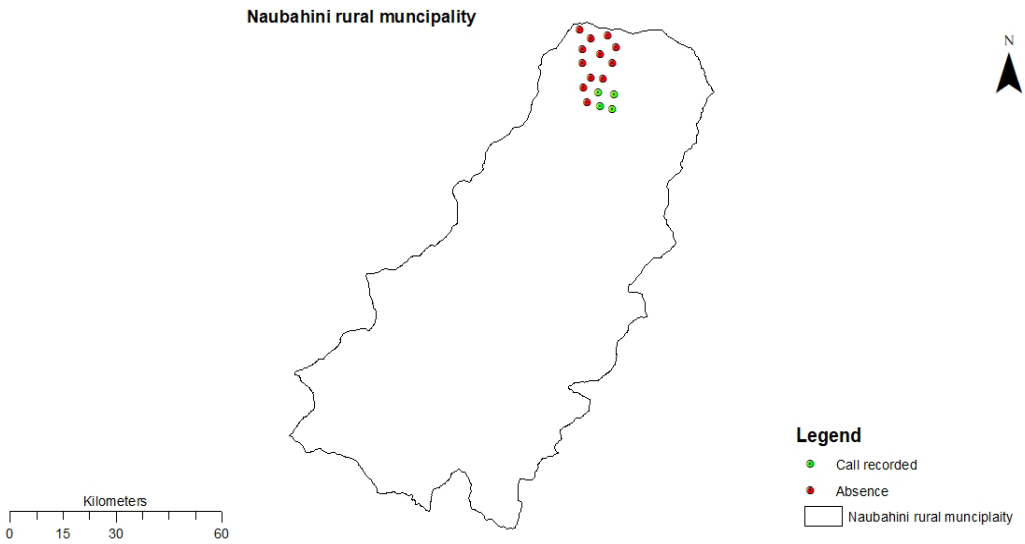

Figure 3: *Distribution of call stations within Naubahini Rural Municipality, Pyuthan District*

(Green dots represent call stations where Cheer Pheasants were detected, while red dots indicate stations where the species was absent.)

Habitat preferences

Table 1: *Significance test of population with different habitat variables*

Predictors	B	Std error	P-value	Exp(β)
(Intercept)	12.512	5.1154	.014	271554.598
Aspect (1=NE)	-1.017	1.8252	.577	.362
Fire incidence (1=absent)	-2.342**	1.0915	.032	.096
Elevation (m)	-.001	.0008	.284	.999
Slope (%)	-.022	.0258	.392	.978
Dist. to settlement (m)	-.003**	.0012	.025	.997
Dist. to farm (m)	-.001*	.0005	.085	.999
Dist. to waterholes (m)	.001	.0010	.140	1.001
Rock cover (%)	-.034	.0305	.268	.967
Shrub density (%)	-33.687***	12.9687	.009	0.00
Herb density (%)	.547	.9135	.549	1.729
Tree density (%)	10.578	12.0707	.381	39272.714
(Scale)	.392[b]	.1387		

Significance code (<0.1*, <0.05**, <0.01***)

Fire damage, distance to human settlements, distance to cultivated lands and shrub density were found to be the significant predictors that affects the population distribution of Cheer Pheasant among the 11-variables used for the habitat study. The most significant predictors include fire damage, places with the absence of fire incidence were found less likely ($\beta = -2.342$, $p = 0.032$) of presence of Cheer Pheasant. Distance to human settlements also plays a significant role, with increasing in distance decreases the presence likelihood ($\beta = -0.003$, $p = 0.025$). likewise, higher shrub density significantly decreases of observing Cheer ($\beta = -33.687$, $p = 0.009$).

Public perception and threat assessments

Locals near the area were asked how often they see the Cheer Pheasant. 82% (N= 50) of the locals responded that they occasionally see them, while 18% reported frequently seeing the Cheer Pheasant. Female locals usually see the Cheer Pheasant while cutting grass in the area. Locals were asked where they have frequently seen Cheer and 88% responded that they have seen Cheers in the rocks with long grass and 12% responded they have seen Cheer in forest areas.

Local peoples and herders were asked if they knew that Cheer is a nationally endangered and protected bird species 94% of the locals were unaware of the status of Cheer and only 6% of the people knew the status of Cheer.

Public perception on the conservation of Cheer was asked with the locals in which 78 percent of the respondents were positive for the conservation of the Cheer, 4% responded Negatively for the conservation of Cheer and 18 % did not give any response.

Locals recognized hunting (44%) as one of the main threats to the Cheer Pheasant during the social survey. Similarly, forest fires (18%), habitat degradation from overgrazing and lack of awareness (18%), and predators (14%). Cases of forest fires, overgrazing, etc. were noted during the field survey.

DISCUSSION

In Nepal, Cheer Pheasant surveys have been mainly focused on the protected areas of the Dhorpatan Hunting Reserve, Annapurna Conservation area and Rara National Park. However, areas beyond these PAs received little attention despite the fact that the majority of Cheer Pheasant habitat lies outside PAs (Basnet & Poudyal, 2017; Inskipp *et al.*, 2016). Recently, Cheer Pheasant has been reported first time from Pyuthan, Gulmi, Parbat, Arghakhanchi and new localities in Myagdi District in Western Nepal (Chokhal *et al.*, 2020; Khanal *et al.*, 2020; Thakuri *et al.*, 2018). However, detailed surveys on this subject are lacking, making our survey valuable in providing critical information about the habitat predictors, distribution, threats, and local perceptions

of the Cheer Pheasant in Pyuthan, outside the PAs. The Cheer Pheasant is typically found within an altitudinal range of 1800–3050 m (Inskipp *et al.*, 2016), which is similar to our observations, where the species was recorded between 2174–2793 m.

Hunting, among other threats, poses a serios impact on the abundance and survival of Cheer Pheasant in the study area. It roosts communally in open habitat, at lower elevation than other pheasants, close to inhabited areas, and is easily detected by its call (Young *et al.*, 1987), which makes them more susceptible to hunting.

According to Singh *et al.* (2006), the yearly forest fire season in Nepal typically falls during the Cheer breeding season, negatively impacting the species' ability to lay eggs and hatch. Similarly, Aacharya (2006) discovered that 80% of the Cheer habitat in Lower Kali Gandaki was destroyed by forest fires. As a ground-dwelling, ground nesting non-migratory species it is especially vulnerable to disturbance by fire. Our observations of fires in Cheer Pheasant habitat, along with the discovery of two birds guarding eggs that were burned in a forest fire last year (as reported by local people), further confirm this vulnerability.

Under the National Parks and Wildlife Conservation Act, 1973, Cheer Pheasant is given special protection priority as one of Nepal's nine protected bird species (DNPWC & DFSC, 2018). Any hunting, harassment, or sale of protected bird species is punishable by fines ranging from NRs 20,000 to NRs 50,000, as well as a prison sentence of six months to one year, or both. Yet Pheasants are among the most commonly hunted and disturbed birds in Nepal, with prior studies citing snaring, hunting, overgrazing, and forest fires as significant threats to Cheer Pheasant (Acharya *et al.,* 2006; Basnet *et al.,* 2020; Budha 2006; DNPWC & DFSC, 2018; Inskipp *et al.*, 2016; Singh, 2009; Singh *et al.,* 2011; Subedi 2013). Our study indicates that the majority of people are unaware of the conservation status of the Cheer Pheasant and lack knowledge about its conservation. Furthermore, hunters exploit weak law enforcement and commonly hunt Pheasant species such as the Cheer Pheasant, Kalij Pheasant, and Himalayan Monal. Such illegal hunting of pheasants has been observed in Cheer Pheasant habitats across Nepal (Inskipp *et al.*, 2016).

The current survey was unable to cover the entire potential range of the species, nor was it practical to conduct an in-depth survey within the available time. Therefore, we believe it is likely that the Cheer Pheasant is more common and widespread in the study area than our survey suggests.

Although Cheer Pheasants were recorded from a new site in Pyuthan, Nepal, this area lies outside the PAS network, where illegal activities are relatively prevalent. Given that local perceptions toward Cheer

Pheasant conservation are generally positive, a community-based conservation program, involving collaborative efforts from concerned stakeholders, should be initiated to curb hunting and protect the remaining Cheer population. Additionally, as Cheer Pheasant habitat is susceptible to fires during the breeding season, local communities should be trained in fire prevention and control.

CONCLUSION

Cheer Pheasants in Naubahini Rural Municipality were recorded only in Lahare block, with a population density of 6 birds/km², indicating a highly localized distribution. Habitat factors such as fire incidence, shrub density, distance to human settlements, and proximity to farmland significantly influenced their presence, with lower shrub density and minimal fire impact favouring the species. Public surveys showed low awareness of its endangered status, though most locals supported its conservation. Hunting, forest fires, habitat degradation, and predators were identified as major threats. Lahare block is therefore a major habitat, requiring focused conservation, awareness programs, and habitat management to protect Cheer Pheasants.

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