



Himachal Pradesh
Forest Department



GREAT HIMALAYAN NATIONAL PARK

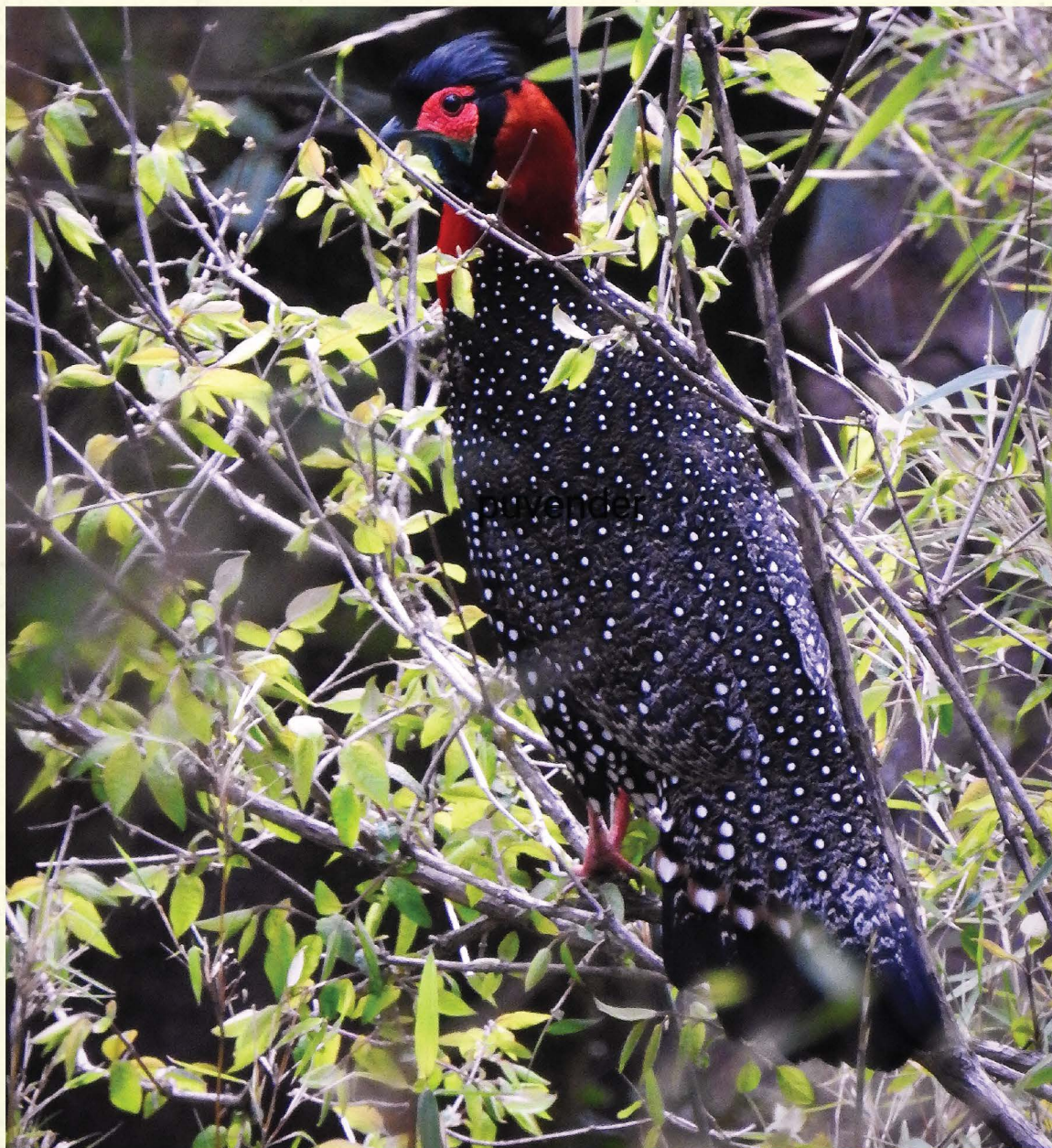
ग्रेट हिमालयन नैशनल पार्क



United Nations
Educational, Scientific and
Cultural Organization



GHNHP inscribed
as world heritage
site in 2016



POPULATION STATUS & DISTRIBUTION

OF

WESTERN TRAGOPAN
(*Tragopan melanocephalus*)

IN THE

**GREAT HIMALAYAN
NATIONAL PARK, H.P.**

(2023-24)



Population Status & Distribution of Western Tragopan (*Tragopan melanocephalus*) in the Great Himalayan National Park, H.P. (2023-24)

Technical support

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Sh. Nishant Mandhotra, DCF GHNP

Sh. Hans Raj Thakur, ACF GHNP

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Report designing - Chinmay Kher, Designer, 51A WCRF



GREAT HIMALAYAN NATIONAL PARK

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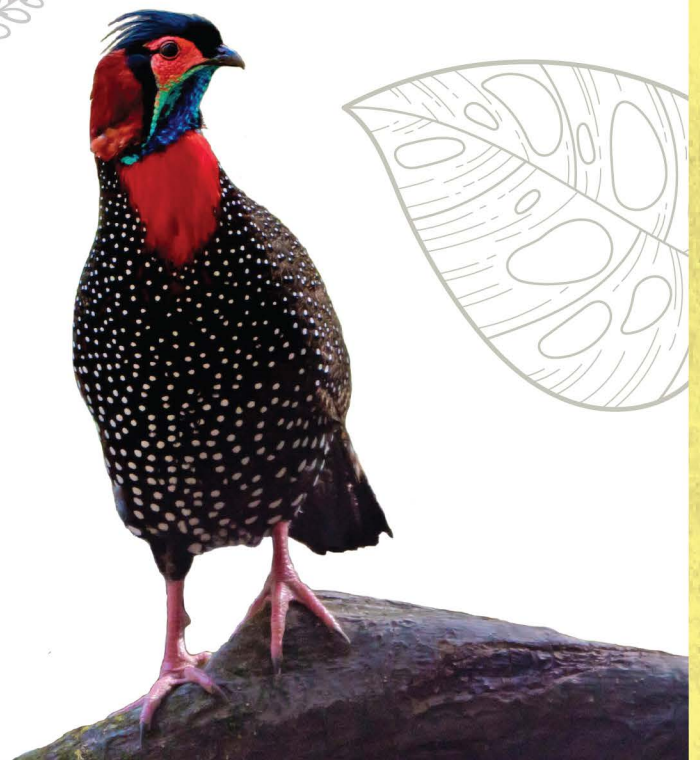
Survey Period: 4-6 May, 2023

Survey Team

1. Sh. Rajesh, ACF WL Kullu
2. Sh. Parmanand, RFO
3. Sh. Vikramjeet, RFO
4. Sh. Lenin Sharma, Dy. Ranger
5. Sh. Gyan, Dy. Ranger
6. Sh. Nok Singh, Dy. Ranger
7. Sh. Shiv Kumar, Dy. Ranger (Lahaul Division)
8. Sh. Kavinder, Dy. Ranger
9. Sh. Pritam, Dy. Ranger
10. Sh. Vinay, Sr. Fgd
11. Mrs. Usha, Sr. Fgd
12. Sh. Rakesh, Sr. Fgd
13. Sh. Gehru Ram, Fgd
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15. Sh. Gajender, Fgd (Plant Expert)
16. Sh. Manoj, Fgd
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29. Sh. Tanuj, Fgd
30. Sh. Puvender, Fgd
31. Sh. Ashutosh (Plant Expert)
32. Ms. Goldie, JICA (Bird Watcher)
33. Sh. Vipin Kumar (Plant Expert)
34. Apoorv Dixit IFS (P)
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Message



Rajiv Kumar IFS,

Principal Chief Conservator of Forests
(HoFF) & Chief Wildlife Warden
Himachal Pradesh

I am delighted to know that the population estimation exercise of the Western Tragopan, a majestic bird native to the western Himalayas in the Great Himalayan National Park, a UNESCO World Heritage Site has been done and this report is the outcome of the efforts. As conservationists, researchers and nature enthusiasts, we have a unique opportunity to contribute to the understanding and conservation of this magnificent species.

The Western Tragopan, scientifically known as *Tragopan melanocephalus*, is a critically endangered bird, facing numerous threats to its survival. Habitat loss, illegal hunting and fragmentation of its natural range have led to a significant decline in its population. By conducting this estimation exercise, the aim was to gather valuable data that will aid in formulating effective conservation strategies for future. By gaining insights into the population size, breeding patterns and habitat preferences, the initiatives to protect and restore their natural habitats can be taken. This exercise is not only an opportunity to contribute to conservation efforts but also a chance to immerse one in the breathtaking landscapes of the western Himalayas of which GHNP is a pristine representative.

I extend my heartfelt appreciation to all the participants who dedicated their time and energy to this population estimation exercise. Together, we make a meaningful difference in the conservation of the Western Tragopan and the ecosystems it inhabits. I am glad to know that the population estimation exercise for assessing the status of population of Western Tragopan is being regularly carried out in GHNP on annual basis since 2020. The results are fruitful for the Great Himalayan National Park given increase in bird calls per station from 3.11 in 2020, 3.50 in 2021, 4.24 in 2022 to 4.48 in 2023 which is positive sign exhibiting improvement in habitat of the flagship species of GHNP.

I would like to congratulate the entire team of GHNP behind this exercise under the guidance of Meera Sharma, IFS, CCF GHNP, field exercises led by Nishant Mandhotra, IFS, DCF GHNP, Hans Raj Thakur, ACF GHNP and all the field functionaries for their immense efforts and hard work to carry out the exercise and bringing out such a comprehensive document with invaluable information for future pheasant surveys in PAs in Himachal Pradesh. I hope and wish that similar effort continues in future too.

Rajiv Kumar

Message



Anil Thakur

Additional Principal Chief Conservator
of Forests (Wildlife), Himachal
Pradesh

The state of Himachal Pradesh is having a rich protected area spread across 15% of its geographical area with majestic floristic diversity and treasured faunal diversity. I am thrilled to know that an extraordinary endeavour—the population estimation exercise of the Western Tragopan in the Great Himalayan National Park, a UNESCO World Heritage Site was taken from 4th to 6th May, 2023. The conservation is a remarkable journey, where we contribute to the conservation of this magnificent bird that graces the western Himalayas starting from the days of its existence, its first camera trap photograph to its annual estimation exercise.

The Western Tragopan, scientifically referred to as *Tragopan melanocephalus*, finds itself teetering on the brink of extinction, besieged by a multitude of threats. Rapid habitat loss, unlawful hunting and the fragmentation of its once-vast domain have precipitated a distressing decline in its global population. As guardians of nature, this population estimation exercise assumes paramount significance in our quest to comprehend and safeguard this splendid flagship species.

The Call Count based population estimation method used is a scientific method to estimate the density and abundance of the pheasants in the given area. This protected area spread over an area of 754.40 km² houses immense in situ biodiversity. Thus, there is a great need to periodically evaluate the population of avifauna especially in the backdrop of climate change, urbanization, forest fires and other biotic impacts. In this context, it is heartening to see that GHNP has been conducting such population estimation exercises on assessing the status of population of Western Tragopan, the flagship species of GHNP annually for the past many years. This exercise presents an opportunity not only to contribute to the cause of conservation but also to immerse in the breathtaking grandeur of the western Himalayas. The results of the exercise are encouraging with an increase in the number of Western Tragopans recorded in GHNP given an increase in bird calls per station from 3.11 in 2020 to 4.48 in 2023 which is a great sign of improvement in habitat of the flagship species of this PA.

Efforts done by GHNP management team and field functionaries in conducting this population estimation exercise and hard work to carry out the same for bringing out this comprehensive document detailing the various aspects which is invaluable for future pheasant surveys is appreciable. It is my sincere hope that such a comprehensive document would undoubtedly be of immense value in wildlife monitoring and management in the PAs across the state.

Anil Thakur

Message



Meera Sharma

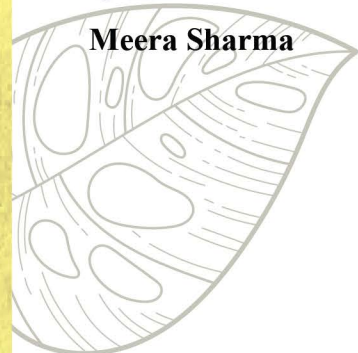
Chief Conservator of Forests
Great Himalayan National Park

I am happy to announce the publication of Report on Population Estimation of Western Tragopan in Great Himalayan National Park. The population estimation exercises are conducted by DFO GHNP and his field staff on annual basis following the monitoring protocol of GHNPCA. This year it was conducted from 4th June, 2023 to 6th June, 2023. On the culmination of hard work and dedicated field work by GHNP team, the result has been compiled with the fine tuning of documents with the assistance of 51A Wildlife Conservation & Research Foundation.

I am thrilled to see the results i.e. increase in number in bird calls recorded per station. A gradual increase has been seen in population of Western Tragopan since 2020 onwards. In 2020, it was 3.11; in 2021, it was 3.50; in 2022, it was 4.242 and in 2023, it has increased to 4.48. this has been the result of sincere protection measures being taken up by the field staff/GHNP managers which include closing of habitat areas during breeding season for tourism activities, increase in patrolling in forest areas and involvement of communities in PA management activities.

I extend my appreciation to all the field staff for best of efforts done by them. The publication of such reports on regular basis will be of immense help to the field staff, tourists, organizations involved in conservation of biodiversity and researchers in future. I hope that these efforts of monitoring continues in future too.

Meera Sharma



Preface



Nishant Mandhota

Deputy Conservator of Forests
Great Himalayan National Park

Dear friends,

With immense pleasure we are sharing this report on the annual population estimation of the Western Tragopan, a highly elusive and globally threatened bird species. As per IUCN Red Data Book list, the species is Vulnerable, with decreasing numbers and largely depleted population. This population estimation using the call count method, has proven to be effective in studying and estimating the population of this elusive bird species. This year's exercise was particularly special as we also had the privilege of collaborating with Indian Forest Service probationers from the Indira Gandhi National Forest Academy (IGNFA), Dehradun.

I am also delighted to announce that a documentary capturing the remarkable efforts and findings of this population estimation has been produced by Sh. Vinay Kumar, one of our talented forest guards. The documentary provides an insightful glimpse into the challenges faced during the survey and highlights the importance of conserving the Western Tragopan and is available at: <https://tragopancount.page.link/GHNP>. I highly recommend taking the time to view it, as it showcases the dedication and commitment of our team, as well as the significance of preserving this magnificent bird species in the pristine habitat of Great Himalayan National Park. During this exercise another forest guard, Sh. Puvender Kumar also captured a video clip and photograph of this elusive and very less recorded bird in its habitat.

I am especially grateful for the guidance provided by senior forest officers Sh. Rajiv Kumar, PCCF Wildlife, Sh. Anil Thakur, APCCF Wildlife, Smt. Meera Sharma, CCF GHNP and Sh. Hans Raj Thakur, ACF GHNP all throughout. I would also like to extend my heartfelt appreciation to the range officers, deputy rangers and forest guards who were directly involved in the estimation exercise. Their dedication and hard work, along with the support of the porters, cooks and guides who greatly enriched the process, even in the face of challenging weather conditions and difficult terrain. Their efforts have helped to gather the data and information and has advanced our understanding of the Western Tragopan population and its habitat in the GHNP and eventually helped to come out in the form of this report. Let us continue our collective efforts to protect and conserve the biodiversity of the Great Himalayan National Park.

Thank you for your ongoing support for the cause of Nature and Conservation.

Best regards,

Nishant Mandhota

The Great Himalayan National Park

About GHNP

The Great Himalayan National Park (GHNP) is located in the Kullu district of Himachal Pradesh, within the Biogeographic Zone-2A North West Himalayas. Its geographical coordinates lie between Latitude $31^{\circ} 38' 28''$ & $31^{\circ} 54' 58''$ North and Longitude $77^{\circ} 20' 11''$ to $77^{\circ} 45' 00''$ East. GHNP was granted the highest conservation status in 1999, initially covering an area of 754.40 km². However, with boundary readjustments, the park expanded and now encompasses an area of 1171 km², referred to as the Great Himalayan Park Conservation Area (GHNPCA). This includes the Tirthan Wildlife Sanctuary (61 km²) and Sainj Wildlife Sanctuary (90 km²), along with an eco-zone area (265.60 km²). GHNPCA's diverse flora, fauna and unique habitats led to its recognition as a UNESCO World Heritage Natural Site on June 25, 2014.

GHNPCA is characterized by highly undulating, rugged and steep mountains, with elevations ranging from 1300 to 6248 meters. Around 68% of the total area has an elevation above 3,200 meters. The park is traversed by major tributaries of the Beas River, including Tirthan, Sainj, Jivanal and Parvati, while approximately 2,787 minor tributaries form its drainage system.

Around 17% of the park's land is covered by forests which include temperate, sub-alpine and alpine vegetation. These forests contribute to the overall biodiversity and ecological value of the region. GHNP provides crucial habitat for several endangered and vulnerable species including the Snow Leopard, Himalayan Musk Deer, Himalayan Serow, Himalayan Brown Bear, Blue Sheep, Cheer Pheasant and Himalayan Monal Pheasant. Notably, it is one of the only two national parks in the world that supports a population of the endangered Western Tragopan (*Tragopan melanocephalus*), which also happens to be the State Bird of Himachal Pradesh.

The Great Himalayan National Park and its Conservation Area, with its stunning landscape, abundant wildlife and ecological significance stand as a testament to the unique natural heritage of the North West Himalayas.



The Western Tragopan

Class: Aves

Order: Galliformes

Family: Phasianidae

Genus: *Tragopan*

Species: *Tragopan melanocephalus* (Gray, 1829)

Other Names: Jujurana, Phulgar, Jyaazi, Pyaara

IUCN Status: Vulnerable

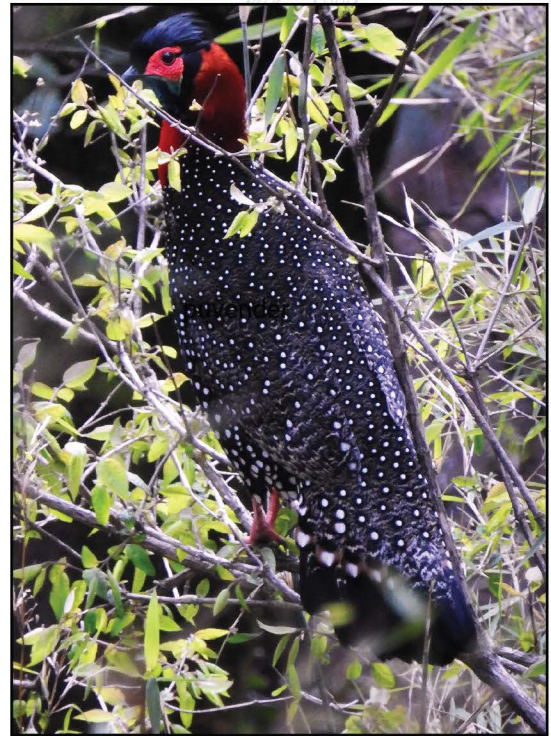
Population Trend: Decreasing

Current Population: Less than 3500 adult
individuals left in wild

Symbolized as: State Bird of Himachal Pradesh

Male size & weight: 55-60 cm; 1.8-2.2 kg

Female size & weight: 48-50 cm; 1.25-1.4 kg



The Western Tragopan (*Tragopan melanocephalus*) considered to be the rarest of all extant pheasants, is endemic to North-Western Himalayas. They are medium-sized montane pheasants with a high level of dimorphism displayed by the sexes (Johnsgard, 1986). The bird has long been associated with the cultural heritage of the locals and has been named “Jujurana” meaning the “King of Birds”.



The species exhibits distinct sexual dimorphism (McGowan, 1994), the males are brightly coloured and larger in size, while the females have a dull appearance. The males can be described as having a black crown with a decumbent red tipped occipital crest. The face is bright red with lines of blue spots below the eyes. The throat is deep blue while the cheeks are blue-green and a black beak. A bare tumescent, dark blue tinged with purple, sac of skin called the lappet is present on the throat. A tumescent blue wattle is present above each eye that, when engorged, stands erect like a miniature horn. These fleshy horns and lappets become prominent and can be inflated and expanded during courtship displays (Delacour, 1977; Johnsgard, 1986). The neck including nape, sides, lower throat, and upper breast are red. The upper-part including wing-coverts and tertiary feathers are a dark shade of grey and have a vermiculated appearance with round black bordered white ocelli. The under-parts are black, with white ocelli and random splashes of red.

Females and yearlings have inconspicuous and similar plumages, while males are larger, higher on leg and have variation in the black colour on head and red on neck. The females lack the red colour and the ocelli are reduced to fine streaks on the under parts allowing them to blend with the forest habitat.

The Western Tragopan

Distribution

The species is endemic to the western Himalayas, occurring from Indus-Kohistan district, Kaghan Valley in north Pakistan, east through Kishtwar in Kashmir and Chamba & Kullu in Himachal Pradesh to Bhagirathi River in Uttarakhand, north-western India (Birdlife International 2017).



Habitat

The species is a habitat specialist (Ramesh, 2003) occurring in open moist deciduous and coniferous temperate forests with dense undergrowth at elevations of 2,400–3,600 m (Delacour, 1977, Grimmett, et al., 1998). They inhabit montane to sub-alpine areas with specific broadleaved (e.g., *Aesculus indica*, *Acer* spp. and *Betula utilis*) and coniferous (*Cedrus deodara*, *Pinus wallichiana*, *Abies pindrow*, *Picea smithiana*) vegetation (Duke, 1989). In Palas valley of Pakistan, they have been recorded to occupy conifer dominated temperate forests at altitudes between 2,400 and 3,350 m during spring and in oak (*Quercus baloot*) forests at altitudes of 1,735 m during winter; indicative of lateral and altitudinal migration. The cooler northern aspects are preferred during summers while the sunny and warmer southern slopes are preferred during winters (Whale, 1996). A study by Katoch et al. (1997) revealed an uneven distribution through several sites with similar tree structure but varied understorey structure suggesting that variation in the latter is critical in determining its distribution. They occur in low densities and prefer extremely steep terrain. They have been reported to be fairly sedentary, with preference for higher altitude coniferous forests followed by mixed deciduous and high-altitude oak forests (Gaston, et al., 1981, Singh and Tu, 2008).

The Western Tragopan



Feeding ecology

The principal component of their diet includes sprouting oak leaves, shrubs like Bhekhal (*Prinsepia utilis*), Ringal (Nargal) bamboo (*Arindunaria falcata*) and other plant materials (Johnsgard, 1986; Schales and Schales, 1994). Sheppard et al. (1998), from a study of museum specimens and a review of available literature on diets of pheasants suggested that they are likely to be herbivorous, specialized in feeding on parts like leaves, flowers, bulbs and buds. They also consume berries of *Viburnum nervosum* and *Skimmia laureola*, and acorns of *Quercus semecarpifolia* and occasionally invertebrates such as grubs and insects (Ali and Ripley, 1968; Delacour, 1977; Roberts, 1991). The foraging behaviour of the bird is poorly known, except for the fact that peak periods of feeding occur during dawn and dusk, often with other pheasants.

Reproduction

Western Tragopans perform ritualized, complex courtship displays during their breeding period and male birds produce distinctive advertisement calls (a “waa” note) to attract females as well as to defend their territory from other males (Delacour, 1977; Johnsgard, 1986). During the breeding season, the calls by males are uttered during dusk and daybreak at intervals of about five or ten minutes. The calls starting from late April; continue through May in the early hours of the morning (starting at 04:15 hours and reaching a peak at 05:00–05:14 hours) (Miller, 2010). The species has been observed to exercise displaced call timing with that of competing sympatric Koklass pheasant (Miller, 2010), to avoid overlapping of auditory space as both share the same habitat and breeding season. The species is assumed to have a monogamous mating system, with males assisting in caring for the chicks (Ali and Ripley, 1968; Baker, 1930). They are highly territorial and occupy large home ranges during the breeding season. Mating generally takes place during April–June (Baker, 1932; Johnsgard, 1986), with breeding beginning in mid-May and extending to the end of June (Roberts, 1991). Western Tragopans are known to nest on trees.

Threats:

It is one of the four threatened members of the 11 bird species that are entirely restricted to the “Western Himalayas Endemic Bird Area” (Stattersfield et al., 1998). The species is threatened by habitat degradation and fragmentation through commercial exploitation activities like timber extraction, browsing of understorey shrubs by livestock, tree lopping and fuel wood collection (Gaston et al., 1983; Jandrotia et al., 1995). Disturbance in the form of graziers and collectors of edible fungi and medicinal plants (Gaston and Garson, 1992; Pandey, 1993) have been reported to interfere with nesting. Further threats include poaching for meat and ornamentation (Islam and Crawford, 1987; Chauhan and Sharma, 1991).

Objective, Methodology & Analysis

Objective

To estimate abundance and density of Western Tragopan in Great Himalayan National Park.



Methodology

Population estimation/assessment is among the most basic yet crucial information required for the conservation of wildlife across the globe. But, assessing information of shy animals is challenging due to their low detectability during the surveys. Pheasants are such a group of birds, assessing population of which is really challenging due to their elusive behaviour and highly shy nature (Ghose et al., 2003). Call count has been evolved as one of the most basic and simplest method to record and assess the population numbers of pheasant (Gaston 1980). Call count is based on the calls made by the male pheasants to advertise their territory which is used to count by observer at different direction from a vantage point (Shah, 2004). However, call count did not involve the detection probability in the count framework and hence results in index of population estimates of pheasants rather than the absolute count (Luukkonen et al., 1997). However, framework which involves detection probability to assess the population estimates such as distance sampling, capture and recapture is tedious and challenging in the hilly landscape (Shah, 2004). Therefore, call count method was used to assess the population abundance of Western Tragopans in the Great Himalayan National Park.

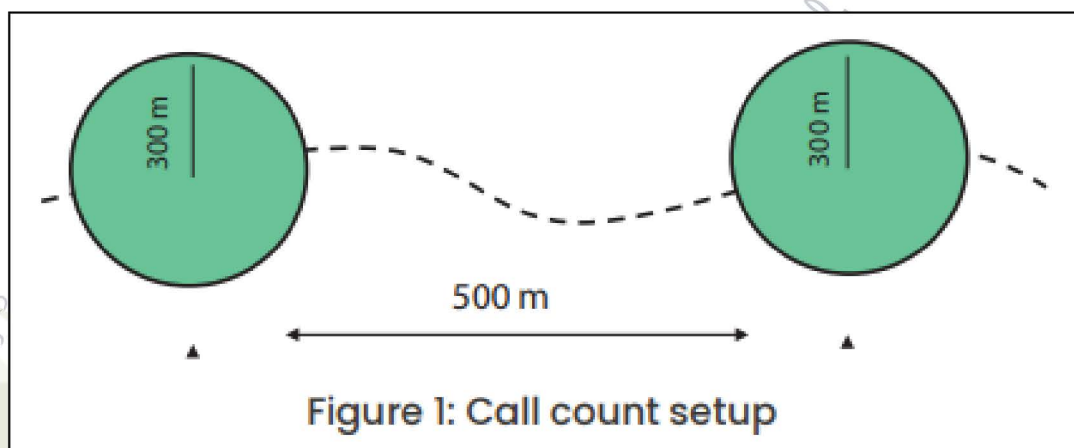


Figure 1: Call count setup

Objective, Methodology & Analysis

Step 1. Briefing about survey methodology

A detailed briefing was conducted on 2nd May, 2023. During the briefing exercise, detailed call count methodology was discussed with all the participants in the presence of DFO, GHNP. A quick practical exercise was also demonstrated in order to avoid errors.



Step 2. Marking of Call station

All the call station points were geo-located for map as well as visually marked one day prior to the survey for the easy identification by the observers.



Objective, Methodology & Analysis

Step 3. Team Formation

A total of 18 teams were formed for 18 call count stations which is distributed in Sainj, Jiwanal & Tirthan Range of Great Himalayan National Park. The list of Station & Team has been mentioned below

Sr. No.	Station	Range	Beat	Alt. (m)	Coordinates		Team Members
1	Keelam Nalla	Sainj	Shakti	2730	N31048'02.1"	E77028'55.9"	Nok Singh, BO (GL)
	(Field Staff)						Naresh, Fgd (Kullu WL)
	(Duaar)						Chuni, Peon (Cook)
							Sherry (Porter)
2	Homkhani	Sainj	Homkhani	2842	N31046'74.2"	E77029'11.6"	Vinay, Fgd (WL Expert) (GL)
	(7.5 hours)						Ashutosh (Plant Expert)
	(P/Hut)						Apoorv Dixit IFS (P)
							Sundara Niveadhan M IFS (P)
							Arvind T IFS (P)
							Arulselvan K IFS (P)
							Subburaj G IFS (P)
							Ankit Sinha IFS (P)
							Khem Raj (Cook)
							Padam Dev (Porter)
							Kishori Lal (Porter)
							Kuber (Porter)
							Govind (Porter)
3	Thanain	Sainj	Shakti	2528	N31047'40.4"	E77030'05.9"	Vijay, Fgd (Kullu WL) (GL)
	(Field Staff)						Arjun (Cook)
							Dabe Ram (Porter)
4	Shugaad Nalla	Sainj	Shakti	2489	N31047'46.4"	E77027'50.9"	Virender, Fgd(GL)
	(Field staff)						Dharamveer, Fgd (Kullu WL)
							Tharvan (Cook)
							Harnaam (Porter)
5	Khodu Thach	Sainj	Homkhani	2565	N31045'83.4"	E77025'74.6"	Lenin Sharma, BO (GL)
	(5 hours)						Gehru Ram, Fgd
							Mohamed Azad IFS (P)
							Neeraj Nischal IFS (P)
							Stalin Fidel Kumar IFS (P)
							Kaushal Kishore IFS (P)
							Ailu Ram, Mali

Objective, Methodology & Analysis

Step 3. Team Formation (contd.)

Sr. No.	Station	Range	Beat	Alt. (m)	Coordinates		Team Members
5	Khodu Thach	Sainj	Homkhani	2565	N31045'83.4"	E77025'74.6"	Sanju (Cook)
	(5 hours)						Ved Ram (Porter)
							Tulsi (Porter)
6	Sara Thach	Sainj	Lapah	2905	N31045'39.9"	E77024'57.7"	Gyan, BO (GL)
	(4 hours)						S Naveenkumar IFS (P)
	(P/Hut)						Venkatesha M G IFS (P)
							Nagaraju Balakrishna K IFS (P)
							Desabathula Rajiv Shankar IFS (P)
							Deependra Jewaria IFS (P)
							Pawan Ashok Khade IFS (P)
							Sher Singh, F/Worker
							Narayan (Porter)
							Gyan (Cook)
							Jeevan (Porter)
							Mohar (Porter)
7	Kalikanda	Sainj	Shakti	2873	N31048'46.8"	E77024'09.5"	Goldie, JICA (Bird Watcher) (GL)
	(FieldStaff)						Shiv Kumar, BO (WL Expert)
	(P/Hut)						Jog Raj, MPW (Bird Watcher)
							Dilip (Cook cum Porter)
8	Bahli Thach	Sainj	Shakti	3118	N31048'26.5"	E77030'43.3"	Manoj, Fgd (Bird Watcher) (GL)
	(Field Staff)						Nishant, Fgd (Bird Watcher)
	(Duaar)						Anil (Cook cum Porter)
							Rohit (Porter)
9	Langam Thach	Sainj	Shakti	2904	N31047'45.9"	E77029'00.1"	Rakesh, Fgd (GL)
	(Field Staff)						Durga Singh, F/Worker
							Tirth Ram (Cook/Porter)
10	Sanjath Thach	Sainj	Shakti	3184	N31045'55.8"	E77027'19.0"	Shamsher, Fgd (GL)
	(FieldStaff)						Rohitasav, Fgd (Kullu WL)
							Bhim (Cook/Porter)
							Aashu (Porter)
11	Apgain-I	Jiwanal	Pashi	2895	N31051'02.5"	E77023'04.3"	Khila, Fgd (GL)
	(4 hours)						Valli N IFS (P)
	(P/Hut)						Menaga V IFS (P)

Objective, Methodology & Analysis

Step 3. Team Formation (contd.)

Sr. No.	Station	Range	Beat	Alt. (m)	Coordinates		Team Members
11	Apgain-I	Jiwanal	Pashi	2895	N31051'02.5"	E77023'04.3"	Urvashi Jain IFS (P)
	(4 hours)						Neethu George Thoppan IFS (P)
	(P/Hut)						Dole Ram (Porter)
							Mahesh (Porter)
							Khub Ram (Cook)
12	Apgain-II	Jiwanal	Pashi	2860	N31051'02.7"	E77023'04.3"	Usha, Fgd (GL)
	(4 hours)						Karthikeyan V IFS (P)
	(Base camp at						Kirubananthan RT IFS (P)
	Apgain-I)						Donthula Revanth Chandra IFS (P)
							Kavs Prasad Reddy IFS (P)
							Beli Ram, F/Worker
							Jevan Lal (Cook)
							Ram Singh (Porter)
13	Ean Thach	Jiwanal	Bah	2916	N31048'27.8"	E77024'31.3"	Vijender, Fgd (GL)
	(4.5 hours)						Prakashkar Akshay Ashok IFS (P)
	(P/Hut)						Tejas Vishnu Patil IFS (P)
							Dhruv Srivastava IFS (P)
							Hitesh Khandelwal IFS (P)
							Dipesh Kapil IFS (P)
							Dev Raj, F/Worker
							Heera Lal (Porter)
							Moti Ram (Cook)
							Banwari (Porter)
14	Shilt/Dunaga	Tirthan	Rohla	3059	N31041'14.3"	E77028'95.7"	Rajesh, ACF WL Kullu
	(4 hours)						Gajender (Plant Expert)
	(P/Hut)						Vipan Kumar (Plant Expert)
							Tanuj, Fgd (GL)
							Iqbal Rasool Dar IFS (P)
							Pema Tobgay IFS (P)
							Mohammed Abdul Rawoof IFS (P)
							Tshering Samdrup IFS (P)
							Shahbazul Rehman IFS (P)
							Jhalkar Uyake IFS (P)

Objective, Methodology & Analysis

Step 3. Team Formation (contd.)

Sr. No.	Station	Range	Beat	Alt. (m)	Coordinates		Team Members
14	Shilt/Dunaga	Tirthan	Rohla	3059	N31041'14.3"	E77028'95.7"	Purshottam (Cook)
	(4 hours)						Jhony (Porter)
	(P/Hut)						Bobby (Porter)
							Rajesh (Porter)
							Pradeep Slath (Porter)
15	Chhowdwaar	Tirthan	Rohla	2924	N31041'40.4"	E77029'26.4"	Sivabala, IFS, Faculty IGNFA
	(7 hours)						Puvender, Fgd (Bird Watcher) (GL)
	(P/Hut)						Tarun S IFS (P)
							Shivakumar Gangal IFS (P)
							Varadaraj Gaonkar IFS (P)
							Elavarasan K IFS (P)
							Sita Ram (Cook)
							Diwan (Porter)
							Deepu (Porter)
							Surender (Porter)
16	Khorlipoi	Tirthan	Bhandaar	2981	N31040'01.0"	E77030'18.5"	Parmanand, RFO (GL)
	(6 hours)						Vikram, RFO
	(P/Hut)						Om Prakash, Fgd (Bird Watcher)
							Mahesh, Fgd (Bird Watcher)
							Sumit Kumar IFS (P)
							Ayush Krishna IFS (P)
							Dhanraj Meena IFS (P)
							Bhupender (Cook)
							Sonu (Porter)
							Khem (Porter)
							Prem (Porter)
17	Basu	Tirthan	Bhandaar	3004	N31039'52.2"	E77030'40.8"	Kavinder, BO (Bird Watcher) (GL)
	(4 hours)						Jagdish Chander, Fgd
	(P/Hut)						Sameed Mahaveer Patil IFS (P)
							Sushant Shukhadev Bobade IFS (P)
							Pritesh Manoharrao Pakhale IFS (P)
							Padmabhushan Rajguru IFS (P)
							Sandeep Karbhari Shinde IFS (P)

Objective, Methodology & Analysis

Step 3. Team Formation (contd.)

Sr. No.	Station	Range	Beat	Alt. (m)	Coordinates		Team Members
17	Basu	Tirthan	Bhandaar	3004	N31°39'52.2"	E77°30'40.8"	Girish Haribhau Palwe IFS (P)
	(4 hours)						Pushkar Kumar IFS (P)
	(P/Hut)						Swapnil Manohar Ahire IFS (P)
							Jeevan (Cook)
							Kishori (Porter)
							Megh Chand (Porter)
							Diwan Chand (Porter)
							Khem (Porter)
							Khem-II (Porter)
18	Nada	Tirthan	Rohla	3225	N31°41'53.7"	E77°31'25.6"	Sh. Pritam, BO (GL)
	(Field Staff)						Sh. Bintu, Fgd
	(P/Hut)						Sh. Ailu Ram (Cook)
							Sh. Bharti (Porter)

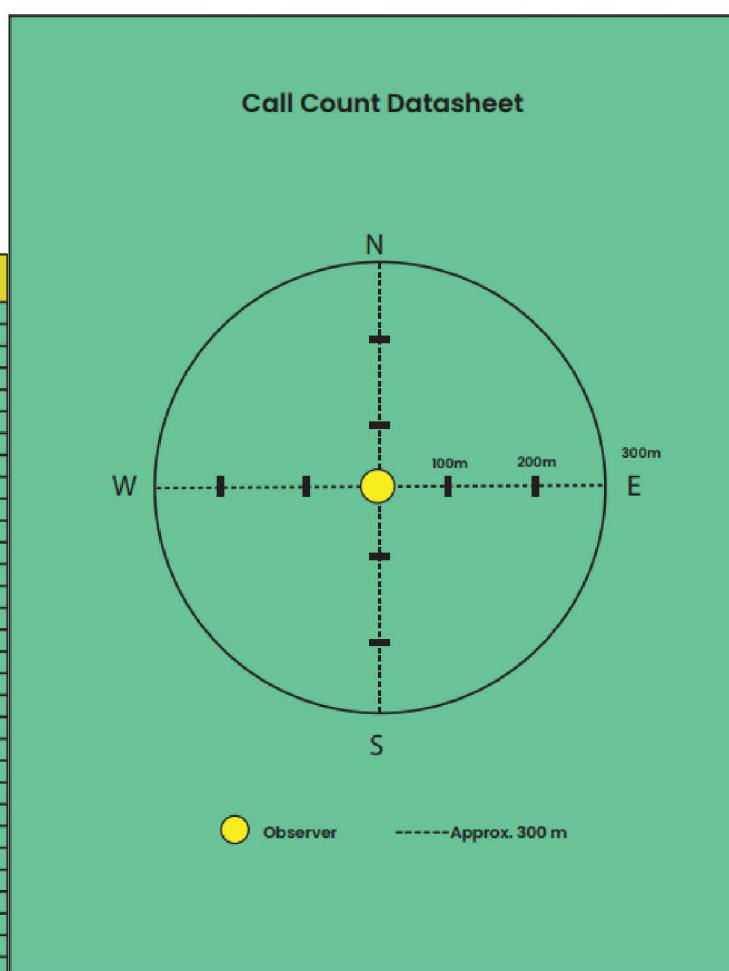
Objective, Methodology & Analysis

Step 4. Data collection in data sheets

A total of 18 vantage points were established in the Great Himalayan National Park on the ridge tops to provide easy access to the calls of the Western Tragopans (Table 1). Call count were carried out during the dawn and dusk when pheasants used to advertise their territory (Ghose et al., 2003). Information like station, name of observer, date, location of vantage point (Geo-coordinates), starting & ending time, nearest village, its distance from the vantage point and weather conditions which are likely to affect the call, time of call counts, the time of commencement and termination of call given by a single bird, duration of a single call and total number of call notes uttered during that period were recorded. A circular chart was used to record the position of the vantage point as well as the tentative position of the calling tragopan with directions marked on it. The distance from the vantage point to a calling tragopan was estimated depending on the intensity and loudness of the call emitted. At times, the calling bird was visible. Thus, a more accurate distance was plotted on the chart. All tragopan calls emitted from an arbitrary radius of 300 m taking the vantage point as center were recorded, as birds beyond 300 m were not usually audible.

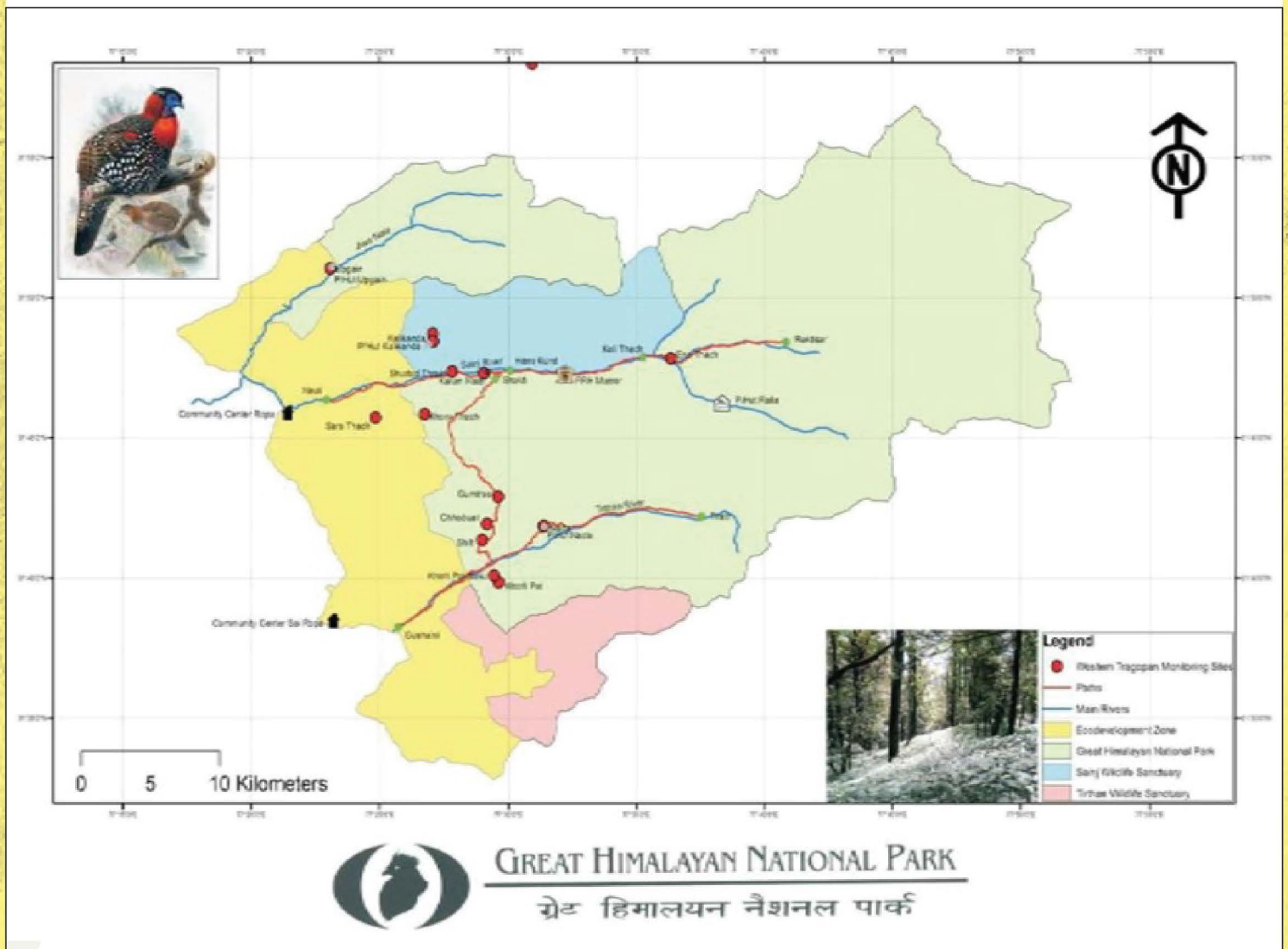
Call Count Survey-Data Sheet

Date:	Time:	Place:
Location:	Latitude:	Longitude:
Starting Time:	End Time:	Transect Name:
Altitude:	Habitat: Natural/Plantation:	

[illegible]

Objective, Methodology & Analysis

Step 4. Data collection in data sheets (contd.)



Objective, Methodology & Analysis

Analysis

We assessed the population of Western Tragopan using two methods i.e., by assessing their population density (Ghose et al., 2003; Shah, 2004). To assess the population abundance, number of birds encountered per station was calculated in the radius of detection. Area of detection and number of population count were used to calculate the bird population abundance. Mean area of detection was assessed by calculating the mean radius of the audible distance across the vantage points and then converting the area of circle using formula πr^2 . Number of detections across the vantage points were then divided by the mean area covered through vantage point to provide the bird encounter. Similarly, number of birds at each vantage point was also calculated vantage point by dividing the number of birds heard by the mean area calculated for all the vantage points. Also, two calls recorded from the same direction with small/marginal difference in position was counted as same individual with the assumption that the same might have changed its position with time frame. Also, one call was assumed to count one pair of Western Tragopan. i.e., 2 individuals.

Since, a long-term data of Western Tragopan is available from the GHNP which provides an opportunity to understand the population changes from the last two decades (Figure 1). Therefore, a linear regression was run which provide an intrinsic growth rate (r) as a measure of population is growing, declining or stable from last two decades.



Results

A total of 18 vantage points were sampled resulting in total of 139 independent calls of Western Tragopans at 16 vantage points (Table 1). Highest calls of Western Tragopans were detected in Basu (19), Apgain (19) and Humakani (19) while lowest in Dunga (1) (Table 1). Highest number of Western Tragopan calls were heard between 500-600 hours in the morning while the least was heard during the 2000-2100 hours in the evening (Figure 3). Maximum percentage of calls were heard during the morning i.e., 80.58% than evening hours i.e., 19.42% (Figure 4).

Mean distance of call heard was 130 meters while the mean number of birds heard during the survey was 8.68 ± 1.44 birds across the vantage points. Mean abundance (bird Individuals $\pm$ S.E.) of Western Tragopan across the vantage points was 2.24 ± 0.17 . Considering a female with male bird resulted in a bird overall abundance of 4.48 ± 0.34 across the calling station. Highest bird abundance was in the Kalikanda i.e., 2.11 while lowest was in Dunga near Shilt i.e., 0.07 (Table 1).

Linear regression shows a positive growth rate ($r=0.10 \pm 0.03$; $p < 0.01$) during the last two decades which indicates a growing population of Western Tragopan in GHNP (Figure 5).



Figure 1. Earlier estimates of Western Tragopan from GHNP

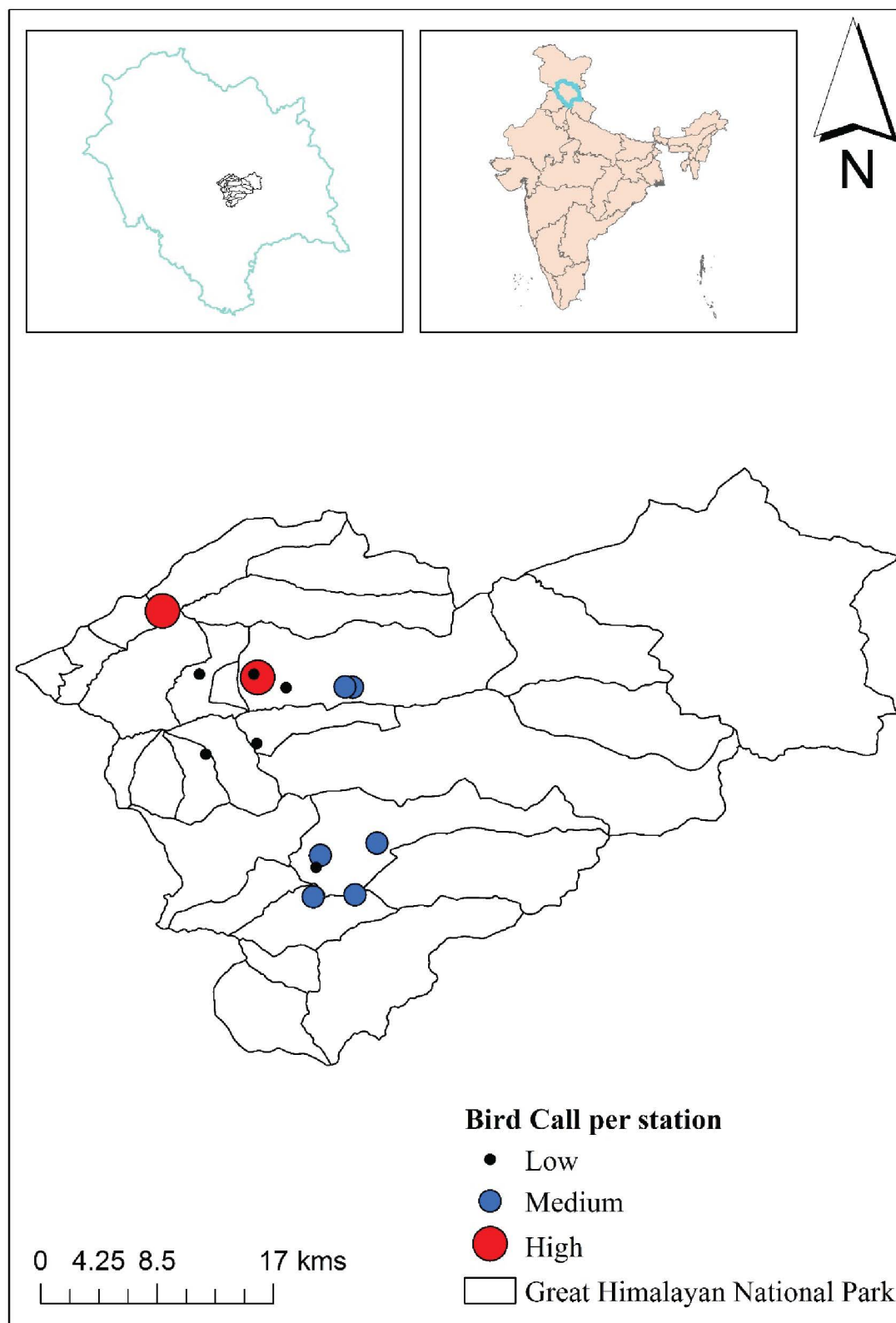
Results

Table 1. Population density and Western Tragopan in Great Himalayan National Park

Sr. No.	Vantage Point Name	No. of Birds heard	Birds call per station
1	Kalikanda (Ulta Dwar)	8	2.11
2	Apgain-1	11	1.02
3	Chhodwaar	9	0.67
4	Nadda	6	0.74
5	Bahli Thach	5	0.83
6	Dunga (Shilt)	1	0.07
7	Basu	19	1.17
8	Ean Thach	6	0.24
9	Apgain-2	19	1.89
10	Langam Thach	5	1.10
11	Sarah Thach	2	0.44
12	Khodu Thach	9	0.42
13	Humkhani	19	0.26
14	Khorlipoi	8	0.74
15	Shugaad Nalla	12	0.16
16	Sanjath Thach	7	0.11
17	Keelam Nala	0	0
18	Thanain	0	0

Results

Figure 2. Map of the study area along with number of calls at each station



Results

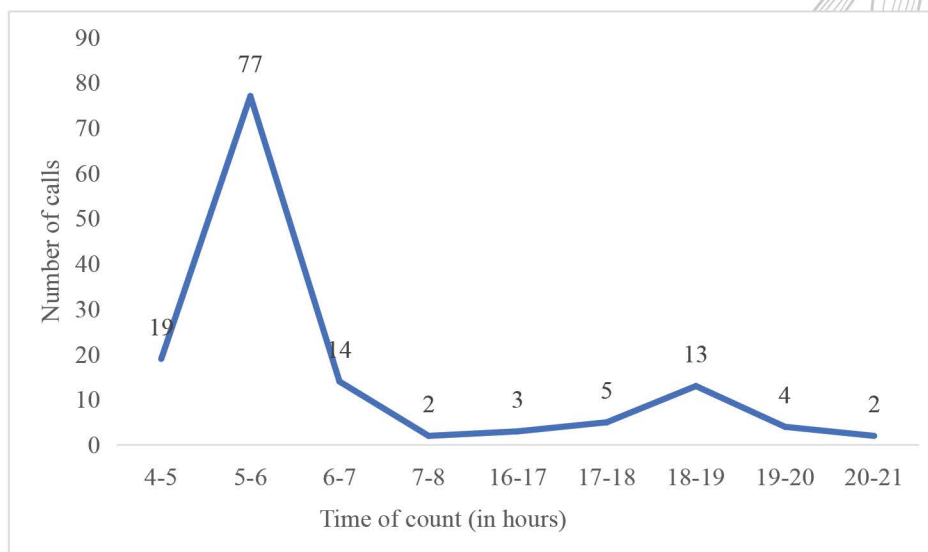


Figure 3. Birds call in relation to different hours of observation

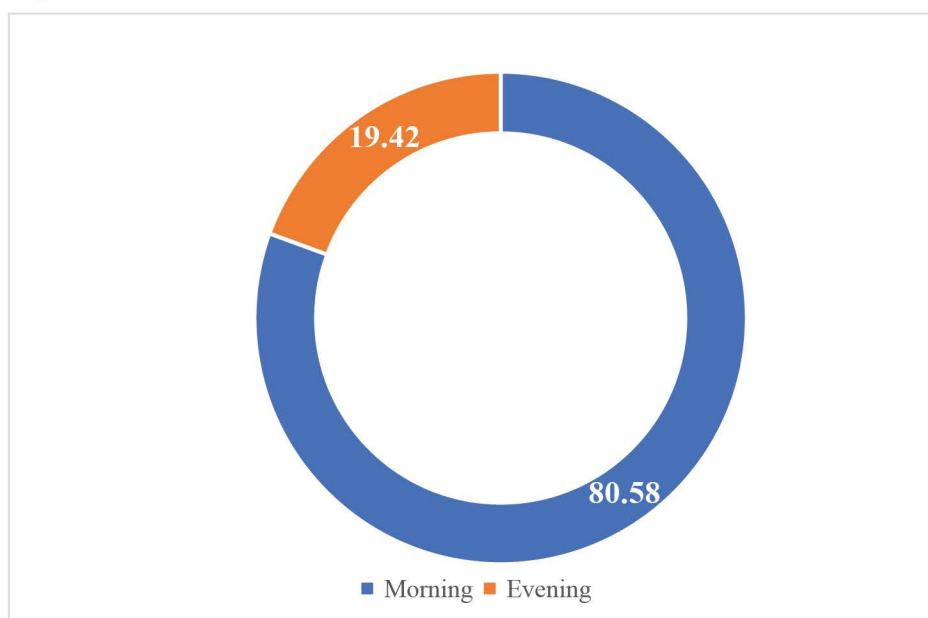


Figure 4. Percentage of bird call during morning and evening hours

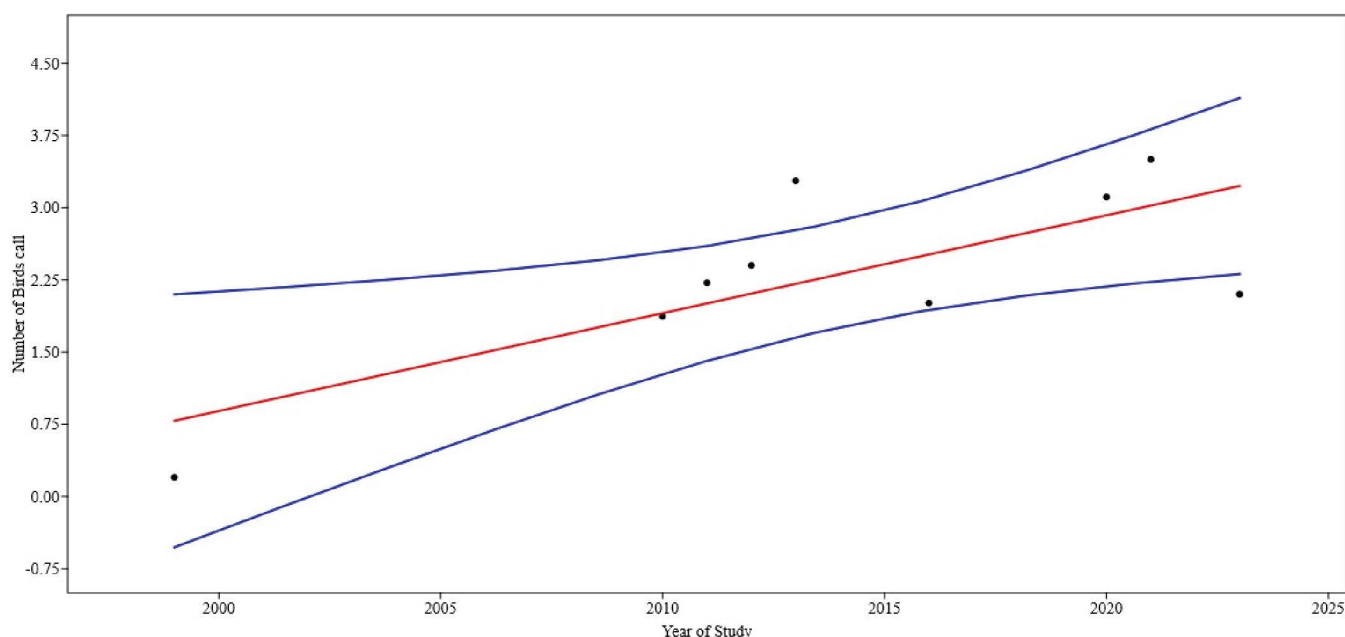


Figure 5. Growth in population of Western Tragopan during the last two decades

Discussion

Assessment of population abundance is among the basic but most important information required for effective conservation and management of wildlife. In present survey, we found overall Western Tragopan abundance was 4.48 ± 0.34 birds/station which is significantly higher form pervious study conducted in Great Himalayan Nation Park i.e. 0.4 ± 0.14 birds/Km walk (Ramesh et al., 1999), 3.2 ± 1.4 birds / station (Miller, 2010), and 2.5 ± 0.42 mean abundance in Apgain area of GHNP (Jolli & Pandit, 2011). While studies in other protected areas reveled low population of Western Tragopan as compared to GHNP i.e. 0.5 birds/km² in Daranghati WLS (Pandey, 1994), Machiara National Park, Pakistan has 2.01 birds/km² (Awan et al., 2015). High overall abundance in GHNP could be due to strong management actions followed by the park mangers & field staff which include efficient patrolling, awareness programs with locals, check on hunting practices, egg stealing, control on grazing by livestock, kindling of fire near forested areas as well as regular surveys in order to understand trend of Western Tragopan population in GHNP.

Considering this study as baseline data of the pheasants, further scope for research is suggested by incorporating other population estimation methods (direct sighting and camera trap based monitoring) as well as information on food, habitats and behavior in response to biotic and abiotic factors are urgently needed to understand the requirements of the pheasants. An extensive survey based on the data collected on habitat use and the extensive work on Remote Sensing and GIS (habitat suitability modelling) would provide vital information for the management of these species.



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Annexure-I

Our Team





GREAT HIMALAYAN NATIONAL PARK

ग्रेट हिमालयन नैशनल पार्क



United Nations
Educational, Scientific and
Cultural Organization



GHNP inscribed
as world heritage
site in 2014

For more information, contact:

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