FINAL REPORT

Conservation of Critically Endangered Bengal florican in Koshi Tappu Wildlife Reserve, Nepal

CLP ID: 03679722

Nature Conservation and Research Committee

CONSERVATION LEADERSHIP PROGRAMME

Final Report

Project ID: 03679722

Project Title: Conservation of Critically Endangered Bengal Florican in Koshi Tappu Wildlife Reserve, Nepal

Host Country: Nepal

Implementing Institution: Nature Conservation and Research Committee (NCRC)

Team Members: Aditya Pal, Tika Regmi, Shruti Shakya, Ganesh Sah

Award Year: 2022

Project Duration: Start Date: 01 October 2022, End Date: 30 July 2024

Report Completion Date: June 2025

TABLE OF CONTENTS

TABLE OF CONTENTS *1*

SECTION 1: *3*

Project Partners & Collaborators 3

ACKNOWLEDGEMENT *4*

SUMMARY *5*

INTRODUCTION *6*

PROJECT MEMBERS *8*

SECTION 2: *9*

AIM AND OBJECTIVES *9*

Changes to the Original Project Plan *9*

METHODOLOGY *10*

Preliminary Survey 10

Population and ecology of Bengal Florican 11

Vegetation and Habitat Assessment 12

Threat Assessment 13

Conservation Workshops and Capacity Building 13

OUTPUTS AND RESULTS *16*

Population and ecology of Bengal Florican *16*

Habitat characterization and hotspot map preparation *17*

Quantification of Threats *19*

Community Outreach and Capacity Building *22*

School Conservation Workshop 24

COMMUNICATION & APPLICATION OF RESULTS *27*

MONITORING AND EVALUATION *27*

ACHIEVEMENTS AND IMPACTS *28*

CAPACITY DEVELOPMENT AND LEADERSHIP CAPABILITIES *28*

Initiation of the Bengal Florican Project (BFP) *29*
SECTION 3: *30*
CONCLUSION *30*
Problems Encountered and Lessons Learned *30*
IN THE FUTURE *31*
SECTION 4: *32*
APPENDICES *32*
Bibliography **32**
Appendix 1: Financial Report **34**
Appendix 2: Monitoring and Evaluation table of CLP **35**
Appendix 3: Photos **38**
Threats to Bird Habitat in Koshi Tappu Wildlife Reserve (KTWR) **39**
Bio monitors **39**
Conservation Workshop in Koshi Tappu Wildlife Reserve **40**
Conservation Workshop in Chitwan National Park **41**
Conservation Workshop in Shuklaphanta National Park **41**

SECTION 1:

Project Partners & Collaborators

Nature Conservation and Research Committee (NCRC)
NCRC served as the principal partner for this project, providing strategic guidance, scientific oversight, and administrative support throughout the project period. Their continued commitment to avian conservation in Nepal ensured alignment with national conservation goals and policies.

Sustainability and Environmental Studies Endeavor (SENSE)
SENSE played a vital role in facilitating on-ground implementation. Their support was crucial in managing logistical arrangements, coordinating field operations, and ensuring smooth execution of project activities in collaboration with local stakeholders.

Koshi Bird Society (KBS)
KBS actively participated in bird surveys and conservation awareness activities. As a community-based organization, their involvement strengthened grassroots engagement, ensuring local participation in monitoring and conservation of the Bengal Florican and other avifauna in the region.

Koshi Bird Observatory (KBO)
KBO contributed significantly by coordinating and supporting conservation workshops. Their field station provided a platform for knowledge exchange, helping raise awareness among students, local communities, and stakeholders about the importance of protecting critical bird habitats.

ACKNOWLEDGEMENT

I want to thank the Conservation Leadership Programme (CLP) for their generous support of this initiative. My sincere thanks also go to the Department of National Parks and Wildlife Conservation (DNPWC) and the Koshi Tappu Wildlife Reserve (KTWR) for granting the necessary research permissions and facilitating our field activities. I would like to express my gratitude to the Koshi Bird Society for their invaluable assistance during fieldwork and community-based conservation workshops. I am particularly grateful to Chakra Timsina, Anish Timsina, and Suman Acharya for their dedicated support and coordination in the field.

I would also like to acknowledge the significant contributions of Amrit Baral, Uttam Rai, Ashok Timsina, and Anand Jha, whose technical expertise and logistical support were essential to this project's success. My thanks go to Sagar Pathak and Bishal Khatri for their active involvement in facilitating the conservation workshops.

In Chitwan, I extend my heartfelt thanks to Prem Mahto and Namuna Community Forest, Kawasoti, for helping us broaden our conservation efforts into the buffer zone of Chitwan National Park, and to Mahesh Limbu in Meghauli for his valuable on-ground support. I am also deeply grateful to Laxman Timilsina for his crucial coordination in initiating our work in Shuklaphanta National Park. Finally, I wish to thank the Koshi Bird Observatory and Bimal Timsina for their ongoing guidance, expertise, and encouragement throughout the duration of this project. I sincerely thank Dr. Hem Sagar Baral and Dr. Tej Bahadur Thapa for their insightful guidance and dependable support.

SUMMARY

The Bengal Florican (*Houbaropsis bengalensis*), a Critically Endangered grassland bird native to Nepal, India, and Cambodia, is now on the brink of extinction. In Nepal, fewer than 50 individuals remain, with the species now largely confined to its last stronghold the Koshi Tappu Wildlife Reserve. During the breeding season in April and June 2023, our team conducted comprehensive surveys across the reserve, buffer zones, and nearby community areas, recording 20 individuals (14 males and 6 females). A hotspot map was developed to identify three key areas of Bengal Florican concentration within the Koshi region. Additionally, NDVI (Normalized Difference Vegetation Index) analysis was used to assess habitat degradation due to human resource utilization, revealing significant overlap between human and florican habitat use posing a major threat to the species' survival. Community interviews highlighted a widespread lack of awareness about the Bengal Florican and its endangered status. Local communities heavily depend on the reserve for firewood, fodder, and grazing activities that degrade crucial breeding habitats. To address these challenges, we conducted an education campaign from 8 May to 3 June 2024 in collaboration with the Koshi Bird Society and with support from the Conservation Leadership Programme. Through conservation and comunity workshops, this outreach reached over 900 students across 11 schools and more than 250 community members. Activities included school workshops, drawing competitions, bookmark distribution, and the appointment of student bio-monitors to champion local bird conservation.These initiatives significantly increased awareness and interest in protecting the Bengal Florican. To further scale outreach and impact, we launched the www.bengalflorican.org, a regional initiative aimed at fostering collaborative conservation across Nepal, India, and Cambodia. This project underscores the urgent need for an integrated conservation strategy one that balances habitat protection with community-based stewardship, promoting coexistence through education, sustainable resource management, and inclusive community engagement.

INTRODUCTION

The Bengal Florican (*Houbaropsis bengalensis*) is one of the rarest bustards in the world, native to the Indian subcontinent, Cambodia, and Vietnam (BirdLife International, 2018). Listed as Critically Endangered on the IUCN Red List, the species faces an extremely high risk of extinction due to the widespread destruction and degradation of its grassland habitat. It is also listed in Appendix I of CITES, underscoring its global conservation importance. The global population was estimated at fewer than 1,000 individuals (BirdLife International, 2018).

The Bengal Florican prefers open tall grasslands interspersed with scattered shrubs. In Nepal, it is found in the lowland protected areas of Shuklaphanta, Bardia, Chitwan, and Koshi Tappu Wildlife Reserve (KTWR) with the latter representing one of the last strongholds of the species in the country (Baral et al., 2020; DNPWC, 2024). However, even within protected areas, the species remains highly threatened by unsustainable habitat management practices such as plowing, frequent burning, and unregulated grass harvesting (Poudyal et al., 2008; DNPWC, 2024).

The Bengal Florican breeds in tall grasslands during the late dry season and shifts to shorter grasslands and open forest patches in the non-breeding period. These seasonal movements increase their vulnerability to human disturbances beyond protected boundaries (Jha et al., 2018). Local communities' heavy reliance on grasslands for firewood, fodder, and thatch, combined with the traditional use of fire for land management, continues to degrade the species' habitat (Inskipp et al., 2017). Natural factors such as river course changes caused by flooding also contribute to habitat loss and population declines. A study by Baral et al. (2020) reported a 13% decline in the Bengal Florican population within KTWR over five years, emphasizing the urgent need for local conservation action.

Our field study documented 20 Bengal Floricans within KTWR, its buffer zone, and adjacent potential habitats comprising 14 males and 6 females. Surveys frequently encountered farmers and fishermen collecting natural resources inside the reserve. Notably, the western region of KTWR, particularly around Bhagalpur, appeared to contain the most suitable habitat for the species. However, results from a community questionnaire revealed a substantial awareness gap, with most buffer zone residents unable to recognize the Bengal Florican. In response, the project implemented targeted outreach and education programs to enhance local awareness. Recognizing the bird's seasonal shifts between breeding and non-breeding habitats spanning both protected and unprotected landscapes the study highlighted the pressing need to understand habitat-use patterns and foster coexistence. This project aimed to identify high-risk habitat-use hotspots using Landsat satellite imagery for monitoring local resource use. Questionnaire surveys and focus group discussions with buffer zone residents were conducted to assess levels of resource dependency and identify conservation challenges. As part of a long-term capacity-building initiative, six students were trained as species bio-monitors around Koshi Tappu Wildlife Reserve and three in Chitwan National Park. Educational materials including posters, booklets, brochures, and audiovisual content were developed to engage both youth and adult community members.

Given that the Bengal Florican has already disappeared from at least one protected area in Nepal, and with KTWR serving as its final refuge, this study underscores the urgency of balancing biodiversity conservation with community livelihoods. The findings offer critical insights into whether managed, moderate disturbance rather than strict exclusion can offer a sustainable conservation model for this grassland specialist in a human-dominated landscape.

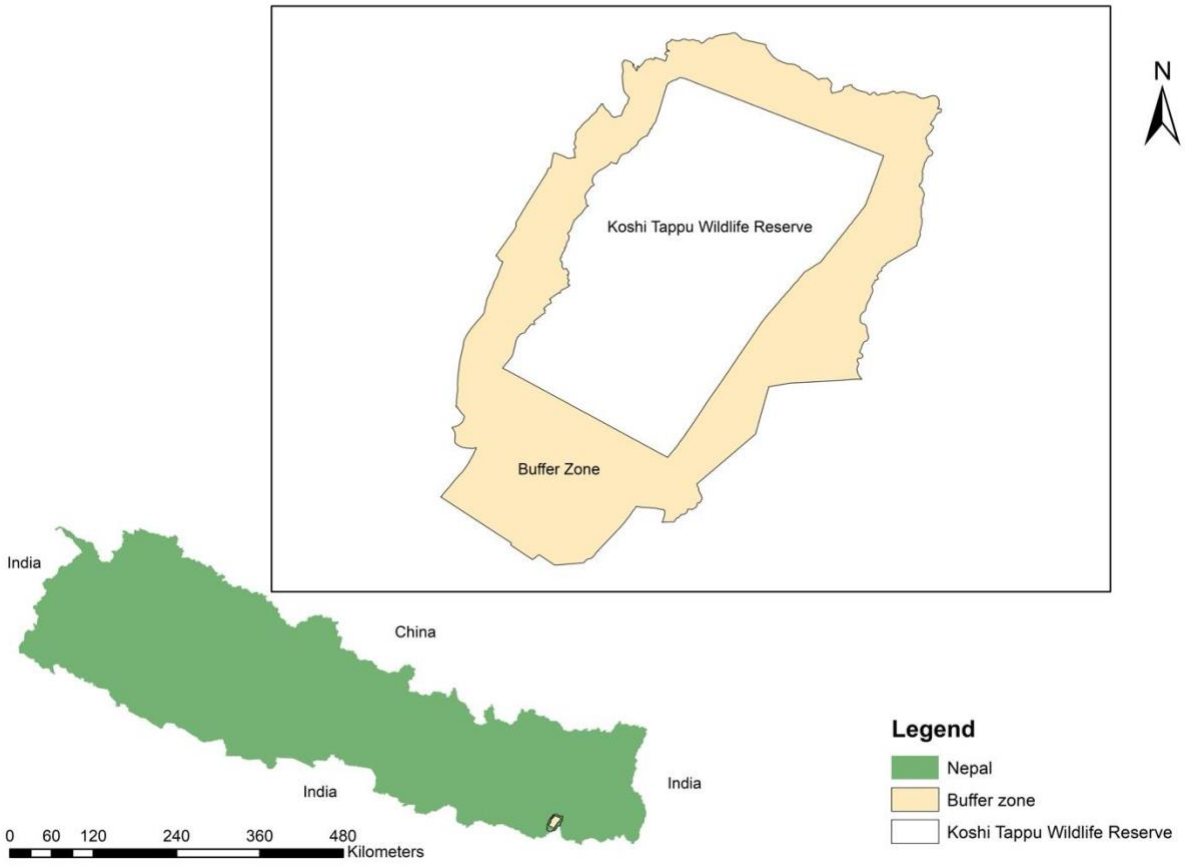

Figure 1: Map of the KTWR

PROJECT MEMBERS

Aditya Pal
Aditya Pal holds a Master's degree in Zoology with a specialization in Ecology and Wildlife from the Central Department of Zoology, Tribhuvan University. As the founder and director of the Nature Conservation and Research Committee, he served as the project lead and co-designed the overall project framework. He was actively involved in all phases of the project, including field data collection, ecological monitoring, and data analysis. Aditya played a key role in engaging with local stakeholders, facilitating workshops, coordinating field logistics, and ensuring smooth implementation of project activities across sites.

Tika Regmi
Tika Regmi earned her Master's degree in Environmental Science from the Central Department of Environmental Science, Tribhuvan University. She led the development of conservation education components, contributing significantly to the design of school and community-based awareness workshops. Tika also created visually engaging and informative conservation materials tailored to local audiences, including brochures, bookmarks, and presentation content used during outreach events.

Shruti Shakya
Shruti Shakya completed her Master's degree in Zoology from the Central Department of Zoology, Tribhuvan University. She was primarily responsible for conducting educational workshops in schools and facilitating community awareness programs. Shruti successfully led sessions on Bengal Florican ecology, threats, and conservation strategies, effectively engaging students, teachers, and community members in discussions and activities that promoted species protection.

Ganesh Sah
Ganesh Sah is an experienced citizen scientist with extensive involvement in grassroots conservation, especially in herpetofauna rescue and awareness in Nepal's lowland areas. For this project, he supported community interaction activities by conducting household interviews and administering semi-structured questionnaires. His deep local knowledge and rapport with the community were instrumental in gathering reliable data on resource use patterns and perceptions of the Bengal Florican.

Anand Jha
Anand Jha holds a Bachelor's degree in Engineering and contributed his technical skills to the project's media and outreach components. He was responsible for the planning and production of a conservation documentary and assisted with photography and videography throughout the project. In addition, Anand supported various field activities, helped document project milestones, and contributed to the creation of audio-visual materials used in workshops and online platforms.

SECTION 2:

AIM AND OBJECTIVES

This project is designed to promote effective and sustainable resource utilization by local communities under the supervision of the Koshi Tappu Wildlife Reserve. A key component of the project is the establishment of long-term species monitoring through the engagement of trained local volunteers. Additionally, the project aims to reduce the dependency of local communities on protected area resources by offering alternative livelihood and capacity-building training programs.

A critical part of the initiative involves identifying resource utilization hotspots within Bengal Florican habitats. Mapping these areas will enable the Koshi Tappu Wildlife Reserve to monitor and manage human activities more effectively. Furthermore, reducing reliance on reserve resources through alternative livelihood opportunities will empower local communities and contribute to long-term conservation goals.

Project Objectives:

1. Population and Ecology of Bengal Florican
2. Habitat Characterization and Hotspot Mapping
3. Threat Quantification
4. Conservation Workshops and Capacity Building

Changes to the Original Project Plan

Post-CLP Training Adjustments

Following the Conservation Leadership Programme (CLP) training, we strategically refined our project objectives to enhance impact and ensure feasibility within the available budget. While the core theme and goals of the project remained unchanged, specific activities were adjusted based on expert feedback. For instance, our initial plan to conduct livelihood training for women was postponed in favor of conducting a more in-depth needs assessment before implementation, as suggested by CLP reviewer.

Workshop and Outreach Expansion

We revised the schedule for our conservation workshops to improve participant engagement and logistical coordination. Additionally, we expanded the outreach component of the project to cover all key locations in Nepal where Bengal Florican populations are found. This includes critical habitats in and around Chitwan National Park and Shuklaphanta National Park, ensuring a more inclusive and nationally representative conservation approach.

METHODOLOGY

Preliminary Survey

During the preliminary phase of the project, we conducted surveys across all suitable habitats for Bengal Floricans within the reserve. However, no individuals were detected, likely due to the species' cryptic behavior outside the breeding season. This outcome underscored the importance of scheduling intensive surveys during the breeding period to improve detection rates. While monitoring grasslands on both the eastern and western sides of the reserve, we observed a significant dependence of local communities on these areas particularly in regions dominated by *Typha* vegetation. Notably, the western side of the reserve and areas beyond the protected boundary supported more suitable habitats for the species.

The Koshi River was observed to be shifting westward, which led to the installation of porcupine fencing to mitigate erosion. Despite these efforts, much of the grassland remained waterlogged and difficult to access. A stakeholder analysis was conducted to identify key interest groups, and semi-structured interviews provided valuable insights into local land-use practices and perceptions of conservation. Additionally, data collection included an assessment of community-use areas such as Khar Khadai, where local access is traditionally granted on an annual basis. This information contributed to a better understanding of human-wildlife interactions and resource pressures within potential Bengal Florican habitats.

Figure 2: Preliminary Survey – Eastern Part of (KTWR)

Population and ecology of Bengal Florican

The study was conducted in Koshi Tappu Wildlife Reserve (KTWR), which spans 175 sq. km and was divided into four survey blocks: A, B, C, and D . Field surveys were carried out during April–May, coinciding with the Bengal Florican's breeding season. Observations took place during peak activity hours (05:00–10:00 and 15:00–18:00) using a combination of boat, vehicle, and foot-based access methods (Davidson, 2004). Each block was surveyed two times using 8x42 binoculars to maximize detection.

To enhance survey efficiency during the breeding season, surveyors used a black-and-white cloth mounted on a pole to mimic the male Bengal Florican's display behavior, thereby increasing the likelihood of visual encounters (Baral et al., 2013; Baral et al., 2020). All sightings were geo-referenced using GPS.

Post-breeding season assessments included searches for nests and chicks to gather reproductive data. Vegetation sampling was conducted along 1 km transects spaced at 250 m intervals, with 1m x 1m quadrats placed every 100 m to record dominant plant species and vegetation height (Wolf et al., 2012). These data provided essential context on habitat characteristics influencing Florican presence.

Figure 3: Boat Crossing During Population Survey

Vegetation and Habitat Assessment

A land-use map was generated using supervised habitat classification based on the maximum likelihood method applied to a Landsat image. The study area was categorized into four primary habitat types: dense vegetation, light vegetation, sand, and river. Ground-truth points were assigned to each habitat type during field surveys and were later aggregated into broader habitat categories for analysis (Packman et al., 2011).

To assess seasonal vegetation changes, Normalized Difference Vegetation Index (NDVI) maps were produced for periods before and after resource utilization. NDVI, which ranges from -1 to +1, served as a widely accepted metric for evaluating vegetation greenness and detecting changes in plant biomass and productivity (Pettorelli et al., 2005). This approach provided a clear indication of grassland degradation and helped inform adaptive management strategies for Bengal Florican conservation. Ground-truthing was conducted during both the Bengal Florican population survey and the post-breeding assessment. These field observations supported the satellite-derived findings, confirming a decline in vegetation cover and indicating potential disturbances to key florican habitats.

Figure 4: Vegetation Survey in KTWR

Threat Assessment

A questionnaire survey was conducted with a 40% representation of households within the buffer zone. Semi-structured questionnaires were designed to assess the extent of local dependency on grasslands, the economic value of harvested grass, and potential alternatives to reduce grass consumption. In addition to household surveys, focus group discussions were held with diverse community groups to capture a broader range of perspectives. Interviews were also conducted with local herders to gather insights on perceived threats to grassland habitats and to document opportunistic sightings of Bengal Floricans outside the protected area. These qualitative data provided valuable context on human-wildlife interactions and informed the development of community-based conservation strategies.

Figure 5: Questionnaire Survey – Western KTWR

Conservation Workshops and Capacity Building

Conservation workshops were conducted in 11 schools: three in the eastern and three in the western parts of the Koshi Tappu Wildlife Reserve, three in and around Chitwan National Park, and two in Shuklaphanta National Park. Each workshop included pre- and post-activity quizzes to assess changes in students' perceptions and attitudes toward species conservation. One student from each school was selected as a volunteer and received wildlife training, which included bird

identification skills and the use of tools like Google Maps and GPS. These student volunteers acted as bio-monitors, tracking Bengal Florican movements outside protected areas and collaborating with local NGOs to share data with the relevant wildlife authorities.

Figure 6: School-Based Conservation Workshop

In addition, four community conservation workshops were conducted one in the eastern and one in the western buffer zones of the reserve, along with two more around Chitwan National Park. Pre- and post-workshop questionnaires were administered to assess changes in conservation awareness among participants. Each workshop included a two-hour session covering bird ecology, threats to avian species, and conservation strategies, followed by a guided birdwatching activity to reinforce experiential learning in the field.

Semi-structured questionnaires and focus group discussions revealed that no previous conservation initiatives in these communities had specifically focused on birds or the Bengal Florican. Interviews with herders highlighted a high level of dependence on reserve resources, including instances of illegal entry for grass and firewood collection. To further explore local perceptions and resource use, a comprehensive questionnaire survey was conducted in April 2023 across both the eastern and western zones of the reserve, targeting farmers, herders, and fishers.

Figure 7: Community Workshop – Group Discussion

OUTPUTS AND RESULTS

Population and ecology of Bengal Florican

During the breeding season survey conducted in early April 2023, we recorded a total of 20 Bengal Floricans. Among these, 14 were males and 6 were females. Twelve individuals were observed within the core area of Koshi Tappu Wildlife Reserve (KTWR), three in the buffer zone, and five in areas beyond the reserve boundaries.

The survey extended beyond traditional core zones, enabling the identification of additional key habitats where breeding behaviors particularly the males' characteristic hovering display were regularly observed. A range of environmental parameters was recorded to better understand the species' habitat preferences and spatial distribution during the breeding season.

The successful completion of this phase was made possible through the active support of local community members, KTWR staff, and partner conservation organizations. The fieldwork also provided an opportunity to capture high-resolution photographs and video footage, which were later used in the production of a conservation awareness documentary.

Our findings confirmed that both the buffer zone and areas beyond it included suitable habitats for the Bengal Florican. This underscores the importance of incorporating these peripheral landscapes into future habitat management and conservation planning strategies.

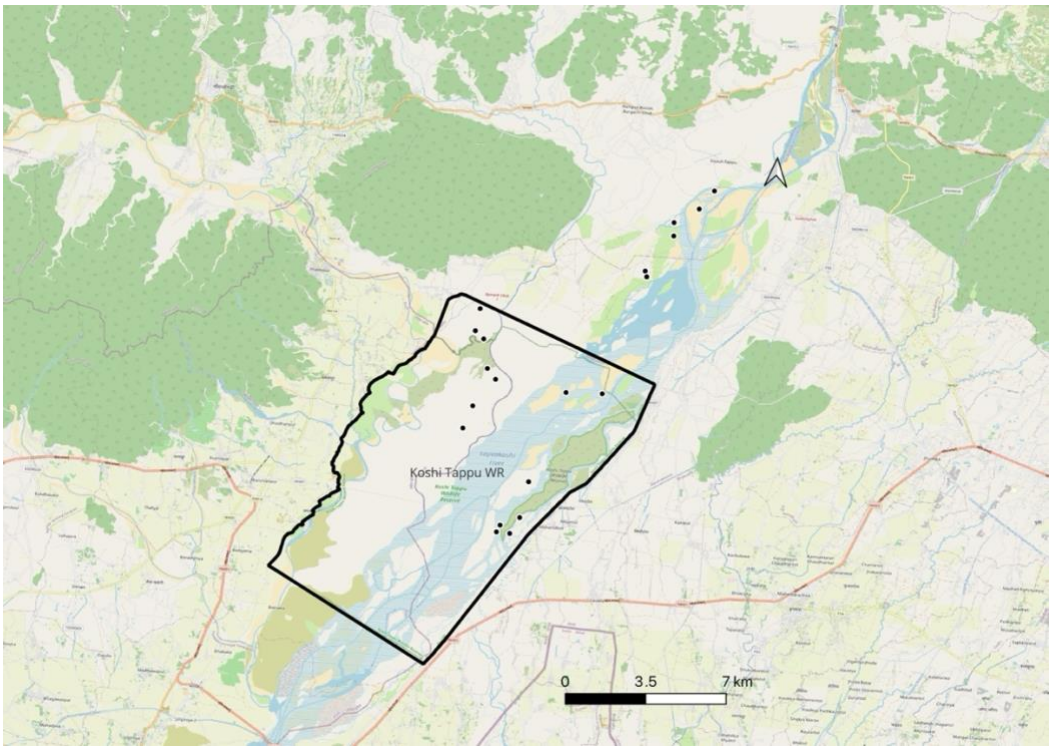

Figure 8: Distribution of Bengal Florican During Survey

Habitat characterization and hotspot map preparation

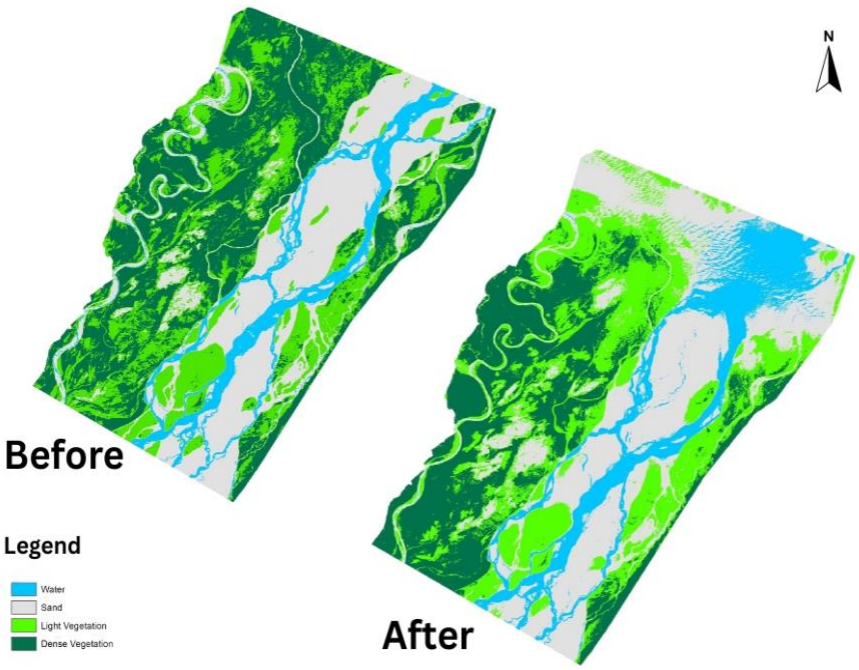

Figure 9: Map Showing Vegetation Changes Before and After Grass Harvest

The NDVI (Normalized Difference Vegetation Index) analysis revealed a significant decline in vegetation cover, particularly in the western part of Koshi Tappu Wildlife Reserve, following the period of resource extraction. This region exhibited a marked reduction in NDVI values, indicating substantial degradation of tall grassland habitats.

The absence of a permanent ranger station and limited surveillance in the western section made it more accessible to local communities. As a result, increased human activity including grazing, grass and firewood collection, and potential encroachment was observed. These disturbances likely contributed to the deterioration of habitat quality, rendering the area more susceptible to long-term ecological degradation.

The comparative NDVI values recorded before and after the resource collection period visually confirmed the extent of vegetation loss, supporting the need for targeted management interventions in this vulnerable zone.

Table 1: : NDVI Value Changes Before and After Grass Harvest

NDVI	**Before**	**After**
Maximum	-0.898	-0.213
Minimum	0.428	-0.867

Grass harvesting significantly reduced overall vegetation health, with the most substantial impact observed in the previously healthiest areas, as indicated by the sharp decline in minimum NDVI from 0.428 to -0.867. This shift highlights a severe loss of photosynthetically active vegetation. Additionally, the overall NDVI range moved further into negative values, confirming the widespread removal or destruction of green biomass following harvesting.

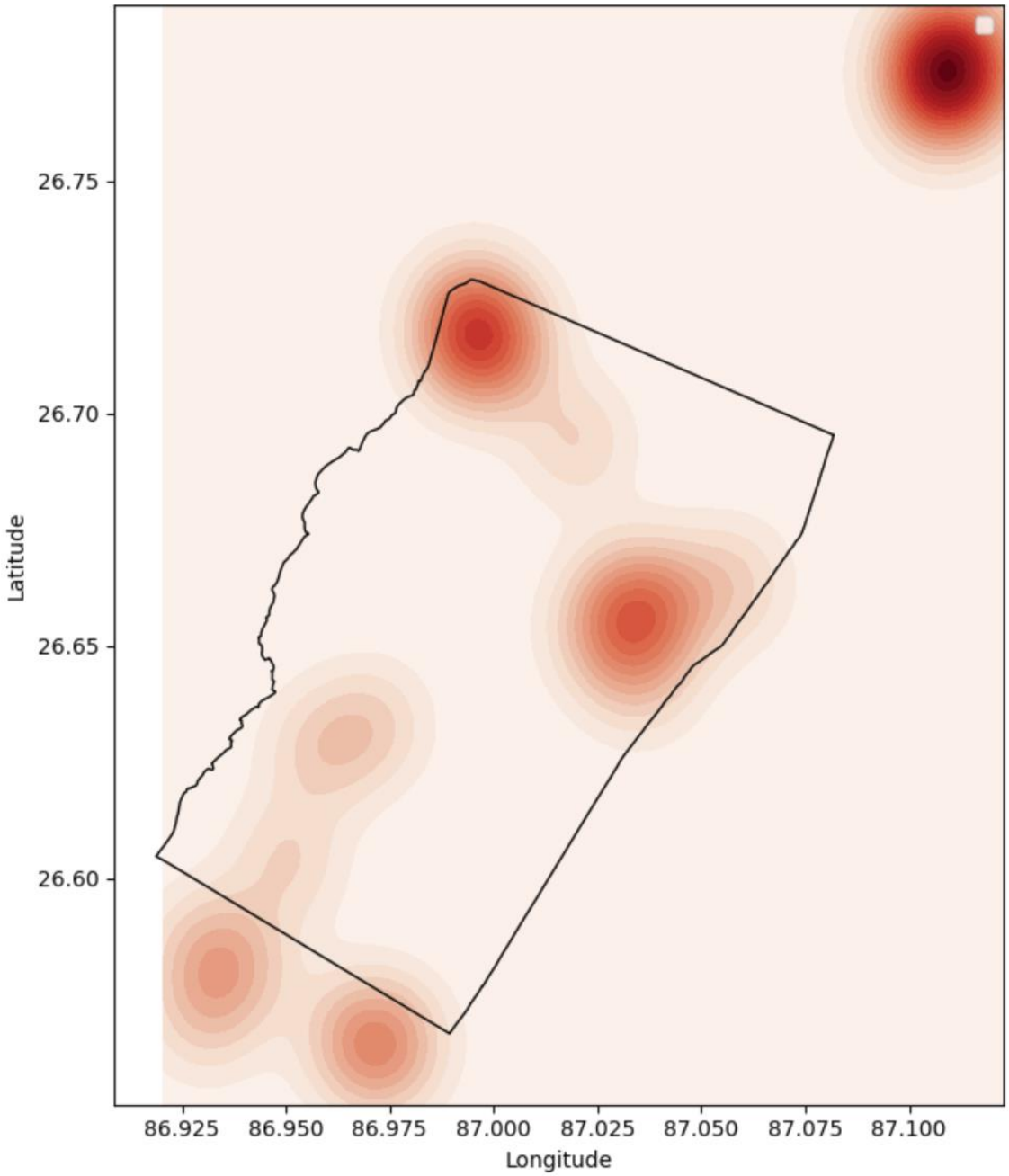

Figure 10:. Hotspot Map for Bengal Florican in KTWR

Using multi-year data compiled from published research, eBird, GBIF, and our field surveys, we conducted a Kernel Density Estimation (KDE) analysis to identify key habitat hotspots for the Bengal Florican in the Koshi region. The analysis confirmed three major hotspots: two within Koshi Tappu Wildlife Reserve specifically in the Bhagalpur and Prakashpur areas and one outside the reserve in Sisaulighat.

These sites consistently recorded repeated sightings of both male and female Bengal Floricans. The frequent observation of male courtship behaviors, such as hovering display flights, provided strong evidence of active breeding activity in these areas. The KDE output highlighted these zones as core habitat patches characterized by tall, relatively intermediately-disturbed grasslands dominated by *Saccharum* species further underscoring their critical ecological importance for the species' long-term survival.

Quantification of Threats

Awareness and Attitudes Toward the Bengal Florican

All survey respondents reside within the Koshi Tappu Wildlife Reserve buffer zone, ensuring that the data accurately reflects the perspectives of communities living closest to Bengal Florican habitats. Despite their proximity, there is a pronounced gap between residency and ecological awareness, indicating a pressing need to enhance environmental education and community engagement initiatives. The Bengal Florican remains virtually unknown to residents. Only 10% reported having seen the bird, 25% had heard of it, and a majority (65%) were completely unaware of its existence.

Table 2: Stakeholder Interview During Questionnaire Survey

SN	Type of respondent	No
1.	Local	145
2.	Nature Guide	15
3.	Herders	20
4.	Farmers	70

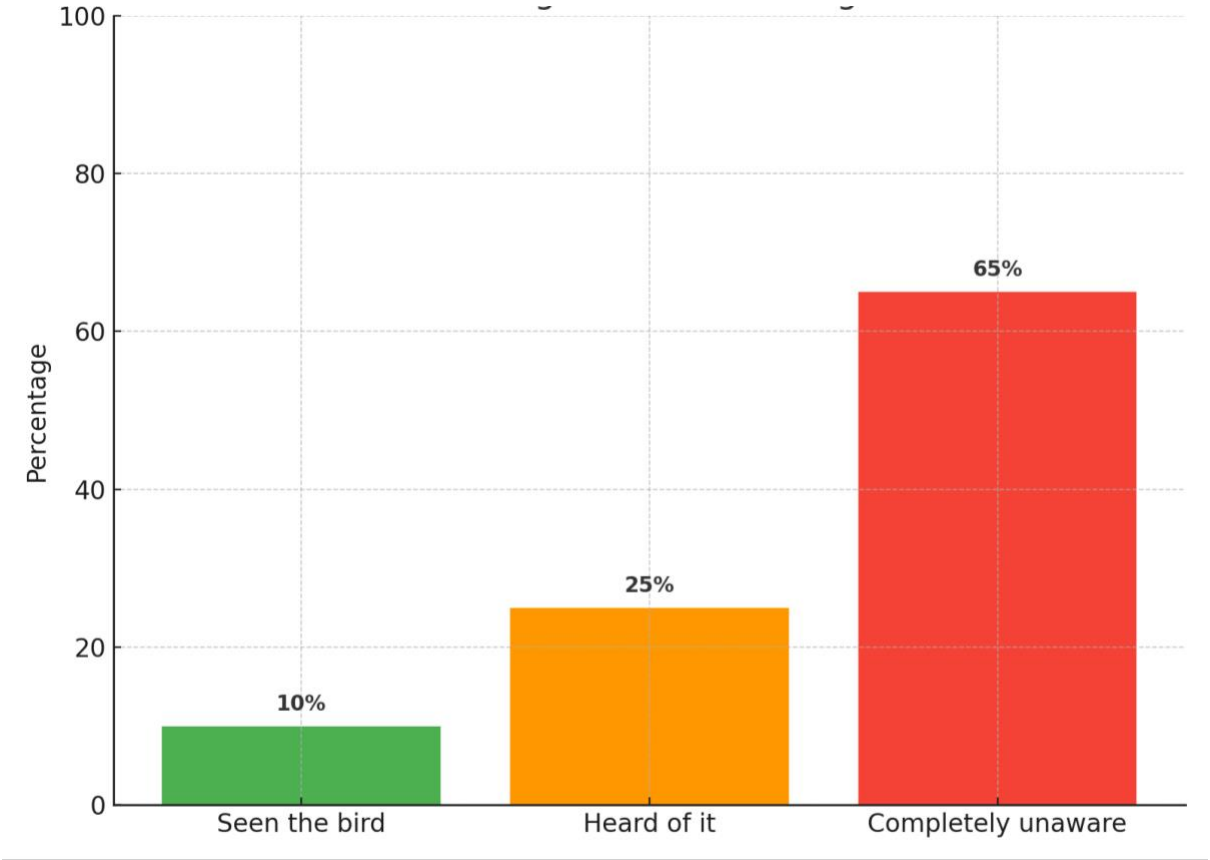

Figure 11: Awareness and Attitudes Toward the Bengal Florican

Bird identification skills were generally poor, with only 32% able to name common species. Conservation awareness focused mainly on large mammals like elephants (55%) and wild buffalo (40%), indicating a communication gap when it comes to bird conservation. Notably, no prior conservation awareness programs addressing the Bengal Florican had been conducted in the area.

Despite this knowledge gap, there is a growing interest and willingness to engage. Approximately 70% of respondents expressed interest in participating in conservation activities such as monitoring, eco-tourism, and anti-poaching efforts. This provides a strong foundation for initiating community-based conservation models.

All survey respondents were residents of the Koshi Tappu landscape, providing direct insights into the attitudes of those living closest to Florican habitats. Yet, only 2% had ever participated in any conservation activities. This disconnect emphasizes the need for increased inclusion, awareness, and opportunity. While 82% acknowledged ongoing conservation efforts in the reserve, most had little understanding of the Bengal Florican's status or the rationale behind these interventions.

Locals dependency of KTWR

About 48% of respondents visit the reserve once per year, and 32% visit between three and five times annually, primarily for grass thatching(resource collection), 20% do not use grass. Despite these frequent interactions, there appears to be little ecological connection or awareness, as evidenced by low Bengal Florican sighting reports. This represents a missed opportunity to integrate routine resource use with conservation education and engagement.

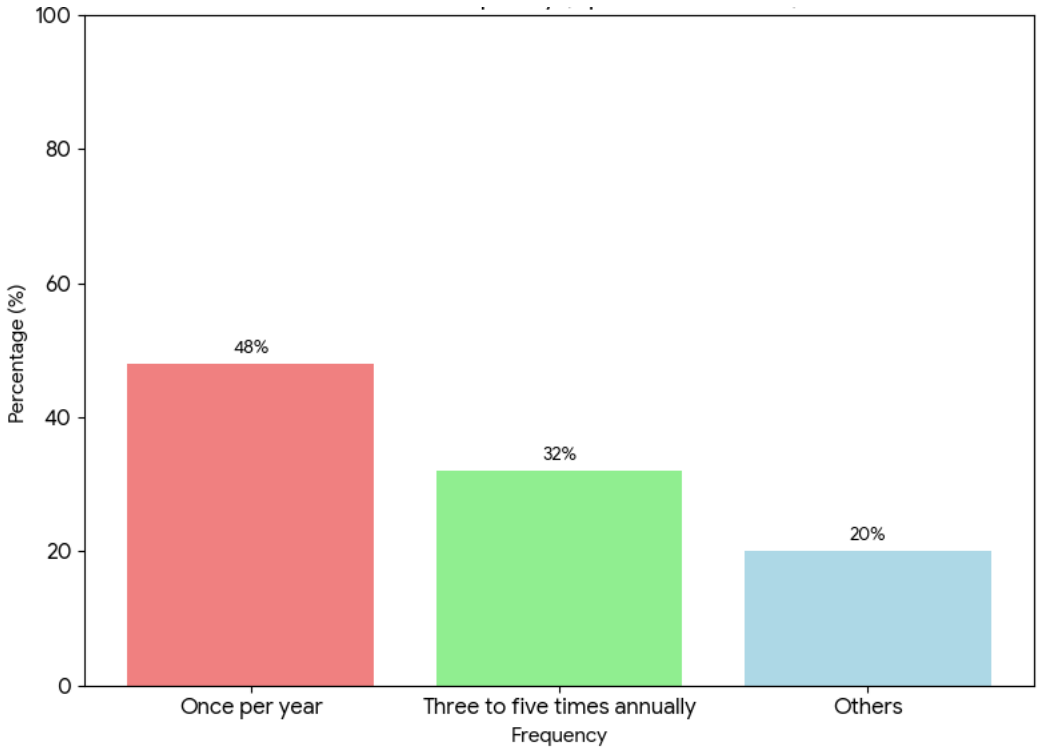

Figure 12: Local Dependency on KTWR Resources

General awareness of threats to the Bengal Florican is high, with 80% of respondents recognizing the species faces significant dangers and 53% acknowledging the prevalence of illegal activities such as poaching and unauthorized resource extraction. This widespread recognition of threats presents a strong foundation for community-driven conservation efforts, contingent on appropriate training and the establishment of effective reporting mechanisms.

Only 25% of respondents considered current conservation measures sufficient, while the majority were uncertain about their effectiveness. Recommendations for improvement primarily focused on increasing community awareness and fostering direct local participation. This feedback highlights a perception among residents that existing conservation programs are either insufficiently visible or exclusive and signals a desire for greater involvement in conservation processes.

Community Outreach and Capacity Building

A total of four community workshops were conducted two in the buffer zones of Koshi Tappu Wildlife Reserve and two around Chitwan National Park reaching over 250 local stakeholders, including farmers, landowners, and community leaders. Each workshop featured a two-hour interactive session that introduced key concepts related to Bengal Florican ecology, habitat preferences, seasonal distribution, and the various threats facing the species. Special emphasis was placed on the crucial role of local communities, particularly farmers, in conserving grassland ecosystems and supporting Bengal Florican recovery.

After the presentation, participants were provided with meals and educational materials, including conservation-themed diaries, pens, and printed informational resources. The workshops also integrated participatory group activities designed to foster local engagement. Attendees were divided into groups and asked to identify existing conservation challenges in their area and propose practical, community-based solutions. Each group selected a spokesperson to present their ideas, while others provided feedback and suggestions. This format encouraged dialogue, critical thinking, and community-driven problem-solving.

The sessions concluded with a synthesis by the organizing team, summarizing key discussion points and outlining actionable next steps. These workshops served as an essential platform for building local ownership of conservation initiatives and collecting valuable community insights to guide future interventions.

In addition, a strategic consultation was held with the warden of Koshi Tappu Wildlife Reserve to discuss long-term capacity building and community-based conservation strategies. His recommendations helped us identify priority areas and target communities for engagement.

Figure 13: Interview with the Warden of KTWR

Table 3: Locations of Community Workshops

SN	Name	Location	Number of Participants
1	Sagarmathi Yuwa Club	Koshi	65
2	Tharu Community Lodge	Koshi	70
3	Namuna Buffer zone community forest	Chitwan	50
4.	Community Cultural Center	Chitwan	68

Figure 14: Community Workshop – General Session

School Conservation Workshop

Eleven conservation workshops were conducted across schools near key protected areas: six schools around Koshi Tappu Wildlife Reserve, three near Chitwan National Park, and two near Shuklaphanta National Park, reaching approximately 900 students. The implementation in Koshi was carried out in close collaboration with the Koshi Bird Society, a local conservation organization.

Figure 15: Drawing Competition at School Conservation Workshop

Each workshop included pre- and post-surveys designed to assess changes in students' knowledge and awareness of the Bengal Florican's ecology, habitat requirements, threats, and relevant wildlife protection legislation in Nepal. Results demonstrated a measurable positive impact: around 80% of participants showed a significant increase in understanding of the Bengal Florican's ecological role, conservation challenges, and distribution. Additionally, 75% of students improved their comprehension of Nepal's wildlife laws, particularly regarding the legal implications of poaching and the importance of protected areas such as Koshi Tappu Wildlife Reserve.

These findings confirm that youth-focused, interactive conservation education effectively raises awareness of critically endangered species. To build on this success, we recommend expanding the workshop model to additional districts and protected areas. Incorporating field visits would provide experiential learning opportunities, while establishing eco-clubs in schools could promote

sustained engagement. Employing visual storytelling and creative educational materials will help simplify complex ecological and legal concepts for students.

Table 4: Schools Engaged Near Koshi Tappu Wildlife Reserve

SN	Name of School	Location	Number of Students
1	Shree Prakash H.S. School	Eastern, Koshi	78
2	Shree Nand Uma Public H.S. School	Western, Koshi	59
3	Prakashpur Ma. Vidyalaya	Eastern, Koshi	85
4	Shree Jaldevi Nimna Ma. Vidyalaya	Western, Koshi	48
5	Shree Moham Ma. Vidyalaya	Eastern, Koshi	73
6	Shree Janta Adharbut Vidyalaya	Western, Koshi	81

Table 5: Schools Engaged Near Chitwan National Park

SN	Name of School	Location	Number of Students
1	Shree Saraswati Secondary School	Nawalparasi	85
2	Shree Basic School Sisabas	Chitwan	98
3	Shree Janata Secondary School	Nawalparasi	83

Table 6: Schools Engaged Near Shuklaphanta National Park

SN	Name of School	Location	Number of Students
1	Shree Shanti Secondary School	Kanchanpur	88
2	Vatsalya Vidya Niketan	Kanchanpur	92

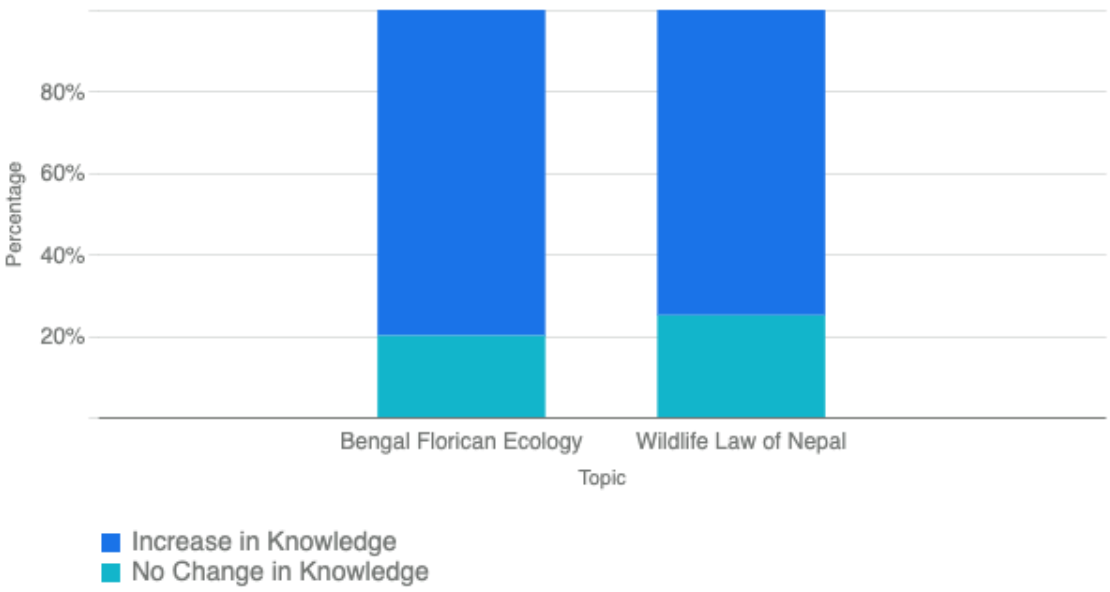

Figure 16: Increased Knowledge Among Students After Workshops

COMMUNICATION & APPLICATION OF RESULTS

We implemented a large-scale conservation outreach program in the Koshi Tappu Wildlife Reserve to raise awareness and promote sustainable conservation practices. A central component of the project was the deployment of bio-monitors on both the eastern and western parts of the reserve. These bio-monitors tracked bird activity in buffer zones and worked closely with local NGOs to share data and inform conservation actions. Equally impactful was our community engagement strategy. We organized educational sessions to raise awareness about local bird species, their ecological roles, the threats they face, and the urgency of conserving the remaining populations. Following these sessions, community members were encouraged to identify conservation challenges in their local areas and develop their nature-based solutions. We also introduced them to opportunities in eco-tourism and bird tourism to promote conservation-linked livelihoods. To broaden the reach of our initiative, we extended bio-monitoring activities and conservation workshops to Chitwan National Park and conducted school-based outreach programs in Shuklaphanta National Park.

MONITORING AND EVALUATION

The monitoring and evaluation component of this project focused on assessing the effectiveness of conservation interventions through a combination of ecological data collection and community-based indicators. Field surveys during the 2023 breeding season resulted in the recording of 20 Bengal Florican individuals across Koshi Tappu Wildlife Reserve (KTWR), its buffer zone, and adjacent landscapes. These findings helped establish baseline population data and informed the identification of key habitat hotspots using Kernel Density Estimation (KDE) and NDVI analyses.

Community engagement was monitored through pre- and post-intervention surveys conducted during school and community workshops. Knowledge assessments revealed that over 80% of students and 70% of community members demonstrated increased awareness of Bengal Florican ecology, conservation status, and associated legislation. Eleven student bio-monitors were trained to use GPS devices, identify birds, and contribute observational data to local conservation bodies. Additionally, the success of outreach activities was evaluated through participant feedback, workshop attendance, and online engagement metrics, including web traffic to the project's dedicated platform (www.bengalflorican.org). This dual approach combining ecological monitoring with social impact evaluation ensured that the project not only generated scientific insights but also fostered lasting stewardship among key local stakeholders.

ACHIEVEMENTS AND IMPACTS

During our survey, we recorded 20 Bengal Florican sightings a significant milestone that reflects both the species' persistence and the effectiveness of our fieldwork. Our research extended beyond the core and buffer zones of Koshi Tappu Wildlife Reserve, encompassing adjacent areas outside the reserve to gain a broader understanding of the species' distribution. The study focused on understanding the ecology and behavior of the Bengal Florican. We gathered a range of environmental data to analyze the species' habitat preferences, providing critical insights for future conservation planning. We are deeply grateful for the support of the local communities, park staff, and conservation organizations whose collaboration and expertise greatly enriched our efforts. Their on-the-ground knowledge and guidance were instrumental in enhancing the quality and reach of our work.

In addition to ecological research, we documented our findings through high-resolution photographs and video footage. These materials were the basis of an documentary aimed at raising public awareness and inspiring conservation action used during conservation workshops.

A key impact of our project was the empowerment of local youth through bio-monitoring initiatives. We established eco-clubs in schools, equipping students with bird field guides, stationery, and conservation materials. These young monitors now regularly track bird activity in their areas. While our primary focus was in Koshi, we successfully expanded the initiative to Chitwan, strengthening grassroots engagement in Bengal Florican conservation across multiple regions.

CAPACITY DEVELOPMENT AND LEADERSHIP CAPABILITIES

The Bengal Florican conservation project served as a transformative platform for enhancing the research, communication, and leadership skills of the entire team. Engaging with a diverse range of stakeholders from local communities and school students to conservation authorities provided each team member with hands-on experience in navigating complex social-ecological systems. Leading workshops, organizing school programs, managing field logistics, and conducting surveys demanded not just scientific expertise, but also strong leadership and communication skills, which were significantly strengthened during the project.

Aditya Pal marked a major milestone in his conservation career. It was his first opportunity to lead a landscape-scale initiative focused on a critically endangered species. He applied his expertise in remote sensing and GIS to real-world habitat mapping in the Koshi Tappu landscape. Beyond technical skills, he also ventured into conservation communication by producing a podcast series that amplified the voices of bird conservationists across Nepal.

Shruti Shakya expanded her knowledge of grassland and wetland bird species and their ecological interactions. She led biodiversity education initiatives, developed training materials for school workshops, and sharpened her leadership and team coordination skills.

Tika Regmi deepened his understanding of grassland ecology and bird–fortunate interactions, which she plans to incorporate into future research and conservation work. Her involvement across both scientific and community-based efforts fostered a more holistic perspective on conservation planning.

Ganesh Sah gained hands-on experience in biodiversity surveys and played a key role in developing outreach materials, such as posters and educational visuals. His ability to simplify complex ecological ideas into engaging content improved significantly throughout the project.

A major legacy of this project was the formation of a local non-governmental organization (NGO) by the team. This initiative represents a shift from a time-bound project to a long-term conservation commitment aimed at sustaining grassroots efforts, expanding public engagement, and strengthening local stewardship for threatened species like the Bengal Florican.

Initiation of the Bengal Florican Project (BFP)

We launched the Bengal Florican Project (BFP) to foster collaboration among conservationists across all range countries of the species Nepal, India, and Cambodia. As part of this initiative, we developed a comprehensive distribution map, compiled relevant scientific literature, and created multilingual conservation materials to support cross-border knowledge sharing and action.

SECTION 3:

CONCLUSION

During our field survey, we recorded 20 Bengal Floricans, reaffirming the Koshi Tappu Wildlife Reserve as a key stronghold for this critically endangered species in Nepal. Despite its ecological importance, awareness of the Bengal Florican remains alarmingly low among local communities. In several core habitats, many residents had never seen or even heard of the bird, largely due to limited conservation outreach. To address this, we conducted targeted workshops engaging farmers and herders key land stewards who were often surprised and inspired to learn about the bird's presence in their landscape. These engagements helped foster a sense of local stewardship and highlighted the bird's role within the grassland ecosystem.

Our research also revealed important ecological interactions and habitat use patterns. Bengal Floricans were frequently observed foraging near feral cattle, suggesting a potential ecological relationship worth further study. Spatial analysis identified three critical habitat zones requiring immediate management interventions, including regulated grazing, fire control, and seasonal protection. The data supports the Intermediate Disturbance Hypothesis (IDH), as the floricans were more abundant in moderately disturbed areas, such as those with controlled grazing and harvesting, compared to both heavily degraded and strictly protected zones. NDVI analysis confirmed that habitat heterogeneity created by light disturbance may in fact benefit the species, reinforcing the importance of adaptive, inclusive conservation approaches that align biodiversity goals with community needs.

Problems Encountered and Lessons Learned

Our work encountered several significant challenges that offered critical insights for future conservation efforts. One major issue was the presence of Wild Water Buffalo, which posed serious safety risks and restricted access to important survey areas. This emphasized the need for enhanced safety protocols when working in multi-species habitats. Additionally, heavy monsoon rains frequently disrupted fieldwork, underscoring the importance of incorporating seasonal variability into planning and scheduling.

Human-induced pressures, such as illegal harvesting, poaching, and the widespread presence of free-ranging cattle, further exacerbated the degradation of already fragile grassland ecosystems. These pressures intensified competition for resources and highlighted the urgency of integrated land-use management.

A particularly alarming finding was the estimated national population of Bengal Floricans, which appears to number fewer than 50 individuals. This prompted a strategic shift: instead of focusing

on detailed resource-use modeling, we prioritized the identification and mapping of key habitat hotspots. This adjustment revealed an important lesson contrary to prevailing conservation assumptions: Bengal Floricans favor moderately disturbed habitats over pristine ones.

Our experience underscores the necessity of long-term ecological research, especially into breeding behaviors, and the critical role of sustained community engagement and secure funding. Together, these elements form the foundation for effective and adaptive conservation strategies in dynamic and vulnerable landscapes.

IN THE FUTURE

Building on the momentum generated by this project, we remain firmly committed to the long-term conservation of the Bengal Florican through adaptive research, community engagement, and collaborative partnerships. Our immediate priority is to continue ecological monitoring across at least two consecutive breeding seasons to better understand the species' habitat use, breeding success, and population trends. Expanding standardized monitoring protocols to other lowland grassland sites, such as Shuklaphanta and Chitwan National Parks, will be critical for determining whether remnant populations persist outside Koshi Tappu Wildlife Reserve. We also aim to refine our NDVI and hotspot mapping approaches for improved habitat management planning in response to seasonal changes and anthropogenic pressures.

At the community level, we will strengthen the network of trained bio-monitors and establish eco-clubs in additional schools to ensure sustained youth engagement. Formalizing collaborations with government agencies, conservation NGOs, and academic institutions across Nepal, India, and Cambodia under the Bengal Florican Project (BFP) will facilitate regional knowledge exchange and transboundary action. Recognizing the importance of coexisting land use, we plan to explore sustainable grazing and resource-use models informed by our findings on moderate disturbance and florican presence. With continued support from the Koshi Tappu Wildlife Reserve and national conservation bodies, our future efforts will prioritize inclusive, science-based strategies that balance biodiversity protection with local livelihoods to secure a viable future for this critically endangered species.

SECTION 4:

APPENDICES

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Appendix 1: Financial Report

Itemized expenses	CLP requested (USD)*	Total CLP used % (USD)	% (USD) Difference
PHASE I - PROJECT PREPARATION			
Communications (telephone/internet/postage)	150	120	
Field guidebooks, maps, journal articles and other printed materials	518	480	
Insurance	150	250	
Visas and permits			
Team training			
Other (Phase 1) Medical Supplies (First Aid)	50	150	
Sub-total	**868**	**1000**	
EQUIPMENT			
Scientific/field equipment and supplies	250	220	
Photographic equipment	250	335	
Camping equipment			
Boat/engine/truck (including car hire)	2740	2500	
Sub-total	**3240**	**3055**	
PHASE II - IMPLEMENTATION			
Accommodation for team members and local guides	1575	1425	
Food for team members and local guides	1800	1600	
Travel and local transportation (including fuel)	1400	1200	
Customs and/or port duties			
Workshops	3150	4120	
Outreach materials (brochures, posters, video)	2030	1850	

Sub-total	**9,955**	**10,195**	
PHASE III - POST-PROJECT EXPENSES			
Administration			
Report production and results dissemination	300	250	
Other (Phase 3)	Miscellaneous	150	
Sub-total	**300**	**400**	
Total	**14,363**	**14,650**	

The insurance expenditure increased from the planned $150 to $250 due to a broader coverage strategy. Initially, insurance was only meant for the core team, but the actual spending included coverage for field assistants as well. This adjustment was made to strengthen safety and risk management for everyone involved in field operations, reflecting a commitment to comprehensive personnel welfare.

The workshop budget also saw an overrun, with spending rising from the planned $3,150 to $4,120. This was primarily because the conservation outreach initiatives were expanded beyond the original scope. Workshops were extended to engage local communities and schools in areas surrounding Chitwan and Shuklaphanta National Parks. This shift aligned with the project's revised goal of addressing all critical Bengal Florican habitats throughout Nepal.

Appendix 2: Monitoring and Evaluation table of CLP

Output	**Number**	**Additional Information**
Number of CLP Partner Staff involved in mentoring the Project	2	WCS, Cambodia Bird Conservation Nepal, for planning the field survey
Number of species assessments contributed to (E.g. IUCN assessments)		
Number of site assessments contributed to (E.g.IBA assessments)		
Number of NGOs established	1	Nature Conservation and Research Committee (www.ncrc.org.np)

Amount of extra funding leveraged ($)	$10687	Kate Stokes Memorial Award and Stiftung Artenschutz Grant
Number of species discovered/rediscovered	2	Rare sighting of Glossy ibis vagrant bird(14) which is unusually large number. Painted stork(2), which is rare in case of eastern Nepal.
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)		
Number of species/sites legally protected for biodiversity		
Number of stakeholders actively engaged in species/site conservation management	12	
Number of species/site management plans/strategies developed	1	Identified hotspot for Bengal Florican.
Number of stakeholders reached	(1300 Directly & 445 In-directly)	250 stakeholders 900 students and 150 community members over 445 on (www.bengalflorican.org)
Examples of stakeholder behaviour change brought about by the project.		We engaged directly at the grassroots level where people closely interact with the bird. Through our sustained efforts, we reshaped its perception from a distant rarity to a tangible part of their environment, ultimately influencing behavior and shifting public attitudes toward conservation.
Examples of policy change brought about by the project		To promote sustained interest in bird

		conservation, we introduced a structured birdwatching program through a formal agreement between the community school and a local NGO.
Number of jobs created	2	Nature Guide, Resource Person
Number of academic papers published	2	In review
Number of conferences where project results have been presented	2	

Appendix 3: Photos

Figure 17: Preliminary Survey

Figure 18: Population Survey of Bengal Florican

Figure 19: Questionnaire Survey – Eastern KTWR.

Figure 20: School Conservation Workshop

Figure 21: Community Workshop Figure

Figure 22: Community Workshop – General Session

Threats to Bird Habitat in Koshi Tappu Wildlife Reserve (KTWR)

Bio monitors

Conservation Workshop in Koshi Tappu Wildlife Reserve

Conservation Workshop in Chitwan National Park

Conservation Workshop in Shuklaphanta National Park