Final Evaluation Report

Your Details	
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Project Title	Distribution assessment and conservation initiatives of endangered Indian peacock soft-shell turtle in Kankai River floodplain of eastern lowland Nepal
Application ID	37792-1
Date of this Report	06/11/2025

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
To study the factors affecting the distribution of Indian peacock soft-shell turtles			■	We conducted a comprehensive survey in the proposed Kankai River floodplains, supplemented by data collection from the Biring, Ratuwa, Kamal, Aduwa, and Lohandra rivers, along with associated tributaries, wetlands, and fishponds in Jhapa and Morang districts. An additional £345 in funding was secured from donors to support this work. Survey was conducted in 95 different sites. Key variables for analysis were selected based on their ecological relevance, including pH, dissolved oxygen (DO), water temperature, habitat type, water depth, connectivity, and the Human Disturbance Index (HDI). HDI was calculated based on four variables: 1) habitat encroachments (HE), 2) electrocution or explosion (E), 3) fishing, traps, and hooks (F), and 4) pollution (PO). Each was assigned equal weight (0.25) to avoid bias, using the formula: **HDI = (HE × 0.25) + (E × 0.25) + (F × 0.25) + (PO × 0.25).** Values were averaged for each site based on replication, with HDI scores categorized as low (≤0.25), moderate (0.25–0.5), or high (>0.5) disturbance. As no a priori weight existed, logistic regression analysis was performed to validate categorization, assessed using the Hosmer-Lemeshow test and Fisher's Exact test. Results confirmed appropriate classification of HDI values. The surveys were conducted between 5 May 2023 and 24 June 2024 by a team of three skilled surveyors. Each survey point was visited at least once with an average of 2–5 replications, with an average survey duration of two hours per point. All fieldwork was conducted between 08:00 and 20:00 hours.
Water quality analysis			■	For heavy metal analysis, wet sediment samples (1 g each) were collected from 50 locations and analyzed using Atomic Absorption Spectrometry (AAS) with the Direct-Air-Acetylene Flame Method. Sample preparation, including metal digestion and filtrate analysis, adhered to the

				APHA 2023 protocol, utilizing a Thermo iCE3000 Series Atomic Absorption Spectrometer. Heavy metals, including Cadmium (Cd), Chromium (Cr), and Mercury (Hg), were not detected in any samples, indicating concentrations were likely below the instrument's detection limit. This finding suggests that heavy metal contamination is not currently a significant factor affecting the softshell turtle population in the study area. Additionally, as proposed, parameters including ammonia, nitrate, and chlorine were not assessed due to their determined minimal ecological impact on the target turtle species. However, Cadmium (Cd) and Chromium (Cr) were added for the test.
Community attitudes towards softshell turtles				Between July and December 2023, we conducted a questionnaire-based survey limited to individuals aged ≥16 years. Informed verbal consent was obtained from all respondents after explaining the study objectives and funding sources. Trained enumerators conducted interviews in Nepali or local dialects, typically lasting 20–25 minutes. The questionnaire incorporated open-ended questions, following established methodological recommendations (Singer & Couper, 2017). Descriptive statistics summarized respondents' socio-demographic characteristics (age, gender, ethnicity, occupation, education) and responses concerning knowledge, attitudes, perceptions, and perceived threats toward the elongated tortoise. Attitudes were quantified using a five-point Likert scale (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree; adapted from Joshi et al., 2015). Associations between socio-demographic factors and key response variables—including knowledge level, attitudes, conservation awareness, and recognition of conservation status (binary)—were evaluated using chi-square (χ^2) tests.

School level and community level awareness campaign				Given the urgent threats and lack of prior awareness initiatives, we exceeded our proposed outreach targets. We conducted 11 student-focused awareness campaigns across educational institutions, engaging 550 participants (male-to-female ratio 40:60) aged 13–25 years. Programs were held at: 1. Mechi English Boarding School, Maidhar, Jhapa 2. Shree Bhagwati Secondary School, Jhapa 3. Dharampur Pragya Pathshala, Mangalbare, Jhapa 4. Shree Chetana Secondary School, Jhapa 5. Ashim Secondary School, Panchgachi, Jhapa 6. Jana Adarsha Higher Secondary School, Sivgunj, Jhapa 7. Dikshyanta Sikshya Niketan, Thana Road, Jhapa 8. Shree Nawa Kiran Vidya Mandir, Sivgunj 9. Shree Sukra Secondary School, Chandradangi, Jhapa 10. Central Campus of Technology, Sunsari 11. Sunakhari Academy, Dharan. For community engagement, we organized three large-scale awareness programs and 30 small focused discussion sessions targeting indigenous Santhal and Majhi communities along the Kankai River belt. This prioritization reflected the Majhi community's livelihood dependence on aquatic ecosystems and Santhal traditional ethnomedicinal practices involving turtles. Approximately 150 locals participated.
Conservation materials preparation				Considering that booklets are more informative, sustainable, and eco-friendly than posters, 350 copies of the turtle conservation booklet *("Turtles of Nepal - Booklet for conservation"; available at: https://www.researchgate.net/publication/390266044_Turtles_of_Nepal_Booklet_for_conservation)* were produced using the allocated funds. This booklet introduces the turtles and tortoises of Nepal, providing information on their evolutionary history, distribution, ecology, and conservation challenges, with a specific focus on 12 species found in eastern Nepal. Written in Nepali, the booklet aims to educate local communities, school children, and policymakers about turtles, their ecological roles, and the need for their conservation. Additionally, three permanent conservation information boards were installed at the study site.

2. Describe the three most important outcomes of your project.

a). We surveyed 90 different sites and collected different variables providing baseline information on softshell turtle's distribution and its ecology

Our analysis revealed that softshell turtle occurrence was significantly influenced by **deeper water** levels (Estimate = 1.23, CI = 0.713–2.011, $p < 0.05$). Conversely, higher **Human Disturbance Index (HDI)** values negatively affected their presence (Estimate = -6.4642, CI = -12.01 to -2.36, $p < 0.05$). Furthermore, the presence of **rivers** and **wetlands** was positively associated with softshell turtle occurrence (River: Estimate = 8.637, CI = 3.484–15.18; Wetland: Estimate = 8.7518, CI = 3.269–15.779; $p < 0.05$).
In the study area, potential habitats for these species are nearing a critical threshold due to intense human pressures, including electrocution, poisoning, overexploitation of aquatic resources, and habitat modification. This project provides baseline information on turtle occupancy and the factors influencing it, addressing one of the key objectives of this report.

Through consistent surveys conducted over a 12-month period, we documented *Nilssonia nigricans* (CR) as a **freshly killed** carapace, *Indotestudo elongata* (CR) along riverbanks, and *Cyclemys gemelli* (NT) kept as pets—the first records of these species at the study site. This highlights both rich biodiversity and extensive anthropogenic threats.

b). 236 questionnaires were collected and analysed threats and people perception of the study site

In addition, a socio-demographic and attitudinal survey (n = 236 respondents) in Jhapa district, Nepal, revealed a predominantly male (70%), ethnically diverse population (Janajati 32%, Aadibasi 29%, Brahmin 17%, Chettri 13%, Madhesi 5%, Muslim 1%, Dalit 1%), with varied education levels (37% uneducated). Attitudes towards turtles showed tension: while 58% supported traditional use, 54% emphasized conservation importance and 48% endorsed strict laws. However, only 37% were willing to personally contribute. Chi-square analysis identified **ethnicity** as strongly associated ($p < 0.001$) with all conservation perception variables (traditional value, religious role, trade, cultivation, saving, participation, law enforcement), reflecting differing cultural practices (e.g., Brahmin/Chettri reverence vs. Aadibasi consumption). **Education** significantly influenced perceptions of cultivation, saving turtles, participation, and law enforcement ($p < 0.01$). Age affected views on cultivation, participation, and law enforcement ($p < 0.05$), while gender showed no significant association. Findings highlight the critical influence of ethnicity and education on conservation attitudes and underscore urgent threats requiring targeted strategies.

Complementing this, community perception assessment reveals a complex picture: while local people express predominantly positive attitudes (69% support conservation, 90% associate with positive omens, 52% recognize ecological value), significant knowledge gaps persist (40% unaware of threatened status). Crucially, a stark paradox exists between stated support and the identification of **hunting for meat (**31%) and **ethnomedicine** (24%), **bycatch** during fishing mud eel (12%), illegal trade (11%), and habitat degradation (9%).

Addressing the synergistic threats of habitat degradation and direct exploitation, while actively engaging local communities as partners, offers the most promising pathway for securing the species' future in this critical habitat.

In addition, two turtle species that were being kept as pets by locals were rescued during the questionnaire survey.

c). Awareness and Community Outreach Activities

A total of 550 students and 150 local residents were informed about turtle ecology, conservation threats, their vulnerable status, and the laws enacted by the government.

A. Student-Based Awareness Programs

These programs were conducted in two phases:

1. PowerPoint Presentation
A PowerPoint presentation was delivered using a projector to educate students about turtles. Topics such as evolutionary history, geographical distribution, life cycle, ecological behaviour, and the role of turtles in maintaining ecosystem balance were covered. Local threats were highlighted, and actions that could be taken by students to support conservation were emphasized. Legal provisions in Nepal for turtle protection were also presented.

2. Quiz and Cross-Jumbled Word Contest
A quiz consisting of ten pre-prepared questions based on the presentation was conducted to assess knowledge retention. Students who answered correctly were awarded ballpoint pens—10 pens were distributed at each school.
Following the quiz, a cross-jumbled word contest was organized. Students were divided into groups of four and were given a set of jumbled words to solve. The first three groups to complete the puzzle correctly were rewarded, with 12 students receiving ballpoint pens. In total, 110 students were awarded for the quiz, and 132 students were rewarded for the word contest.

Additional Conservation Activities

Face Painting
Face painting with turtle-themed designs was introduced at Sunakhari Academy to engage students in a fun and interactive way. Over 100 students from different grades participated. Placards with turtle illustrations and conservation messages were used to enhance photo sessions and raise awareness.

Color Art Competition
A turtle coloring competition was organized. Outlines of turtles were distributed to students, and the best entries from male and female participants were selected and rewarded.

B. Community-Level Awareness and Discussion Campaigns

Community-level programs were formally conducted through pre-scheduled evening meetings (6 PM to 8 PM) to ensure higher participation without interfering with daily routines.

Videos and audio materials highlighting the mythological significance of turtles were presented in the Santhal language to make the content more relatable. Sessions were concluded with words of thanks, and snacks and drinks were distributed to all participants as a token of appreciation.

Presentations and discussions focused on the religious, cultural, and ethno-medicinal significance of turtles. Their ecological importance and the threats they face were emphasized. Traditional hunting practices were discussed within cultural contexts, while their impact on turtle populations was addressed to raise conservation awareness.

The awareness campaign has aroused interest and sympathy for the species, and the active participation and support from the community indicate a positive attitudinal change that will significantly contribute to the sustained conservation of softshell turtles within and along the Kankai River Floodplain. If upscaled, this initiative could further aid in achieving the broader conservation goal of protecting the species and its habitat.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

- **Ethical Concerns**: Strict ethical and respectful protocols were followed when engaging with local indigenous communities, including obtaining informed consent before discussing

sensitive cultural or medicinal topics related to traditional hunting and ethnomedicinal practices.

- **Trust Issues and Language Barriers**: To overcome language barriers and build trust with elderly members of indigenous communities, we collaborated with local translators from those communities. They facilitated communication of our objectives and consent procedures.
- **Low Participation in Awareness Campaigns**:
    - *Students*: Engagement was boosted by incorporating focused group discussions, quizzes, a cross-jumbled word contest, a coloring competition, and face painting. These interactive activities increased curiosity and effectively conveyed our objectives.
    - *Local Residents*: We worked closely with the village chief ("Majhi Hadam") and other community leaders to secure buy-in. Presenting videos and audio materials in the Santhal language that highlighted the mythological, religious, and cultural significance of turtles made the content more relatable and fostered greater participation.
- **Scheduling Community Meetings**: All community-level programs were formally scheduled in the evenings (6 PM–8 PM) to maximize attendance without disrupting participants' daily routines.

4. Describe the involvement of local communities and how they have benefitted from the project.

The involvement of local communities was both enthusiastic and instrumental to the success of this project. Local governing bodies, school principals, and indigenous community leaders provided critical support by granting permits for field surveys, appointing knowledgeable local guides, and mobilizing community members for conservation-awareness activities. Their active participation ensured that logistical challenges were minimized and that project messages reached every corner of the Kankai River floodplain region.

Through our awareness sessions, community members gained a deeper understanding of the ecological significance of softshell turtles and the roles these animals play in maintaining healthy aquatic ecosystems. We emphasized how coordinated efforts by local governments, academic institutions, school groups, and community organizations can ensure the long-term persistence of turtle populations—not only in the immediate study areas but across the lowlands of eastern Nepal.

By highlighting these roles, we fostered a sense of shared responsibility for conservation outcomes. Targeted outreach to fishing communities—particularly the Majhi and Santhal peoples, whose livelihoods depend on riverine resources—proved highly effective. Fishers were educated about the turtles' ecological importance and urged to abandon harmful practices such as electrocution and poisoning, which devastate aquatic habitats and threaten all forms of riverine life. Students from eleven local schools learned about turtle evolutionary history, ecological functions, and the threats that disrupt ecosystem balance. As a result, over 550 young people now appreciate how turtles contribute to ecosystem stability and understand their own potential to support conservation through everyday actions.

In addition, local government officials and academic staff were briefed on current turtle population status, species diversity, and pressing threats—such as bushmeat harvesting and bycatch in the Kankai River floodplain. These discussions also covered relevant Nepali wildlife-protection laws to promote sustainable management of both turtles and their habitats. Finally, ten community members and two BSc students from the Central Campus of Technology participated directly in field surveys and awareness campaigns. Through hands-on training in scientific survey methods and community outreach techniques, they developed skills that will serve them in future research and conservation

endeavors, thereby helping to ensure the continuation of this work well beyond the life of the current project.

Furthermore, distributing informational booklets in schools and local libraries will ensure that knowledge of turtle ecology, threats, evolutionary history, and relevant legislation remains accessible over the long term.

5. Are there any plans to continue this work?

Yes, we plan to build upon our work in the Kankai River floodplains by expanding surveys into additional areas of the eastern lowlands. During the current project, we identified several critical threats to softshell turtles—including unintentional bycatch from thin-spear fishing, unsustainable bushmeat consumption, and the ethnomedicinal use of turtle body parts by local Santhal communities—compounded by ongoing habitat modification and degradation.

Although we have gained valuable insights into general community perceptions of turtles, significant knowledge gaps persist. In particular, we lack a clear understanding of the socio-cultural and economic drivers that motivate turtle bushmeat consumption—whether taste preferences, social status, or economic necessity—and the specific health beliefs and traditional uses associated with turtle parts, as well as any locally accepted plant-based alternatives.

Our future work will focus on filling these gaps through mixed-methods research that combines household surveys, key-informant interviews, and participatory focus groups. We will work closely with Santhal healers and community elders to document traditional medicinal recipes and explore culturally appropriate plant substitutes. At the same time, we will pilot community-led bycatch mitigation strategies—such as modified spear tips and fishing-practice workshops—to reduce accidental turtle captures.

By offering viable, culturally sensitive alternatives and empowering local stakeholders through participatory conservation planning, we aim to foster long-term, community-led stewardship of softshell turtles. Given the critically low occupancy rates of these turtles across the region, this initiative represents a timely and perhaps the final realistic opportunity to reverse their decline and promote sustainable coexistence between traditional livelihoods and biodiversity conservation.

6. How do you plan to share the results of your work with others?

Final reports will be shared with The Rufford Foundation, Sivasatakshi Municipality, traditional authorities, and the academic institutions involved in the project. Two peer-reviewed manuscripts are currently under review: one entitled “Habitat Quality and Human Disturbance Influence the Occurrence of Endangered Softshell Turtles (*Nilssonia* spp.) in Eastern Nepal: Implications for Conservation,” which addresses ecological findings, and another titled “Human–Turtle Interactions in Eastern Nepal: Communities, Challenges, and Conservation,” which examines social dimensions. Once these articles are published, they will deliver up-to-date insights to inform turtle conservation plans and policy. We also plan to issue a press release through a national news agency following publication to broaden the reach of our findings.

7. Looking ahead, what do you feel are the important next steps?

Looking ahead, the most important next step is to implement long-term monitoring surveys to accurately determine softshell turtle population size, distribution, and habitat occupancy across the eastern lowlands. At the same time, targeted research must clarify the socio-cultural and economic drivers behind turtle bushmeat consumption—whether taste preference, social status, or economic necessity—and document the specific health beliefs and traditional uses of turtle parts, while identifying locally accepted plant-based alternatives. To reduce unintentional bycatch, we will

introduce modified fishing gear—such as bottle traps or net tubes—to replace thin-spear techniques and work directly with fishers to demonstrate their use and effectiveness. Partnering with local herbalists and traditional healers will be essential for promoting culturally acceptable plant-based remedies in place of turtle-derived medicines. Finally, a sustained program of community-level education and outreach will be maintained, ensuring that conservation messages remain fresh, that local stakeholders continue to feel ownership of the project, and that the long-term protection of both turtle populations and their habitats is woven into local practice and policy.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, the Rufford Foundation logo was prominently displayed at numerous events, including on permanent conservation boards, banners, and presentation slides. We have also acknowledged the Foundation as a funder in the informational booklets, which have already been published. In addition, the Rufford Foundation will be formally credited in any future publications arising from this work.

9. Provide a full list of all the members of your team and their role in the project.

Asmit Subba (Team Leader) led the project and served as the principal field researcher, conducting all surveys and coordinating the organization of conservation-education activities. He also oversaw and performed the statistical analyses essential for interpreting survey data and evaluating conservation outcomes.
Mr. Manoj Pokherel (GIS Expert) designed and developed detailed maps and species-distribution models for the study area. His spatial analyses were critical for identifying key turtle habitats and guiding survey effort.
Mr. Nishan Limbu provided invaluable support during field surveys and education events, assisting with data collection, logistics, and direct community engagement.
Mrs. Kamala Hangham Limbu managed project data, ensuring its accuracy and integrity, and assisted in both field surveys and the delivery of conservation outreach activities.
Mr. Nischal Kunwar and **Mr. Siva Raj Limbu**, both BSc students, contributed to data collection and participated actively in community-based conservation initiatives, gaining hands-on experience in ecological monitoring and outreach.
Mr. Mate Tudu, a native community member and local fisherman, served as a field guide, aiding site navigation and helping to build rapport with local stakeholders.
Mr. Bijay Kisku, also a native community member and one of the Maji Hadam (traditional community leaders), facilitated translation, organized local conservation events, and provided cultural guidance to ensure that outreach activities were both respectful and effective.

10. Any other comments?

This project took longer than anticipated, although all of its goals were ultimately achieved. Key findings emerged regarding the ecology of softshell turtles, including the identification of critical occupancy thresholds linked to intense human pressures such as electrocution, poisoning, overexploitation of aquatic resources, and habitat modification. The study also clarified patterns of human–turtle interaction and initiated targeted conservation activities in critical habitats, culminating in the production of informational booklets for students, local residents, and policymakers.

Questionnaire surveys revealed a stark paradox between expressed support for turtle conservation and the persistence of harmful practices—bycatch, bushmeat hunting, and ethnomedicinal use of turtle parts. These insights underscore the urgency of immediate action: this may be the last realistic

opportunity to reverse softshell turtle declines in these landscapes and to promote sustainable coexistence between biodiversity conservation and Indigenous livelihood practices.

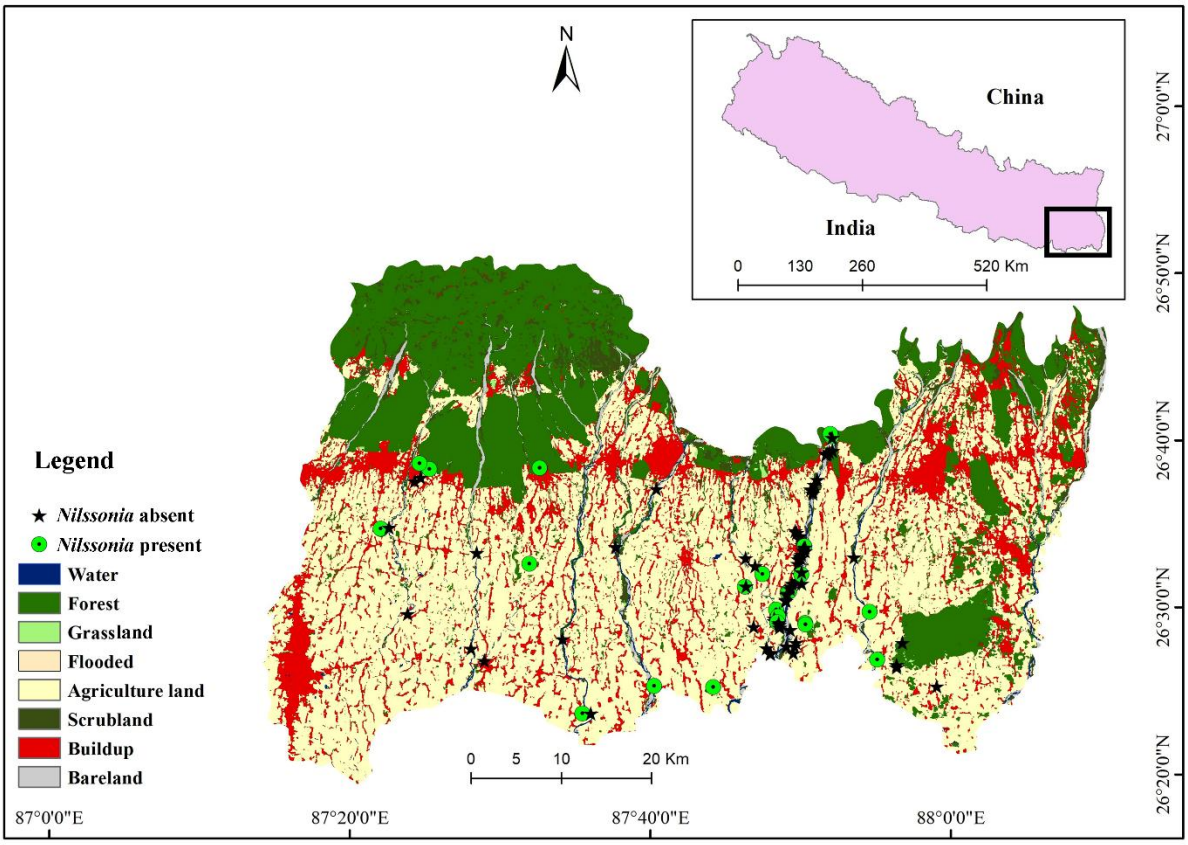

Figure 1. Map showing the land use land cover of the study area; black star represents the non-presence points where green mark represents the presence points of *Nilssonia* spp.

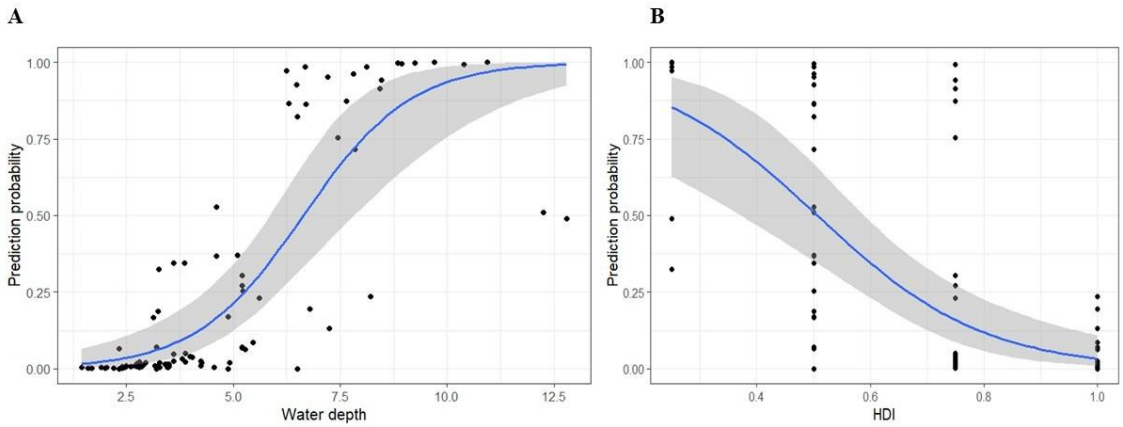

Figure 2. The plots depict the relationships between (A) habitat depth and (B) the Human Disturbance Index (HDI). The x-axis shows the range of water depths in (A) and HDI values in (B),

while the y-axis indicates the predicted probability of softshell turtle's species occurrence. These graphs illustrate how variations in habitat depth and disturbance levels influence the likelihood of softshell turtle presence in the study areas.

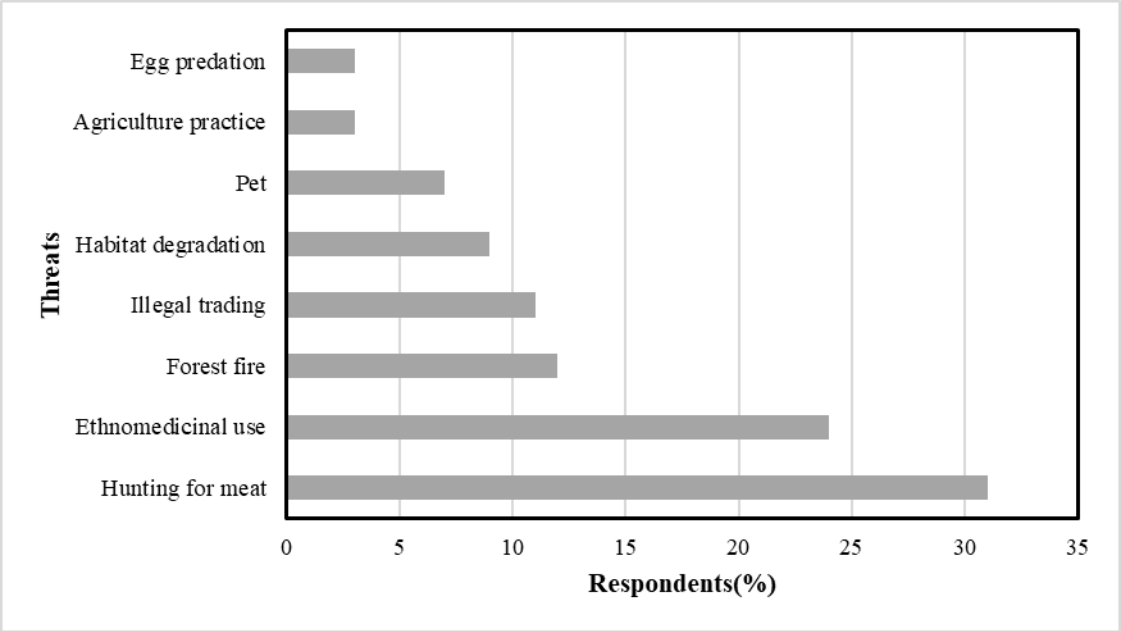

Figure 3. Primary threats of turtle perceived from respondents in Kankai River of eastern lowland Nepal.

Photo 1: Presenting power points slides at school and colleges highlighting the importance of turtles.

Photo 2: Students participating in quiz and solve the cross jumbled contest and prize distribution

Photo 3: Photo session and chocolate distribution program among students

Photo 4: Awareness campaign through face painting program

Photo 5: Competition of color panting

Photo 6: Presenting power point slides to local indigenous people and involvement in their cultural activities to disseminate our conservation goals

Photo 7: Existing local threats of softshell turtles in the Kankai river floodplain.

ANNEX – Financial Report

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