



An Interim Progress Report on
'Detailed Assessment of Biodiversity, Threats, and Human-wildlife
Conflict to Initiate Conservation Interventions in Ramaroshan Lake
Complex, Far Western Nepal'



Project Supporters



PROJECT DETAILS

Project Title	Detailed Assessment of Biodiversity, Threats, and Human-Wildlife Conflict to Initiate Conservation Interventions in Ramaroshan Lake Complex, Far Western Nepal
Project Site	Ramaroshan Rural Municipality, Ward Number 5 and 6, Sudurpaschim Province, Achham, Nepal
Project Duration	15 August 2022 to 15 February 2024
Objectives	<ol style="list-style-type: none">1. To assess biodiversity, threats to/of biodiversity, and human-wildlife conflict of Ramoroshan lake cluster in detail2. To recommend a data based holistic conservation plan for the landscape, using the baseline data from objective 1
Team Members	Raju Acharya Sharma Bikash Ghimire Manshanta Ghimire Yogendra Bikram Poudel Suman Sapkota Durlav Parajuli
Local Guides	Sarai Bahadur Rokaya Junga Bahadur Rokaya Tek Bahadur Sahakari Amar Bahadur Rokaya
Funding Agencies	Rufford Foundation, UK Bernd Thies Stiftung, Switzerland Dhole Conservation Fund, USA S.P.E.C.I.E.S., USA
Implementing Agency	Friends of Nature, FON Nepal

PROJECT SUMMARY

Ramaroshan is a mid-hill wetland complex in Achham district of far western Nepal extending from 1401 m to 3792 m elevation range. The complex, popularly known as 12 lakes and 18 meadows, is the headwater of Kailash River and it provides greater ecological services in the region. This project was designed to assess the biodiversity and prevailing threats to initiate conservation interventions in the region. Bird survey, vegetation survey and camera trapping survey were carried out in the study area. In addition, questionnaire surveys and indirect group discussions were also conducted to document human wildlife interactions and its consequences. Further, formal discussions with stakeholders from Province, District and Local government have been also conducted.

Bird survey, vegetation survey and questionnaire survey have been completed, whereas camera trapping survey is ongoing. Although planned, we couldn't complete bioacoustics survey and herpetofauna survey due to budget constraints. This report outlines the progress made in relation to the project activities proposed.



Figure 1: Heard of Himalayan Tahr

PROJECT STATUS

S. No.	Activities	Status	Remarks
1	Preliminary Survey	Completed	Our team visited the area, discussed with stakeholders from local, district and province level. It made our field planning easy.
2	Biodiversity Assessment	Partially Completed	Bird survey and vegetation survey completed. Camera trapping survey ongoing.
2.1	Camera Trap survey	Partially completed	A total of 57 camera traps are installed in the field. We will retrieve them in the last week of March 2023.
2.2	Avifauna survey	Completed	Point count and Transect surveys conducted. A detailed checklist is prepared.
2.3	Butterfly Survey	Partially Completed	Photographs of butterflies compiled. Identification and checklist yet to be finalized.
2.4	Visual Encounter Transect Survey	Not completed	This activity was not carried out due to limited budget.
2.5	Bio-acoustics Survey	Not completed	This activity was not carried out due to device malfunction.
2.6	Vegetation Survey	Completed	Vegetation survey carried out using circular plots.
3	Assessment of Threats to Wildlife	Partially Completed	Datasheet was made to assess disturbance to forest and wildlife. Data entry ongoing.
4	Assessment of Human-wildlife Conflict	Partially Completed	A total of 147 households were visited, and questionnaire survey conducted. Data entry ongoing.
5	Workshop with local stakeholders	Partially Completed	Formal and informal group discussions were carried out with the stakeholders of Provincial, District and Local level. Outcome sharing workshop will be planned and conducted after data analysis.

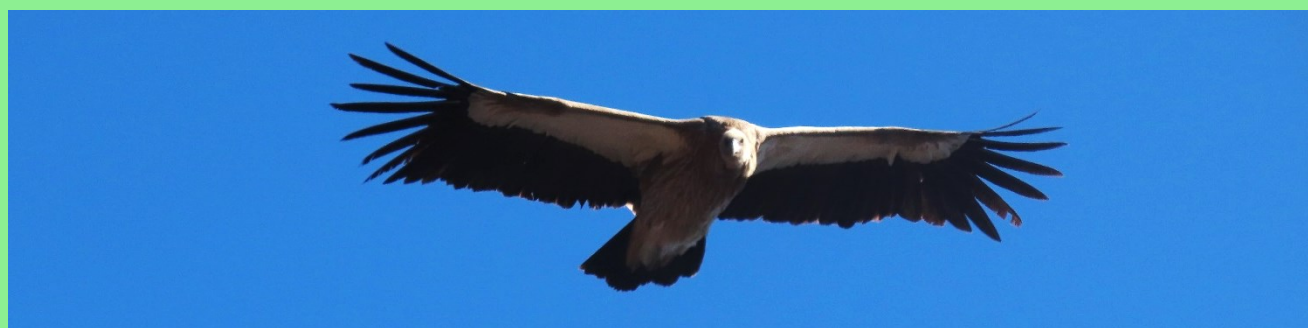


Figure 2: Adult Himalayan Vulture soaring in the sky

ACTIVITY DETAILS

Activity 1: Preliminary Survey

Our team made recce survey on August 13-22, 2022, in the area prior to field planning. Also, formal and informal discussions with stakeholders from Ministry of Industry Tourism Forest and Environment, Kailali, Divisional Forest Office Achham, Ramaroshan Rural Municipality, and Ramaroshan Tourism Board was carried out to inform them about the scale of the project. All local stakeholders were supportive throughout the planning and implementation phase. The visit enabled us to plan our field activities in a proper manner. We could generate more ideas on social survey sampling, camera trap sites, potter finalization and gather local support.

Activity 2: Biodiversity Assessment

Activity 2.1: Camera Trap Survey

For the camera trap survey, the land use land cover (LULC) map was created using Arc GIS, with the reference of LULC map from ESRI. Seven different land use categories were identified in the area of 120 sq. km. Next 1*1 sq. km grids were laid down making a total of 120 grids. Settlement area, cultivated area, cliffs, ponds/lakes, and inaccessible areas above 3500 meters were discarded and a total of 60 grids were selected. After installing the camera trap in one grid, the alternative grid was omitted. If the randomly chosen grid was occupied with settlement/ cultivated/ cliffs/ inaccessible area, the consecutive grid in the east direction was chosen. If similar issue arose, in the East grid, West grid was chosen. Further, if camera trapping was impossible in both Eastern and Western grids from the random grid, that random grid was left as inaccessible.

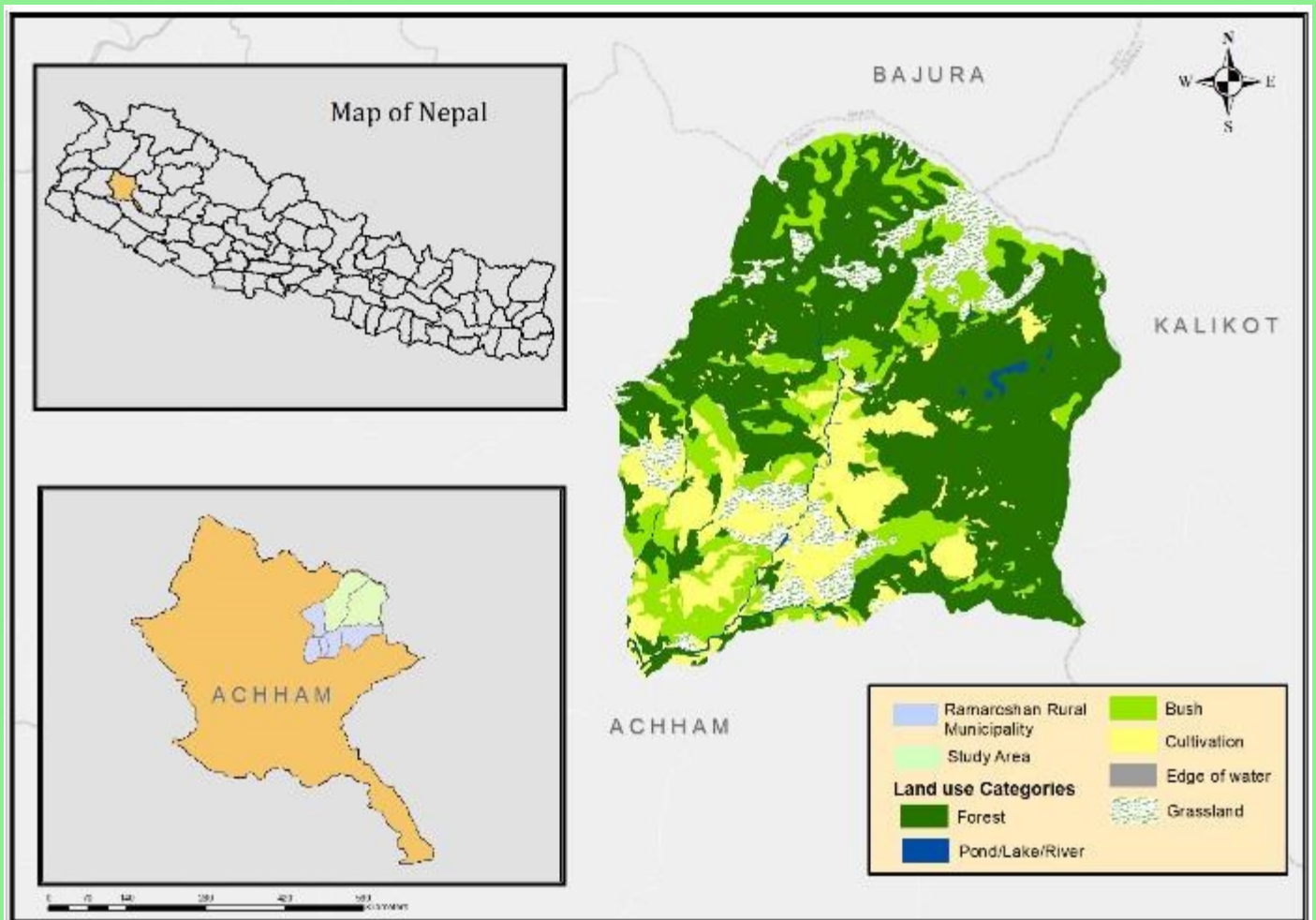


Figure 3: Map of study area

Before installing the camera traps, transect walk was conducted in each chosen grids. Researchers walked along the transects at the speed of 3 km/ hour and searched for signs. Areas with maximum probability of animal movement was selected for which, areas with forest trail junctions, water holes, streams, animal sign (pugmark, scrape mark, scratch marks, scats/ dung, etc.) availability and so forth was preferred. All the camera traps were set up uniformly. A detailed data sheet containing habitat information and disturbance assessment was filled simultaneously. We were planning to install 60 camera traps, however 3 camera traps could not perform well in the field, hence a total of 57 camera traps were installed in the field. The camera traps used in this study are Scoutguard, Bushnell and Browning. The first camera trap was installed on 1st December 2022 and the last camera trap was installed on 26th December 2022.

The camera traps installed in this project is yet to be retrieved from the field and we do not have records of species. During the study period we have observed different species of the mammals which are presented in Table 3. Previous study conducted by Shah et. al. in the area have reported 44 species of mammals which are listed below.

Table 1: Checklist of mammals reported from the project area

S. No.	Common Name	Scientific Name	Shah et. al. 2014	FON, Nepal 2023
1.	Nubra Pika	<i>Ochotona nubrica</i>	observation	-----
2.	Royle's Pika	<i>Ochotona roylei</i>	observation	-----
3.	Indian Hare	<i>Lepus nigricollis</i>	literature	-----
4.	Himalayan Stripped Squirrel	<i>Tamiops macclellandii</i>	Interview/literature	-----
5.	Irrawaddy Squirrel	<i>Callosclurus pygerythrus</i>	literature	-----
6.	Particolored Flying Squirrel	<i>Hylopetes alboniger</i>	literature	-----
7.	Hodgon's Giant Flying Squirrel	<i>Petaurista magnificus</i>	interview/literature	-----
8.	Common Giant Flying Squirrel	<i>Petaurista petaurista</i>	interview	-----
9.	Little Indian Field Mouse	<i>Mus booduga</i>	literature/interview	-----
10.	Eastern House Mouse	<i>Mus musculus</i>	literature/interview	-----
11.	Brown Rat	<i>Rattus norvegicus</i>	literature/interview	-----
12.	House Rat	<i>Rattus rattus</i>	literature/interview	-----
13.	Himalayan Rat	<i>Rattus pyctoris</i>	literature/interview	Observation
14.	Lesser Bandicoot Rat	<i>Bandicota bengalensis</i>	interview/literature	-----
15.	Malayan Porcupine	<i>Hystrix brachyura</i>	interview/sign	Sign
16.	Large Indian Civet	<i>Viverra zibetha</i>	literature/interview	-----
17.	Masked Palm Civet	<i>Paguma larvata</i>	observation	-----
18.	Small Indian Civet	<i>Viverricula indica</i>	literature/interview	-----
19.	Jungle Cat	<i>Felis chaus</i>	literature/interview	Interview
20.	Leopard Cat	<i>Prionailurus bengalensis</i>	interview/sign	Interview
21.	Leopard	<i>Panthera pardus</i>	interview/signs	Sign
22.	Small Indian Mongoose	<i>Herpestes auropunctatus</i>	interview/literature	-----
23.	Indian Grey Mongoose	<i>Herpestes edwardsii</i>	interview/literature	-----
24.	Bengal Fox	<i>Vulpes bengalensis</i>	interview/literature	-----

25.	Red Fox	<i>Vulpes vulpes</i>	Interview/sign	-----
26.	Asiatic Golden Jackal	<i>Canis aureus</i>	observation	Observation
27.	Wild Dog	<i>Cuon alpinus</i>	Interview/literature	Sign
28.	Asiatic Black Bear	<i>Ursus thibetanus</i>	Interview/literature	Sign
29.	Eurasian Otter	<i>Lutra lutra</i>	Interview/literature	Interview
30.	Yellow-throated Marten	<i>Martes flavigula</i>	Interview/literature	Observation
31.	Asian House Shrew	<i>Suncus murinus</i>	Interview/literature	-----
32.	Himalayan Shrew	<i>Soriculus nigrescens</i>	Interview/literature	-----
33.	Himalayan Water Shrew	<i>Chimarrogale himalayica</i>	literature	-----
34.	Bats	<i>Bat spp.</i>	Observation/interview	-----
35.	Himalayan Grey Langur	<i>Semnopithecus ajax</i>	observation	Observation
36.	Assam Macaque	<i>Macaca assamensis pelops</i>	interview	Observation
37.	Rhesus Macaque	<i>Macaca mulatta</i>	observation	Observation
38.	Eurasian Wild Boar	<i>Sus scrofa</i>	Interview/signs	Observation
39.	Alpine Musk Deer	<i>Moschus chrysogaster</i>	Do	Interview
40.	Barking Deer	<i>Muntiacus vaginalis</i>	Do/do	Call
41.	Sambar Deer	<i>Rusa unicolor</i>	Do	-----
42.	Common Goral	<i>Naemorhedus goral</i>	observed	Observation
43.	Himalayan Serow	<i>Capricornis thar</i>	interview	-----
44.	Himalayan Tahr	<i>Hemitragus jemlahicus</i>	observed	Observation
45.	Lesser Striped Shrew	<i>Sorex bedfordiae</i>	-----	Observation



Figure 4: Kinimini Phant, largest pasture in Ramaroshan area

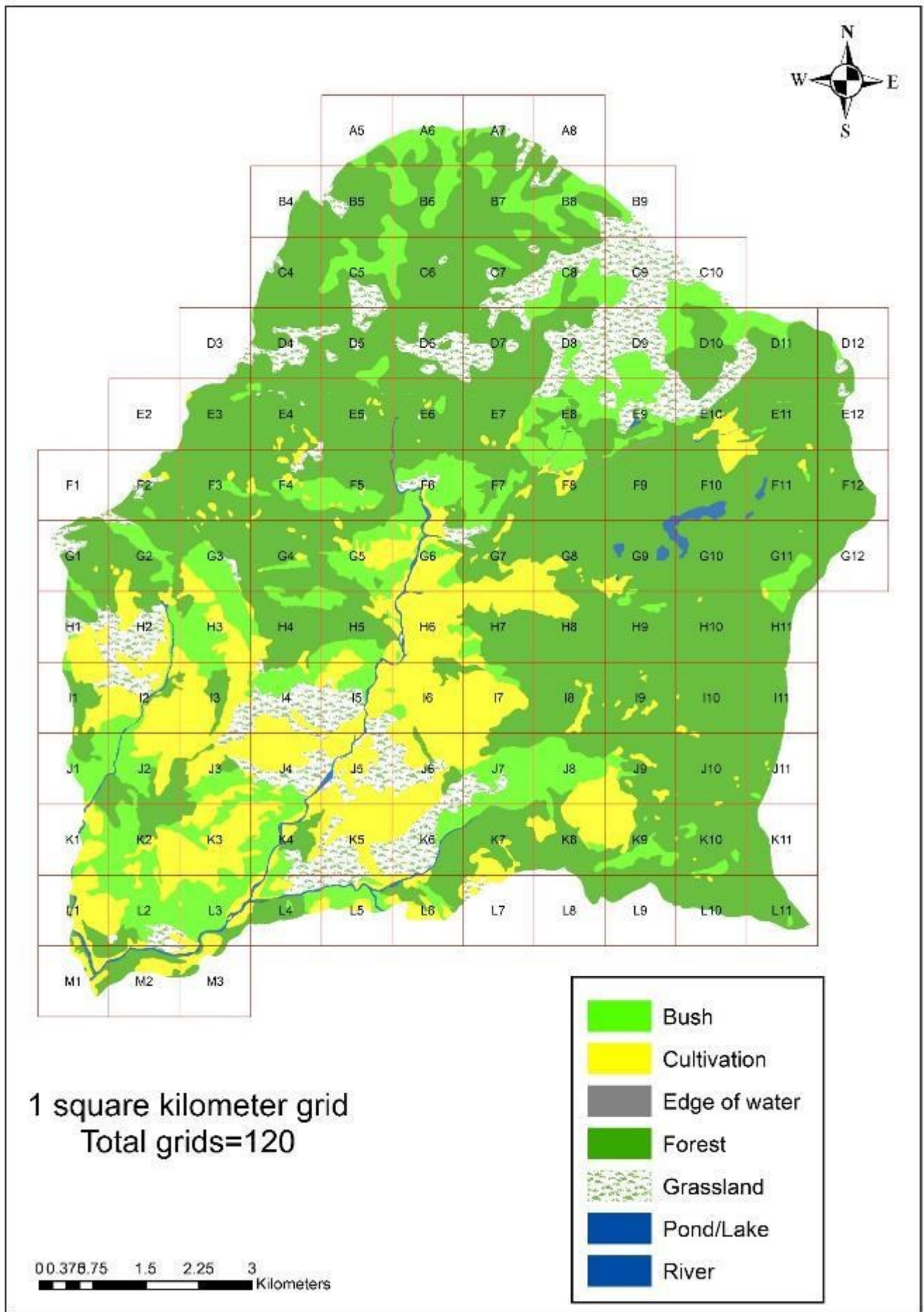


Figure 5: LULC map of study area with grids

Activity 2.2: Avifauna Survey

Avifauna survey took place in 23 different birding routes within the study area. Birds were observed by experts in the morning (6:30-10:30 AM) and evening (4:30-6:30 PM) hours using binoculars. Photographs were also captured for identification purpose. Mckinnon's Listing Method (20 species count) was used in each birding routes to assess avifaunal diversity and relative abundance. A checklist of 171 birds of Ramaroshan area is prepared and is being verified.



Figure 6: Team members looking for White-tailed Nuthatch

Activity 2.3: Butterfly Survey

Butterfly survey was also the part of our project activity. However, we could not perform detailed survey on butterfly due to the seasonal constrain. Although we managed to take few photographs of them basking in the warmth of sunlight. The identification and preparation of the checklist is yet to be completed. Karki et. al. 2002 have reported 13 species of butterflies from the area which is provided below.

Table 2: Checklist of butterfly reported from the study of Karki et. al. 2002

SN	Scientific Name	Common Name
1	<i>Colias erate</i>	Pale Clouded Yellow
2	<i>Colias fieldii</i>	Dark Clouded Yellow
3	<i>Gonepteryx rhamni</i>	Common Brimstone
4	<i>Pieris brassicae</i>	Large Cabbage White
5	<i>Pieris canidia</i>	Indian Cabbage White

6	<i>Issoria issaea</i>	Queen of Spain Fritillary
7	<i>Celastrina dilecta</i>	Pale Hedge Blue
8	<i>Everes arqiades</i>	Chapman's Cupid
9	<i>Heliophorous androcles</i>	Green Sapphire
10	<i>Lampides boeticus</i>	Pea Blue
11	<i>Lycaena phlaeas</i>	Common Copper
12	<i>Zizeeria maha</i>	Pale Grass Blue
13	<i>Taractrocera danna</i>	Himalayan Grass Dart

Activity 2.4: Vegetation Survey

We planned to conduct vegetation survey both in center of random grids and camera trap locations. For the first week of the field work, we tried to reach the center of each randomly selected grids and conducted vegetation survey. However, due to time and budget constraint, we could not keep up with it and we decided to conduct the survey in camera trap locations only.

Circular plots of 500 m² area [radius (r)=12.62 m] for big trees [Diameter at breast height (DBH)>20 cm diameter], 250 m² area (r=8.92 m) for small trees (DBH 5 cm – 20 cm), 25 m² area (r=2.82 m) for sapling (height >1.3 m, DBH < 5 cm) and 3.1416 m² area for regeneration (height <1.3 m) were used for vegetation enumeration. Big trees and small trees were measured using the same center point. However, saplings and regeneration were measured at 5 m distance from center point in the North direction.



Figure 7: A part of vegetation survey

A total of 57 Plots were surveyed for vegetation analysis. Data entry is in progress now. Interestingly, our team has been able to record a rare species of flowering plant, which is believed to be a new species for Nepal. The manuscript of the paper entitled: FLORA OF NEPAL NOTULAE?: REINSTATEMENT OF

SPECIES RANK FOR PRIMULA SULPHUREA AND A NEW RECORD FOR NEPAL has been submitted. Beside this a checklist of 295 plants of Ramaroshan area is prepared and is being verified.

Activity 2.5: Herpetofauna Survey

We could not conduct herpetofauna survey as the survey was conducted in winter season which is generally the hibernating period. Although we have managed to capture few pictures of lizards which were basking. We reported three species of lizards: Common Garden Lizard (*Calotes versicolor*), Kashmir Rock Agama (*Laudakia tuberculata*), and Agaupani Forest Agama (*Japulara dasi*), the later one being endemic to far west Nepal. The detailed records of herpetofauna from the previous study is presented in Table 3.



Figure 8: Kashmir Rock Agama observed during study

Table 3: Checklist of herpetofauna reported from the study area

S. No.	Common Name	Scientific Name	Shah et. al. 2014	FON Nepal 2023
	Amphibians			
1.	Himalayan Toad	<i>Duttaphrynus himalayanus</i>	observation	-----
2.	Khaptad Pelobatid Toad	<i>Scutigera nepalensis</i>	observation	-----
3.	Beautiful Stream Frog	<i>Amolops formosus</i>	Interview/literature	-----

4.	Bajhang Frog	<i>Nanorana ercepeae</i>	observation	-----
5.	Tiny Frog	<i>Nanorana minica</i>	observation	-----
	Reptiles (Lizards)			-----
1.	Common garden lizard	<i>Calotes versicolor</i>	observation	Observation
2.	Himalayan rock lizard	<i>Laudakia tuberculata</i>	observation	Observation
3.	Agaupani Forest Agama	<i>Oriotiaris dasi</i>	observation	Observation
4.	Sikkim Skink	<i>Asymblepharus sikimmensis</i>	observation	-----
5.	Himalayan Ground Sink	<i>Asymblepharus himalayanus</i>	observation	-----
6.	Brahminy Skink	<i>Mabuya carinata</i>	observation	-----
7.	Spotted Litter Skink	<i>Sphenomorphus maculates</i>	observation	-----
	Reptiles (Snakes)			
1.	Burmese Rock Python	<i>Python bivittatus</i>	interview	-----
2.	Mountain Keelback	<i>Amphiesma platyceps</i>	interview	-----
3.	Himalayan trinket snake	<i>Ophithriophis hodgsonii</i>	interview	-----
4.	Asian Rat Snake	<i>Ptyas mucosa</i>	Interview/literature	-----
5.	Himalayan Pit Viper	<i>Gloydius himalayanus</i>	interview	-----
6.	Mountain Pit Viper	<i>Ovophis monticola</i>	Interview	-----
7.	Green Pit Viper	<i>Trimeresurus sp.</i>	interview	-----

Activity 3: Assessment of Threats to Wildlife

Threats to wildlife was assessed using field observations (signs of hunting in the plot, number of gun shots heard during field survey, etc), questionnaire and datasheet. A total of 7 gunshot incidents were heard during our field work. The data entry for other threats is underway.

Activity 4: Assessment of Human-Wildlife Conflict

For the assessment of Human-Wildlife Conflict in the Ramaroshan area, semi structured questionnaire survey was carried out. Our study area comprises of 23 villages including 1200 households. First, the villages were categorized into three categories (very near, near, far) based on the walking distance from the largest lake, Jingale Taal (here after referred as center of forest). We then identified 10 villages in very near category (less than 1 hour walking distance from center of forest), 7 villages in near category (1-3 hours walking distance from center of forest), and 6 villages in far category (more than 3 hours walking distance from center of forest). Questionnaire survey was carried out only in very near and near village clusters, as the inhabitants solely dependent in the forest of Ramaroshan area. Sample size was maintained to at least 10% of the total household in each village. We did purposive survey to choose the first household of each village which was the first house below the major road. After surveying the first household, two consecutive households were systematically left, and the fourth household was surveyed. We managed to survey 147 households out of 610 existing households in two village clusters. Data management for this activity is underway.



Figure 9: A glimpse of Human Wildlife Conflict Survey

Activity 5: Workshop with local stakeholders

We planned to conduct a workshop in the beginning of the project, however due to time constraints of the stakeholders, we visited each of them including province, district and local level and briefed them about the program thoroughly. After analyzing the data, we are planning to conduct a sharing workshop.



Figure 10: Interaction with herders about wildlife

OTHER OBSERVATIONS DURING FIELD SURVEY

Our team sighted following mammals during the field work of bird survey, vegetation survey and camera trapping survey.

Table 4: List of mammals observed during the study period.

S. No.	Species	Live sighting occasions	Live sighting numbers	Calls heard occasions	Remarks
1	Barking Deer	1	2	10	
2	Himalayan Tahr	4	36	-	A herd of 20 individuals including 4 males were sighted in one occasion
3	Himalayan Goral	9	13	-	One individual was sighted above 3000 m
4	Asiatic Wild Boar	1	4	2	
5	Langur	6	107	-	Possible Kashmir Langur
6	Himalayan Black bear				18 scats in 0.5km ²
7	Assamese Macaque	1	10	-	
8	Yellow-throated Marten	5	12	-	
9	Golden Jackal	8	21	1	
10	Rhesus Macaque	1	1	-	
11	Lesser Striped Shrew	1	1		
12	Himalayan Rat	1	1		



Figure 11: Queen of Spain Fritillary spreading its wings in the warmth of sunlight

Table 5: Schedule of the study period

Date	Day	Activities	Remarks
November 27, 2022	1	Departed from Kathmandu	
November 28	2	Reached Mangalsen	
November 29	3	Reached Ramaroshan	
November 30	4	Camp at Jingale Taal	Camp 1
December 1, 2022	5	Camp at Jingale Taal	
December 2	6	Camp at Jingale Taal	
December 3	7	Camp at Jingale Taal	
December 4	8	Camp at Roshan Maidan	Camp 2
December 5	9	Camp at Roshan Maidan	
December 6	10	Camp at Roshan Maidan	
December 7	11	Camp at Roshan Maidan	
December 8	12	Camp at Kinimini Phant	Camp 3
December 9	13	Camp at Kinimini Phant	
December 10	14	Camp at Kinimini Phant	
December 11	15	Camp at Pase Kharka	Camp 4
December 12	16	Camp at Pase Kharka	
December 13	17	Camp at Pase Kharka	
December 14	18	Camp at Pase Kharka	
December 15	19	Camp at Nigaldadi	Camp 5
December 16	20	Camp at Nigaldadi	
December 17	21	Camp at Bhaurechulla	Camp 6
December 18	22	Camp at Bhaurechulla	
December 19	23	Camp at Dhanesalla	Camp 7
December 20	24	Camp at Dhanesalla	
December 21	25	Camp at Rame	Camp 8
December 22	26	Camp at Rame	
December 23	27	Camp at Salimkot	Camp 9
December 24	28	Camp at Salimkot	
December 25	29	Camp at Salimkot	
December 26	30	Reached Mangalsen	
December 27	31	Reached Nepalgunj	
December 28	32	Departed from Nepalgunj	
December 29	33	Reached Kathmandu	



Figure 12: One of the camp sites at Pase Kharka