

## **Project Update: February 2022**

**Background:** Out of 10 globally important bird and biodiversity areas in the world with the highest number of threatened raptor species, seven exist in Nepal (McClure et al 2018). Significant raptors population declines have been reported in six out of seven areas (McClure et al 2018). Anthropogenic activities such as trapping, poisoning, agricultural intensification, urbanisation, hunting, electrocution and collision with power lines have been regarded as a driving force behind declining populations (McClure et al 2018). Between 2016 and 2019, we deployed GPS transmitters on different species of raptors. This study showed raptors are highly vulnerable to electrocution/collision with the powerlines as we recently lost one bearded vulture and two mountain hawk eagles out of 21 birds tracked. The first one foraged over vast mountain ranges of Nepal with over 70% of their range lying outside the protected areas (Subedi et al 2018) and the second one, foraged often near to human settlements for easy prey (chicken) where the powerlines are laid. Similarly, we found several other electrocuted raptors. This shows raptors are the potential victims of the powerlines since most of the powerlines has been laid in raptor foraging, breeding and the areas where they take thermals to get a lift (forests, farmlands and ridges of the hills).

**Activity conducted:** Between 12<sup>th</sup> January – 7<sup>th</sup> February 2022, we did an electrocution survey in the foraging areas of bearded vulture (BV) and mountain hawk-eagle (MHE) based on their tracking data from our previous study. We overlaid the home range polygons of BV and MHE from the GPS tracked birds (total 14 birds) on Google Earth to identify areas to be surveyed. Based on the movement data, we focused our work on the Kaski (Thoolakharka, Dhampus, Ghandruk, Tolka, Bhadaurey, Panchase, Dipang, Puranchaur), Parbat (Deupur, Chitre) and northern belt of Syanja (Khamaley, Rapu) districts that lie in and around the periphery of Annapurna Conservation Area (Fig 1). Surveyed areas are the core ranges of bearded vulture in Nepal as shown from the movement study; as well as these areas overlap with the territories of mountain hawk eagle.

During the survey, we recorded mortalities of raptors and other birds due to electrocutions and collisions with the powerlines. Two researchers were involved throughout the survey period. During the survey period, we walked entirely under the power poles, inspected each of the pole tops and searched the ground within a radius of 7.6 m around the base of each pole for the presence of avian remains (Harness and Wilson 2001, Dwyer and Mannan 2007). We also walked beneath the power lines to record the mortalities of raptors and other birds that may happen due to the power line collision. We also collected information from opportunistic observation (e.g., personal communication - local people like herders, farmers, local electricians etc.) to record the mortalities.

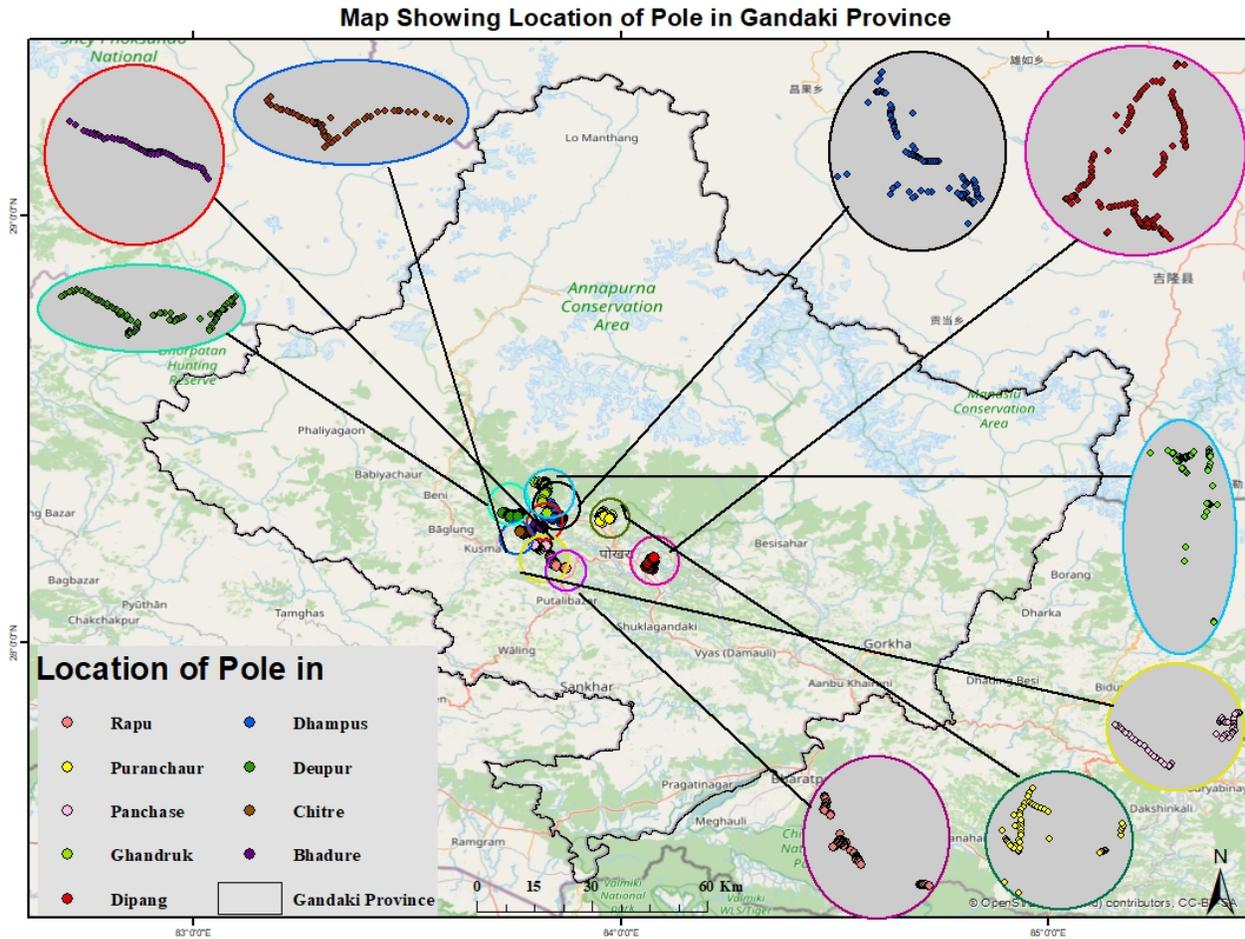


Fig 1: Map of the study area

**Results:** In total, we surveyed 687 power poles along the electricity distribution line and 25 high voltage (220 KV) electric transmission lines in the study areas (Dhampus -111, Deupur -103, Ghandruk and Tolka – 67, Bhadaurey – 63, Chitre – 56, Panchase – 57, Rapu – 56, Dipang – 139 and Puranchaur – 60). Six hundred and seventy-one (94.24%) power poles were made up of metal, 32 (4.49%) of concrete and nine (1.26%) of wood. Out of 712 power poles, 278 power poles did not have cross arms; they were connected to the insulator that was attached to the pole. All the cross arms of the poles were made up of metal. We found five variations among in cross arm type, i.e., triangular (32.87%), horizontal (9.41%), vertical (43.12%), mixed types with triangular and horizontal (0.28%), horizontal and vertical (9.41%) and triangular and vertical (4.92%) respectively. All the power line poles of the triangular were of “simple I” cross-shaped configuration while the horizontal cross arm types were “simple I – 56.72%” and “simple H-frame -43.28%” configuration. The vertical cross arm type has a “double circuit, angled struts” and “the three phases on one side, single circuit” configuration. Most of the insulating materials were made up of ceramics (85.96%) followed by glass (7.02%) and polymer (7.02%). Most of the insulators were arranged in a “simple pin-type” arrangement while few were in a “strain-insulators” arrangement pattern. We did not see any anti electrocution and anti-collision devices installed in the electric power lines and electric transmission lines.

In total, 45 electrocution and collision cases were recorded during the study. Among them 39 were non-raptors, six were raptors and one was a mammal (Table 1). Most of the electrocuted avian families were Corvidae followed by Sturnidae, Accipritidae, Ardeidae, Muscicapidae and Anatidae. Yellow-throated marten was found electrocuted in Deupur. The mortality rate of all birds (raptors + non-raptors) was found to be 6.32 birds/ 100 poles, which was 0.70/100 poles for only raptors.

**Table 1:** Checklist of birds and mammal that got electrocuted and collision in the powerlines

S. No	Species	Family	Status
Raptors			
1	Himalayan Vulture	Accipritidae	Near Threatened
2	Peregrine Falcon	Accipritidae	Least Concern
3	Black Kite	Accipritidae	Least Concern
4	Mountain Hawk Eagle	Accipritidae	Near Threatened
5	Unid Vulture	Accipritidae	
Non-raptors			
6	Large-billed Crow	Corvidae	Least Concern
7	Red-billed Blue Magpie	Corvidae	Least Concern
8	Oriole spp	Corvidae	Least Concern
9	Jungle Myna	Sturnidae	Least Concern
10	Common Myna	Sturnidae	Least Concern
11	Blue Whistling-thrush	Muscicapidae	Least Concern
12	Intermediate Egret	Ardeidae	Least Concern
13	Indian Pond Heron	Ardeidae	Least Concern
14	Black- crowned Night heron	Ardeidae	Least Concern
15	Lesser Whistling Duck	Anatidae	Least Concern
Mammals			
16	Yellow-throated Marten	Mustelidae	Least Concern

Bird electrocution was found in poles with all types of cross arm configurations and on both the metal as well as concrete poles. Detection and scavenging rates were not quantified, hence, there were minimal estimates and the real number killed per month is still unknown.

## References

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Photo: Annapurna Range seen from the Dhampus village



Photo: Pristine forests of Tolka where Mountain Hawk Eagle breeds and Majestic Bearded Vulture forage



Photo: Sidaney village of Panchase – a foraging area of Bearded Vulture and the forest on the background -a breeding habitat of Mountain Hawk Eagle



Photo: Farmland of Puranchaur



Photo: A landscape of Ghandruk village taken from the Northern side where Bearded Vulture often forages



Photo: Horizontal configuration with a "Simple H-frame" with a ceramic insulator arranged in "strain insulator" type with an external transformer



Photo: Triangular configuration with "Simple I" cross-shaped having a cross arm made of metal (left) and vertical configuration with an absence of cross-arm materials (right)



Photo" Power poles with a concrete pole material (left) and high-tension lines with a vertical configuration of "Double circuit, angled struts"



Photo:" Simple I" type of Horizontal configuration with a glass insulator "strain insulator" arrangement having 3 jumpers about the insulators



Photo: Injured Peregrine Falcon by electric poles found during the survey period in lower Dhampus



Photo: Researcher Mr. Milan Baral recording the data of the power poles in Dipang



Photo: Recording the decayed carcass of the large, billed crow situated under the electric poles in Bhadaurey



Photo: Dead bodies of Black-crowned Night Heron under the pole in Dipang (left) and Decayed bodies of Mountain Hawk Eagle under the electric poles in Panchase (right)