



REPORT

WHITE-BELLIED HERON

Ardea insignis

ANNUAL POPULATION SURVEY
2022



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Summary

The annual, White-bellied Heron (WBH) population survey conducted from 16 - 20 March 2022 accounts for two decades of consecutive surveys conducted since 2003. The survey, usually conducted annually from the last week of February to the first week of March was pushed to a later date this year due to the COVID-19 pandemic. The survey was conducted by more than 95 surveyors from Department of Forests and Park Services, members of Local Conservation Support Groups, and staff of the Royal Society for Protection of Nature. The survey covered major river basins that include the current and potential WBH sites categorized into zones. The data were gathered using Epicollect5 app that includes information of the observer, GPS coordinates of the sites, date, time, count, activity and major threats to the bird and habitats observed. A total of 24 WBH were recorded during the survey. From this, 22 individuals were observed in the wild including one dead carcass of WBH found, and 2 individuals for the total count are from the WBH conservation center.

Other bird species and wild animals sighted during the survey were also enumerated for record and to understand the diversity and population trend. The survey covered more than 600km of four major river basins in the country and recorded 224 bird species and 20 other wild animals.

Introduction/background

The *Ardea insignis*, Hume 1878, commonly known as the White-bellied Heron (WBH), is a rare and critically endangered species of bird that is restricted to a few Southeast Asian countries of Bhutan, Northeast India, and Myanmar. Within its range, the distribution is further isolated to a few undisturbed and healthy freshwater riverine ecosystems of the inner Himalayas.

In Bhutan, its presence was known since mid of 1970s, although the first breeding record was only confirmed in 2003 with the discovery of an active nest. Its' specialized habitat preference and ecological niche isolate itself to a few major river basins in Bhutan. Today, a major population is concentrated in two river basins of Punatsangchhu and Mangdechhu with occasional sightings from other rivers in the country. All the currently known breeding population is also restricted to these two river basins.

The Royal Society for Protection of Nature (RSPN) has been conducting an annual population census for WBH since 2003. The annual survey is conducted in known and potential occurrence sites across the country which is divided into habitat zones. The observation record from each zone is later accumulated as a census or a total count of WBH present in the country for a particular year. The result of the survey implies the number of individuals sighted in the field and it is not on the basis of estimation that is derived using different biodiversity indices. Therefore, an attempt is made to survey all potential areas within five consecutive days to find and count every individual present. At the end of the survey, the data are reviewed in detail and filtered to identify individuals on the basis of date, time, location, activity, and other information. An attempt is made to avoid double counting and missing counts. Also, it is assumed that herons are not flying very far (more than 20 - 30 km) during the night time which would set drawbacks in the approach and inaccuracy in the final count.

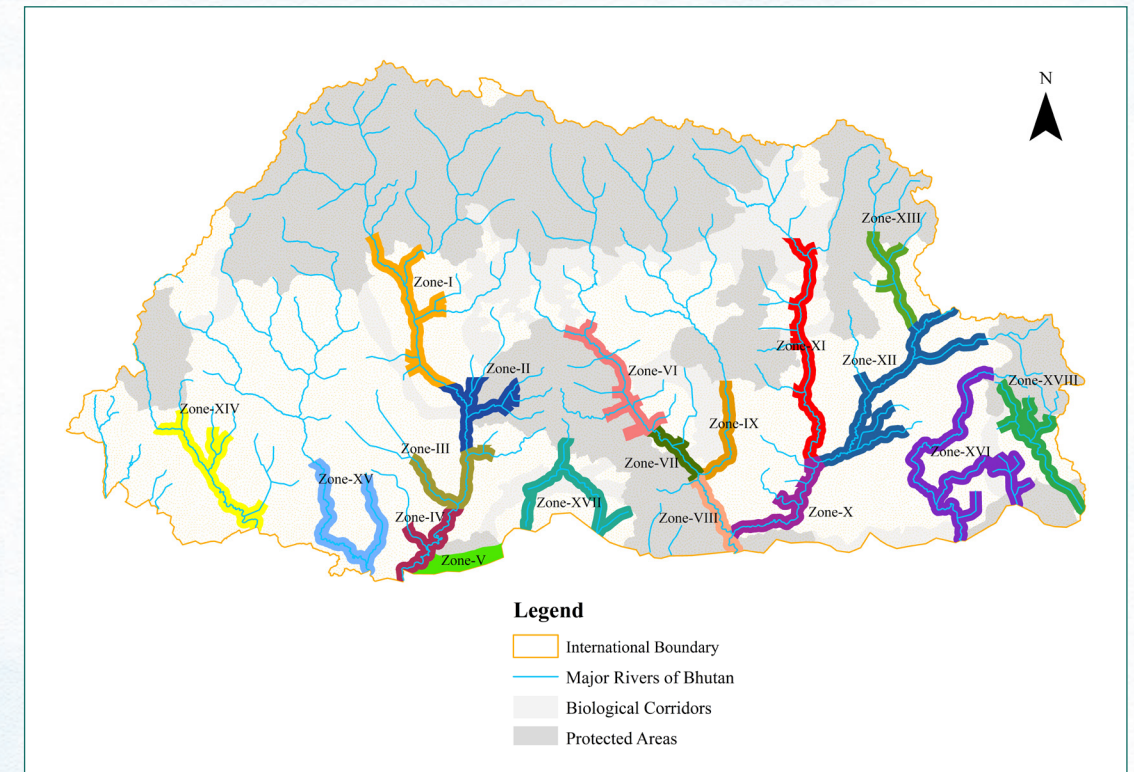
This annual survey, carried out since 2003, is a primary source of population information on WBH at the national level which aids in prioritizing conservation measures. Even, the survey methodology and core survey principles of the count have remained the same over the last two decades. Therefore, the data gathered thus far is comparable and useful for scientific inferences. In recent years survey, additional data are also gathered for other taxa to understand the overall biodiversity and health of the WBH landscape.



Materials/methods

The currently occupied and potential WBH habitats in Bhutan were divided into 18 zones for the WBH survey and mapping. It covered more than 5173 Sqkm of all major rivers and tributaries below the altitude of 1800 meters across the country. During the survey, the zones were further divided into 58 survey plots/transects where a surveyor was deployed to search for WBH. However, due to lack of any past observations and evidence of WBH occurrence in zone XIV, XVI, and XVIII located in extreme east and west, these areas were not covered during this survey.

Each surveyor walked along the designated transect, from 7:00AM - 6:00PM for five consecutive days looking for WBH and associated species. A total of 96 surveyors from DoFPS, LCSGs and RSPN were engaged for the survey. Data were collected using Epicollect5 mobile app on digital data collection platform. Prior to the survey, all the surveyors were familiarized in using Epicollect5 mobile App and survey protocols. While in the survey area, surveyor collected the data of observer's detail, location of start and end survey, details of WBH and other wildlife sightings, and threats observed. Even in the case where surveyor may not have observed WBH or any other wildlife to update during the period of survey, surveyors were required to update the location after every two hours for the record. While observation of WBH and other associated species were made, surveyors recorded additional information like time, GPS location, count, weather, age category (juvenile or adult) and threats from the conservation site. For other wildlife species, mostly birds and mammals, surveyors recorded GPS location, species and count for every species encountered during the survey. The species that were difficult to identify by the surveyors at the site were immediately consulted with the expert through social forum maintained in Telegram group. This helped in gathering accurate checklist of species observed. However, any doubtful species were removed from further analysis during the data cleaning and analysis.



Map 1: Map of prioritised habitat zones for White-bellied Heron population survey, 2022

Data analysis

All the data collected during the survey were uploaded on “WBH Annual Population Survey” project of Epicollect5 whenever surveyor had access to internet or at the end of the survey. The project was closed after the end of survey period and all data were downloaded as MS Excel and CSV file. The data were segregated into four categories; WBH observed, other wildlife observed, Start & End survey and Location update, and the Threats.

To determine the WBH population, only WBH observed data were used. The observations were grouped by dates and zones. To avoid potential double counting of the same individual and repeated entries by different surveyors, other supporting information such as surveyor, time, GPS location, age, date, and observational remarks were considered. For the final count, the highest number individuals sighted in any of the five survey days was taken as the total individual count from respective zone and summed.

Similarly, for other wildlife species, total number of species (species checklists) and total count were prepared for birds and mammals. Incomplete entries with missing coordinates, doubtful species and those species that are less likely to occur in the survey area during the period were removed. To determine the total count of observed individuals for each species, highest number of individuals sighted on particular transects in a zone were taken as a total count and later the count was summed from respective zones to represent the count for whole WBH survey area.

Microsoft Excel, R statistical package and ArcGIS Ver. 10.3 were used for data analysis, interpretation, and mapping.

Results

A total of 655 km of stretch of rivers, divided into 15 Zones and 58 transects within prioritised, White-bellied Heron sites were surveyed during the five-day annual population count. A total of 96 surveyors, ranging from one to four depending on the length and accessibility of the area were engaged during the survey. A total of 4872 data entries were gathered from the entire survey period of which 1.5% (74 entries) were WBH observations, 56.75% (4765 entries) for other wildlife species, and 41.72% (2033 entries) for the start and end survey location, and update location of every two hours period.

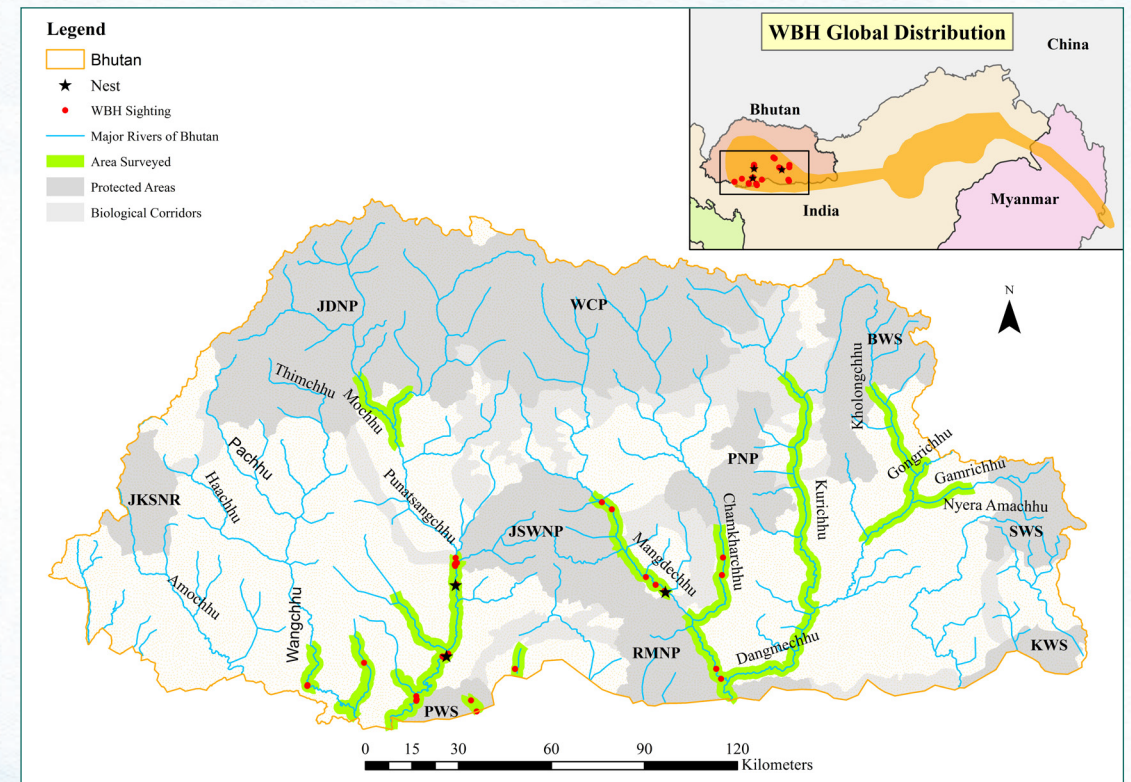
A total of 21 White-bellied Herons were sighted from 9 of the 15 zones surveyed (Table 1) in Punatsangchhu and Mangdechhu basins. With inclusion of one carcass recently found in Zone III and two birds in the conservation center, a total of 24 birds were confirmed in Bhutan for the year 2022. Details of the sighting location and area covered during the survey are illustrated in the Map 2 below.

Table 1: White-bellied Heron count from different priority zones as sighted during the population survey, 2022

	WBH Habitat Zones	Places	Count
In-situ	Zone - 2	Adha, Nagzhina, Hararongchhu, Kisonachhu and Taksha area	3
	Zone - 3	Burichhu, Sunkosh-Dagachhu, Relangthang, Wakletar, Balwani, Malbasey, Kalikhola and Middle Punatsangchhu area	7
	Zone - 4	Lamozingkha, Rangae and Gumti Lower Punatsangchhu area	2
	Zone - 5	Phibsoo Wildlife Sanctuary	1
	Zone - 6	Berti and Upper Mangdechhu area	1
	Zone - 7	Goling and Tsaidang area	3
	Zone - 8	Chamkharchhu, Pantang and Lower Mangdechhu area	2
	Zone - 10	Manas and Panbang and Lower Mangdechhu and Drangmechhu area	2
	Zone - 15	Jigmechhu and Wangchhu area	1
	WBH Conservation Center (WBHCC)		2
	Total Count		24



Figure 1: Graphs of WBH sighting details



Map 2: Map of area surveyed and White-bellied Heron sightings during the annual population survey, 2022

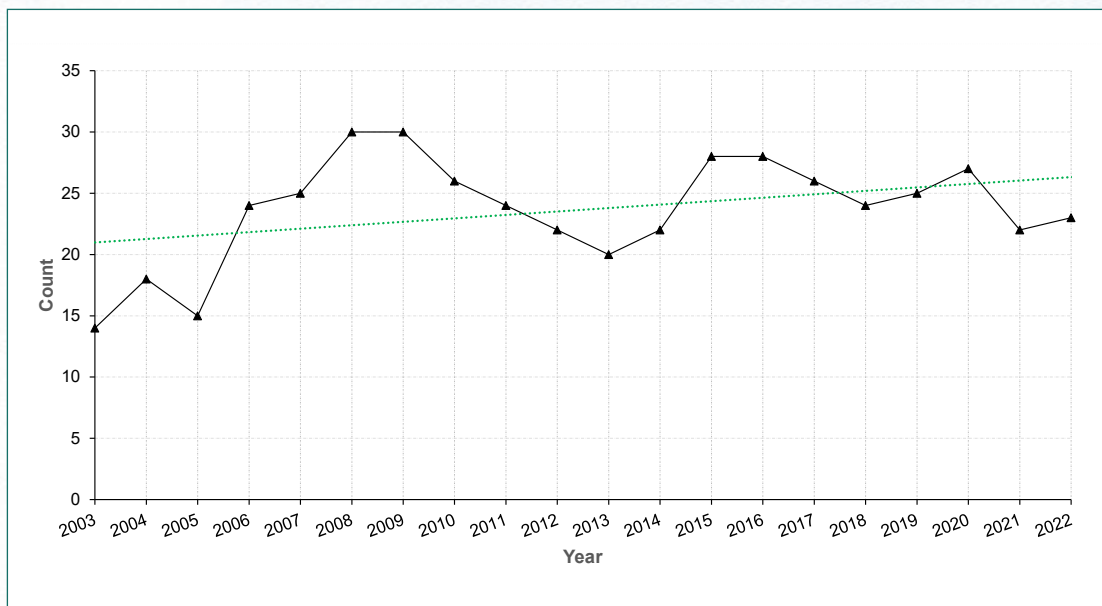


Figure 2: White-bellied Heron population trend in Bhutan, 2003 - 2022

The highest count of WBH in the wild were recorded from Zone III which extends from Wakleytar bridge to Balwani. A total count of seven individuals including two breeding pairs were recorded in the area. On the basis of river basins, 57% (12 individuals) were recorded from Punatsangchhu basin, 38% (8 individuals) in the Mangdechhu basin, and 5% (1 individual) in the Wangchhu basin. In comparison to the previous year, two less individuals were recorded from the Punatsangchhu basin, whereas same numbers were observed Mangdechhu basin. The first record of WBH from the Wangchhu basin was made in 2021 during the inventory, where two individuals were sighted from Wangchhu and Jigmechhu. However, only one individual was sighted during this annual population survey.

The analysis of population trends within zones indicate that the population is disappearing from zone I which extends from Phochu and Mochu to Kamichhu area under Punakha and Wangduephodrang. No herons have been sighted in the area for the past two consecutive years. Similarly, there were no sighting reports from Kurigongri basins that extend far east till Bumdeling in Trashiyangtse. However, there are past records of the occasional sightings of WBH from the upper Kurigngri basin; a lone individual was observed at Bumdeling wetland on 12 April 2020, at Gyelposhing on 9 October 2019, and at Jamkhardang in Trashiyangtse on 18 April 2016. Overall, the data analysis since 2003 indicates the declining

trend of the WBH population in Zone I and Zone II. For the zones, III, IV, V, VI, VII, VIII, and IX, an increasing population trend was observed though in some zones the counts are dropping in recent years. In the remaining zones, it is either observed once during the annual population survey since 2003 or there is no record of sightings made so far. Details of the population trend in each zone is presented in graphs (Fig.3).

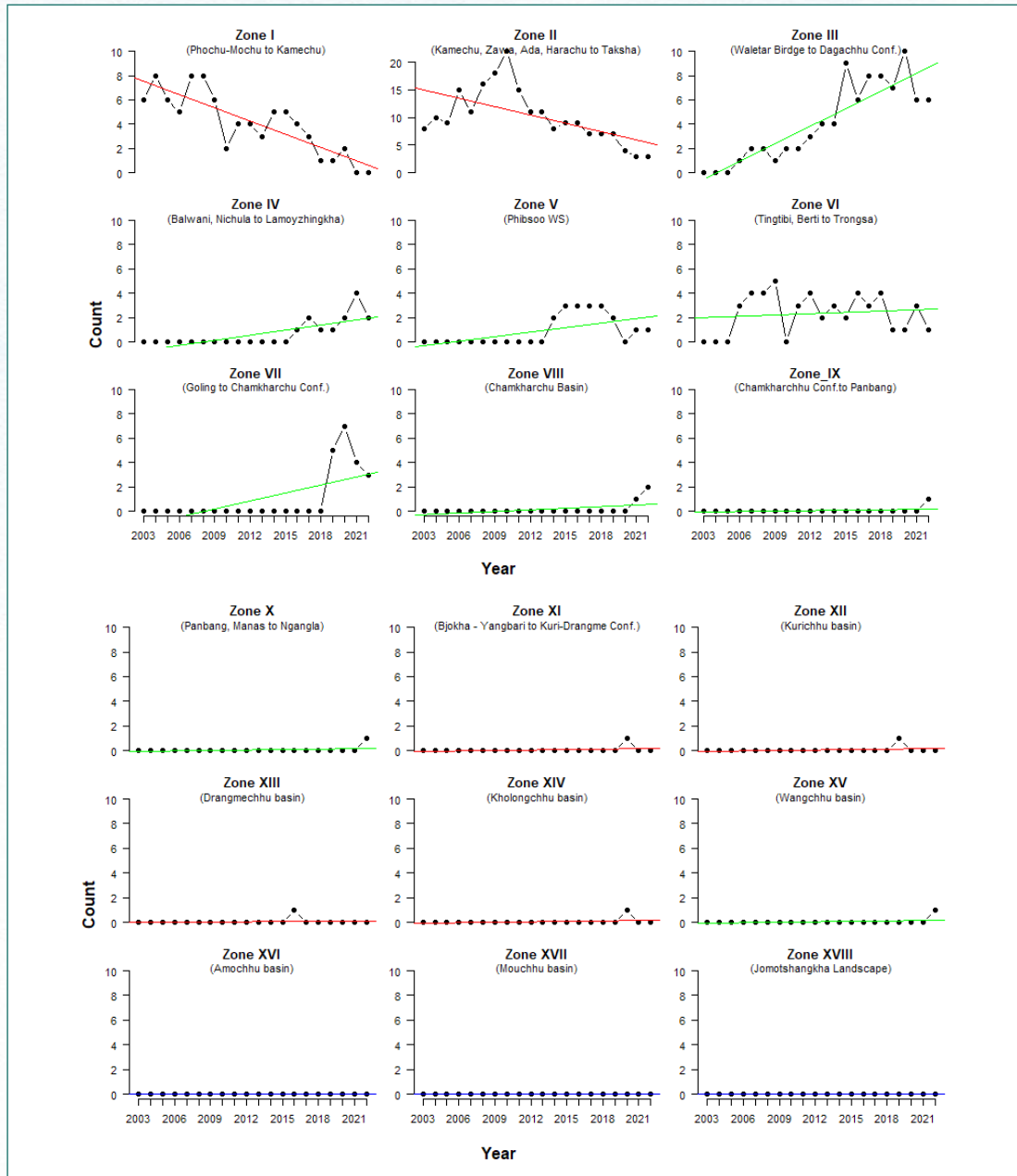


Figure 3: White-bellied Heron Population trend in different habitats zones since 2003

Wildlife diversity in White-bellied Heron landscape

The riverine ecosystems are known to host diverse species and are regarded as important corridors for wildlife. The data of other wildlife species gathered through the survey are important for the purpose of monitoring biodiversity health and understanding the overall pattern of wildlife diversity in the WBH landscape. Many birds and other animals are known to be sensitive to any environmental change, and their documentation can form an important basis to inform the conservation managers for intervention measures.

Some of the species that are of globally threatened similar to WBH will also add conservation value in preserving the landscape that has become critical habitat for the WBH.



Bird diversity

Bhutan is known for the rich diversity of birds because of its location between two biogeographical realms of the Palearctic and Indo-Malayan in the Eastern Himalayan biodiversity hotspot. The country also falls on two major migratory flyways; Central Asian and East Asia-Australasian flyways. Even, the presence of large river basins in the country provides a safe corridor for migration and stopover for many migratory birds. However, in this survey, only the bird species observed along the WBH habitat, mainly in the riverine ecosystem including the riparian habitat and adjacent forests are counted. The species were recorded by the surveyor using the Epicollect5 app during the five-day WBH population survey. Surveyors maintained the checklist of birds and other wildlife encountered during the survey and for every species observed, a count, GPS coordinate, and any other threats observed in the area were also recorded.

A total of 2599 observation entries of birds were made belonging to 66 families and 244 species. Most abundant family observed was Muscicapidae with 22 species. Species such as Great Cormorant *Phalacrocorax carbo*, Pallas's Fish Eagle *Haliaeetus leucoryphus*, Grey Heron *Ardea cinerea*, Osprey *Pandion haliaetus*, Tawny Fish Owl *Ketupa flavipes*, and Crested Kingfisher *Megaceryle lugubris* having similar feeding habit and site preferences to WBH were also observed. 249 individuals of Ruddy Shelducks *Tadorna ferruginea* were counted, which was highest count for single species during the survey.

Regarding global conservation status for the species observed, six were Near Threatened, four Vulnerable, one Endangered, one critically endangered and 232 were Least Concerned species.

Table 2: Checklist of birds sighted during the White-bellied Heron population survey

CR- Critically Endangered, **EN-** Endangered, **VU-** Vulnerable, **NE-** Near Threatened

Common Name	Scientific Name	Conservation Status	Count
Common Snipe	<i>Gallinago gallinago</i>		1
Pallas's Fish Eagle	<i>Haliaeetus leucoryphus</i>	EN	6
Aberrant Bush Warbler	<i>Cettia flavolivacea</i>	LC	2
Ashy Bulbul	<i>Hemixos flavala</i>	LC	33
Ashy Drongo	<i>Dicrurus leucophaeus</i>	LC	13
Ashy-throated Warbler	<i>Phylloscopus maculipennis</i>	LC	5
Asian Barred Owlet	<i>Iucium cuculoides</i>	LC	1
Asian Fairy Bluebird	<i>Irena puella</i>	LC	1

Common Name	Scientific Name	Conservation Status	Count
Asian Pied Starling	<i>Gracupica contra</i>	LC	3
Banded Bay Cuckoo	<i>Cacomantis sonneratii</i>	LC	2
Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	LC	2
Barred Cuckoo Dove	<i>Macropygia unchall</i>	LC	9
Bay Woodpecker	<i>Blythipicus pyrrhotis</i>	LC	1
Bhutan Laughingthrush	<i>Garrulax imbricatus</i>	LC	1
Black Bulbul	<i>Hypsipetes leucocephalus</i>	LC	71
Black Drongo	<i>Dicrurus macrocercus</i>	LC	7
Black Eagle	<i>Ictinaetus malaiensis</i>	LC	2
Black Redstart	<i>Phoenicurus ochrurus</i>	LC	2
Black Stork	<i>Ciconia nigra</i>	LC	2
Black-backed Forktail	<i>Enicurus immaculatus</i>	LC	4
Black-capped Kingfisher	<i>Halcyon pileata</i>	LC	1
Black-chinned Yuhina	<i>Yuhina nigrimenta</i>	LC	11
Black-crested Bulbul	<i>Hypsipetes leucocephalus</i>	LC	5
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	LC	2
Black-naped Monarch	<i>Hypothymis azurea</i>	LC	2
Black-throated Sunbird	<i>Aethopyga saturata</i>	LC	4
Black-throated Tit	<i>Aegithalos concinnus</i>	LC	8
Black-winged Cuckooshrike	<i>Coracina melaschistos</i>	LC	3
Blue Rock Thrush	<i>Monticola solitarius</i>	LC	6
Blue Whistling Thrush	<i>Myophonus caeruleus</i>	LC	51
Blue-fronted Redstart	<i>Phoenicurus frontalis</i>	LC	2
Blue-throated Barbet	<i>Megalaima asiatica</i>	LC	11
Blue-winged Siva	<i>Siva cyanouroptera</i>	LC	13
Booted Eagle	<i>Hieraaetus pennatus</i>	LC	1
Bronzed Drongo	<i>Dicrurus aeneus</i>	LC	2
Brown Bullfinch	<i>Pyrrhula nipalensis</i>	LC	8
Brown Dipper	<i>Cinclus pallasii</i>	LC	94
Brown Hawk Owl	<i>Nonox scutulata</i>	LC	1
Cattle Egret	<i>Bubulcus ibis</i>	LC	18
Chestnut-bellied Nuthatch	<i>Sitta cinnamoventris</i>	LC	4

Common Name	Scientific Name	Conservation Status	Count
Chestnut-bellied Rock Thrush	<i>Monticola rufiventris</i>	LC	3
Chestnut-crowned Bush Warbler	<i>Cettia major</i>	LC	3
Chestnut-crowned Laughingthrush	<i>Trochalopteron erythrocephalum</i>	LC	9
Chestnut-crowned Warbler	<i>Phylloscopus castaniceps</i>	LC	3
Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>	LC	7
Chestnut-headed Tesia	<i>Cettia castaneocoronata</i>	LC	2
Collared Falconet	<i>Microhierax caerulescens</i>	LC	2
Common Buzzard	<i>Buteo buteo</i>	LC	3
Common Green Magpie	<i>Cissa chinensis</i>	LC	2
Common Hawk Cuckoo	<i>Hierococcyx varius</i>	LC	1
Common Hill Myna	<i>Gracula religiosa</i>	LC	5
Common Hoopoe	<i>Upupa epops</i>	LC	3
Common Iora	<i>Aegithina tiphia</i>	LC	5
Common Kestrel	<i>Falco tinnunculus</i>	LC	5
Common Kingfisher	<i>Alcedo atthis</i>	LC	20
Common Myna	<i>Acridotheres tristis</i>	LC	5
Common Sandpiper	<i>Actitis hypoleucos</i>	LC	14
Common Stonechat	<i>Saxicola maurus</i>	LC	3
Common Tailorbird	<i>Orthotomus sutorius</i>	LC	1
Crested Kingfisher	<i>Megaceryle lugubris</i>	LC	33
Crested Serpent Eagle	<i>Spilornis cheela</i>	LC	11
Crimson Sunbird	<i>Aethopyga siparaja</i>	LC	5
Crimson-breasted Woodpecker	<i>Dryobates cathpharius</i>	LC	1
Darjeeling Woodpecker	<i>Dendrocopos darjellensis</i>	LC	1
Dark-sided Flycatcher	<i>Muscicapa sibirica</i>	LC	1
Dollarbird	<i>Eurystomus orientalis</i>	LC	2
Eurasian Thick-knee	<i>Burhinus oedicnemus</i>	LC	2
Eurasian Tree Sparrow	<i>Passer montanus</i>	LC	18
Eurasian Wigeon	<i>Mareca penelope</i>	LC	3
Fire-breasted Flowerpecker	<i>Dicaeum erythrorhax</i>	LC	1
Fulvous-breasted Woodpecker	<i>Dendrocopos macei</i>	LC	1

Common Name	Scientific Name	Conservation Status	Count
Golden-throated Barbet	<i>Psilopogon franklinii</i>	LC	3
Goosander/Merganser	<i>Mergus merganser</i>	LC	21
Great Barbet	<i>Psilopogon virens</i>	LC	24
Great Cormorant	<i>Phalacrocorax carbo</i>	LC	227
Great Egret	<i>Ardea alba</i>	LC	6
Great Thick-knee	<i>Esacus recurvirostris</i>	LC	2
Great-crested Grebe	<i>Podiceps cristatus</i>	LC	1
Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	LC	2
Greater Yellownappe	<i>Chrysoplegma flavinucha</i>	LC	3
Green Sandpiper	<i>Tringa ochropus</i>	LC	1
Green Shrike Babbler	<i>Pteruthius xanthochlorus</i>	LC	3
Green-backed Tit	<i>Parus monticolus</i>	LC	18
Green-billed Malkoha	<i>Phaenicophaeus tristis</i>	LC	2
Green-tailed Sunbird	<i>Aethopyga nipalensis</i>	LC	2
Grey Heron	<i>Ardea cinerea</i>	LC	3
Grey Nightjar	<i>Caprimulgus jotaka</i>	LC	1
Grey Treepie	<i>Dendrocitta formosae</i>	LC	39
Grey Wagtail	<i>Motacilla cinerea</i>	LC	15
Grey-backed Shrike	<i>Lanius tephronotus</i>	LC	7
Grey-bellied Tesia	<i>Tesia cyaniventer</i>	LC	1
Grey-chinned Minivet	<i>Pericrocotus solaris</i>	LC	6
Grey-headed Canary Flycatcher	<i>Culicicapa ceylonensis</i>	LC	2
Grey-headed Woodpecker	<i>Picus canus</i>	LC	3
Grey-hooded Warbler	<i>Phylloscopus xanthoschistos</i>	LC	17
Grey-winged Blackbird	<i>Turdus boulboul</i>	LC	1
Hill Partridge	<i>Arborophila torqueola</i>	LC	7
Himalayan Bluetail	<i>Tarsiger rufilatus</i>	LC	3
Himalayan Bulbul	<i>Pycnonotus leucogenys</i>	LC	41
Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>	LC	18
House Crow	<i>Corvus splendens</i>	LC	3
House Sparrow	<i>Corvus splendens</i>	LC	2

Common Name	Scientific Name	Conservation Status	Count
Ibisbill	<i>Ibidorhyncha struthersii</i>	LC	9
Indian Peafowl	<i>Pavo cristatus</i>	LC	8
Indian Pond Heron	<i>Ardeola grayii</i>	LC	4
Indian Robin	<i>Copsychus fulicatus</i>	LC	4
Indian Roller	<i>Coracias benghalensis</i>	LC	1
Jungle Myna	<i>Acridotheres fuscus</i>	LC	5
Kalij Pheasant	<i>Lophura leucomelanos</i>	LC	21
Large Woodshrike	<i>Tephrodornis virgatus</i>	LC	1
Large-billed Crow	<i>Corvus macrorhynchos</i>	LC	27
Lemon-rumped Warbler	<i>Phylloscopus chloronotus</i>	LC	1
Lesser Coucal	<i>Centropus bengalensis</i>	LC	1
Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	LC	5
Lesser Yellownappe	<i>Picus chlorolophus</i>	LC	2
Little Bunting	<i>Emberiza pusilla</i>	LC	4
Little Cormorant	<i>Microcarbo niger</i>	LC	3
Little Egret	<i>Egretta garzetta</i>	LC	7
Little Forktail	<i>Enicurus scouleri</i>	LC	4
Little Ringed Plover	<i>Charadrius dubius</i>	LC	9
Long-tailed Broadbill	<i>Psarisomus dalhousiae</i>	LC	1
Long-tailed Minivet	<i>Pericrocotus ethologus</i>	LC	16
Long-tailed Shrike	<i>Lanius schach</i>	LC	2
Long-tailed Thrush	<i>Zoothera dixonii</i>	LC	2
Mallard	<i>Anas platyrhynchos</i>	LC	7
Maroon Oriole	<i>Oriolus traillii</i>	LC	2
Maroon-backed Accentor	<i>Prunella immaculata</i>	LC	4
Mountain Bulbul	<i>Ixos mccllellandii</i>	LC	12
Mountain Imperial Pigeon	<i>Ducula badia</i>	LC	11
Nepal Fulvetta	<i>Alcippe nipalensis</i>	LC	13
Northern Goshawk	<i>Accipiter gentilis</i>	LC	1
Olive-backed Pipit	<i>Anthus hodgsoni</i>	LC	6
Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>	LC	6

Common Name	Scientific Name	Conservation Status	Count
Oriental Honey-buzzard	<i>Pernis ptilorhynchus</i>	LC	1
Oriental Magpie Robin	<i>Copsychus saularis</i>	LC	12
Oriental Pied Hornbill	<i>Anthracoceros albirostris</i>	LC	2
Oriental Skylark	<i>Alauda gulgula</i>	LC	3
Oriental Turtle Dove	<i>Oriental Turtle Dove</i>	LC	3
Oriental White-eye	<i>Zosterops palpebrosus</i>	LC	29
Osprey	<i>Pandion haliaetus</i>	LC	5
Paddyfield Pipit	<i>Anthus rufulus</i>	LC	6
Pallas's Gull	<i>Ichthyaetus ichthyaetus</i>	LC	1
Plain-backed Thrush	<i>Zoothera mollissima</i>	LC	3
Plumbeous Water Redstart	<i>Phoenicurus fuliginosus</i>	LC	108
Red Junglefowl	<i>Gallus gallus</i>	LC	8
Red-crested Pochard	<i>Netta rufina</i>	LC	3
Red-faced Liocichla	<i>Liocichla phoenicea</i>	LC	5
Red-headed Trogon	<i>Harpactes erthrocephalus</i>	LC	2
Red-tailed Minla	<i>Minla ignotincta</i>	LC	7
Red-vented Bulbul	<i>Pycnonotus cafer</i>	LC	95
Red-wattled Lapwing	<i>Vanellus indicus</i>	LC	8
Rock Pigeon	<i>Columba livia</i>	LC	12
Rosy Pipit	<i>Anthus roseatus</i>	LC	5
Ruddy Shelduck	<i>Tadorna ferruginea</i>	LC	249
Rufescent Prinia	<i>Prinia rufescens</i>	LC	1
Rufous Sibia	<i>Heterophasia capistrata</i>	LC	18
Rufous Woodpecker	<i>Micropternus brachyurus</i>	LC	2
Rufous-bellied Niltava	<i>Niltava sundara</i>	LC	4
Rufous-breasted Accentor	<i>Prunella strophiata</i>	LC	5
Rufous-capped Babbler	<i>Cyanoderma ruficeps</i>	LC	1
Rufous-fronted Tit	<i>Aegithalos iouschistos</i>	LC	5
Rufous-necked Laughingthrush	<i>Pterorhinus ruficollis</i>	LC	6
Rufous-vented Yuhina	<i>Yuhina occipitalis</i>	LC	1
Russet Sparrow	<i>Passer cinnamomeus</i>	LC	18

Common Name	Scientific Name	Conservation Status	Count
Rusty-cheeked Scimitar Babbler	<i>Erythrogonys erythrogonys</i>	LC	4
Savanna Nightjar	<i>Caprimulgus affinis</i>	LC	1
Scaly Thrush	<i>Zoothera dauma</i>	LC	7
Scaly-breasted Munia	<i>Lonchura punctulata</i>	LC	7
Scaly-breasted Wren Babbler	<i>Pnoepyga albiventer</i>	LC	1
Scarlet Minivet	<i>Pericrocotus speciosus</i>	LC	31
Shikra	<i>Accipiter badius</i>	LC	1
Short-billed Minivet	<i>Pericrocotus brevirostris</i>	LC	7
Slaty-backed Flycatcher	<i>Ficedula erithacus</i>	LC	4
Slaty-backed Forktail	<i>Enicurus schistaceus</i>	LC	13
Small Niltava	<i>Niltava macgrigoriae</i>	LC	2
Small Pratincole	<i>Glareola lactea</i>	LC	20
Snow Pigeon	<i>Columba leuconota</i>	LC	31
Speckled Wood Pigeon	<i>Columba hodgsonii</i>	LC	5
Spot-winged Grosbeak	<i>Mycerobas melanozanthos</i>	LC	11
Spotted Dove	<i>Spilopelia chinensis</i>	LC	18
Spotted Forktail	<i>Enicurus maculatus</i>	LC	5
Striated Heron	<i>Butorides striata</i>	LC	1
Striated Laughingthrush	<i>Grammatoptila striatus</i>	LC	9
Striated Prinia	<i>Prinia crinigera</i>	LC	1
Stripe-throated Yuhina	<i>Yuhina gularis</i>	LC	10
Sultan Tit	<i>Melanochlora sultanea</i>	LC	5
Tawny Fish Owl	<i>Ketupa flavipes</i>	LC	3
Tibetan Serin	<i>Spinus thibetanus</i>	LC	45
Tufted Duck	<i>Aythya fuligula</i>	LC	3
Verditer Flycatcher	<i>Eumyias thalassinus</i>	LC	1
Wallcreeper	<i>Tichodroma muraria</i>	LC	3
Whiskered Yuhina	<i>Yuhina flavicollis</i>	LC	7
White wagtail	<i>Motacilla alba</i>	LC	57
White-bellied Redstart	<i>Luscinia phaenicuroides</i>	LC	2

Common Name	Scientific Name	Conservation Status	Count
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	LC	2
White-browed Fulvetta	<i>Fulvetta vinipectus</i>	LC	2
White-browed Scimitar Babbler	<i>Pomatorhinus schisticeps</i>	LC	2
White-browed Shrike babbler	<i>Pteruthius aeralatus</i>)	LC	6
White-browed Wagtail	<i>Motacilla maderaspatensis</i>	LC	25
White-capped Water Redstart	<i>Phoenicurus leucocephalus</i>	LC	93
White-collared Blackbird	<i>Turdus albocinctus</i>	LC	2
White-crested Laughingthrush	<i>Garrulax leucolophus</i>	LC	22
White-crowned Forktail	<i>Enicurus leschenaulti</i>	LC	2
White-naped Yuhina	<i>Yuhina bakeri</i>	LC	3
White-tailed Nuthatch	<i>Sitta himalayensis</i>	LC	3
White-throated Bulbul	<i>Alophoixus flaveolus</i>	LC	2
White-throated Fantail	<i>Rhipidura albicollis</i>	LC	3
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	LC	16
White-throated Laughingthrush	<i>Pterorhinus albogularis</i>	LC	21
Yellow Wagtail	<i>Motacilla flava</i>	LC	1
Yellow-bellied Fantail	<i>Chelidorhynch hypoxanthus</i>	LC	1
Yellow-billed Blue Magpie	<i>Urocissa flavirostris</i>	LC	1
Yellow-breasted Greenfinch	<i>Chloris spinoides</i>	LC	13
Yellow-vented Warbler	<i>Phylloscopus cantator</i>	LC	15
Blossom-headed Parakeet	<i>Psittacula roseata</i>	NT	3
Ferruginous Duck	<i>Aythya nyroca</i>	NT	13
Green Imperial Pigeon	<i>Ducula aenea</i>	NT	5
Mountain Hawk Eagle	<i>Nisaetus nipalensis</i>	NT	3
Red-breasted Parakeet	<i>Psittacula alexandri</i>	NT	6
River Lapwing	<i>Vanellus duvaucelii</i>	NT	82
Great Hornbill	<i>Buceros bicornis</i>	VU	29
River Tern	<i>Sterna aurantia</i>	VU	2
Rufous-necked Hornbill	<i>Aceros nipalensis</i>	VU	4
Wreathed Hornbill	<i>Pterorhinus albogularis</i>	VU	1

Other wildlife diversity in White-bellied Heron landscape

Similar to WBH, and other birds, mammals encountered during the survey were recorded including their count. From the total of 712 entries of mammals made by surveyors, there were 20 species. Three species were of Near Threatened, five Vulnerable, two Endangered, one Data Deficient, and nine of least Concerned. Assamese Macaque was the most abundant mammalian species found during the survey.

Table 3: Checklist of mammals sighted during the White-bellied Heron population survey

Common Name	Scientific name	Conservation Status	Count
Asiatic Black Bear	<i>Ursus thibetanus</i>	VU	2
Assamese Macaque	<i>Macaca assamensis</i>	NT	302
Barking Deer	<i>Muntiacus muntjak</i>	LC	18
Capped Langur	<i>Trachypithecus pileatus</i>	VU	50
Crab eating Mongoose	<i>Herpestes urva</i>	LC	1
Eurasian Otter	<i>Lutra lutra</i>	NT	1
Golden Langur	<i>Trachypithecus geei</i>	EN	97
Himalayan Goral	<i>Naemorhedus goral</i>	NT	9
Hanuman Langur/Gray Langur	<i>Semnopithecus</i>	LC	35
Himalayan Serow	<i>Capricornis sumatraensis thar</i>	VU	1
Himalayan striped Squirrel	<i>Tamiops mccllellandii</i>	LC	1
Kashmir Cave Bat	<i>Myotis longipes</i>	DD	20
Orange-bellied Himalayan Squirrel	<i>Dremomys lokriah</i>	LC	1
Rhesus Macaque	<i>Macaca mulatta</i>	LC	5
Sambar deer	<i>Rusa unicolor</i>	VU	8
Bengal Slow Loris	<i>Nycticebus bengalensis</i>	EN	1
Smooth-coated Otter	<i>Lutrogale perspicillata</i>	VU	68
Spotted Deer	<i>Cervus axis</i>	LC	70
Wild Boar	<i>Sus scrofa</i>	LC	12
Yellow-throated Marten	<i>Martes flavigula</i>	LC	10

Threats to White-bellied Heron and other wildlife

The riverine ecosystems in the inner Himalayan region are threatened by many anthropogenic factors. WBH birds, which are completely associated with the riverine ecosystem are at high risk of extinction due to habitat loss and degradation. It is also constrained by the impact of climate change, natural calamities, diminishing food resources and limited knowledge on its ecology and biology. Indirectly, lack of awareness, lack of knowledge, and negligence is also driving the species to the edge.

The data gathered through this population survey indicate that some levels of threats are widespread across the river systems in Bhutan. In more than 438 sites, threats such as encroachment of wildlife habitat by settlements, cattle grazing, natural resource extraction, waste pollution, infrastructure development, hydropower, driftwood collection, logging, forest fire, fishing, riverside recreational activities, and natural sign of habitat degradation were observed.

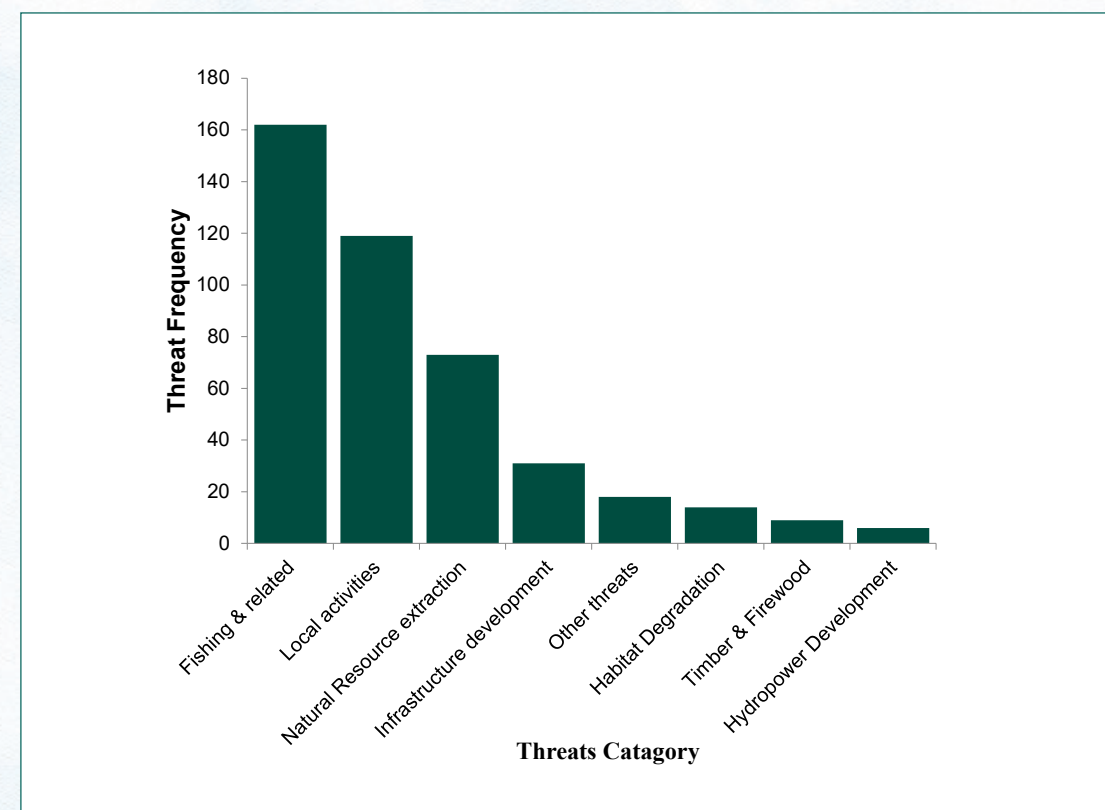


Figure 4: Common threats observed along the survey sites during the population survey (the graph doesn't indicate the severity of threats by only the frequency of occurrence).

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We appreciate the support and hard work of all surveyors, local conservation support groups and volunteers in making this annual survey a success.

List of surveyors

SI No	Surveyor Name	Division/Park/LCSG	Survey Area
1	Kencho Wangdi	Dagana Forest Division(Dagana range)	Darachhu confluence-Pelichhu
2	Pema Dorji Tamang		
3	Ran.Bdr.Rai	Dagapela Range office	Daga dam - Darachhu Confluence
4	San.Bahadur Tamang		
5	Sangay Drukpa	Dungzam Park Range	Bumdeling area (Yangtse to Kangteng)
6	Ugyen Wangmo		
7	Choki Lham	JDNP, Punakha	Rimchu to Shatem and potential area
8	Karma Jangchuk		
9	Leki Wangdi		
10	Pema Dendup		
11	Tshering		
12	Wangchuk		

SI No	Surveyor Name	Division/Park/LCSG	Survey Area
13	Ngawang Tenzin	JSWNP Taksha range office	Pinsa -Gebachhu -Taksha-Wakletar Bridge
14	Tshering Dorji		
15	Kado Rinchen	JSWNP, Trongsa	Nabji-Korphu
16	Ratan Giri		
17	Nar Bdr. Rai	Local Conservation Support Group (LCSG)	Balwani-Kalikhola Confluence
18	Dorji		Bertichhu
19	Karna Bdr. Tamang		Chunikhang base-Dagachhu Confluence
20	Phurba (Security)		Damji till Rueychena
21	Penjor		Harachu-Migtana
22	Chitra Kumar Gurung		Jigmechhu-Wangchhu
23	Choki Dorji		
24	Partab Gurung		Kalikhola Confluence-Domakha
25	Garjaman Rai		
26	Kharka Singh Chhettri		Kalikhola Confluence-Domakha
27	Sam Bdr. Tamang		Karmaling-Samachhu
28	Choten Norbu		Lower Drangmeychhu
29	Dechen Pem		Maachhu, Nebachhu, Ada lake
30	Gyan Kumar Limbu		Malbasey-Kalikhola Confluence
31	Tshering Norbu		Paibang - Pantang - Panbang
32	Dorji Wangchuk		Panbang
33	Ektar Subba		Rangakhola-Gumaniey
34	Sukman Layo Mongar		Rateykhola-Chunikhang base
35	Kinley Penjor		Samdingkha-Tshosabu
36	Moni Raj Chhettri		Sunkosh-Ratey Khola
37	Monilal Rai		Thamchen
38	Suk Bahdhur	Wangchhu	
39	Harka Kharka	Zawa-Digchhu Confluene	
40	Chado (Selden)	Zeelangbi-Chamkharchhu	
41	Dorji Nima		

SI No	Surveyor Name	Division/Park/LCSG	Survey Area		
42	Karma Tenzin	Lhamoizingkha Range	Karmaling to Lhamoizingkha		
43	Kumar Limbu				
44	Gempa	Mendrelgang, Tsirang Forest Division	Ratey khola-Dagachhu confluence		
45	Gyeltshen	Mongar Forest Division	Dorjilung-Autsho area		
46	Krishna Prasad Dhimal				
47	Tendel Wangdi				
48	Kinley Wangdi		Kurigongri Confluence - Kuri Zampa		
49	Lhadharla				
50	Binod Kumar Subba	Pangbang Zhemgang Forest Division	Pangbang_Kurigongri side		
51	Sangay Choden				
52	Indra Kumar Bhujel				
53	Tandin Wangchuk	Pangtang BO, Gomphpu, RMNP	Paibang - Pantang - Panbang		
54	Pema Zangpo	Pemagastshel Forest Division	Tshobaley -Yangbari-Kuri-Gongri confluence		
55	Cheki Wangdi	PWS	Phibsoo wildlife Sanctuary (Phibsoo & Longa, other potential rivers)		
56	Pema Tshering				
57	Bal.Krishan. Koirala				
58	Dorji Rabten				
59	Khandu				
60	Khandu Tshomo				
61	Namgyel Dorji				
62	Pema Jamtsho				
63	Phuntsho Tobgay				
64	Rekila				
65	Tshewang Tenzin				
66	Yeshi Tshering				
67	Karma Chedup			PWS, Nichula	Sama Doven- Karmaling
68	Namgay Tenzin				
69	Pema Dorji				
70	Ugyen				

SI No	Surveyor Name	Division/Park/LCSG	Survey Area
71	Sangay Dorji	RMNP	Panbang - Manas
72	Tshering Dorji		
73	Rinchen Wangdi	Trashigang , Division	Drangmechhu-Gamrichhu valley
74	Sonam Tobgay		
75	Sonam Dendup		Rollongrii-Jamkhardrang (Trashigang)
76	Tshewang Lhendup		
77	Ugyen Dechen		
78	Chhoglay Namgyel	Trashigang, Doksum Range	Doksum-along Drangmechhu (Doksum-Gongza)
79	Tenzin Namgyal		
80	Pema Tshewang	Trashigang, Jamkhar Beat	Jamkhardrang-Doksum
81	Rinzin Phuntsho		
82	Singye Wangchuk	Trashigang, Udorong Beat	Rollongrii-Drangmechhu (Downstream)-Gengkhar/thangrong
83	Pema Tenzin	Trashigang, Yangtshe Range	Yangtse area (Khencholing-Dongdi)
84	Phuntsho		
85	Kinley	Tsirang Forest Division	Malbasey-Kalikhola Confluence
86	Birkha Bdr.Mongar		Wakleytar-Burichhu
87	Singye	WFD(Punakha Range)	Phochhu-Mochhu Confluence - Samdingkha
88	Pema Namgay		Phochhu-Mochhu Confluence - Zomlingthang
89	Norbu		Samdingkha - Wolathang area
90	Chimi Rinzin		Zomlingthang - Kabesa
91	Kuenzang Thinley	Zhemgang Forest Division	Pirchen-Goling
92	Yeshi Dorji		Tintibe to Kungki
93	Sherab Jamtsho		Upper Chamkhachhu basin
94	Tshering Dorji		



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