A WINTER 2015-2016 STUDY OF BLACK-NECKED CRANES

(1st November, 2015 - 20th March, 2016)

“Habitat mapping and population change of Black-necked Crane in Bumdeling wintering habitat, Eastern Bhutan”.

Sangay Drukpa

Supported by Oriental Bird Club, UK
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<tr>
<th>ACRONYMS</th>
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<tbody>
<tr>
<td>BNC</td>
<td>Black-necked Crane</td>
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<tr>
<td>BWS</td>
<td>Bumdeling Wildlife Sanctuary</td>
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<tr>
<td>ICF</td>
<td>International Crane Foundation</td>
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<tr>
<td>FNCA</td>
<td>Forest and Nature Conservation Act</td>
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<td>FNCR</td>
<td>Forest and Nature Conservation Rule</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<td>GIS</td>
<td>Geographic Information System</td>
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<td>RSPN</td>
<td>Royal Society for Protection of Nature</td>
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<td>WMD</td>
<td>Watershed Management Division</td>
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EXECUTIVE SUMMARY

Black-necked Crane (BNC) (*Grus nigricollis*) is last of 15 cranes species to be discovered (ICF, 2012) and it is classified as vulnerable species by IUCN due to its single small population that is in decline owing to the loss and degradation of wetland. BNC is listed under Schedule I of Forest and Nature conservation Act (FNCA) of Bhutan 1995 and Forest and Nature conservation Rules (FNCR) of Bhutan 2006. BNC breeds on the Qinghai-Tibetan plateau in China, with a small population in adjacent Ladakh in India. The wintering areas are identified at lower altitudes on Qinghai-Tibet and Yunnan-Guizhou plateau, Yunnan and Western Guizhou in China. It also winters in Bhutan and in Arunachal Pradesh in India. In Bhutan it is found between 1770 and 3050 masl and the main wintering grounds are Phobjikha, Khothokha, Gyetsa-Chumey and Bumdeling. Bumdeling is located in northeastern part of Bhutan and hosts about 100 individuals every year. The cranes fly to other adjacent areas in Yangtse valley for foraging due to insufficient feeding areas in Bumdeling and high disturbances. In total about 14 foraging grounds including regular and stopovers feeding areas are identified. Some of the areas are abandoned due to human disturbances, stray dogs and developmental activities taking place. The numbers of BNC visiting this habitat is in decline. The maximum number (203 individuals) visited in 1993-1994 and the minimum number (94 individuals) in 2010-2011. In 2015-2016 winter, 109 individuals (9-Juvenile and 100- Adult) were counted. Threats such as disturbances by stray dogs and local people were also observed in the habitat.

**Key words:** Black-necked Crane (*Grus nigricollis*), Bumdeling, Habitat, Mapping, Population.
1. INTRODUCTION

1.1. Introduction

Black-necked Crane (BNC) (*Grus nigricollis*) is the last to be discovered amongst 15 crane species in the world (ICF, 2012) and the least effort has been put on this species for its ecological, biological and demographic researches (Sherub, 2009). However, due to its single small population that is in decline owing to the loss and degradation of wetland, and changing agricultural practices in both breeding and wintering grounds, it is classified as vulnerable by IUCN (Buzzard, *et al.* 2012). In Bhutan, it is listed under Schedule I of Forest and Nature conservation Act (FNCA) of Bhutan 1995 and Forest and Nature conservation Rules (FNCR) of Bhutan 2006.

BNC breeds on the Qinghai-Tibetan plateau in China, with a small population in adjacent Ladakh in India (Birdlife International, 2001). The wintering areas are identified at lower altitudes on Qinghai-Tibet and Yunnan-Guizhou plateau, Yunnan and Western Guizhou in China (Li, 2005). It also winters in Bhutan and in Arunachal Pradesh in India, small number was once recorded in Vietnam (Bishop and Drolma, 2007), but now it has been more than 30 years without seeing it. BNCs are found at elevations between 1900 and 3050 masl in the winter and 2950 and 4900 masl in the breeding season (Bishop, 1996). As per Inskipp *et al.*, (1999), it is found between 1770 and 3050 masl in Bhutan.

In addition to China and India, Bhutan is one of the major wintering habitats of BNC (Namgay and Wangchuk, 2016). Phobjikha, Bumdeling, Gyetsa, and Khothokha are main habitat in Bhutan. However, small numbers are also recorded from Kurtoe in Lhuntse. Bumdeling habitat is located at 1900 masl and the habitat comprises of marshes, riverine shingles, flowing rivers, sand bank, fields and ponds.

The global population estimated at 10,070-10970 individuals (Birdlife International, 2012) and Bhutan hosts more than 500 individuals every winter. Bhutan alone recorded 609 individuals of BNC (RSPN, 2016) and of these 109 individuals was found in Bumdeling Habitat during 2015-2016 winter. Protection of wetlands to conserve this wetland iconic migratory bird was found very important and in 2012 the Royal Government of Bhutan joined RAMSAR Convention and declared 141.50 and 113.50 hectares of wetland in Bumdeling and Khotokha respectively as Ramsar site. Bumdeling site is used by cranes as their main roosting site and also feeding grounds. The only roosting site is located at the riverside of the Kholongchu River that is flowing from the heart of the valley. Cranes in Bumdeling mainly forage on fallen rice grains in the paddy fields as their primary food sources besides roost and tubers, insects and worms. The feeding sites are scattered all over
Bumdeling and Yangtse valleys. Yangtse valley is located in south approximately 10 KMs from the roosting site. After full winter study by Chako in 1991-1992, 1992-1993 and 1997-1998, very few studies have been carried out in the conservation of BNC; Cranes’ migratory routes, threats and conservation prospects, Habitat use by Black-necked Crane, Habitat mapping and assessing conservation threats in Bumthang and Current population status and conservation initiatives in Bhutan by (Lhendup and Webb, 2009; Sherub, 2009; Namgay and Wangchuk, 2016; Phuntsho and Tshering, 2014). However, those studies and related species conservation management attached importance only to population numbers, the conservation initiatives in the country and finding out the threats related to BNC conservation in the western part of the country. They ignored to study the trends of BNC in Bumdeling and map the habitat of Bumdeling which will actually guide the planners, students, conservationist and visitors who are visiting for the first time.

1.2. Aims and objectives of the study are:
   1. To see the population change dynamics of BNC in Bumdeling over the years and identify threats.
   2. To do the mapping of roosting and foraging areas of Black-necked Crane in Bumdeling and adjoining areas.

2. MATERIALS AND METHODOLOGY

2.1. Project area description
The main project area was in Bumdeling Block in Trashiyangtse District. It is located at 1900 masl (N27°39′51.0″, E091°26′37.8″) in the extreme north eastern part of the country. Bumdeling Block has 389 households with 1460 people. The area of the block is 851 sq. km and the main rural livelihoods of the people are Agriculture farming, Livestock, Vegetable production, Forestry products and Non Wood Forest Products. The locality receives mean rainfall of 1500mm/year. A part of Yangtse block is also included in project area because it is used as feeding grounds by BNC every year. The open and wide rice fields located very near to town is used for feeding every year.
Figure 2.1: Map showing project area

### 2.2. Field equipment and instruments

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Equipments</th>
<th>Uses</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Global Positioning System (GPS) – eTrax 12C</td>
<td>For taking the geographic position of each feeding areas, roosting site and mapping the habitat areas in Bumdeling and Yangtse valleys</td>
</tr>
<tr>
<td>2</td>
<td>Digital Camera (Canon EOS6D DLSR)</td>
<td>For taking the pictures of BNC in the feeding and also in roosting site. It also helps in capturing the threats and disturbances.</td>
</tr>
<tr>
<td>3</td>
<td>Binoculars (NIKON 42X8)</td>
<td>To count the birds and observe the behaviour of cranes in feeding and roosting site.</td>
</tr>
<tr>
<td>4</td>
<td>Pens, Pencils, format and note pad</td>
<td>For noting down the information and collect data in the field.</td>
</tr>
<tr>
<td>5</td>
<td>Others</td>
<td>Equipment’s such as Knives, Threads, Pegs etc were also used.</td>
</tr>
</tbody>
</table>
2.3. **Survey design and data collection**

2.3.1. **BNC counting and monitoring**

A sample spot survey and direct count method (Buzzard, *et al.* (2012) was used to get the total count of the cranes visiting Bumdeling for the study period (2015-2016). The counting started from 1st week of November, 2015 to third week of March, 2016. Since there are no watch towers, the hill tops and vantage points were used to count the birds and to observe their behavior in the roosting and feeding grounds. The counting in the roosting site was done weekly from 0600-0800 hours (two hours), within this time bound the cranes break up in to smaller groups/ flocks and move from roosting to the open grounds. They fly to feeding areas in line and this flying pattern makes the surveyor to count easily and get accurate numbers. The counting in the feeding areas and observation of disturbances were also done. Opportunistic observation was also done in feeding areas mainly to identify the threats and disturbances to BNC.

2.3.2. **Habitat mapping**

GPS eTrax 12C was used to collect geographic position of roosting site and feeding areas in Bumdeling block and Yangtze valley. However, ArcGIS 10.2.2 software was used to produce habitat map and project area map.

2.3.3. **Conservation threats of Black-necked Crane**

Information on threats and issues related to conservation of BNC in the area were collected through interviews and field observation for one season (2015 - 2016). Twenty households residing inside crane habitat were interviewed. Disturbances to cranes in the foraging were noted down during regular visits to the foraging for counting. Focal persons were appointed in each locality to update BNC arrival information in the foraging and they keep all tracks of cranes arrival and departure from the feeding areas and also observe the threats and disturbances to BNC.

2.4. **Secondary data**

To see the population changing trends of BNC in Bumdeling over the years, past record and information were gathered from Royal Society for Protection of Nature and Bumdeling Wildlife Sanctuary field office at Bumdeling. Record on total visit in Bumdeling wintering ground since 1986-1987 to 2013-2014 was retrieved from Phuntsho and Tshering (2014). For 2014-2015, it was collected from Dungzam Park Range Office. The records were validated and true.
3. RESULTS AND DISCUSSIONS

3.1. Status and population change in Bumdeling winter habitat

The annual counting of cranes was done in Bhutan since 1986-1987 winter (Lhendup and Webb, 2009). The data on record of cranes that visited Bumdeling habitat was obtained from Phuntsho and Tshering (2014). It was found that there was change in the number of BNC in Bumdeling over the years. The highest number recorded was in 1993-1994 winter with 203 individuals and the lowest in 2010-2011 winter with only 94 individuals. The main reason for declining of BNC numbers in the area could be due to expansion of town and settlement, changing of agricultural practices and increase in domestic dog population. Lhendup (2007) also pointed out that the main reason for decline in population are due to expansion of settlements and developmental activities that is taking place nearby the habitat. Their finding showed that the land use change through settlement expansion and land development was critical only in Bumdeling habitat and not in other habitat in Bhutan.

However, after drastic decline in 2010-2011, the population is in gradual rise today. In 2015-2016 winter (study period), 109 individuals (9-Juveniles and 100- Adults) were recorded (Figure 3.1). Every year, to get exact count of the bird, roosting site counting is done in the morning (0600 – 0800hrs) and afternoon. The same method was also followed by Chako during his visit to the site in 1991 and 1992.

Figure 3.1: BNC arrival trends in Trashiyangtse from 1986-87 to 2015-2016 winters
3.2. **Arrival and departure of BNC**

Mostly the first group of BNC in this habitat between 28\textsuperscript{th} October and 5\textsuperscript{th} November coinciding with 8\textsuperscript{th}, 10\textsuperscript{th}, 15\textsuperscript{th} 25\textsuperscript{th} 30\textsuperscript{th} of Bhutanese calendar (Auspicious days). In 2015-2016 winter, the first two cranes arrived at Bumdeling on 3\textsuperscript{rd} November. Thereafter, small flock of cranes continue coming on daily basis till the end of December. During the study period the cranes were counted weekly in roosting site to keep the track of crane arrival and departure for the period. The normal flying pattern of BNC is different from other birds; they fly in line and in V-shape from roosting site and from feeding sites if they are not disturbed. This pattern of flying makes the surveyor to get accurate count of the bird for the day (Figure 3.2)

![Figure 3.2: Normal flying pattern of BNC from roosting site and from feeding sites](image)

After staying in this winter habitat for 3 - 4 months, the Cranes start flying to their summer breeding grounds from first week of February and by the end of the same month almost all cranes will be gone. Most of the time only few individuals remain back after February and fly before the end of second week of March. However, if there are injured and unhealthy cranes they will remain back for longer period till the end of March. So far there was no record on death of cranes except one kill by Golden Eagle in 2007. The first group of cranes (five individuals) left Bumdeling habitat on 8\textsuperscript{th} February, 2016 and the last group (four individuals) on 17\textsuperscript{th} March, 2015 – 2016 winter. **Figure 3.3** shows the BNC arrival and departure in Bumdeling wintering habitat for 2015-2016 winter.
3.3. **Habitat mapping of Black-necked Crane**

Of four main wintering habitats namely Phobjikha (2900 masl), Khotokha (2500 masl), Gyetsa (3000 masl) and Bumdeling (1900 masl) in Bhutan (Phuntsho and Tshering, 2014), Bumdeling receives second highest number of cranes every year. Crane habitats in Bhutan are entirely different from those of the summer breeding habitats in the Tibetan Plateau. Bumdeling habitat is located in warm broadleaved forest at 1900 masl and it comprises of marshes, riverine shingles, flowing rivers, sand bank, paddy fields and ponds, whereas other habitats are located above 2500 masl.

As per Bishop (1996), the habitat of the BNC in Tibet and China during summer season ranges from 2950 to 4900 masl and found between 1900 and 3950 masl during winter season. However, in Bhutan it is found between 1770 to 3050 masl (Inskipp *et al.*, 1999). This study for the very first time probably identifies the location of roosting site and foraging areas in Bumdeling habitat under Trashiyangtse District in eastern Bhutan (Figure 3.4a & 3.4b). The habitat mapping is done only for roosting and foraging habitats because these are the two common habitats of cranes. The breeding and nesting sites are not found in Bhutan as it happens only in the summering habitat. For habitat mapping, the presence of birds’ sign such as drooping, call, feeding, direct sighting and the local people hearsay about the cranes sighting were considered.
Figure 3.4a. Habitat range map showing location of foraging areas and roosting site in Bumdeling habitat.
In total about fourteen feeding areas and one roosting site was identified based on the past information maintained by Dungzam Park Range Office located at Bumdeling and also information shared by the older people in the locality (Drukpa, 2016). Of these feeding areas
50% were classified as regular feeding areas in 2015 winter because these areas were visited daily for feeding. Around 25% each was classified as stopover areas and abandoned feeding areas (Figure 3.5). Abandoned areas are those feeding areas that used to be the feeding grounds but stopped going there since 2-3 years back. The reason could be due disturbances by the children, dogs and constructions as most of these areas are located very near to villages and settlements. Cranes were also found using some areas for few hours or minutes and these areas were classified at stopover areas. They usually fly in such areas when they are disturbed from feeding areas.

Figure 3.5. Different types of habitat in Bumdeling and adjoining in Trashiyangtse

3.4. BNC conservation threats and people’s perceptions

Black-necked Crane faces threats both in breeding and wintering areas. In Bumdeling habitat, human disturbance, stray dogs, developmental activities and expansion of town are main threat to BNC conservation. Movement of vehicle in the habitat areas and visitors not obeying the guideline are main issues in the habitat. Shortage of foods is also accounted as threats in Bumdeling habitat. As per personal communication with the elder people of Bumdeling, the flood plains that is seen along the river side was cultivated with rice and used to be one of the main feeding grounds of crane in 1980s. But the flash flood occurred in 1990s and 2000s have washed away all the fields and today it has become sand bank which is unproductive for cultivation. However, it is used by cranes as resting and stopover area during the day time. The loss and degradation of the roosting and foraging habitat such as wetland, agriculture field and grass lands are one of the main threats in Bumdeling. BWS (2013) also pointed out that the main reason for abandoning of marginal paddy fields are due to poor fertility and crop damage by wildlife and erosion of paddy fields by the Kholongchu river reducing the feeding area. The conversion of wetland for land expansion and construction for developmental activities were also observed as threats in Bhutan (Namgay, 2013).
Killing, hunting and poaching of bird and its products are also threats but such cases have not been encountered in Bumdeling. Wearing of colourful clothes and going very near, Chasing and shouting, picnicking in the habitat, playing out door games, making fire in the habitat are accounted as threats (Figure 3.6).

Figure 3.6. Percentage of respondents’ for each disturbances factor

These disturbance factors in the lists are human made and through our repeated observation it was found that the moving of people in group scares the cranes and disturbs them in feeding areas. So movement of people in large group is not recommended. Plying of vehicles in the feeding habitat was observed as main threats in Bumdeling and question “Is moving car in habitat disturb cranes?” was asked to the respondents and found 95% (N=19) respondents responded that the moving vehicle is one of the main threats. For last many decades we saw temporary cattle sheds constructed in the middle of paddy fields to keep the cattle’s in winter. It also obstructs the cranes in feeding and sighting of intruders and frequent movement of people in and out of shed disturbs the cranes in feeding. However, about 90% of respondents responded that it doesn’t disturb the cranes.

Predation by wild animals, mortality, diseases and other environmental factors affecting the cranes survival are also accounted as threats. In case of Bumdeling, such type of threats has not been encountered except one juvenile kill report by Golden Eagle in 2007. They have also responded that Leopard cat and Yellow-throated Martin rarely disturb the cranes in roosting site. However, the frequency of disturbance by domestic dogs in the feeding areas was found very high. Today we find that most of the feeding areas near to the settlements are abandoned and this is due to disturbances by dogs. The dogs were found chasing away the cranes in the feeding areas.
4. CONCLUSION AND RECOMMENDATIONS

The total number of cranes coming to Bumdeling wintering habitat in eastern Bhutan is in decline. However, of the total arrival in Bhutan, the habitat receives second highest number of cranes every year. Habitat is located in warm broadleaved forest and the people of Bumdeling and Yangtse valleys grow rice as main cereal crops. So, the cranes also depend mainly on fallen rice grains in stubble rice fields.

About 14 feeding areas were identified in this habitat and all of them are scattered all over Bumdeling and Yangtse valleys. The only roosting site is located in the heart of Bumdeling valley at the river side of Kholongchu.

Overall, human disturbances, stray dogs, developmental activities and expansion of town are considered as main threat to BNC conservation. Of these, the disturbance frequency by human being and stray dogs were found to be very high in feeding areas. Movement of vehicle in the habitat areas and visitors not obeying the guideline are main issues in the habitat.

Since the human disturbance is main disturbance, awareness and advocating programme should be conducted to the local people, institutions, residents, and visitors. To curb down the disturbance from stray dogs, annual sterilization of dogs should be carried out so that population of dogs will be controlled in years to come.

References


ICF. (2012). International Crane Foundation


