Тоодог

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IS SIBERIAN CRANE POPULATION RECOVERING? A POSSIBLE INDIRECT EVIDENCE BASED ON SUMMER OCCURRENCES IN MONGOLIA

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abstract. Монгол оронд цагаан тогорууны тохиолдоц сүүлийн жилүүдэд нэмэгдэх хандлагатай байна. Бид 1875-2012 оны хооронд Монгол улсын нутаг дэвсгэрт үзэгдсэн цагаан тогорууны тохиолдолуудыг шүүн үзэж дүгнэлт хийлээ. Дээрх хугацаанд нийтдээ 54 тохиолдлоор цагаан тогорууны 197 бодгаль бүртгэгдсэн байна. Дээхэн үедээ цагаан тогоруу ихэвчлэн Онон, Улз, Хурх голын хөндийд бүртгэгдэж байсан бол сүүлийн үед Монгол орны төв хэсгээр үзэгдэх болсон. Мөн 90-ээд оны дунд үеэс эхлэн үзэгдэх тохиолдол тоо толгой эрс нэмэгдэх хандлага гарчээ. Бидэнд байгаа мэдээнээс үзэхэд сүүлийн үед цагаан тогорууны тоо толгой нэмэгдэж байгаа нь шувуу судалгааны ажил нэмэгдсэн, мөн шувуу ажиглагчид, гадаадын жуулчдын тоо нэмэгдсэнтэй шууд холбоотой байна. Гэхдээ сүүлийн үед цагаан тогоруу Монголын нутагт тогтмол үзэгдэж бүр зусах болсон нь энэ зүйл шувууны тоо толгой өсөж, үржлийн бус залуу шувууд олширсонтой холбоотой байх боломжтой байна.

Keywords: Siberian cranes, non-breeding population, dispersal

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Introduction

Two subpopulations of the critically endangered Siberian Crane *Leucogeranus leucogeranus* (IUCN 2012) currently breed in western and eastern Siberia. A previously documented third subpopulation bred in north central Siberia and wintered in India, but individuals from this subpopulation have not been sighted on the Indian wintering grounds since 2003. The western subpopulation has very few birds that winter in Iran, and in contrast the entire eastern population of Siberian Cranes (approximately 4,000 individuals) winters at China's Poyang Lake in the Yangtze River Basin (BirdLife International, 2012; Li et al., 2012).

The western edge of the flyway between wintering and breeding grounds for the eastern subpopulation of Siberian Cranes covers most of the eastern portion of Mongolia (Ellis et al., 1996; Meine and Archibald, 1996). Overall number of records of this species in Mongolia is low, but it is increasing over the last two decades. Siberian Cranes were regarded as a passage migrant (Bold, 1981; Shiirevdamba et al., 1997), but because of records of summering at several locations (Tseveenmyadag, 2002, 2005, 2007, 2008, 2011a, b; Tseveenmyadag et al., 2012; Tseveenmyadag et al., 2006) the recently published Mongolian Red List of Birds classified this crane species as a migrant and summer visitor to Mongolia (Gombobaatar and Monks, 2011). The species is protected under multiple legal statutes including the Law on Hunting (2000) and Mongolian Law on Fauna (2000), and hunting this species is prohibited. The Siberian Crane is listed as Very Rare in the Mongolian Red Data Book (Shiirevdamba et al., 1997) and as Critically Endangered in the Mongolia Red List of Birds (Gombobaatar and Monks, 2011).

Siberian Cranes were first reported as a breeding species in northern Mongolia by Radde, but this was later reported as incorrect by Taczanowski (1893) who observed the species near the Buur River along the Russia and Mongolia border in 1875 (Taszanowski, 1893). After this first confirmed report the species was seen near Torey Lake by Mollesson in spring 1896 (Molleson, 1897). These two records constitute the only documentation of this species in the territory of Mongolia until a single bird was observed near Ulaanbaatar on 1 May 1958 (Bold and Tseveenmyadag 1979). The next observation, a single bird that was about 2 years old, was made between 29 July and 1 August 1981 at the Doch River in northeast Mongolia's Mongol Daguur region (Tseveenmyadag 2005, Ostapenko and Zewenmjadag 1983). On 10 June 1987, two individuals were observed again in the Mongol Daguur region near Khaitsiin Tsagaan Lake. Around same time, another single crane was observed at a location not far from this lake (Sumiya et al. 2000, Tseveenmyadag 2005), though they could be same bird.

Since 1994, the number of Siberian Crane sightings within Mongolia has gradually increased. This trend is particularly apparent during the last decade, when there were records of Siberian Cranes almost every year. This apparent increase in Siberian Crane sightings led us to compile all of the available data on this species and to look at the development of increased number of Siberian Cranes recorded in the country. We hypothesized that the increased number of Siberian Crane observations in Mongolia might be linked to increased ornithology and tourism activities in the country. Prior to this paper, there was no paper written specifically on Siberian Cranes in Mongolia apart from some notes and reports published in the Siberian Crane Flyway News and conference proceedings (see list of reports by N.Tseveenmyadag).

Methods

We collected and summarized all available Siberian Crane records in Mongolia from published, online, and unpublished personal sources. Also a number of people shared their personal records and photographs with us. It is impossible to account for all possible sightings of Siberian Cranes in Mongolia, but every effort has been made to include all known records of the species within Mongolia in this paper.

All data were compiled and re-organized in a spreadsheet with location name, date, number of individuals, possible age and sex information, duration of stay, and data source information. Most observations after 1990s had accompanying GPS data, but earlier observations had references mostly limited to a lake or a river name at best. Local names of each record were used to approximate GPS location of observation points. We used Google Earth and 1:500,000 topographic maps to find closest latitude and longitude values for observations missing geographic coordinates. We pooled all available data for further analysis. Side by side box plots were used to summarize the average monthly records to compare the differences in mean number of birds observed each month. We tested whether the number of observations had an effect on the number of Siberian Cranes recorded using simple linear regression techniques. We used scatterplots to see if the number of observations can explain the increasing number of Siberian Cranes recorded.

Many records come with the information about the age of birds observed, although not all records contained age data. For records lacking age data on observed birds, age of birds was identified from photographic evidence, when available. Ages were categorized into three classes, a) hatch year or juvenile, b) immature or birds less than 3 years old, and c) adult birds probably more than 3 years old. Ages classes were assigned according to the following criteria: adult Siberian Cranes are pure white except for black primaries and primary coverts, alula, a bare red face with reddish beak and pinkish legs. Juveniles or first year birds can be distinguished from adults and second year birds by feathered face and excessive rufous brown covert feathers. Immature birds from their first autumn and winter have more white coverts and remains of rufous brown plumage which gradually fades as it is replaced by adult plumage. It is very hard to determine the age of Siberian Crane more than second calendar years, though it is possible to determine ages up to 3rd year (Flint and Kistchinski, 1981; Johnsgard, 1983).

Results

Between 1875 and 2012, a total of 54 observations were made and 197 Siberian Cranes were recorded within Mongolia. Siberian Crane observations

have become more frequent since 1994 when researchers, tourists, and birdwatchers recorded at least one or two records of the species almost every year. Siberian Cranes were observed 7 times in 2006, which was the highest frequency for a year. The year with the highest number of birds was 1994 when the total number reached 40 individuals. The total number of birds observed annually was related to the number of observations made per year ($R^2=0.61$, P-value<0.001, Figure 2) suggesting more observations yielded more cranes per year.

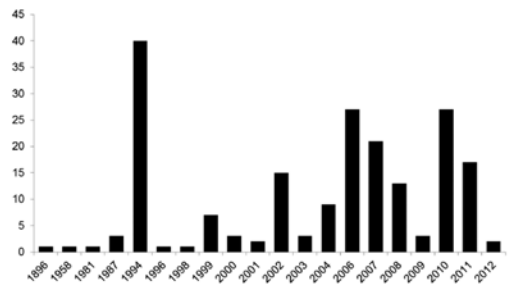

Figure 1. Number of Siberian Cranes recorded in Mongolia between 1896 and 2012

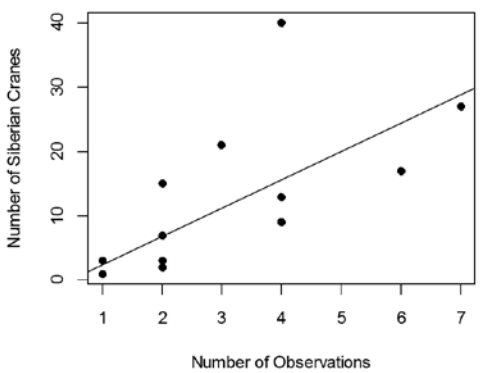

Figure 2. Relationship between annually observed number of birds and the number of observations per year in x axis

Most observations of Siberian Cranes in Mongolia were made in the Khurkh and Khuiten River Valleys, Ulz River Valley, and Ayga Lake and Tsengiin Burd in the Kherlen River Valley. Frequencies of Siberian Cranes at these locations were higher than other parts of Mongolia and the cranes stayed longer at these locations. On several occasions, Siberian Cranes spent extended period of time at Gun Galuut Nature Reserve (NR).

In general, most records lacked information about the number of days Siberian Cranes spent at particular sites. Such information was available only for few records. Tseveenmyadag and Ostapenko observed one crane for four days at Doch River in northeast Mongolia (Ostapenko and Tseveenmyadag, 1988; Ostapenko and Zewenmjadag, 1983). In June 1994, one bird stayed at least 11 days near Doroo Lake in Dornod province. One bird spent 10 days in Saikhan River Valley on 12-22 September 2000 in Khentii province. Two cranes stayed at Chukh Lake for 17 days from middle of May to beginning of June in 2008. In 2011, 2 cranes stayed at Gun Galuut for 14 days from 22 August to 5 September. There were 3 birds in June at this same location, but no one has reported Siberian Cranes in between, thus they are likely different groups. Also there is a report from local people that confirms the Siberian Cranes stayed at Gun Galuut NR for two months in 1994, though it was not possible to confirm the report.

We tried to identify the age of cranes from all available photographs taken in Mongolia. Most Siberian Cranes recorded in Mongolia were immature and birds less than 2 years old and at least four records were adult birds. Unfortunately, constructing a complete set of data related to cranes' age was difficult from records and photographs due to the photo qualities and distances between birds and the photographer.

Siberian Cranes were recorded as early as at the end of April (notably it was the report by Mollesson) and the latest record was made in the middle of October; however, most records were made in June (26%), July (22%), and August (24%).

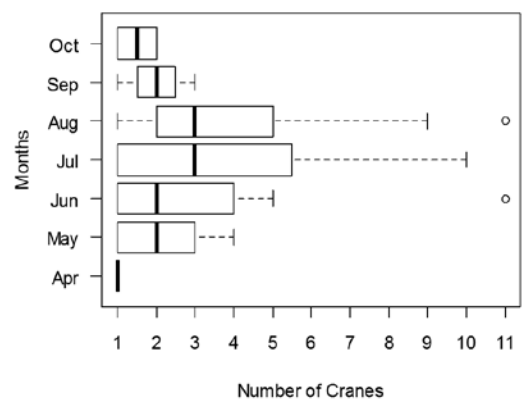

Figure 3. Frequencies of the Siberian Crane observations by months

Over 35% of all observations were of single bird, whereas groups with 2 birds comprised 20%, 3-bird groups 13%, 4-bird groups 11%, 5-bird groups 6%, and the remaining 6 (2-4%) observations were of larger groups with 7-31 individuals. The largest number of Siberian Cranes observed in a single day at one location was 34 birds in two close groups (29 and 5 cranes) which were observed on 3 September 1994 at Galuut Lake in Mongol Daguur Strictly Protected Area in Dornod province, a group likely migrating south.

Table 1. Records of Siberian Cranes in Mongolia. Numbers outside parentheses show the number of observations and the numbers in the parentheses are the number of individuals.

Year	Apr	May	June	Jul	Aug	Sep	Oct	Total
1896	1(1)	:	:	:	:	:	:	1(1)
1958	:	1(1)	:	:	:	:	:	1(1)
1981	:	:	:	1(1)	:	:	:	1(1)
1987	:	:	2(3)	:	:	:	:	2(3)
1988	:	:	:	:	:	:	:	1(1)
1994	:	:	2(6)	1(3)	:	1(31)	:	4(40)
1996	:	:	1(1)	:	:	:	:	1(1)
1998	:	:	1(1)	:	:	:	:	1(1)
1999	:	:	1(5)	:	1(2)	:	:	2(7)
2000	:	:	1(2)	:	:	1(1)	:	2(3)
2001	:	1(1)	:	1(1)	:	:	:	2(2)
2002	:	1(4)	1(11)	:	:	:	:	2(15)
2003	:	:	:	:	1(3)	:	:	1(3)
2004	:	1(4)	:	:	1(2)	1(2)	1(1)	4(9)
2006	:	1(1)	:	3(12)	3(14)	:	:	7(27)
2007	:	:	:	1(10)	1(9)	:	1(2)	3(21)
2008	:	1(2)	:	2(7)	1(4)	:	:	4(13)
2009	:	:	:	1(3)	:	:	:	1(3)
2010	:	1(2)	2(5)	1(7)	3(13)	:	:	7(27)
2011	:	1(2)	1(7)	:	2(5)	1(3)	:	6(17)
2012	:	:	1(1)	1(1)	:	:	:	2(2)
Observations (%)	1 (1.9)	8 (14.8)	14 (25.9)	12 (22.2)	13 (24.1)	4 (7.4)	2 (3.7)	54 (100)
Total number of birds (%)	1 (0.5)	17 (8.6)	42 (21.3)	45 (22.8)	52 (26.4)	37 (18.8)	3 (1.5)	197 (100)

Discussions

In general, available data suggests that higher numbers of Siberian Crane records in the last 15 years may be the result of increased field activities by ornithologists and tourists throughout the country. That is possible because the timing of increased numbers of Siberian Crane observations start coincide with Mongolia's opening up to western countries following the collapse of the communist system. This collapse led to an increase in the number of international conservation and research projects and tourists pouring into the country at the beginning of the 1990's. But it is still doubtful to conclude that numbers of Siberian Cranes recorded before 1994 were low solely due to low ornithology activities in the country, and we suspect it may need additional explanations.

Siberian Cranes were mostly recorded in the eastern portion of the country, but in recent years they have been recorded a number of times in central part of Mongolia. These more westerly observations cannot be linked by increased ornithology or bird tourism activities. Because, the amount of ornithology expeditions in central part Mongolia was more or less equal to the number of expeditions organized to eastern Mongolia since 1990s and in fact, the frequency of tourists are higher in central Mongolia than east Mongolia (BirdLife Asia, 2009). There might be some other reasons that caused this species to depart from their normal migration timing and areas. For example, earlier temperature drop at breeding ground in northeastern Siberia was related to early onset of autumn migration (Kanai et al., 2002).

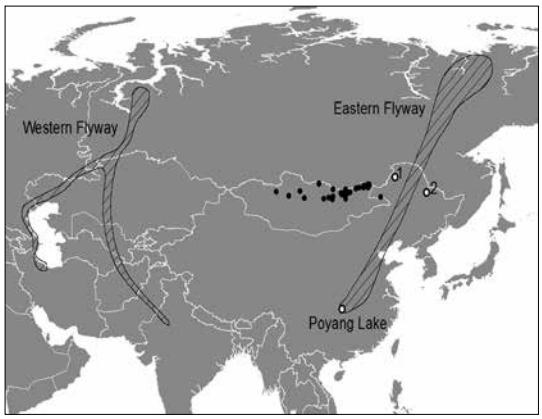

Figure 4. Distribution map of Siberian Crane records in Mongolia in relation to subpopulation flyways and wintering locations. Black dots are observations in Mongolia. Two white circles in northeast China shows approximate historical breeding locations, 1-Hulungboir and 2-Qiqihar, that are mentioned in Cheng (1981). Poyang Lake is the wintering ground. Flyway polygons are adopted from Siberian Crane Wetland Project flyway map.

But it is hard to detail the temperature effect on non-breeders during summer. Further studies are needed to better understand how temperature effects may influence the distribution patterns of non-breeding Siberian Cranes.

Siberian Cranes arrive on breeding grounds in late May to breed and the autumn migration starts around at the middle of September (Ellis et al., 1996; Johnsgard, 1983; Kanai et al., 2002). The fact that most records are from northeastern Mongolia suggests that Siberian Cranes observed in Mongolia are individuals that belong to eastern subpopulation. Available records from Mongolia indicate that most individuals are young and a few non-breeding adults. It is unclear whether these non-breeders come to Mongolia after they reached northern Siberia or they are birds that stopped short during migration from the wintering grounds in southeastern China to the breeding areas in northeastern Siberia.

Radde (1863) mentioned breeding Siberian Cranes in northern Mongolia, but he did not provide convincing evidence to support it and his observation was later denounced by Taszanowski as incorrect (Taszanowski, 1893). Interestingly, Cheng (1981) reported possible historical breeding of Siberian Cranes in northeast China. According to his paper, Siberian Cranes formerly bred in the Hulungboir (a.k.a Hulunbuir) wetland in the northern Inner Mongolia and Qiqihar Nature Reserve in Heilongjiang Province in northeast China (Cheng, 1981). These two sites are located at similar latitudes where Siberian Cranes are observed in Mongolia. However, no one has questioned validity of Cheng's report. Typical Siberian Crane breeding habitats are arctic cold wetlands with bogs and marshlands, though some Siberian Cranes nested in drier upland areas (Flint and Kistchinski, 1981; Johnsgard, 1983). But wetlands in northern Siberia are very different habitats compared to sites where Siberian Cranes are observed in Mongolia. Because of the dramatic differences in habitat types between Siberia and Mongolia, it is unlikely the birds ever bred in Mongolia.

Siberian Cranes were recorded more frequently in the northeastern part of the country, but in recent years they have been recorded in central part of Mongolia. Siberian Cranes observations in northeastern Mongolia were all within the Mongol Daguur Special Protected Area which is also a part of the Dauria International Protected Area. Several lakes in this region are particularly important for Siberian Cranes, such as Galuut Lake, Khaichiin Tsagaan Lake, and Doch Lake. There are also several reports of Siberian Cranes at Torey Lake and Middle Onon River on the border between Mongolia and Russia (Goroshko, 2007, 2011; Goroshko et al., 2004; Malkov, 2011). Some of these cranes may be the same individuals observed in Mongolia.

In conclusion, we believe that the increasing records of Siberian Cranes on the territory of Mongolia could be a reflection of population increase in Siberia. Although the number of summer records of Siberian Cranes is slowly increasing in Mongolia, it is important to continue and increase monitoring activities across the country so that better records of the species and its distribution with in Mongolia can be constructed which will be essential to understand use and to protect sites that repeatedly supported the species. Based on the data presented in this paper, We estimate that between 4-40 Siberian Cranes (40 is ~1% threshold of regional population) regularly pass through Mongolia each year. Also based on the increasing trend of observed Siberian Cranes within Mongolia, it is likely that more observations of this species will occur in the future.

Further conservation activities for Siberian Cranes in Mongolia should be directed at improving

knowledge of local people about cranes, wetland habitats, and sustainable use of water resources among local communities. The Siberian Crane is one of the highly specialized species within the crane family in terms of habitat requirements (Meine and Archibald, 1996), therefore, those locations with repeated observations should be monitored in the future.

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