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Citation	Eurasian Journal of Forest Research, 10(1), 139-143
Issue Date	2007-03
Doc URL	http://hdl.handle.net/2115/24498
Type	bulletin (article)
File Information	10(1)_P139-143.pdf



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The Structure and Distribution of Crane Roosting Sites in Muraviovka Park for Sustainable Land Use

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Abstract

Stopover areas for migrating birds are important for nesting and wintering sites. Muraviovka Park is one of the most important sites in the world where a large number of crane species gather during spring and autumn migration. The research being presented here was conducted on the day-round dynamics of crane roosting sites and their distribution in the Park's area for conservation. It will provide an opportunity to choose the best ways to conserve and manage this territory and its rare species.

Key words: Crane roosting site, East Siberia, International Crane Foundation, Wild Bird Society, migration

Introduction

The territory of Muraviovka Park contains about 6 thousand hectares of wetlands and arable lands, located in the Amur River basin and terrace to the south of Tambovka District. The highest diversity of biotic communities is concentrated here in the valley of the middle basin of the Amur River (Ahtiamov *et al.* 2002). As the result of dam construction on the Zeya River in 1975 the flooding of this area has stopped and the wetlands are drying out.

Muraviovka Park was founded in 1996 by the International Socio-ecological Union (Moscow) with the support of Tambovka District and Amur Region Administration, Wild Bird Society of Japan, POP Group Ltd., Япония, International Crane Foundation, ISAR, National Audubon Society, Nature Conservancy in USA and other environmental organizations. The Park is the first non-governmental area of sustainable land use in Russia. The main purpose of the Park is to test out and establish new practices in sustainable land use and environmental education that are good for both biodiversity conservation and improving the local economics and living standards of people. (Smirenski 1994, Smirenski *et al.* 1995).

The Park and its surrounding farms (Muraviovski, Amur, Korfovski) are included in "the wetlands of international importance" (Ramsar Convention) and are in the regime of the Muraviovski game refuge, established in 1967. Moscow State University staff was the first to start the research and find cranes nesting here back in 1982. This area was heavily used for agricultural purposes before 198#, and the nesting density of the rare species of red-crowned (*Grus japonensis*) and white-napped (*G. vipio*) cranes was higher than after it became a protected area, though the breeding success was lower. Human activity enriched habitat quality through a mosaic of wetlands, fields, pastures and hay fields, leading to a comfortable place for the cranes to nest, roost and feed. At the same time,

human-caused fires, ferrous contamination, sewage from cattle farms, use of chemicals and fertilizers, poaching and human disturbance lead to nest damage and chick fatalities. They also planned to drain the Amur River basin which would result in the extinction of these crucial wetlands. There was no reason to establish a new zapovednik (nature reserve) or zakaznik (game refuge) as local land users (state farms and collective farms) would never agree to that and good feeding grounds for the cranes would be lost.

Muraviovka Park's endeavors to include the preservation of the wetlands, organic farming, fighting fires, planting of lure crops and creating education programs for school students about the habitat of rare species of birds. The highest density of nest populations of red-crowned (*Grus japonensis*) and white-napped (*Grus vipio*) cranes and oriental white stock (*Ciconia boyciana*) was registered in the territory of Muraviovka Park for the purpose of sustainable land use. Six crane species out of 7 nesting in Russia are registered in Muraviovka Park. In spring and autumn, a large number of cranes and fowls can be observed here.

During autumn migrations, the cranes consume enough nutrition necessary for migrating to the wintering sites. According to color and satellite banding, white-napped and hooded cranes (*G. monacha*), and hybrids of common (*G. grus*) and hooded cranes, winter in Izumi, Japan. White-napped cranes also winter in the Demilitarized Zone (DMZ) on the Korean peninsula. Red-crowned cranes winter in the Yncheng Nature Reserve, in eastern China. Flocks of the cranes (white-napped, red-crowned and hooded) can be found at the Park throughout the whole summer, but a larger number of the migrating birds start to gather from August. The highest number of birds can be found from mid-September to the beginning of October. Demoiselle (*Anthropoides virgo*) and Siberian cranes (*Grus leucogeranus*) are also observed here. The last cranes to leave the area (red-crowned ones) stay at the

Park until the middle or end of November. For effective conservation of crane species, we studied the daily dynamics of crane roosting sites and their distribution in the Park's area.

Materials and Methods

For conducting a census on cranes we used the recommended method as proposed by Kespaik (1987) and Qian and Smirenski (2001). We started the observations from September 12th, when the cranes chose the roosting site. The observation of the roosting sites was conducted from 3 watching points, which were situated at the first Amur basin terrace (Fig. 1). These watching points provided a good view of the area, birds, their activities and movements and the direction of their flights from roosting sites to the feeding grounds. At the same time, we didn't disturb the birds in any way.

In the morning we started the observation half an hour before sunrise and finished after all the birds had

flown away. It took about an hour. In the evening, we started the observation 2 hours before sunset and finished after the sun had set, when most of the birds were at the roosting site. We occasionally observed the resting cranes during the day. When a flock of birds started to fly, or flew over or onto the fields, the birds gave out loud calls and so did the other cranes. So it was easy to find the roosting and feeding grounds even if we couldn't see them. When the cranes flew away from the roosting sites we recorded the weather, number of the birds, the number of the site they were flying from, and the time and direction of their flights both in and out of the area. In total, we observed cranes for 70 hours.

We observed the cranes using «Wildlife» brand binoculars (7x), and spotting scopes (60x). This article discusses the results of the observations from September 12th to September 29th. The roosting sites are situated in the sedge wetlands close to the terrace of the Amur River. Roosting site number 1 is situated to the

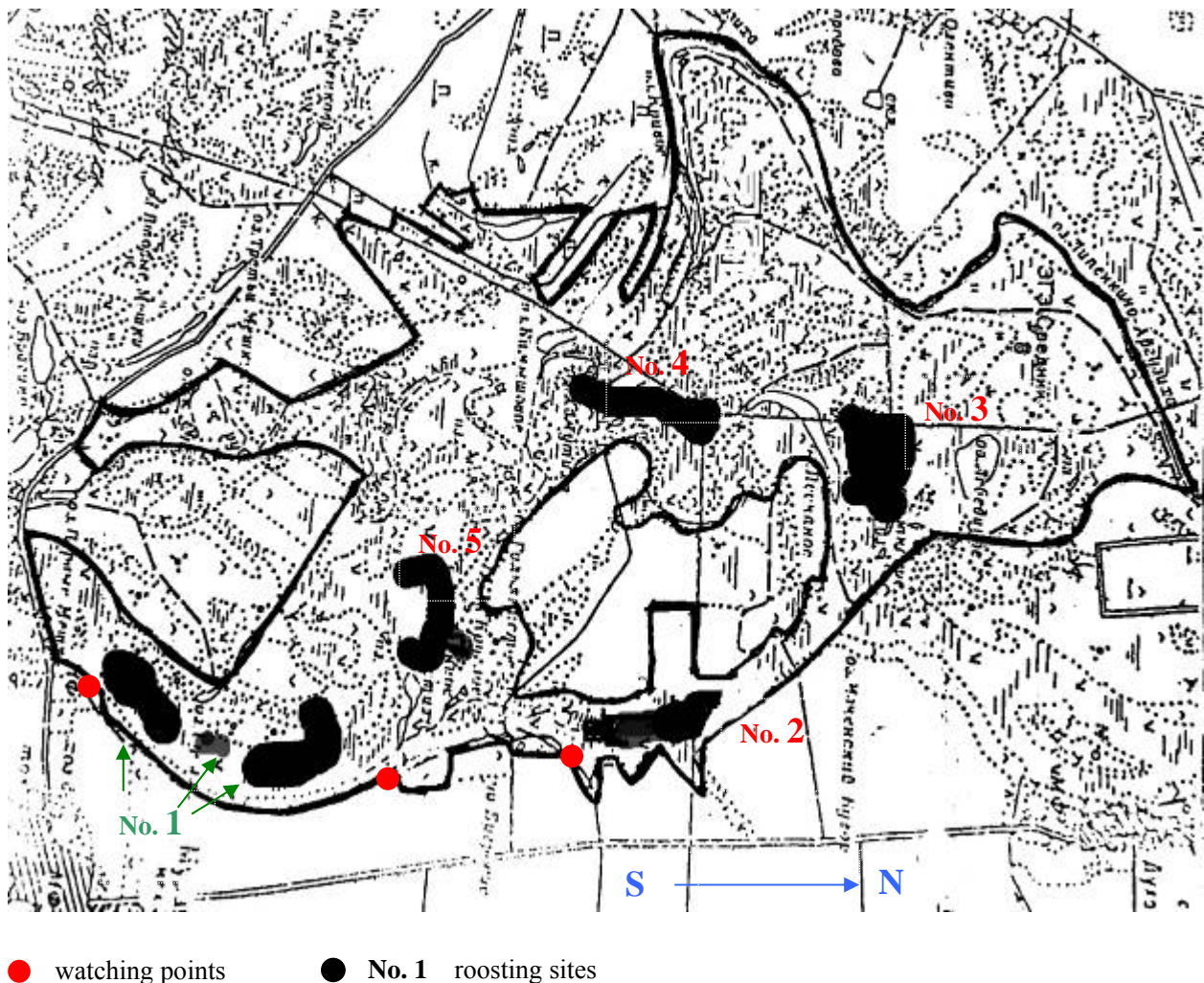


Fig. 1. Relatively stable gathering sites of cranes at the territory of Muraviivka Park.

south, roosting sites numbers 2 and 3 to the north and north-west, and numbers 4 and 5 to the west of the Central Headquarters of the Park. We observed roosting sites numbers 1 and 2.

Results and Discussion

Demoiselle and common cranes continue to use the same areas for many years if the conditions are good (Kespaik, *et al.* 1997, Thoropova and Kulagin, 2005). The cranes gather at the Park in August and leave completely by the end of November (Citation of reference). The times of flying to (прилета) and flying away (отлета) from the area were quite different. Each gathering goes through the following stages: 1) growth, 2) stabilizing, 3) decreasing (Citation). Even during the stabilizing period, the structure of the gathering is constantly changing as some birds leave and others join. In Estonia new flocks of common cranes can join the gathering even during the last days of its stay in that location (Keskpaik. and Rootsmæe 1989).

The birds can move from one feeding area to another even during the day. There are several reasons for this. First, the amount of food is constantly changing during the day and the season. Also, people can disturb them. Finally, cranes need both plants and animals for feeding.

In 2006, the gathering (birds staying in one place for a period of time) started to form rather early (Unclear). We first observed a flock of 41 white-napped cranes from August 4th (out of the study period). From mid-August small flocks of hooded cranes (up to 15 birds) were registered but didn't stay for longer than 3 - 5 days. The gathering of cranes started to grow from August 20th. A significant increase in crane numbers occurred in the first week in September of 2006 (but before this study began; personal observation). The largest size was registered at the end of September to the beginning of October. During this time in the Park and on the surrounding lands, the grain crops were harvested. Grains (barley and wheat), the main diet of the cranes, are supplied to the cranes in the areas where they gather in summer and autumn.

Flying is one of the most energy-draining forms of birds' activities (Gavrilov 1996). At the beginning (until mid-September), when the gathering was just forming, most of the cranes flew to the fields 1 km away from the roosting site. Later the cranes flew to fields 3 or more kilometers away. The birds try to find feeding grounds as close to the roosting sites as possible. If they change feeding grounds, it means they can no longer find food at their present location. The number of birds on the roosting site depends a lot on the agriculture. When they stopped planting grains in the Dubna area, the cranes stopped using some of the roosting sites (Grinhtcenko 2001). By September 20th, all the grain (barley and wheat) were picked up by the cranes and other birds. By this time, the fields were already either ploughed or tilled under and was no longer good for them. The birds then started to fly to the fields north of Ivchenkin Bugor and south of Duhovskoye. They formed 2 new roosting sites – between the Central Headquarters of the Park and Ivchinkin Bugor and by

Lake Peschanoye south of Ivchunkin Hill. On the evening of September 23rd, most of the birds moved to site number 2, which they used until October 2nd (the last day of observations).

Cranes are territorial birds, but during migration they stay on roosting sites, day-rest areas and feeding grounds in both one-species flocks and mixed ones. Huge mixed flocks of hooded cranes and white-napped cranes could be found on the fields and wetlands in September and at the beginning of October. Also, common and red-crowned cranes (up to 13) were seen among them. We frequently observed all four species on the feeding grounds together in one group on the roosting site. Families of red-crowned cranes and white-napped cranes, which flew from other regions, stayed on the roosting sites in flocks, but ate apart (this distance sometimes reached over 100 meters). The correlation of species on roosting sites varied. White-napped cranes and hooded cranes dominated by turns. For instance, on September 13th the quantity of hooded cranes was 27% of the general number of species, but on September 22^d it was 95.6%.

On the roosting sites of mixed flocks, red-crowned cranes were recorded irregularly and no more than 6 birds at a time. They were young or immature birds. At the beginning of October the general number of cranes at the roosting sites was between 1400-1500 birds.

Fourteen groups of cranes were registered at roosting site № 1. The distance between them ranged from between 150- meters to 2.8 km and the roosting site area was about 3 square kilometers. Flying away from the roosting site in the morning began 15 minutes before the sunrise and its duration was 33.6 minutes. In Figure 3 you can see the typical dynamics of birds flying from the roosting site on September 15th. It is necessary to mention that the outcome (of flying) changed according to the day and depended on weather, distance and other factors.

In the morning small groups (3-5 species) of hooded cranes were the first to begin leaving the roosting site. After 15 minutes, white-napped cranes joined them and then finally red-crowned cranes. 5-10 minutes before flying the birds started calling, and unison calls could often be heard. The calls were heard for the entire time the birds were flying from the roosting site.

Many species of cranes, during the pre-migratory gathering period, migrations and winterings, use arable lands as feeding grounds and react positively to the creation of feeding grounds (Alonso *et al.* 1984, Archibald 1987, Ohsako and Swanberg 1989, Allan, 1994). During the migration, up to 96% of the still-heal crane's diet consists of cereal seeds (corn) lost in the harvest (Lewis, 1979, The Platte River ecology study, 1981). During the entire day, birds predominantly use farm fields as feeding grounds.

In Muraviovka Park cranes willingly visited areas where we scattered cereals and corns. Small groups, but sometimes large, one-species flocks, could be seen on the wetlands. During the day the wetlands were used as a stopover area and a feeding ground for cranes where they could move around from place to place for several hours. Then they would fly to other parts of the

wetlands or returned to the fields. So for three hours on September 16th 124 white-napped cranes, 3 red-crowned cranes and 1 common crane were seen on the feeding grounds in the wetlands near Muraviovka Village.

Birds started leaving the roosting site at 7 o'clock in the morning, and the flight times from the roosting site and the duration of the flight hardly changed (on average, 34 minutes). In the evening, the first flocks of cranes started to land on the roosting site several hours before sunset. A mass flock of birds were seen landing several minutes before and at the moment the sun set.

During the entire period of observation, the starting flight time to the roosting sites changed to a much later time (September 13th - 18:20; September 30th - 19:05). The mass flight to the roosting site was 10-20 minutes before and at the moment the sun set. At the beginning of observation, the overall flight time of the birds to the roosting site was 130 minutes on average. This average time decreased to 80 minutes from September 17th to September 23rd, 56 minutes from September 26th to September 29th, and finally to 30 minutes on October 9th. The last flights to the roosting site ended 3-5 minutes earlier than the previous evening. The time

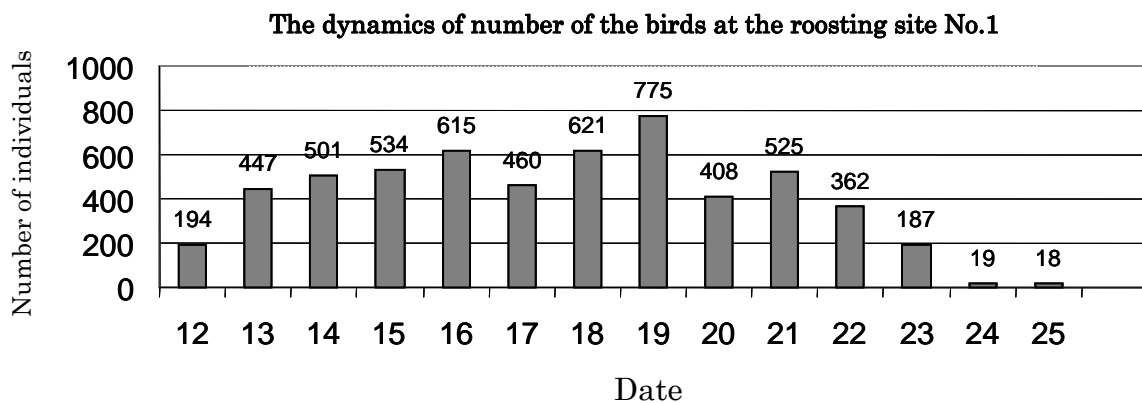


Fig. 2. The top number of the birds at this roosting site is 775 individuals. The cranes used the roosting site №1 till September 25th.

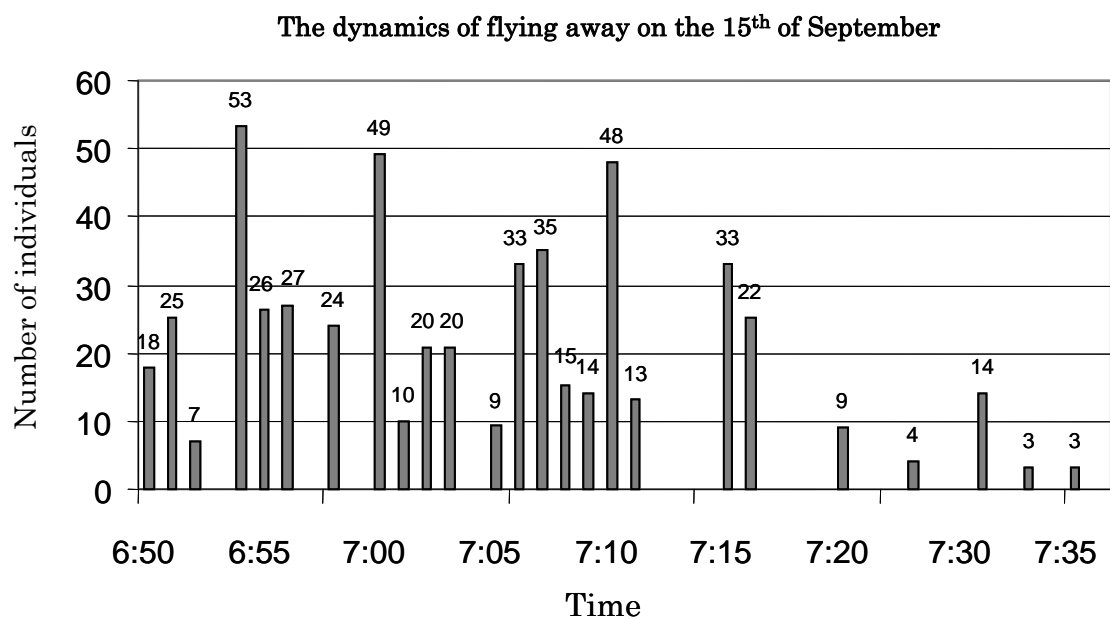


Fig. 3. The dynamics of flying away on the 15th of September.

reduction of the duration of the flights to the roosting site was also recorded for hooded cranes (Kuesson 1997).

Small and incompact groups form early in the evening and are very noisy, restless and physically active until sunset. They fly from place to place on the roosting site or even fly away to other roosting sites. The last flocks of cranes appear in the darkness. These birds fly and settle silently, seldom making contact calls. So it is difficult to observe all the birds because of this factor. That is why more birds fly away from the roosting site in the morning than have been registered in the evening. Thus the perceived problem of the disturbance of cranes on roosting sites in the morning can radically change. Places occupied in the evening can appear to be free from birds, while generally vacant places can be occupied by a large group of birds. Great disturbances of birds and immediate changes of roosting sites were caused by the appearance of people, machinery, lights, predators, (hunters) and by the sound of gunshots.

Conclusion

The time and duration of flights from roosting sites, particularly the late starting time and the reduction in the duration of the birds flight to the roosting sites in the period from the middle to end of September, are likely connected with the decreasing lure of resources and the duration of light in a day. Roosting sites are situated on the safe sites of wetlands near the feeding grounds. The existence of wetlands on the Muraviovka Park territory allows cranes to use remote lure biotic communities and make it possible to form large and long-existing gatherings. Therefore, Muraviovka Park is of great significance for reserving nesting cranes as well as migrating populations of cranes. Birds are not afraid of people at the Central Headquarters or farmers on the fields or of the agricultural machinery they use. But the appearance of human voices and sounds of dogs or transport and the use of flashlights, especially in the basin of the Amur River, greatly disturbs birds and causes them to leave the roosting sites and feeding grounds.

The constant promotion of protecting cranes and the places they inhabit is needed. Also, organizing lessons and excursions along the nature trails and to places where cranes are kept captive give visitors a real opportunity to look at cranes without disturbing or harming them in any way. It is necessary to provide areas of special protection for both nesting birds and the places they gather. In addition, the building of even temporary structures and objects near water and wetlands should be prohibited. It's important to continue to organize feeding grounds and lure crops near crane stopover areas.

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