STATUS AND ECOLOGY OF WATTLED CRANES IN BANGWEULU BASIN, ZAMBIA

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ABSTRACT

Wattled Cranes (*Bugeranus carunculatus*) are widely spread out in the southern African region. The Kafue Flats and the Bangweulu Basin are known to harbor the highest Wattled Crane population in the area. The Bangweulu Basin provides extensive floodplains, swamps, and grasslands which are attractive to the species. There is, however, concern over the reduction of their range due to encroaching human activities which are the immediate threat facing their status. A population survey of Wattled Cranes in the Bangweulu has indicated that there are at least 1,455 individuals. Measures for conservation and understanding of the status of Wattled Cranes in Bangweulu are outlined.

INTRODUCTION

Zambia is one of the landlocked countries in Africa. Its land surface is predominantly an elevated plateau (over 1,000 m above sea level) with two major river systems, the Zambezi and the Laupula. It is one of the few countries in Africa which is endowed with extensive and diversified wetland systems. Approximately 12% of the country's land surface (750,000 km^2) is occupied by wetlands, which include lakes, rivers, swamps, floodplains, pans, and dambos.

The major wetlands in the northern part of the country are Bangweulu and Mweru-wa-ntipa which form part of the Luapula-Zaire river system. The Zambezi floodplains and the Kafue Flats are situated in the south. Another important wetland in the center of Zambia is the Lukanga swamp on the Kafue River.

The Wattled Crane (*Bugeranus carunculatus*) is considered to be "a species of Special Concern" (Collar and Stuart 1985). Its distribution ranges from Ethiopia to South Africa, with the highest concentrations in the Kafue Flats and the Bangweulu swamps in Zambia (Johnson and Barnes 1985). The Bangweulu swamps in the northeastern part of the country are a refuge for an appreciable population of Wattled Cranes. Other populations are found in the other major wetlands in Zambia, including Kafue Flats, Busanga plain, Liuwa plain, Lukanga swamp, and Sioma-ngwezi plain of the Zambezi basin. The species has also been sighted in smaller wetlands, which are less disturbed, throughout the country (Douthwaite 1974). The smaller wetlands make up an important portion of the total habitat available to the Wattled Cranes. These habitats, however, are much more prone to disruption by human habitation. This has led to the decline in the geographical range for the species, consequently threatening it.

There have been attempts in the past to estimate the Wattled Crane population in the Bangweulu swamps (Howard and Aspinwall 1984; *pers. obs.*). In spite of these, the status of the Wattled Crane is still not well known because there is no regular population monitoring. Population estimates have been reported for Kafue Flats, Busanga plain, and Lukanga swamps (Douthwaite 1974) and for other parts of Africa (Konrad 1981; Tarboton 1984; Johnson and Barnes 1985).

In July, 1993, as part of a routine bird census monitoring wetland birds in the Bangweulu swamps, data were collected on Wattled Cranes. The purpose of this paper is to describe the status of Wattled Cranes and to outline conservation measures to be taken.

AREA DESCRIPTION

Bangweulu Basin is located in the northeast part of Zambia, 10°45′-12°40′S and 29°30′E. It covers an area approximately 20,000 km^2. The wetland system measures approximately 11,900 km^2 which makes it the largest and most diverse wetland in Zambia.

The Bangweulu catchment lies in the highest rainfall belt in Zambia with the mean annual rainfall up to 1,300 mm. Most precipitation takes place between November and March. The basin also receives its water from the system's 17 principal rivers, the Chambeshi being the largest. The water level over its wetland varies seasonally between one and three meters causing the flooding to advance and recede by as much as 45 km at the periphery (Grimsdell and Bell 1975).

The Luapula River, headwaters of the Zaire River, is the only river draining the Bangweulu system. Water meadows formed along the floodplain are marked by an association of the sedges *Cyperus latiforians* and *Eleocharis fistulosa* (Verboom 1971). This habitat provides feeding grounds for black lechwe (*Kobus leche smithemanii*) and Wattled Cranes and other various waterbirds.

Bangweulu is an important wetland for wildlife, supporting a diverse fauna including sitatunga (*Tragelaphus spekei*) and the rare Shoebill Stork (*Balaeniceps rex*). Large numbers of local and migrant waterbirds use the bountiful resources available here. Bangweulu supports one of Zambia's largest fishing industries with fishing villages and

camps scattered along the wetland perimeter and islands.

Except for a small area included in the Isangano National Park, a large area of the Bangweulu Wetlands are included in game management areas which protect wildlife but allow hunting of predetermined numbers of certain species, using permits issued by the National Parks and Wildlife Service.

MATERIALS AND METHODS

Both ground and aerial surveys were undertaken. Most sites which are important to birds were flown using a single engine Cessna 182 aircraft, at approximately 61 m altitude. A total area of approximately 800 km^2 was covered. Equipment used during the ground count included binoculars, telescope, bird field guides, and 1:250,000 topographic maps covering the area. A total area of about 50 km^2 was covered. A small team of counters was split to cover a wider range to search for the presence of Wattled Cranes.

RESULTS

The results of the aerial survey are given in Table 1. During the ground census, a total of 468 individuals were observed out of which 10 pairs had a chick and 14 breeding pairs were sighted. Any two cranes observed together isolated from others or displaying to each other were considered to be a mating pair and hence a breeding pair. The rest appeared either singly or in flocks. Five nests were sighted with a single egg clutch.

DISCUSSION

Population status and distribution

The present population of 1,453 birds indicates a decline of 15% of birds when compared to Howard and Aspinwall's (1984) population estimate. This decline in population could not necessarily mean a reduction in population as such, since the methods employed are different. Table 2 below shows results of the surveys done in the area.

Differences in the populations from the three censuses could also be attributed to the different sizes of areas covered and also the times of the year when the censuses took place. The 1984 and 1991 censuses were carried out in July.

In both the 1984 and 1991 surveys, the method employed was specifically established to estimate black lechwe population sizes, so it may not have been very practical for Wattled Crane censusing. As Howard and Aspinwall (1984) suggested, probably some birds were overlooked in high black lechwe densities and thus, the total population is likely to have been underestimated. The results presented show that there was a slight decline in the species between 1984 and 1991. However, the population showed an increase in 1993.

In the present survey misleading estimates, particularly from the air, could have been possible for larger flocks as appropriate photography was not possible. Double counting and crossing of birds cannot be ruled out.

The largest crane population is confined to the eastern floodplains and the surrounding swamps of the Bangweulu wetlands. They utilize large expanses of the Chimbwi floodplain which gets inundated from January to May. Smaller populations are, however, widely spread out in the swamps during the breeding period.

Their movements seem to follow the water level pattern. They tend to move towards the central swamps during the dry season. They feed on sedge tubers and rhizomes, grass seeds, and insects (Douthwaite 1974). They have apparently been observed to feed on small tubers of the water lily *Nymphoides spp.*

Breeding

During the breeding period, mating pairs are rather dispersed as they need expanses of wetlands. Hence in reality, the number could be much higher than were seen.

From the general observations made since 1989, it is apparent that most nesting takes place from May to September with a peak in July, and that most birds pair up. This phenomenon was also recorded by Konrad (1981).

The number of pairs nesting each year is probably dependent on the amount of flooding (Douthwaite 1974). Nesting has been observed to take place around shallow water and at a distance from human disturbance. Although the breeding period is apparently from May to August, it is most probable that nesting continues in small wetlands as long as there is adequate water and a low level of disturbance.

Very little work has been carried out on the breeding capabilities of the Wattled Cranes in Zambia. Nevertheless, it is worth pointing out that the breeding status of the Wattled Cranes and some other waterbirds could have been negatively affected by habitat alterations in their traditional habitats in recent years.

During the non-breeding periods, Wattled Cranes usually congregate on grasslands of the floodplains, in flocks ranging in size from 10 to 40 individuals. When flushed, they all fly in tight flocks. Movements of the Wattled Crane species in and out of Bangweulu are poorly understood. A good number of them, however, start arriving at the beginning of floodwater recession in April. Most of them at this time are either in pairs or accompanied by a fully fledged chick.

A successful breeding pair is the one with a chick. Although the chick attains its parents' size quickly, it can easily be differentiated by its whitish head and light colored body plumage. In the present survey some pairs were observed with big chicks, that they had successfully raised them beyond fledgling.

Threats

Food, water, cover, and human activities are the four major habitat factors affecting the status of cranes. Human encroachment into the swamps is common in the Bangweulu. In some areas, sedges and other kinds of hydrophytes used as cover in the birds' nesting sites are removed for construction of makeshift shelters, mat making, and basket-making. In some cases, this activity abets the decrease of breeding and living areas for cranes.

Bush fires pose the greatest threat to breeding of cranes and other waterbirds. Eggs and chicks which are not fledged are caught in fierce fires which are quite common from July.

Although pollution may have adverse effects on the status of cranes, it is not very common in Bangweulu and most other Zambian wetlands in general.

There are reports (from local villagers) that Wattled Cranes are sometimes hunted for meat. It is also most likely that eggs can be picked for food by local people once found. The author once observed a fully grown crocodile (*Crocodilus niloticus*) feeding on nestlings of egrets and cormorants, which means that it can probably feed on non-fledged crane chicks once they are in sight. Because it takes a long time for the chicks to fledge, crane chicks are at a great disadvantage with predators.

CONSERVATION MEASURES TAKEN

The fluctuation in waterbird populations is closely related to the quality of their habitat. Cranes and other waterbirds are, therefore, important indicators of the status of the wetland habitats.

Scientific study of the current habitat management and environmental monitoring are essential for the sound management of the habitat. Public education flanked by law enforcement play an important role in the same fight.

Local governments are instrumental at the grassroots level in the implementation of wetland conservation. The central government also needs to assist in drawing up policies in line with the conservation and management of these fragile habitats, which are vital for cranes.

The Bangweulu Basin has an important conservation status in that it falls in the WWF-Zambia Wetland Project core area. The Project was established under the Department of National Parks and Wildlife Service in the Ministry of Tourism. It is currently financially supported by the WWF. The Project was instituted in order to integrate local people with the management, conservation, and sustainable development of the area. The fundamental aims of the Project are to conserve and manage natural resources and enhance their productivities, consequently maintaining the biological diversity.

Zambia is one of the few countries in Africa which is taking a step toward the formulation of a national wetland policy. There have been no guidelines in the management of the country's wetlands in the past. A large area of the Bangweulu is partly protected as Game Management Area. The wetlands are not fully protected, however, since settlement and other human activities are allowed within. This results in conservation conflicts at times. Zambia is a signatory to the Ramsar Convention, and the Chikuni area in the Bangweulu has been ratified as a wetland site of international importance.

RECOMMENDATIONS AND CONCLUSION

In order to gain proper understanding of the status of Wattled Cranes in the area, frequent censusing and coordinated research should be undertaken. A date for national censusing of Wattled Cranes and other important wetland bird species should be established. This could be conducted through the National Parks and Wildlife Service, conservation groups such as Zambia Ornithological Society, and individual ornithologists. Information on feeding, roosting, and particularly breeding and the population status should be collected. Banding or ringing at this stage should also be encouraged. At a regional scale, this census network could be coordinated throughout the distribution areas of Wattled Crane in Africa.

This important work will be able to furnish us with information pertaining to the species' seasonal movements and assist in identifying areas which could be safeguarded by legislation as national parks or sanctuaries for the perpetuation of the Wattled Cranes, plants, and other animal species.

Public education, going side by side with law enforcement, should be stepped up in all areas of importance for the species. Fishermen should be restricted to areas outside suitable breeding sites.

Finally, there is need for coordinated research on the Wattled Cranes using methods specifically formulated for the species. In conclusion, the Bangweulu Wattled Cranes population is viable and may breed well once their habitats are properly maintained.

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Table 1. Frequency of observation of Wattled Crane group sizes and sum of birds in each group size, in the Bangweulu.

Group size	Frequency of observation	Sum of birds in group size
1	8	8
2	40	80
3	30	90
8	15	120
9	6	54
10	3	30
60	3	180
70	1	70
75	1	75
96	1	96
100	1	100
150	1	150
200	2	400
Total		1,453

Table 2. Results of Wattled Crane Census in the Bangweulu area.

Year	Population estimate	Source
1984	1,718	Howard and Aspinwall (1984)
1991	1,367	Kamweneshe, unpubl.
1993	1,453*	Kamweneshe, present

*Total count

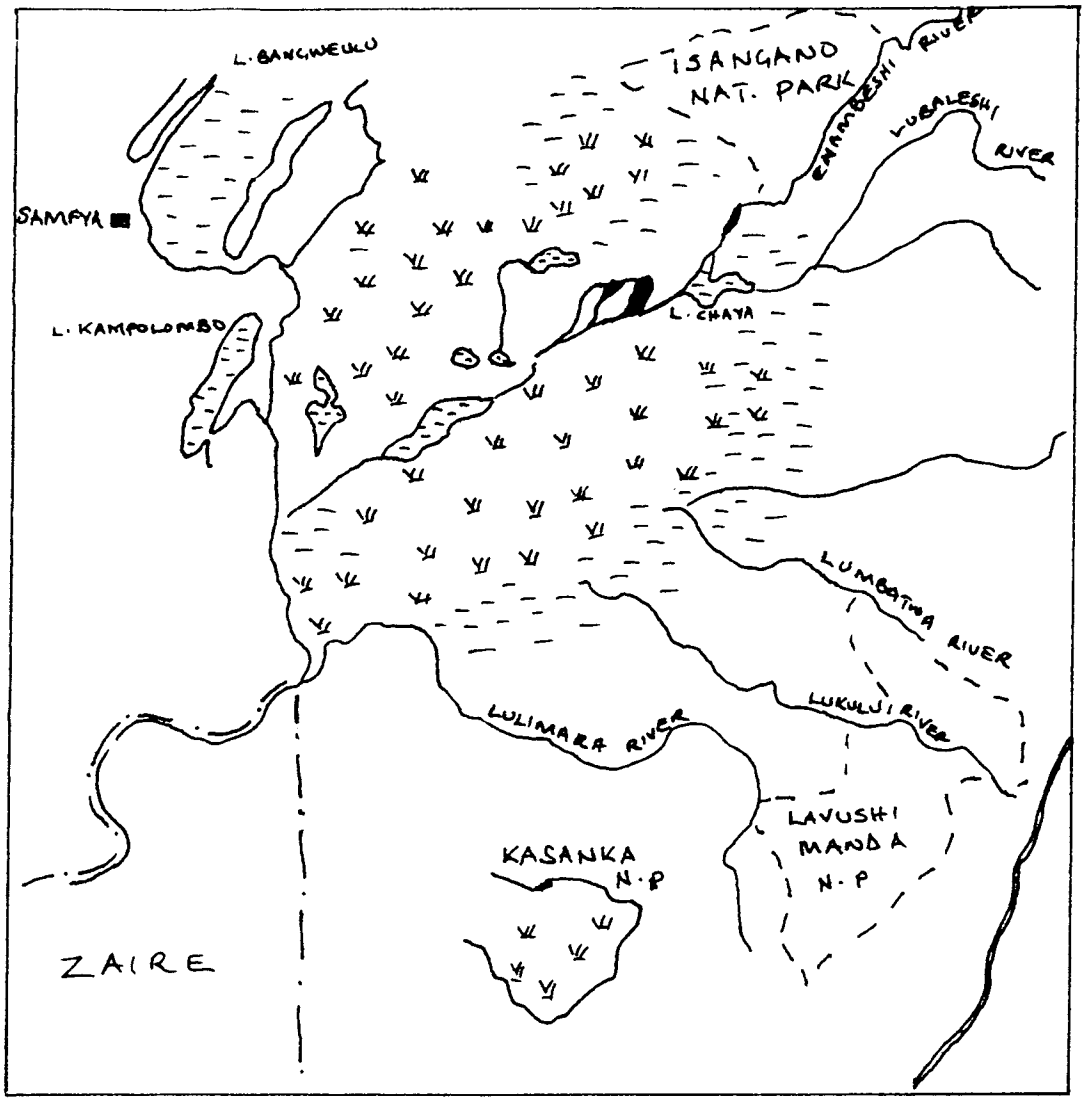

Figure 1. Bangweulu basin with its associated wetland and floodplain.