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### Large nocturnal roosting aggregations and mass movements of Whiskered Terns in Liuwa Plain National Park, Zambia

Jonah Gula<sup>1</sup>, Camden Martin<sup>2</sup>, Amukena Mungole<sup>3</sup>, Andre Botha<sup>4</sup>

1. University of KwaZulu-Natal, Pietermaritzburg, South Africa; email: [jonah.gula@yahoo.com](mailto:jonah.gula@yahoo.com)
2. (no affiliation)
3. African Parks Zambia, Lusaka, Zambia
4. Endangered Wildlife Trust, Gauteng, South Africa

### Abstract

The Whiskered Tern (*Chlidonias hybrida*) is little studied in southern Africa. In Zambia, it is primarily found in the south and west of the country, where the Barotse Floodplain and Kafue Flats are known to contain substantial numbers of terns. Although the species is common in Liuwa Plain National Park, there are no high counts. While in Liuwa in July 2021, we observed over 1,600 Whiskered Terns at a nocturnal roost, which was located on floating vegetation in the middle of a pan. In June 2022 we observed three large nocturnal roosts ranging from 400–725 terns as well as large early morning movements of as many as 850 terns dispersing towards floodplains outside Liuwa. Our observation in 2021 represents one of the highest concentrations of Whiskered Terns recorded in southern Africa and those in 2022 suggest terns may commute tens of kilometers to forage during the day but return to Liuwa to roost communally.

**Keywords:** Wetland; waterbird; Zambezi; flock; *Chlidonias hybrida*

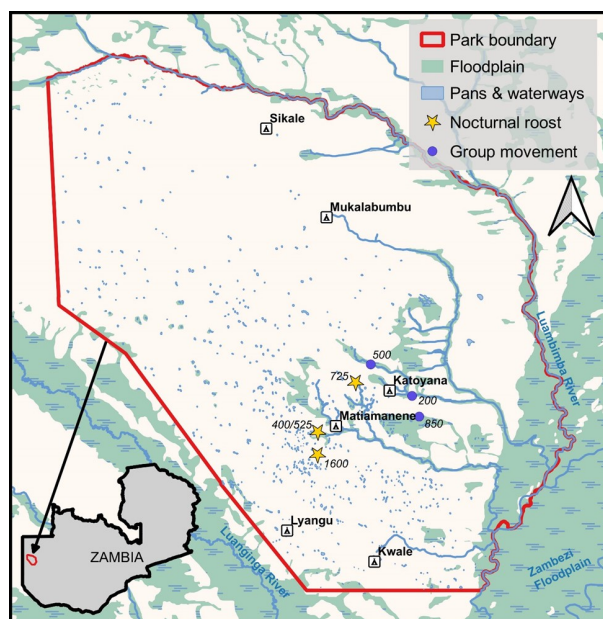
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The southern African subspecies of Whiskered Tern *Chlidonias hybrida delalandii* has a fragmented distribution in south-central Africa linked to its patchy wetland habitat, which includes floodplains, rivers, lakes, marshes, and ephemeral pans (Tyler 2012, Underhill and Herremans 1997, Urban et al. 1986). Although migration patterns are not well understood, there are clearly seasonal movements in some regions (Parker 2005, Underhill and Herremans 1997). However, the extent to which seasonal movements

influence local abundance in areas occupied year-round is unknown.

In Zambia, the Whiskered Tern occurs primarily in the south and west of the country, although there are occasional sightings from elsewhere in the country (Dowsett et al. 2008). The only confirmed breeding in Zambia has been in Liuwa Plain National Park (Conant 1980), although other breeding areas likely have been overlooked, such as the



**Fig. 1.** Liuwa Plain National Park, Zambia, showing the locations of nocturnal roosts and group movements of Whiskered Terns in July 2021 and June 2022. The size of the roost or group movement is indicated next to each location.



**Fig. 2.** Part of the large flock of Whiskered Terns gathering to roost at a pan in Liuwa Plain National Park, Zambia, on 24 July 2021.

Barotse Floodplain and Kafue Flats (Dowsett et al. 2008). Large numbers have been reported from these areas, including counts of over 1,000 terns (BirdLife and Wetlands International 2022; F. Willems, pers. comm.). Generally, however, counts are cumulative for an entire area or survey day, so there are no details on group or roost sizes. Here we report Whiskered Terns forming large nocturnal roosts in a national park and dispersing during the day, including one of the largest recorded concentrations of the species from south-central Africa.

We visited Liuwa Plain National Park, Zambia, from 17 July to 4 August 2021 and 31 May to 12 June 2022. Whiskered Terns were common at pans throughout the south of the park where we were working, but usually in small groups or as singletons. However, on 24 July 2021 we observed a nocturnal roost of over 1,600 Whiskered Terns. Between 17:30 and 18:30, we were at a ~15-ha pan in the south of the park at 14.691°S, 22.616°E (Figure 1) when groups of 50–100 terns began flying in and joining the few dozen that were already present. Many of the incoming terns landed on floating vegetation in the middle of the pan, and some began flying in flocks back and forth across the pan (Figure 2). As the numbers grew, we roughly counted by fifties, as the activity of the terns and dozens of other waterbirds coupled with the diminishing light conditions made it difficult to be more precise.

Whiskered Tern groups streamed in for approximately 45 min, almost exclusively from the south. As daylight faded, most terns settled on the floating vegetation in a cacophony of vocalisation. By the time we could no longer see, our conservative estimate was that 1,600 terns had arrived at the pan, but after dark we continued to hear the distinctive wing noise of more groups dropping steeply from high above. Therefore, the actual number almost certainly exceeded 2,000 terns. We only observed small groups of terns on subsequent visits to the same pan during the day.

On 4 August 2021, we returned at dusk and found fewer than 200 terns. No groups came to roost for the night as in our initial observation.

In June 2022 JG and AM observed three large Whiskered Tern roosts at dusk (Figure 1). The first of at least 400 terns was at 18:22 on 1 June at a pan at 14.661°S, 22.616°E. On 7 June we observed terns aggregating at the same pan between 17:50 and 18:50. The number of terns present began to grow as small groups arrived before sunset, eventually numbering around 300 by 18:10 at sunset. However, at that time a group of about 150 terns suddenly separated and flew west as one group. In the following 30 min a further 225 terns arrived, thus the total number observed at the pan was 525, of which 375 stayed to roost. At approximately 06:05 on 9 June, we heard a large number of terns at a pan at 14.602°S, 22.661°E while it was still dark. We observed the pan as it got light and counted 675 terns leaving in groups of 75–200 every 2–4 minutes. Groups left the pan between 06:24 and 06:34 in an east/southeast direction, leaving c. 50 terns when we left the pan at approximately 06:40, so the total roost was at least 725 terns. Both pans where these roosts occurred had extensive floating vegetation, similar to the roost pan in 2021.

On three separate occasions in June 2022, JG and AM also observed fairly large group movements of Whiskered Terns in the south of Liuwa at dawn and dusk. On 1 June at 06:40 JG observed 200 terns moving east along Katoyana Stream at 14.619°S, 22.729°E. Between 06:43 and 06:50 on 10 June, we observed 850 terns (with 400 in a single group) at 14.644°S, 22.737°E, all flying east toward the Luambimba-Zambezi River floodplains. Finally, at 17:24 on 11 June, we estimated 500 terns flying north at 14.581°S, 22.679°E.

Our observations appear to be the first records of large nocturnal roosts of Whiskered Terns in southern Africa. The highest count we are aware of in the region was of 4,000

Whiskered Terns at Lake Ngami, Botswana, in December 2009 (Tyler 2012). We expect that this count, like others totaling over 1,000 terns, is a total count of terns across the entire wetland, and may have been a result of unusually high water levels in the preceding months. If so, our observation in 2021 is the highest concentration recorded at a single site in south-central Africa.

Breeding on Liuwa Plain has been recorded in March–April (Conant 1980), so high counts following the fledging period, such as 1,000 seen along the Barotse Floodplain in June 2019 (F. Willems, pers. comm.), are not unexpected. Our observations were particularly exceptional given that the mean count of Whiskered Terns on Liuwa Plain from dry season waterbird censuses is 150 individuals, as is the mean for the Barotse Floodplain (BirdLife and Wetlands International 2022). It is therefore possible that the nocturnal roosts we observed, especially the one in 2021, contained a significant portion of western Zambia's dry season population.

Our largest cumulative daily count of Whiskered Tern in June 2022 while driving 50–80 km was 250 and more typically 20. This suggests that Whiskered Terns disperse across a large area outside of Liuwa to forage during the day but move into park to roost communally at night. The arrival of tern groups from the south in our 2021 observation also suggests they may have come from the floodplains of the Zambezi and Luanginga Rivers outside the park. The large dawn movements toward the Luambimba-Zambezi floodplains in 2022 lend similar support to daily movements outside the national park.

Although the Whiskered Tern is considered a year-round resident in Zambia (Dowsett et al. 2008), it is probable that some seasonal movement occurs considering known seasonality in reporting rates at higher latitudes (Underhill

and Herremans 1997). Indeed, terns that breed farther south during the summer wet season may move to lower latitudes during the dry season, where they remained scattered at low densities during the day but form temporary aggregations at night like the ones we observed. The Whiskered Tern population in southern Africa remains little known. In remote areas, such as Liuwa Plain, it is not surprising observations of spectacles like the nocturnal roosts and large movements we observed are unreported. While much remains to be learned about Whiskered Tern movements in Zambia – and southern Africa as a whole – our observations provide some insight into the population in western Zambia.

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