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Waterbirds of the Murchison Falls–Albert Delta Wetland System, an important Ramsar site

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Summary

The Murchison Falls–Albert Delta Wetland System Ramsar Site, declared in 2006, consists of the River Nile from the Murchison Falls up to and including a small part of Lake Albert. Before entering the lake, the river splits into three main channels passing through an extensive delta supporting a papyrus swamp; the Ramsar site also includes the land within a kilometre of the river banks, north and south. Most is within Murchison Falls National Park. The river, including the channels through the papyrus, supports large numbers of waterbirds of many species. For a year, we undertook monthly waterbird counts along the channels through the delta swamps, and on the section of Lake Albert within the Ramsar site. Overall, we recorded 78 waterbird species and the site regularly supports three globally and another seven nationally threatened species, including Shoebill *Balaeniceps rex,* Grey Crowned Crane *Balearica regulorum* and Papyrus Gonolek *Laniarius mufumbiri*. The site is also important for large numbers of White-winged Black Terns *Chlidonias leucopterus* on passage. Most of the larger species, such as White-faced Whistling Duck *Dendrocygna viduata* and Long-tailed Cormorant *Microcarbo africanus* rarely, if ever breed in this area, instead their numbers drop at the times when they are expected to breed, apparently elsewhere. A number of pairs of Fish Eagles *Haliaeetus vocifer* breed, and there is a small colony of African Darters *Anhinga rufa*. The large numbers of easily-seen birds attract increasing numbers of visitors, adding to the site's value. Various industrial activities are planned within the watershed of this Ramsar Site, mainly associated with oil and gas, and our data are expected to provide baseline data for future monitoring of the site.

Keywords Murchison, Ramsar, waterbirds, Uganda

Introduction

The Murchison Falls-Albert Delta Wetland System (hereafter the Murchison Ramsar Site), an area of 173 km^2, was designated as a Ramsar site in 2006, together with eight other sites in Uganda (WMD/NU 2008). The Murchison Ramsar Site has several components, but the River Nile—locally known as the Victoria Nile—from the Murchison Falls to Lake Albert is its centre piece (Fig. 1). Along the river's final ten kilometres, before reaching the lake, there is a highly biodiverse and extensive area of papyrus *Cyperus papyrus* swamp, locally known as the Nile Delta (Kibuule *et al.* in prep). The Ramsar site then extends for up to 4 km into Lake Albert, where water

depths are mostly less than a metre. Finally, the site includes the land on both banks, up to one kilometre from the shores of the river and delta. Although mainly for watershed protection, these areas of land support nesting sites of African Fish Eagles *Haliaeetus vocifer*, whilst various species of plover, thick-knee and even Shoebill *Balaeniceps rex* are sometimes found on land adjacent to the river. On the north bank, this land is entirely within Murchison Falls National Park, as is most of the south bank. However, for some 18 km along the western part of the south bank, it is community land, extending to the lake port of Wanseko. Some of this land, and beyond to the boundary of the watershed, is cultivated with crops that include cassava and cotton, the remainder being mainly pastoral and heavily over-grazed. Thus run-off, both of soil and agricultural chemicals, may enter the river and the swamps.

Figure 1. Murchison Falls National Park, showing the extent of the Murchison Ramsar site, from the Falls to the Nile Delta, plus an adjacent few square kilometres of Lake Albert. The dotted lines are administrative boundaries.

The River Nile here varies in width, but averages about 200 m across, and it has several swampy islands within it. The channels through the delta are about 130 m wide on average. The delta is almost entirely covered in papyrus swamp, sometimes with a fringe of *Vossia cuspidata*, and also including a few areas of more open swamp. The section of the Ramsar site from the falls to the start of the delta comprises 24 waterbird count sites that have been counted by teams from NatureUganda for about 20 years, every January and July (the international waterbird count months).

Within the park, adjacent to the Ramsar site, as well as in areas south of the Nile, developments related to the oil and gas industry are beginning to take place, but only the place where the oil pipeline is planned to cross beneath the river is within the Ramsar site, so that most potential effects on the site would be indirect. In this paper we are concerned with the numbers and seasonality of the larger waterbirds of the Ramsar site, providing baseline data which will allow for future monitoring. We follow the Ramsar definition of waterbirds that covers all main non-passerine bird families whose members are largely ecologically dependent on wetlands (Wetlands International 2019), but we also include the aquatic kingfishers. Smaller passerine species, such as some warblers that also depend upon wetlands, are considered elsewhere (Kibuule *et al.*, in prep.).

As well as the conservation importance of this Ramsar site, boat trips on the River Nile are a major tourist activity for the tens of thousands who visit the park each year, amongst them increasing numbers for whom birds are a major interest. The majority of boat trips go upstream from Paraa to the Falls, but some also go downstream to the delta, particularly for those hoping to see Shoebill. Nomenclature follows Skeen & Pomeroy (2016).

Methods

We used two complementary methods to obtain an overview of the waterbirds. First, for the approximately 30 km of the Victoria Nile before it enters the delta, we have used the January and July total counts conducted by NatureUganda, in which all waterbirds were recorded. January and July 2018 were the two months for which we also had counts in the delta area, which involved sampling rather than total counts.

Within the Nile Delta, large waterbirds along the open channels of the river were counted by boat from a series of 20 point count sites, aimed mainly at the birds within the papyrus, with each point visited monthly from September 2017 to August 2018. Records were also kept of the distance from the observers to the point at which each large waterbird species was recorded in the channels, and for each species we noted the maximum distance at which it was seen, an estimate of its detectability. As an example, this distance was 250 m in each direction for the Squacco Heron *Ardeola ralloides* and on each side of the channel (where most were seen perched). So, for this species we surveyed a length of 500 m at each of the 20 point count sites, a total of 10 km. To estimate how many Squacco Herons were in the whole 35 km of channels, we then multiplied the average number per month by 35/10 = 3.5 birds/km^2. The results are given in the Delta Channels columns of Table 1.

To count birds in the part of Lake Albert within the Ramsar site, we made transects by boat in the open lake for a distance of 9.4 km. Here we could only record birds near enough to be seen (around 250 m, but varying with the conspicuousness of the species), but the numbers were low (it was not practical to use Distance software, as most birds were flying). It follows that our counts of birds in the lake will have been under-estimates. We also made counts along the lakeshore and the adjacent very shallow waters. This is a complex ecosystem, involving many plant species. Part of the shoreline is papyrus, but most is more open swamp, mainly vegetated by smaller macrophytes, including *Ottelia scabra, Ottelia ulvifolia, Nymphaea nouchali, Nymphaea lotus, Eichhornia crassipes* (water hyacinth), *Salvinia molesta* (Nile cabbage), *Ludwigia adscendens* (on sand bars within the lake) and many other species (S. Mutebi, pers. comm.). This habitat was similar in two open swamps along the north channel of the delta, and we combined the data from them with those of the 8.1 km lake shore habitat.

Results

During the course of the year, we recorded a combined total of 81 waterbird species at the delta. Site records for the park go back to the 1960s, since when just over 100 waterbird species have been recorded. Table 1 shows a sub-set of these data, containing all species of conservation concern (whether global, regional or national), plus the more numerous other species, for the two months in 2018 when counts were made for the whole Murchison Ramsar Site. The open waters of Lake Albert had the

fewest birds, but as indicated in the Methods section, the numbers recorded on the lake were only those seen from our transects, and their numbers, although still likely to have been relatively low compared to the other areas, will therefore have been under-recorded.

Table 1. Estimated total numbers of waterbirds in the whole Murchison Ramsar site in January and July 2018, showing species of conservation concern and all those with >10 individuals across all counts. There were 36 other waterbird species that were considered as vagrants when either recorded in other months, and/or with <10 individuals. Habitat: W: Waterbird G: Grassland species P: Palaearctic migrant A: Afrotropical migrant F: Forest species. Conservation status: EN: Endangered, VU: Vulnerable, NT: Near-Threatened; U: Uganda, G: Global. P (in numbers columns) = Present, but not counted. *Full datasheets for the 240 counts along the channels through the delta, and the 107 counts in Lake Albert, are available from MK at mkibiile@gmail.com.*

				January 2018					July 2018				
2016 No	Species	Habitat	Conservation status	R. Nile-Upstream	Delta channels	Open swamps	Open water	Total	R. Nile –Upstream	Delta channels	Open swamps	Open water	Total
2	White-faced Whistling Duck *Dendrocygna viduata*	W		24		175	18	217	29	12	10	2	53
3	Fulvous Whistling Duck *Dendrocygna bicolor*	W		2		12	7	21		4			4
6	Egyptian Goose *Alopochen aegyptiaca*	WG		101		3		104	43		3		46
7	Spur-winged Goose *Plectropterus gambensis*	W		28				28					
139	Black Crake *Zapornia flavirostra*	W		65	P	5		70	21	P	5		26
152	Grey Crowned Crane *Balearica regulorum*	WG	G-EN, U-EN	61	2			63	2	175	2		179
163	African Open-billed Stork *Anastomus lamelligerus*	AWG		4	2	73	1	80		70	10		80
168	Saddle-billed Stork *Ephippiorhynchus senegalensis*	W	U-VU	2				2			4		4
170	Pink-backed Pelican *Pelecanus rufescens*	W				6	1	7			10	8	18
172	Shoebill *Balaeniceps rex*	W	G-VU, U-EN			1		1			1		1
177	Black-crowned Night Heron *Nycticorax nycticorax*	PW		17				17	1				1
178	Striated Heron *Butorides striatus*	W	U-NT	9				9	3				3
179	Squacco Heron *Ardeola ralloides*	W		57	35	24	6	122	2		6	2	10
183	Grey Heron *Ardea cinerea*	W		18		8		26	3	2	1		6
185	Goliath Heron *Ardea goliath*	W	U-VU	16	3	3		22	8		1		9
186	Purple Heron *Ardea purpurea*	W		15	\6			21	4	26	1		31
187	Great White Egret *Ardea alba*	W		5		2		7					
188	Intermediate Egret *Ardea intermedia*	W		19	P	1		20	1				1
190	Little Egret *Egretta garzetta*	W		7	P	10		17					
191	Sacred Ibis *Threskiornis aethiopicus*	W		18	9	17		44					
196	Hadada Ibis *Bostrychia hagedash*	W		36	9			45	10	9			19
198	Long-tailed Cormorant *Microcarbo africanus*	W		453	115	240	17	825		12	44	32	88
199	Great Cormorant *Phalacrocorax carbo*	W		2	1	7		10			1		1
200	African Darter *Anhinga rufa*	W	U-VU	81	8	2		91	71	5	2		78

2016 No	Species	Habitat	Conservation status	January 2018					July 2018				
				R. Nile-Upstream	Delta channels	Open swamps	Open water	Total	R. Nile –Upstream	Delta channels	Open swamps	Open water	Total
208	Black-winged Stilt *Himantopus himantopus*	PW		2		6		8					
211	Common Ringed Plover *Charadrius hiaticula*	PW				15		15					
221	Long-toed Lapwing *Vanellus crassirostris*	W		50	P	19		69	7		1		8
222	Spur-winged Lapwing *Vanellus spinosus*	WG		64	4	8		76	36	4	7		47
227	African Wattled Lapwing *Vanellus senegallus*	W			32			32			2		2
231	African Jacana *Actophilornis africana*	W		92	P	200		292	62	P	88	4	154
244	Little Stint *Calidris minuta*	PW				11		11					
246	Great Snipe *Gallinago media*	PW	G-NT, U-VU			6	1	7					
250	Common Sandpiper *Actitis hypoleucos*	PW		19	6	6		31	7				7
264	Collared Pratincole *Glareola pratincola*	W				16	1	17					
266	Rock Pratincole *Glareola nuchalis*	W	U-VU	4				4	2				2
272	Grey-headed Gull *Chroicocephalus cirrocephalus*	W				108	1	109			4	2	6
280	White-winged Tern *Chlidonias leucopterus*	PW		2	53	90	40	185	1		11	10	22
336	African Fish Eagle *Haliaeetus vocifer*	W		27	2	1		30	19	2	2		23
358	Pel's Fishing-Owl *Scotopelia peli*	FW	U-EN						1				1
462	Malachite Kingfisher *Corythornis cristata*	W		46	P	4		50	14		3		17
464	Giant Kingfisher *Megaceryle maxima*	W	U-NT	3				3	2				2
465	Pied Kingfisher *Ceryle rudis*	W		279	124	4		407	269	113	11	1	394

The generally higher numbers of birds in January (3402 were counted, compared to 1452 in July (Table 2), are mainly due to the presence of Palaearctic migrants, of which the White-winged Tern *Chlidonias leucopterus* was the most numerous (Table 1). Overall, only the African Jacana *Actophilornis africana* and Pied Kingfisher *Ceryle rudis* had more than 100 birds in both January and July counts, whilst a further four species—White-faced Whistling Duck *Dendrocygna viduata*, Grey Crowned Crane *Balearica regulorum*, African Open-billed Stork *Anastomus lamelligerus* and Long-tailed Cormorant *Microcarbo africanus* had above 50 individuals in both months.

Table 2. Overall numbers of waterbirds from table S1.

	January 2018					July 2018				
	R. Nile (upstream)	Delta channels	Open swamps	Open water	Total	R. Nile (upstream)	Delta channels	Open swamps	Open water	Total
Number of species	42	31	42	13	62	30	18	31	9	44
Number of individuals	1695	491	1118	98	3402	632	414	244	62	1452

Seasonality

As would be expected, the number of species and particularly individuals, is higher in January than July (Table 2) and probably reflects movements of Ugandan resident species as well as large numbers of migrants, both Afrotropical and Palaearctic. The majority

of the large waterbird species recorded are present throughout the year in Uganda, but many of them do not nest within the Murchison Ramsar Site. Consequently, many birds leave for a part of the year, including Long-tailed Cormorant, African Open-billed Stork and White-faced Whistling Duck—some pairs of this intra-African migrant nest in the park (Carswell *et al.* 2005) (Fig. 2). Numbers of Long-tailed Cormorants in the months of August to November are presumably immatures, but this was not confirmed. The seasonality pattern for Purple Heron *Ardea purpurea* is less clear, but the higher numbers in December and February could be due to Palaearctic migrants.

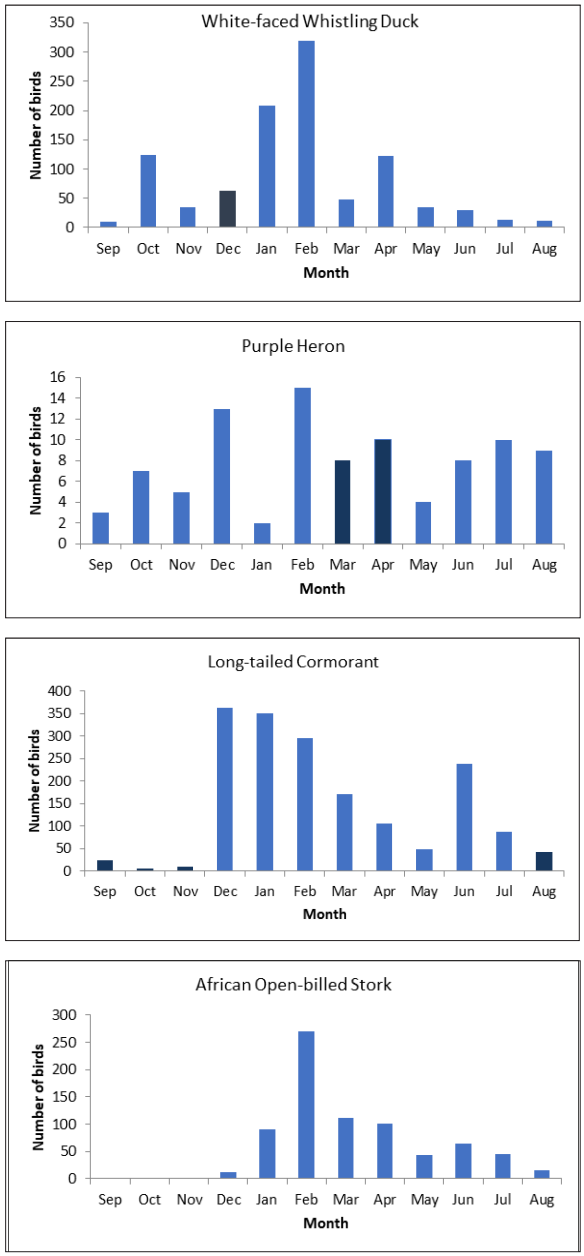

Figure 2. Seasonality of four waterbird species. All four species are resident in Uganda, but the nesting sites of those observed in the Ramsar site are not known, and some Purple Herons may be Palaearctic migrants.. The figure shows the combined total numbers of each species from monthly counts of the delta channels, open swamps and open waters of Lake Albert. The main egg-laying months of Purple Heron and Long-tailed Cormorant according to Brown & Britton (1980) are indicated in dark blue. For African Open-billed Stork, these months are September and October, when none were recorded.

Of the Palaearctic migrants, the numerous White-winged Black Terns, showed a strong southward passage in November and a comparable return in April (Fig. 3). Some Palaearctic species, such as Common Sandpiper *Actitis hypoleucos*, were present through the northern winter. The area also has large numbers of some non-waterbird passage migrants, notably Barn Swallow *Hirundo rustica* and Sand Martin *Riparia riparia* (Fig. 3), both of which are commonly seen over the various wetland habitats, where some also roost.

Up to seven Red-knobbed Coot *Fulica cristata* were recorded on Lake Albert in five months between November 2017 and July 2018 — a new distribution record. This species is widespread in Africa (Urban *et al.* 1986) so it is surprising that the only previous records in Uganda are from the south-west and south-east (Carswell *et al.*, 2005).

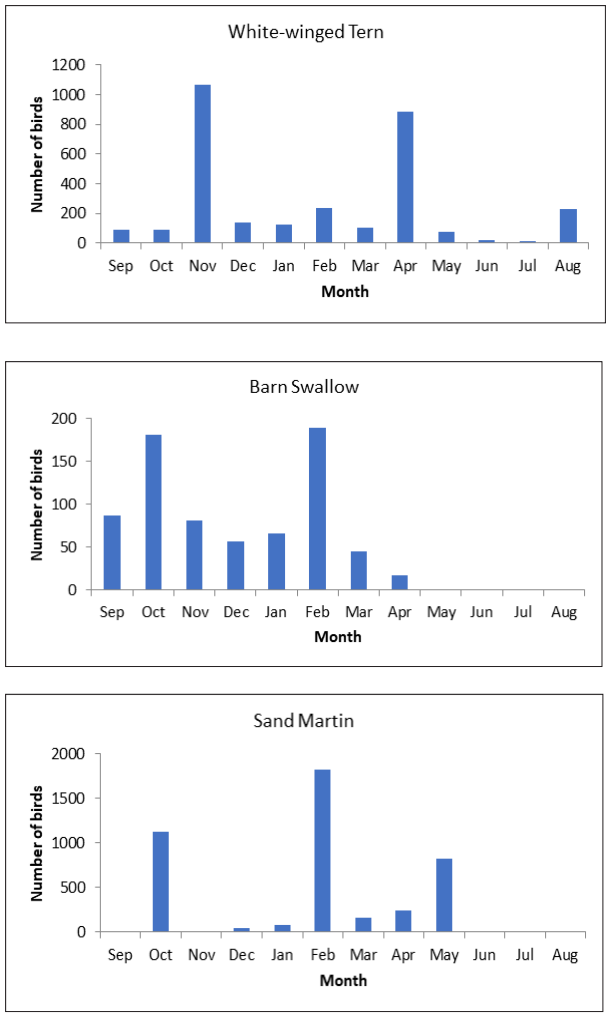

Figure 3. Numbers of three Palaearctic migrants in the same areas as for Fig. 2. The Ramsar site is important for many non-waterbird species, including Barn Swallows and Sand Martins.

Breeding

Within the Ramsar site, kingfishers nest in small cliffs at several sites along the river, and there is a small nesting colony of African Darters *Anhinga rufa* below the Murchison Falls. Sempala (1999), using aerial surveys, recorded several Shoebill nests in the delta, and presumably they still nest there. One Saddle-billed Stork *Ephippiorhynchus senegalensis* nest is in occasional use, and an estimated 15 pairs of African Fish Eagles nest in trees near the river. However, for the majority of herons, egrets, ibises and other large waterbirds, no nesting records are known from the Ramsar site, or elsewhere in the park and its surrounding areas.

Discussion

The Murchison Ramsar Site supports a good diversity of waterbirds, though many of them breed elsewhere, which largely explains the seasonal variations recorded. The count totals in Table 1 are minima, for several reasons. Firstly, as already noted, counts on Lake Albert were only transects of limited width. Secondly, it is known from aerial survey flights that there are a number of more open areas within the papyrus swamps, and these hidden areas will have supported some other waterbirds. Finally, we have given actual and average numbers, rather than just quoting the highest recorded for each species.

The Murchison Ramsar Site qualifies under Ramsar criteria 1, 2 and 3 (www.ramsar.org), although it does not have the very large numbers of waterbirds of some other sites, nor does it reach the 1% criterion for the global population of Shoebill *Balaeniceps rex*, estimated as 5000–8000 (Wetlands International 2019). Nevertheless, Murchison is a generally reliable site to find this enigmatic species that is much sought after by birders, who are usually successful in finding it here. And not only is there a large variety of waterbirds, the majority are easily seen, often at close range. Birding and nature-based tourism in general are of high importance to Murchison Falls and surrounding areas and bring significant economic benefits to the region. Roussouw & Sacchi (1998) describe a visit to Murchison as a must for every birder. As well as sustainable tourism, there are several other opportunities for wise use, as recommended by the Ramsar Convention, for which effective management is essential. This is particularly difficult to achieve for fishing, although sustainable harvesting of papyrus can be compatible with conservation of the important papyrus birds (Donaldson *et al.* 2010) and could be managed by the Uganda Wildlife Authority and the local communities around Wanseko town.

The Murchison Ramsar Site is more notable for the variety of species that it supports—78 of them—than their numbers. As we have stated, our counts represent conservative estimates; For example, during our counts on Lake Albert, we only saw birds for a distance of about 250 m on either side of our transects, representing only about 5 km^2 of the lake. As the lake has a total area of about 5300 km^2, it is likely as a whole to support tens of thousands of waterbirds, together with many thousands more along its shores, and the waterbirds that are there would very probably qualify the lake as another Ramsar site, to add to the present number of 12 in Uganda.

Several globally threatened species occur, notably the Shoebill and Grey Crowned Crane, for both of which Single Species Action Plans have been compiled (Dodman 2013, Morrison 2015), with the aim to also produce national action plans for both species for Uganda. Numbers of Grey Crowned Cranes recorded in July 2018 fall somewhat short of the 1% population threshold of 220 birds. There are also periodic

visits of African Skimmers *Rynchops flavirostris*, usually on sandbanks upstream from Paraa, with up to 200 between October and March (GK, pers. obs.), although they also move frequently, and were absent in the counts reported here. African Skimmers have been recorded in high congregations here, with a maximum of 1400 noted by Byaruhanga *et al.* (2001). In addition to the species recorded in Table 1, a pair of Pel's Fishing Owls *Scotopelia peli* appears to be resident just below the Falls, and a few Rock Pratincoles *Glareola nuchalis* are always found there too, with many more above the Falls (GK, pers. obs.), and past congregations noted of 500 – 1000 birds (Byaruhanga *et al.* 2001). The Near Threatened Papyrus Gonolek *Laniarius mufumbiri* is resident in the papyrus swamps, whilst species such as Greater Swamp Warbler *Acrocephalus rufescens* and Lesser Swamp Warbler *A. gracilirostris* breed here as well.

The wide range of habitats in the Murchison Ramsar Site is clearly a reason for the diversity of waterbirds. Those inhabiting the delta swamps are of course different from those of the open riverine and lake habitats, the former being the subject of a separate report (Kibuule *et al.*, in prep). Adjacent land habitats included in the Ramsar site as watershed protection areas also support many non-waterbird species, and they provide roosting sites for some species..

The outer edge of the delta swamps forming the lakeshore is particularly rich in birds, with Shoebill, Goliath Heron *Ardea goliath*, numerous African Jacanas, and many other waterbird species regularly recorded. The waters here are very shallow, and only suitable for small, shallow-draught boats, but the tourist potential is considerable. The local community could benefit by offering boat trips from Wanseko (Fig. 1) to the nearby parts of the lake, where a great variety of birds can be found. At the creation of the park, the western boundary was drawn as a straight line joining the two most westerly points of dry land, but that excluded the outer parts of the swamp, and the section of Lake Albert which is part of the Ramsar site. The Uganda Wildlife Authority is currently reviewing these boundaries, with a view to extending the park boundary to coincide with that of the Ramsar Site (P. Kasoma, pers. comm). The shallow lake waters are also heavily fished, and the site would benefit significantly from enforcing a sustainable fishing policy to ensure against over-fishing in the lake.

Several environmental factors could affect the future of waterbird numbers and diversity in the Ramsar site. Climate change is obviously one of them; for example, changes in rainfall affect water levels. Potential oil spills and related pollution from oil and gas operations also pose a direct risk to the lake, as well as to the wider environment. Over-fishing also affects fish-eating birds where it occurs. The extent and impact of fisheries has not been well studied at Murchison, but in the lake, fishermen told us that their fish catches have decreased considerably in recent years, and many of the fish are now smaller than they used to be. The breeding sites of several of the large waterbird species, such as Goliath and other herons, Pink-backed Pelicans *Pelecanus rufescens* and Long-tailed Cormorants, are unknown, but are likely to be in trees close to communal land. Consideration should be given to discovering where they nest, and encouraging the local communities to protect them.

Continuing twice-annual monitoring will help to track changes in bird populations that may result from these factors, and should then lead to potential management actions. Currently, the monitoring extends into the swamp, but ideally should be extended to the lake, for example, by a route that follows the southern channel of the swamp, proceeds northwards up the lakeshore and returns via the northern channel. By recording each section separately, comparisons with previous data for the long-established river sections can continue.

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