

The birds (Aves) of the middle Save River valley, Moçambique

D.G. ALLAN¹, G.B. DAVIES¹ & V. PARKER²

¹ Durban Natural Science Museum, P.O. Box 4085, Durban 4000, South Africa
E-mail: david@prcsu.durban.gov.za

² Endangered Wildlife Trust, Private Bag X11, Parkview 2122, South Africa

Summary

Allan, D.G., Davies, G.B. & Parker, V. 2000. The birds (Aves) of the middle Save River valley, Moçambique. *Durban Museum Novitates* 25: 18-24. This report reviews all the bird species that have been recorded in the middle Save River valley (between Massangena in the west and Covane in the east) in Moçambique, including the results of a recent survey made in November 1998. A total of 268 bird species has been recorded from the region, including 11 new species found in November 1998. Twenty-five species were recorded from the area by early expeditions (mainly in 1950, 1963 and 1965) that have not been found in recent times. Thirteen of these are waterbirds, suggesting that these early surveys were made during wetter periods than the subsequent efforts and/or that upstream water extraction has resulted in a reduction in waterbird diversity in recent times. Of the remaining 12 dryland species, nine may have been overlooked by recent surveys but three species (Ostrich *Struthio camelus*, Hooded Vulture *Necrosyrtes monachus* and Crested Guineafowl *Guttera pucherani*) seem to have disappeared during the intervening period. One of the species found for the first time in November 1998, Southern Banded Snake Eagle *Circaetus fasciolatus*, is of global conservation concern. A further 10 of the 268 species recorded are regarded as locally threatened in southern Moçambique. Five of these (Ostrich, Hooded Vulture, Crowned Crane *Balearica regulorum*, Lesser Jacana *Microparra capensis* and Pel's Fishing Owl *Scotopelia peli*) have not been found during recent surveys and are priority candidates for more detailed investigation. The records of one of the locally threatened species found for the first time in November 1998, Mangrove Kingfisher *Halcyon senegaloides*, are of particular interest in the light of current controversy as to its migratory patterns. The middle Save River valley lies within a global Endemic Bird Area and two species with globally restricted ranges occur in the region: Pink-throated Twinspot *Hypargos margaritatus* and Lemon-breasted Canary *Serinus citrinipectus*. The densities of large diurnal birds of prey were found to be surprisingly high.

KEYWORDS: *birds*, *Circaetus fasciolatus*, *endemics*, *Halcyon senegaloides*, *Hypargos margaritatus*, *Moçambique*, *raptors*, *Save River*, *Serinus citrinipectus*, *threatened species*.

Introduction

The avifauna of Moçambique is the least well-known of all the countries in southern African (i.e. those found south of the Zambezi and Kunene rivers) (Clancey 1996; Parker in 1999). This is largely due to the state of warfare which lasted for some 20 years, ending only in 1992.

The best-known work on the birds of Moçambique is that of Clancey (1970, 1971) which reviewed the avifauna of the region south of the Zambezi River. A revision of this work appeared in 1996 (Clancey 1996). More recently, a bird atlasing project in the region south of the Save River has been completed (Parker 1999), fieldwork for which largely spanned the period 1994-1998.

Particularly relevant to this study, Storer & Dalquest (1967) reported on the birds of the middle Save River valley. Their expeditions were made during the periods 30 September-28 October 1963 and 5-24 October 1965. The 1963 expedition was to "the hunting camp" at Zinave National Park on the south bank of the Save River. The 1965 expedition visited both this camp and "Panzila hunting camp" further to the west and also on the banks of the river.

An even earlier exploration of the middle Save River valley was the Carp Expedition undertaken by staff of the National Museums of Zimbabwe. This expedition visited Maringa

(21°22'S; 33°30'E), on the banks of the Save River and also in Zinave National Park, during the winter of 1950.

Study area

The middle Save River valley is defined here as the ca. 120 km section of the river situated between the river-side settlements of Massangena in the west (21°32'S; 32°57'E) and Covane in the east (21°22'S; 33°56'E) (Fig. 1). In this region, the area to the north of the river falls within the hunting concession of Coutada 4, which extends approximately 30 km north of the river and includes the upper reaches of the Repembe River. We (DGA and GBD) visited Coutada 4 during November 1998. Most of the area south of the river lies in Zinave National Park.

The Save River was almost totally dry during our visit, except for a minor channel of water and various stagnant pools. The immediate area had received little rain. Vegetation along the river comprises thickets and tall riverine woodland, surrounded by less well-developed 'mixed' deciduous woodland (comprising both broadleaved and *Acacia* species) away from the river. Lala palms *Hypphaene coriacea* and baobabs *Adansonia digitata* are common. The grass cover was scarce due to extensive recent fires. Extensive tracts of mopane *Colophospermum mopane* woodland occur in the

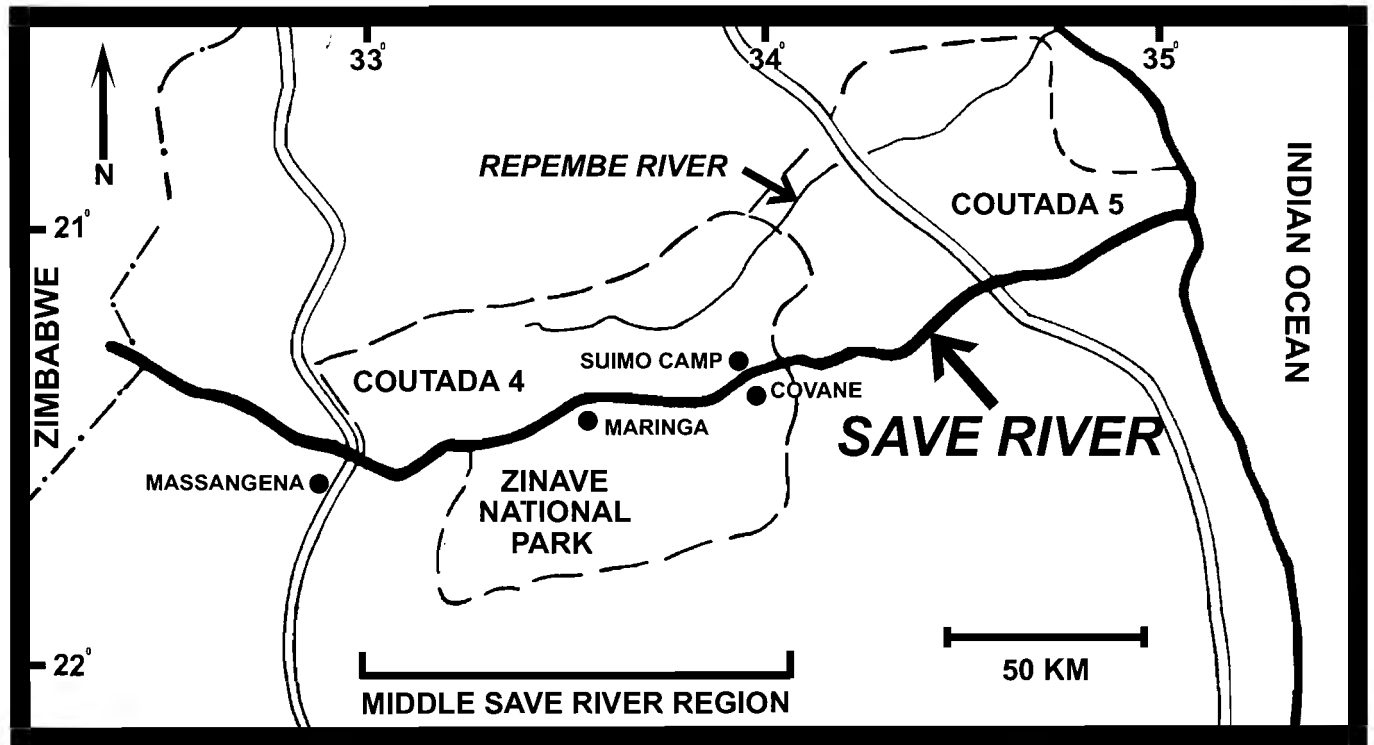


Fig. 1. The middle Save River valley showing some of the place names mentioned in the text.

area between the Save and Repembe rivers. The Repembe River, which was dry at the time, is also fringed by lush riparian growth. A band of miombo (*Julbernardia*) woodland occurs between five and ten kilometres south of the Save River (VP pers. obs). No miombo woodland was recorded in the areas visited north of the Save River. The restricted areas of ephemeral wetlands were all dry during our visit.

The dwellings of local communities in Coutada 4 are concentrated along the Save and Repembe rivers. These people have few livestock (only a few goats and chickens were noted). Livestock disappeared from the area during the state of warfare. Subsequent re-introduction has been inhibited by the absence of livestock-dipping facilities, extreme poverty and the presence of tsetse flies. The limited agricultural fields are also localised to the riverine regions, especially in the restricted areas with open floodplain habitats. The destruction of riverine trees associated with these fields was observed. It was noted that the harvesting of lala-palm wine, especially in riverine areas, for subsistence consumption is a major local activity. It was our impression that frequent burning is practised in order to favour the growth of lala palms over tall grassland and dense woodland. We do not know if any commercial logging has occurred in the area. The wild game in the area has been decimated through hunting by soldiers and local people. The same land-use practices occur to a limited extent in the Zinave National Park south of the Save River (VP pers. obs). We were surprised to find the water level so low in the Save River and the extent to which water extraction for irrigation upstream in Zimbabwe is responsible for this merits investigation.

These anthropogenic influences are probably having a profound impact on the ecology of this region. The absence of the foraging and trampling impact of grazers and browsers, in the form of either domestic livestock or wild herbivores, might promote unusually prolific vegetation growth. The absence of elephants in particular might promote the

development of tall, dense woodland and thickets. The development of woody vegetation, however, might be offset by extensive fires fuelled by untrammelled grass growth. These factors could be tilting the vegetation towards more open savanna conditions. The burning (associated with lala-palm wine harvesting) and agriculture in the riverine zone degrades this habitat by removing the grass layer, damaging floodplain wetlands, and destroying both young and mature trees. If the water level of the Save River is being significantly lowered by upstream water extraction, this has obvious implications for the ecology of the river, including its waterbird populations.

Methods

We visited Coutada 4 during the period 1-5 November 1998 to compile a bird list for the area. Access to the region was through Coutada 5 (Fig. 1) to the east and a separate bird list was compiled for this latter concession while *en route* to Coutada 4. Most of our observations were made on foot in the area around the 'Suimo Camp' (GPS reading: 21°18.9'S; 33°56.3'E, in quarter-degree-grid cell 2133BD) on the north bank of the river opposite Covane (Fig. 1). On 3 November we made a brief day-trip by motor vehicle to the Repembe River (grid cell 2133BB) about 20 km to the north (Fig. 1). The results of our survey have been forwarded to the ongoing Moçambique bird atlas project.

Additional information on the birds of the middle Save River valley was extracted from Storer & Dalquest (1967) and Parker (1999). In the case of the latter, a list of the birds recorded from the following grid cells was extracted from the distribution maps in that publication: 2132DB, 2133BD (the same grid cell in which the Suimo Camp is located), 2133CA, 2133CB and 2134AC. These grid cells represent those that incorporate sections of the river in the middle Save River valley between Massangena and Covane. Visits to this

Table 1. The 11 species recorded during the November 1998 survey that were not found in the middle Save River valley by the earlier studies of Parker (1999), Storer & Dalquest (1967), and those reported in Clancey (1996).

Cuckoo Hawk	Mangrove Kingfisher
Lesser Spotted Eagle	Grey-hooded Kingfisher
Southern Banded Snake Eagle	Forest Weaver
Steppe Buzzard	Orange-breasted Waxbill
Little Sparrowhawk	Red-backed Mannikin
Marsh Sandpiper	

region were made in April and November 1996, June and October 1997, and March 1998. Although parts of the grid cells 2133AD and 2133BC lie south of the Save River, they were not visited because the single road which previously accessed these localities has not been used since 1991 because of the suspected presence of land-mines. The results of the Carp Expedition to Maringa were never published (Clancey 1996). Clancey (1996), however, mentions many of the more interesting species collected there during this expedition. He also mentions a few other early records from the middle Save River valley from other sources; these data have also been included here. Although the Carp Expedition, Storer & Dalquest (1967) and Parker (1999) apparently only collected information from south of the river (largely within Zinave National Park), opposite Coutada 4, the habitats on both sides of the river appear similar and are likely to support comparable avifaunas. For this reason, their data have been considered here with our information from Coutada 4 on the north bank of the river.

Results and discussion

Bird diversity

Clancey (1996) mentions 78 bird species as having been recorded at Maringa in 1950 by the Carp Expedition and also describes an additional nine species as having been recorded in the middle Save River valley by other early observers. Storer & Dalquest (1967) recorded 148 bird species during their 1963 and 1965 surveys, while Parker (1999) recorded 214 species in the five grid cells covered along the middle Save River valley during 1994-1998.

We found a total of 184 bird species in the Coutada 4 area during our survey and 11 of these were not found in the middle Save River valley during the earlier studies (Table 1). All the bird species we recorded were found in the area around the Suimo Camp (grid cell 2133BD) on the banks of the Save River, except for the following six species which were only recorded north of the camp (in grid cell 2133BB) on the drive to the Repembe River: Black-shouldered Kite, Lesser Spotted Eagle, African Hawk Eagle, Red-crested Korhaan, Red-billed Helmetshrike and Spotted-backed Weaver. The following five species were only recorded in the westernmost reaches of Coutada 5 to the east *en route* to Coutada 4 but, as these are considered likely also to occur in Coutada 4, they have been included in our total: Steppe Buzzard, African Goshawk, Dark Chanting Goshawk, Coqui Francolin and Pied Crow.

Combining the information from all these sources provides a total list of 268 bird species recorded from the middle Save River valley. The bird lists from each study are presented in Appendix 1, along with the scientific names of all species.

Although not mentioned in any of the other sources, Greater Flamingoes *Phoenicopterus ruber* were reported on the

southern banks of the Save River by Snr Jujume, a Zinave National Park official, in July 1997. The flock included newly fledged young. This coincides with reports of flocks with newly fledged young arriving at coastal localities in southern Moçambique (Parker 1999) and supports the hypothesis that birds which breed in Botswana disperse up the east coast of southern Africa after breeding.

Comparison between historical and recent studies

The early studies of Storer & Dalquest (1967) and those reported in Clancey (1996) (including the Carp Expedition), despite their relatively low species totals, recorded 25 species not found during the more recent surveys (Appendix 1). A large proportion of these (13/25) are waterbirds, suggesting that these early surveys were made during wetter periods than the subsequent efforts. During the bird atlas survey, the areas south of the Save River were inaccessible after heavy rains because of the flooding of the roads and visits were only made during relatively dry periods. It is also possible that upstream water extraction has negatively affected waterflow in the Save River resulting in a reduction in waterbird diversity in recent times.

Of the remaining 12 dryland species, nine were likely to have been overlooked by Parker (1999) and ourselves but the status of three may have changed in the intervening period. Both Ostrich and Hooded Vulture have decreased markedly in southern Moçambique in recent times, the former through extreme hunting pressure and the latter due to the reduction in its food supply (Parker 1999). The survival of both species in the middle Save River valley requires investigation. Storer & Dalquest (1967) state the following relevant to Crested Guinea-fowl: "although probably not uncommon, Crested Guinea-fowl were shy and rarely seen". Although it is possible that this species was overlooked during the two subsequent surveys, it is also conceivable that hunting and/or the destruction of riverine habitat has led to its local extinction in the middle Save River valley.

It is of interest to note that Storer & Dalquest (1967) recorded Natal Robin but not Heuglin's Robin; the former was not found by ourselves, Parker (1999) or the Carp Expedition but the latter was recorded by all three of the other surveys.

Parker (1995) stresses the scarcity of large diurnal birds of prey (vultures and eagles) in southern Moçambique (south of the Save River) based on observations made between December 1994 and May 1995. Those comments, however, apply only to the densely populated parts of the region and we found a high diversity and abundance of these birds in the Coutada 4 area during our survey. Three species of vulture and ten species of eagle were recorded (Appendix 1), and Wahlberg's Eagle, Brown Snake Eagle and Bateleur Eagle were particularly common.

Threatened species

One of the species recorded by us, but not by any of the previous surveys, Southern Banded Snake Eagle, is regarded as globally of conservation concern. This bird is regarded as globally 'near-threatened' (Collar *et al.* 1994). Its world distribution is restricted to the coastal lowlands of east and southeastern Africa from Kenya to northern KwaZulu-Natal in South Africa. The main threat faced by this species is habitat destruction (Parker 1999). A single bird was seen perched in dense woodland close to the Suimo Camp along the Save River on 1 November. This represents the first record of this species along the Save River in Moçambique (Clancey 1996; Parker 1999).

An additional 10 species are regarded as locally threatened in southern Moçambique (Parker 1999) (Appendix 1). Of these, five species (Ostrich, Hooded Vulture, Crowned Crane, Lesser Jacana, Pel's Fishing Owl) were recorded only during the early surveys, two (Martial Eagle, Mangrove Kingfisher) only during the more recent surveys, and three (Saddle-billed Stork, Lappet-faced Vulture, White-crowned Plover) were recorded during both periods. The status of the five species not recently recorded is a high priority for future investigation. Parker (1999) fails to list the African Skimmer as locally threatened because of uncertainty as to whether the species occurs regularly here or is merely a vagrant. This species is of high conservation concern in southern Africa (Tree 1997) and was recorded by Storer & Dalquest (1967) and Parker (1999) along the middle Save River.

Details of our observations of these locally threatened species are presented below.

Saddle-billed Stork: several single individuals were seen along the Save River.

Lappet-faced Vulture: two adults were recorded drinking at the Save River on 2 November and several individuals were seen soaring.

Martial Eagle: one adult was seen on 2 November over the Save River.

White-crowned Plover: numerous individuals and pairs were recorded along the Save River.

Mangrove Kingfisher: two individuals were recorded in riverine woodland, one on 3 November along the Repembe River (grid cell 2133BB) and another on 4 November along the Save River close to the Suimo Camp. In both cases, careful note was taken of the wholly red and relatively bulky bills of the birds seen, as well as their greyer heads and lack of any black markings behind the eye, relative to the Woodland Kingfisher (which was not recorded during our survey).

These records of Mangrove Kingfisher are particularly interesting. The distribution of this species extends along the coastal region from southern Somalia to the Eastern Cape Province in South Africa. This species was initially described as wintering in coastal mangrove stands and moving inland to breed in the summer in woodland and forest regions (i.e. largely an east-west migration), and in South Africa records from the Kruger National Park have been ascribed to such movements (e.g. Clancey 1992). Berruti *et al.* (1994), however, state that in South Africa the species migrates between its summer breeding grounds in the Eastern Cape Province and its wintering areas in northern KwaZulu-Natal (i.e. largely a north-south migration in this area). They state that in South Africa the species remains strictly coastal at all times and attribute inland records, such as those from the Kruger National Park, to confusion with the Woodland Kingfisher, especially as aberrant individuals of the latter species that resemble Mangrove Kingfishers have been reported (e.g. Hanmer 1989). In Moçambique evidence for a seasonal movement inland to breed comes from the Inhamitanga area just south of the Zambezi River and about 120 km inland, where the species was found to be common during the summer (Clancey 1992). Our records, coming from about 350 km south of Inhamitanga (and about 125 km inland), extend the evidence for an inland movement during the summer by the Moçambique population of this species. It therefore seems likely that the Mangrove Kingfisher population in the Eastern Cape Province and KwaZulu-Natal

shows a north-south and wholly coastal migration, while the Moçambique population shows an east-west movement between the coast and inland regions. The putative records from the Kruger National Park therefore deserve closer examination viewed in the light of our records of inland birds on the Save River. During the Moçambique bird atlas survey (Parker 1999), Mangrove Kingfishers were reported from coastal localities in Moçambique south of the Save River only during the period March to November and were not reported at any inland localities. While the species may have been overlooked when breeding at inland localities, it should be noted that large watercourses are very scarce in the region between the Limpopo and Save rivers and consequently riverine vegetation is correspondingly scarce. Along the Limpopo River in Moçambique, riverine vegetation has been severely degraded as a result of human population pressure. It is possible therefore that inland migration is restricted to the area from the Save River northwards.

Endemic species

The middle Save River valley does not support a high proportion of bird species endemic to the southern African subregion (Clancey 1986; 1989). Only 11 of the 268 species recorded (4%) are southern African endemics (Appendix 1). This paucity of endemic species is due to the proximity of the area to the northeastern boundary of the subregion, and because the lowland woodland and riverine habitats (and associated avifauna) present there extend widely to the north into other parts of the Afrotropical region. The most interesting of the endemic species are the Pink-throated Twinspot and Lemon-breasted Canary.

The middle Save River valley falls within one of the world's 218 'Endemic Bird Areas' (EBAs), as identified by BirdLife International (Stattersfield *et al.* 1998). There are 19 EBAs in mainland Africa, six of which occur in southern Africa. These are regions where the distributions of two or more 'restricted-range' bird species overlap. A restricted-range species is defined as a bird with a global distribution of less than 50 000 km². The four species delineating this 'South-east African Coast' EBA are: Rudd's Apalis *Apalis ruddi*, Neergaard's Sunbird *Nectarinia neergaardi*, Pink-throated Twinspot and Lemon-breasted Canary. The last two species have been recorded in the middle Save River valley and the first two should be looked for there as they occur in nearby areas (Parker 1999).

Habitat guilds

An examination of the gross habitat requirements of the 268 species recorded in the middle Save River valley (based on Maclean 1993) shows that 60 species (22%) are waterbirds (defined as species reliant on wetland habitats for foraging) and 208 species (78%) are birds of dryland, mainly woodland, habitats. On current information it is not possible to categorize bird habitat guilds with greater precision. It would be informative to differentiate between waterbirds inhabiting the permanent lentic riverine conditions versus those attracted to ephemeral lotic wetlands situated in the floodplain areas and in the surrounding woodlands. Similarly, the dryland birds probably show different patterns of presence/absence or relative abundance in the various woodland types present, e.g. *Acacia* woodland, and mopane and other broadleaved woodland types. In particular, it would be insightful to identify those dryland species that are entirely or largely restricted to the riverine woodland and thickets along the Save, and perhaps Repembe, rivers, especially in the light of the limited area of these habitats and their sensitivity.

Seasonality of occurrence

Based on comments in Maclean (1993) and Parker (1999), the majority of the 268 species (239; 89%) can be regarded as resident, or could occur at any time of year, in the region, while 12 species are breeding intra-African migrants, one species (Carmine Bee-eater) is a non-breeding intra-African migrant, and 16 species are non-breeding Palearctic migrants.

Breeding

We did not pay any particular attention to searching for nests during this survey and we recorded only 12 species with positive evidence of breeding (Appendix 1). The most interesting of these were a pair of Lesser Black-winged Plovers with small chicks close to the Repembe River (grid cell 2133BB) and a Red-winged Pratincole nest with two eggs close to the Suimo Camp, both on 3 November. During a visit to the south banks of the Save River in June 1997 during the Mozambique bird atlas survey, it was obvious from the remains of nests that breeding by a colony of Red-billed Queleas numbering hundreds of thousands had taken place during the previous summer.

Conclusion

The middle Save River valley supports a high diversity of bird species. It is a region of conservation value, due to the presence of several species of conservation concern and because it is situated in a globally significant Endemic Bird Area. Unlike the situation with large mammals, the status of its avifauna appears largely unchanged between the 1950s/60s and the 1990s, despite the intervening period of warfare. The status of several waterbird species, however, may have been negatively impacted by alterations in the waterflow of the Save River brought about by water extraction upstream in Zimbabwe. This requires further investigation. Some birds of dryland habitats may also have decreased or become locally extinct due to habitat destruction, hunting or reduction in their food supply.

Acknowledgements

We thank Shannon Chalton, of the Peace Parks Foundation, and Adrian Frey, of Suimo Project Development & Project Management, for inviting us to do this survey. Shannon, Adrian and Libby Kerr are also thanked for their assistance in the field. The Mozambique bird atlas project was supported

by the Endangered Wildlife Trust, SAPPI, Landrover South Africa, BP Moçambique, Mabor Tyres, Richards Bay Minerals, the Avian Demography Unit and BirdLife South Africa.

References

- BERRUTI, A., HARRISON, J.A. & NAVARRO, R.A. 1994. Seasonal migration of terrestrial birds along the southern and eastern coasts of southern Africa. *Ostrich* 65: 54-65.
- CLANCEY, P.A. 1970. A handlist of the birds of southern Moçambique. *Instituto de Investigação científica de Moçambique Série A* 10: 145-302.
- CLANCEY, P.A. 1971. A handlist of the birds of southern Moçambique part II (Passeriformes). *Instituto de Investigação científica de Moçambique Série A* 11: 1-169.
- CLANCEY, P.A. 1986. Endemicity in the southern African avifauna. *Durban Museum Novitates* 13(20): 245-284.
- CLANCEY, P.A. 1989. Four additional species of southern African endemic birds. *Durban Museum Novitates* 14: 140-152.
- CLANCEY, P.A. 1992. *Kingfishers of sub-Saharan Africa*. Jonathan Ball & A.D. Donker Publishers: Johannesburg.
- CLANCEY, P.A. 1996. *The birds of southern Moçambique*. African Bird Book Publishing: Westville.
- COLLAR, N.J., CROSBY, M.J. & STATTERSFIELD, A.J. 1994. Birds to watch 2 - the world list of threatened birds. *BirdLife Conservation Series* 4: 1-407.
- HANMER, D.B. 1989. Even more aberrant Woodland Kingfishers. *Safring News* 18: 43-46.
- MACLEAN, G.L. 1993. *Roberts' birds of southern Africa. 6th edition*. Trustees of the John Voelcker Bird Book Fund: Cape Town.
- PARKER, V. 1995. The current status of some birds of prey in southern Moçambique. *Journal of African Raptor Biology* 10(1): 2-3.
- PARKER, V. 1999. *The atlas of the birds of Sul do Save, southern Moçambique*. Avian Demography Unit and Endangered Wildlife Trust: Cape Town and Johannesburg.
- STATTERSFIELD, A.J., CROSBY, M.J., LONG, A.J. & WEGE, D.C. 1998. Endemic bird areas of the world - priorities for biodiversity conservation. *BirdLife Conservation Series* 7: 1-846.
- STORER, R.W. & DALQUEST, W.W. 1967. Birds from the Save River area of Moçambique. *Occasional Papers of the Museum of Zoology, University of Michigan* 652: 1-13.
- TREE, A.J. 1997. African Skimmer *Rynchops flavirostris*. In: HARRISON, J.A., ALLAN, D.G., UNDERHILL, L.G., HERREMANS, M., TREE, A.J., PARKER, V. & BROWN, C.J. (eds), *The atlas of southern African birds. Vol. 1: Non-passerines*, pp. 490-491. BirdLife South Africa: Johannesburg.

Appendix 1. The 268 bird species recorded in the middle Save River valley by: this study (184 spp.), Parker (1999) (214 spp.), Storer & Dalquest (1967) (148 spp.), and the Carp Expedition (87 spp.) (Clancey 1996). Species marked with ‘**’ under this study had evidence of breeding. Entries marked with ‘*’ under the last column represent early records from the middle Save River valley other than from the Carp Expedition and taken from Clancey (1996). Entries in square brackets (‘[]’) represent records requiring confirmation. Species of conservation concern (from Collar *et al.* 1994 and Parker 1999) are in **bold**. Species endemic to southern Africa are marked with an ‘(E)’ (from Clancey 1986).

Species	This study	Parker	Storer & Dalquest	Carp	Species	This study	Parker	Storer & Dalquest	Carp
Ostrich <i>Struthio camelus</i>	-	-	X	-	African Jacana <i>Actophilornis africanus</i>	X	X	X	-
Dabchick <i>Tachybaptus ruficollis</i>	-	-	X	-	Lesser Jacana <i>Microparra capensis</i>	-	-	X	-
White Pelican <i>Pelecanus onocrotalus</i>	-	X	-	-	White-fronted Plover <i>Charadrius marginatus</i>	X	X	-	-
Reed Cormorant <i>Phalacrocorax africanus</i>	X	X	X	X	Kittlitz's Plover <i>C. pecuarius</i>	-	X	-	-
Grey Heron <i>Ardea cinerea</i>	-	X	-	-	Three-banded Plover <i>C. tricollaris</i>	X	X	-	-
Goliath Heron <i>A. goliath</i>	-	X	X	-	Caspian Plover <i>C. asiaticus</i>	-	X	-	-
Purple Heron <i>A. purpurea</i>	-	-	X	-	Lesser Black-winged Plover <i>Vanellus lugubris</i>	X*	X	X	-
Great White Egret <i>Egretta alba</i>	-	X	-	-	Blacksmith Plover <i>V. armatus</i>	-	-	X	-
Little Egret <i>E. garzetta</i>	X	X	X	-	White-crowned Plover <i>V. albiceps</i>	X	X	X	X*
Cattle Egret <i>Bubulcus ibis</i>	-	X	-	-	Common Sandpiper <i>Actitis hypoleucos</i>	X	X	X	-
Squacco Heron <i>Ardeola ralloides</i>	-	-	X	-	Wood Sandpiper <i>Tringa glareola</i>	X	X	-	-
Green-backed Heron <i>Butorides striatus</i>	X	X	-	X	Marsh Sandpiper <i>T. stagnatilis</i>	X	-	-	-
Black-crowned Night Heron <i>Nycticorax nycticorax</i>	-	-	X	-	Greenshank <i>T. nebularia</i>	X	X	-	-
Hamerkop <i>Scopus umbretta</i>	X*	X	X	-	Curlew Sandpiper <i>Calidris ferruginea</i>	X	X	-	-
Woolly-necked Stork <i>Ciconia episcopus</i>	-	X	X	-	Little Stint <i>C. minuta</i>	X	X	-	-
Saddle-billed Stork <i>Ephippiorhynchus senegalensis</i>	X	X	X	-	Black-winged Stilt <i>Himantopus himantopus</i>	X	-	X	-
Marabout Stork <i>Leptoptilos crumeniferus</i>	X	-	X	-	Water Dikkop <i>Burhinus vermiculatus</i>	X	X	-	X
Yellow-billed Stork <i>Mycteria ibis</i>	-	X	-	-	Temminck's Courser <i>Cursorius temminckii</i>	-	X	-	-
Hadeda Ibis <i>Bostrychia hagedash</i>	X	X	X	-	Red-winged Pratincole <i>Glareola pratincola</i>	X*	X	X	-
White-faced Duck <i>Dendrocygna viduata</i>	-	X	-	-	African Skimmer <i>Rynchops flavirostris</i>	-	X	X	-
Egyptian Goose <i>Alopochen aegyptiaca</i>	X	X	X	-	Double-banded Sandgrouse <i>Pterocles bicinctus</i> (E)	-	X	X	X
Pygmy Goose <i>Nettapus auritus</i>	-	X	-	-	Red-eyed Dove <i>Streptopelia semitorquata</i>	X	X	X	X
Knob-billed Duck <i>Sarkidiornis melanotos</i>	-	X	-	-	African Mourning Dove <i>S. decipiens</i>	X	X	-	-
Spur-winged Goose <i>Plectropterus gambensis</i>	X	X	X	-	Cape Turtle Dove <i>S. capicala</i>	X	X	X	-
Hooded Vulture <i>Necrosyrtes monachus</i>	-	-	[X]	X*	Laughing Dove <i>S. senegalensis</i>	-	X	-	-
White-backed Vulture <i>Gyps africanus</i>	X	X	X	-	Namaqua Dove <i>Oena capensis</i>	-	X	X	-
Lappet-faced Vulture <i>Torgos tracheliotus</i>	X	-	-	X*	Green-spotted Dove <i>Turtur chalcospilos</i>	X	X	X	-
White-headed Vulture <i>Trigonoceps occipitalis</i>	X	X	-	X*	Green Pigeon <i>Treron calva</i>	X	X	X	-
Yellow-billed Kite <i>Milvus migrans</i>	X	X	X	-	Cape Parrot <i>Poicephalus robustus</i>	-	X	-	X*
Black-shouldered Kite <i>Elanus caeruleus</i>	X	X	X	-	Brown-headed Parrot <i>P. cryptoxanthus</i>	X	X	X	-
Cuckoo Hawk <i>Aviceda cuculoides</i>	X	-	-	-	Purple-crested Lourie <i>Tauraco porphyreolophus</i>	X	X	X	-
Tawny Eagle <i>Aquila rapax</i>	X	X	-	X*	Grey Lourie <i>Corythaixoides concolor</i>	X	X	X	-
Lesser Spotted Eagle <i>A. pomarina</i>	X	-	-	-	Red-chested Cuckoo <i>Cuculus solitarius</i>	X	X	-	-
Wahlberg's Eagle <i>A. wahlbergi</i>	X*	X	X	-	Striped Cuckoo <i>Clamator levaillantii</i>	-	X	-	-
Booted Eagle <i>Hieraaetus pennatus</i>	-	X	-	-	Thick-billed Cuckoo <i>Pachyococcyx audeberti</i>	-	-	-	X
African Hawk Eagle <i>H. spilogaster</i>	X	X	-	-	Klaas's Cuckoo <i>Chrysococcyx klaas</i>	X	X	X	-
Long-crested Eagle <i>Lophaelix occipitalis</i>	X	X	-	-	Diederik Cuckoo <i>C. caprius</i>	X	X	-	-
Martial Eagle <i>Polemaetus bellicosus</i>	X	X	-	-	Burchell's Coucal <i>Centropus burchellii</i> (E)	X	X	-	-
Brown Snake Eagle <i>Circaetus cinereus</i>	X	X	-	X*	Wood Owl <i>Strix woodfordii</i>	X	X	X	X
Black-breasted Snake Eagle <i>C. pectoralis</i>	-	X	-	-	African Scops Owl <i>Otus senegalensis</i>	X	X	-	-
Southern Banded Snake Eagle <i>C. fasciolatus</i>	X	-	-	-	White-faced Owl <i>O. leucotis</i>	-	X	-	X
Bateleur Eagle <i>Terathopius ecaudatus</i>	X	X	X	-	Pearl-spotted Owl <i>Glaucidium perlatum</i>	-	X	-	-
African Fish Eagle <i>Haliaeetus vocifer</i>	X*	X	X	-	Barred Owl <i>G. capense</i>	X	X	X	-
Steppe Buzzard <i>Buteo buteo</i>	X	-	-	-	Spotted Eagle Owl <i>Bubo africanus</i>	X	X	X	X
Lizard Buzzard <i>Kaupifalco monogrammicus</i>	X	X	-	-	Pel's Fishing Owl <i>Scotopelia peli</i>	-	-	-	X
Little Sparrowhawk <i>Accipiter minullus</i>	X	-	-	-	Fiery-necked Nightjar <i>Caprimulgus pectoralis</i>	X	X	-	X
Little Banded Goshawk <i>A. badius</i>	X	X	-	-	Mozambique Nightjar <i>C. fossii</i>	X	X	X	X
African Goshawk <i>A. tachiro</i>	X	X	-	-	White-rumped Swift <i>Apus caffer</i>	-	X	-	-
Gabar Goshawk <i>Micronisus gabar</i>	-	X	X	-	Horus Swift <i>A. horus</i>	-	-	-	X
Dark Chanting Goshawk <i>Melierax metabates</i>	X	X	X	-	Little Swift <i>A. affinis</i>	-	X	-	-
Gymnogene <i>Polyboroides typus</i>	-	X	X	-	Palm Swift <i>Cypsiurus parvus</i>	X	X	-	-
Dickinson's Kestrel <i>Falco dickinsoni</i>	-	X	-	-	Mottled Spinetail <i>Telacanthura ussheri</i>	X	X	-	-
Coqui Francolin <i>Francolinus coqui</i>	X	X	-	-	Bohm's Spinetail <i>Neafrapus boehmi</i>	-	X	X	-
Crested Francolin <i>F. sephaena</i>	X	X	X	-	Speckled Mousebird <i>Colius striatus</i>	X	X	X	X
Red-necked Francolin <i>F. afer</i>	X	X	X	-	Red-faced Mousebird <i>Urocolius indicus</i>	X	X	X	-
Swainson's Francolin <i>F. swainsonii</i> (E)	-	X	-	-	Pied Kingfisher <i>Ceryle rudis</i>	X	X	X	-
Helmeted Guineafowl <i>Numida meleagris</i>	X	-	X	-	Giant Kingfisher <i>Megaceryle maxima</i>	-	-	X	X
Crested Guineafowl <i>Guttera pucherani</i>	-	-	X	-	Malachite Kingfisher <i>Alcedo cristata</i>	-	-	-	X
Kurriichane Buttonquail <i>Turnix sylvatica</i>	X	X	-	-	Pygmy Kingfisher <i>Ispidina picta</i>	X	-	X	-
Crowned Crane <i>Balearica regulorum</i>	-	-	X	X*	Woodland Kingfisher <i>Halcyon senegalensis</i>	-	X	-	-
African Rail <i>Rallus caerulescens</i>	-	X	-	-	Mangrove Kingfisher <i>H. senegaloides</i>	X	-	-	-
Black Crake <i>Anaethorornis flavirostris</i>	-	X	X	-	Brown-hooded Kingfisher <i>H. albiventris</i>	X	X	X	X
Common Moorhen <i>Gallinula chloropus</i>	-	-	X	-	Grey-hooded Kingfisher <i>H. leucocephala</i>	X	-	-	-
Red-crested Korhaan <i>Eupodotis ruficrista</i> (E)	X	X	-	-	Striped Kingfisher <i>H. chelicuti</i>	X	X	X	X
Black-bellied Korhaan <i>E. melanogaster</i>	-	X	X	-	Eurasian Bee-eater <i>Merops apiaster</i>	X	X	X	-

Species	This study	Parker	Storer & Dalquest	Carp	Species	This study	Parker	Storer & Dalquest	Carp
Blue-cheeked Bee-eater <i>M. persicus</i>	-	X	-	-	Yellow-bellied Eremomela <i>Eremomela icteropygialis</i>	-	-	-	X
Carmine Bee-eater <i>M. nubicoides</i>	-	X	X	-	Green-capped Eremomela <i>E. scotops</i>	X	-	X	X
White-fronted Bee-eater <i>M. bullockoides</i>	X*	X	-	X	Bleating Warbler <i>Canaroptera brachyura</i>	X	-	X	X
Little Bee-eater <i>M. pusillus</i>	X	X	X	-	Stierling's Barred Warbler <i>Calamonastes stierlingi</i>	X	X	X	-
Swallow-tailed Bee-eater <i>M. hirundineus</i>	X	X	X	X	Fan-tailed Cisticola <i>Cisticola juncidis</i>	X	X	-	X
Eurasian Roller <i>Coracias garrulus</i>	-	X	-	-	Rattling Cisticola <i>C. chiniana</i>	X	X	X	X
Lilac-breasted Roller <i>C. caudata</i>	X	X	X	-	Red-faced Cisticola <i>C. erythrops</i>	X	X	-	X
Racket-tailed Roller <i>C. spatulata</i>	-	X	X	X	Black-backed Cisticola <i>C. galactotes</i>	-	X	-	-
Purple Roller <i>C. naevia</i>	-	X	-	X	Neddicky <i>C. fulvicapilla</i>	X	X	-	X
Broad-billed Roller <i>Eurystomus glaucurus</i>	X	X	X	-	Tawny-flanked Prinia <i>Prinia subflava</i>	X	X	X	X
African Hoopoe <i>Upupa epops</i>	X	X	X	X	Blue-grey Flycatcher <i>Muscicapa caerulescens</i>	X	X	X	X
Red-billed Woodhoopoe <i>Phoeniculus purpureus</i>	X	X	X	-	Fan-tailed Flycatcher <i>Myioparus plumbeus</i>	X	X	-	-
Scimitar-billed Woodhoopoe <i>Rhinopomastus cyanomelas</i>	X	X	X	X	Black Flycatcher <i>Melaenornis pammelaina</i>	X*	X	X	-
Trumpeter Hornbill <i>Bycanistes bucinator</i>	X	X	X	-	Pallid Flycatcher <i>M. pallidus</i>	-	X	X	X
Grey Hornbill <i>Tockus nasutus</i>	X	X	X	X	Mozambique Batis <i>Batis soror</i>	X	X	X	X
Yellow-billed Hornbill <i>T. leucomelas</i> (E)	X	X	X	X	Paradise Flycatcher <i>Terpsiphone viridis</i>	X	X	X	X
Crowned Hornbill <i>T. alboterminatus</i>	X	X	X	X	African Pied Wagtail <i>Motacilla aguimp</i>	X	X	X	X
Ground Hornbill <i>Bucorvus leadbeateri</i>	X	X	X	-	Grassveld Pipit <i>Anthus cinnamomeus</i>	X	X	-	-
Black-collared Barbet <i>Lybius torquatus</i>	X	X	X	-	Yellow-throated Longclaw <i>Macronyx croceus</i>	-	-	X	-
Pied Barbet <i>Tricholaema leucomelas</i> (E)	-	X	-	-	Red-backed Shrike <i>Lanius collurio</i>	-	X	-	-
Yellow-fronted Tinker Barbet <i>Pogoniulus chrysoconus</i>	X	X	-	X	Southern Boubou <i>Laniarius ferrugineus</i> (E)	X	X	X	-
Golden-rumped Tinker Barbet <i>P. bilineatus</i>	X	X	-	-	Puffback <i>Dryoscopus cubla</i>	X	X	X	-
Crested Barbet <i>Trachyphonus vaillantii</i>	X	X	X	X	Brubru <i>Nilaus afer</i>	X	X	X	X
Greater Honeyguide <i>Indicator indicator</i>	X	-	-	X	Three-streaked Tchagra <i>Tchagra australis</i>	X	X	-	X
Lesser Honeyguide <i>I. minor</i>	X	X	X	-	Black-crowned Tchagra <i>T. senegala</i>	X	X	X	-
Sharp-billed Honeyguide <i>Prodotiscus regulus</i>	-	X	-	-	Gorgeous Bush Shrike <i>Telophorus quadricolor</i>	X	X	X	-
Bennett's Woodpecker <i>Campethera bennettii</i>	-	X	-	X	Orange-breasted Bush Shrike <i>T. sulfureopectus</i>	X	X	X	X
Golden-tailed Woodpecker <i>C. abingoni</i>	X	X	-	X	Grey-headed Bush Shrike <i>Malaconotus blanchoti</i>	X	X	X	X
Little Spotted Woodpecker <i>C. cailliautii</i>	X	-	X	-	White Helmetshrike <i>Prionops plumatus</i>	X	X	X	-
Cardinal Woodpecker <i>Dendropicos fuscescens</i>	X	-	X	X	Red-billed Helmetshrike <i>P. retzii</i>	X	X	-	-
Bearded Woodpecker <i>Thripias namaquus</i>	X	X	X	X	Wattled Starling <i>Creatophora cinerea</i>	X	X	-	-
Rufous-naped Lark <i>Mirafra africana</i>	X	X	-	-	Plum-coloured Starling <i>Cimyrincinelus leucogaster</i>	X	X	X	-
Flappet Lark <i>M. rufocinnamomea</i>	X	X	X	X	Greater Blue-eared Starling <i>Lamprolornis chalybaeus</i>	X	X	X	X
Chestnut-backed Finch Lark <i>Eremopterix leucotis</i>	X	-	X	-	Black-bellied Starling <i>L. coruscus</i>	-	-	X	-
Eurasian Swallow <i>Hirundo rustica</i>	X	X	-	-	Marico Sunbird <i>Nectarinia mariquensis</i>	-	X	-	-
Wire-tailed Swallow <i>H. smithii</i>	-	X	X	X	Purple-banded Sunbird <i>N. bifasciata</i>	X	X	X	-
Mosque Swallow <i>H. senegalensis</i>	X	X	X	X	White-bellied Sunbird <i>N. talatala</i>	X	X	X	X
Lesser Striped Swallow <i>H. abyssinica</i>	X	X	X	-	Scarlet-chested Sunbird <i>N. senegalensis</i>	X	-	X	-
Grey-rumped Swallow <i>Pseudhirundo griseopyga</i>	X	X	-	-	Collared Sunbird <i>Antheptes collaris</i>	X	-	X	-
Brown-throated Martin <i>Riparia paludicola</i>	-	-	-	X	Yellow White-eye <i>Zosterops senegalensis</i>	-	-	-	X
Black Saw-wing Swallow <i>Psalidoprocne holomelas</i>	X	X	-	-	Grey-headed Sparrow <i>Passer diffusus</i>	X	X	-	-
Black Cuckooshrike <i>Campephaga flava</i>	X	X	-	-	Yellow-throated Sparrow <i>Petronia superciliaris</i>	X*	X	X	X
White-breasted Cuckooshrike <i>Coracina pectoralis</i>	-	-	-	X	Forest Weaver <i>Ploceus bicolor</i>	X	-	-	-
Fork-tailed Drongo <i>Dicurus adsimilis</i>	X	X	X	-	Spectacled Weaver <i>P. ocularis</i>	X	X	-	X
Black-headed Oriole <i>Oriolus larvatus</i>	X	X	X	-	Spotted-backed Weaver <i>P. cucullatus</i>	X*	X	X	-
Pied Crow <i>Corvus albus</i>	X	-	X	-	Masked Weaver <i>P. velatus</i>	X	-	-	X
Southern Black Tit <i>Parus niger</i> (E)	X	X	X	-	Lesser Masked Weaver <i>P. intermedius</i>	X*	-	X	X
Grey Penduline Tit <i>Anthoscopus caroli</i>	-	X	-	-	Brown-throated Weaver <i>P. xanthopterus</i>	-	-	X	-
Arrow-marked Babbler <i>Turdoides jardineii</i>	X	X	X	-	Red-headed Weaver <i>Anaplectes rubriceps</i>	X*	X	X	-
Black-eyed Bulbul <i>Pyconotus barbatus</i>	X	X	X	-	Red-billed Quelea <i>Quelea quelea</i>	X	X	X	-
Terrestrial Bulbul <i>Phyllastrephus terrestris</i>	X	X	X	-	Red Bishop <i>Euplectes orix</i>	X	X	X	X
Sombre Bulbul <i>Andropadus importunus</i>	X	X	X	-	Red-shouldered Widow <i>E. axillaris</i>	-	X	-	-
Yellow-bellied Bulbul <i>Chlorocichla flaviventris</i>	X	X	X	-	White-winged Widow <i>E. albonotatus</i>	X	X	-	-
Yellow-spotted Nicator <i>Nicator gularis</i>	X	X	-	-	Melba Finch <i>Pytilia melba</i>	X	X	X	-
Kurriehane Thrush <i>Turdus libonyana</i>	X	X	-	X	Pink-throated Twinspot <i>Hypargos margaritatus</i> (E)	[X]	-	-	X
Arnot's Chat <i>Thamnomolaea arnoti</i>	-	X	X	-	Jameson's Firefinch <i>Lagonosticta rhodopareia</i>	X	X	X	X
Heuglin's Robin <i>Cossypha heuglini</i>	X	X	-	X	Red-billed Firefinch <i>L. senegala</i>	X	X	X	X
Natal Robin <i>C. natalensis</i>	-	-	X	-	Blue Waxbill <i>Uraeginthus angolensis</i>	X	X	X	-
White-throated Robin <i>C. humeralis</i> (E)	-	-	X	-	Common Waxbill <i>Estrilda astrild</i>	X	X	-	-
White-browed Robin <i>Erythropygia leucophrys</i>	X	X	X	X	Quail Finch <i>Ortygospiza atricollis</i>	-	X	X	-
Bearded Robin <i>E. quadrivirgata</i>	X	X	X	X	Orange-breasted Waxbill <i>Sporaeginthus subflavus</i>	X	-	-	-
Great Reed Warbler <i>Acrocephalus arundinaceus</i>	-	X	-	-	Bronze Mannikin <i>Spermestes cucullatus</i>	-	X	-	X
African Marsh Warbler <i>A. baeticatus</i>	-	X	-	-	Red-backed Mannikin <i>S. bicolor</i>	X	-	-	-
Eurasian Marsh Warbler <i>A. palustris</i>	-	X	-	-	Pin-tailed Whydah <i>Vidua macroura</i>	-	X	X	X
Cape Reed Warbler <i>A. gracilirostris</i>	-	X	-	-	Paradise Whydah <i>V. paradisaea</i>	-	X	-	X
African Sedge Warbler <i>Bradypieris baboecala</i>	X	X	-	-	Steelblue Widowfinch <i>V. chalybeata</i>	X	X	-	X*
Willow Warbler <i>Phylloscopus trochilus</i>	-	X	-	-	Yellow-eyed Canary <i>Serinus mozambicus</i>	X*	X	-	X
Yellow-breasted Apalis <i>Apalis flavida</i>	X	X	X	X	Lemon-breasted Canary <i>S. citrinpectus</i> (E)	X	-	X	-
Long-billed Crombec <i>Sylvietta rufescens</i>	X	X	X	X	Golden-breasted Bunting <i>Emberiza flaviventris</i>	X	X	X	X