

**Environmental Management and Biodiversity Conservation of Forests,
Woodlands, and Wetlands of the Rufiji Delta and Floodplain**

**Waterbird counts in the Rufiji Delta, Tanzania,
in December 2000**

Oliver Nasirwa, Alfred Owino, Elias Munguya & James Washira



Technical report No. 24

December 2001

For more information please contact

Project Manager,
Rufiji Environment Management Project
P O Box 13513
Dar es Salaam, Tanzania.
Tel: 023- 402972 Utete Rufiji or 0741- 322366 or 022-2667589 Dar es Salaam
Email: rempute1@bushmail.net; iucndar@epiq.or.tz

¹ The Rufiji District Council implements Rufiji Environment Management Project with technical assistance from IUCN – The World Conservation Union, and funding from the Royal Netherlands Embassy.

Rufiji Environment Management Project – REMP

Project Goal: To promote the long-term conservation through ‘wise use’ of the lower Rufiji forests, woodlands and wetlands, such that biodiversity is conserved, critical ecological functions are maintained, renewable natural resources are used sustainably and the livelihoods of the area’s inhabitants are secured and enhanced.

Objectives

- To promote the integration of environmental conservation and sustainable development through environmental planning within the Rufiji Delta and Floodplain.
- To promote the sustainable use of natural resources and enhance the livelihoods of local communities by implementing sustainable pilot development activities based on wise use principles.
- To promote awareness of the values of forests, woodlands and wetlands and the importance of wise use at village, district, regional and central government levels, and to influence national policies on natural resource management.

Project Area

The project area is within Rufiji District in the ecosystems affected by the flooding of the river (floodplain and delta), downstream of the Selous Game Reserve and also including several upland forests of special importance.

Project Implementation

The project is run from the district Headquarters in Utete by the Rufiji District Administration through a district Environmental Management Team coordinated by the District Executive Director. The Project Manager is employed by the project and two Technical Advisers are employed by IUCN.

Project partners, particularly NEMC, the Coast Region, RUBADA, The Royal Netherlands Embassy and the Ministry of Natural Resources and Tourism, collaborate formally through their participation in the Project Steering Committee and also informally.

Project Outputs

At the end of the first five –year phase (1998-2003) of the project the expected outputs are:
An Environmental Management Plan: an integrated plan for the management of the ecosystems (forests, woodlands and wetlands) and natural resources of the project area that has been tested and revised so that it can be assured of success - especially through development hand-in-hand with the District council and the people of Rufiji.

Village (or community) Natural Resource Management Plans: These will be produced in pilot villages to facilitate village planning for natural resource management. The project will support the implementation of these plans by researching the legislation, providing training and some support for zoning, mapping and gazettement of reserves.

Established Wise Use Activities: These will consist of the successful sustainable development activities that are being tried and tested with pilot village and communities and are shown to be sustainable

Key forests will be conserved: Forests in Rufiji District that have shown high levels of plant biodiversity, endemism or other valuable biodiversity characteristics will be conserved by gazettement, forest management for conservation, and /or awareness-raising with their traditional owners.

Summary

From 4-21 December 2000, waterbird counts were conducted in the Rufiji Delta. Terrestrial bird species were recorded. Almost the entire area was covered. The survey started from Mohoro town, the entry point to the southern delta and proceeded southward to the border with Kilwa District in the Lokotonazi area and then gradually moved north through the central delta and finally the northern delta, including the coastline north to Msindaji close to the border with Kisarawe District (see map). Waterbirds were counted on all beaches on the seafront and in approximately 80% of the creeks and riverine habitats. A notable exception was the area of the Twani river, in the northeast of the delta, which could not be reached by boat. A total of 40,160 individual waterbirds were counted, belonging to 62 species. A total of 165 bird species were observed.

From the observations it appears that the Rufiji Delta qualifies, in its entirety, as a wetland of international importance as it most probably habitually accommodates over 20,000 waterbirds. Certain species also reached the internationally agreed threshold levels of 1% of the biogeographical population (Table 1).

Table 1: Waterbird species for which over 1% of biogeographical population thresholds were reached

Species name	Scientific name	Counted	Threshold
Curlew Sandpiper	<i>Calidris ferruginea</i>	16,043	7,500
Crab Plover	<i>Dromas ardeola</i>	3,402	300
Terek Sandpiper	<i>Xenus cinereus</i>	2,884	430
Greater Sandplover	<i>Charadrius leschenaultii</i>	1,096	650
Lesser Sandplover	<i>Charadrius mongolus</i>	722	720
Gull-billed Tern	<i>Gelochelidon nilotica</i>	3,427	270
Lesser Crested Tern	<i>Sterna bengalensis</i>	1,939	250
Saunders's Tern	<i>Sterna saundersi</i>	235	200

Certain sites or counting sections within the delta also fulfil the criteria for sites of international importance (Table 2).

Table 2: Sites and sections with important waterbird concentrations

Site or section	Species name	Counted
Jaja to Pombwe	Crab Plover	564
Pombwe	Crab Plover	682
Kikunguni to Mkambe	Curlew Sandpiper	7,500
	Saunders's Tern	203
Ras Dima	Gull-billed Tern	3,800
	Crab Plover	1,950
	Lesser Crested Tern	1,600

It is recommended that regular waterbird surveys be conducted in the delta, with special emphasis on the richest sites.

Acknowledgments

We thank Mr Haji H. Mkungura, Rufiji District Game Assistant (Wildlife Division), Mr Omari Bakari Chaugambo the coxswain and his assistant Mr Kasim Mpiri. The success of this survey was greatly enhanced by Mr. Chaugambo's knowledge of the delta. Dr. Olivier Hamerlynck joined us for several days and his knowledge of birds greatly assisted this survey. Rose and Francis Karanja of the Rufiji Environment Management Project assisted us with the day to day logistical guidance while in the field. Frank Sima of Mangrove Management Project was very kind to host us at Nyamisati and also gave us additional information about the delta. Thanks to the entire IUCN Staff in Tanzania for their assistance in various ways that led to the success of this survey. The people living in the Rufiji Delta (in particular around Mbungwi, Jaja, Maparoni, Mfisini and Nyamisati where we camped) were all very kind and we are thankful for their hospitality. Neil Baker's comments on an earlier draft were highly appreciated.

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1 Introduction

The Rufiji delta, formed by the largest river in East Africa, is situated along the Tanzanian coast and lies within the Rufiji District of the Coastal Region. The northern limit of the delta is situated at approximately 110 km south of Dar es Salaam and the southern limit, on the border with Kilwa District, at about 170 km. The delta follows on from a wide floodplain, which starts below Stiegler's gorge in the Selous Game Reserve. Just east of Ndundu ferry, at approximately 40 km from the coast the first deltaic branch, which seasonally supplies the Mohoro river, leaves the main river. About 20 km further downstream the Jaja river branch leaves the river and the main Rufiji turns north to supply the other branches. The delta covers some 72,000 ha, of which about 54,000 hectares are covered by mangroves, forming the largest continuous area of mangrove in eastern Africa.

Despite of its richness and important biodiversity, the delta is coming under increasing pressure ranging from over-harvesting of mangroves, clearing mangrove for cultivation, and overexploitation of riparian forests and fisheries. Developmental pressure in the Rufiji catchment such as intensive irrigation, infrastructure improvements, oil and gas exploration and mining may affect the delta ecosystems. To initiate conservation and management intervention that would preserve the delta's rich biodiversity, baseline ecological and socio-economic data are required but is at present largely lacking.

Birds have been widely used to identify conservation sites of global biodiversity importance. The Convention on Wetlands, signed at Ramsar in Iran in 1971 is an intergovernmental treaty, which provides the framework for national action and international cooperation for the conservation and wise use of wetlands. Tanzania is a signatory to the Convention on Wetlands but has so far designated two sites:

- Malagarasi-Muyovozi Wetlands 3,250,000 ha
- Lake Natron Basin 224,781 ha

Because of the relative ease of observation, waterbird numbers have traditionally been one of the criteria on which the identification of wetlands of international importance has been based. If a wetland is known to habitually hold more than 1% of a biogeographical population of a waterbird species, it qualifies to be designated a Ramsar site. The criteria for Important Bird Area or IBA's are similar to the Ramsar thresholds except that they are based on the population within the African continent. Information on the abundance of birds can provide a baseline from which to monitor the ecological characteristics of a site.

Very little ornithological work had been done previously in the Rufiji Delta, but waterbirds were counted in part of the Delta by Bregnballe *et al.* (1990). The coastal forest remnants of Rufiji have also been studied only very partially, the only notable exception being the Kiwengoma Forest reserve in the Matumbi Hills (Burgess *et al.*, 1991, Waters & Burgess, 1994). For the Rufiji District in general, bird observations are available from Haldane (1946) and Hillman (unpublished). Most of these data, and a large number of unpublished observations have been compiled in the excellent database of the Tanzanian Bird Atlas (Baker & Baker, in prep) and are accessible on the internet at <http://home.no.net/stenil1/TZbirdatlas/tzatlas.htm>

This report summarises the results of a twenty day survey as follows:

- records waterbird species and numbers in the Rufiji Delta
- indicates the importance of Rufiji Delta based on agreed criteria for the selection of globally important sites
- presents a checklist of the bird species observed during this survey.

2 Study Area and Methods

The travel schedule was as follows:

- Dar es Salaam to Mohoro by road on 3rd December 2000
- Camped at Mohoro for the night. Terrestrial birdwatch in Mohoro on the morning of 4th December, waiting for the tide to come in. At 12:15 the tide was high enough to proceed by 45 horsepower fibreglass boat to Mbungwi.
- Camped at Mbungwi for two nights (4th -6th December), covering the creeks in the most southerly part of the delta including Lokotanazi and Utagite.
- Proceeded to Jaja, camped there for four nights (6-10th December), covering the rest of the southern delta.
- Proceeded to Maparoni, camped there for three nights (10-13th December), covering the central delta.
- Proceeded to Mfisini, camped there three nights (13-16th December), covering the north-eastern delta.
- Proceeded finally to Nyamisati for five nights (16-21st December), covering the northern delta.
- Return to Dar es Salaam by road on 21st December 2000.

Most of the Rufiji Delta, South, Central and North have thus been covered from Lokotonazi on the border with Kilwa District to the coastal mangroves and tidal flats to the north of the delta proper but under its influence at Msindaji and Mkambe close to the border with Kisarawe District. Waterbirds were counted in all creeks, rivers and on the coastline.

The boat was manned by a team of seven people including the coxswain and his assistant. While the coxswain and his assistant navigated the boat along the middle of the river or creek, the birdwatching team sat in such a way that four observers (two per side) had a clear view of the opposite river bank.

The observers identified waterbird species seen along the river or creek, counted the number of individuals of each species and informed the fifth person who recorded in a notebook. This counting set-up was repeated for all creeks, rivers and sea front that were lined with mangrove or tidal flats. The boat cruised at speeds between 10 to 27 km/hr with an average around 20-km/hr. Along the beaches on the sea front and when coming across a large sandbank or isle, the team disembarked and mounted telescopes on the ground. Both binoculars and telescopes were used as appropriate to spot birds. The sandy beach from Jaja to Kiongoroni was counted on foot, stopping at every 100-m to count waterbirds within a hundred metres ahead using binoculars and telescopes. All the counts in the creeks and river were covered during or around the high tide. The beach between Jaja and Kiongoroni was the only one counted during low tide. If a certain stretch was covered twice, birds were only counted once (usually going upstream). On the return trip only species not observed on the first leg were noted. All waterbird species as listed in the African-Eurasian Waterbird Agreement (AEWA annex 2, Secretariat of AEWA 1999) were counted in this survey and included Black Kite *Milvus migrans*, African Harrier-Hawk *Polyboroides typus* and Palm-nut Vulture *Gypohierax angolensis*.

All the areas were covered as sections and a GPS reading, the local name and the time were recorded at the beginning and end of each section (see Appendices 2 and 4).

Around each campsite some birdwatching was done to complete the terrestrial birds not easily detected during the waterbird surveys.

3 Results

The count of birds in wetlands in the delta realised a total of 40,160 individuals in 62 species, including Black Kite, African Harrier-Hawk and Palm-nut Vulture. The most abundant group were the sandpipers followed by plovers and thirdly gulls & terns (Table 3).

Table 3: Summary of number of waterbird species grouped by taxonomic families showing the total number of species and individuals counted in the Rufiji Delta

Group	Number of species	Number of birds
Cormorants	2	4
Crab-plover	1	3,402
Ducks	1	32
Egrets	11	675
Flamingos	2	3
Gulls & terns	10	6,321
Hamerkop	1	72
Kingfishers	6	178
Oystercatchers	1	46
Pelicans	1	286
Plovers	6	4,656
Raptors	6	105
Sandpipers	11	23,600
Storks	3	515
Terns unidentified		125
Waders unidentified		140
Total	63	40,161

The most abundant species are shown in Table 4.

Table 4: Summary of 11 species of waterbird that were most abundant during the survey

Curlew Sandpiper	<i>Calidris ferruginea</i>	16,043
Gull-billed Tern	<i>Gelochelidon nilotica</i>	3,831
Crab-plover	<i>Dromas ardeola</i>	3,402
Terek Sandpiper	<i>Xenus cinereus</i>	2,884
Ringed Plover	<i>Charadrius hiaticula</i>	2,665
Lesser Crested Tern	<i>Sterna bengalensis</i>	1,939
Whimbrel	<i>Numenius phaeopus</i>	1,584
Greater Sandplover	<i>Charadrius leschenaultii</i>	1,096
Grey Plover	<i>Pluvialis squatarola</i>	831
Common Sandpiper	<i>Actitis hypoleucos</i>	822
Lesser Sandplover	<i>Charadrius mongolus</i>	722

With regard to localities (Table 4), the highest number of birds were found along the coast between Kikunguni and Mkambe in the northern part of the delta. Here the most abundant species was Curlew Sandpiper making up 85% (12,800/15,032) of the total number counted. The second most spectacular site was Ras Dima, a sandy beach situated at the mouth of Kiechuru River. Here Gull-billed Terns were the most abundant species, making up 39% (3,800/9,647) of all the waterbirds counted.

Table 5: Number of waterbirds and species richness in sections of creeks/ivers and sites surveys in the Rufiji Delta in December 2000.

Site	Habitat type	No. of waterbird species	Total No. of waterbirds
Mohoro to Mbungwi	River/creek	12	117
Mbungwi to Mohoro River	Creek	20	141
Mbungwi to Mohoro River-mouth	Creek	12	165
Mbungwi to Lokotanazi	Creek	16	180
Kinyamamba to Jaja	Creek	9	61
Lokotanazi to Lokotanazi	Creek	17	208
Jaja to Lipaka	Creek/river	7	45
Jaja to Kiongoroni	Sandy beach	12	127
Lipaka to Ulemia	Creek/river	5	23
Lipaka to Bumbwani	Creek/river	6	29
Bumbwani to Mbwera	Creek/river	10	68
Jaja to Kipoka	Creek/river	20	532
Kipoka to Kipale	Creek/river	3	4
Jaja to Pombwe	Creek	16	2,004
Pombwe to Bachambao	Creek	13	60
Bachambao to Jaja	Creek	6	17
Roma to Rufji ya chini	Creek/river	5	6
Pombwe	Littoral zone (seagrass bed)	18	2,043
Mto Nyedu to Maparoni	Creek/river	10	122
Maparoni (Usimbe Ndai) to Nyaurere	River	20	338
Maparoni to Dima	River/estuary	20	473
Ras Dima	Beach/sandbank	18	9,647
Maparoni (Usimbe Ndai) to Beta	River	21	88
Beta to Suini	Creek/river	18	1,571
Suini to Kiomboni	River	10	70
Mfisini to Kiomboni	Creek/river	10	89
Kiomboni to Mto Msala	Creek/river	10	407
Mto Msala to Bumba	Creek/river	16	223
Bumba to Suini	Creek/river	5	17
Suini to Salale	Creek/river	16	101
Salale to Mfisini	Creek/river	5	12
Salale to Kiomboni	Creek/river	7	90
Simba Uranga	Estuary/sandbank	19	2,059
Simba Uranga to Kikondo	Creek/river	17	351
Kikondo to Tingi Mpendu	Creek/river	9	138
Tingi Mpendu to Nyamisati	Creek/river	6	4
Nyamisati to Mchungu	Creek/river	18	236
Mchungu to Kikunguni	Mangrove seafront	27	2,322
Kikunguni to Mkambe	Creek/river	28	15,032
Mkambe to Nyafugwa	Creek/river	8	25
Matosa to Kitonga	Creek/river	18	132
Kitonga to Mtunda	Creek/river	15	38
Kitonga to Nyamisati	Creek/river	19	745
Total		62	40,160

A casual observation of a Kelp Gull *Larus dominicanus* at Kiomboni river mouth was not included in the counts. With the terrestrial birds a total of 165 species were recorded.

Some observations on other animal groups were also made (Table 6):

Table 6: Non-avian species encountered

English Name	Latin Name	Location
Sykes' Monkey	<i>Cercopithecus mitis</i>	common in mangrove
Vervet Monkey	<i>Cercopithecus aethiops</i>	common around human settlements
Black and White Colobus	<i>Colobus angolensis</i>	Upstream part of Kikale river
Banded Mongoose	<i>Mungos mungo</i>	Nyamisati
Marsh Mongoose	<i>Atilax paludinosus</i>	
Lesser Galago	<i>Galago senegalensis</i>	
Warthog	<i>Phacochoerus aethiopicus</i>	
Hippopotomus	<i>Hippopotamus amphibius</i>	most rivers
Indo-Pacific Humpback Dolphin	<i>Sousa chinensis</i>	Simba Uranga river mouth
Eastern Green Mamba	<i>Pendroapis angusticeps</i>	Pombwe mangrove
Nile Crocodile	<i>Crocodilus niloticus</i>	most rivers

Nomenclature

In this report the nomenclature of the Tanzanian checklist as proposed by Baker & Baker (in prep.) is used. The advantage is that it is being regularly updated as part of the work on the Bird Atlas. It is a working list that gives guidance only as long as a definitive list of bird names has not been agreed upon for the East African Region. This disagreement has its own merits and we do not wish to add to the controversy here.

Globally Important Bird Areas

Waterbird numbers and species richness are identified as useful indicators of wetland productivity and biological diversity. The Ramsar Convention uses several criteria to list wetland sites of international importance but waterbird numbers have traditionally been one of the most used criteria. Important Bird Areas can be defined through a wider range of criteria (see Bennun & Njoroge 1999):

For areas such as the Rufiji delta with no endemic species only the fourth criterion is applicable and virtually coincides with the Ramsar Convention's criteria. By applying these criteria one can identify sites that potentially qualify on this basis as Globally Important Bird Areas and thus as 'shadow' or 'potential' Ramsar sites. In summary, this criteria selects sites that are regularly used by more than 20,000 waterbirds, or regularly used by more than 1% of waterbird species' biogeographic population. The 1%-level criteria used here are those given by BirdLife International based on Rose & Scott (1997).

4 Discussion

The entire delta qualifies as a Globally Important Bird Area and could be nominated for listing as a Ramsar site based on the above criteria. However, the area may be too large to develop a detailed management plan and therefore sub-sites could be considered with the important waterbird species that make them qualify being the focus. However monitoring of these sub-sites is needed to determine the extent to which the species use the sites. This should answer questions such as:

- For how many months of the year is the site in use?
- For what is the site used, roosting, feeding, other activities? If a roosting site, where are the feeding areas the birds using the site depend on?
- How is the site used with regard to the tidal cycle?

It should be remembered that most observations were made during high tide when it is easier to travel by boat and when waterbird species such as waders, which are dependent on intertidal areas for feeding, are concentrated on the high water roosts. During low tide waders move onto exposed mudflats, sandy shores and islets in the creeks and rivers and on the beaches. This implies that waterbirds are spreading over a much wider area to feed at low tide and converge to fewer sites during high tide. Along the coastal beaches, waders move quickly to any recently exposed sand or mudflats to feed following the tide receding tide. The seagrass beds around Pombwe were also especially attractive to waders at low tide. From an energetic point of view it is important that the birds are not disturbed on the feeding areas, especially when energy demand is high such as when the birds are preparing for their migration. Conflicts may arise if fisheries or other human activities on the feeding areas create continuous disturbance. At the present level of activity disturbance in the delta is generally low. When creating a management unit or a protected area it is important to include both high water roosts and feeding areas. It should be mentioned that the tide tables given in Appendix 5 are those for Dar es Salaam and that the tides within the Rufiji delta can differ substantially from them, especially as one moves upstream into the various river branches and creeks.

The Rufiji delta provides an important stop-over site for both Palaearctic and Afrotropical migrants utilising the East African flyway. The species passing through this area are very similar those plying the Kenyan coast (see Nasirwa *et al.* 1995). From these data, it is clear that the Rufiji delta is an important area supporting many waterbird species that are listed in the African-Eurasian Waterbird Agreement.

Records by Haldane (1946), Hillman (1998), Baker (1998) and Hamerlynck (2000) cover areas west of the ones covered by this survey. Hence additional records of species that we missed like African Darter *Anhinga rufa*, African Pygmy Goose *Nettapus auritus* and African Skimmer *Rynchops flavirostris* which prefer fresh water habitats. Data from this survey also needs to be compared with data from the survey by Bregnballe *et al.* (1990) as there is a big area of data overlap. This analysis could bring out trends or changes that may have occurred in the last twelve years.

These numbers reflect the abundance of birds by site but due to limitations of the methodology used and time, it is important to note that many individual waterbirds may have been overlooked and also the fact that not all parts of the delta were counted. It was noted that during high tide some waders move into the mangrove for roosting or to feed in the areas cleared for agriculture. Though it is estimated that the counts covered entire sea front along the beach excluding the islands and about 80% of the creeks and riverine habitats it is not known what percentage of the waterbirds present was actually recorded. The numbers of waterbirds in this study should therefore be interpreted as being a minimum. The true numbers are likely to exceed the counted numbers.

The extensive clearing of mangrove for rice cultivation, especially in the western parts of the Northern delta around Kikale is a worrying phenomenon, even more so as it is accompanied by the use of

pesticides to eliminate the crabs that are eating the young rice shoots. The levels of pollutants need to be assessed at various levels of the foodchain and its impact on the ecosystem and human health evaluated.

5 Conclusion

From this study it is clear that the Rufiji Delta qualifies as a Globally Important Bird Area and as a wetland of international importance in the basis of the total number of waterbirds and on the presence of internationally significant populations of Curlew Sandpiper, Crab Plover, Terek Sandpiper, Greater Sandplover, Lesser Sandplover, Gull-billed Tern, Lesser Crested Tern and Saunders's Tern

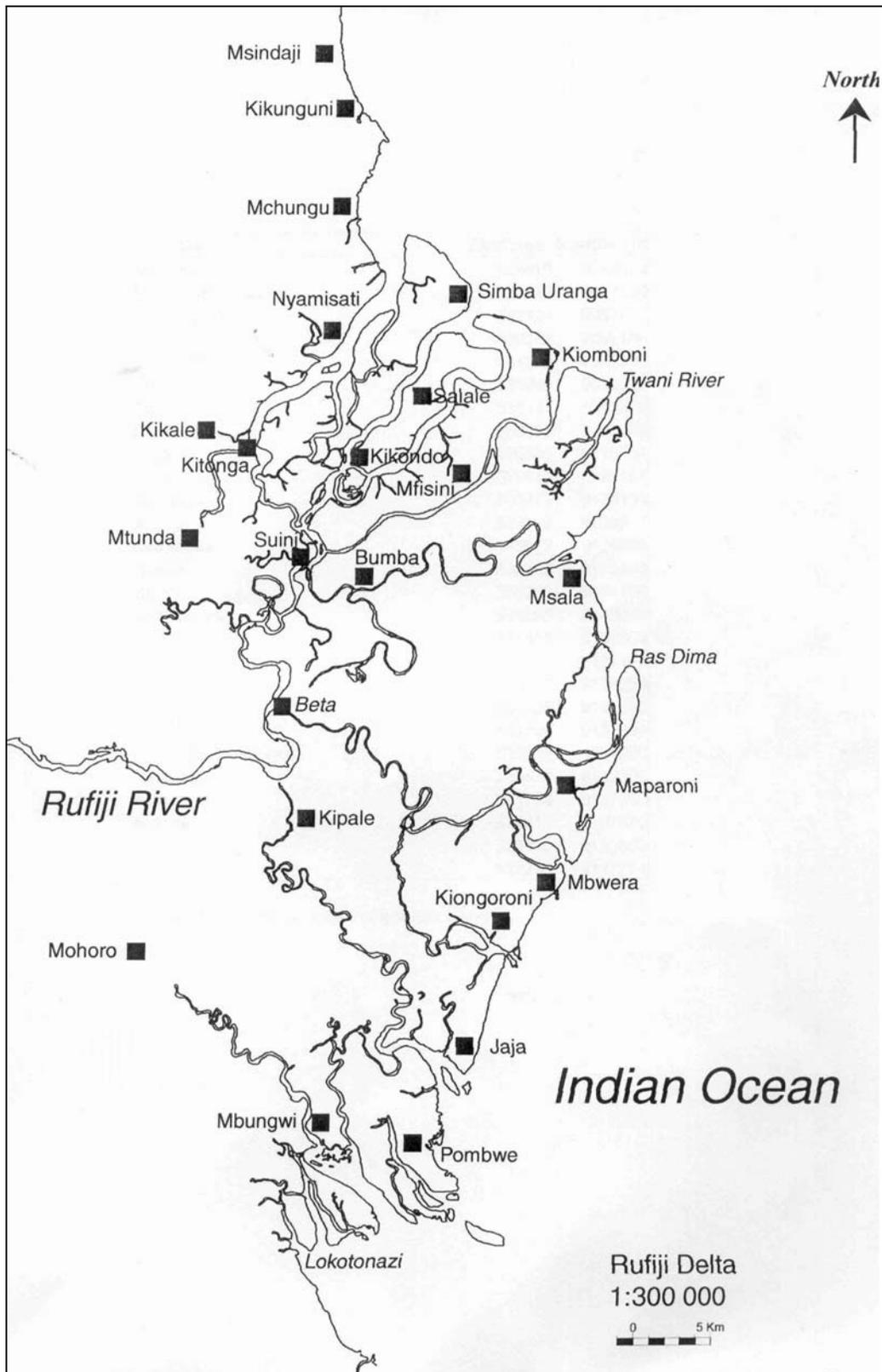
Human activities in the area including fishing, harvesting of mangroves and agriculture are high and increasing. Reduction of mangrove cover, use of harmful agrochemicals and developments causing reduced flow of fresh water to the delta threaten the biological integrity of the delta. Efforts need to be developed in the lines of ensuring that these globally significant populations of birds can continue to find a safe haven in the Rufiji Delta as a Global hotspot for birds but to preserve the important biodiversity.

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7 Appendices

7.1 Map of the Rufiji Delta



7.2 GPS readings of selected localities

Locality	Eastings	Southings
Mbungwi	529410	9090554
Mohoro river mouth	530222	9087220
Kinyamamba	532328	9087733
Jaja	539282	9092186
Kiongoroni	541279	9099386
Pombwe	536994	9083950
Bachambao	535147	9089670
Pombwe Kubwa	538436	9085968
Beta	526783	9115084
Suini	529611	9125193
Kiomboni	545379	9138159
Mfisini	539136	9130277
Mto Msala	545872	9125385
Bumba	532390	9123544
Salale	536262	9134106
Simba Uranga	539295	9142850
Kikondo	531885	9131509
Tingi Mpendu	531024	9127140
Nyamisati	530343	9138689
Mchungu	531629	9147899
Kikunguni	532700	9153881
Mchungu River-mouth	535828	9149780
Mkambe	534576	9142206
Nyafugwa	531790	9137980
Matosa	529415	9127570
Kitonga	526110	9132903
Mtunda	523278	9127774

7.3 List of bird species observed in the Rufiji Delta, December 2000

Common name	Scientific name	Common name	Scientific name
1 Pink-backed Pelican	<i>Pelecanus rufescens</i>	61 Greenshank	<i>Tringa nebularia</i>
2 White-breasted Cormorant	<i>Phalacrocorax lucidus</i>	62 Common Sandpiper	<i>Actitis hypoleucos</i>
3 Long-tailed Cormorant	<i>Phalacrocorax africanus</i>	63 Terek Sandpiper	<i>Xenus cinereus</i>
4 Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	64 Ruddy Turnstone	<i>Arenaria interpres</i>
5 Cattle Egret	<i>Bubulcus ibis</i>	65 Lesser Black-backed Gull	<i>Larus fuscus</i>
6 Little Egret	<i>Egretta garzetta</i>	66 Kelp Gull	<i>Larus dominicanus</i>
7 Dimorphic Egret	<i>Egretta (g.) dimorpha</i>	67 Black-headed Gull	<i>Larus ridibundus</i>
8 Black Heron	<i>Egretta ardesiaca</i>	68 Gull-billed Tern	<i>Gelochelidon nilotica</i>
9 Common Squacco Heron	<i>Ardeola ralloides</i>	69 Caspian Tern	<i>Sterna caspia</i>
10 Green-backed Heron	<i>Butorides striatus</i>	70 Greater Crested Tern	<i>Sterna bergii</i>
11 Yellow-billed Egret	<i>Mesophoyx intermedia</i>	71 Lesser Crested Tern	<i>Sterna bengalensis</i>
12 Great Egret	<i>Casmerodius alba</i>	72 Common Tern	<i>Sterna hirundo</i>
13 Grey Heron	<i>Ardea cinerea</i>	73 Saunder's Tern	<i>Sterna (a.) saundersi</i>
14 Goliath Heron	<i>Ardea goliath</i>	74 Whiskered Tern	<i>Chlidonias hybridus</i>
15 Hamerkop	<i>Scopus umbretta</i>	75 African Green Pigeon	<i>Treron calva</i>
16 Woolly-necked Stork	<i>Ciconia episcopus</i>	76 Tambourine Dove	<i>Turtur tympanistria</i>
17 African Open-billed Stork	<i>Anastomus lamelligerus</i>	77 Emerald-spotted Wood Dove	<i>Turtur chalcospilos</i>
18 Yellow-billed Stork	<i>Mycteria ibis</i>	78 Namaqua Dove	<i>Oena capensis</i>
19 Sacred Ibis	<i>Threskiornis aethiopicus</i>	79 Red-eyed Dove	<i>Streptopelia semitorquata</i>
20 Hadada Ibis	<i>Bostrychia hagedash</i>	80 Ring-necked Dove	<i>Streptopelia capicola</i>
21 African Spoonbill	<i>Platalea alba</i>	81 Laughing Dove	<i>Streptopelia senegalensis</i>
22 Greater Flamingo	<i>Phoenicopterus (r.) roseus</i>	82 Brown-headed Parrot	<i>Poicephalus cryptoxanthus</i>
23 Lesser Flamingo	<i>Phoeniconaias minor</i>	83 Red-chested Cuckoo	<i>Cuculus solitarius</i>
24 White-faced Tree Duck	<i>Dendrocygna viduata</i>	84 Klaas's Cuckoo	<i>Chrysococcyx klaas</i>
25 Osprey	<i>Pandion haliaetus</i>	85 Diederik Cuckoo	<i>Chrysococcyx caprius</i>
26 Black-shouldered Kite	<i>Elanus caeruleus</i>	86 Burchell's Coucal	<i>Centropus burchelli</i>
27 Black Kite	<i>Milvus migrans</i>	87 African Palm Swift	<i>Cypsiurus parvus</i>
28 Hooded Vulture	<i>Necrosyrtes monachus</i>	88 Little Swift	<i>Apus affinis</i>
29 African White-backed Vulture	<i>Gyps africanus</i>	89 Speckled Mousebird	<i>Colius striatus</i>
30 Black-chested Snake Eagle	<i>Circaetus pectoralis</i>	90 Grey-headed Kingfisher	<i>Halcyon leucocephala</i>
31 Brown Snake Eagle	<i>Circaetus cinereus</i>	91 Brown-hooded Kingfisher	<i>Halcyon albiventris</i>
32 Bateleur	<i>Terathopius ecaudatus</i>	92 Mangrove Kingfisher	<i>Halcyon senegaloides</i>
33 African Harrier-Hawk	<i>Polyboroides typus</i>	93 Striped Kingfisher	<i>Halcyon chelicuti</i>
34 Eurasian Marsh Harrier	<i>Circus aeruginosus</i>	94 Malachite Kingfisher	<i>Alcedo cristata</i>
35 Dark Chanting Goshawk	<i>Melierax metabates</i>	95 African Pygmy Kingfisher	<i>Ispidina picta</i>
36 African Fish Eagle	<i>Haliaeetus vocifer</i>	96 Pied Kingfisher	<i>Ceryle rudis</i>
37 Palm-nut Vulture	<i>Gypohierax angolensis</i>	97 Blue-cheeked Bee-eater	<i>Merops persicus</i>
38 Steppe Eagle	<i>Aquila nipalensis</i>	98 Carmine Bee-eater	<i>Merops nubicus</i>
39 Wahlberg's Eagle	<i>Aquila wahlbergi</i>	99 White-throated Bee-eater	<i>Merops albicollis</i>
40 Long-crested Eagle	<i>Lophaelus occipitalis</i>	100 White-fronted Bee-eater	<i>Merops bullockoides</i>
41 Sooty Falcon	<i>Falco concolor</i>	101 Little Bee-eater	<i>Merops pusillus</i>
42 Helmeted Guineafowl	<i>Numida meleagris</i>	102 Lilac-breasted Roller	<i>Coracias caudata</i>
43 Crab-plover	<i>Dromas ardeola</i>	103 Broad-billed Roller	<i>Eurystomus glaucurus</i>
44 Eurasian Oystercatcher	<i>Haematopus ostralegus</i>	104 Green Wood-hoopoe	<i>Phoeniculus purpureus</i>
45 Water Thick-knee	<i>Burhinus vermiculatus</i>	105 Crowned Hornbill	<i>Tockus alboterminatus</i>
46 Collared Pratincole	<i>Glareola pratincola</i>	106 African Grey Hornbill	<i>Tockus nasutus</i>
47 Ringed Plover	<i>Charadrius hiaticula</i>	107 Trumpeter Hornbill	<i>Bycanistes bucinator</i>
48 Three-banded Plover	<i>Charadrius tricollaris</i>	108 Yellow-rumped Tinkerbird	<i>Pogoniulus bilineatus</i>
49 White-fronted Plover	<i>Charadrius marginatus</i>	109 Brown-breasted Barbet	<i>Lybius melanopterus</i>
50 Lesser Sandplover	<i>Charadrius mongolus</i>	110 Greater Honeyguide	<i>Indicator indicator</i>
51 Greater Sandplover	<i>Charadrius leschenaultii</i>	111 Golden-tailed Woodpecker	<i>Campethera abingoni</i>
52 Grey Plover	<i>Pluvialis squatarola</i>	112 Little Spotted Woodpecker	<i>Campethera cailliautii</i>
53 White-crowned Plover	<i>Vanellus albiceps</i>	113 Cardinal Woodpecker	<i>Denropicos fuscescens</i>
54 Little Stint	<i>Calidris minuta</i>	114 Wire-tailed Swallow	<i>Hirundo smithii</i>
55 Curlew Sandpiper	<i>Calidris ferruginea</i>	115 Barn Swallow	<i>Hirundo rustica</i>
56 Sanderling	<i>Calidris alba</i>	116 Lesser Striped Swallow	<i>Hirundo abyssinica</i>
57 Ruff	<i>Philomachus pugnax</i>	117 Black Saw-wing	<i>Psalidoprocne holomelas</i>
58 Whimbrel	<i>Numenius phaeopus</i>	118 African Pied Wagtail	<i>Motacilla aguimp</i>
59 Curlew	<i>Numenius arquata</i>	119 African Pipit	<i>Anthus cinnamomeus</i>
60 Marsh Sandpiper	<i>Tringa stagnatilis</i>	120 Zanzibar Sombre Greenbul	<i>Andropadus importunus</i>

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Common name	Scientific name
121 Terrestrial Brownbul	<i>Phyllastrephus terrestris</i>
122 Yellow-vented Bulbul	<i>Pycnonotus barbatus</i>
123 Red-capped Robin-Chat	<i>Cossypha natalensis</i>
124 White-browed Robin-Chat	<i>Cossypha heuglini</i>
125 Morning Trush	<i>Cichladusa arquata</i>
126 Spotted Flycatcher	<i>Muscicapa striata</i>
127 Great Reed Warbler	<i>Acrocephalus arundinaceus</i>
128 Red-faced Cisticola	<i>Cisticola erythrops</i>
129 Rattling Cisticola	<i>Cisticola chiniana</i>
130 Tawny-flanked Prinia	<i>Prinia subflava</i>
131 Grey-backed Camaroptera	<i>Camaroptera brachyura</i>
132 Yellow-breasted Apalis	<i>Apalis flavida</i>
133 African Paradise Flycatcher	<i>Terpsiphone viridis</i>
134 Black-headed Batis	<i>Batis minor</i>
135 Red-backed Shrike	<i>Lanius collurio</i>
136 Black-crowned Tchagra	<i>Tchagra senegala</i>
137 Brown-crowned Tchagra	<i>Tchagra australis</i>
138 Marsh Tchagra	<i>Tchagra minuta</i>
139 Grey-headed Bush-Shrike	<i>Malaconotus blanchoti</i>
140 Tropical Boubou	<i>Laniarius aethiopicus</i>
141 Black-backed Puffback	<i>Dryoscopus cubla</i>
142 Common Drongo	<i>Dicrurus adsimilis</i>
143 Eurasian Golden Oriole	<i>Oriolus oriolus</i>
144 Black-headed Oriole	<i>Oriolus larvatus</i>
145 Pied Crow	<i>Corvus albus</i>
146 Black-bellied Starling	<i>Lamprotornis corruscus</i>
147 Lesser Blue-eared Starling	<i>Lamprotornis chloropterus</i>
148 Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>
149 Collared Sunbird	<i>Anthreptes collaris</i>
150 Olive Sunbird	<i>Nectarinia olivacea</i>
151 Scarlet-chested Sunbird	<i>Nectarinia senegalensis</i>
152 Marico Sunbird	<i>Nectarinia mariquensis</i>
153 Grey-headed Sparrow	<i>Passer griseus</i>
154 Yellow-throated Petronia	<i>Petronia superciliosus</i>
155 African Golden Weaver	<i>Ploceus subaureus</i>
156 Black-headed Weaver	<i>Ploceus cucullatus</i>
157 Red-billed Quelea	<i>Quelea quelea</i>
158 Zanzibar Red Bishop	<i>Euplectes nigroventris</i>
159 Fan-tailed Widowbird	<i>Euplectes axillaris</i>
160 Green-winged Pytilia	<i>Pytilia melba</i>
161 Red-billed Firefinch	<i>Lagonosticta senegala</i>
162 Common Waxbill	<i>Estrilda astrild</i>
163 Black-and-white Mannikin	<i>Lonchura bicolor</i>
164 Pin-tailed Whydah	<i>Vidua macroura</i>
165 Yellow-rumped Seedeater	<i>Serinus reichenowi</i>

7.4 Waterbird numbers in the Rufiji Delta, December 2000

Locality	Muhoro to Mbungui	Mbungui to Muhoro River	Mbungui to Muhoro River mouth	Mbungui to Lokotana Zi	Kinyama mba to Jaja	Lokotana Zi	Jaja to Lipaka	Jaja to Klongoro ni	Lipaka to Ulemia	Lipaka to Bumbwa ni
Date	04-Dec-00	04-Dec-00	04-Dec-00	05-Dec-00	06-Dec-00	06-Dec-00	07-Dec-00	07-Dec-00	07-Dec-00	07-Dec-00
Start	12:15:00	13:15:00	16:39:00	15:10:00	10:27:00	17:07:00	8:40:00	9:00:00	9:30:00	9:55:00
Stop	13:15:00	14:00:00	18:30:00	16:45:00	11:58:00	18:20:00	9:30:00	12:00:00	9:45:00	10:45:00
Species/Habitat type	River/creek	Creek	Creek	Creek	Creek	Creek	Creek/river	Sandy beach	Creek/river	Creek/river
Pink-backed Pelican				1						
Great Cormorant										
Long-tailed Cormorant						1				
Cattle Egret										
Little Egret	2	4	3	13	3	6	1	1		
Dimorphic Egret		1		1		1				1
Black Heron					2					
Common Squacco Heron		1								
Green-backed Heron	1	4			4	2				
Yellow-billed Egret										
Great Egret										
Grey Heron	1	1	3							
Goliath Heron						1				
Black-headed Heron										
Hamerkop	4	1								
Woolly-necked Stork										
African Open-billed Stork	49	3								
Yellow-billed Stork										
Greater Flamingo										
Lesser Flamingo										
White-faced Whistling Duck										
Osprey		1								
Black Kite		1						1		
African Harrier-Hawk										
Eurasian Marsh Harrier										
African Fish Eagle										
Palm-nut Vulture								1		
Crab-plover				2		1				
Eurasian Oystercatcher										
Water Thick-knee	17	18	5							
Ringed Plover	8	19	2			1				
White-fronted Plover				5			1	32		
Lesser Sandplover								2		
Greater Sandplover				4	2	2		35		
Grey Plover			6	5	1	1				10
White-crowned Plover										
Little Stint										
Curlew Sandpiper			2	3		3				
Sanderling								2		
Whimbrel		19	16	12	5	48	5	4	7	2
Eurasian Curlew		5	2	7		9				
Marsh Sandpiper		4								1
Common Greenshank		3	3							
Common Sandpiper	27	32	42	6	5	14	15	14	10	10
Terek Sandpiper		3	76	113	38	112	21	23	4	5
Ruddy Turnstone										
Lesser Black-backed Gull										
Black-headed Gull										
Gull-billed Tern										
Caspian Tern							1	10		
Greater Crested Tern										
Lesser Crested Tern				2						
Common Tern										
Saunders's Tern				1		1				
Whiskered Tern										
White-winged Tern				2						
Grey-headed Kingfisher	1									
Brown-Hooded Kingfisher										
Mangrove Kingfisher		5				1				
Malachite Kingfisher	3	6							1	
African Pygmy Kingfisher										
Pied Kingfisher	4	10	5	3	1	4	1	2	1	
unidentified terns										
unidentified waders										
Total	117	141	165	180	61	208	45	127	23	29

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Locality	Bumbwani to Mbweza	Jaja to Kipoka	Kipoka to Kipate	Jaja to Pombwe	Pombwe to Bachamba	Bachamba to Jaja	Roma to Rufiji ya chini	Pombwe	Mto Nyedu to Maparoni	Maparoni to Nyaurere
Date	07-Dec-00	08-Dec-00	08-Dec-00	09-Dec-00	09-Dec-00	09-Dec-00	09-Dec-00	10-Dec-00	10-Dec-00	11-Dec-00
Start	10:45:00	9:15:00	13:36:00	5:47:00	11:25:00	12:20:00	14:05:00	5:50:00	15:30:00	7:05:00
Stop	11:25:00	13:36:00	13:56:00	7:25:00	11:15:00	13:50:00	14:20:00	7:35:00	16:40:00	8:45:00
Species/Habitat type	Creek/river	Creek/river	Creek/river	Creek	Creek	Creek	Creek/river	seagrassbed	Creek/river	River
Pink-backed Pelican										
Great Cormorant										
Long-tailed Cormorant										
Cattle Egret										
Little Egret	2	14		6	1	1		30		3
Dimorphic Egret		6		19				14		1
Black Heron										
Common Squacco Heron										
Green-backed Heron					2		1			1
Yellow-billed Egret										
Great Egret										
Grey Heron		2						2		
Goliath Heron										
Black-headed Heron		1								
Hamerkop	2		1		3					2
Woolly-necked Stork										
African Open-billed Stork	1	1								
Yellow-billed Stork										
Greater Flamingo										
Lesser Flamingo										
White-faced Whistling Duck										
Osprey										
Black Kite		5							4	
African Harrier-Hawk		1								1
Eurasian Marsh Harrier										
African Fish Eagle					1					2
Palm-nut Vulture			2		1					
Crab-plover				564				682		
Eurasian Oystercatcher				29				17		
Water Thick-knee										
Ringed Plover	7	94		400	1	1		40	4	
White-fronted Plover		1								77
Lesser Sandplover										
Greater Sandplover		21					2	350		4
Grey Plover	4	4		26				57		31
White-crowned Plover										
Little Stint		13						3		
Curlew Sandpiper		3						189		5
Sanderling										
Whimbrel	2	51		479	7	2	1	482	4	17
Eurasian Curlew				6	1		1	2		
Marsh Sandpiper										
Common Greenshank		40		1	4			4	17	6
Common Sandpiper	15	147		4	4	7	1	1	79	74
Terek Sandpiper	33	99		331	31	5		43	7	98
Ruddy Turnstone										
Lesser Black-backed Gull										
Black-headed Gull										
Gull-billed Tern				1						
Caspian Tern				3						
Greater Crested Tern		8								
Lesser Crested Tern				101				27		2
Common Tern										
Saunders's Tern										
Whiskered Tern										
White-winged Tern										
Grey-headed Kingfisher										
Brown-Hooded Kingfisher										
Mangrove Kingfisher	1	4		1	2	1			1	1
Malachite Kingfisher			1							
African Pygmy Kingfisher										2
Pied Kingfisher	1	17		8	2				6	11
unidentified terns				25				100		
unidentified waders										
Total	68	532	4	2004	60	17	6	2043	122	338

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Locality	Maparoni to Dima	Ras Dima	Maparoni (Usimbe Ndai) to Beta	Beta to Suini	Suini to Kiomboni	Mfisini to Kiomboni	Kiomboni to Mto Msala	Mto Msala to Bumba	Bumba to Suini	Suini to Salale
Date	11-Dec-00	11-Dec-00	12-Dec-00	12-Dec-00	12-Dec-00	13-Dec-00	13-Dec-00	13-Dec-00	13-Dec-00	13-Dec-00
Start	9:39:00	14:00:00	6:00:00	8:35:00	10:23:00	7:15:00	7:55:00	7:55:00	11:30:00	11:43:00
Stop	11:05:00	16:00:00	8:35:00	10:00:00	11:15:00	7:50:00	9:01:00	9:01:00	11:40:00	12:45:00
Species/Habitat type	River/estuary	Sandbank	River	Creek/river	River	Creek/river	Creek/river	Creek/river	Creek/river	Creek/river
Pink-backed Pelican							36			
Great Cormorant										
Long-tailed Cormorant										
Cattle Egret								2		11
Little Egret	3		1	1	3	1			3	11
Dimorphic Egret	8		2		1			5		6
Black Heron										
Common Squacco Heron			2	3						
Green-backed Heron										
Yellow-billed Egret										
Great Egret										1
Grey Heron	1		2	2						2
Goliath Heron										
Black-headed Heron								1		
Hamerkop	2		5	2	15			19		10
Woolly-necked Stork	1							2		
African Open-billed Stork	220			13				43	11	
Yellow-billed Stork										
Greater Flamingo										
Lesser Flamingo										
White-faced Whistling Duck				32						
Osprey										
Black Kite	2		1	3				22		2
African Harrier-Hawk			1							
Eurasian Marsh Harrier			1					1		
African Fish Eagle			1	2				2	2	2
Palm-nut Vulture			1	4						
Crab-plover	42	1950								
Eurasian Oystercatcher										
Water Thick-knee			6	32						
Ringed Plover				1360	9					3
White-fronted Plover	20	84								
Lesser Sandplover										
Greater Sandplover		15					5			
Grey Plover	7	292								
White-crowned Plover			1	10						
Little Stint				50						
Curlew Sandpiper		1572					135			
Sanderling		93								
Whimbrel	38	41			1	19		13		9
Eurasian Curlew		80								
Marsh Sandpiper				1						
Common Greenshank	7			26	7	1	1	8		13
Common Sandpiper	44	3	44	30	33	22	20	21	1	26
Terek Sandpiper	68	9				27	120	80		
Ruddy Turnstone										
Lesser Black-backed Gull			5				26			
Black-headed Gull		1								
Gull-billed Tern		3800								
Caspian Tern		105				3	9			3
Greater Crested Tern		1								
Lesser Crested Tern	1	1600					55			
Common Tern										
Saunders's Tern		1								
Whiskered Tern					1					
White-winged Tern										
Grey-headed Kingfisher										
Brown-Hooded Kingfisher			1							
Mangrove Kingfisher	1		1			1		1		1
Malachite Kingfisher	2		3							
African Pygmy Kingfisher			1							
Pied Kingfisher	6		9			15		3		1
unidentified terns										
unidentified waders										
Total	473	9647	88	1571	70	89	407	223	17	101

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Locality	Salale to Mfisiini	Salale to Kiomboni	Simba Uranga to Simba Uranga	Simba Uranga to Kikondo	Kikondo to Tingi Mpendu	Tingi Mpendu to Nyamisati	Nyamisati to Mchungu	Mchungu to Kikunguni	Kikunguni to Mkambe	Suini to Salale
Date	13-Dec-00	14-Dec-00	14-Dec-00	14-Dec-00	16-Dec-00	16-Dec-00	17-Dec-00	17-Dec-00	18-Dec-00	13-Dec-00
Start	13:30:00	7:54:00	8:45:00	13:51:00	8:25:00	9:15:00	7:50:00	8:45:00	7:45:00	11:43:00
Stop	14:15:00	8:45:00	10:20:00	15:10:00	8:58:00	9:30:00	8:30:00	9:35:00	10:04:00	12:45:00
Species/Habitat type	Creek/river	Creek/river	Estuary	Creek/river	Creek/river	Creek/river	Creek/river	Mangrove seafront	Creek/river	Creek/river
Pink-backed Pelican			35					158	56	
Great Cormorant								3		
Long-tailed Cormorant										
Cattle Egret										11
Little Egret			8	3			1		2	11
Dimorphic Egret				8			8	4	16	6
Black Heron										
Common Squacco Heron										
Green-backed Heron										
Yellow-billed Egret										
Great Egret							64	9	9	1
Grey Heron			1				10	45	218	2
Goliath Heron										
Black-headed Heron										
Hamerkop				2	1					10
Woolly-necked Stork							1			
African Open-billed Stork					62					
Yellow-billed Stork								42	36	
Greater Flamingo			2							
Lesser Flamingo									1	
White-faced Whistling Duck										
Osprey										
Black Kite		1		3	5		16		3	2
African Harrier-Hawk										
Eurasian Marsh Harrier										
African Fish Eagle				2			1			2
Palm-nut Vulture							1			
Crab-plover									161	
Eurasian Oystercatcher										
Water Thick-knee										
Ringed Plover			160	1				1	42	3
White-fronted Plover			6					67	53	
Lesser Sandplover			405					15	300	
Greater Sandplover			210	24				15	400	
Grey Plover			40	5				69	260	
White-crowned Plover										
Little Stint										
Curlew Sandpiper			350					979	12800	
Sanderling			214	4				72	14	
Whimbrel		51		147	5	2	13	43	20	9
Eurasian Curlew			92						60	
Marsh Sandpiper										
Common Greenshank	1	3	80	3				26		13
Common Sandpiper	6	4		15	15	1	2		1	26
Terek Sandpiper	3	25	300	125	50			730	200	
Ruddy Turnstone								10		
Lesser Black-backed Gull			39				37	7		
Black-headed Gull										
Gull-billed Tern			30							
Caspian Tern			30				1	3		3
Greater Crested Tern								3		
Lesser Crested Tern			57				63	7	24	
Common Tern								1	10	
Saunders's Tern							17	12	203	
Whiskered Tern										
White-winged Tern				2						
Grey-headed Kingfisher										
Brown-Hooded Kingfisher										
Mangrove Kingfisher	2			3			1			1
Malachite Kingfisher									1	
African Pygmy Kingfisher										
Pied Kingfisher		6		4		1		1	2	1
unidentified terns										
unidentified waders									140	
Total	12	90	2059	351	138	4	236	2322	15032	101

REMP Technical Report 24: Waterbird Counts in Rufiji Delta

Locality	Mkambe to Nyafugwa	Matosa to Kitonga	Kitonga to Mtunda	Kitonga to Nyamisati	Total
Date	18-Dec-00	19-Dec-00	19-Dec-00	19-Dec-00	
Start	10:58:00	10:02:00	10:40:00	12:45:00	
Stop	11:15:00	10:40:00	11:07:00	13:30:00	
Species/Habitat type	Creek/river	Creek/river	Creek/river	Creek/river	
Pink-backed Pelican					286
Great Cormorant					3
Long-tailed Cormorant					1
Cattle Egret					13
Little Egret		7	5	4	143
Dimorphic Egret				1	103
Black Heron					2
Common Squacco Heron					6
Green-backed Heron			1		16
Yellow-billed Egret				1	1
Great Egret		4	6	2	95
Grey Heron		1		2	293
Goliath Heron					1
Black-headed Heron					2
Hamerkop		1	2		72
Woolly-necked Stork					4
African Open-billed Stork		29			432
Yellow-billed Stork			1		79
Greater Flamingo					2
Lesser Flamingo					1
White-faced Whistling Duck					32
Osprey					1
Black Kite				1	70
African Harrier-Hawk					3
Eurasian Marsh Harrier					2
African Fish Eagle		2	1		18
Palm-nut Vulture			1		11
Crab-plover					3402
Eurasian Oystercatcher					46
Water Thick-knee		2			80
Ringed Plover		5	7	500	2665
White-fronted Plover		1			347
Lesser Sandplover					722
Greater Sandplover				7	1096
Grey Plover				13	831
White-crowned Plover					11
Little Stint		39		105	210
Curlew Sandpiper		1		1	16043
Sanderling					399
Whimbrel	1	3	1	14	1584
Eurasian Curlew					265
Marsh Sandpiper					6
Common Greenshank	4	12		11	281
Common Sandpiper	1	22	4		822
Terek Sandpiper	17	3	8	77	2884
Ruddy Turnstone					10
Lesser Black-backed Gull					114
Black-headed Gull					1
Gull-billed Tern					3831
Caspian Tern				5	173
Greater Crested Tern					12
Lesser Crested Tern					1939
Common Tern					11
Saunders's Tern					235
Whiskered Tern					1
White-winged Tern					4
Grey-headed Kingfisher					1
Brown-Hooded Kingfisher					1
Mangrove Kingfisher					28
Malachite Kingfisher					17
African Pygmy Kingfisher					3
Pied Kingfisher	2		1	1	128
unidentified terns					125
unidentified waders					140
Total	25	132	38	745	40160

7.5 Tide table for Dar es Salaam, December 2000

Date	Time	Tide (m)		Date	Time	Tide (m)
01-dec-00	0:30	0,91		11-dec-00	3:43	3,76
01-dec-00	6:46	3,13		11-dec-00	10:01	0,22
01-dec-00	13:03	8,87		11-dec-00	16:11	3,32
01-dec-00	19:12	2,77		11-dec-00	22:04	0,4
02-dec-00	1:07	1,08		12-dec-00	4:22	3,88
02-dec-00	7:24	2,93		12-dec-00	10:41	0,12
02-dec-00	13:42	1,05		12-dec-00	16:52	3,39
02-dec-00	19:55	2,63		12-dec-00	22:43	0,35
03-dec-00	1:50	1,26		13-dec-00	5:03	3,91
03-dec-00	8:09	2,73		13-dec-00	11:21	0,11
03-dec-00	14:30	1,22		13-dec-00	17:33	3,39
03-dec-00	20:51	2,51		13-dec-00	23:26	0,37
04-dec-00	9:12	1,41		14-dec-00	5:45	3,84
04-dec-00	15:37	2,55		14-dec-00	12:02	0,19
04-dec-00	22:08	1,35		14-dec-00	18:15	3,33
04-dec-00	20:51	2,47		15-dec-00	0:09	0,47
05-dec-00	4:21	1,48		15-dec-00	6:30	3,66
05-dec-00	10:41	2,46		15-dec-00	12:46	0,35
05-dec-00	17:04	1,38		15-dec-00	19:01	3,22
05-dec-00	23:37	2,56		16-dec-00	0:57	0,64
06-dec-00	6:01	1,38		16-dec-00	7:18	3,41
06-dec-00	12:11	2,51		16-dec-00	13:32	0,57
06-dec-00	18:22	1,27		16-dec-00	19:53	3,08
07-dec-00	0:46	2,77		17-dec-00	1:50	0,85
07-dec-00	7:08	1,15		17-dec-00	8:11	3,11
07-dec-00	13:17	2,67		17-dec-00	14:26	0,81
07-dec-00	19:18	1,09		17-dec-00	20:52	2,94
08-dec-00	1:38	3,03		18-dec-00	2:56	1,06
08-dec-00	7:59	0,88		18-dec-00	9:18	2,83
08-dec-00	14:07	2,86		18-dec-00	15:30	1,04
08-dec-00	20:03	0,89		18-dec-00	22:04	2,84
09-dec-00	2:21	3,3		19-dec-00	4:22	1,19
09-dec-00	8:42	0,62		19-dec-00	10:41	2,62
09-dec-00	14:51	3,05		19-dec-00	16:49	1,18
09-dec-00	20:45	0,69		19-dec-00	23:27	2,85
10-dec-00	3:02	3,56		20-dec-00	5:58	1,17
10-dec-00	9:22	0,39		20-dec-00	12:11	2,57
10-dec-00	15:32	3,21		20-dec-00	18:12	1,19
10-dec-00	21:25	0,52		21-dec-00	0:43	2,96
				21-dec-00	7:15	1,01
				21-dec-00	13:26	2,66
				21-dec-00	19:19	1,11