

**LAKE VICTORA ENVIRONMENT MANAGEMENT PROJECT  
WETLANDS MANAGEMENT COMPONENT**

**The diversity of aquatic birds and their relationship to  
aquatic ecosystems in the Lake Victoria basin**

*BY*

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## **Introduction**

Lake Victoria basin harbours a variety of aquatic ecosystems mainly referred to as wetlands. These wetlands range from permanent swamps, open water bodies and river systems. The wetlands being a transition ecosystem between land and water are characterised by high diversity of flora and fauna.

Some of these wetlands are important habitats for varied number of waterfowls. This chapter attempts to give a highlight on the diversity of Lake Victoria wetland birds, their relationship to aquatic ecosystems and their conservation strategy.

Most of the information that is documented in this chapter originates from pilot study area as identified during the Lake Victoria Environmental Management Project (LVEMP) Activity Implementation. These study areas are centred at Simiyu and Rubana Riverine Wetland System and the Mwanza Gulf and the Kitaji Wetland System, which is situated in Musoma town.

Birds can provide a lot of information with respect to measure of the health of the environment because of their sensitivity to changes in characteristics of the aquatic ecosystems. It is important first to carry out fieldwork to realize how various species interact with the ecosystem, discover their population dynamics of particular concern and assess the impact of environmental degradation, before finally determining steps which are required to enable the ecosystem to flourish with a full complements of species at sustainable manner. Birds have been used as indicators of pollution either through direct analysis of the food they take, or by monitoring the changes in species richness or abundances.

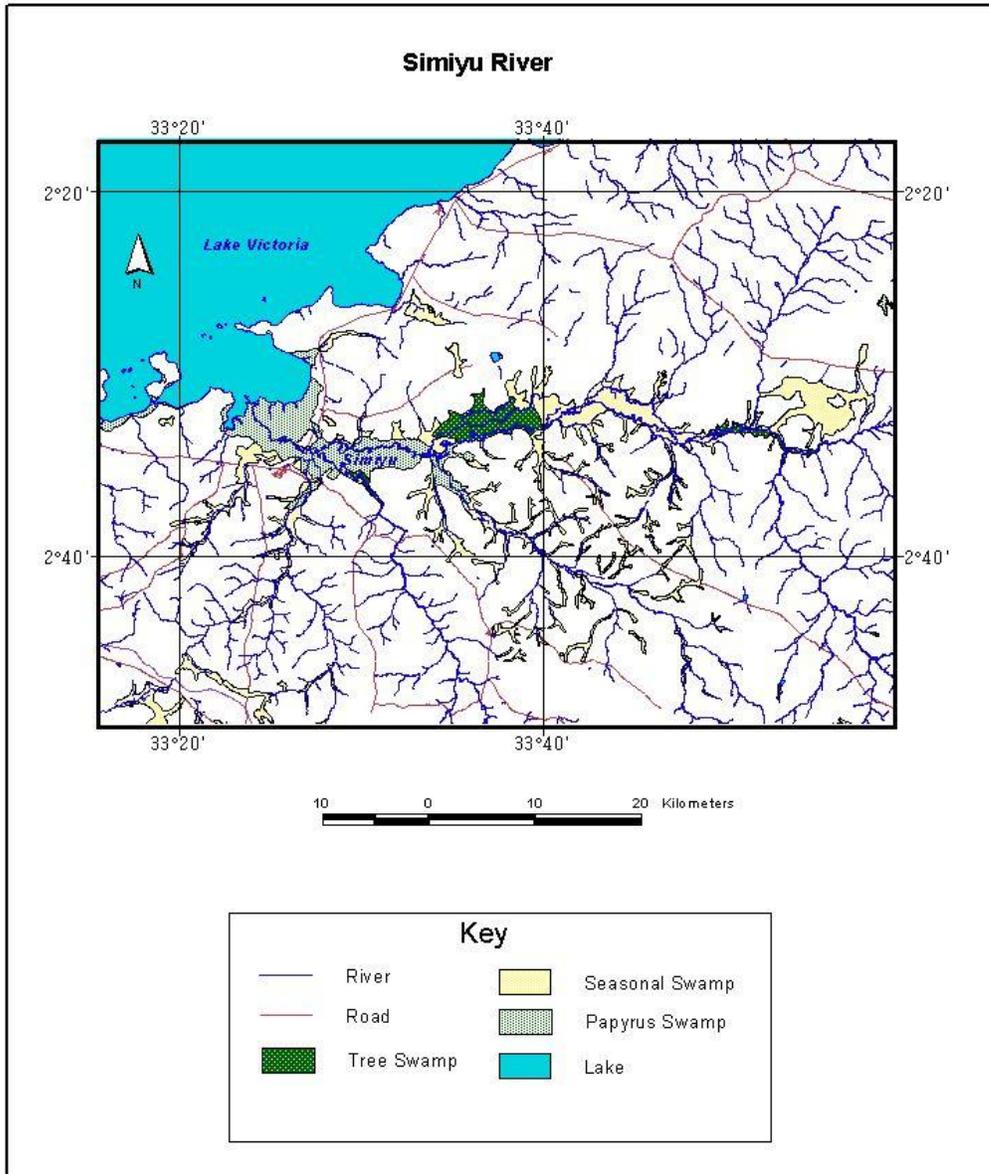
Unlike the reptiles that are scarce or inconspicuous, birds are easily seen and many of the species move in great numbers. The status of most bird species is reasonably known and update of species conservation have been developed or are in the process of being developed, especially for the Lesser Flamingo.

## **Definition of the study areas**

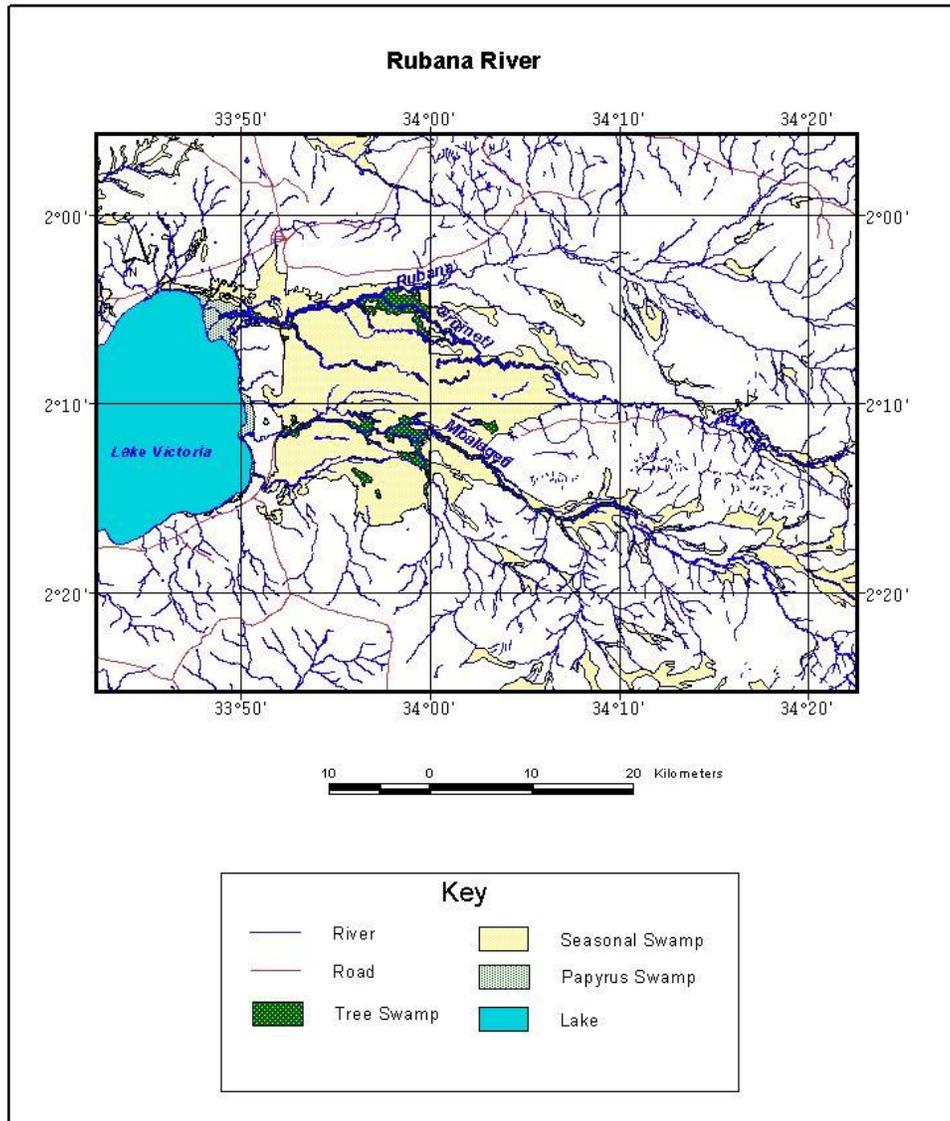
### **Rubana wetland**

Rubana wetland is located on the eastern part of the Speke Gulf in Bunda district, Mara region. It is bordered by four villages, namely Nyatwali and Tamau to the south (in Kunzugu ward), Migungani and Tairo to the north (in Guta ward). The wetland is drained by Rubana River which originates in Serengeti district. This river is joined by Grumentu River that originates in the Serengeti National Park. There are several seasonal streams that discharge into the wetland. The wetland comprises of permanent swamp which is dominated by sedge (*Cyperus papyrus*) and reeds (*Phragmites mauritianus*). The seasonal floodplain occupies largest portion of the wetland, and extends to Serengeti National Park. The floodplain is dominated by two vegetation types. Acacia-grassland dominates the banks and margins of large rivers such as Rubana river, Tairo streams at the border with Migungani, and southern areas of Migungani village. The remaining floodplains are grassland with scattered shrubs and forbs. The area studied extends to the west from Mwanza-Musoma road, and to the south of Bunda-Nansio road (see Fig. 1a and 1b).

**Fg 1a**



**Fg 1b**



## **Simiyu wetland**

Simiyu wetland is situated on the southern part of Speke Gulf of Lake Victoria. It is found in Magu district in Mwanza region. To the west the wetland is bordered by Bugabu and Ilungu villages. Itumbili village, including Magu township occurs to the south, whereas Bubinza, Nsola, and Masanza Kona (Kiloleli) villages are located in the eastern part. The wetland is fed mainly by Simiyu river, which is joined by Duma river within Simiyu floodplain. Simiyu wetland comprises of permanent swamp and seasonal floodplain. The permanent swamp is dominated by *Cyperus papyrus*, and is associated with reeds (*Phragmites* sp.), grasses (*Leersia* spp.), cattails (*Typha* spp), ferns, and water hyacinth. The extensive floodplains support a mosaic of reeds, shrubs, and grasses. Over 200 species of plants have been identified in this wetland. The area studied extends from Mwanza-Musoma road towards the lake.

## **Kitaji wetland**

Kitaji wetland is located in Musoma town, Mara region. Results from 104 observations in early 2002 showed that about 34 species of birds utilize the wetland at different periods of the year. These belonged to 17 families, and included ducks, egrets, herons, plovers, jacanas, wagtails, waders, kingfishers, storks, pelicans, warblers, and cranes. Survey results indicate that the number of birds utilizing the wetland per day fluctuate in different periods of the year.

The total counts for all 104 observations showed that Little egret was the most dominant, and accounted for about 56% of all individuals, followed by Sacred ibis (11%), Black-headed herons (9.8%), Glossy ibis (5.7%), Grey heron (5.7%), Long-toed lapwing (3%), Jacana (2.7%) and White pelican (1.2%). The main threats to birds at

Kitaji are related to human activities, and included solid waste disposal and disturbances. Wastes are largely disposed at the eastern margins of the swamp.

## **Mwanza Gulf**

### Mwanza Municipality

This area extends from Bwiru Hill to Nyegezi. Much of this vast area was covered by foot surveys. The wetlands that once engulfed the area have been converted into agriculture mainly rice fields. Others have currently been reclaimed for human settlements. Many species have therefore been forced to shift from this area with only a few species resisting and are now well adapted to this environment. These birds include some white-breasted cormorants, and little egrets colonies and are spotted roosting and nesting in eucalyptus trees and palms.

Generally, observations showed that Mwanza Gulf is richer in water birds though much of their wetland habitats have been converted into different uses by human activities. A few Afro-tropical and Palaearctic migrants have been identified and include species like Abdim's storks and open billed storks. Many species seem to breed in this part of the region and they include the black headed herons, white breasted cormorants as well as large populations of little egrets and a few individuals of African fish eagles. Microhabitats that were sampled in Mwanza Gulf included Ilemela, Breweries, Butuja, Bwiru, Mihama, Ibanda, Kigogo, Mwaloni, Nera, Mirongo river mouth, Kamanga, Capri-point, Nyashishi, Shadi, Luchelele, Nyegezi, Butimba and Mkuyuni.

### Missungwi District

The Stuhlman's Sound in Missungwi District particularly Mitego swamps several breeding sites of the Hamerkops were spotted. Zinu Island, which is totally isolated

from human activities, was also identified as among the favourable breeding sites of Hamerkops.

### Sengerema District

The southwest bay in Sengerema district especially the Buyagu Bay was found to be rich in bird species. Several pairs of African fish eagles have been spotted.

## **Species Composition**

National Water bird Census of 1995 showed that Mwanza city supported largest populations of cormorants in Tanzania. This finding stimulated further interest in investigating the species composition including the non-cormorant species at five different sites i.e. Kitaji, Rubana, Simiyu and Mwanza.

There are 107 species of wetland birds that have been recorded in the Simiyu, Rubana, Kitaji and Mwanza Gulf wetland ecosystems as shown in Table 1 (NEMC/LVEMP 2002). Simiyu and Rubana wetlands have the highest species diversity totalling 55 and 51 individual species respectively. Mwanza wetland has recorded 30 individual species while the Kitaji wetland has 33 individual species. The composition for the most abundant and common species at various sites is summarized in Table 2.

Table 2: Bird Species Composition at Kitaji, Rubana, Simiyu and Mwanza

Species	Kitaji	Rubana	Simiyu	Mwanza	Residential status
Reed cormorant <i>Pharacrocorax africanus</i>				+	
Long tailed cormorant <i>Pharacrocorax africanus</i>		+	+	+	R
White breasted cormorant <i>Pharacrocorax carbo</i>		+	+	+	
African Darter <i>Anhinga melanogaster</i>				+	
Great cormorant			+		

Species	Kitaji	Rubana	Simiyu	Mwanza	Residential status
Little egret <i>Egretta garzetta</i>	+	+	+	+	R
Great-white egret <i>Egretta alba</i>	+		+	+	R
Yellow-billed egret <i>Egretta intermedia</i>	+	+	+	+	R
Cattle egret <i>Bubulcus ibis</i>	+	+	+	+	R
Squacco heron <i>Ardea ralloides</i>	+			+	R
Goliath heron <i>Ardea goliath</i>		+			R
Grey heron <i>Ardea cinerea</i>	+			+	R
Black-headed heron <i>Ardea melanocephala</i>	+	+	+	+	R
White stock <i>Ciconia ciconia</i>		+	+		M
Abdim's Stork <i>Ciconia abdimii</i>		+	+		M
Marabou <i>Leptoptilos crumineferus</i>		+	+	+	R
Hamerkop <i>Scopus umbretta</i>		+	+	+	R
Yellow-billed stork <i>Mycteria ibis</i>	+	+	+	+	R
African open-billed stork <i>Anastomus lamelligerus</i>	+	+	+	+	R
Saddle-billed stork <i>Ephippiorhynchus senegalensis</i>		+	+		R
Hadada ibis <i>Bostrychia hagedash</i>	+	+	+	+	R
Sacred ibis <i>Threskiornis aethiopica</i>	+			+	R
Glossy ibis <i>Plegadis falcinellus</i>	+			+	R
African spoonbill <i>Platalea alba</i>	+		+	+	R
White-faced whistling duck <i>Dendocyna viduata</i>	+			+	R
Black kite <i>Milvus migrans</i>		+		+	R
African fish-eagle <i>Haliaeetus vocifer</i>		+	+	+	R
African marsh-harrier <i>Circus ranivorus</i>		+	+		R
Augur buzzard <i>Buteo auguralis</i>		+	+		R
Black-crake <i>Amaurornis flavirostris</i>	+	+	+	+	R
Common moorhen <i>Gallinula chloropus</i>	+		+		R
Purple swamphen <i>Porphyrio porphyrio</i>	+		+		R
Grey-crowned crane <i>Balearica regulorum</i>	+	+	+		R
African Jacana <i>Actophilornis africana</i>	+	+	+	+	R
Common stilt <i>Himantopus himantopus</i>	+			+	R
Common pratincole <i>Glareola pratincola</i>			+		M
Ringed plover <i>Charadrius hiaticula</i>	+				R
African wattled lapwing <i>Vanellus senegallus</i>		+	+		R

Species	Kitaji	Rubana	Simiyu	Mwanza	Residential status
Long-toed lapwing <i>Vanellus crassirostris</i>	+	+	+		R
Spur-winged lapwing <i>Vanellus spinosus</i>	+			+	R
Crowned plover <i>Vanellus coronatus</i>		+	+		R
Little stint <i>Caladris minuta</i>	+				M
Pectoral sandpiper <i>Caladris melanotos</i>	+				M
Ruff <i>Philomachus pugnax</i>	+				M
Redshank <i>Tringa tetanus</i>	+				M
Green shank <i>Tringa nebularia</i>	+				M
Wood sandpiper <i>Tringa glareola</i>	+				M
Common sandpiper <i>Actitis hypoleucos</i>	+				M
Grey-headed gull <i>Larus ridibundus</i>				+	M
Herring gull <i>Larus argentatus</i>		+		+	M
Gull-billed tern <i>Gelochelidon nilotica</i>		+		+	M
Namaqua dove <i>Oena capensis</i>		+	+		R
African mourning dove <i>Streptopelia decipiens</i>		+	+		R
Fischer's lovebird <i>Agopornis fischeri</i>		+			R
Speckled mousebird <i>Colius striatus</i>		+	+		R
Grey-headed kingfisher <i>Halcyon leucocephala</i>			+		R
Malachite kingfisher <i>Corythornis cristata</i>		+	+		R
Pied kingfisher <i>Ceryle rudis</i>	+	+	+	+	R
Larks		+			R
Common bulbul <i>Pycnonotus barbatus</i>		+	+		R
Cistocals		+	+		R
Sunbirds		+	+		R
Long-tailed fiscal <i>Lanius cabanisi</i>		+	+		R
White-helmet shrike <i>Prionops plumata</i>		+	+		R
Pied crow <i>Corvus splendens</i>	+				R
African drongo <i>Dicrurus adsimilis</i>		+			R
Superb starling <i>Spreo superbus</i>		+			R
Wattled starling <i>Creatophora cinerea</i>		+			R
Ashy starling <i>Cosmopsarus unicolor</i>		+			R
House sparrow <i>Passer domesticus</i>	+				R
Chestnut sparrow <i>Passer eminiibey</i>		+			R

Species	Kitaji	Rubana	Simiyu	Mwanza	Residential status
Black-headed weaver <i>Ploceus cucullatus</i>		+	+		R
Viellot's black weaver <i>Ploceus nigerrimus</i>			+		R
Yellow-backed weaver <i>Ploceus melanocephalus</i>		+	+		R
Golden backed weaver <i>Ploceus jacksonii</i>		+	+		R
Northern masked weaver <i>Ploceus taeniopterus</i>		+	+		R
Little weaver <i>Ploceus luteolus</i>		+			R
Cardinal quelea <i>Quelea cardinalis</i>			+		R
Red-billed quelea <i>Quelea quelea</i>		+	+		R
Zanzibar red bishop <i>Ueplectes nigroventris</i>			+		R
Black-winged red bishop <i>Euplectes afer</i>			+		R
Blue cheeked cordon-bleu <i>Uraeginthis angolensis</i>		+			R
Common waxbill <i>Estrida astrid</i>			+		R
Pin-tailed whydah <i>Vidua macroura</i>			+		R
Bronze Mannikin <i>Lonchura fringilloides</i>			+		R
<b>TOTAL</b>	<b>33</b>	<b>51</b>	<b>55</b>	<b>30</b>	

Source: LVEMP/NEMC Survey Results, 2002.

Key to abbreviations: R = Resident; M = Migratory

## Ecological Adaptation of Some Aquatic Birds

Observations made between the period 1998/1999 generated some special characteristic of the Lake Victoria aquatic birds with respect to habitat adaptation, status and some behaviour. Table 2 shows the characteristics of wetland birds of Mwanza Gulf. The Table indicates how well these birds have successfully adapted themselves to the Lake Victoria Aquatic Ecosystem with respect to habitat. Also their status in terms of abundance, richness, rareness and behaviour in terms of nesting, roosting, feeding and breeding are clearly indicated in the Table 3.

**Table 3: Mwanza Gulf Wetland Birds Characteristics**

Species	Habitat				Status			Behaviour			
	Sw	Es	Fl	Sh	Ab	Co	Ra	N	Ro	Fe	Br
<b>Family: Phalarocoridae/Anhingide</b>											
Red Cormorant <i>Phalarocorax africanus</i>	+						+			+	
Long-tailed Cormorant <i>Phalarocorax africanus</i>	+	+					+			+	
White-breasted Cormorant <i>Phalarocorax carbo</i>	+					+		+	+	+	
African Darter <i>Anhinga melanogaster</i>	+						+			+	
<b>Family: Arderidae</b>											
Cattle Egret <i>Bulbulcus ibis</i>				+	+					+	+
Little Egret <i>Egretta garzetta</i>				+	+					+	+
Yellow-billed Egret <i>Egretta intermedia</i>				+						+	
Great White Egret <i>Egretta alba</i>			+			+			+	+	
Grey Heron <i>Ardea melanocephala</i>			+			+				+	
Black-headed Heron <i>Ardea melanocephala</i>				+	+			+		+	+
Goliath Heron <i>Ardea goliath</i>	+						+			+	
<b>Family: Scopidae</b>											
Hamerkop <i>Scopus umbretta</i>				+		+		+		+	+
<b>Family: Ciconidae</b>											
Open-billed Stork <i>Anastomus lamelligerus</i>			+			+				+	
Abdim's Stork <i>Ciconia abdimii</i>		+	+			+				+	
Marabou Stork <i>Leptoptilos crumineferus</i>				+		+				+	
<b>Family: Threskiornithidae</b>											
Glossy Ibis <i>Plegadis falcinellus</i>			+			+				+	
Hadada Ibis <i>Bostrychia hagedash</i>			+			+				+	
Sacred Ibis <i>Threskiornis aethiopicus</i>		+	+		+			+		+	
<b>Family: Balearicidae (Gruidae?)</b>											
Crowned Crane <i>Balearica regulorum</i>	+		+			+				+	
<b>Family: Accipitridae</b>											
Augur buzzard <i>Buteo rufofuscus</i>				+			+			+	
Grey Kestrel <i>Falco ardosiaceus</i>				+			+			+	
Black Kite <i>Milvus migrans</i>				+	+			+		+	
African Fish Eagle <i>Haliaeetus vocifer</i>	+						+			+	
<b>Family: Jacanidae</b>											
African Jacana <i>Actophilornis africanus</i>	+						+			+	
<b>Family: Burhinidae</b>											
Spotted Stone Curlew <i>Burhinus copensis</i>	+						+		+		

<b>Family: Alcedinidae</b>											
Pied Kingfisher <i>Ceryle rudis</i>				+	+			+		+	
Malachite Kingfisher <i>Alcedo cristata</i>		+					+			+	
Blue-breasted Kingfisher <i>Halcyon malimbicus</i>		+						+		+	
Brown-hooded Kingfisher <i>Halcyon albiventris</i>		+						+		+	
<b>Family: Motacillidae</b>											
African Pied Wagtail <i>Motacilla aguimp</i>				+			+			+	
<b>Family: Ploccidae</b>											
Fan-tailed Widowbird <i>Euplectes axillaris</i>	+							+			+
<b>Family: Corvidae</b>											
Pied Crow <i>Corvus albus</i>				+			+			+	
<b>Family: Pycnonotidae</b>											
Common bulbul <i>Pycnonotus barabatus</i>				+	+		+			+	
<b>Family: Coliidae</b>											
Speckled Mousebird <i>Colius striatus</i>				+			+			+	
<b>Family: Colombidae</b>											
Ring-necked Dove <i>Streptopelia capicola</i>				+			+		+	+	
<b>Family: Apidae</b>											
Little Swift <i>Apus affinis</i>				+			+			+	
<b>Family: Laniidae</b>											
Fiscal Shrike <i>Lanius collaris</i>				+			+			+	
<b>Family:</b>											
Superb Starling <i>Spreo superbus</i>				+				+		+	

Source: LVEMP/NEMC, 1998

Key to the abbreviations:

Sw = Swamps; Rm = River mouth; Fl = Flood plan; Sh = Open beaches and shores;  
 Ab = Abundant; Co = Common; Ra = Rare; N = nesting; Ro = Roosting; Fe = Feeding;  
 Br = Breeding.

### **Aquatic birds and feeding behaviour**

Birds have a variety of feeding requirement. Kingfishers for instance and a great number of cormorants do feed on fish. The amount of fish taken in the Lake Victoria waters is very insignificant that no interest has been taken to study their impacts. Some

fish like the Marabou stork are for ages been regarded as scavengers of the unwanted trash of fish. However, birds have been causing a lot of damage to some aquatic crops mainly rice. They are menace to rice growers although some may cause damage to other crops like maize and sorghum. The period before harvest in March and the period of harvest of May and June is the time when bird damage to rice is rampant.

#### Conservation Status of Wetlands and their waterfowl

Tanzania's wetlands area covers about 10% of the total 945,200 km<sup>2</sup> of the country (MTNRE, 1994). These wetlands can be grouped into:

- Marine and coastal wetlands
- Inland wetlands systems (Lakes Victoria, Nyasa, Tanganyika)
- Rivers and inland flood plain
- Artificial wetlands

The inland wetland ecosystem includes the rift valley lakes and some swamps. This category comprises also the Lake Victoria whose shores and flowing rivers such as the Kagera and Mara river systems and Lake Ikimba provide habitats for a varied range of waterfowls. However most part of this ecosystem is not very well conserved except in areas where there is a category of Protected Areas (PA). Such protected areas are indeed very small in size in proportion to the size of the lake. These PAs include a small portion of the Serengeti National Park that takes care of the upper Rubana Riverine Wetland Systems. The other PA is the Rubondo Island National Park in the Lake Victoria Basin. The conservation status of some of the Lake Victoria's main wetlands is indicated in Table 4.

Table 4: Conservation status of some of the Lake Victoria's main wetlands

Name	Wetland Type	Approximate Size (km <sup>2</sup> )	Conservation Status	General Remarks
Upper Kagera	Shallow lake	350	Partly protected as conservation area	Strengthen public participation Conservation approaches
Lake Ikimba	Shallow lake	125	Unprotected	Some portion to be conserved
Lake Victoria	Lake with swamp areas	33756	Largely unprotected	About 1,000 km <sup>2</sup> be under PA
Mara River	Swamp and flood plain	300	Unprotected	About 50 km <sup>2</sup> be extended to PA
Kagera River	Swamp and forest	*****	Partly unprotected - The Minziro Forest Reserve	Further 100 km <sup>2</sup> be extended to PA

Source: UNEP, 1998

Since the great part of the Lake Victoria basin is completely unprotected concerted efforts are required to protect some of the hot spots for waterfowl. These areas to include the hot spots in Simiyu, Rubana, Kitaji and Mwanza City Wetland Systems. These areas are very well documented with respect to water bird biology. Other areas for conservation will be identified and recommended after thorough studies have been conducted.

Other conservation strategies for the conservation of water-bird biodiversity will include among many others the following strategies:

- Since some sites of the Lake Victoria basin aquatic systems fulfil the requirement criteria for the establishment of the Ramsar sites, efforts must be initiated to establish such Ramsar sites for better management of the waterfowl biodiversity.
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## References

LVEMP/NEMC, 1998: Preliminary studies on the status of wetland resources around Mwanza Gulf of Lake Victoria, Tanzania. LVEMP/NEMC Report No. 2.

**Table 1: The full list of birds identified**

S/N	Common Name	Scientific Name	S/N	Common Name		
1	Great Crested Grebe		37	Purple Swamphen		
2	Great Cormorant		38	Crowned Crane		
3	Long-tailed Cormorant		39	Hartlaub's Bustard		
4	White Pelican		40	African Jacana		
5	Little Egret		41	Common Stilt		
6	Great White Egret		42	Crowned Lapwing		
7	Yellow-billed Egret		43	Long-toed Lapwing		
8	Cattle Egret		44	Ruff		
9	Goliath Heron		45	Buff-breasted Sand Piper		
10	Black Headed Heron		46	Herring Gull		
11	Black Stork		47	Slender-billed Gull		
12	Abdim's Stork		48	Namaqua Dove		
13	Hamerkop		49	Collared Dove		
14	Marabou Stork		50	Red-eyed Dove		
15	Yellow-billed Stork		51	Vinaceous Dove		
16	African Open-billed Stork		52	Lilian's Love Bird		
17	Saddle-billed Stork		53	Sokoke Scops-Owl		
18	Sacred Ibis		54	Verre Aux's Eagle-Owl		
19	Glossy Ibis		55	Fraser's Eagle-Owl		
20	Hadada		56	Bate's Night Star		
21	African Vs Eurasian Spoon Bill		57	Scarce Swift		
22	White-faced Whistling Duck		58	Blue Naped Mouse Bird		
23	Non-billed Duck		59	Speckled Mouse Bird		
24	Black Kite		60	Pied King Fisher		
25	African Fish Eagle		61	Grey Headed King Fisher		
26	Bateleur		62	Half Coloured King Fisher		
27	African White- backed Vulture		63	African Grey Horn Bill		
28	African Marsh-		64	Black Dwarf Horn Bill		

	Harrier					
29	Eastern Chanting Goshawk		65	Hemprich's Horn Bill		
30	Spotted Eagle		66	Wood Pecker		
31	Secretary Birds		67	Ficher's Sparrow Lark		
32	Red-necked Spur Fowl		68	Chestnut-headed Sparrow Lark		
33	Helmeted Guinea Fowl		69	Bima Culated Lark		
34	Common Quail		70	African Pied Wagtail		
35	Blue Quail		71	Citrine Wagtail		
36	Black Crake		72	Yellow Wagtail		
73	Black Heron		91	Cordon-bleu Birds		
74	White-browned Coucal		92	Wax Bill Birds		
75	Robin-chart		93	Mannikin Birds		
76	Common Bulbul		94	Pale Petronia		
77	Black Fly Catcher		95	Cisticola Birds		
78	Sun Bird		96	White-chested Alethe		
79	White-necked Raven		97	Black-billed Wood-hoopoe		
80	Pied Crow		98	Giant King Fisher		
81	Yellow-billed Oxpecker		99	Sooty Boubou		
82	Weaver Birds		100	Quail Plover		
83	Long-tailed Widow Bird		101	Pied Wagtail		
84	Fan-tailed Widow Bird		102	Buff-bellied Warble		
85	Red-billed Quelea		103	Black-faced Rufous Warble		
86	Red-headed Quelea		104	Green Sylvietta		
87	Red Bishop Birds		105	Common Bristle Bill		
88	Acacia Paradise Why Dah		106	Abyssinian Catbird		
89	Jameson's Fire Finch		107	Shoe Bill		
90	Village Indigo Bird					