

Waterbirds at Lake Oloidien, Naivasha, Kenya, autumn 1987

Peter Lyngs

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This paper presents data from regular counts of the waterbirds using the small Lake Oloidien, Rift Valley, Kenya in autumn 1987. The majority (73%) of the recorded waterbirds were Afrotropical breeders, but among the waders 85% of the birds were Palearctic breeders. For many species, there are indications of intra-African or local movements.

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INTRODUCTION

I had the pleasure of living close to the shores of Lake Oloidien from 11 September 1987 to 5 January 1988. Apart from almost daily short visits to the lake, this gave me the opportunity to undertake regular counts of the birds using Lake Oloidien in the period 26 September 1987 - 4 January 1988. Jørgen Rabøl participated in the counts in September, and Jens Bagger, John Faldborg and Ole Thorup from mid-December.

This paper presents the data collected. I do not, however, have the time or the knowledge to discuss the significance of the findings in any depth. As there seem to be very few long-term counts of waterbirds from eastern Africa, I simply felt it a pity that the data should rot in my drawers. Thus, my humble aim is to make them available for other workers, who hopefully can make better use of them than I can.

LAKE OLOIDIEN

Lake Oloidien (approx. 00°50'S, 36°17'E; altitude 1900 m) is situated some 20 km ESE of Naivasha town in the Rift Valley of Kenya (see Map 1). The eutrophic Lake Oloidien was formerly a part of Lake Naivasha (Oloidien Bay), but is now cut off from the main lake due to decreasing water levels. Even throughout my stay, the water level decreased slowly. However, the surface of the exposed mud quickly dried to a hard crust, leaving a fairly constant area of newly exposed soft mud. The two lakes are separated by only a short stretch of land, but because of its high vegetation one cannot see from one lake to the other.

The shores of Lake Oloidien were grassy and very open: there were no reeds and very little scrub. It was heavily grazed by cattle, and dominated by stands of high yellowfever trees *Acacia xanthophloë*. The lake has retained its cover of submerged macrophytes even during the loss and subsequent recovery of these in Lake Naivasha. However, there was no floating vegetation.

The information mentioned below on the state of the lake (June-September 1987) is taken from Harper (1987). Some typical physical and chemical values for the open

water surface layers were: temperature 23 °C, oxygen 9 mg/l, pH 9.5, total alkalinity 10 meq/l. The phytoplankton was dominated by mixed smallcelled species of *Cyanophyceae*. Biomass was up to 50 ug/l chlorophyll 'a'. The zooplankton was dominated by *Diaphanosoma exisum*. Fish composition from gill net catches was: *Oreochromis leucostictus* 22%, *Tilapia zillii* 68%, *Micropterus salmoides* 10% (n= 127).

METHODS

Counts of birds from the orders Podicipediformes, Pelecaniformes, Ciconiiformes, Phoenicopteriformes, Anseriformes, Gruiformes and Charadriiformes were conducted once in every international pentade (*i.e.* five-day periods starting January 1) in the period 26 September 1987 to 4 January 1988. All birds except Cattle Egret *Bubulcus ibis* and Hadada *Bostrychia hagedash* using Lake Oloidien (including the shore) were noted (as well as kingfishers and Yellow Wagtail *Motacilla flava*; see Table 2), whereas birds passing the area were excluded. It took approximately five hours to do a count. Most of the 21 counts were done in the afternoon. The number of bird-days (total number of birds in all counts) is given for all regularly recorded species.

English and scientific names follow Lewis & Pomeroy (1989). I use the term 'Palearctic' for birds breeding in the Palearctic area, while 'Afrotropical' is used for birds breeding in Africa. For most of the birds mentioned here, there are no problems in making this distinction as they are either one or the other. For Black-winged Stilt *Himantopus himantopus*, Avocet *Recurvirostra avosetta*, Whiskered Tern *Chlidonias hybridus* and maybe Squacco Heron *Ardeola ralloides* and Little Egret *Egretta garzetta* it is, however, likely that Palearctic birds augment the Afrotropical populations in Kenya during the northern winter (Lewis & Pomeroy 1989). A comment on the knowledge of inter-African or local movements is given for all Afrotropical species.

Harper (1987) presents some data on waterbirds from Lake Oloidien in the period 14 July to 12 September 1987, which is just before my data were collected. Unfortunately, no numbers or dates are given, only a code

of frequency, where R equals regularly seen, F frequently seen, O occasionally seen and + recorded once. In the species account below RH indicates that the species were recorded by Harper, NRH that it was not. The frequency code is also given.

SPECIES COMPOSITION AND NUMBERS

A total of 68 species from the above mentioned orders was recorded. Most of the species (46; 68%) were of Afrotropical origin, the remaining (22; 32%) of Palearctic origin. Species of Palearctic origin were all from the orders Anseriformes and Charadriiformes (Table 1).

A total of 66,231 bird-days was recorded. The bird-days were distributed on avian orders as follows: Podicipediformes 4.7%, Pelecaniformes 22.8%, Ciconiiformes 1.6%, Phoenicopteriformes 4.9%, Anseriformes 18.3%, Gruiformes 15.6% and Charadriiformes 32.2%.

The overall average number of birds recorded on a count was 3,162. However, the numbers of birds increased during the period. Minimum numbers were recorded on 26 September (1,929 birds), maximum numbers 20 December (5,207 birds). The mean number of Afrotropical birds remained fairly stable at 2,120 birds per count until mid-December, when it rose to 2,636 (Figure 1). The number of Afrotropical species declined from a mean of 31.3 in late September - early October to 28.7 in late October - early November; rising gradually to 34.9 species per count from early December (Figure 2). The mean number of Palearctic birds remained fairly stable at 571 birds per count until mid-November, when it rose to 990 birds. From mid-December the number averaged 1,400 per count (Figure 1). The number of Palearctic species increased from a mean of 14.4 species per count in September - mid November to 16.3 in the remaining period (Figure 2). The number of Palearctic waders increased from a mean of 480 birds per count in September - early November to 793 in the remaining period, while the number of Afrotropical waders increased from 112 birds per count to 159 (Figure 3).

Table 1. Number of species, bird-days and origin of birds from the avian orders recorded regularly at Lake Oloidien, September 1987 - January 1988. Bird-days = Total numbers of birds on all counts.

Avian order	No. species	No. bird-days	Afrotropical origin	Commonest Afrotropical species	Palearctic origin	Commonest Palearctic species
Podicipediformes	2	3,092	100%	Little Grebe (99%)		
Pelecaniformes	5	15,080	100%	Greater Cormorant (90%)		
Ciconiiformes	11	1,056	100%	Little Egret (27%)		
Phoenicopteriformes	2	3,221	100%	Lesser Flamingo (94%)		
Anseriformes	11	12,132	95%	Egyptian Goose (73%)	5%	Garganey (57%)
Gruiformes	1	10,344	100%	Red-knobbed Coot (100%)		
Charadriiformes	22	21,306	15%	Blacksmith Plover (31%)	85%	Little Stint (36%)

Map 1. Location of Lake Oloidien and Crater Lake in relation to Lake Naivasha, Kenya.

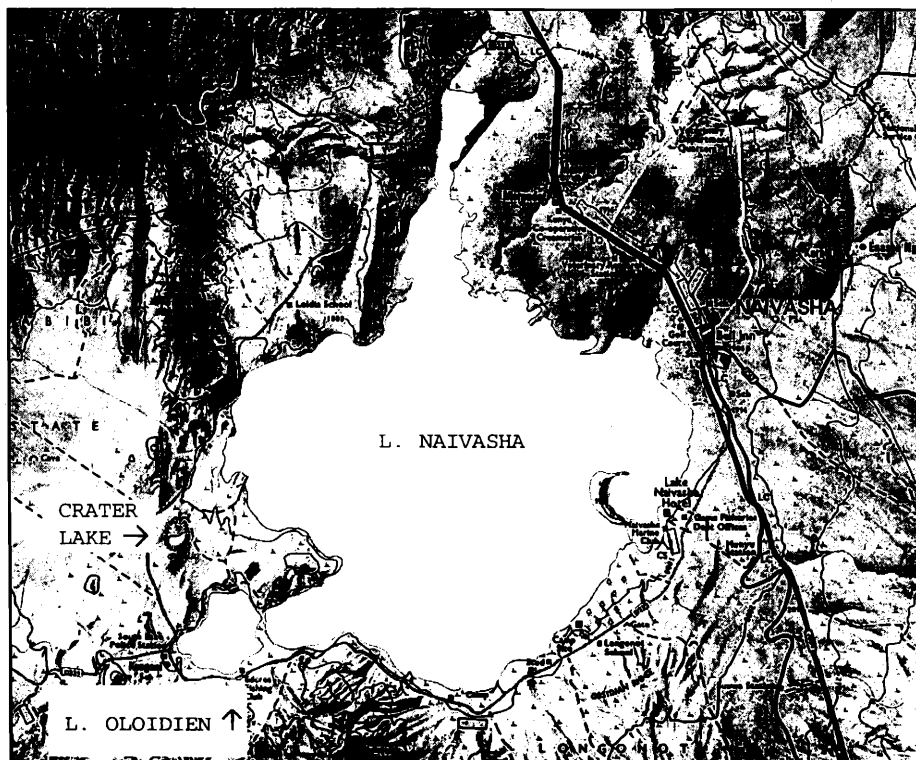


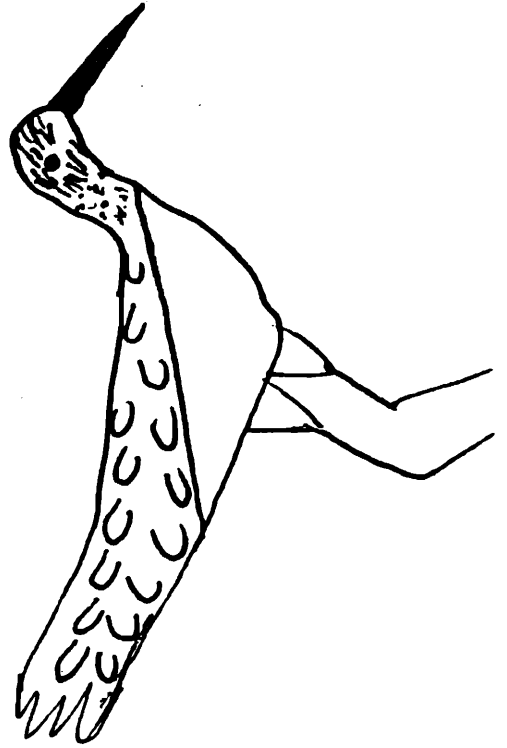
Table 2. Waterbirds recorded at Lake Oloidien, Kenya, September 1987 - January 1988.

Species/Pentade	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	Totals	
Little Grebe (<i>Tachybaptus ruficollis</i>)	102	230	165	164	185	203	165	195	185	115	130	120	145	165	110	130	137	73	86	121	121	3047	
Black-necked Grebe (<i>Podiceps nigricollis</i>)	16	7	10														4			1	6	1	45
Great White Pelican (<i>Pelecanus onocrotalis</i>)	5	2	9	4	9	2	4	3	4	7	12	16	7	12	10	250	121	370	72	7	7	2	885
Pink-backed Pelican (<i>Pelecanus rufescens</i>)	522	795	870	600	565	650	830	970	550	410	160	950	860	520	560	1050	615	1540	422	50	6	6	156
Greater Cormorant (<i>Phalacrocorax carbo</i>)	10	14	12	12	16	14	23	16	21	20	19	18	28	21	23	15	21	25	10	19	18	18	13603
Long-tailed Cormorant (<i>Phalacrocorax africanus</i>)	2	2	2	2	1	2	2	3	2	3	2	4	5	4	4	4	5	5	1	3	3	3	61
Darter (<i>Ahinga rufa</i>)	7	4	3	4	4	5	6	3	2	2	3	3	1	1	1	3	1	2	2	2	3	2	58
Squacco Heron (<i>Ardeola ralloides</i>)	14	9	9	12	8	11	13	13	11	11	11	12	16	14	12	8	22	23	24	18	16	16	287
Little Egret (<i>Egretta garzetta</i>)	6	3	3	3	5	5	5	7	5	4	6	3	5	6	5	6	9	9	7	11	9	9	122
Great White Egret (<i>Egretta alba</i>)	3	4	6	5	4	9	4	4	5	5	7	7	5	5	6	8	6	7	8	9	11	11	128
Grey Heron (<i>Ardea cinerea</i>)	5	4	5	4	5	5	6	4	5	6	7	7	7	6	7	8	7	7	7	8	7	7	124
Goliath Heron (<i>Ardea goliath</i>)	3	3	3	4	4	4	6	1	3	2	3	3	2	2	2	2	7	7	4	8	7	7	40
Yellow-billed Stork (<i>Threskiornis ibis</i>)	6	7	3	2	9	4	3	3	3	4	6	1	2	1	1	1	7	4	3	1	1	1	70
Sacred Ibis (<i>Threskiornis aethiopicus</i>)			1	2	1	1				2	2		1	1	1	1	2	4	3	2	2	2	24
Glossy Ibis (<i>Plegadis falcinellus</i>)	9	11	13	11	10	16	9	6	10	9	7	4	17	9	6	8	7	5	16	8	12	12	203
African Spoonbill (<i>Platalea alba</i>)																							203
Greater Flamingo (<i>Phoenicopterus ruber</i>)												1											203
Lesser Flamingo (<i>Phoenicopterus minor</i>)	1	2	35	2	7	10	27	53	33	17	19	11	13		5	13	18	20	26	62	58	58	3018
Egyptian Goose (<i>Alopochen aegyptiaca</i>)	241	355	409	504	540	550	425	548	580	605	575	400	465	390	330	315	268	241	224	223	224	224	8412
Spur-winged Goose (<i>Plectropterus gambensis</i>)	4	2	2	4	48	75	64	15	27	25	57	57	11	11	21	44	3	1	33	4	12	450	
Knob-billed Duck (<i>Sarkidiornis melanotos</i>)													1	3	3	3	1	1	1	1	1	1	11
Garganey (<i>Anas querquedula</i>)	3	6	6	11	9	22	18	17	10	8	5	1	7	8	8	11	12	8	18	18	15	15	215
Yellow-billed Duck (<i>Anas undulata</i>)	22	33	27	45	37	33	55	60	54	58	38	62	45	65	71	52	89	81	58	79	110	1174	
Pintail (<i>Anas acuta</i>)												1	2	2	2	12	14	45	34	55	166	334	
Red-billed Teal (<i>Anas erythrorhynchos</i>)	3	3	9	6	4	3	4	4	2	2	2	1	2	2	2	2	2	2	7	23	22	81	
Hottentot Teal (<i>Anas hottentota</i>)	3	3	3	3	3	3	3	1	5	2	2	11	8	8	10	6	11	3	14	44	61	213	
Shoveler (<i>Anas clypeata</i>)													1	1	6	4	7	5	9			42	
Southern Pochard (<i>Aythya erythrorhynchos</i>)	37	31	27	50	63	68	35	29	12	19	8	26	11	10	15	32	10	16	39	122	228	888	
Maccoa Duck (<i>Oxyura maccoa</i>)	6	25	45	17	34	16	40	28	10	25	13	13	10	10	3	14	4	6	6	6	6	312	
Red-knobbed Coot (<i>Fulica cristata</i>)	350	360	345	462	520	516	440	475	590	621	531	545	575	518	495	535	535	362	560	540	469	10344	
Long-toed Plover (<i>Vanella crassirostris</i>)	5	3	3	4	3	3	4	4	4	6	6	7	7	6	6	9	9	10	9	8	13	129	
Blacksmith Plover (<i>Vanella armatus</i>)	30	46	46	53	32	51	39	45	48	56	47	38	45	68	57	60	40	35	26	57	89	1008	
Spur-winged Plover (<i>Vanellus spinosus</i>)	4	9	10	6	4	4	8	7	6	5	6	4	4	8	3	10	7	4	2	4	13	128	
Little Ringed Plover (<i>Charadrius dubius</i>)													1	1	3	5	5	8	2	7	2	47	
Ringed Plover (<i>Charadrius hiaticula</i>)	4	4	2	4	3	6	6	11	23	61	92	103	78	137	141	135	92	107	91	120	88	1308	
Kittitz's Plover (<i>Charadrius pecuarius</i>)	25	14	11	16	11	9	8	11	16	27	29	26	17	18	30	59	42	40	39	28	18	494	
Three-banded Plover (<i>Charadrius tricollaris</i>)	26	17	10	17	20	13	19	17	15	31	25	30	21	23	23	19	28	17	21	24	16	432	

Table 2 (continued). Waterbirds recorded at Lake Oloidien, Kenya, September 1987 - January 1988.

Species/Pentade	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	1	Totals	
Little Stint (<i>Calidris minuta</i>)	123	148	160	176	138	132	150	183	183	229	361	350	289	313	295	293	254	285	286	313	287	4948	
Curlw Sandpiper (<i>Calidris ferruginea</i>)	37	26	38	37	21	21	14	8	11	5	19	54	92	24	34	25	13	35	12	24	24	24	574
Ruff (<i>Philomachus pugnax</i>)	42	44	43	51	44	32	57	43	68	71	68	88	85	68	99	97	104	47	32	74	112	1369	
Snipe sp (<i>Gallinago</i> sp)			1	2	3	4	3	6	8	13	17	3	6	5	6	3	11	8	9	6	3	117	
Marsh Sandpiper (<i>Tringa stagnatilis</i>)	70	92	80	107	91	93	79	80	89	77	91	112	93	102	98	81	118	109	128	102	122	2014	
Greenshank (<i>Tringa nebularia</i>)	18	14	20	18	18	22	32	13	8	10	14	15	19	14	18	20	17	19	7	19	28	363	
Green Sandpiper (<i>Tringa ochropus</i>)	1				3	2	1	1				1				1	1		1		3	15	
Wood Sandpiper (<i>Tringa glareola</i>)	41	53	41	65	50	62	70	60	69	63	76	73	72	78	75	75	64	54	49	52	61	1303	
Common Sandpiper (<i>Tringa hypoleucos</i>)	64	72	95	113	78	93	78	85	86	90	101	97	70	101	88	99	107	110	69	113	84	1893	
Black-winged Stilt (<i>Himantopus himantopus</i>)	27	32	36	24	18	35	24	25	27	34	29	21	33	35	37	31	31	33	37	48	98	715	
Avocet (<i>Recurvirostra avosetta</i>)	1	1	1	1					1							1					5	14	
Grey-headed Gull (<i>Larus cirrocephalus</i>)	4		10	3		6			1	10	13	22	19	12	14	28	30	53	26	31	39	321	
Lesser Black-backed Gull (<i>Larus fuscus</i>)	1				1	3	2	2	2	1	2	6	13	8	15	16	32	47	14	27	8	200	
Gull-billed Tern (<i>Gelochelidon nilocottii</i>)	17	10	8	22	16	14	19	9	23	18	14	10	25	20	6	45	30	20	20	37	30	413	
Whiskered Tern (<i>Chlidonias hybridus</i>)	7	20	15	25	18	16	10	11	22	20	40	45	13	18	70	24	500	1000	800	75	25	2774	
White-winged Black Tern (<i>Chlidonias leucoptera</i>)	4	31	24	25	26	30	18	26	70	75	300	8	44	38	14	23	22	37	9	13	7	844	
Pied Kingfisher (<i>Ceryle rudis</i>)	22	25	24	23	23	29	25	26	29	26	26	18	16	23	25	23	25	53	44	39	45	589	
Malachite Kingfisher (<i>Alcedo cristata</i>)	3	1	1	3	3	1	2	1	3	3	2				1		1		1			23	
Yellow Wagtail (<i>Motacilla flava</i>)	10	9	25	24	35	25	55	65	60	45	50	70	50	40	70	105	70	70	70	75	250	1273	

Grün Schenkel



SPECIES ACCOUNTS

Little Grebe *Tachybaptus ruficollis*

3,047 bird-days; 73-230 birds seen at all counts. Numbers declined gradually from early November (Table 2). Known to perform regular movements (Lewis & Pomeroy 1989). RH;R.

Black-necked Grebe *Podiceps nigricollis*

45 bird-days; 7-16 birds seen daily until 8/10, then 1-6 almost daily 15/12-4/1 (Table 2). Known to perform regular, but less extensive movements than Little Grebe (Lewis & Pomeroy 1989). RH;+.

Great White Pelican *Pelecanus onocrotalus*

885 bird-days. First staging birds (3) seen 21/11. After this date numbers of staging birds increased to a maximum of 370 20/12 (Table 2). However, in December far larger numbers were seen passing the area on northward migration, for example 1,000-1,100 on 11/12. Diurnal movements between the various rift lakes are a regular phenomenon (Lewis & Pomeroy 1989). RH;F.

Pink-backed Pelican *Pelecanus rufescens*

156 bird-days; 2-16 birds seen on all counts (Table 2). Numbers almost doubled from mid-November. Considerable local movements are known to occur (Lewis & Pomeroy 1989). RH;F.

Greater Cormorant *Phalacrocorax carbo*

13,603 bird-days; 50-1,540 birds seen on all counts (Table 2). Daily numbers varied, and were highest in the afternoon. Known to perform some local movements (Lewis & Pomeroy 1989). RH;R.

Long-tailed Cormorant *Phalacrocorax africanus*

375 bird-days; 10-28 birds seen on all counts (Table 2). Numbers rose gradually throughout the period. The movements of this species are poorly known, but seem to be more extensive than in the case of the Greater Cormorant (Lewis & Pomeroy 1989). RH;R.

Darter *Ahinga rufa*

61 bird-days; 1-5 birds seen on all counts (Table 2). Performs considerably but poorly known movements in response to precipitation (Lewis & Pomeroy 1989). RH;O.

Squacco Heron *Ardeola ralloides*

58 bird-days; 1-7 birds seen on almost all counts (Table 2). Highest numbers seen in September-October. The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;F.

Little Egret *Egretta garzetta*

287 bird-days; 8-24 birds seen on all counts (Table 2). Highest numbers seen in December. All birds were of the white form. The movements of this species are poorly

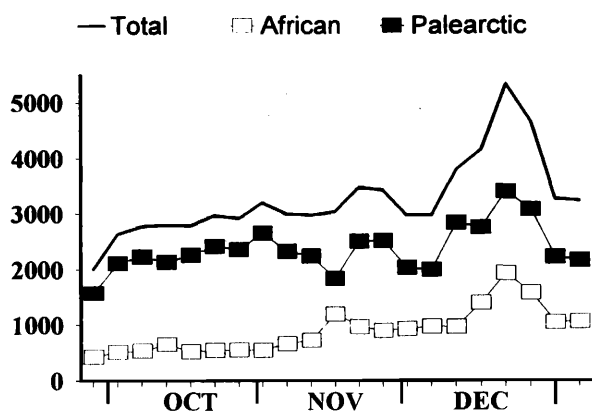


Figure 1. Number of waterbirds recorded at Lake Oloidien, 26 September 1987 - 4 January 1988.

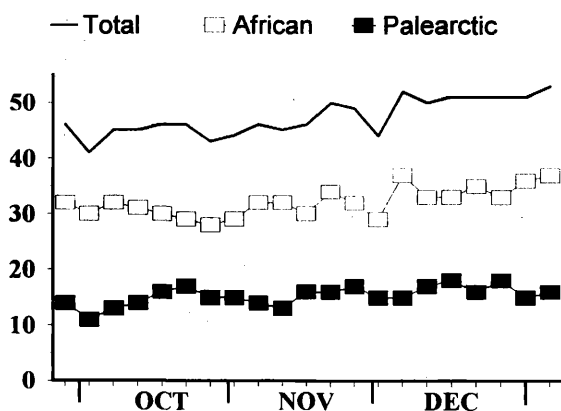


Figure 2. Number of waterbird-species recorded at Lake Oloidien, 26 September 1987 - 4 January 1988.

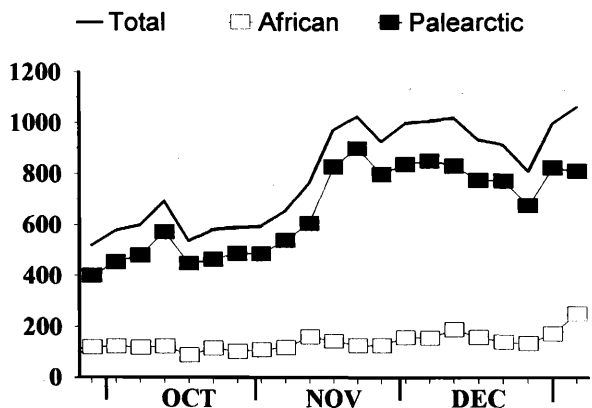


Figure 3. Number of waders recorded at Lake Oloidien, 26 September 1987 - 4 January 1988.

known, and it is not known if Palearctic migrants occur this far south (Lewis & Pomeroy 1989). RH;F.

Great White Egret *Egretta alba*

122 bird-days; 3-11 birds seen on all counts (Table 2). Highest numbers seen in December-January. The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;+.

Grey Heron *Ardea cinerea*

128 bird-days; 3-9 birds seen on all counts (Table 2). Highest numbers seen in December-January. The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;F.

Goliath Heron *Ardea goliath*

124 bird-days; 4-8 birds seen on all counts (Table 2). The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;R.

Yellow-billed Stork *Ibis ibis*

40 bird-days. 1-6 bird/count seen regularly until late November, then 2 5/12 and 1 20/12 (Table 2). The movements of this species are poorly known (Lewis & Pomeroy 1989). NRH (but noted from Lake Naivasha).

Sacred Ibis *Threskiornis aethiopicus*

70 bird-days; 1-9 birds seen on almost all counts (Table 2). The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;F.

Glossy Ibis *Plegadis falcinellus*

24 bird-days; 1-4 birds seen on 14 out of 21 counts (Table 2). Highest numbers in December-January. The movements of this species are poorly known (Lewis & Pomeroy 1989). NRH (but noted from Lake Naivasha).

African Spoonbill *Platalea alba*

203 bird-days; 5-17 birds seen on all counts (Table 2). The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;R.

Greater Flamingo *Phoenicopterus ruber*

203 bird-days. 1 21/11, but seen regularly and in increasing numbers from early December (Table 2). Maximum count 62 on 31/12. RH;+.

Lesser Flamingo *Phoeniconaias minor*

3,018 bird-days. Regular in low numbers until mid December, when numbers increased markedly (Table 2). Maximum count: 1154 on 25/12. Large nocturnal migrations were also heard in December. Most of the birds migrated towards north, but there were also local movements as up to 5,000 birds late in the afternoon moved to the nearby Crater Lake to roost. At Crater Lake daytime numbers were 500-2,000 birds, with highest numbers in December. As the Greater Flamingo, this

species is nomadic and wanders between the rift soda lakes, at times occurring in transit at the freshwater lakes (Lewis & Pomeroy 1989). RH;R.

Egyptian Goose *Alopochen aegyptiacus*

8,412 bird-days; 223-605 non-moulting birds seen on all counts. Numbers peaked in October-November (Figure 4). At least 4-5 pairs were breeding, and newly hatched ducklings were seen on two occasions during October. The movements of this species are poorly known: it is thought to be mainly resident, but local movements are known to occur (Lewis & Pomeroy 1989). RH;R.

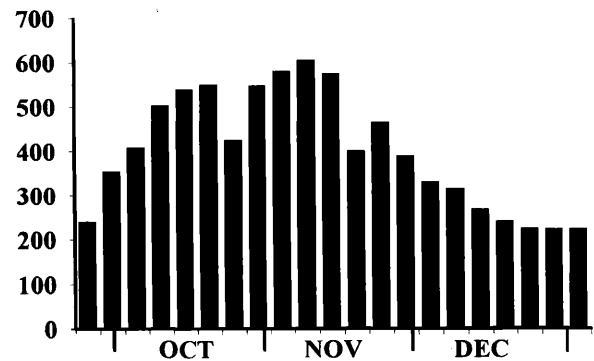


Figure 4. Occurrence of Egyptian Goose *Alopochen aegyptiacus* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Spur-winged Goose *Plectropterus gambensis*

450 bird-days; 1-75 birds seen on almost all counts. Numbers peaked in late October (Table 2). The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;+.

Knob-billed Duck *Sarkidiornis melanotos*

11 bird-days. Fairly regular from late November: 1-3 birds seen on almost all counts 26/11-4/1 (Table 2). The movements of this species are poorly known (Lewis & Pomeroy 1989). NRH.

Garganey *Anas querquedula*

215 bird-days; 1-22 birds seen on almost all counts. Numbers peaked in late October, with a second peak in late December (Figure 5). The most abundant Palearctic duck in Kenya (Lewis & Pomeroy 1989). NRH.

Yellow-billed Duck *Anas undulata*

1,174 bird-days; 22-110 birds seen on all counts. Numbers rose gradually through the period (Figure 6). The movements of this species are poorly known: thought to be mainly resident (Lewis & Pomeroy 1989). RH;+.

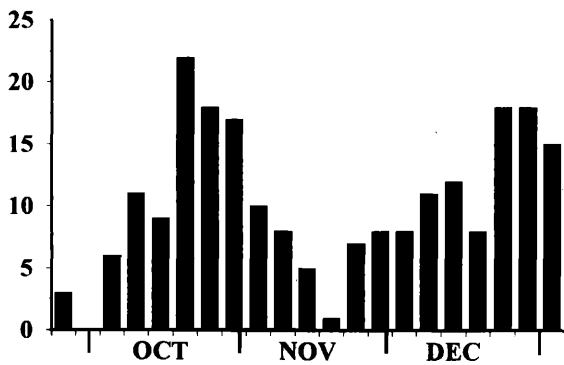


Figure 5. Occurrence of Garganey *Anas querquedula* at Lake Oloidien 26 September 1987 - 4 January 1988.

Red-billed Teal *Anas erythrorhynchos*

81 bird-days; 2-4 birds seen occasionally until 11/11. From 26/11 regular occurrence and numbers peaked in late December - January (Table 2) with a maximum of 23 31/12. The movements of this species are poorly known, but intra-African movements are thought to occur (Lewis & Pomeroy 1989). RH;+.

Hottentot Teal *Anas hottentota*

213 bird-days; 1-64 birds seen on almost all counts. Numbers increased markedly from late December (Table 2). The movements of this species are poorly known, but intra-African movements are thought to occur (Lewis & Pomeroy 1989). NRH (but noted from Lake Naivasha).

Shoveler *Anas clypeata*

42 bird-days. First seen 7/10, and after this date 1-9 birds seen occasionally. Highest numbers recorded in December (Figure 8). NRH.

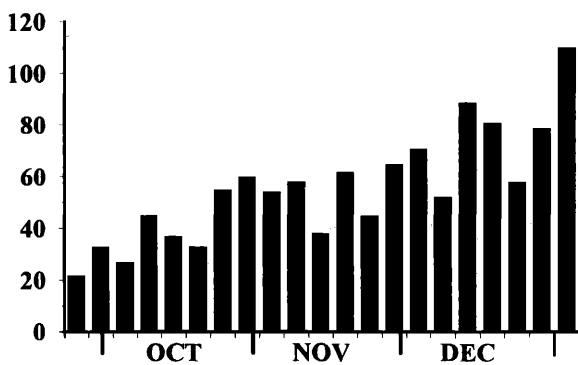


Figure 6. Occurrence of Yellow-billed Duck *Anas undulata* at Lake Oloidien 26 September 1987 - 4 January 1988.

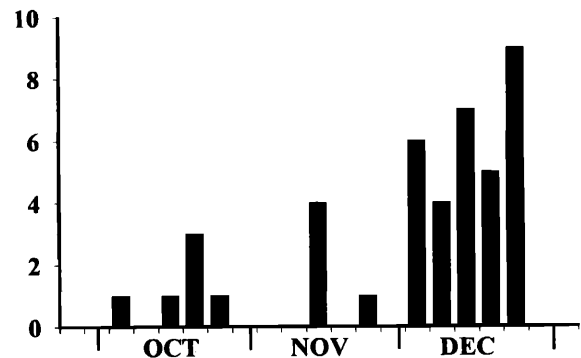


Figure 8. Occurrence of Shoveler *Anas clypeata* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Pintail *Anas acuta*

334 bird-days. First seen 5/11 (3). From mid-December increasing numbers (Figure 7), reaching a maximum of 166 4/1. NRH.

Southern Pochard *Aythya erythrophthalma*

888 bird-days; 8-228 birds seen on all counts. Numbers increased markedly from late December (Table 2). The movements of this species are poorly known, but intra-African movements are known to occur (Lewis & Pomeroy 1989). RH;O.

Maccoa Duck *Oxyura maccoa*

312 bird-days; 3-45 birds seen on almost all counts. Highest numbers seen in October (Figure 9). No details of regular movements exist (Lewis & Pomeroy 1989). RH;O.

Red-knobbed Coot *Fulica cristata*

10,344 bird-days; 345-620 birds seen on all counts. Numbers increased during October (Table 2), and remained fairly stable at 500 birds/count. Known to move extensively (Lewis & Pomeroy 1989). RH;R.

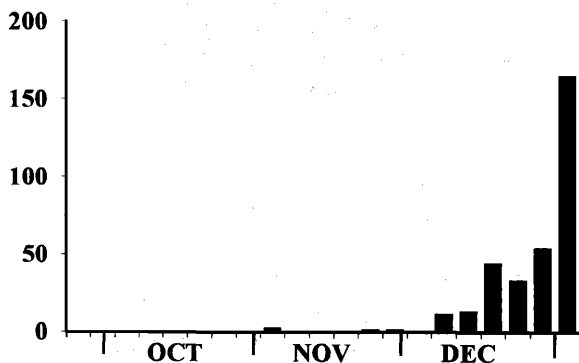


Figure 7. Occurrence of Pintail *Anas acuta* at Lake Oloidien, 26 September 1987 - 4 January 1988.

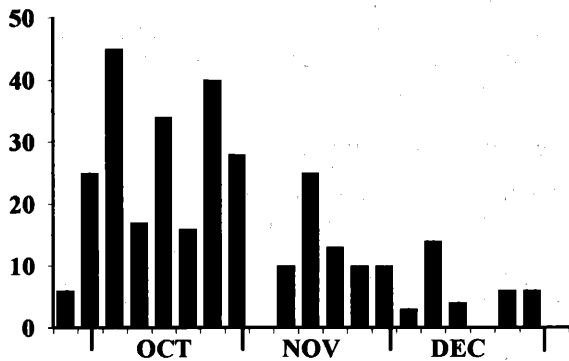


Figure 9. Occurrence of Maccoa Duck *Oxyura maccoa* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Long-toed Plover *Vanella crassirostris*

129 bird-days; 3-13 birds seen on all counts. Numbers increased slowly from mid November (Figure 10). The movements of this species are poorly known: it is thought to be resident (Lewis & Pomeroy 1989). RH;O.

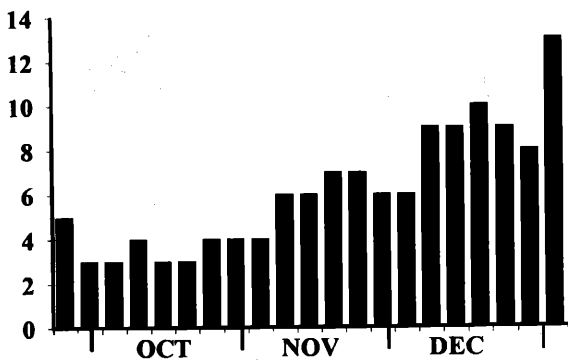


Figure 10. Occurrence of Long-toed Plover *Vanella crassirostris* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Blacksmith Plover *Vanellus armatus*

1,008 bird-days; 26-89 birds seen on all counts (Table 2). Some pairs bred and young were seen occasionally in November. The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;R.

Spur-winged Plover *Vanellus spinosus*

128 bird-days; 3-13 birds seen on all counts (Table 2). The movements of this species are poorly known: it is thought to be resident (Lewis & Pomeroy 1989). RH;F.

Little Ringed Plover *Charadrius dubius*

47 bird-days. Earliest bird seen 17 October. From mid November regular with 1-8 birds/count (Figure 11). NRH.

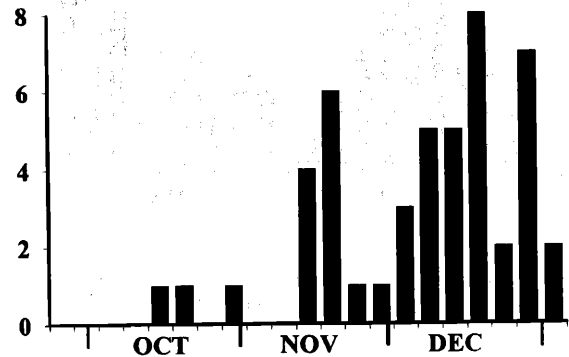


Figure 11. Occurrence of Little Ringed Plover *Charadrius dubius* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Ringed Plover *Charadrius hiaticula*

1,308 bird-days; 4-141 birds seen on all counts. From early November numbers increased markedly, and peaked early December (Figure 12). Most birds seen in September-October were adults. NRH.

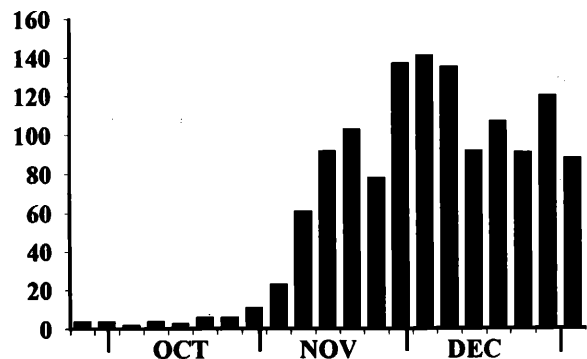


Figure 12. Occurrence of Ringed Plover *Charadrius hiaticula* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Kittlitz's Plover *Charadrius pecuarius*

494 bird-days; 8-59 birds seen on all counts. Numbers peaked in December (Table 2). Some pairs bred: young were seen in mid-November and newly hatched chicks in early December. The movements of this species are poorly known: it is thought to be mostly resident (Lewis & Pomeroy 1989). NRH (but noted from Lake Naivasha).

Three-banded Plover *Charadrius tricollaris*

432 bird-days; 10-31 birds seen on all counts (Table 2). A few pairs bred. The movements of this species are poorly known, but local movements are known to occur (Lewis & Pomeroy 1989). RH;F.

Little Stint *Calidris minuta*

4,948 bird-days; 128-361 birds seen on all counts. Numbers peaked in last half of November (Figure 13). In September 44 out of 59 aged birds (75%) were adults. NRH (but a few noted from Lake Naivasha).

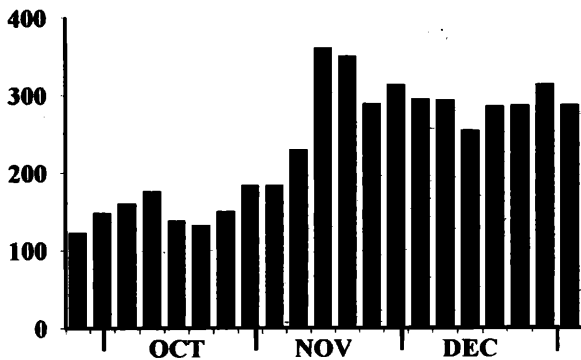


Figure 13. Occurrence of Little Stint *Calidris minuta* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Curlew Sandpiper *Calidris ferruginea*

574 bird-days; 5-92 birds seen on all counts. Numbers peaked in late November (Figure 14). In September 29 out of 32 aged birds (91%) were adults. NRH (but noted from Lake Naivasha).

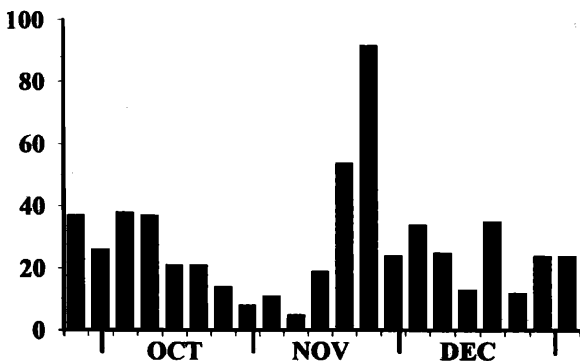


Figure 14. Occurrence of Curlew Sandpiper *Calidris ferruginea* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Ruff *Philomachus pugnax*

1,369 bird-days; 42-112 birds seen on all counts. Numbers increased gradually throughout the period (Figure 15). In September 41 out of 42 aged birds (98%) were adults. NRH (but noted from Lake Naivasha).

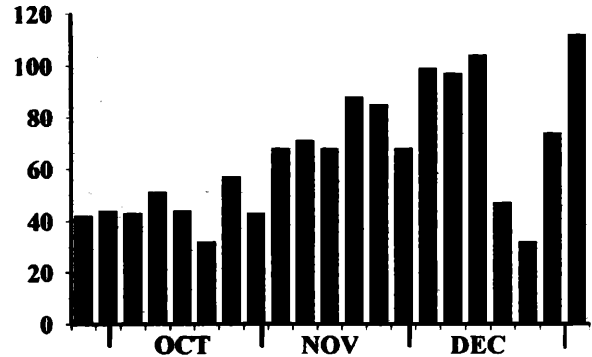


Figure 15. Occurrence of Ruff *Philomachus pugnax* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Snipe sp. *Gallinago gallinago/nigripennis*

Snipe was regularly seen from early October; 1-17 birds/count (Table 2). I did not attempt to identify all snipes seen, but both Common Snipe *G. gallinago* and African Snipe *G. nigripennis* were recorded. Most of the birds were thought to be Common Snipe. African Snipe RH;O.

Marsh Sandpiper *Tringa stagnatilis*

2,014 bird-days; 70-122 birds seen on all counts. Numbers increased slightly through the period (Figure 16). In September 70 out of 70 aged birds (100%) were adults. NRH.

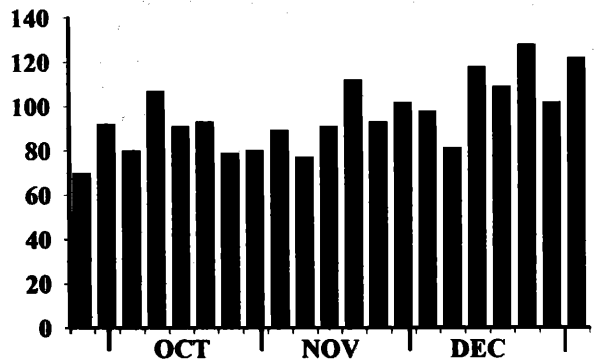


Figure 16. Occurrence of Marsh Sandpiper *Tringa stagnatilis* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Greenshank *Tringa nebularia*

363 bird-days; 8-32 birds seen on all counts (Figure 17). RH;F.

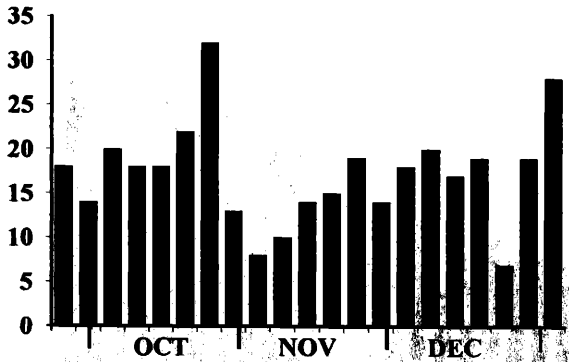


Figure 17. Occurrence of Greenshank *Tringa nebularia* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Green Sandpiper *Tringa ochropus*

15 bird-days; 1-3 birds seen occasionally (Table 2). NRH.

Wood Sandpiper *Tringa glareola*

1,303 bird-days; 41-78 birds seen on all counts. Highest numbers seen from mid-November - early December (Figure 18). RH;F.

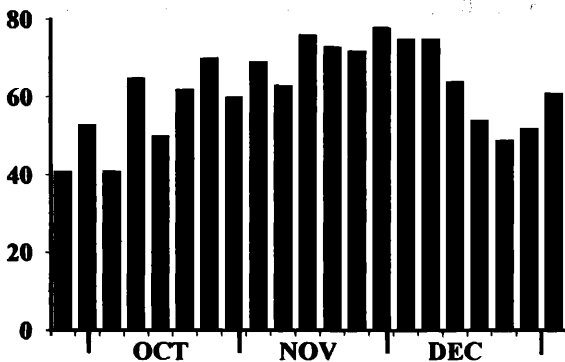


Figure 18. Occurrence of Wood Sandpiper *Tringa glareola* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Common Sandpiper *Tringa hypoleucos*

1,893 bird-days; 64-113 birds seen on all counts (Figure 19). RH;F.

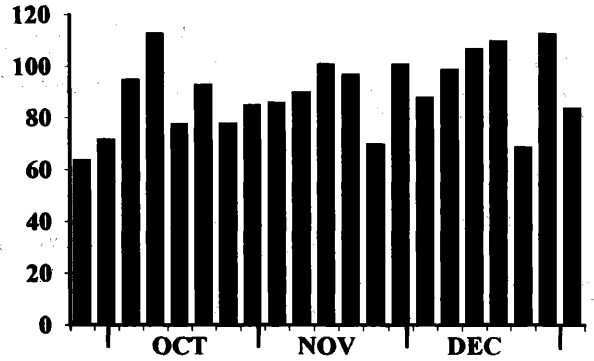


Figure 19. Occurrence of Common Sandpiper *Tringa hypoleucos* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Black-winged Stilt *Himantopus himantopus*

715 bird-days; 18-37 birds seen on all counts until late December, when numbers increased to 98 in January (Table 2). In September 12 out of 23 aged birds (52%) were adults. The movements of this species are poorly known: Palearctic migrants may augment the Afrotropical population in northern winter (Lewis & Pomeroy 1989). RH;O.

Avocet *Recurvirostra avosetta*

14 bird-days. Single birds seen on 6 counts out of 19. On the two last counts (31/12, 4/1) 3-5 birds were seen (Table 2). The movements of this species are poorly known: Palearctic migrants may augment the Afrotropical population in northern winter (Lewis & Pomeroy 1989). NRH.

Grey-headed Gull *Larus cirrocephalus*

321 bird-days; 1-53 birds seen on almost all counts. Numbers rose from mid November and peaked in December (Figure 20). The movements of this species are poorly known (Lewis & Pomeroy 1989). RH;F.

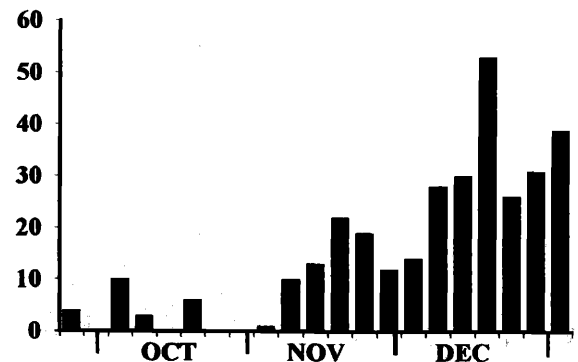


Figure 20. Occurrence of Grey-headed Gull *Larus cirrocephalus* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Lesser Black-backed Gull *Larus fuscus*

200 bird-days; 1-47 birds seen on almost all counts. Numbers peaked in December (Figure 21). Earliest first-year bird was seen on 5/11. All birds were of the nominate race *L. f. fuscus*. NRH (but noted from Lake Naivasha).

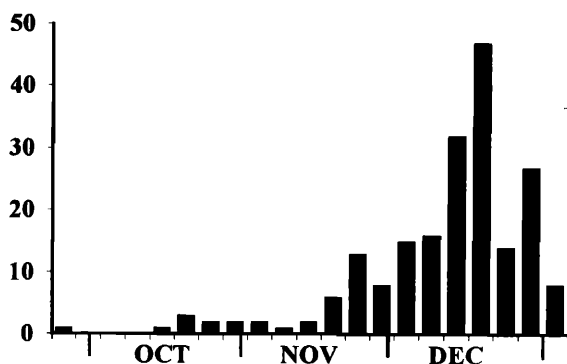


Figure 21. Occurrence of Lesser Black-backed Gull *Larus fuscus* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Gull-billed Tern *Gelochelidon nilocotia*

350 bird-days; 7-37 birds seen on almost all counts (Table 2). RH;+.

Whiskered Tern *Chlidonias hybridus*

468 bird-days; 7-45 birds seen on all counts (Figure 22). Some birds in full adult plumage were seen in the entire period, latest observations were 1 on 10/12, 2 on 25/12 and 1 on 29/12. The movements of this species are poorly known: Palearctic migrants may augment the Afrotropical population in northern winter (Lewis & Pomeroy 1989). RH;R.

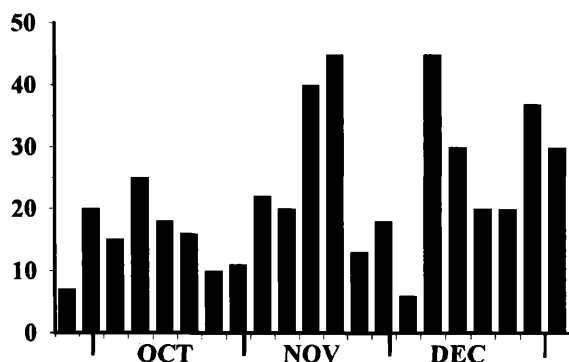


Figure 22. Occurrence of Whiskered Tern *Chlidonias hybridus* at Lake Oloidien, 26 September 1987 - 4 January 1988.

White-winged Black Tern *Chlidonias leucoptera*

3,213 bird-days; 4-1,000 birds seen on all counts. Numbers peaked in December (Figure 23) with a maximum of 1,000 on 20/12. Earliest first-year bird seen 1/11. NRH (but noted from Lake Naivasha).

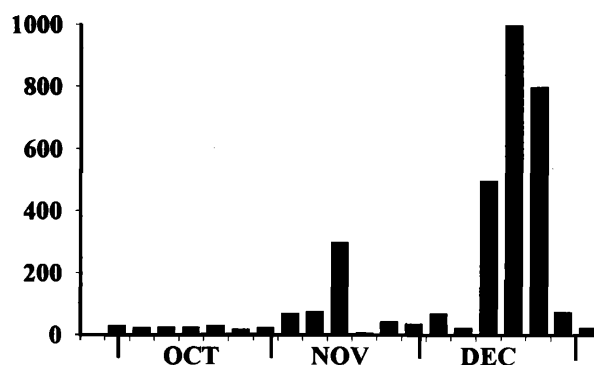


Figure 23. Occurrence of White-winged Black Tern *Chlidonias leucoptera* at Lake Oloidien, 26 September 1987 - 4 January 1988.

Two species were excluded from the counts due to their infrequent use of the lake as a feeding/roosting site: Cattle Egret *Bubulcus ibis*: Seen occasionally. Maximum count: 160 20/12 (RH;F). Hadada *Bostrychia hagedash*: Common (breeding) bird; 10-30 birds seen on all days (RH;F).

The following 12 species frequented Lake Oloidien occasionally and/or in low numbers: Saddlebill Stork *Ephippiorhynchus senegalensis* 1 stayed permanently at the lake during the whole period, Black Heron *Egretta ardesiaca* 1 on 26/9 and 5 on 20/12, Black-headed Heron *Ardea melanocephala* 1 on 26/11, 2 on 31/12 and 1 on 4/11, Hamerkop *Scopus umbretta* 1 on 10/12, Fulvous Whistling Duck *Dendrocygna bicolor* 1 on 21/11, Cape Wigeon *Anas capensis* 3 on 11/11, 2 on 21/11, 2 on 5/12, 1 on 10/12 and 1 on 4/11, Teal *Anas crecca* 3 on 11/10 and 1 on 22/10, Crowned Crane *Balearica pavonina* 2 on 26/11 and 2 on 2/1, Painted Snipe *Rostratula benghalensis* 1 on 11-12/9, Temminck's Stint *Calidris temminckii* 1 on 11/10, 1 on 16/11 and 1 on 26/11, Great Snipe *Gallinago media* 1 on 25/12, Black-headed Gull *Larus ridibundus* 1 first-year on 20/12.

DISCUSSION

The material presented here is the only quantitative, long-term (in an East African perspective) based data on waterbirds yet published from Lake Oloidien. Indeed, there seems to be very few counts of this kind from the rift lakes, and most of the published works typically either are midwinter counts (e.g. Pearson & Stevenson 1980) or

studies of single species (*e.g.* Pearson 1984).

It is my belief that the patterns of occurrence recorded here reflect true movements and not merely movements between Lake Oloidien and Lake Naivasha. The Great Cormorant did move freely between the two lakes, but for the majority of other species I never recorded such movements. Also, the phenology of the Palearctic birds was in close agreement with what is known for the rift (Lewis & Pomeroy 1989, Pearson & Meadows 1992).

Today, the general phenology of the Palearctic waterbirds reaching Kenya is well-known, while the causes, timing and extent of intra-African movements or local movements of both Afrotropical and Palearctic birds are poorly understood (Lewis & Pomeroy 1989). Some 70% of the Afrotropical species recorded at Lake Oloidien shows more or less clear indications of such movements. For many of these species there exist no details of regular movements, while others are known to perform major intra-African migrations (*e.g.* Southern Pochard). It is interesting that some of the more obvious changes in the pattern of occurrence are of birds thought to be resident (*e.g.* Yellow-billed Duck and Long-toed Plover). Hopefully, this paper may give future workers some of the data needed to document intra-African and local movements of both Afrotropical and Palearctic waterbirds. A better understanding of these is needed.

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