

THE DISTRIBUTION, ABUNDANCE AND EXPLOITATION OF CRAYFISH  
(*Procambarus clarkii*) IN LAKE NAIVASHA.



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## SUMMARY

The distribution, abundance and exploitation of *Procambarus clarkii* in Lake Naivasha was studied between January and August 2001. The line transect method was used locating baited traps for a fixed period of one hour, to estimate relative density. The results show that the western zone supported the highest mean density of  $4.54 \pm 0.53$  individuals/trap/hour and a mean biomass of  $106.86 \pm 6.50$  g/trap/hour. The northern zone recorded  $1.12 \pm 0.23$  individuals/trap/hour and  $33.4 \pm 3.20$  g/trap/hour while the southern zone had  $0.53 \pm 0.12$  individuals/trap/hour and  $19.11 \pm 3.20$  g/trap/hour. The eastern zone had  $0.97 \pm 0.18$  individuals/trap/hour and  $35.93 \pm 4.10$  g/trap/hour and the center of the lake had  $0.18 \pm 0.09$  individuals/trap/hour and  $6.41 \pm 1.90$  g/trap/hour. There was significant difference ( $P < 0.05$ ) in mean relative density and mean biomass between the zones. The highest mean density for juveniles were also recorded from the western zone with  $2.40 \pm 0.26$  juveniles/sweepnet. The other zones had relatively low values with the northern having  $0.71 \pm 0.09$  juveniles/sweepnet, the eastern  $0.64 \pm 0.13$  juveniles/sweepnet and the southern zone with  $0.27 \pm 0.09$  juveniles/sweepnet. There was significant difference ( $P < 0.05$ ) in juvenile mean relative density between the zones. The mean relative density averaged over all zones in wet season was  $2.26 \pm 2.29$  individuals/trap/hour and in the dry season was  $1.05 \pm 0.15$  individuals/trap/hour. The mean biomass in dry season was  $17.62 \pm 5.90$  g/trap/hour and in the wet season was  $49.87 \pm 5.00$  g/trap/hour. There was a significant difference ( $P < 0.05$ ) in both adult and juvenile mean density between dry and wet seasons.

Measurements were taken on a total of 1,940 individuals. There was no significant difference in carapace length between males and females. *P. clarkii* from the western zone recorded the lowest values in mean carapace length, total length and wet weight. This was the zone where extensive trapping of *P. clarkii* had been done before instituting a one-year ban on both finfish and *P. clarkii* fishing in order to let the stocks recover. The size class distribution (based on carapace length) ranged between 2.50 cm to 6.00 cm in the western zone, 2.70 cm to 6.60 cm in the eastern, 2.50 cm to 6.40 cm in the northern, 3.70 cm to 6.80 cm in the southern and the center lake had a range of 3.50 cm to 6.60 cm. Recruitment occurred throughout the study period with peaks occurring during the onset of the rainy season. The minimum size at sexual maturity was 3.50 cm carapace length for both males and females. The sex ratio was not significantly different from 1:1 in the lake center. However the ratio was significantly different at 1:1.46 (F: M), in the zones near the shoreline (chi - squared test). *P. clarkii* distribution in the shallows was influenced by availability of suitable habitats – that is shallow muddy shores, with dense inshore beds of *Eichhornia crassipes* as well as extensive mats of *Cyperus papyrus* were preferred. They showed avoidance of sandy and rocky sediments. There was no statistically significant correlation between *P. clarkii* distribution and physico-chemical parameters.

Due to reduced catches in *P. clarkii* prior to 1998 (from 93,833 kg in 1989 to 14,300 kg in 1998), there has been no *P. clarkii* export since then. The small quantities trapped are consumed locally in the nearby tourist hotels. The impact of high fishing pressure was noted on the western zone. Hence to provide further protection of the existing stock, the

following recommendations are given: (i) The minimum harvestable size should be above 3.50 cm carapace length. (ii) No *P. clarkii* trapping should be done on the shoreline (breeding areas). (iii) All berried females should be returned in to the lake. (iv) Fishermen and other *P. clarkii* dealers need to be educated on the need to conserve the resource.