ABSTRACT

The artisanal fishing sector provides approximately 45% of the world's fisheries and nearly a quarter of the world catch. It is vital to livelihoods and food security. However, the decline of fish resources have been linked to artisanal fishing gears. Despite the widespread use fishing gears in Ferguson's Gulf, the information linking their use to water physico-chemical parameters and fish community structure is lacking. The main objective of the study was to investigate the influence of artisanal fishing gears use on physico-chemical parameters and fish community structure in Ferguson's Gulf of Lake Turkana. The specific objectives were to: establish the difference in characteristics and fishing effort of artisanal fishing gears; determine the difference in the level of dissolved oxygen, water transparency, total dissolved solids, salinity, conductivity, temperature, and pH when artisanal fishing gears are used; examine the difference in fish biomass and species diversity from the artisanal fishing gears and; establish the difference in fish bycatch and discard from the artisanal fishing gears. Observational longitudinal research design was used for this study. This study sampled 162 fishing gears so as to obtain data on characteristics, fishing effort, fish biomass, species diversity, bycatch and discard. Data on physico-chemical parameters was obtained from 12 sampling points in Ferguson's Gulf. Differences in fishing gears characteristics, fishing effort, physico-chemical parameters, fish biomass, species diversity, bycatch and discard were established by one way ANOVA and post hoc mean separation by Duncan's Multiple Range Test significant at $\alpha = 0.05$. Results indicated that the mean number of nets in beach seine gears (11.39±5.82) was significantly higher than purse seine (7.29±5.55) and gill net gears (4.11±2.83); ANOVA, $\alpha = 0.05$, $F_{(2,159)} = 29.642$, p=0.0001. Higher mean mesh sizes were recorded in gill net gears (3.37±0.65); ANOVA, $\alpha = 0.05$, $F_{(2, 159)} = 12.273$, p = 0.0001. Purse seine gears recorded the highest mean number of hauls per day (22.8±1.64) while gill net gears recorded the lowest number of hauls (1.39±0.49); ANOVA, $\alpha = 0.05$ $F_{(2, 159)} = 4139.39$, p=0.0001). The longest mean time per haul in minutes recorded in gill net gears (934.44±635.04); ANOVA, $\alpha = 0.05$ $F_{(2, 159)} = 111.594$, p=0.0001. The differences in fishing effort and characteristics of fishing gears implied lack of uniformity. The highest mean dissolved oxygen (9.13±0.77 mg/l) was recorded in purse seining sites. The mean total dissolved solids (1922.1±105.9 mg/l), conductivity (4,764±532 µS/cm) and salinity (2.18±0.29 g/kg) were recorded in gill netting sites. The difference in physico-chemical parameters implied variation of these parameters. The highest mean fish biomass was recorded in purse seine gears (13,692±12,703.8 g); ANOVA, $\alpha = 0.05$, $F_{(2,159)} = 6.672$, p =0.002. A significantly higher Shannon-Wiener index was recorded in beach seine gears (0.4871±0.0912); ANOVA, $\alpha = 0.05$, $F_{(2,159)} = 891.33$, p =0.0001. *Oreochromis niloticus* dominated the biomass in all the fishing gears. The highest mean bycatch (2,278±629 g) and discard (2,301±574 g) were recorded in purse seine gears; thus purse seine gears were the most non-selective. These findings could help fisheries managers to formulate policies for sustainable management of fish resources in Ferguson's Gulf.