## **Data Analyses**

### **3.3.1 Catch Data**

Data were transferred from the data sheets to Microsoft Excel where data was cleaned done prior to analysis. The number of individuals per species was used to calculate the relative abundance (%) according to Mwangudza et al., (2017):

Catch composition data was first standardized prior to analysis. The analysis was conducted using the multivariate non-Metric Multidimensional Scaling (nMDS) technique by season, gear, craft and fishing location (Clarke *et al*., 2014). Differences in catch composition between seasons, craft, gear and fishing location were analysed using one-way Analysis of Similarity (ANOSIM). Differences in catch composition were confirmed using SIMPER analysis to ascertain which species contributed to the dissimilarity. Both ANOSIM and SIMPER analyses are based on Bray-Curtis similarity using PRIMER statistical software ver. 6 (Clarke *et al*., 2014).

Species diversity was analysed descriptively by use of Rarefaction curves. The Rarefaction technique is used to assess the expected number of species sampled in a given sample size. It is a plot of the number of species as a function of the sample size (Sanders, 1968). The Rarefaction curves determined the expected number of species sampled in a given sample size across fishing location with gear type combination where rarefaction standardizes non-uniform sampling and sample sizes.

The catch rate was calculated as kg. fisher-1day-1 for each gear-season combination where the total weight of catch landed in a day was divided by the number of fishers. Differences in catch rate between the gear-season combinations were determined using one-way ANOVA. The ANOVA test was followed by a post hoc pair-wise comparison using the TUKEY’S HSD test (Tukey, 1977). Homogeneity of variance as a requirement for ANOVA test was tested using the Levene’s test (Levene, 1960).

All species were pooled into family level for trophic level (TLev) analysis (Smith & Heemstra, 2003) using data on trophic levels by species from FishBase (2019)(Froese & Pauly, 2018). Trophic level estimates for each fish family were based on diet composition data from FishBase (2019) where the trophic level of each fraction of the diet of the fish was used to calculate the mean trophic level for the family. Since plants, macroalgae and detritus are defined as trophic level 1, the following fish trophic levels were used: herbivores as trophic level 2, omnivores as trophic level 3, and carnivores as trophic level 4. The mean trophic level of the catch for each gear by location was calculated using MS Excel. Differences in fish sizes (mean TL, cm) and the mean trophic level between the gear classification and locations for the most abundant species was determined using one-way ANOVA. To test for the effect of interaction between location and gear classification, a two-way ANOVA was used. Significance was determined at p < 0.05 for all statistical tests (Zar, 2010).