Kisumu Bay is greatly impacted by pollution from anthropogenic activities around Winam Gulf and from increased levels of industrial and municipal discharges from Kisumu town. This has resulted in significant changes in the trophic state and general ecology of the bay, impacting negatively on water quality, fisheries and livehoods. This study, therefore, aimed at determining the levels of physic-chemical parameters,nutrients and chlorophyll a in Kisumu Bay. Water quality measurements were conducted from April 2009-April 2010. Physico-chemical parameters (turbidity, temperature, conductivity, alkalinity, dissolved and suspended solids, and dissolved oxygen concentration) were measured using a sea bird, mult-parameter water quality probe, whereas nutrients (nitrates, nitrites and Phosphorous were analyzed by spectrophotometric techniques. There were significant spatial differences in the dissolved oxygen concentrations ($p<0.0001$) within the bay. These differences were especially pronounced at the Kisat, Maboko and Yatcht club stations which are associated with sewage discharge in Kisumu town. Similarly, significant differences ($<0.05$) associated with discharge from Kisumu town and seasonal nutrients runoffs from storm water were also observed in the spatial and temporal distribution of phosphorous ,ammonia, nitrates, nitrites and silicates within the gulf. Significantly, higher chlorophyll a concentrations were recorded during the dry season compared to the rainy season, probably as a result of high turbidity during the rainy season which reduces light penetration into the water. The study attributes this state of affairs to high nutrient loads from anthropogenic activities and industrial and municipal wastes and recommends stricter enforcement of the established policies on the quality of discharges from municipal and industrial establishments. There is also a need for environmental education and awareness creation targeting the lake communities to abate pollution in the lake.