

There is need to address factors that endanger species' survival now than ever before in order to reverse or slow down the rate of loss of biological diversity. The main objective of this study was to assess the effect of land use on biodiversity in the Lake Ol' Bolossat basin with land cover, human activity, birds and water quality as indicators. Land use aspects evaluated included human population, activity on farms and livestock. Land cover prior to this study was estimated from satellite images selected to reflect a time series pattern spanning about thirty years from 1973 to year 2000. The images were analyzed and interpreted using GIS technology. Systematic random sampling was done on crop cover. Farmers selected at random were also interviewed through questionnaires on key social economic aspects. Birds were counted in stations following the line transect technique along the lake edge between fixed stations approximately 2 km apart. Water quality physical-chemical parameters were measured by means of a portable electronic meter. Water level was determined using temporary and permanent gauges. The common land use types found in the area were mainly subsistence arable farming and livestock rearing. Subsistence farming was the major land use with four crops maize (56%), potatoes (20%), beans (6%) and carrots (7%) having the largest land cover on farms. Increased human population which had a cumulative growth of over 316% from 176,928 in 1969 to approximately 559,626 in 1999 had caused intensification of land use and exploitation of land based resources. Rapid expansion of farms decreased and altered natural habitats of the riparian reserve and the forest. This resulted in acceleration of soil erosion and silt deposition. Population increased and exerted tremendous pressure on the natural ecosystem. Regression analysis of satellite land cover data and human population changes over the corresponding period revealed human population to be the principal factor in all cover area changes observed accounting for 87% on the coefficient of determination, (r^2). This had reduced the area of the lake water mass while deposition of silt increased the area under marsh. Human activities had some influence on the occurrence and distribution of communities of birds and had variable effects on water quality parameters. Water dissolved oxygen recorded was between 0.60mg l^{-1} and 9.60mg l^{-1} . pH value had a range between 6.5 and 9.6 while conductivity was between 172 and 465pS. Dissolved oxygen was influenced by all activities to some extent while the pH was not. Conductivity was affected by land preparation, weeding and harvesting. Water abstraction on the eastern side of Lake Ol' Bolossat influenced hydrologic processes and decreased inflow. Environmental degradation, notable as soil erosion, overgrazing, burning, and encroachment onto the riparian and forest reserves, were found at various areas of the basin. Environmental rehabilitation was minimal in the basin, particularly on the eastern side of the lake. This study, therefore, supports the conclusion that increasing exploitation of land, water and biological resources principally affected biodiversity in the Lake Ol' Bolossat ecosystem.