Modeling and Time Series Analysis of Climate Change Effects on Fisheries in Iraqi Marine Waters

Document Type : Review articles
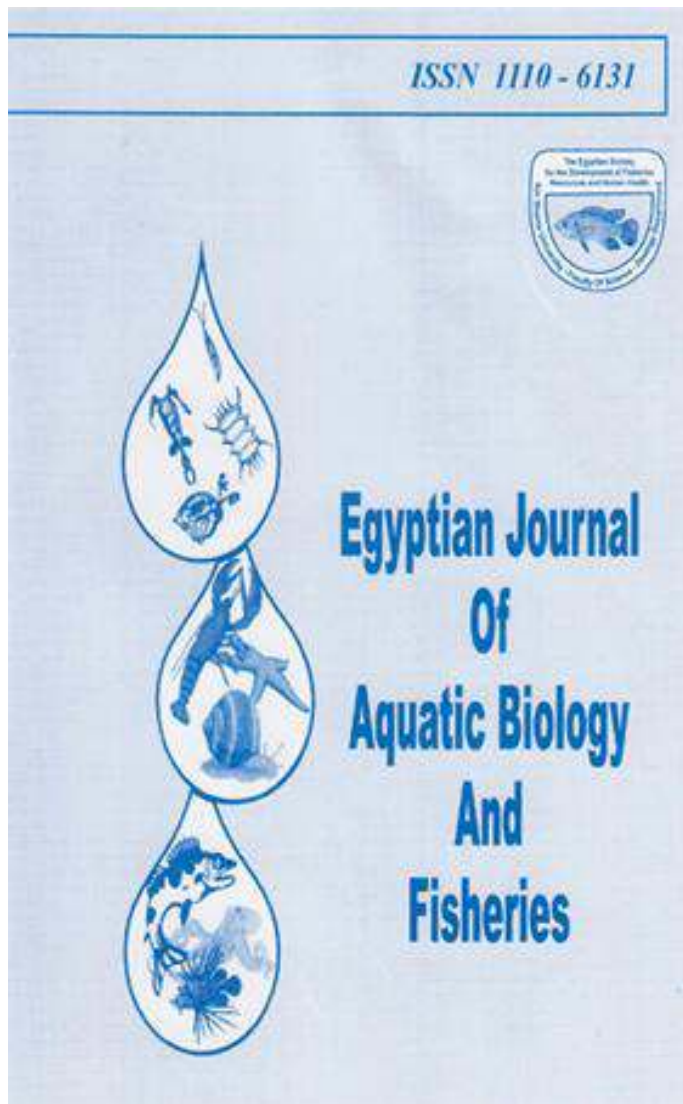
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Abstract

The importance of using time series to quantify changes in fisheries lies in revealing patterns of variation across different time scales. In this study, two time series methods were used: the smoothing test and the homogeneity test. Our results indicated that air temperatures were 1.5°C higher than the calculated global average of 26.5°C, and Iraqi marine water temperatures were 0.89°C higher than the measured average of 24.6°C. At the same time, salinity concentrations increased significantly, reaching 5.8g/ L, compared to their average of 40.7g/ L. The trend analysis indicated a gradual decline in total catch indicators over the subsequent years. Using nonlinear multiple regression analysis on the impact of water temperature and salinity on fisheries in Iraqi territorial waters, the results indicated that the critical values for water temperature and salinity were approximately 26.06°C and 46.5g/ L. Based on the model projections, fish catches are expected to decline between mid-2027 and 2029, primarily due to horizontal migration driven by rising water temperatures, as revealed by the time series analysis.

Keywords

Arabian Gulf ; Climate Change ; Homogeneity Tests ; Fisheries ; Nonlinear Multiple Regression

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