# MONITORING AND ASSESSMENT ENVIRONMENTAL CHANGES IN LAKE MARIOUT USING REMOTE SENSING AND GIS TECHNIQUES

**Submitted By**

**Amany Morsi Mohamed Abd El-Aziz**

**B.Sc. Communication and Electronics Engineering,**

**Helwan University, 2002**

**A Thesis Submitted in Partial Fulfillment**

**Of**

**The Requirement for the Master Degree**

**In**

**Environmental Science**

**Department of Environmental Engineering Science**

**Institute of Environmental Studies and Research**

**Ain Shams University**

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## APPROVAL SHEET

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## ABSTRACT

Mariout Lake has continually undergone extensive alteration as a result of anthropogenic activities, thus threatening environmental equilibrium in Alexandria.

Detecting the magnitude of alteration and anticipating future change are crucial for managing the study area, but challenging because they require long-term records of chemical and biological water quality, which are not widely available. Moderate resolution remote sensing imagery is a rich and temporally extensive source of information about ecological systems and may be useful for detecting the past and predicting future changes in estuarine ecosystems. So, the government has recognized the need for effective monitoring and management to avert the declining condition.

Multidates satellite images have been used in this study to detect the trends of environmental changes in Mariout Lake, particularly for the main two lake ecosystems; water, and vegetation. The study focuses on the aquatic vegetation and the water area of Mariout Lake during the past four decades from 1972 to 2016. The results reported in this study represented the way in which ecosystem degradation processes, affecting Lake Mariout, are increased due to external factors (human activities) of drying and reclaiming some areas to estimate the consequential effects on the lake.

This study explores the applications of Remote Sensing (RS) and Geographical Information Systems (GIS) in the collection of information and analysis of data. Atmospheric, Radiometric, and Geometric corrections were employed to process satellite images, calculating boundary area (total, water, and aquatic vegetation) for each basin of the study area, change detection

method and applying some indices as NDWI, CWQI, and deriving regression models using tools of GIS.

The analysis revealed a high percentage of plants and decreasing water, in the study area. The regression modeling showed an extremely high integration between satellite image and field data to extract Water Quality Parameters from satellite image using ARCGIS (10.2.2) and SPSS (19) Software. These results support the need for effective conservation strategies and a land use plan for the study area to support the development of effective lake management strategies.

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