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ASSESSMENT OF GROUNDWATER DEVELOPMENT POTENTIAL IN SINAI PENINSULA

By

Hadeel Abdelhamid Ibrahim Marzouk

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
In
Irrigation and Hydraulics Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
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Under the Supervision of

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Title of Thesis:

Assessment of Groundwater Development Potential in Sinai Peninsula

Key Words:
Groundwater, Numerical modeling, Groundwater Modeling System, Model calibration, Sinai Peninsula.

Summary:

This study assesses the development potential in the Upper Cretaceous and Lower Cretaceous Aquifers in Sinai and predicts the effect of development on their sustainability. This can be achieved through simulating these groundwater aquifers in Sinai using Groundwater Modeling System (GMS) software that uses MODFLOW-2005 code. Before using the numerical model in prediction, the model has to be calibrated by changing different parameters until the calculated heads in the model domain match the observed ones with minimum error. Calibration can be achieved manually then automatically using the Parameter Estimation Program PEST in transient mode. After calibration, the model can be used to assess the future abstraction through a forward run to predict water levels and drawdown after 30 years. The results show that water depths in the Lower Cretaceous Aquifer will reach uneconomical depths in many areas while the drawdown in the groundwater level in the Upper Cretaceous Aquifer is relatively small.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Hadeel Abdelhamid Ibrahim Marzouk Date: / /

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