

A B S T R A C T

The El Socorro aquifer is one of the major sources of groundwater in Trinidad. Since 1965 the quality of its groundwater has deteriorated due to salt water intrusion caused by overpumping. This thesis reports the findings of a study which was carried out between June 1972 and May 1975 to investigate the salt water intrusion problem. The ultimate objective of the study was to determine a schedule of pumping which would minimise the intrusion of salt water.

The study began with an investigation of the geology and hydrology of the aquifer. The possible sources and mechanisms of salt water intrusion were also examined. A digital simulation model was developed to study the response of the El Socorro aquifer under different pumping schedules.

An important finding of this study is the identification of the salt water intrusion problem in the El Socorro aquifer as an optimisation problem. It was further shown that the processes of the El Socorro aquifer are sequential in nature. Finally a discrete deterministic dynamic programming model was formulated and solved to give a schedule of pumping which would minimise the intrusion of salt water to keep the chloride concentration in the aquifer equal to any recommended level.