

NUMERICAL MODELING OF SALT-WATER INTRUSION AT SHABESTER PLAIN IN IRAN

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ABSTRACT :

The Shabestar plain in the East Coast of Ouroumieh Lake in Iran has been reported over the past decade an increase in Chloride in the monitoring well network. The groundwater withdrawal from this area has caused soil salinity and consequently, a decrease in agriculture productivity in terms of yield and area of the irrigated lands. Suspected causes of the intrusion are believed to be 1) increase pumping rate in recent years, 2) cumulative deficiency in precipitation over the last three years. The inability of standard methods to characterize the salt-water intrusion led to the use of numerical modeling to aid in understanding the processes occurring at Shabestar plain. A cross-sectional model (SUTRA) was used to conceptualize the flow system. This is a 3D model that simulates the arial and cross sectional scale. The simulation has been done with two stable and non-stable recharge and discharge assumptions. With the salt concentration of 1000 mg/l in the zone, according to the model result, the interface front in Dizaj Khalil (as the typical section of this zone) will advance 5400, 5600, 6000, 6400 meters from the coastline for the years of 2003, 2008, 2012, 2020, respectively for the first assumption. The results also indicated that if recharge is stable and discharge declines to 13 and 35 percent of actual rate, the interface would decrease to 500 and 800 meters. The observations as well as others made in the course of this study can be applied generally to coastal water management programs.

Keywords: Salt-water intrusion- numerical modeling- high concentration- cross sectional model- Oroumieh lake- Shabestar plain- Iran

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