

Groundwater Levels in Northern Texas High Plains: Baseline for Existing Agricultural Management Practices

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Abstract

New groundwater policies are being debated for the Northern Texas High Plains because of Ogallala Aquifer depletion. These policies should be evaluated using a calibrated groundwater model for assessing their impact on subsequent groundwater levels. The objective of this study was to calibrate and validate a regional groundwater model for predicting the impact of existing agricultural management practices on groundwater levels beneath 4 counties located in the Northern Texas High Plains. Results indicated that the MODFLOW-2000 groundwater model was calibrated and validated satisfactorily based on reproducing and comparing groundwater levels with coefficients of determination of 0.97 and 0.98, root mean square errors of 28.0 meters (91.9 feet) and 15.5 meters (50.9 feet). The model showed normalized root mean square errors of 6.9% and 4.3%, for calibration and validation, respectively. Analysis of prediction results indicated that 2 zones would become depleted if the current level of aquifer exploitation continues with no modification for the next 50 years. The calibrated model should assist water managers in evaluating alternative agricultural management policy scenarios.




Keywords

groundwater modeling, irrigation, MODFLOW, Ogallala Aquifer, water management

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