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Effects of Pond Irrigation on the Shallow Aquifer of Wadmalaw Island, South Carolina

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ABSTRACT

A flow model was constructed to simulate the ground-water system on Wadmalaw Island, near Charleston, S.C., in order to assess the potential for well interference and saltwater encroachment as a result of pumping from irrigation ponds.

Hydrologic data were collected from 5 domestic wells, 25 observation wells, and 4 pond staff gages for as much as 21 months. The shallow, unconfined aquifer in the study area is a well-sorted, fine-grained sand. In this aquifer, for the period of record, water levels were lowest during October 1993 and highest during March 1994. Seasonal variations in water level as great as 7 feet have been noted in the aquifer. During irrigation season, pond levels declined only slightly more than the maximum seasonal fluctuation of the water table.

Well interference and saltwater intrusion induced by pond pumping were found to be minimal because of the aquifer's low hydraulic conductivity. Cones of depression centered on irrigation ponds were steep but of small areal extent. Ground-water flow patterns were such that domestic-well contamination from farming practices was minimal.

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