

**Title:** A Ground Penetrating Radar Study of Water Table Elevation in a Portion of Wisconsin's Central Sand Plain (Study No. 45)

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**Period of Contract:** July 22, 1987 through June 30, 1988

**Objectives:** To test the reliability of ground penetrating radar (GPR) as a tool for obtaining high-resolution maps of water table elevation, and to test whether GPR can be used to help produce an accurate water table map when only a few observation wells exist.

**Background/Need:** Recent investigators attempted to map the distribution of areas of recharge and discharge in response to aldicarb detection in groundwater in Wisconsin's Central Sand Plain and the moratorium placed on aldicarb use in areas showing detection above the Enforcement Standard.

**Methods:** The Buena Vista Groundwater Basin was chosen as a study site for this project based on preliminary profiles taken and GPR surveys done over a two-week period beginning in July of 1987. The site study began with systematic radar surveys along roads in the field area. Most water level measurements were made during the first week in November of 1987. Various methods were then used to evaluate data in the production of the water table map.

**Results/Conclusions:** Investigators conclude that minor changes in soil type affect radar signal quality, but accurate predictions of water table depth can be obtained from GPR data calibrated with at least three wells. Well data are needed to obtain an estimate of the uncertainty in the two calibration parameters, radar signal velocity and return time correction factor. Lateral variation in the radar signal velocity was found to be the most important source of variation in the calibration data. GPR will yield no useful information in an area with clay-rich soils.

**Recommendations/Implications:** Investigators point the need for understanding mass balance modeling studies and a systematic study of radar performance in various soil types to evaluate the GPR's mapping potential of soil type boundaries and provide input into location of radar surveys for future GPR studies.

**Availability of Report:** This report is available for viewing and loan at:

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1975 Willow Drive  
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**Key Words:** Aldicarb, Central Sands, ground penetrating radar, pesticides

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