

**Title:** West Bend Area Road Salt Study (Study No. 9)

**Investigators:** Principal Investigator

Marianna Sucht, Environmental Specialist  
Wisconsin Department of Natural Resources  
Southeast District, Water Supply Section

**Objectives:** To determine groundwater flow and changes in background water chemistry with respect to chloride in areas of high road salt usage.

**Background/Need:** Several wells are vulnerable to road salt in the cities of Germantown, Pewaukee and West Bend. Chloride detections in a Pewaukee well are believed to result from road salt use. Continued monitoring may allow a valid correlation to be made of road salt use and chloride in groundwater.

**Methods:** Shallow- and moderate- depth wells were sampled from a diversity of geological settings and in areas with a shallow depth to water table on three occasions in 1986. Assessment of field conditions included a surface map drawing, measurement of well water levels and a water table map to determine groundwater flow. Water samples were also taken from cold water taps. Samples were analyzed for 13 parameters. Sodium and chloride, constituents of road salt, were coupled for analysis.

**Results:** Chloride levels were at or near the drinking water standard of 250 milligrams per liter (mg/l) in Pewaukee, while Germantown and West Bend had levels ranging from 4.1 to 78 mg/l. There is a 60-foot elevation differential between land north and south of the freeway near the Pewaukee site which may have contributed to greater chloride infiltration than at the other sites. All three sites consisted of dolomite bedrock capped with a mixture of glacial sand, gravel and clay. Germantown had the shallowest overlying glacial deposits of less than 10 feet compared to 30 to 110 feet at Pewaukee and West Bend. One well in West Bend showed a 200% increase in chloride over the sampling period. Chloride levels at the Pewaukee site were higher than the normal background levels. One well showed small, consistent increases in chloride. Salt was not stored at any of the study areas.

**Conclusions:** Higher chloride levels at Pewaukee compared to Germantown and West Bend occurred due to the proximity of wells to the freeway which has been in use for about 25 years. The depths of glacial till are not accurate predictors of road salt contamination.

**Recommendations/  
Implications:** Investigators recommend investigation of additional chloride sources when testing for road salt impacts. Wells should be sampled every five years with an emphasis of sampling in spring to aid in the prediction of groundwater susceptibility to chloride contamination.

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

The Water Resources Center  
1975 Willow Drive  
Madison, WI 53706  
262-3069  
Publication 050841

**Key Words:**

Chloride, road salt, sodium

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