Title: **Waupaca County Groundwater Testing and Educational Program: Towns of Lebanon, Scandinavia, St. Lawrence and Little Wolf**

Project I.D.: DNR Project No. 79

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Period of Contract: July 11, 1990 through June 30, 1992

Background/Need: Most of Waupaca County uses groundwater. Although current data on groundwater quality is limited, recent tests of community wells have shown contamination from bacteria and volatile organic compounds (VOC's). In addition, some private well samples contained bacterial contamination and nitrate levels exceeding the health advisory standard of 10 ppm. Very few private well samples have been analyzed for pesticide or VOCs.

Objectives: 1) To obtain additional private well water quality data on pesticides, VOC'S, and other water quality parameters to provide an east-west cross-section of groundwater quality in Waupaca county. 2) To inform and educate private well owners about the quality of their water and ways to reduce the risk of contamination. 3) To identify knowledge gained about groundwater protection; have participants analyze their particular farmstead or rural homesite in terms of groundwater protection measures; and identify practices that have been changed to protect groundwater. 4) To provide an incentive for other rural residents to test their water quality and evaluate their management practices.

Methods: The project was completed in two phases: the first year in the towns of Lebanon and Scandinavia; the second year in the towns of St. Lawrence and Little Wolf. Property owners were asked to participate in an informational letter. The respondents to the initial informational letter were asked a series of questions about groundwater. Educational programs offered participants the opportunity to learn about basic groundwater concepts, local geology, and the groundwater quality test results. During the second year some time was spent reviewing the Farmstead Assessment System (Farm-A-Syst) Program. Several months after the educational workshop, a follow-up survey was mailed to participants who had returned the preliminary project survey.

Water samples from 143 wells were analyzed for: 1) EPA 507 for currently used pesticides; 2) EPA 608 for PCB's and older pesticides; 3) VOC's; and 4) Current Task Force Lab Homeowners Test (nitrate, bacteria, pH, chloride, conductivity, alkalinity, hardness and saturation index). Water quality data was collected in such a way that it could be incorporated into DNR computerized databases.

Results and Discussion: Although publicity for the program was identical between 1990 and 1991, fewer people responded to the initial letter 1991. Telephone conversations with some farmers in Little Wolf and St. Lawrence indicated concern over the implication of a "bad" test result due to recent contamination of local municipal wells in Manawa and Bear Creek. Therefore, all respondents that indicated a desire to participate in the 1991 program were accepted. In both years of the project far more non-farm residents than active farmers indicated a willingness to participate. Nearly all of the farmers that indicated a willingness to participate were selected. Non-farm residents that had a well log were selected first. The final result was the selection of 38 property owners (29% farmers) in the Town of Scandinavia and 35 (37% farmers) in the Town of Lebanon, 26 property owners (31% farmers) with 29 wells in the Town of St. Lawrence and 40 (40% farmers) from the Town of Little Wolf.

Most of the 143 samples had a pH between 7.5 and 8.5, alkalinity levels between 200 and 400 ppm of $CaCO_3$, and chloride concentrations between 1 and 10 ppm. Eighteen of the samples had chloride levels above 25 ppm. Only six of the 143 samples tested positive for VOC'S including benzene, ethylbenzene,

toluene, m&p-xylene, o-xylene, and tetrachloroethylene. Five of the samples contained nitrogen and phosphorus containing pesticides including simazine, metolachlor, atrazine, trichloroethylene, and 1, 1, 1, trichloroethane. Two additional samples generated peaks on the gas chromatograph that could not be identified. Only one sample contained pesticides above the Wisconsin Health Advisory Standard. Sixteen out of 143 groundwater samples had bacterial problems. This is about average for Waupaca County private wells based on tests done by the Environmental Task Force Lab over the past three years. Over 90 percent of the wells had nitrate levels less that the health advisory level - 10 ppm. Eleven wells had nitrate levels between 10 and 20 ppm, and one well tested over 20 ppm nitrate.

Of 175 follow-up survey responses mailed, 142 were returned. In general, the more involved participants were in the groundwater testing and educational programs, the greater their increase in knowledge about groundwater and drinking water and the more groundwater protection practices were implemented.

Conclusions/Implications/Recommendations: The percentage of wells in Waupaca County with bacteria contamination and elevated nitrate are somewhat less than the state's average. Generally less that 5% of wells revealed the presence of VOC's and pesticides, most which were far below the state Preventive Action Limit (PAL). Additional testing is needed to further evaluate and compare Waupaca County private wells with the rest of the state. Additional assistance is needed to help those farmers and rural non-farmer residents that have water quality problems, whether it be nitrate, bacteria, pesticides or VOC'S.

Less than one out of five residents who were invited to participate in the program returned the initial survey and less than ten percent actually had their well tested. Farmers were even more apprehensive than their rural non-farm neighbors even though special efforts were made to involve an equal number of farmers in the program. It is unlikely that people will get their drinking water tested for pesticides or VOC's without financial support.

Waupaca County respondents have a poor general knowledge of groundwater regardless of their interest in groundwater testing and educational programs. Well testing alone does not necessarily increase general knowledge of groundwater, but it may sightly increase the likelihood of planning and implementing prevention practices. The greatest increase in both general groundwater knowledge and prevention practices incorporates both broad-spectrum well testing program as well as an interactive educational workshop.

Key Words: survey, nitrate, volatile organic compounds, pesticides

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Project Report: A final report containing more detailed information on this project is available for loan from Wisconsin’s Water Library, University of Wisconsin - Madison, 1975 Willow Drive, Madison, Wisconsin 53706 (608) 262-3069.