Assessing Vulnerability Mapping of Nitrate Contamination Among the Private Well Owners of Black Hawk County, IA

https://scholarworks.uni.edu/agss/2015/all/3

This Open Access Poster Presentation is brought to you for free and open access by the Student Work at UNI ScholarWorks. It has been accepted for inclusion in Annual Graduate Student Symposium by an authorized administrator of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.

Offensive Materials Statement: Materials located in UNI ScholarWorks come from a broad range of sources and time periods. Some of these materials may contain offensive stereotypes, ideas, visuals, or language.
Nitrates in ground water are a problem and widespread contaminant (Carter, L.W., 1997) that occurs due to natural and anthropogenic sources. Increased nitrate concentrations in ground water of Iowa are mainly due to various agricultural practices such as nitrogen fertilizers and intensive animal farming (Weyer et al., 2001). Populations drinking private well water on or near agricultural land are at a higher risk of nitrate contamination exposure. Approximately 67% of Iowa residents depend on ground water from private and public wells to meet daily water needs. Federal and state laws only require that public water supplies be tested regularly for quality, so there is no mandatory requirement for water testing of private wells. Therefore these private well owners could be consuming water that is of uncertain safety, and a significant percentage of individuals may be drinking water that is not safe to drink (CHEEC, 2009). Measuring ground water vulnerability is important because it helps estimate possible contaminated areas and raises public awareness. This study adopted the DRASTIC model to assess groundwater vulnerability in Black Hawk County. This model is a standardized technique for evaluating ground water vulnerability to pollution by using various hydrologic settings (Aller et al., 1987).

RESULTS

The Final Weighted Overlay map produced by considering six parameters indicated that there are many areas (represented by score 5 & 4) that might be vulnerable to potential nitrate leaching to ground water. To confirm the hypothesis, existing nitrate concentrations were used and assigned a respective raster cell value using the Extract Values to Points tool. Statistical analysis, one way ANOVA, showed that differences between the mean nitrate concentrations were statistically significant among the vulnerability scores including relatively high nitrate concentrations found coincident with high vulnerability score sites i.e. 5 and 4. Therefore, we reject the null hypothesis and conclude that nitrate concentrations were weighted according to population of neural areas could influence groundwater contamination at a given point.

REFERENCES


INTRODUCTION
Nitrates in ground water are a problem and widespread contaminant (Carter, L.W., 1997) that occurs due to natural and anthropogenic sources. Increased nitrate concentrations in ground water of Iowa are mainly due to various agricultural practices such as nitrogen fertilizers and intensive animal farming (Weyer et al., 2001). Populations drinking private well water on or near agricultural land are at a higher risk of nitrate contamination exposure.

OBJECTIVES
- To assess vulnerability to potential nitrate contamination in Black Hawk County, Iowa.
- Correlate existing ground water nitrate concentration with vulnerability maps.

HYPOTHESIS
- H0: There is no statistically significant relationship between mapped vulnerability and the level of nitrate contamination measured in wells.
- H1: There is a relationship between vulnerability mapping sites of potential nitrate contamination and existing nitrate contamination points.