Idaho State Department of Agriculture
Division of Agricultural Resources

Ground Water Quality of Northeast Owyhee County: Grand View and Bruneau Areas

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Introduction

The Idaho State Department of Agriculture (ISDA) developed the Agricultural Regional Ground Water Quality Monitoring Program to characterize degradation of ground water quality from contaminants leaching from agricultural sources. The ISDA has sixteen regional monitoring projects (Figure 1). The objective of the program is to characterize nitrates and in some cases pesticides, in the ground water, relate the data to agricultural land use practices, and provide data for Best Management Practices (BMPs) and/or regulatory implementation and evaluation.

The ISDA Grand View and Bruneau regional monitoring project began in 2006 as a result of monitoring data from three domestic wells near the area of Grand View and Bruneau that were part of a larger regional ISDA monitoring project in northern Owyhee County. The three wells near the Grand View and Bruneau areas had nitrate concentrations that exceeded the Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL)[1] of 10 milligrams per liter (mg/L). To establish a more localized monitoring project, the ISDA randomly selected additional domestic wells in the Grand View and Bruneau area and coordinated with homeowners to conduct ground water sampling.

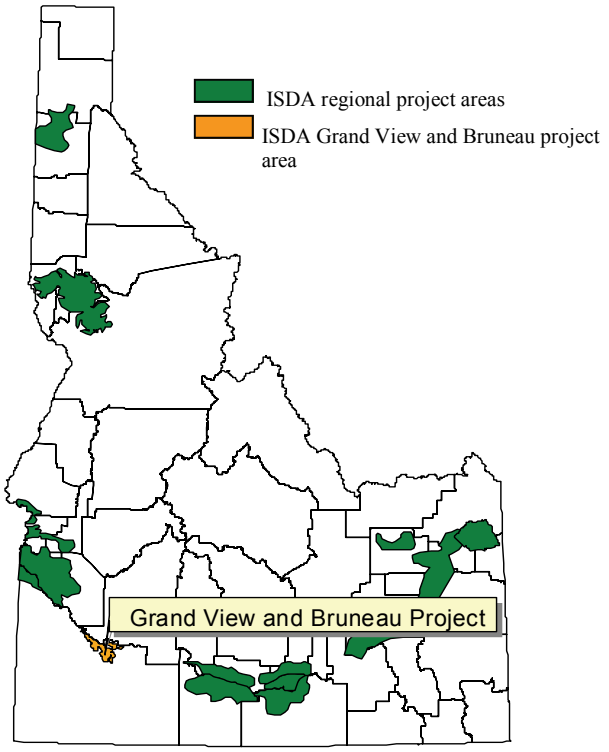

Figure 1. Location of Northeast Owyhee County regional ground water monitoring project and other ISDA regional projects.

Methods

The ISDA statistically determined that sampling 25 domestic wells in the Grand View and Bruneau area would provide regional nitrate results at a high confidence level. The 25 wells include the three wells from the original Owyhee County monitoring project. All sampling was conducted after a Quality Assurance Project Plan (QAPP) was established. Permission was gained from the homeowners prior to sampling.

Nutrients, common ions, and pesticides were evaluated during the first year (2006) of testing. Samples collected were sent to the University of Idaho Analytical Sciences Laboratory (UIASL) in Moscow, Idaho. The UIASL analyzed the ground water samples for nitrate, nitrite, ammonia, ortho-phosphorous, chloride, sulfate, bromide, fluoride, and pesticides using EPA Methods 507, 508, 515.2, and 632. Duplicates, splits, and Matrix Spikes/Matrix Spike Duplicates were collected and submitted as part of the QAPP.

Results

Sampling results for the first year of testing indicate moderate nitrate impacts to the broader aquifer. Results are summarized and presented in the following sections.

[1]MCLs represent the EPA health standard for drinking water.

Table 1. ISDA nitrate results for the Grand View and Bruneau regional project from 25 wells sampled in 2006.

Detection Range General Statistics	Number and % of Detections
Non-Detect (ND)	7 (28%)
ND - 2 mg/L	7 (28%)
2 - 5 mg/L	3 (12%)
5 - 10 mg/L	4 (16%)
> 10 mg/L	4 (16%)
Mean	7.36 mg/L
Median	0.33 mg/L
Maximum Value	110 mg/L

Nitrate

Results of ground water sampling in the project area suggested a mean and median nitrate value of 7.36 and 0.33 milligrams per liter (mg/L) respectively, with a high value of 110 mg/L (Table 1). Sixty-eight percent (17 wells) of 25 well samples tested below 5 mg/L for nitrate. Sixteen percent (four wells) had nitrate concentrations between 5 and 10 mg/L. Sixteen percent (four wells) of the 25 wells tested greater than 10 mg/L.

Nitrate concentrations are most elevated in the area west and northwest of Grand View (Figure 2.). The mean nitrate concentration and the number of detections over 10 mg/L are of concern because of potential health risks to the individuals drinking the water (Table 1). Although there is no official health standard for animals, it is advised by the Idaho Department of Environmental Quality that livestock, such as cattle and sheep, do not drink water with nitrate concentrations above 100 mg/L.

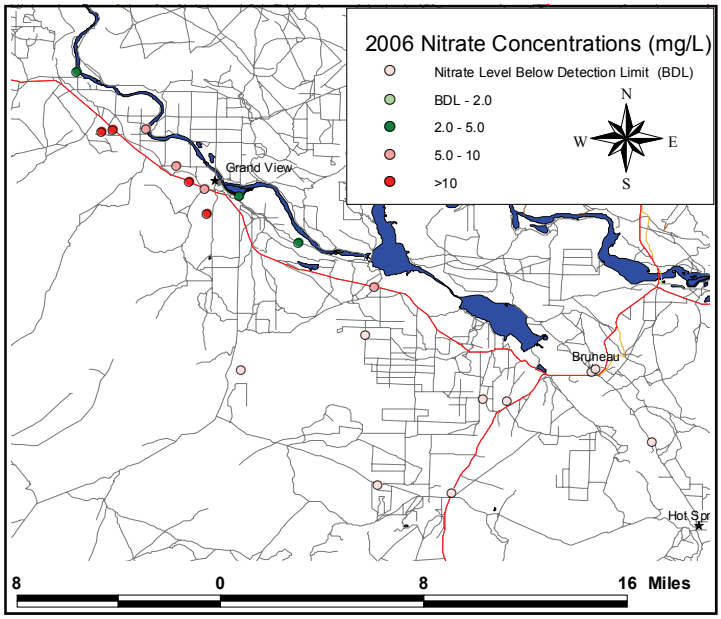

Figure 2. Location and nitrate concentrations of wells sampled in 2006.

Pesticides

All 25 wells were tested for 119 pesticides approved for use in Idaho in 2006. Wells were tested for the following pesticides: Chlorinated Acid Herbicides using EPA method 515.2, Phenyl Urea Pesticides using EPA Method 632, OP and ON Pesticides using EPA Method 507, and Chlorinated Pesticides using EPA Method 508. The results from the UIASL are still pending and will be reported at a later date.

Conclusions

Ground water monitoring results within the Grand View and Bruneau project area indicated that there are impacts occurring from nitrates and there is a potential for impacts from pesticides. Due to the number of nitrate detections greater than 5 mg/L and over the MCL of 10 mg/L, nitrate contamination of ground water is of concern in this area.

Results indicate that nitrate impacts are widespread. Potential sources of the ground water nitrate contamination in the area include the application of nitrogen based fertilizers, crop residue, land application of manure, wastewater lagoons, livestock manure, and septic tanks.

At the time of this report, pesticide impacts are unknown. Results will be evaluated and the information will be disseminated in the near future.

Recommendations

ISDA recommends continued monitoring and evaluation in the project area and isotope testing to determine possible nitrate sources. ISDA also recommends the initiation of a locally led agricultural education, and nutrient management planning effort, and the implementation of agricultural Best Management Practices (BMP). ISDA recommends that the Bruneau River Soil and Water Conservation District lead a response process to create a plan of action to address these ground water contamination issues. ISDA will work with the Idaho Soil Conservation Commission and local Soil Conservation District to implement planning and BMP related projects after the plan of action has been created. ISDA will address pesticide issues for the area if the samples indicate detections.

References

Ground Water in Idaho: Degraded Ground Water: Nitrate, Idaho Department of Environmental Quality, 2006, www.deq.state.id.us/water/prog_issues/ground_water/nitrate.cfm