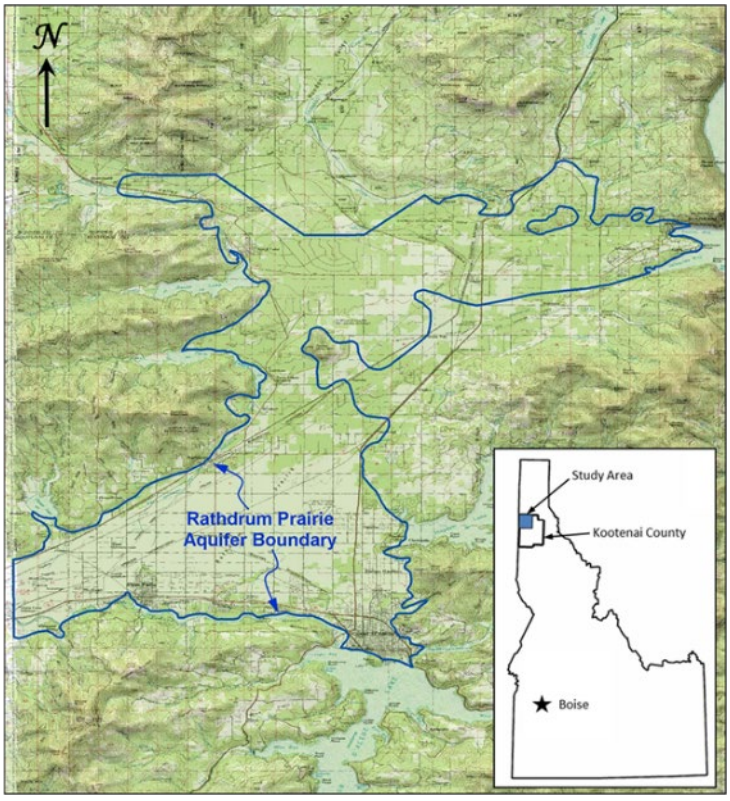
STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Trend Analysis of Selected Ground Water Constituents of the Rathdrum Prairie Aquifer

The Panhandle Health District (PHD) is one of seven health districts in Idaho that provides a number of services to protect human health, including the protection and provision of safe drinking water supplies. The sole aquifer used to provide drinking water to Kootenai County is the Rathdrum Prairie Aquifer (RPA) and monitoring the water quality is an important step in ensuring safe drinking water.

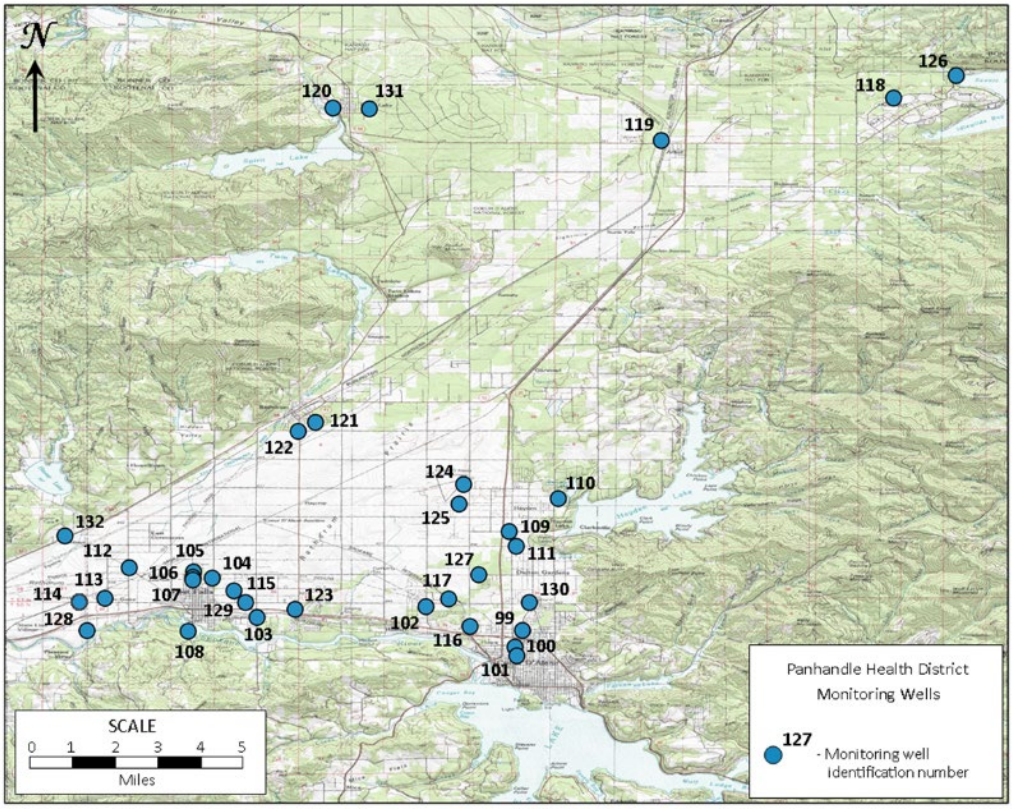
The PHD has been collecting water quality information from a number of wells completed in the RPA since 1975. When the well sampling program was initiated, the emphasis was on monitoring the potential of water quality impacts from subsurface wastewater disposal predominantly in the southern portion of the aquifer. In subsequent years, the well sampling program has evolved to investigate other constituents and different geographical areas of the aquifer. The water quality data consist of a variety of inorganic and organic constituents that represent general aquifer ground water quality, along with some that may indicate contamination from land surface activities.

The RPA covers approximately 200 square miles in Idaho and extends from Lake Pend Oreille south to Coeur d'Alene and Post Falls and west to the Idaho-Washington border. The RPA is part of the larger Spokane Valley-Rathdrum Prairie Aquifer that extends into Washington state.



The water that recharges the RPA is mainly seepage from the Spokane River and adjacent lakes along with precipitation. Ground water from the northern areas of the aquifer starts at a water elevation of about 2,100 feet, and at the state line the water elevation is about 1,970 feet. Depths to water from land surface range from approximately 150 feet to 550 feet.

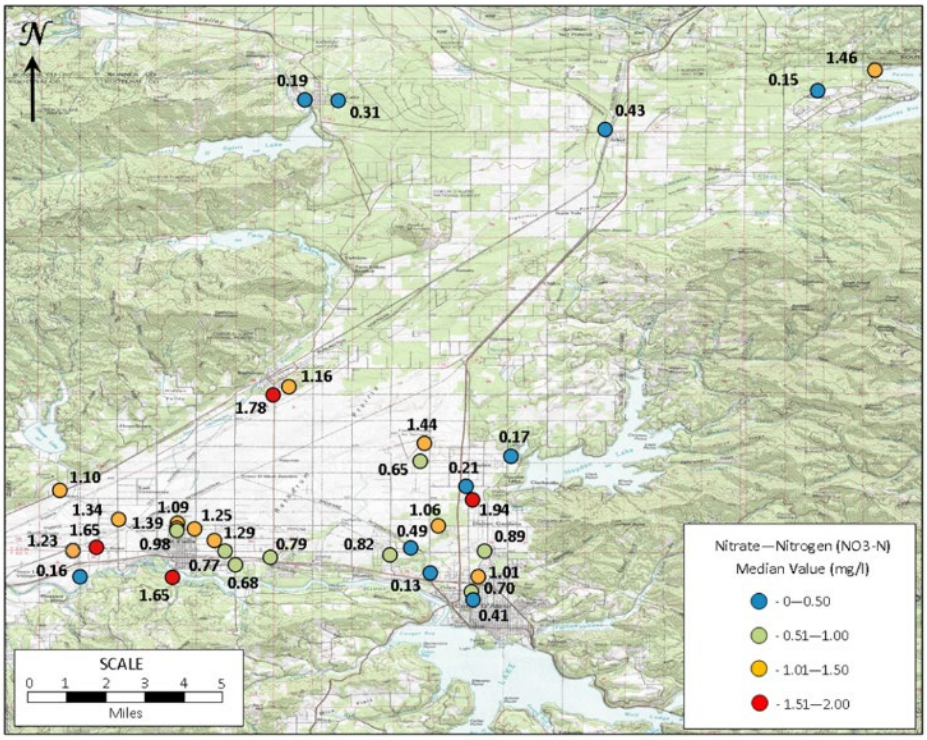
PHD's monitoring well network used for this analysis consists of 34 wells distributed across the RPA that were typically sampled three to four times per year. Most of the wells are clustered around the cities of Coeur d'Alene and Post Falls, with fewer located in the central and northern portions of the aquifer. The monitoring wells are almost all municipal or community wells and have been sampled for a number of years and a variety of constituents.

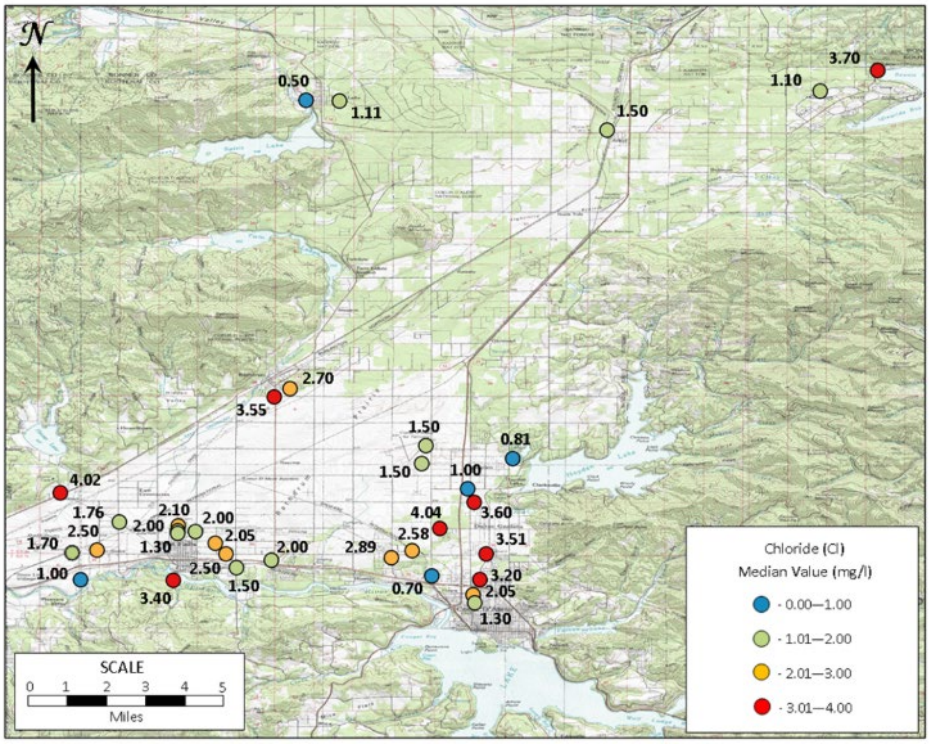


The water quality constituents chosen for statistical analysis were those that could be indicators of anthropogenic activities: (1) nitrate as nitrogen, (2) chloride, (3) sodium, (4) magnesium, and (5) conductivity. The sources of these constituents are many and include septic waste, fertilizer, road deicers, storm water, and landfill leachate.

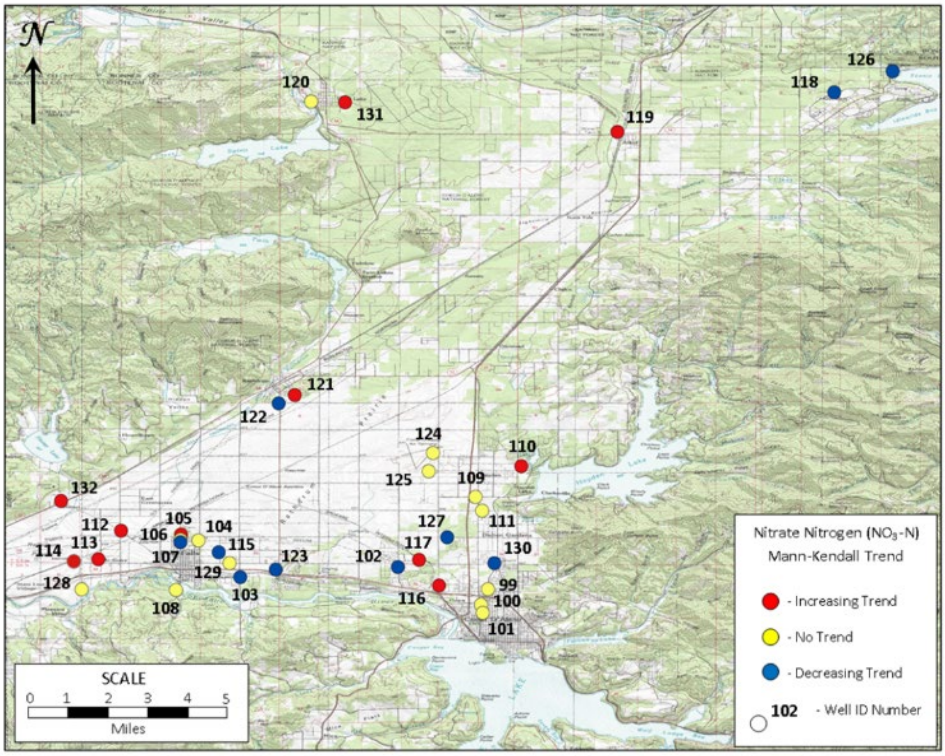
The water quality data sets were analyzed for various statistical parameters and trends: (1) arithmetic mean, (2) median, (3) standard deviation, (4) Mann-Kendall trend, and (5) Theil-Sen trend. These analyses provide information regarding each constituent data set in relation to the drinking water standards and potential contributions from anthropogenic activities.

The mean and median values of the nitrate as nitrogen and chloride sampled by PHD from wells completed in the RPA are well below the drinking water standards of 10 milligrams per liter (mg/L) and 250 mg/L, respectively.





The trend analysis completed with both the Mann-Kendall and Theil-Sen tests indicate a number of wells with increasing trends. Chloride and sodium, followed by magnesium, are the constituents with the most wells showing an increasing trend and most likely reflect anthropogenic impacts. The entire trend analysis report can be seen at *Trend Analysis of Selected Ground Water Constituents of the Rathdrum Prairie Aquifer, Kootenai County, Idaho.*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Nitrate Nitrogen (NO_3-N)
Mann-Kendall Trend
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- No Trend
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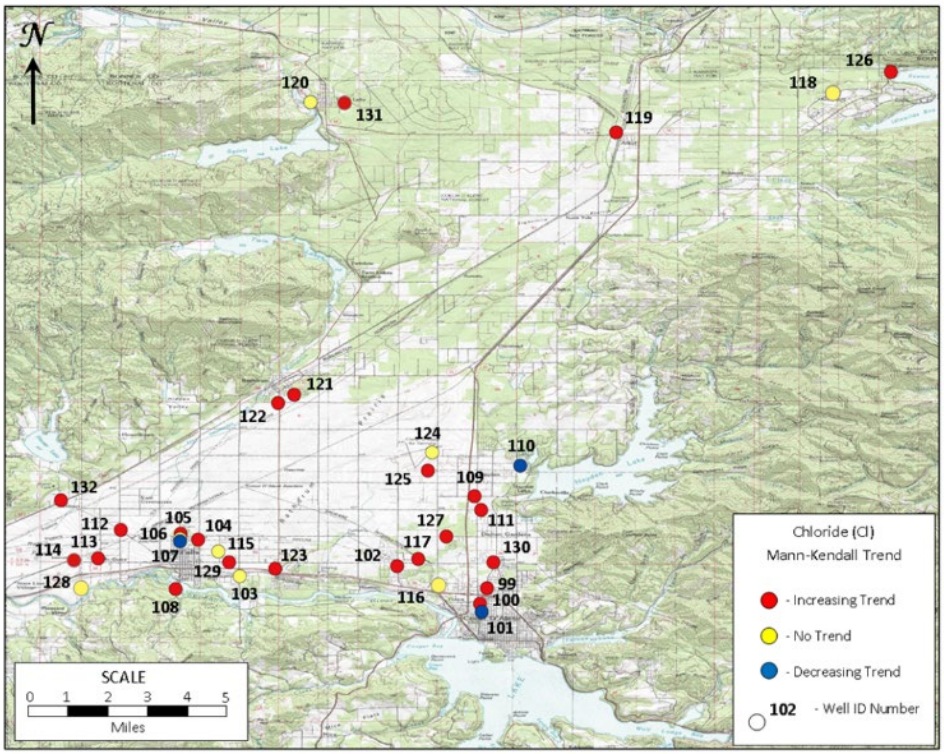
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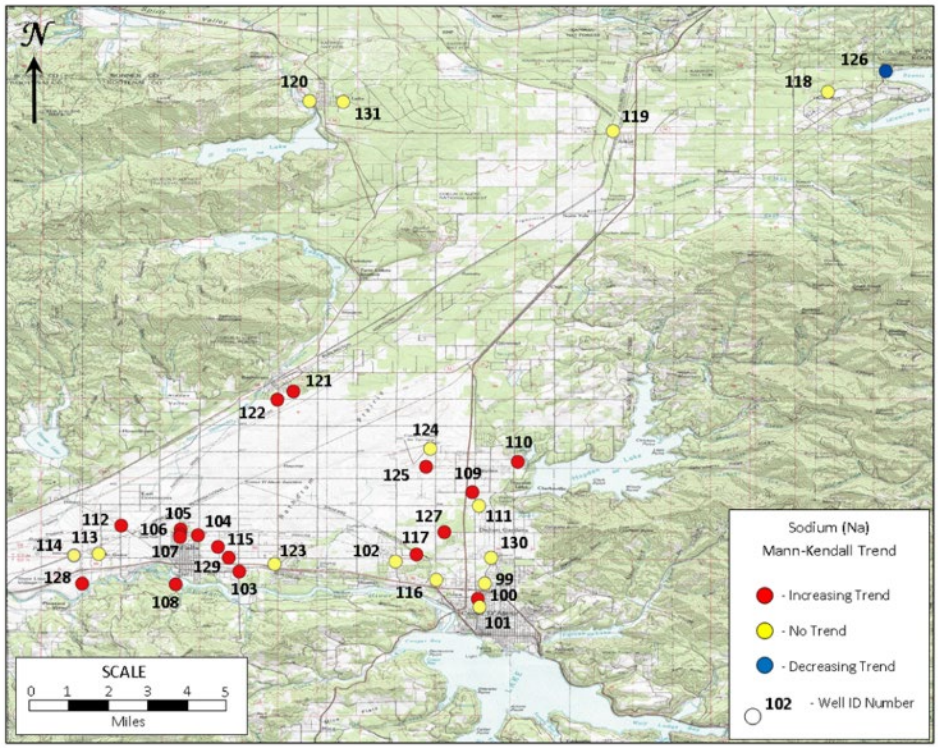
- No Trend
- Decreasing Trend
102 - Well ID Number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Sodium (Na)
Mann-Kendall Trend
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- No Trend
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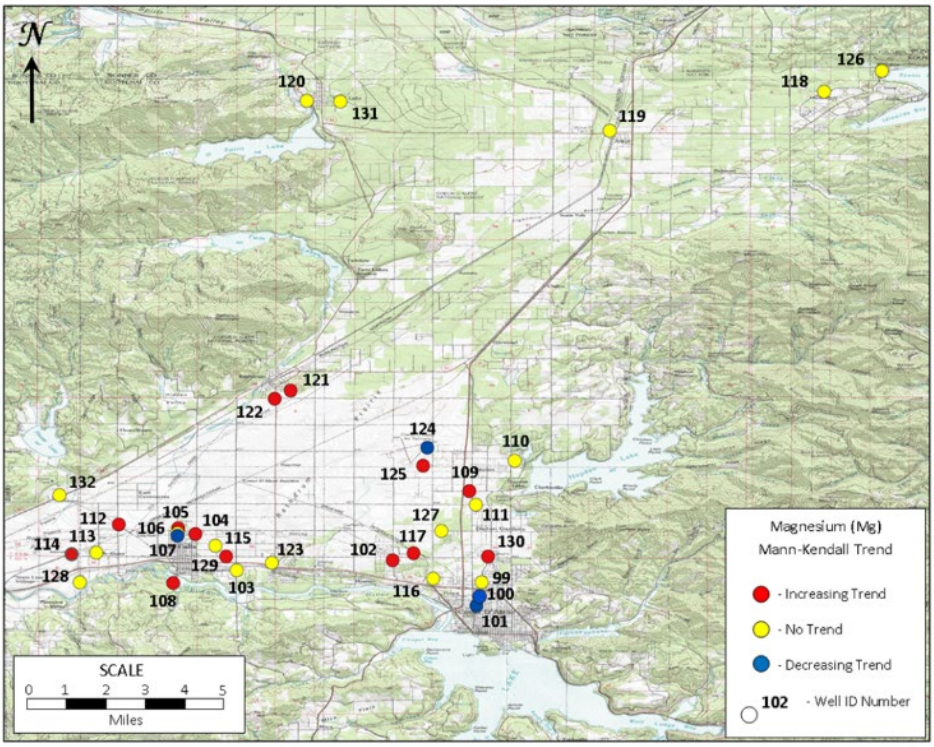
102 - Well ID Number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SCALE
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Miles
Magnesium (Mg)
Mann-Kendall Trend
- Increasing Trend
- No Trend
- Decreasing Trend
102 - Well ID Number